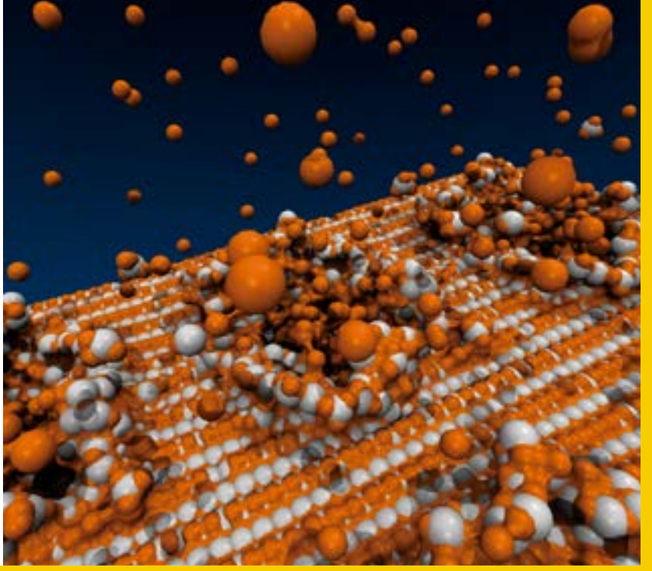

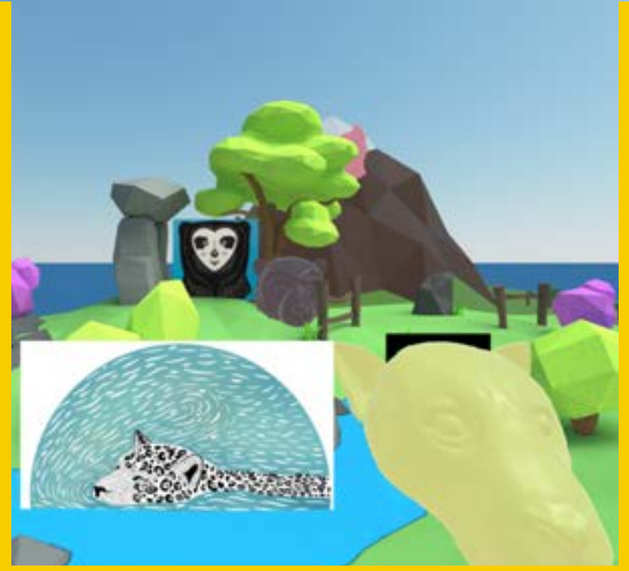

Engineering and Applied Sciences Doctorate Program

Pontificia Universidad
JAVERIANA
Cali

Vigilado Mineducación Res. 12220 de 2016

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Engineering and Applied Science Doctorate Program

Program Description, Faculty and Researched

Programa de Doctorado en Ingeniería y Ciencias Aplicadas

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0.

Introduction to the Engineering and Applied Sciences Doctorate Program

TOPICS **PAGE**

ES

Denominación	Doctorado en Ingeniería y Ciencias Aplicadas
Título que otorga	Doctor en Ingeniería y Ciencias Aplicadas
Nivel educativo	Posgrado, nivel doctoral
Modalidad	Tiempo completo
Registro calificado ante el Ministerio de Educación Nacional (MEN)	No. 2593 del 22 de febrero de 2021 (Renovación)
Registro SNIES	108689
URL	https://www.javerianacali.edu.co/programas/doctorados/doctorado-en-ingenieria-y-ciencias-aplicadas
Inscripciones	Durante todo el año
Admisiones	Dos veces al año: enero y junio de acuerdo con la disponibilidad de cupos.

EN

Denomination	Engineering and Applied Sciences Doctorate
Degree	Doctor in Engineering and Applied Sciences
Education level	Graduate, Doctorate Level
Modality	Full time
Qualified Registration (MEN)	No. 2593 February 22nd, 2021
SNIES registration	108689
URL	https://www.javerianacali.edu.co/programas/doctorados/doctorado-en-ingenieria-y-ciencias-aplicadas
Applications	Open year-round
Admissions	Twice a year: January and June according to the availability of quotas.

El título de Doctor en Ingeniería y Ciencias Aplicadas representa el máximo grado en un campo que trasciende las fronteras disciplinarias. La esencia de nuestro Programa de Doctorado radica en la creación de una cultura de excelencia académica transdisciplinaria y una investigación de alto impacto. Nuestro objetivo es formar profesionales altamente capacitados y con una visión integral, preparados para ocupar posiciones de liderazgo en diversos sectores, ya sea en la academia, la industria o el gobierno, capaces de abordar los desafíos más complejos y trascendentales de nuestro tiempo.

The title of Doctor in Engineering and Applied Sciences represents the highest degree in a field that transcends disciplinary boundaries. The essence of our Doctoral Program lies in the establishment of a culture of transdisciplinary academic excellence and high-impact research. Our goal is to educate highly qualified professionals with an integrated vision, ready to assume leadership positions in various sectors, whether in academia, industry, or government, capable of addressing the most complex and pivotal challenges of our time.

¿Por qué Colombia necesita Doctores en Ingeniería y Ciencias Aplicadas?

En un mundo que cambia constantemente y enfrenta desafíos ambientales, sociales y económicos, la capacidad de abordar problemas interconectados y diversos se ha convertido en una prioridad. Colombia, al igual que otros países, también se enfrenta a estos desafíos, los cuales requieren soluciones innovadoras fundamentadas en el conocimiento. La Misión Internacional de Sabios de 2019: "Colombia hacia una sociedad del conocimiento[1]", reconoció esta necesidad y recomendó una ruta para el desarrollo sostenible del país, enfocada en la Ciencia, la Tecnología y la Innovación (CTeI), y alineada con los Objetivos de Desarrollo Sostenible (ODS)[2].

Esta ruta enfatiza la importancia de transitar de un modelo de crecimiento económico centrado en la explotación de los recursos naturales y el comercio, hacia una economía de valor agregado a través del conocimiento, que permita el desarrollo de tecnologías convergentes, energías renovables y la eficiencia energética, la investigación y la explotación sostenible de los océanos y los recursos hidrobiológicos, la bioeconomía, las ciencias de la vida y de la salud, entre otros.

En este sentido, la educación a nivel doctoral desempeña un papel esencial en el impulso de una economía basada en el conocimiento al fomentar la innovación, formar recursos humanos altamente capacitados y promover la transferencia de conocimiento, lo cual contribuye al crecimiento económico y a la resolución de desafíos globales.

En Colombia, el número de doctores ha aumentado de 56 en 2003 a 973 en 2022. Lo anterior significa que por cada egresado de doctorado en el 2003 hay aproximadamente 17 egresados de doctorado en el 2022.

[1] Ebook Colombia hacia una sociedad del conocimiento. https://minciencias.gov.co/sites/default/files/upload/paginas/ebook-_colombia_hacia_una_sociedad_del_conocimiento.pdf

[2] Objetivos de Desarrollo Sostenible, Naciones Unidas. https://www.un.org/sustainabledevelopment/es/

¿Why does Colombia need Doctors in Engineering and Applied Sciences?

In a constantly changing world grappling with environmental, social, and economic challenges, the ability to address interconnected and diverse problems has become a priority. Like other countries, Colombia also confronts these challenges, necessitating innovative solutions grounded in knowledge. The 2019 International Mission of Wise Persons, titled "Colombia towards a knowledge society," recognized this need and recommended a path for the country's sustainable development, focused on Science, Technology, and Innovation (STI), and aligned with the Sustainable Development Goals (SDGs).

This path emphasizes the importance of transitioning from a model of economic growth centered on the exploitation of natural resources and trade to a knowledge-based economy that enables the development of convergent technologies, renewable energies, energy efficiency, research, and sustainable exploitation of oceans and hydrobiological resources, bioeconomy, life sciences, and health, among others.

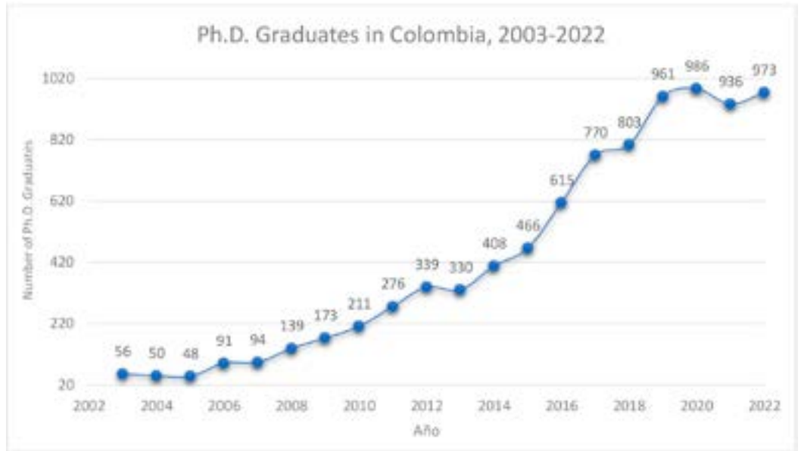
In this context, doctoral education plays an essential role in driving a knowledge-based economy by fostering innovation, training highly skilled human resources, and promoting knowledge transfer, all of which contribute to economic growth and addressing global challenges.

In Colombia, the number of doctoral graduates has increased from 56 in 2003 to 973 in 2022. This signifies that for every doctoral graduate in 2003, there are approximately 17 doctoral graduates in 2022.

This reflects the efforts of the national government to drive Science, Technology, and Innovation (STI). However, it is essential to continue supporting the expansion of knowledge-based assets through the promotion of high-level and transdisciplinary education that integrates various knowledge domains: STEAMD (Science, Technology, Engineering, Arts, Mathematics, and Design). These areas possess the capacity to catalyze significant changes in the Colombian economy and society. This transformation process demands the active involvement of diverse stakeholders and must be propelled by academic collaboration that transcends disciplinary and sectoral barriers.

In this context, the Doctorate in Engineering and Applied Sciences becomes particularly relevant. The challenges facing the contemporary world cannot be effectively addressed through disciplinary knowledge alone; rather, they necessitate a scientific community with inter-, multi-, and transdisciplinary approaches. This doctoral program promotes the convergence of diverse disciplines and sciences, fostering collaboration and the ability to tackle complex problems from multiple perspectives. It shapes change agents capable of leading the necessary transformation in Colombia and the world. This new perspective involves us all, including you.

[3] https://snies.mineducacion.gov.co/1778/articles-391288_recurso_1.pdf https://hecaa.mineducacion.gov.co/consultaspublicas/content/poblacional/index.jsf https://snies.mineducacion.gov.co/1778/articles-391289_recurso_1.pdf



Source: Self-compiled with information retrieved from SNIES-MINEDUCACIÓN [3]

Esto da cuenta de los esfuerzos del gobierno nacional por impulsar la CTeI, sin embargo, es esencial continuar respaldando el incremento de activos fundamentados en el conocimiento a través de la promoción de una educación de alto nivel y transdisciplinaria, que integre las diferentes áreas del conocimiento: STEAMD (Science, Technology, Engineering, Arts, Mathematics, and Design), las cuales tienen el poder de catalizar cambios significativos en la economía y la sociedad colombiana. Este proceso de transformación requiere la participación activa de diversos actores y debe ser impulsado por una colaboración académica que trascienda las barreras disciplinarias y sectoriales.

En este contexto, adquiere relevancia el Doctorado en Ingeniería y Ciencias Aplicadas. Los desafíos que enfrenta el mundo actual no pueden abordarse eficazmente mediante conocimientos disciplinares, sino que requieren de una comunidad científica con enfoques inter, multi y transdiciplinarios. Este doctorado propicia la convergencia de diversas disciplinas y ciencias, fomentando la colaboración y la capacidad de abordar problemas complejos desde múltiples perspectivas, formando agentes de cambio capacitados para liderar la transformación necesaria en Colombia y el mundo. Esta nueva mirada nos involucra a todos, incluyéndolo a usted.

¿Por qué optar por nuestro programa de Doctorado en Ingeniería y Ciencias Apliacadas?

El programa de Doctorado en Ingeniería y Ciencias Aplicadas de la Pontificia Universidad Javeriana Cali, proporciona un contexto único y de alta calidad académica diseñado para estimular el cambio paradigmático referido, porque:

- Ofrece un programa de estudio e investigación interdisciplinar que promueve el descubrimiento de conocimiento en la intersección de los campos tradicionales de la ciencia, la tecnología, la ingeniería y las matemáticas. Sus estudiantes se preparan en al menos dos campos complementarios, y son orientados a resolver problemas abiertos considerados hoy como imposibles usando un enfoque que incorpora teoría, métodos y técnicas de dichos campos.

- Los campos de conocimiento en los que están trabajando nuestros estudiantes dan cuenta de los avances en interdisciplinariedad y flexibilidad del currículo y del impacto que los resultados de estos trabajos tiene en el entorno, así como de la colaboración académica e investigativa entre universidades nacionales e internacionales, centros de investigación y grupos de investigación fruto de las alianzas en el marco de los proyectos de investigación en los que participan los estudiantes y profesores. A continuación, se relacionan dichas intersecciones y temas, como se ve en la Gráfica 1.

- Cuenta con el respaldo de aproximadamente 60 profesores con doctorado en las áreas STEM, quienes contribuyen a la diversidad, experiencia, competencia y originalidad científica, adscritos a la Facultad de Ingeniería y Ciencias Aplicadas y la Facultad de Ciencias de la Salud, así como también profesores e investigadores invitados de otras instituciones de educación superior nacional e internacional.

- Ofrece múltiples oportunidades y modalidades para la participación directa de estudiantes en proyectos financiados, a nivel nacional o internacional, habilitando soluciones a problemas del mundo real en ambientes colaborativos que involucran investiga-

Exact Sciences + Physical Sciences

33%

Students

- Nanodevices for rapid RNA/DNA sequencing.
- GPCRs (G protein-coupled receptors).
- Complex network analysis.
- Deep learning and Computer Vision.
- Phenotyping crops with digital image processing sensors.
- Modeling and analysis of complex systems: from parameter estimation to the selection of genetic markers associated with agronomic traits in sugarcane.
- Mathematical and computational modeling of opinions for predicting group polarization in a social network.

Physical Sciences + Life Sciences

24%

Students

- Non-invasive electrochemical biological sensors for health monitoring in humans and plants.
- Validation of greenhouse gas emissions in crop improvement.
- Antioxidant and antiproliferative potential of extracts obtained from by-products of the sugar industry.

Earth Sciences + Computer Science

5%

Students

Proposal of an intelligent material for seismic control in buildings.

Life Sciences + Exact Sciences

38%

Students

- DNA Methylation Patterns Associated with Aluminum Tolerance in Cultivated and Wild Rice Species.
- Study of genomic architecture and impact of structural variation in the complete genome of a group of patients with rare diseases in Colombia.
- Genetic association analysis and validation of molecular markers for sucrose accumulation and nitrogen use efficiency in sugarcane (Saccharum spp.).
- Genetic networks, functional and structural genomics of crops for genetic sequence extraction and analysis.
- In silico crop improvement from omics characterization: developing and testing computational models for in silico improvement of varieties, using gene and gene circuit information associated with productivity and stress tolerance in plants, based on graph theory, large-scale data analysis algorithms, and visualization tools.
- Development of nanostructured sensors for the early diagnosis of critical diseases using molecular markers obtained from minimally invasive matrices.

Graphic 1: Field intersection between percentage of students and research topics.

Why should you choose our Engineering and Applied Sciences Doctoral program?

The Engineering and Applied Sciences program at the Pontificia Universidad Javeriana in Cali provides a unique and high-quality academic setting designed to stimulate this shift, because our program:

- Offers an academic and interdisciplinary research program that promotes knowledge discovery at the intersection between the traditional fields of engineering, natural sciences, and mathematics; all students prepare in at least two complementary fields, and they are mentored to solve open (currently impossible) problems using an interdisciplinary approach that incorporates theory and methods from both fields.

- The fields of knowledge in which our students are engaged showcase the advancements in interdisciplinary studies and the curriculum's adaptability. They also highlight the impact that these research outcomes have on the environment, emphasizing academic collaboration and research partnerships among national and international universities, research centers, and research groups resulting from alliances within the framework of the research projects in which both students and professors are involved. The following are the intersections and topics related to these endeavors. Graphic 1.

- The program is backed by a cohort of around 60 Ph.D.-qualified professors in the STEM fields, fostering diversity, extensive experience, high competence, and scientific innovation. These professors are affiliated with both the Faculty of Engineering and Applied Sciences and the Faculty of Health Sciences. Additionally, the program benefits from guest professors and researchers from other national and international higher education institutions.

- Offers multiple opportunities and modalities for students to directly engage in funded projects, whether at a national or international level. These opportunities enable the development of solutions for real-world problems in collaborative environments involving both national and international

dores nacionales y extranjeros, quienes participan dentro y fuera del país. Las redes de pares especializados conformadas por los miembros de la Facultad, proporcionan espacios y caminos esenciales para el crecimiento de las capacidades investigativas y personales de nuestros estudiantes doctorales, y una ruta clara para cumplir con el requisito de su pasantía de investigación internacional en un centro científico de excelencia, reconocido internacionalmente (de una duración mínima de 6 meses).

- Convenios y alianzas del Programa: CIAT, CENICAÑA, FEDEARROZ, CIDEIM, ICESI, Universidad del Quindío, Universidad del Valle, Universidad de Ibagué, Universidad de Los Llanos, Universidad de Los Andes, Caltech, Universidad de Texas, NIAB-UK, CSIC-España, Universidad Politécnica de Madrid-España, Centro Europeo de Bioinformática en Inglaterra, EMBL-EBI, Laboratoire d'Informatique de l'X (LIX) at École Polytechnique de Paris, Centro de investigación Inria Grenoble Rhône-Alpes, Francia, KU Leuven, campus Kulak Kortrijk, Belgium, Universidad técnica de Múnich (TUM) – Alemania, University of California, Davis, California, University of California at San Diego (UCSD), San Diego, Politecnico Di Milano, University of Florida, UNIVERSITÄT BONN, Alemania, Universität Würzburg, Alemania, Heinrich Heine University, Düsseldorf, Alemania, entre otros.

- Cuenta con más de 30 laboratorios especializados, equipados con recursos de última generación y con soporte técnico in-situ, para atender las necesidades permanentes de estudio e investigación, entre ellos los laboratorios del Instituto de Investigación en Ciencias Ómicas -iÓMICAS; una biblioteca con más de 15.300 títulos Ciencias naturales y matemáticas, y tecnología y ciencias aplicadas, con acceso en línea a 32 bases de datos de publicaciones científicas electrónicas (incluyendo de texto completo); sistemas de cómputo de alto rendimiento para las necesidades de modelado y simulación, trasversales a las diferentes líneas de trabajo del Programa de Doctorado.

- Se encuentra en un campus universitario que ofrece las condiciones y recursos ideales para estimular el crecimiento intelectual, en un ambiente saludable y sostenible. Entre los recursos de bienestar, se encuentran el Centro de Bienestar, el Centro Deportivo Loyola, el Centro de Expresión Cultural, el Centro Pastoral San Francisco Javier, una cafetería central y restaurantes satélites distribuidos en el campus.

researchers, who actively participate both within and outside the country. Specialized peer networks formed by faculty members provide crucial spaces and avenues for the growth of research and personal capabilities for our doctoral students. These networks also establish a clear path for fulfilling the requirement of an international research internship at an internationally recognized scientific center (of a minimum duration of 6 months).

- Partnerships and Alliances of the Program: CIAT, CENICAÑA, FEDEARROZ, CIDEIM, ICESI, Universidad del Quindío, Universidad del Valle, Universidad de Ibagué, Universidad de Los Llanos, Universidad de Los Andes, Caltech, University of Texas, NIAB-UK, CSIC-Spain, Universidad Politécnica de Madrid-Spain, European Bioinformatics Institute in England, EMBL-EBI, Laboratoire d'Informatique de l'X (LIX) at École Polytechnique de Paris, Inria Grenoble Rhône-Alpes Research Center, France, KU Leuven, campus Kulak Kortrijk, Belgium, Technical University of Munich (TUM) – Germany, University of California, Davis, University of California at San Diego (UCSD), San Diego, Politecnico Di Milano, University of Florida, Universität Bonn - Germany, Universität Würzburg - Germany, Heinrich Heine University, Düsseldorf - Germany, among others.

- It features more than 30 specialized laboratories equipped with cutting-edge resources and on-site technical support to address the ongoing study and research needs. This includes laboratories at the Institute of Omic Sciences (iOMICAS). Additionally, it houses a library with over 15,300 titles in Natural Sciences, Mathematics, Technology, and Applied Sciences, providing online access to 32 electronic scientific publication databases (including full-text). High-performance computing systems are also available to meet the diverse modeling and simulation needs across various lines of work within the Doctorate Program.

- It provides the necessary conditions and resources to stimulate intellectual growth within a healthy environment that includes a Student Welfare Center, the Loyola Sports Center, the Center for Cultural Expression, the San Francisco Javier Pastoral Center, a central cafeteria and satellite restaurants distributed around the campus grounds.

- Otorga a sus estudiantes acceso prioritario a los supercomputadores, proporciona estaciones de trabajo y de cómputo individuales, plataformas TIC de apoyo al proceso de aprendizaje, y otros recursos especializados, así como acceso a todos los recursos computacionales disponibles en el campus (incluyendo 1.592 computadores en salas de cómputo, 147 portátiles para préstamo), entre otros.

- Nuestros estudiantes han sido financiados por proyectos de investigación con recursos externos:

  - Programa Optimización Multiescala In-silico de Cultivos Agrícolas Sostenibles (ÓMICAS),

  - Proyectos:

    - CLASSIC
    - Vigilancia Inteligente para la red de cámaras de la Policía Metropolitana de Cali,
    - Utilización de subproductos específicos derivados de la industria azucarera para la obtención de productos con valor agregado: Potencial antioxidante y anticancerígeno de las melazas y vinazas,
    - Implementación y evaluación de un modelo predictivo de asociación genómica para Enfermedades Raras basado en configuraciones de repeticiones ADN y variantes estructurales,
    - Proyecto Modelos Computacionales para el Análisis de la polarización en redes sociales: PROMUEVA

  - Becas de Minciencias

- Los trabajos de investigación doctoral de nuestros estudiantes, bajo la dirección de los profesores tutores/directores, generan avances en el estado del arte de las diferentes áreas del conocimiento que tienen relación con el Programa, los cuales han sido presentados en eventos científicos nacionales e internacionales, así como en revistas de alto impacto, a 2023: 43 artículos científicos indexados en Web of Science y/o Scopus.

- Nuestros egresados ocupan roles fundamentales en diversos campos: en la academia como profesores de planta en universidades nacionales e investigadores posdoctorales en universidades internacionales. En

- Grants its students priority access to supercomputers, provides individual workstations and computing stations, ICT platforms supporting the learning process, and other specialized resources. Additionally, students have access to all computing resources available on campus (including 1,592 computers in computer labs, 147 laptops on a loan basis), among other facilities.

- Our students have been funded by research projects with external resources:

  - Multi-scale In-silico Optimization Program for Sustainable Agricultural Crops (OMICAS)

  - Projects:

    - CLASSIC
    - Intelligent Surveillance for the Metropolitan Police of Cali's camera network
    - Use of specific by-products derived from the sugar industry for obtaining value-added products: Antioxidant and anticancer potential of molasses and vinasses
    - Implementation and evaluation of a predictive genomic association model for Rare Diseases based on configurations of DNA repeats and structural variants
    - Computational Models for the Analysis of Polarization in Social Networks Project: PROMUEVA

  - Minciencias Scholarships

- Our doctoral students' research, under the guidance of their supervising professors, contributes to advancements in the state of the art across various program-related knowledge domains. These contributions have been presented at national and international scientific events and published in high-impact journals. As of 2023, they have produced 43 indexed scientific articles in Web of Science and/or Scopus databases.

- Our graduates occupy pivotal roles across various sectors: within academia as full professors at national universities and as postdoctoral researchers in international academic environments. In the industry, they function as specialized resear-

la industria como investigadores especializados en aprendizaje automático, análisis de datos, inteligencia artificial, desarrollo de dispositivos electrónicos, biomateriales, biosensores, agricultura de precisión y nanotecnología, así como consultoría estratégica en temas relacionados con la composición nutricional de los alimentos. Esta diversidad de capacidades no solo refleja su flexibilidad, sino también su habilidad para abordar desafíos interdisciplinarios, contribuyendo así al desarrollo y evolución en campos cruciales para el progreso del mundo actual.

- La Pontificia Universidad Javeriana cuenta con Acreditación de Alta Calidad Multicampus por 10 años, otorgada por el Ministerio de Educación Nacional de Colombia en 2020.

chers in machine learning, data analysis, artificial intelligence, electronic device development, biomaterials, biosensors, precision agriculture, nanotechnology, and as strategic consultants in matters related to nutritional composition in foods. This diverse range of expertise not only highlights their adaptability but also their ability to address interdisciplinary challenges, thereby contributing significantly to the development and evolution of crucial fields for the advancement of the contemporary world.

- The Pontificia Universidad Javeriana was granted Multicampus High-Quality Accreditation for 10 years, by the Colombian Ministry of National Education in 2020.

¿Cómo lo beneficia a usted nuestra investigación, como estudiante del programa o como miembro del sector industrial/empresarial?

Una característica esencial en cualquier programa líder de doctorado es su habilidad para identificar y proponer soluciones a problemas abiertos y críticos mediante la investigación y el desarrollo científico y su consecuente transferencia de conocimiento a la sociedad. La investigación y el desarrollo tecnológico son la esencia de nuestro programa de Doctorado en Ingeniería y Ciencias Aplicadas, y la manera como las ejecutamos es lo que permitirá el cambio positivo y transformativo de nuestra sociedad.

Los ingenieros y científicos de nuestro programa doctoral lideran investigaciones que cambiarán paradigmas, lanzan nuevos campos de trabajo y crean tecnologías que benefician y continuarán beneficiando a nuestra sociedad. Para maximizar este beneficio, los descubrimientos científicos y tecnológicos se transfieren al mundo externo desde la Universidad, en la forma de publicaciones, patentes, consultoría técnica, productos y servicios tecnológicos, o mediante la creación de empresas escindidas o iniciadas de la actividad académica investigativa. Los profesores de nuestro programa doctoral, a quienes conocerá con mejor detalle en estas páginas, tienen experiencia demostrada en todas las formas de transferencia de conocimiento descritas.

Queremos invitar a los sectores de la industria y el comercio a vincularse a nuestro programa, mediante la cofinanciación de proyectos de investigación o desarrollo tecnológico, o la participación en colaboraciones activas con nuestro equipo de expertos. Le aseguramos que en el mediano y largo plazo esta relación le permitirá a su empresa hacer dinero, reducir costos, incrementar su productividad y optimizar los procesos humanos y el clima organizacional.

La Figura 1 muestra las líneas de investigación y desarrollo a cargo de nuestro cuerpo de profesores en la Facultad de Ingeniería y Ciencias Aplicadas. Podrá encontrar más detalles e identificar afinidades temáticas en los perfiles de investigación más adelante.

How does our Research benefit you, as a student of the program or as a member of the industrial or commercial sectors?

An essential characteristic of any leading doctoral program is its ability to address solutions to open and critical problems through scientific research and development, and knowledge transfer to society.

Research and development is therefore the driving force in this program, and how we do it is what makes it so uniquely suited to drive positive and transformative change.

Top-caliber engineers and scientists in our doctoral program team lead breakthrough research that shifts paradigms, launches new fields, creates technologies, and benefits our society as a whole.

To maximize the benefit to our society, scientific and technical discoveries and inventions are transferred to the outside world, in the form of publications, patents, technology consulting, technological products and services, or start-up and spin-off companies (alone or in joint ventures). Our Faculty has demonstrated experience in all forms of knowledge transfer.

We want to invite the industrial and commercial sectors to join in the benefits of co-sponsoring our research programs or participating in active collaborations with our team of experts. We assure you that in the medium to long terms, this will make or save your company money or improve your productivity.

Figure 1 depicts the general research topics that are currently active within the Engineering ans Applied Sciences Faculty members. You will find more details as you read the research profiles from our team of scientists herein, and we expect you will be able to identify topics that are aligned with your own interests.

Current projects by our Engeneering and Sciences Faculty members involve work on: renewable and clean energy generation and storage systems; nanoscale science and engineering; porous materials for sensing and sequestration of gas- and liquid-phase particles and molecules; equations of state for chemical and industrial thermodynamic processes; process characterization, optimization and control; growth and characterization of coatings and thin films; computer graphics in didactic and training environments; transportation logistics and route optimization; data mining using dynamic systems theory; infrared thermography for medical diagnosis and non-destructive industrial testing; characterization of earthquake resistant civil structures using frequency response functions; characterization and optimization of cementitiuous materials; first-principles based multiscale modeling and simulation for in-silico design of nano-devices, sensors and systems; cellular cycle control biology and its relation with the carcinogenic process; chemistry-free DNA sequencing systems; In-silico screening of protein-ligand complexes for drug development and treatment of congenital illnesses; high-performance manipulator and autonomous vehicle robotics; technology for the handicapped; celestial dynamics and quantum physics; among others. These projects have financial support from local, national, or in some cases international sources.

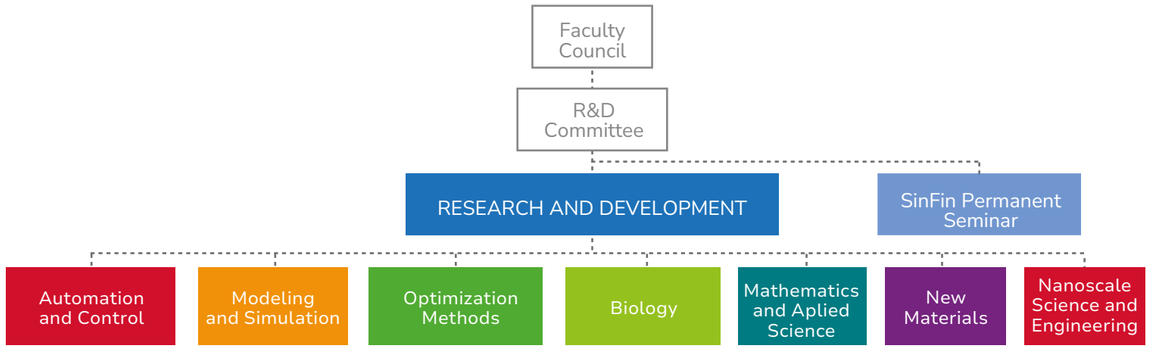


Figure 1. Research areas associated to the Engineering and Sciences Faculty members

El registro actual de proyectos de investigación, a cargo de los profesores del programa, incluye trabajos en una variedad de áreas, entre otras: sistemas para la generación y almacenamiento de energía renovable y limpia; ciencia e ingeniería de nanoescala; materiales porosos para sensado y secuestrado de partículas y moléculas en diferentes fases; desarrollo de ecuaciones de estado para procesos termodinámicos químicos e industriales; caracterización, optimización y control de procesos; crecimiento y caracterización de películas delgadas (e.g. recubrimientos duros); computación gráfica en entornos didácticos y de entrenamiento; logística de transporte y optimización de rutas; minería de datos empleando teoría de sistemas dinámicos; termografía infrarroja digital para aplicaciones de diagnóstico médico y pruebas industriales no destructivas; caracterización de estructuras civiles sismorresistentes empleando funciones de respuesta en frecuencia; caracterización y optimización de materiales cementosos; modelado y simulación de primeros principios para el diseño “in silico” de nanodispositivos, sensores y sistemas; biología de sistemas de control del ciclo celular y su relación con el proceso carcinogénico; sistemas de secuenciación de ADN rápido y libre de química; prototipado y selección rápida de complejos proteína-ligando para el desarrollo de drogas para el tratamiento de enfermedades congénitas; vehículos autónomos y manipuladores robóticos de alto rendimiento; tecnologías de ayuda a los discapacitados; dinámica celeste; información y computación cuántica; los cuales tienen patrocinio financiero de fuentes locales, nacionales e internacionales.
Este documento tiene la intención no solo de informarle, sino de acercarlo a la solución de sus problemas (o los de su empresa) en ingeniería o tecnología. Para ello le brinda

This document is not only meant to inform you, but to bring you closer to the possible solution of some of the critical engineering or technological problems you or your company may be facing. It does so, by providing you with the relevant topical points of contact and enabling an agile engagement environment within sponsored research collaborations between you and our program members. Typical collaborations range between 1-3 years, and must be driven by results. Sponsoring our research will not only benefit you and your company, but it will directly

los puntos de contacto relevantes y habilita un entorno de compromiso mutuo y ágil en colaboraciones copatrocinadas, entre usted y miembros de nuestro programa. La duración típica de proyectos de esta naturaleza está entre 1 y 3 años, y debe ser orientada por los resultados. De tal manera, que su participación lo beneficie a usted y a su empresa, y lo lleve al desarrollo de beneficios compartidos que trascienden a nuestra sociedad. Se resalta el proceso de preparación del recurso humano altamente calificado que será fundamental para usted y para el éxito de su empresa en un futuro cercano.

Para más información sobre cómo patrocinar un proyecto de interés específico o una colaboración con nuestros profesores, por favor, contáctenos.

Aquí se presenta de manera resumida y en un lenguaje común las áreas de investigación, el por qué son importantes y cómo nuestro equipo de profesores ha contribuido a las mismas.

support the pertinent activities associated and allocated to your project, leading to mutually beneficial results. This includes preparing the highly skilled labor that will become essential to you and your company's success in the near future.

For more information on how to engage in such projects and collaborations, please contact the appropriate Faculty member that pertains to your inquiry (specific issue - specific concern - subject matter) or the Doctoral Program Director.

This catalog is meant to present a summary of what we do research on, why it is important, and how our results contribute to the different fields we engage on.

Currículo y requisitos del programa

El currículo del Doctorado en Ingeniería y Ciencias Aplicadas de la Pontificia Universidad Javeriana Cali, está diseñado para encajar con el perfil individual y el potencial para la investigación científica de cada estudiante admitido. El plan de estudios es riguroso pero flexible, diseñado a la medida de cada estudiante. Sin embargo, en lugar de buscar la profundización en el conocimiento de la disciplina tradicional, se promueve explícitamente que la exploración dinámica se de entre las fronteras de las disciplinas tradicionales STEM. Para ello, en el transcurso de los primeros 44 créditos, todo estudiante debe declarar un eje de estudio primario y uno complementario, para alcanzar un conocimiento profundo en el estado del arte de ambas áreas de profundización.

La Figura 2 muestra los cuatros ejes e ilustra la combinación temática posible entre ellos (ciencias físicas, ciencias de la vida, ciencias de la tierra y ciencias de la computación o matemáticas). La computación científica (que no debe confundirse con ciencias de la computación) es un eje hilador requerido para todos los estudiantes.

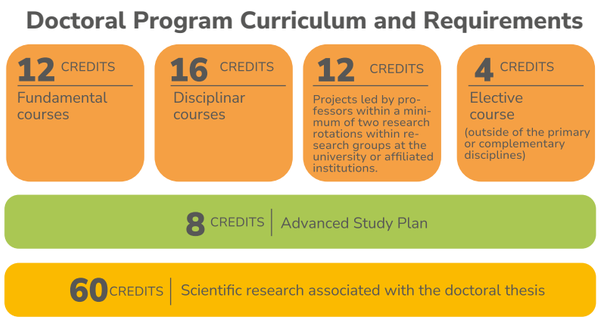
Los estudiantes admitidos al Programa deben completar un plan de estudios de al menos 112 créditos, que debe ser consistente con su formación de base y con los ejes primario y complentario declarados en su aplicación para admisión. El plan de estudios tiene la siguiente estructura de créditos, distribuidos entre cursos fundamentales y avanzados (40 créditos) y las actividades de investigación científica (72 créditos). Como se ve en la Gráfica 2.

Doctoral program curriculum and requirements

The curriculum of the Doctorate in Engineering and Applied Sciences at Pontificia Universidad Javeriana Cali is designed to align with the individual profile and research potential of each admitted student. The curriculum is rigorous yet flexible, tailored to meet the needs of every student. Rather than solely focusing on deepening knowledge within the traditional discipline, the program explicitly encourages dynamic exploration across the boundaries of traditional STEM disciplines. To achieve this, within the first 44 credits, each student is required to declare a primary and complementary study axis to attain in-depth knowledge of the current state of both specialized areas.

Figure 2 displays the four axes and illustrates the potential thematic combinations among them (physical sciences, life sciences, earth sciences, and computer sciences or mathematics). Scientific computing, notably distinct from computer science, serves as a pivotal axis that is mandatory for all students. This requirement enables each doctoral candidate to contribute, through their doctoral dissertation, new knowledge by integrating theories, methods, and perspectives that complement their traditional discipline.

Admitted students to the Program are required to complete a curriculum of a minimum of 112 credits, consistent with their background and the primary and complementary axes declared in their admission application. The curriculum follows this credit structure,



Graphic 2: Curriculum breakdown by credits

Un tutor académico será asignado para cada estudiante en el momento de su admisión. El tutor definirá el programa de estudios requerido para su pupilo hasta que se defina su director de tesis. Una vez el estudiante apruebe estos 44 créditos, debe presentar y aprobar un examen oral, denominado examen de competencias (ECo), para demostrar sus habilidades en la solución de problemas dentro de los ejes de estudio primario y complementario. Aprobado el ECo, el estudiante podrá optar por un título de Maestría en Ingeniería, si no desea continuar con sus estudios doctorales.

Los estudiantes que hayan completado de manera exitosa un programa de maestría en una institución de educación acreditada, en Colombia o en el exterior, podrán homologar y convalidar hasta 44 créditos en cursos del programa de Doctorado en Ingeniería y Ciencias Aplicadas.

El director de tesis, nombrado durante o inmediatamente posterior a las rotaciones de investigación, deberá aprobar un plan avanzado de estudios (PAE) de 8 créditos. Cursados y aprobados los 8 créditos del PAE, el estudiante deberá preparar y presentar el Examen de Candidatura (ECa) para evaluar su propuesta de disertación doctoral; una vez apruebe el ECa se convierte en candidato doctoral, y debe trabajar el equivalente a 60 créditos adicionales en la investigación científica relacionada con su propuesta de disertación doctoral. Al terminar la etapa de disertación, el candidato a doctor deberá defender de manera oral y pública su trabajo ante su Comité Doctoral.

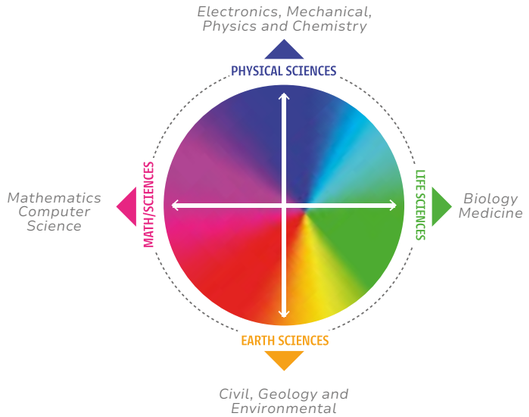


Figure 2: Engeneering and Applied Sciences Doctorate areas of study

divided between fundamental and advanced courses (40 credits) and scientific research activities (72 credits). As can be seen in Graphic 2.

An academic tutor will be assigned to each student upon admission. The tutor will outline the required study program for the student until a thesis director is determined. Once the student completes these initial 44 credits, they must undertake and pass an oral exam known as the Competency Exam (CoE) to demonstrate their problem-solving skills within the primary and complementary fields of study. Upon successful completion of the CoE, the student can choose to receive a Master's in Engineering degree if they decide not to continue with their doctoral studies.

Students that have successfully completed a Master's program from an accredited institution, in Colombia or abroad, may apply and homologate up to 44 credits towards the Doctoral Degree in Engineering and Applied Sciences.

A Thesis advisor appointed during or immediately after a student has completed the 12 credit research rotations, must then approve an additional 8 credits in advanced coursework for his/ her advisee (known as the Advanced Study Plan - ASP), after which the oral Candidacy Exam (CaE) must be passed to evaluate the student's Thesis research plan. Students that successfully complete the CaE become Doctoral Candidates and must work towards completing an additional 60 credits of scientific research that will be known as the student's doctoral dissertation. The doctoral dissertation must be defended orally and evaluated by the student's doctoral committee in order to fulfill the program requirements, and subsequently obtain the title of Doctor in Engineering and Applied Sciences.

¿Qué esperar como estudiante o profesional graduado de este programa?

Los objetivos educativos de este programa deben garantizar que sus graduados: reconozcan el estado del arte en sus correspondientes campos de estudio; planeen, propongan y defiendan la solución de una hipótesis original y novedosa de investigación y extiendan las fronteras del estado del arte; aporten soluciones rigurosas basadas en las herramientas, habilidades y conocimientos que definen su campo de estudio; desarrollen e implementen protocolos de investigación que aseguren la conformidad a estándares existentes en el campo o contribuyan a la creación y aceptación de nuevos estándares; validen su hipótesis usando métodos técnicamente correctos; integren puntos de vista, metodologías, teorías y técnicas de al menos dos disciplinas de estudio complementarias; aporten contribuciones significativas de corte teórico o aplicado, en profundidad o amplitud, al conocimiento combinado de sus ejes de estudio primario y complementario; preparen y presenten propuestas de investigación para financiación externa; comuniquen sus conjeturas científicas, descubrimientos y metodologías, de manera oral o escrita, en español e inglés; identifiquen las limitaciones de sus contribuciones y el potencial de al menos dos nuevas áreas de investigación en su campo de trabajo, y una fuera del mismo; y que discutan y consideren de manera crítica las implicaciones éticas y morales de su trabajo.

Los graduados de este programa serán empoderados para transformar como innovadores tecnológicos; profesores e investigadores en las áreas STEM; científicos en centros de investigación internacionales; miembros de agencias gubernamentales dedicadas al pensamiento estratégico sobre la innovación en políticas públicas y privadas sobre investigación tecnológica o como emprendedores en empresas de base tecnológica.

What should you expect as a student and graduate of this program?

The educational goals of this program must guarantee that its graduates: recognize the state of the art in their corresponding fields of study; plan, set forth and defend an original and novel research hypothesis and solution that goes beyond the corresponding state of the art; provide rigorous solutions based on the tools, skills and knowledge that defines their field of study; develop and implement research protocols that assure the conformity to existing standards in the field or contribute to the creation and acceptance of new standards; validate their hypothesis using technically sound methods; integrate viewpoints, methodologies, theories and techniques from at least two complementary fields of study; make a significant theoretical and/or applied contribution, in depth or breadth, to their combined primary and complementary fields of study; prepare and present research proposals for external funding; communicate their scientific conjectures, discoveries and methodologies, orally or written in Spanish and English, to an expert audience or to a layman one; identify the limitations of their contributions and the potential for at least two new areas of research within their fields, and one outside of it; and critically discuss and consider the ethical and moral implications of their work.

Graduates from this program will be empowered to make a difference, in roles such as: technology innovators; engineering research professors; scientists at international research centers; members of government agencies dedicated to strategic thinking on research and technology innovation policy or entrepreneurs capable of creating and directing new technology-based start-ups.

Sergio Ramírez Rico

Assistant professor, Universidad EAFIT

“All of the professors with whom I had classes and conversations were admirable. This is the image I received and that I try to project in my life as a professor and researcher. I believe that the program has a very pleasant work environment. It does not only train people who will be doctors, but it also strives to train people with values and the ability to handle difficult situations, not only from the academic world. I believe that graduates of the program have the ability to work in different areas. We are capable of forming work teams and participating actively in them. I also emphasize that having a doctoral degree in Colombia allows us to have a deeper understanding of the current situation and the reality of the country. I see this as additional preparation for professional life in Colombia”.

Miguel Romero González

Data Engineer, bld.ai

“The Doctorate in Engineering and Applied Sciences provided me with tools to enhance my learning processes, creativity, resourcefulness, and innovation. With these tools, I can approach different problems in professional or personal settings. They allow me to structure and establish methodologies to tackle problems with a critical focus, to adapt and learn in the process of reaching a stable and appropriate solution according to the circumstances. Additionally, in the program I learned that many times multiple perspectives or observations of a problem are required, enabling a more exhaustive analysis that reduces the risks associated with executing a possible solution”.

Jenny Johana Gallo Franco

Consultant at the Bioversity & CIAT Alliance

“The Doctorate in Engineering and Applied Sciences had a profoundly significant impact on my life, both professionally and personally. Concerning my professional life, this academic program not only provided me with new tools and concepts but also played a fundamental role in strengthening and enriching the knowledge I had previously acquired during my academic career. In general terms, my time in this academic program allowed me to consolidate my scientific skills, turning me into a mature professional with enhanced analytical abilities, greater productivity, critical thinking skills, and an increased capacity to propose, develop, and conclude scientific projects. I learned to pose fundamental questions and seek answers through research and rigorous analysis. This critical mindset has become an invaluable asset in my career, enabling me to tackle challenges with an interdisciplinary approach. On a personal level, my experience in this program transformed me into a more disciplined and independent woman. I learned the importance of teamwork and appreciated the contribution of each individual within a group. I also gained a deeper understanding of balance in different aspects of life.”

¿Que dicen nuestros egresados?

¿What do our graduates say?

Pedro Miguel Hernández Acosta

Professor, Basic Science of Health Department. Pontificia Universidad Javeriana Cali

“The Doctorate Program allowed me to overcome challenging obstacles, discover solutions to seemingly impossible problems, and expand my horizons by learning a new language and exploring topics in areas of knowledge with which I had never interacted. Each of these areas was challenging and demanding, but they all showed my ability to propose fresh ideas and tackle complex challenges that benefit not only my faculty and university, but also society, my region, and the scientific community at large. Through rigorous coursework, I identified critical health, chemical, and biological science issues that can be addressed with the knowledge and tools acquired. Each course was specially designed to equip us for the specific challenges we would encounter in our research. This instilled in me a strong foundation of concepts from diverse areas, paving the way for new skills honed throughout the semesters. These skills culminated in a research project that yielded novel insights into pressing global issues like food security.

The diverse research rotations of the program, along with the masterclasses, stand out as fundamental learning experiences. They thrust us into tackling real-world problems across varied knowledge domains. The pressure to solve these problems fostered the development of versatile problem-solving skills and mastery of new techniques specific to each rotation. For instance, one rotation involved genome editing of plants with CRISPR-Cas, while another focused on computational molecular simulation and its applications, including force field implementation and programming. Finally, I am profoundly grateful for the invaluable guidance of our esteemed professors and directors. Their expertise and high expectations have molded us into highly competent doctors capable of tackling significant problems that push the boundaries of knowledge. They equip us not only to solve these problems, but also to identify new ones and generate groundbreaking research projects that contribute to the advancement of cutting-edge knowledge”.

Andrea Molina Cortés

“A challenge as great as a doctorate in engineering and applied sciences provided me with great lessons that transcend beyond the academic realm and contributed to further shaping my mindset as a researcher. Given the program’s distinctive interdisciplinary nature, I developed the ability to approach a problem from different perspectives, integrating elements from different areas that, in many cases, were outside of my initial training. This allowed me to broaden my intellectual horizon by exploring and fusing different knowledge, strengthening my critical thinking much more, and significantly enriching my approach to solving challenges in a more creative and holistic way. This ability to adapt and be open to new ideas has become a valuable asset in my professional work. Additionally, facing the challenges inherent in the doctoral program taught me to see difficulties as opportunities for growth. I learned to identify the hidden lessons in adverse results, which has been essential to strengthening my decision-making skills”.

David Alejandro Jiménez Sierra

AI Engineer, MILL5 is a global software consulting

“My experience in the Doctorate in Engineering and Applied Sciences was extremely enriching. The program’s interdisciplinary approach allowed me to interact with individuals from diverse backgrounds, providing me with the opportunity to approach problems from various perspectives. This diversity of approaches equipped me with the ability to adapt to new fields of knowledge, facilitating my capacity to find innovative solutions. The theoretical, methodological, and technical foundations acquired during the program have been crucial in facing challenges in my professional life. The solid research training I received has been vital in my development as a researcher, enabling me to stay updated with the latest advancements in the field and consequently generating pertinent and effective solutions”.

Camila Riccio Rengifo

Data scientist, iOMICAS, Pontificia Universidad Javeriana, Cali

“The Doctoral program in Engineering and Applied Sciences has been fundamental for the development of my analytical thinking, providing me with the skills necessary for high-quality research and contributing to the advancement of knowledge in my field. The interdisciplinary training I received has prepared me to tackle problems in an integrated way, taking advantage of mathematical modeling and computational tools. I experienced significant growth in the field of computing, acquiring advanced skills in handling large volumes of data and applying complex algorithms. The doctoral experience has honed my communication skills, effectively transmitting complex concepts, essential in any professional environment. Additionally, establishing valuable connections with other researchers has enriched my academic experience and created opportunities for future collaborations and professional growth. Although the Ph.D. presented significant challenges, it cultivated my perseverance and resilience, qualities that are beneficial both professionally and personally ”.

Roger Gómez Nieto

Technical Lead, AI Team, Proforest

“The Doctorate in Engineering Applied Sciences at Pontificia Universidad Javeriana was fundamental to my professional and personal development. It provided me with advanced technical knowledge in artificial intelligence and strengthened my skills in research and complex problem-solving. I learned to be persistent and meticulous, qualities that I have consistently applied in my career. The program instilled in me an analytical mindset to confront challenges and provided me with the skillset to lead complex research projects. These experiences have been crucial in my roles, first as an AI professor at Icesi University and currently as the Technical Lead of the AI team at Proforest.

During my doctorate, I learned valuable lessons that I still apply in my professional and personal life. The importance of rigorous research, perseverance in the face of challenges, and the ability to work on long-term projects are some of them. These lessons have been essential to my success in academia and industry”.

Jan Alejandro Medina López

Full stack Developer, Brand Guarde LLC

“The Doctorate in Engineering and Applied Sciences provided me with significant growth by overcoming obstacles and expanding my perspective to address problems from different angles. This experience motivated me to broaden my understanding beyond my area of specialization, fostering an interdisciplinary approach.

On a personal level, the rigorous doctoral process involved facing and overcoming numerous academic and personal challenges, contributing to the development of my self-confidence. Doctoral research, with its inherent possibility of obtaining negative results, has taught me to handle failure and has cultivated resilience and the ability to overcome difficulties. In turn, I have learned to balance academic demands with my personal life.

In the professional realm, my experience in the doctorate has been fundamental. Not only has it allowed me to specialize in a specific area, but it has also trained me as a professional capable of demonstrating critical thinking, project organization and planning, responsibility in decision-making, as well as discernment of the quality and veracity of information. The interdisciplinary approach acquired during the doctorate has significantly influenced my approach to addressing challenges in my professional field”.

Sammy Alejandro Perdomo Ospino

Postdoctoral Researcher, iOMICAS, Pontificia Universidad Javeriana, Cali

“As a graduate of the Doctorate in Engineering and Applied Sciences program offered by Pontificia Universidad Javeriana Cali, I have been able to strengthen my skills in the field of engineering focused on scientific research and technological development. I am now capable of formulating, planning, executing, and leading high-impact projects, while also offering innovative solutions to the different challenges that persist in the world today in my field of work.

All of this is possible thanks to the high-quality academic training I received from this graduate program. This quality is reflected in both the human talent represented by professors with a high level of education, pedagogy, and relevant careers in their respective fields of action, as well as in the laboratory facilities equipped with cutting-edge technologies that facilitate research and development activities.

As a doctoral student, I had the opportunity to be part of important projects at both the national and international levels. This allowed me not only to strengthen my knowledge in the field, but also to have the opportunity to exchange these knowledge and ideas with researchers from different cultures, backgrounds, and experiences. This strengthened my assertive communication skills and networking opportunities.

Being part of this academic program has not only given me the tools I need to succeed at a professional level, but it has also strengthened my ethical and moral virtues to act in a correct way and contribute as best I can to our society. It has instilled in me a strong commitment to the development of our country”.

PARA INFORMACIÓN ADICIONAL
FOR ADDITIONAL INFORMATION

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Financial aid and scholarship programs ..... http://www.javerianacali.edu.co/financiacion
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1.

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2.

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LIST OF PROFESSORS **PAGE**

Dr. César Camilo Cañón

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Rural Water and Sanitation Supply
- Disaster Reduction and Response
- Water Pollution Control

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Camilo Cañon thinks in low-cost, easy-to-build structures to provide water and sanitation to rural communities, in order to ensure their quality of life, and to facilitate demographic attraction from overcrowded cities. At the same time, he prioritizes actions to reduce economic losses due to disasters and cultural mispractices in major cities.

ES

El Profesor Camilo Cañón busca alternativas estructurales económicas y de fácil construcción para proveer de agua y saneamiento a las comunidades rurales, con el fin de asegurar su calidad de vida y facilitar la atracción demográfica desde ciudades superpobladas. Al mismo tiempo, prioriza acciones para reducir pérdidas económicas por desastres y malas prácticas culturales en ciudades principales.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/2zKA_

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Assistant Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

Javeriana Sustainable Drainage (Pontificia Universidad Javeriana Cali, 2021-2023)

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

- Engineering and Applied Sciences Doctorate
- Master of Engineering (Civil emphasis)
- Bachelor of Science in Civil Engineering
- Contaminants Detection and Remediation (DECOR) research group
- MIRAVE research seedbed.
- FORJA bachelor courses

EDUCATION |
EDUCACIÓN

- 2022: Doctor in Engineering, University of Bonn, Germany
- 2011: Master of Science in Civil Engineering, University of Arizona, USA
- 2006: Bachelor in Civil Engineering, Universidad Nacional, Bogotá, Colombia.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 2013-Present: Pontificia Universidad Javeriana Cali, Colombia
- 2011-2012: Ambientalmente S.A.S, Medellín, Colombia
- 2010: National Weather Service, Salt Lake City, USA
- 2008-2010: The University of Arizona, USA
- 2006-2008: Construcciones Planificadas S.A., Bogotá, Colombia
- 2005-2006: Instituto de Desarrollo Urbano, Bogotá, Colombia
- 2004-2005: Proyecta Ltda., Bogotá, Colombia

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

- Excellence at Student Interface – Teaching Assistant, The University of Arizona, 2009.
- Outstanding Graduate Student in Civil Engineering, The University of Arizona, 2010.
- San Francisco Javier Grant for Projects on Technical Assistance for Rural Water Systems, Pontificia Universidad Javeriana Cali, 2020 through 2023.

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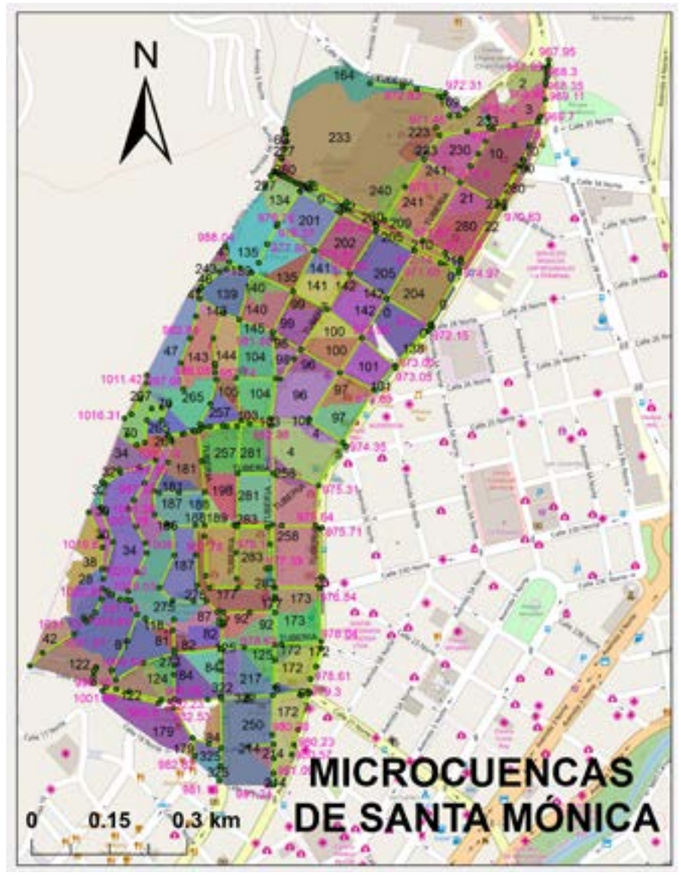

Figure 3. Microcuencas de drenaje

Figure 4. Trabajo con comunidades

Dr. Paola Andrea Cruz Daraviña

RESEARCH INTERESTS |

INTERESES DE INVESTIGACIÓN

- Transportation
- Traffic Analysis
- Urban Mobility
- Traffic Analysis
- Regional Planning
- Urban Road
- Railroad Design

RESEARCH SUMMARY |

RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Paola is a civil engineer, specialist in railroads and transport from the Universidad Nacional, and has a master's degree in urban and regional planning from the University Lyon II in France. Her research is focused on urban and regional transport planning, mobility plans that improve quality, security and efficiency in the transportation system with a strong focus on sustainability. In the engineering field, Paola is also a professor of highway geometry design, traffic engineering and road safety. Her PhD research focused on passenger transport planning vs urban freight operations. She has directed undergraduate and postgraduate theses in different universities as a consultant. She also has 15 years' experience and has participated in several projects in urban transport, Land Use Plans and regional development in Colombia. She worked for the French national railroad in Paris France. The most significant and important project for her is the development of the Land Use plan for the Valle del Cauca Department and her recent research about the evaluation of the use of railway system projects for urban supply in Colombian cities in the project "Tren de Cercanías del Valle del Cauca". She has a particular interest in foreign cultures and has majored in modern languages. She has been a French teacher at several institutions.

ES

Paola Andrea es ingeniera civil con experiencia en proyectos urbano-regionales de Ordenamiento Territorial con énfasis en temas de Movilidad, Tránsito y Transporte. Es ingeniera civil graduada de la Universidad del Valle, con especialización en vías y transporte de la Universidad Nacional de Colombia, y un Máster en Urbanismo y Ordenamiento Territorial de la Universidad de Lyon II, Francia. Tiene título de doctorado en Ingeniería de la Universidad de los Andes de Bogotá. Su tema de tesis doctoral trata sobre el Transporte Urbano de Mercancías vs Planeación Urbana Sostenible. Tiene 15 años de experiencia como consultora y ha participado en varios proyectos en transporte urbano, Planes de Ordenamiento Territorial y desarrollo regional en Colombia. Trabajó para la Sociedad Nacional de Caminos Férreos Franceses en París, Francia. El proyecto más significativo e importante para ella es el desarrollo del Plan de Ordenamiento Territorial para el Departamento del Valle del Cauca y su reciente investigación sobre los proyectos de Evaluación del uso del sistema ferroviario para el abastecimiento urbano en ciudades colombianas en el proyecto Tren de Cercanías del Valle del Cauca. Investigadora y profesora universitaria con un compromiso social por el mejoramiento de la cátedra sobre movilidad sostenible. Tiene gran interés por las culturas y lenguas extranjeras, es licenciada en lenguas Modernas de la Universidad del Valle y tiene mucha experiencia en la enseñanza de francés.

GOOGLE SCHOLAR |

GOOGLE ACADÉMICO

t.ly/UuIsU

ACADEMIC TITLE |

TÍTULO ACADÉMICO

Assistant Professor

PROGRAM/GROUP AFFILIATIONS |

AFILIACIONES

Grupo de investigación en Ingeniería Sísmica y Materiales (SIGMA) Pontificia Universidad Javeriana Research, Centre on Urban and Regional Sustainability (SUR), Universidad de los Andes.

EDUCATION |

EDUCACIÓN

- 2023: Diplomat in Planning, Design, Construction and maintenance of Railroads infrastructure.
- 2021: Doctor of Philosophy, Engineering, Universidad de los Andes
- 2013: Universidad Nacional de Colombia. Specialization in Roads and Transportation.
- 2007: University of Lyon II. Institute of Urbanism. Lyon, France. Master of Science in Urban Planning. Mention: Cities and societies (Second Year).
- 2006: Universidad del Valle, Cali – Colombia. Bachelor of Science in Civil Engineering.
- 2006: University of Eastern Britain. “Géoarchitecture” Institute. Brest, France. Master of Science in Urban Planning. (First Year).
- 2004: Universidad del Valle, Cali – Colombia. Major in Modern Languages.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 2017-present: Pontificia Universidad Javeriana Cali. Professor at the Civil engineering Program
- 2022: Mobility advisor for the Land use Plan of the municipality of Palmira.
- 2021: Mobility advisor for the Land use Plan of the municipality of Yumbo.
- 2020: Mobility advisor for the Rural Planning Units at the main (Headquarters) office in Cali.
- 2019: Consultancy and technical support for the Strategical Regional Pacific Plan (Chocó, Valle, Cauca and Nariño Departments).
- 2016: Universidad de San Buenaventura – Gobernación del Valle del Cauca. Plan de Ordenamiento Territorial del Valle del Cauca.
- 2011-2013: Universidad del Valle, Cali. Professor at the Civil engineering Program
- Consultancy and technical support for the Road Geometric Design “Complementary Designs for the Tunnel project of “La Línea”, Cali, Valle. Fundación Universidad del Valle.
- 2011: Consultancy for the firm “Proyecto de Infraestructura S.A. PISA”. Feasibility Proposal and Evaluation to the Accessibility and operation of the EDS Guadalajara SAS Inland Port – Buga, in the highway Buga – Tuluá – La Paila.
- 2007-2008: Engineer at the AREP society “Aménagement REcherche Pôles d’échanges” SNCF – National Societies of French railroads. Paris, France. Mobility, transport and Urban Diagnoses.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

- ‘Pasaporte a la Ciencia’ Scholar (Doctoral studies), ‘Colombia Científica’ program, Colombian government (2019-2021).
- Graduate scholarship for Universidad de Concepción (Master studies), Chile (2006-2007).
- Universidad de Sucre Scholar (undergraduate studies), Colombia (1993-1997).

CONTACT INFORMATION |

INFORMACIÓN DE CONTACTO

paola.cruz@javerianacali.edu.co
Engineering Building, No. 2-29

Dr. Orlando Cundumí Sánchez

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Dynamic of Structures
- Seismic Analysis of Structures
- Dynamic Analysis of Secondary Element
- Energy Dissipation Systems for Vibrations Control - Structural Control
- Nonlinear Analysis of Structures
- Soil Dynamics
- Earthquake Engineering

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Cundumi works on passive and semiactive control systems for structures. He has made significant contributions to the development of control devices and control algorithms.

ES

El profesor Cundumi trabaja en sistemas de control pasivos y semiactivos para estructuras. Ha logrado contribuciones significativas en el desarrollo de equipos de control y algoritmos de control.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/JFl60

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Assistant Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

- Development and Implementation of a Virtual Laboratory in Structural Engineering to Support Teaching and Learning (CIDESCO).

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate, Masters of Engineering (Civil Engineering), Civil Engineering undergraduate.

EDUCATION |
EDUCACIÓN

- 2006: Doctor of Philosophy, Civil Engineering, Universidad de Puerto Rico, Mayagüez, Puerto Rico.
- 2003: Master of Science in Engineering, Civil Engineering, Universidad de Puerto Rico, Mayagüez, Puerto Rico.
- 1990: Bachelor of Science, Civil Engineering, Universidad del Valle, Cali, Colombia.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 2016-Present: Professor, Pontificia Universidad Javeriana, Cali, Colombia.
- 2011-2016: Specialist Structural Engineering, INGETEC S.A., Bogotá, Colombia.
- 2011-2016: Part Time Professor, Engineering Department, Pontificia Universidad Javeriana, Bogotá, Colombia.
- 2013-2015: Part Time Professor, Engineering Department, Universidad Santo Tomás de Aquino, Bogotá, Colombia.
- 2015-present: Visiting Professor, Master in Seismic Engineering, Engineering Department, Universidad del Quindío, Armenia, Colombia.
- 2006-2011: Director and Professor, Engineering Department, Universidad de Puerto Rico, Mayagüez, Puerto Rico.
- 2000-2005: Teaching fellow, Universidad de Puerto Rico, Mayagüez, Puerto Rico.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

- Member Earthquake Engineering Research Institute (EERI), USA.
- Member Asociación de Ingeniería Sísmica de Colombia (AIS).

CURRENT POSITION

POSICIÓN ACTUAL

Civil Engineering Undergraduate Program Director.

CONTACT INFORMATION |

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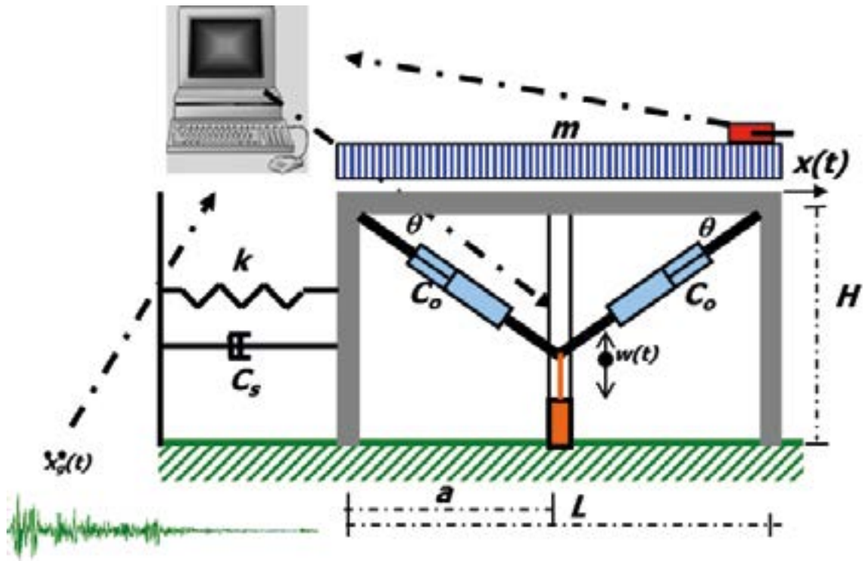

Figure 5. VDSA Control System

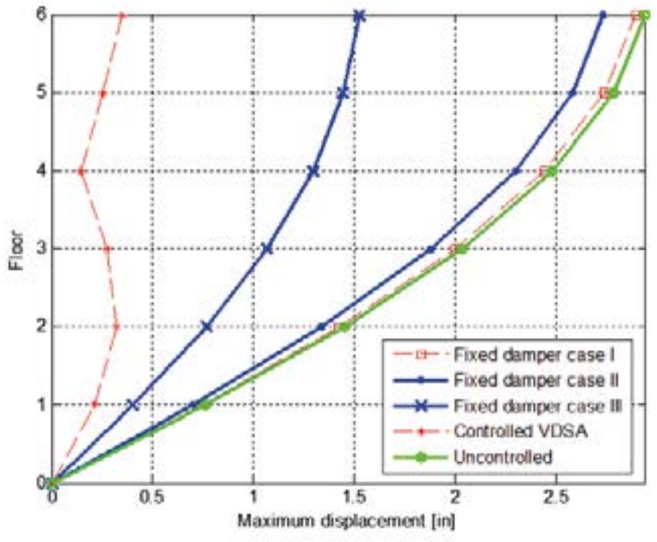

Figure 6. Maximum Displacement for each of the Control Systems

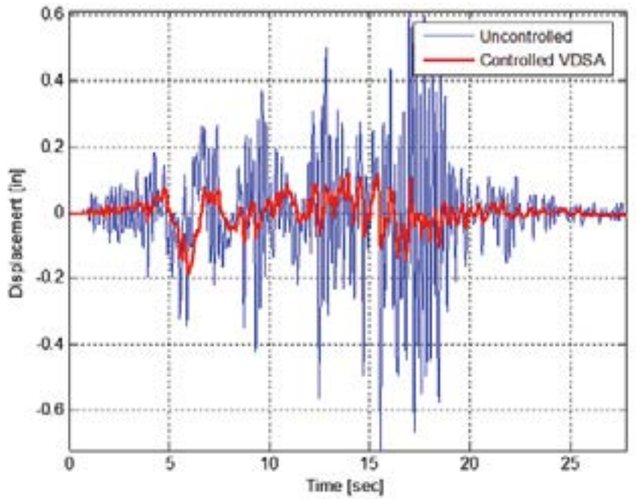

Figure 7. Displacement Record Last Floor - Structure Controlled with VDSA vs. Non-Controlled

Dr. Olga Lucía Delgadillo Vargas

RESEARCH INTERESTS |

INTERESES DE INVESTIGACIÓN

- Environmental History
- Hydrological Studies (Water Footprint)
- Landscape Ecology

RESEARCH SUMMARY |

RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Delgadillo studies the industrialization and transition from traditional to “modern” agriculture from the viewpoint of environmental concerns.

Environmental history added a fundamental question to the interrogation of past agricultural systems and their changing patterns: how sustainable were they and at what scales? ¿How sustainable are the agroecosystems as they confront the challenges of a deteriorating biophysical base, changing climate conditions and the imperative of the intensification of productive systems? What are the recent socio-ecological transitions and what are the implications in the regional territories? ¿How can the past agricultural systems provide a worthy lesson for the contemporary agricultural and energy policies? The approach used by professor Delgadillo is to recover the materiality of history by accounting for water, material, and energy circulation between social and natural systems.

The historical development of agriculture as a regional specificity is the result of an interaction between socioeconomic factors such as work, technology and land tenure, and natural factors such as climate, vegetation and the characteristics of the soil. In this order of ideas, this work tries to integrate the biophysical perspective into the traditional focuses of the agrarian history, until now largely ignored.

She is currently focusing her studies on the Valle del Cauca region, in Colombia.

ES

La profesora Delgadillo estudia la industrialización y transición de la agricultura tradicional hacia la modernidad, desde la perspectiva de preocupaciones ambientales. La historia ambiental añadió una pregunta fundamental al interrogante de los sistemas agrícolas del pasado y sobre sus patrones de cambio: ¿Qué tan sostenibles eran y a qué escalas? ¿Qué tan sostenibles son los ecosistemas a medida que confrontan retos de deterioro en su base biofísica, cambios de condiciones climáticas y la imperativa intensificación de los sistemas productivos? ¿Cuáles son las transiciones socioecológicas y cuáles son las implicaciones para los territorios regionales?, ¿Cómo pueden los sistemas agriculturales pasados proporcionar lecciones dignas para la agricultura contemporánea y las políticas energéticas? El enfoque de la profesora Delgadillo es recuperar la materialidad de la historia, teniendo en cuenta la circulación de agua, material y energía entre los sistemas naturales y sociales.

El desarrollo histórico de la agricultura como una especificidad regional es el resultado de una interacción entre factores socioeconómicos como el trabajo, la tecnología y la tenencia de tierra y factores naturales como el clima, la vegetación y las características del suelo. En este orden de ideas, este trabajo busca integrar la perspectiva biofísica en los enfoques tradicionales de la historia agraria, hasta ahora ampliamente ignorados.

La profesora Delgadillo enfoca sus estudios actuales en la región del Valle del Cauca, en el suroccidente de Colombia.

GOOGLE SCHOLAR |

GOOGLE ACADÉMICO

t.ly/gKwYm

ACADEMIC TITLE |

TÍTULO ACADÉMICO

Associate professor

CURRENT RESEARCH |

INVESTIGACIÓN EN CURSO

- Socioecological Transition and Sustainability of the Agricultural Frontier in the Geographic Valley of the Cauca River: An Analysis from Social Metabolism and Landscape Ecology (1960-2015) (Universidad Javeriana Cali).
- Sustainable Farm Systems: Long-Term Socio-Ecological Metabolism in Western Agriculture (Granjas Sostenibles) (Universidad de Saskashawen, Canada).

PROGRAM/GROUP AFFILIATIONS |

AFILIACIONES

Engineering undergraduate and graduate school, Social Sciences & Humanities School, Economic & Administrative Sciences School.

EDUCATION |

EDUCACIÓN

- 2014: Doctor in Environmental and Rural Studies, Pontificia Universidad Javeriana, Bogotá, Colombia.
- 1997: Master's in Landscape Ecology Design and Management, Wye College, University of London, London, UK.
- 1995: Agronomist, Universidad del Tolima, Ibagué, Colombia.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 2001-Present: Pontificia Universidad Javeriana Cali, Colombia, Facultad de Ingeniería y Ciencias, Associate Professor Civil & Industrial Engineering Department, University Social Responsibility Projects Coordinator (2007-2009), Analysis and Development Assistant (2003–2006), University-Industry relations Coordinator (2001-2003).
- 2000: FES Fundación Social – Colciencias. Cali, Valle del Cauca, Colombia.Cuclí Cuclí–Pléyade Agreement: Encouraging and Development of Research in the Primary School in Colombia. Regional Coordinator (1999-2000).
- 1999: Center for Research on Sustainable Agricultural Production Systems – CIPAV. Professional - Technical Support Team on Sustainable Farming Systems and Management of Natural Resources in four areas of Chocó biogeographic region (Pacific coast of Colombia and Ecuador). WWF-Pacific Project.
- 1996: Artesanías de Colombia –FES Foundation, Cali, Valle del Cauca, Colombia. Program Coordinator for Sustainable Management of Natural Resources used in the manufacture of Handicrafts in Colombia.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

Orden al Mérito Académico Javeriano, Pontificia Universidad Javeriana - Puj - Sede Bogotá - octubre de 2014. Mención honorífica por tesis meritoria, Pontificia Universidad Javeriana - Puj - Sede Bogotá - octubre de 2014.

CONTACT INFORMATION |

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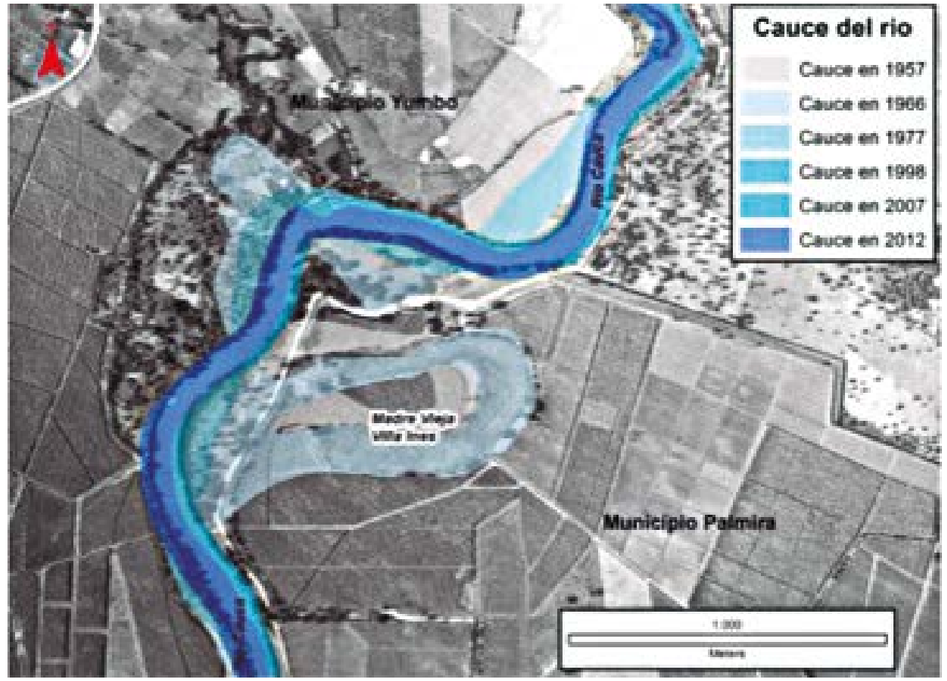

Figure 8. Madrevieja Villa Inés morphodynamics and neighboring areas (1957-2010).
Assembly on the photo FAL 2004, Flight 461, belt 32, photograph 128. Scale approximate 1: 31.300. The most complete cartography available allowed us to observe some changes between 1966 and 1998. The Cauca and Amaime rivers tended to carry out lateral displacements alternating to both margins, even making cuts of several meanders, until forming new madreviejas, especially the well-known Villa Inés, that with the time was dried up and at the moment is planted in sugar cane.

Dr. María Isabel Díaz Vega

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Technology Management
- Knowledge Management
- Project Management

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor María Isabel Díaz works on the construction of models, examining the impacts generated by the relationships of constructs associated with technological management and Innovation in different sectors, through a process of research, reflection and application of tools that allow analyzing the Current situation. and trends in the subject, to carry out technological prospective, obtaining as a result a greater competitiveness for the companies of the sector under study.

This is how Professor María Isabel Díaz developed an investigation in order to propose a theoretical-analytical framework and an adequate analysis model to examine the impacts generated by the main relationships between knowledge management and performance in the project analysis stage of micro and small companies dedicated to the development of custom software in Colombia, through a process of research, reflection and application of tools that allowed analyzing the current situation and reviewing trends on the subject.

ES

La profesora Diaz trabaja en la construcción de modelos de análisis apropiados que examinan los impactos generados por las principales relaciones entre constructos asociados a la gestión de la Tecnología y la Innovación en diferentes sectores, mediante un proceso de investigación, reflexión y aplicación de herramientas que permiten analizar situaciones actuales y tendencias en el tema, para realizar prospectiva tecnológica que permita mayor competitividad a las empresas del sector objeto de estudio.

La profesora Diaz realizó una investigación con el fin de proponer un marco teórico- analítico y un modelo de análisis apropiado que examinará los impactos generados por las principales relaciones entre gestión de conocimiento y el desempeño en la etapa de análisis de los proyectos de las micro y pequeñas empresas dedicadas al desarrollo de software por encargo en Colombia, mediante un proceso de investigación, reflexión y aplicación de herramientas que permitieron analizar la situación actual y revisar las tendencias en el tema.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/e3FMU

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Instructor Professor

EDUCATION |
EDUCACIÓN

- Doctor in technology management and innovation, Universidad Pontificia Bolivariana, Medellín. October 2021.
- Master's degree in technology management, Universidad Pontificia Bolivariana, Medellín. July 2022.
- Master's Degree in Industrial Engineering Universidad del Valle. Cali november 2009.
- Industrial Engineering. Universidad Autónoma de Occidente. Cali, march 2002.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 2011-present: Pontificia Universidad Javeriana Cali, Colombia, Facultad de Ingeniería, Professor. Civil & Industrial Engineering Department,
- 2008-2011: Universidad autónoma de Occidente Cali, Colombia, Facultad de Ingeniería, Professor. Operations & Systems Department,
- 2004-2007: Sodexo Colombia. Contract manager; Argos regional Sur occidente, Whyeth & Centro empresa
- 2002- 2004. Colgate – Palmolive company, Cali, Colombia. Production Engineer.

HONORS AND MEMBERSHIPS |
HONORES Y MEMBRESÍAS

Doctoral Thesis Cum Laude.

CURRENT POSITION
POSICIÓN ACTUAL

Director of the Logistics Specialization and the Engineering Management Systems Specialization.

CONTACT INFORMATION |
INFORMACIÓN DE CONTACTO

midiaz@javerianacali.edu.co
Engineering Building, No. 2-71

Dr. Sandra Lorena Galarza Molina

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Sustainable Drainage Systems
- Rainwater Harvesting
- Decision Making

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Galarza has ten years of professional experience as a junior researcher, mainly in developing, implementing, and monitoring urban drainage research projects. Particular expertise in the development of decision-making methodologies, stormwater systems, and SUDS (Sustainable Urban Drainage Systems) performance determination. In addition to the implementation and calibration of water quality and quantity monitoring systems.

ES

La profesora Galarza cuenta con diez años de experiencia profesional como investigador junior, principalmente en el desarrollo, ejecución y seguimiento de proyectos de investigación sobre drenaje urbano. Es especialmente experta en el desarrollo de metodologías de toma de decisiones, sistemas de aguas pluviales y determinación del rendimiento de los SUDS (Sistemas Urbanos de Drenaje Sostenible). Además de la implementación y calibración de sistemas de monitoreo de calidad y cantidad de agua.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/XUgqr

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Assistant Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

- Quantification and Valuation of Ecosystem Services from Nature-Based Solutions on the Universidad Javeriana Campus (Cali). (Pontificia Universidad Javeriana, Cali y Universidad de Los Andes).
- Visión de un campus universitario como laboratorio a escala para apoyar el cambio en la gestión del drenaje urbano (Funded by Pontificia Universidad Javeriana, Cali).

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

- Research Group: Detección de Contaminantes y Remediación (DECOR).
- Mesa de SUDS.

EDUCATION |
EDUCACIÓN

- Doctor of Engineering - Pontificia Universidad Javeriana. Bogotá. Faculty of Engineering.
- Masters in Hydrosystems - Pontificia Universidad Javeriana. Bogotá. Faculty of Engineering.
- Civil Engineering- Pontificia Universidad Javeriana. Bogotá. Faculty of Engineering.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 2019-present: Pontificia Universidad Javeriana Cali
- 2010-2011: Pontificia Universidad Javeriana.
- 2007-2010: DataBANK MKS Ltda.
- 2006-2007: Consorcio DataBANK MKS UCO
- 2006: Pedro Pablo González Yañez
- 2004: Edificios y Puentes de Acero.

HONORS AND MEMBERSHIPS |
HONORES Y MEMBRESÍAS

- Scholarship from Colciencias - Estudiantes Doctorales Nacionales 567. Scholarship from Fundación CEIBA.

CONTACT INFORMATION |
INFORMACIÓN DE CONTACTO

sandra.galarza@javerianacali.edu.co
Engineering Building, No. 2-32

Dr. María Fernanda García Aladín

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Road Security
- Structural Modeling of Pavement
- Modeling and Characterization of Anisotropic Materials

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor García works in road safety. Her research focuses on pavement modeling and the analysis of the influence of road infrastructure on the occurrence of traffic accidents. In general, it identifies the behavior of the human being (driver, pedestrian, and passenger) and of the vehicle (including motorcycles and bicycles) with respect to a road installation. This also includes the characterization of conventional and alternative construction materials, the structural modeling of the pavement and the prediction of their respective deterioration mechanisms.

ES

La profesora García trabaja en el área de seguridad vial. Su investigación se centra en la modelización de pavimentos y el análisis de la influencia de la infraestructura vial en la ocurrencia de accidentes de tráfico. En general, identifica el comportamiento del ser humano (conductor, peatón y pasajero) y del vehículo (incluyendo motocicletas y bicicletas) con respecto a una instalación vial. Lo anterior también incluye la caracterización de materiales de construcción convencionales y alternativos, el modelado estructural del pavimento y la predicción de sus respectivos mecanismos de deterioro.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/HkWk-

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Titular Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

- Structural modeling of pavement.
- Alternative building materials.
- Modeling and Characterization of anisotropic materials.

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate (2016), Master's of Engineering (Civil Engineering), Bachelor in Civil Engineering, and Seismic Engineering, and Materials and Transportation Research Group.

EDUCATION |
EDUCACIÓN

- 2016: Doctor in Engineering, Materials Engineering, Universidad del Valle, Cali, Colombia.
- 2003: Master's in Terrestrial Road Engineering, Universidad del Cauca, Popayán, Colombia.
- 2001: Especialist in Terrestrial Roads Engineering, Universidad del Cauca, Popayán, Colombia.
- 1997: Bachelor in Civil Engineering, Universidad del Cauca, Popayán, Colombia.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 2002-Present: Professor, Pontificia Universidad Javeriana Cali, Colombia.
- 2006-Present: Invited Professor, Universidad Autónoma Juan Misael Saracho, Science and Technology Faculty.
- 1999-2001: Interventor, Fondo Nacional de Caminos Vecinales, Presidencia de la República, Bogotá, Colombia.
- 1998: Budget and Construction Control Engineer, Hacienda Santa Bárbara S.A., Palmira, Colombia.

- 1996-1997: Credit and Commercial Coordinator, Arkus S.A., Cali, Colombia.
- 1993-1996: Quality Control Engineer, Concretos Premezclados S.A., Cali, Colombia

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

- Recognition for teaching a human excellence by the Pontificia Universidad Javeriana, Cali (2018, 2011, 2010, 2009, 2006, 2004), and Academic excellence award from Master's program at the Universidad del Cauca.

CONTACT INFORMATION |

INFORMACIÓN DE CONTACTO

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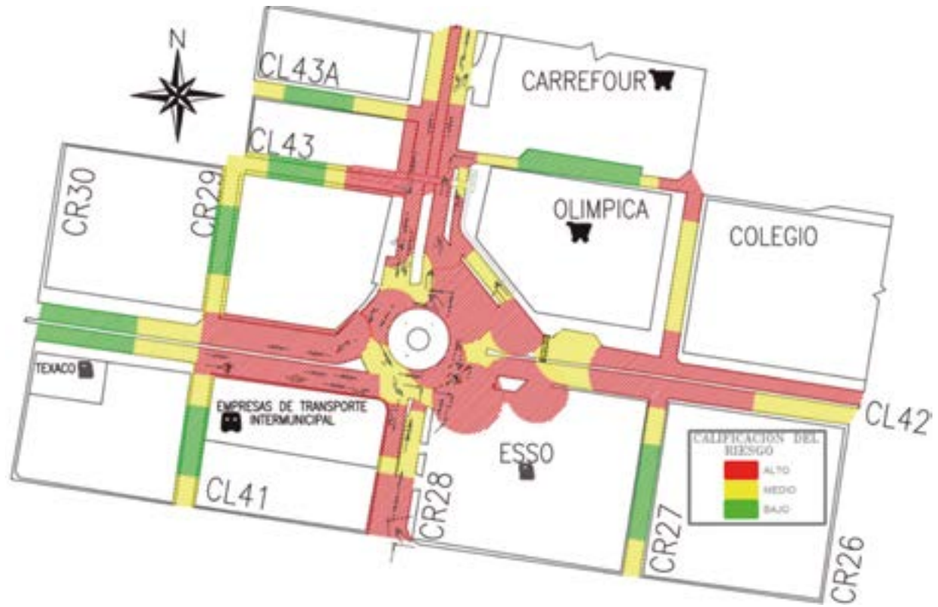

Figure 9. Risk diagram for the Carrera 28 with 42nd street in Cali, Colombia.

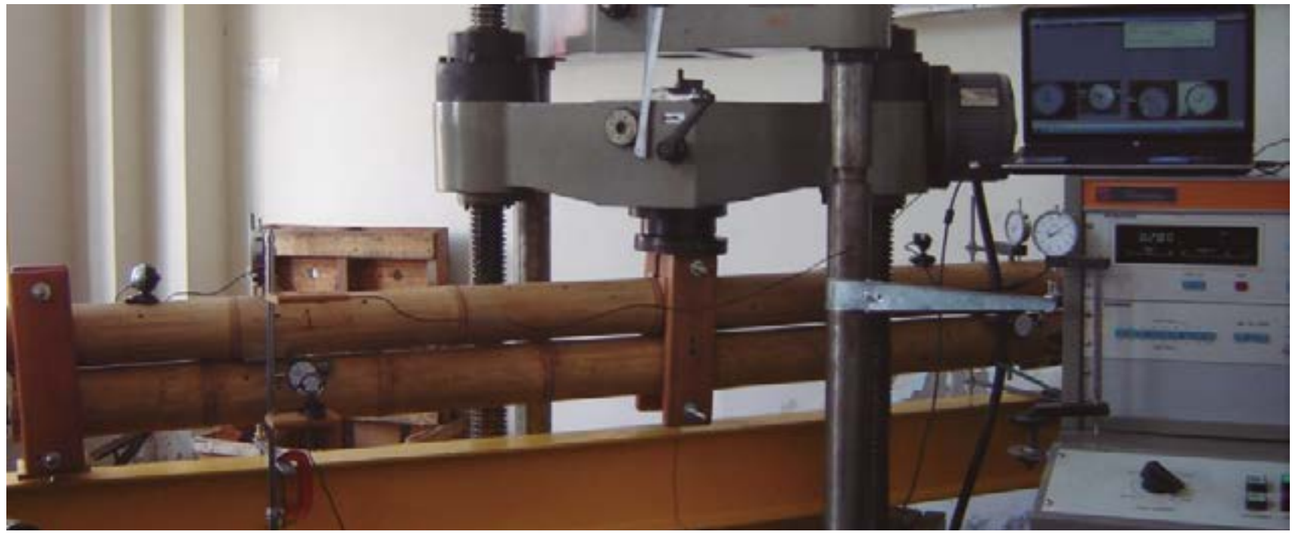

Figure 10. Three -point bending test for a compound Guadiana beam

Dr. Adriana Gómez Gómez

RESEARCH INTERESTS |

INTERESES DE INVESTIGACIÓN

- Thin Film Characterization of Mechanical Properties
- Characterization of Phases in Composite Materials
- Re-utilization of Industrial Wastes

RESEARCH SUMMARY |

RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Thin films are now pervasive in many applications, including electronic semiconductors, optical devices, and even household items, such as mirrors. They are used to change the surface properties of a substrate material with a thin coating with thickness in the range of nanometers. The properties of thin films depend on both composition and deposition process parameters. Dr. Gómez' work focuses on the non-destructive characterization of the mechanical properties of thin films, by measuring residual stresses from X-ray diffraction (XRD). As opposed to the conventional film deflection techniques to measure the residual stresses in the material, this work uses XRD to determine gradient-based measurements without affecting the sample. Accurate characterization is essential for tuning the deposition process in optimizing the film properties. Dr. Gómez's group also uses XRD techniques to analyze and characterize the different phases present in a composite material, for example, in solid waste, in order to find possible uses for these wastes.

ES

Las películas delgadas tienen un uso generalizado en aplicaciones que van desde materiales semiconductores y dispositivos ópticos, hasta ítems para la casa, como espejos. Se utilizan para cambiar las propiedades superficiales de un material (sustrato), mediante una película delgada con espesor de tamaño nanométrico. Las propiedades de las películas delgadas dependen no solo de los precursores químicos empleados sino también de los parámetros del proceso de deposición. La profesora Gómez enfoca su trabajo de investigación en métodos de caracterización no-destructivos, para establecer las propiedades mecánicas de películas delgadas. Se enfoca principalmente en la medición de esfuerzos residuales empleando difracción de rayos-X (XRD). A diferencia de las técnicas convencionales basadas en la deflexión para medir los esfuerzos residuales en el material, su trabajo usa XRD para determinar medidas por gradiente sin destruir la muestra. La caracterización precisa de películas delgadas es esencial para optimizar los procesos de deposición y por ende las propiedades de la película resultante. También ha sido pionera en el estudio y la comprensión de los efectos mecánicos y la morfología en películas delgadas de múltiples capas y en el estudio de gradientes de esfuerzos residuales en recubrimientos duros. La doctora Gómez también emplea la técnica de XRD para analizar y caracterizar las diferentes fases presentes en materiales compuestos, por ejemplo, en residuos sólidos, con el fin de buscarles un uso posible a estos residuos.

GOOGLE SCHOLAR |

GOOGLE ACADÉMICO

t.ly/cwt3Z

ACADEMIC TITLE |

TÍTULO ACADÉMICO

Full professor

CURRENT RESEARCH |

INVESTIGACIÓN EN CURSO

Study of the particle size reduction of aluminum dross used as a partial replacement of cement in the mechanical properties of mortars.

PROGRAM/GROUP AFFILIATIONS |

AFILIACIONES

Engineering and Applied Sciences Doctorate, Bachelors in Industrial Engineering, and Seismic Engineering, Materials and Transportation research group (SIGMA).

EDUCATION |

EDUCACIÓN

- 2006: Doctor in Metallurgical Engineering, Escola Politécnica, Universidade de Sao Paulo, Sao Paulo, Brazil.
- 2000: Bachelor in Mechanical Engineering, Universidad Nacional de Colombia, Medellín, Colombia.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 2010-Present. Pontificia Universidad Javeriana, Cali-Colombia.
- 2010. Post-doctoral fellow, Surface Phenomena Laboratory, Universidade de Sao Paulo, Sao Paulo, Brazil.
- 1999. Engineering Assistant. Industrias HRV, Ltda, Medellín-Colombia.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

President of RECIMEC (Network of Mechanical Engineering Programs).

CURRENT POSITION

POSICIÓN ACTUAL

Mechanical Engineering Undergraduate Program Director.

CONTACT INFORMATION |

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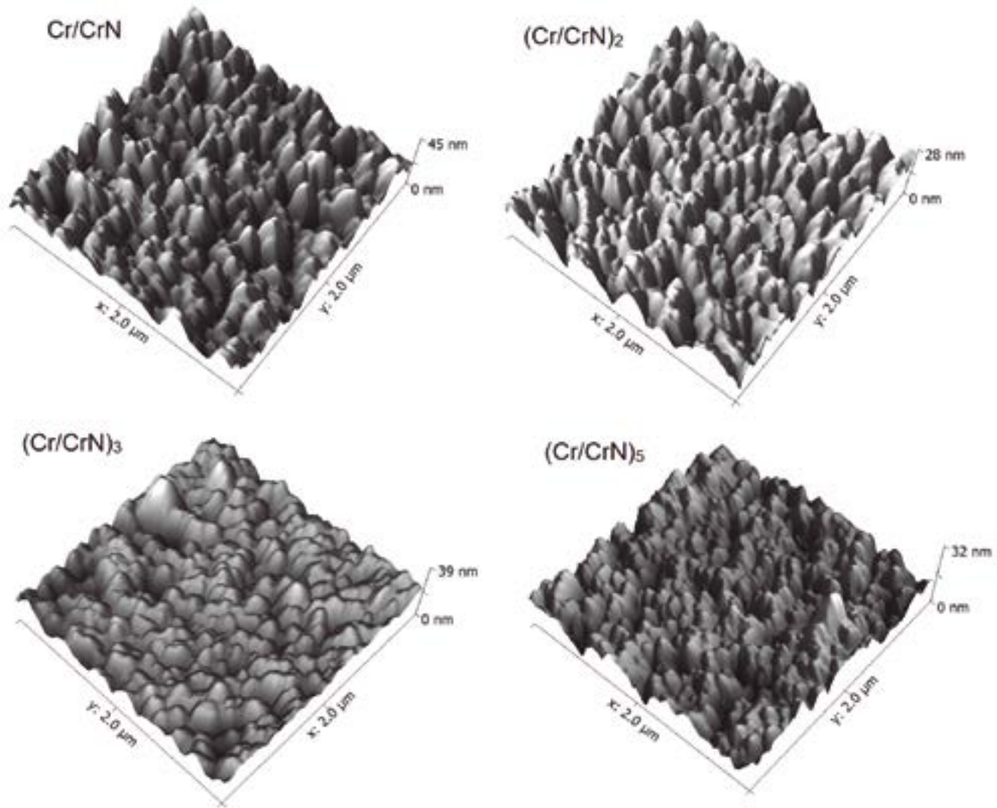

Figure 11. Morphological effect of multiple layers on the grain size of Cr/CrN thin films.

Dr. Juan Carlos Herrera Sánchez

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Structural Dynamics
- Damage Identification
- Performance-Based Earthquake Engineering.
- Nonlinear Dynamic and Static Analysis
- Wavelet Analysis
- Numerical methods

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Herrera's research interests include dynamic response of buildings, structural earthquake engineering, pushover analysis of reinforced concrete buildings, non-linear time history analysis of structures. His research is focused on global methods for structural damage identification based on the Frequency Response Function – FRF. Professor Herrera also uses Wavelet Transform to analyze seismic ground motions, as part of his work on Structural Earthquake Engineering. His contributions to the field include new indexes for structural damage identification.

ES

Los intereses de investigación del profesor Herrera incluyen la respuesta dinámica de los edificios, ingeniería sísmica estructural, análisis de empuje lateral de edificios de concreto reforzado y análisis cronológico no lineal de estructuras. Su investigación se enfoca en métodos globales para la identificación de daño estructural basados en la Función de Respuesta en Frecuencia (FRF). También utiliza la Transformada Wavelet para el análisis de movimientos sísmicos, como parte de su trabajo en ingeniería sísmica estructural. Entre sus contribuciones al campo se encuentran nuevos índices para la identificación de daño estructural.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/rQv9r

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Associate Professor

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate, Masters of Civil Engineering, Civil Engineering undergraduate.

EDUCATION |
EDUCACIÓN

- 2007-Present: Pontificia Universidad Javeriana Cali, Colombia.
- 2006: Lecturer, Caribbean University of Puerto Rico, Puerto Rico.
- 2001-2004: Teaching fellow, University of Puerto Rico, Mayagüez, Puerto Rico.
- 1994-1997: Adjunct instructor, Universidad del Valle, Cali, Colombia.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 2007-Present: Pontificia Universidad Javeriana Cali, Colombia.
- 2006: Lecturer, Caribbean University of Puerto Rico, Mayagüez, Puerto Rico.

HONORS AND MEMBERSHIPS |
HONORES Y MEMBRESÍAS

- Member Earthquake Engineering Research Institute (EERI), USA.
- Member Seismological Society of America (SSA), USA.

CONTACT INFORMATION |
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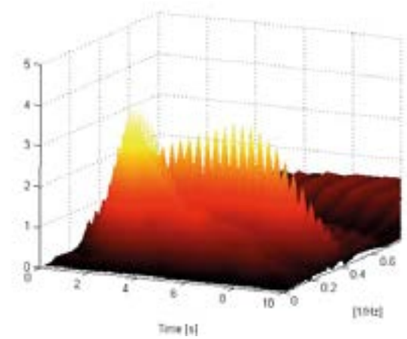

Figure 12. Wavelet Transform Coefficients-Seismic ground motion

Dr. Luis Fernando Macea Mercado

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Urban Mobility and Transportation
- Urban Policy and Planning
- Humanitarian Logistics

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Macea studies the development of complex models based on operation research, statistics and econometric theory to understand and predict the behavior of users of transport systems, thus allowing its designing and management. He also uses optimization tools and numerical analysis to model transport networks attending to their flows requirements and constraints. Some of his main interests are focused on the economic aspects of transportation as government regulatory policies and the valuation of its negative external effects (congestion, accidents, air pollution, noise and spatial segregation). His current efforts are focused on developing humanitarian logistics models to perform risk analysis as well as to conduct economic evaluation of humanitarian aid operations. One of his most significant contributions to this research field was the design and coding of a vulnerability assessment model of transportation networks for the decision making in humanitarian logistics.

ES

El profesor Macea estudia el desarrollo de modelos complejos basados en la investigación operativa, la estadística y la teoría econométrica para comprender y predecir el comportamiento de los usuarios de los sistemas de transporte, permitiendo así su diseño y gestión. También utiliza herramientas de optimización y análisis numérico para modelar redes de transporte atendiendo a sus requerimientos de flujos y restricciones. Algunos de sus principales intereses se centran en los aspectos económicos del transporte, como son las políticas reguladoras del gobierno y la valoración de sus efectos negativos (congestión, accidentalidad, contaminación del aire, ruido y segregación espacial). Sus esfuerzos actuales se centran en el desarrollo de modelos de logística humanitaria destinados al análisis de riesgos y a la evaluación económica de las operaciones de ayuda humanitaria. Una de sus contribuciones más significativas a este campo de investigación fue el diseño y codificación de un modelo de evaluación de la vulnerabilidad de las redes de transporte para la toma de decisiones en logística humanitaria.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/83ehb

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Associate professor

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Operations Management and Modeling Group (MGO). The Center of Excellence for Sustainable Urban Freight Systems (CoE-SUFS).

EDUCATION |
EDUCACIÓN

- 2017: Doctor in Civil Engineering, Transportation Engineering, Universidad del Norte, Barranquilla, Colombia.
- 2012: Master's in Civil Engineering, Transportation Engineering, Universidad del Norte, Barranquilla, Colombia.
- 2019: Especialist in Terrestrial Roads Engineering, Universidad del Cauca, Popayán, Colombia.
- 2014: Bachelor in Systems Engineering, Universidad de Córdoba, Montería, Colombia.
- 2007: Bachelor in Civil Engineering, Universidad de Cartagena, Cartagena, Colombia

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 2016-Present: Pontificia Universidad Javeriana, Cali, Colombia.
- 2013-2016: Universidad del Norte, Barranquilla, Colombia.
- 2019: Metro Cali S.A, Cali, Colombia.
- 2018-2021: Departamento Administrativo de Planeación Municipal del Distrito de Santiago de Cali, Cali, Colombia.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

- Javerian Biennial Award in Research 2023. Best research paper in recent years in the fields of natural sciences, environment, engineering, and technology. Pontificia Universidad Javeriana Cali, September 2023.
- Honorable Mention, Production and Operations Management Society, May 2017.
- Javeriano Biennial research prize. For the best research work in Engineering, Architecture, and design, Pontificia Universidad Javeriana, September 2017.

CONTACT INFORMATION |

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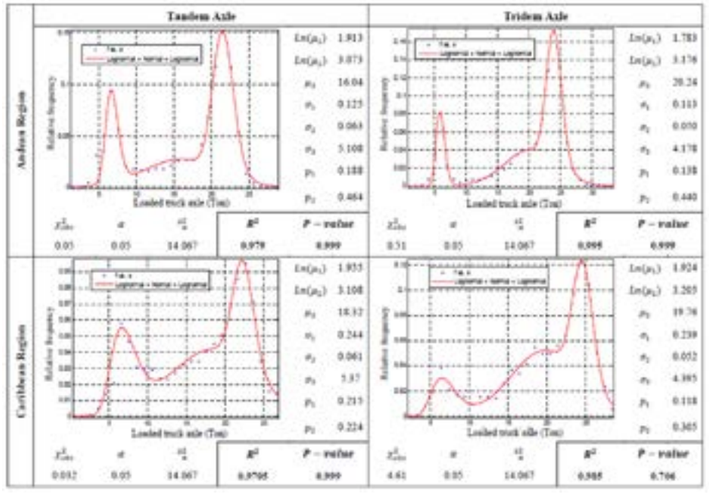

Figure 13. Load spectra and models of load spectrum for the Andean and Caribbean regions of Colombia.
Referencia: Macea, L. F., Fuentes, L. G., y Márquez, L. G. (2015). Characterization and development of closed form solutions for axle load spectra associated with trucks circulating the highways of Colombia. Revista Facultad de Ingeniería, Vol. 77, pp. 32-40.

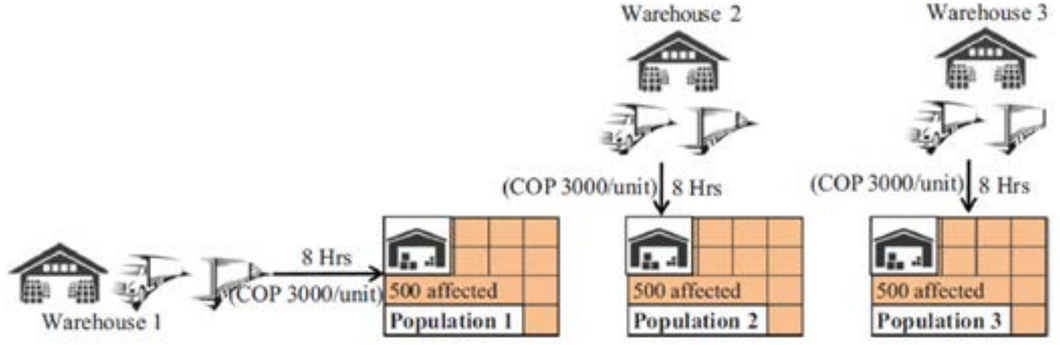

Figure 14. Scenarios for water distribution.
Reference: Macea, L.F., Amaya, J., Cantillo, V. and Holguin-Veras, J. (2018). Evaluating economic impacts of water deprivation in humanitarian relief distribution using stated choice experiments. International Journal of Disaster Risk Reduction. Vol. 28, pp. 427–438.

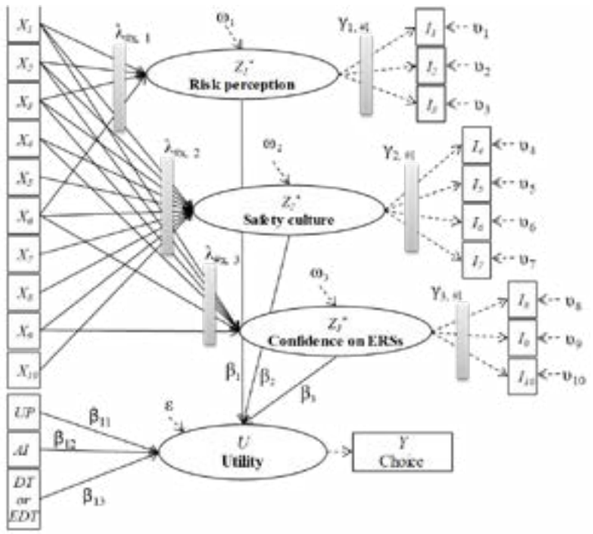

Figure 15. The Hybrid Latent Variable – Discrete Choice Models
Reference: Macea, L.F., Cantillo, V. and Arellana, J. (2018), Influence of attitudes and perceptions on deprivation cost functions. Journal of Transportation Research Part E: Logistics and Transportation Review. Vol. 112, pp. 125–141.

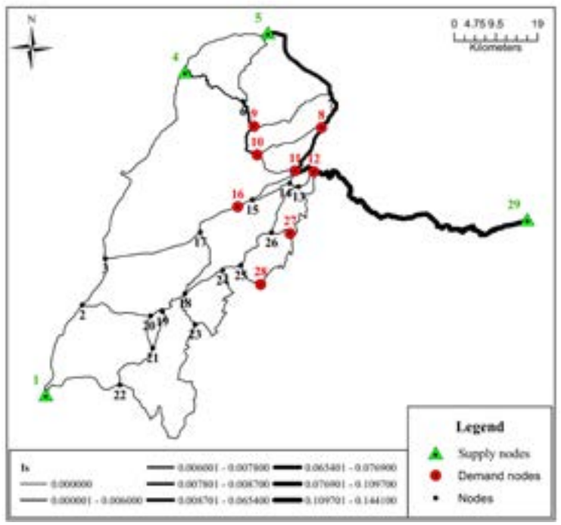

Figure 16. Critical links on the affected area
Reference: Cantillo, V., Macea, L.F. and Jaller, M. (2018), Assessing vulnerability of transportation networks for humanitarian relief operations. Networks and Spatial Economics, Vol. 17, No. 63, pp.1–31

Dr. Daniel Morillo Torres

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Scheduling Problems
- Routing and Logistic Problems
- Stochastic Optimization
- Combinatorial Optimization
- Metaheuristic Algorithms
- Mixed-integer Linear Programming
- Artificial Intelligence
- Multi-objective Optimization

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

In recent years, professor Morillo has worked on the optimization of vehicle routing problems, activity or project sequencing problems and staff scheduling problems. The models developed by the professor consider both deterministic systems and those that include stochastic or disruptive events. The main tools used to solve these problems include integer-mixed linear programming, evolutionary algorithms, variable neighborhood search, tabu search, constructive heuristics, local search, two-stage optimization and Monte Carlo simulation.

ES

En los últimos años, el profesor Morillo ha trabajado en la optimización de problemas de ruteo de vehículos (routing problems), de secuenciación de actividades o proyectos (scheduling problems) y de asignación de personal (staff scheduling problems). Los modelos desarrollados por el profesor consideran tanto sistemas determinísticos como aquellos que incluyen eventos estocásticos o disruptivos. Dentro de las principales herramientas usadas para la resolución de estos problemas se destacan la programación lineal entera-mixta, algoritmos evolutivos, búsqueda en vecindad variable, búsqueda tabú, heurísticas constructivas, búsqueda local, optimización en dos etapas y simulación Monte Carlo.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/5aFj3

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Associate Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

A robust approach to the optimization of the Resource-Constrained Project Scheduling Problem (founded by MinCiencias).

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Modelamiento y gestión de operaciones (MGO) and Inteligencia Artificial, Planificacion y Scheduling (AI-GPS).

EDUCATION |
EDUCACIÓN

- 2017: Ph.D. in Informatics at the Universitat Politécnica de Valéncia, Spain.
- 2012: Master of Science in Systems Engineering at the Universidad Nacional de Colombia, sede-Medellín, Colombia.
- 2010: Bachelor in Industrial Engineering at the Universidad Nacional de Colombia, sede-Medellín, Colombia.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 2018 – present: Professor, Department of Civil and Industrial Engineering, Faculty of Engineering, Pontificia Universidad Javeriana - Cali, Colombia.
- 2021 – 2021, Adjunct Professor, Faculty of Engineering, Universidad de la Costa, Colombia.
- 2021 - 2021 Adjunct professor Universidad Andres Bello - Santiago, Chile.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

- 2021 Jóvenes Investigadores, Colombian Ministry of Science Technology and Innovation (MinCiencias).
- 2019 Alianza Pacífico, international scholarship for a research stay at Andres Bello University in Chile.
- 2017 Cum laude thesis granted by the Doctoral School of Universitat Politècnica de València
- 2015 Doctorado en el Exterior, announcement number 728, Colombian Administrative Department of Science, Technology and Innovation (ColCiencias).
- 2013 EnlazaMundos program of the High Education Agency (Sapiencia) and the Mayor office of Medellín, Colombia.

CONTACT INFORMATION |

INFORMACIÓN DE CONTACTO

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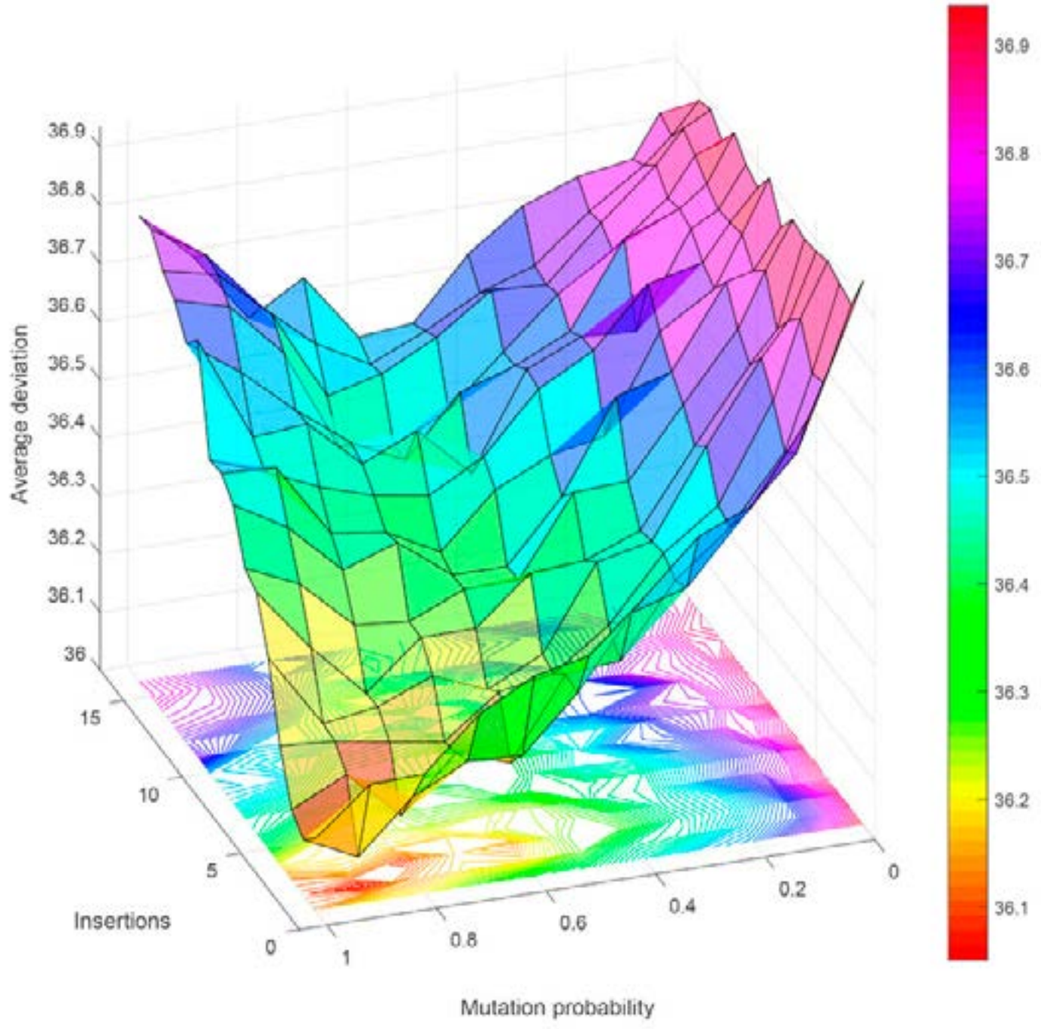

Figure 17. Makespan average deviations depending on the number of insertions and the mutation probability per solution for 600 scheduling instances with 120 activities each.

Dr. Francisco Muñoz Prado

RESEARCH INTERESTS |

INTERESES DE INVESTIGACIÓN

- Design & Control of Production Systems
- Simulation of Stochastic Systems
- Decentralized Decision-Making
- Agri-Food Supply Networks
- Cyber-Collaborative Systems

RESEARCH SUMMARY |

RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Munoz studies cyber-methods for collaborative real-time control of decentralized engineered systems. Some of the methods applied in his research include the development of protocols for demand and capacity sharing in collaborative networks of enterprises, dynamic resource allocation based on social welfare functions, and decentralized decision support systems. He has investigated the application of these approaches to problems in collaborative distribution networks of perishable products, harvesting and transportation operations in agri-food systems, equipment-sharing in agriculture, data routing in wireless sensor networks, ambulance dispatching in emergency systems, task-allocation in collaborative multi-robot systems, group decision-making in intelligent shared environments, and resource-sharing in cyber-physical systems.

ES

El profesor Muñoz estudia ciber-métodos para el control colaborativo en tiempo real de sistemas descentralizados de ingeniería. Algunos de los métodos aplicados en su investigación incluyen el desarrollo de protocolos para compartir capacidad y demanda en redes colaborativas empresariales, asignación dinámica de recursos basada en funciones de bienestar social y sistemas descentralizados de soporte de decisión. El profesor ha investigado la aplicación de estos métodos a problemas en redes colaborativas de distribución de productos perecederos, operaciones de cosecha y transporte en sistemas de producción de alimentos, sistemas de agricultura con maquinaria compartida, transmisión de datos en redes de sensores inalámbricos, asignación de ambulancias en sistemas de emergencia, asignación de tareas en sistemas colaborativos multi-robot, toma de decisiones grupales en ambientes inteligentes y sistemas ciber-físicos con recursos compartidos.

GOOGLE SCHOLAR |

GOOGLE ACADÉMICO

t.ly/AUjgK

ACADEMIC TITLE |

TÍTULO ACADÉMICO

Assistant Professor

PROGRAM/GROUP AFFILIATIONS |

AFILIACIONES

Engineering and Applied Sciences Doctorate, Master´s in Engineering (Industrial Engineering), Bachelor in Industrial Engineering, and Operations Management and Modeling Group (MGO).

EDUCATION |

EDUCACIÓN

- 2022: Ph.D. in Industrial Engineering, Purdue University, USA.
- 2013: Master of Science in Finance, Universidad ICESI, Colombia.
- 2009: Specialist in Logistics Management, Universidad ICESI, Colombia.
- 2005: Bachelor of Science in Industrial Engineering, Pontificia Universidad Javeriana Cali, Colombia.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 2014 – Present: Assistant Professor, Pontificia Universidad Javeriana Cali.
- 2013 – 2014: Senior Business Process Management Consultant, Ankara Solutions.
- 2010 – 2011: National Logistics Coordinator, Cadbury Adams.
- 2008 – 2010: Supply-Chain Management Specialist, Kraft Foods Colombia.
- 2007 – 2008: Continuous Improvement Coach, Kraft Foods Colombia.
- 2006 – 2007: Operations Planner, Dinalsa.
- 2005 – 2006: Production and Inventory Planner, Fesa.
- 2004 – 2005: Regional Distribution Logistics Analyst, Movistar.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

- Member of Institute of Industrial and Systems Engineers (IISE).
- Faculty Advisor of IISE Chapter 699, Pontificia Universidad Javeriana Cali, 2022.
- Fulbright scholarship cohort 2018 (ranked first position in the country), Fulbright Colombia.
- Outstanding Teaching Award (2014, 2015, 2016, and 2017), Pontificia Universidad Javeriana Cali.
- Academic and Human Excellence Award, Pontificia Universidad Javeriana Cali, 2005.
- Undergraduate Thesis Excellence Award, Pontificia Universidad Javeriana Cali, 2005.
- Classified into National Top Ten Industrial Engineers according to ECAES National Exam, Instituto Colombiano para la Evaluación de la Educación Superior, 2004.
- First place in Regional Math-Olympics, Universidad Autónoma de Occidente, 2003.
- First place in the qualifying round of the Universidad Javeriana to the National Math-Olympics Finals, 2002.

CONTACT INFORMATION |

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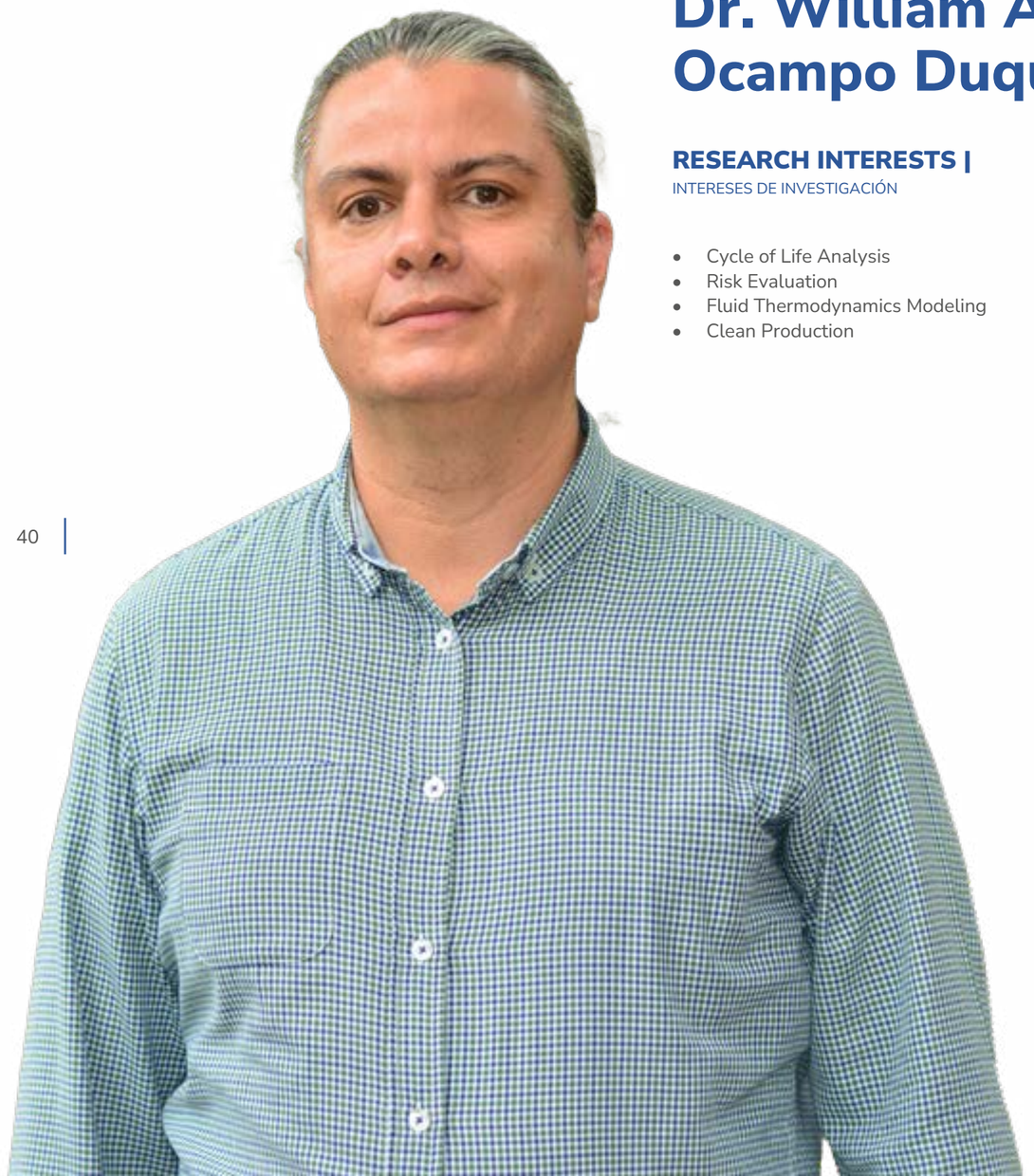

Dr. William Andrés Ocampo Duque

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Cycle of Life Analysis
- Risk Evaluation
- Fluid Thermodynamics Modeling
- Clean Production

EN

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

Professor Ocampo focuses on the investigation of problems associated with the irreversible environmental impact caused by production activities. Particular interest is placed on those caused by water and air contamination, development of renewable energy sources, and dangerous residues. He uses experimental, analytical and computational methods to characterize the presence of contaminants in the environment and their impact on human and ecosystem's health. Physicochemical and biological processes that must be understood govern the mobility of chemical substances in the environment. Prof. Ocampo has contributed with new models for the evaluation of water and air quality, analytical methods for the control of contamination, and heads the environmental quality laboratory at the Javeriana University with ISO 17025 protocols.

ES

La investigación del profesor Ocampo se enfoca en problemas asociados con el impacto ambiental irreversible causado por las actividades de producción. De su particular interés son los daños al recurso hídrico y al aire, los residuos contaminantes y el desarrollo de fuentes de energía renovables. Emplea experimentos y métodos analíticos y computacionales para caracterizar la presencia de contaminantes en el ambiente y su impacto sobre la salud humana y del ecosistema. De la misma manera, estudia los procesos físico-químicos y biológicos que deben ser elucidados para comprender la movilidad de sustancias químicas en el ambiente. El profesor ha contribuido con modelos novedosos para la evaluación de la calidad del agua y el aire, y métodos analíticos para el control de la contaminación. Lidera, con protocolos ISO 17025, el laboratorio de calidad ambiental en la Universidad Javeriana.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/0d4cW

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Full Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

- Pesticide measurements and characterization
- Characterization of PCBs in electrical transformer oils
- Variables measurement in water quality
- Toxicological assays.

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate, Master's of Engineering, Bachelors in Engineering.

EDUCATION |
EDUCACIÓN

- 2004-2008: Doctor in Chemical Engineering, Rovira i Virgili University.
- 2000: Master's in Chemical Engineering, Universidad del Valle, Cali, Colombia
- 1995: Bachelor of Science in Chemical Engineering, Universidad del Valle, Cali, Colombia

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 2001-Present: Pontificia Universidad Javeriana, Cali, Colombia.
- 1996: Universidad del Valle, Cali, Colombia.

CONTACT INFORMATION |

INFORMACIÓN DE CONTACTO

wocampo@javerianacali.edu.co
Office: Guayacanes Building, Enviromental research laboratory - LIA

Figure 18. Proffesor Ocampo setting up a measurement experiment in the industrial process laboratory

Dr. Iván Fernando Otálvaro Calle

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Coupled Problems for Mechanical Behavior
- Unsaturated Soil Hidromechanical Behavior
- Construction and Demolition Waste in Civil Works
- Soil Dynamics Site Response
- Wattle and Daub Construction

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Otálvaro's research is focused on mechanical behavior of porous materials, particularly on problems associated with coupled hydraulic and mechanical response, constitutive models and unsaturated geomaterials. Typical applications include: tropical soil landslides under transient rain infiltration, shear strength and deformation response of the tropical unsaturated soils, amount estimation and use of the construction and demolition waste, and recent, wattle and daub construction for rural housing. He has contributed with how to better understand the hydraulic conductivity function for experimental and numerical modeling.

ES

La investigación del profesor Otálvaro está enfocada en caracterizar el comportamiento mecánico de materiales porosos, particularmente en problemas asociados con el acoplamiento en las respuestas hidráulicas y mecánicas, en la formulación de modelos constitutivos en geomateriales no saturados. Las aplicaciones típicas de su trabajo incluyen: el análisis de estabilidad de taludes y laderas en zonas tropicales considerando análisis acoplados con flujo de agua transiente, la respuesta mecánica en resistencia y deformaciones de suelos tropicales no saturados, y el análisis de generación y alternativas de aprovechamiento de residuos de construcción y demolición, y recientemente en el análisis de edificaciones construidas en bahareque de tierra. Ha contribuido a entender la función de permeabilidad hidráulica del suelo desde el análisis experimental y la modelación numérica de problemas de contorno.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/9JZxg

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Associate Professor

CURRENT POSITION |
POSICIÓN ACTUAL

Civil and industrial engineering department director.

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

Rural ecohousing with wattle and daub construction (Propuesta de edificación rural eco-amigable con muros de bahareque no cementado).

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate, Master's of Engineering, Civil Engineering and Seismic Engineering, Materials and Transportation (SIGMA) research group

EDUCATION |
EDUCACIÓN

- 2013: Doctor in Geotechnics, Brasilia University, Brasilia, Brasil.
- 2005: Master's in Engineering, Geotechnics, Universidad Nacional de Colombia, Medellín, Colombia.
- 2001: Bachelor of Science in Civil Engineering, Universidad Nacional de Colombia, Medellín, Colombia.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 2007-Present: Pontificia Universidad Javeriana, Cali, Colombia.
- 2008, 2009, 2014, 2017: Part-time Professor Master of Highway Engineering, Universidad Autónoma Juan Misael Saracho, Tarija, Bolivia.
- 2013, 2017, 2019: Part-time professor, Master of Engineering, Universidad del Valle, Cali, Colombia.
- 2006: Instructor, Universidad de Medellín, Medellin, Colombia.
- 2004-2007: Instructor, Universidad Nacional de Colombia, Medellín, Colombia
- 2006: Instructor Master of Engineering – Geotechnics, Universidad Nacional, Medellín, Colombia.
- 2002: Young research, Universidad EAFIT, Medellín, Colombia.

CONTACT INFORMATION |

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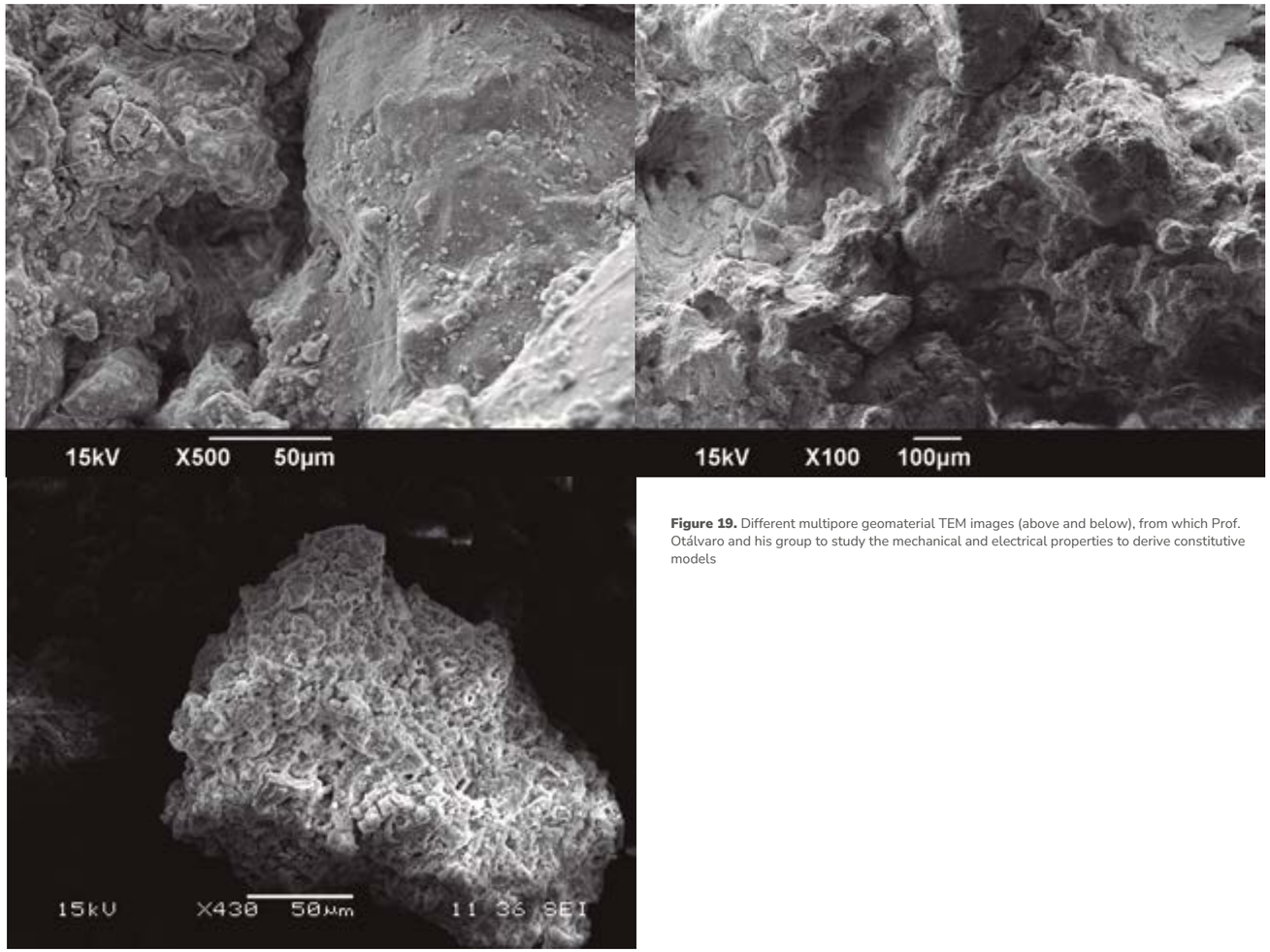

Figure 19. Different multipore geomaterial TEM images (above and below), from which Prof. Otálvaro and his group to study the mechanical and electrical properties to derive constitutive models

Dr. Juan Camilo Paz Roa

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Real-Time Resource Assignment
- Computational Simulation
- Decisions Optimization
- Data Analytics
- Supply Chain
- Vehicle Routing
- Scheduling

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Dr. Juan Paz is an industrial engineering researcher specializing in data analytics, simulation, and optimization for decision-making. His research portfolio spans electric vehicle routing, supply network redesign, stochastic production schedule optimization, simulation-based construction project scheduling, and real-time resource allocation. Dr. Paz adopts a holistic system-thinking approach to tackle complex decision challenges within production, distribution, and service systems. His work centers on enhancing sustainability and societal well-being by leveraging innovative decision models that consider interactions with emerging technologies and policies. Presently, Dr. Paz is focused on creating decision support tools for AI-driven real-time resource allocation in emergency operations and investigating the impact of emerging AI technologies and policies on healthcare systems.

ES

El Dr. Juan Paz es investigador en ingeniería industrial especializado en analítica de datos, simulación y optimización para la toma de decisiones. Su cartera de investigación abarca rutas de vehículos eléctricos, rediseño de redes de suministro, optimización del cronograma de producción estocástica, programación de proyectos de construcción basada en simulación y asignación de recursos en tiempo real. El Dr. Paz adopta un enfoque holístico de pensamiento sistémico para abordar desafíos de decisiones complejas dentro de los sistemas de producción, distribución y servicios. Su trabajo se centra en mejorar la sostenibilidad y el bienestar social aprovechando modelos de decisión innovadores que consideran las interacciones con tecnologías y políticas emergentes. Actualmente, el Dr. Paz se centra en la creación de herramientas de apoyo a la toma de decisiones para la asignación de recursos en tiempo real impulsadas por IA en operaciones de emergencia y en la investigación del impacto de las tecnologías y políticas emergentes de IA en los sistemas de atención médica.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/lY5Ou

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Assistant Professor

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Operations Management and Modeling Group (MGO).

EDUCATION |
EDUCACIÓN

- 2023: Ph.D. in Industrial Engineering, Purdue University, USA
- 2017: Master of Science in Engineering, Industrial Engineering concentration, Pontificia Universidad Javeriana, Cali, Colombia
- 2014: Bachelor of Science in Industrial Engineering, Universidad del Valle, Cali, Colombia

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 2017 - Present: Appointed Faculty Professor, Pontificia Universidad Javeriana Cali
- 2015 - 2017: Part-Time Lecturer, Pontificia Universidad Javeriana Cali
- 2016 - 2017: Research Assistant, Universidad Tecnológica de Pereira
- 2015 - 2016: Algorithms Developer, Integra S.A.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

- 2021 IISE Annual Conference Best Student Paper Competition, 2nd place in the Supply Chain and Logistics Division
- 2018 Fulbright-Minciencias Scholarship for PhD Studies
- INFORMS member since 2022
- IISE member since 2021

CONTACT INFORMATION |

INFORMACIÓN DE CONTACTO

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Office: Engineering Building, No. 2-24

Figure 20. Professor Juan Camilo Paz in the IISE Conference

Dr. Diego Dario Pérez Ruiz

RESEARCH INTERESTS |

INTERESES DE INVESTIGACIÓN

- Clean Production
- New Materials for Construction and Civil Engineering
- Dispersion of Contaminants in Porous Materials
- Soil Behavior and improvement

RESEARCH SUMMARY |

RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Perez's research spans the use of recyclable materials, sustainability in geotechnical engineering, expansive and partially saturated soils, improvement of soils, transportation of contaminants in water bodies through porous materials. Prof. Perez works on both constitutive modeling and experimental approaches. He has made significant contributions to the use of recycled materials for improving expansive soils and hydraulic and asphaltic concrete via rubber, fly ash, iron and aluminum filings, residual glass, construction and demolition cull, and vitrified clay.

ES

El profesor Pérez investiga sobre el uso de materiales reciclables, sostenibilidad en ingeniería geotécnica, suelos expansivos y parcialmente saturados, mejoramiento de suelos, transporte de contaminantes en cuerpos de agua a través de materiales porosos. Trabaja en modelos constitutivos y en aproximaciones experimentales. Ha logrado contribuciones significativas con la aplicación de materiales reciclados en el mejoramiento de suelos expansivos y concretos asfálticos e hidráulicos, incluyendo el uso de residuos de caucho, cenizas volátiles, hierro, aluminio, vidrio, desechos de construcción y demolición, y arcilla vitrificada.

GOOGLE SCHOLAR |

GOOGLE ACADÉMICO

t.ly/_OxlO

ACADEMIC TITLE |

TÍTULO ACADÉMICO

Full time Professor

PROGRAM/GROUP AFFILIATIONS |

AFILIACIONES

Engineering and Applied Sciences Doctorate, Master's of Engineering (Civil emphasis), Bachelor of Science in Civil Engineering, and Contaminants Detection and Remediation (DECOR) research group.

EDUCATION |

EDUCACIÓN

- 2009: Doctor in Civil Engineering, University of Texas, Arlington, Texas, USA.
- 1991: Master in Engineering Transport and Transit, Universidad del Cauca, Popayán, Colombia.
- 1994: Master in Civil Engineering, Universidad de Puerto Rico, Mayagüez, Puerto Rico.
- 1987: Bachelor of Science in Civil Engineering, Universidad del Cauca, Popayán, Colombia.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 2000-Present: Pontificia Universidad Javeriana, Cali, Colombia.
- 1995-2000: Universidad del Cauca, Popayán, Colombia.
- 1994: Instituto Colombiano de Geología y Minería.
- 1994: Universidad de Puerto Rico, Mayagüez, Puerto Rico.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

Corona Pro Habitat Prize, Corona Foundation, Colombia (2011), and Outstanding graduate student, University of Texas at Arlington, Arlington, Texas, USA.

CONTACT INFORMATION |

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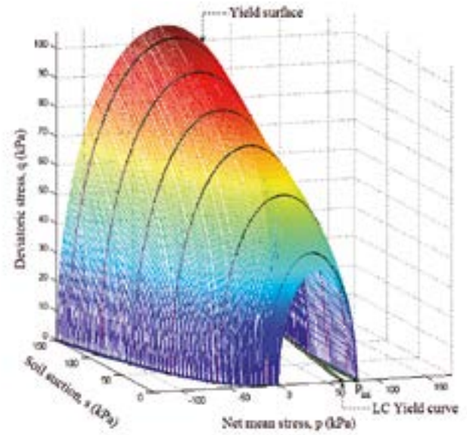

Figure 21. Geomechanical constitutive model from Prof. Perez and his group accurately captures the deviatoric stress response to soil suction and net mean stress

Dr. José Luis Ramírez Duque

RESEARCH INTERESTS |

INTERESES DE INVESTIGACIÓN

- Energy Efficiency and Renewable Energy
- Energy Management Systems (Standard ISO 50001)
- Biotechnology
- Exergy Analysis and Thermo-Economic Evaluation of Industrial Processes
- Multiphase Pumping Systems
- Modeling and Simulation of Thermo-Hydraulic Systems

RESEARCH SUMMARY |

RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor José Luis Ramirez studies Thermodynamics, heat transfer and fluid mechanics application in physical phenomena Modeling and Simulation, which are important to characterize and evaluate industrial processes. He is also interested in rational energy use and sustainable development. He has conducted research about the following topics: Exergy and thermo-economic analysis of distilleries for ethanol production, renewable energy projects related to the development of technologies for micro-algal biomass production, and performance evaluation of twin-screw multiphase pumps for oil gathering Systems.

ES

El profesor José Luis Ramírez estudia la aplicación de la termodinámica, la transferencia de calor y la mecánica de fluidos en el modelado y simulación de fenómenos físicos importantes para la caracterización y evaluación de procesos industriales. Además, tiene interés en el uso racional de la energía y el desarrollo sostenible. Ha desarrollado investigaciones en los siguientes temas: Análisis exergético y termo-económico de destilerías para la producción de alcohol carburante, proyectos en energías renovables relacionados con el desarrollo de tecnologías para la producción de biomasa a partir de micro-algas, y evaluar el desempeño de bombas multifásicas de doble tornillo utilizadas en sistemas para la extracción de petróleo.

GOOGLE SCHOLAR |

GOOGLE ACADÉMICO

t.ly/J3hsK

ACADEMIC TITLE |

TÍTULO ACADÉMICO

Associate Professor

PROGRAM/GROUP AFFILIATIONS |

AFILIACIONES

Engineering and Applied Sciences Doctorate, Master´s of Engineering, Bachelor in Industrial Engineering.

EDUCATION |

EDUCACIÓN

- 2016: Ph.D. in Mechanical Engineering (Energy and Fluids), Universidad de São Paulo, São Paulo, Brasil.
- 2008: Master of Science in Mechanical Engineering (Thermal Sciences), Universidad del Valle, Cali, Colombia.
- 2002: Bachelor of Science in Mechanical Engineering, Universidad Tecnológica de Pereira, Pereira, Colombia.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 2016-Actually. Full time professor, Industrial Engineering, Universidad Javeriana, Cali, Colombia.
- 2008-2012. Full time professor, Mechanical Engineering, Universidad Autónoma de Occidente, Cali, Colombia.
- 2006-2008. Teaching Assistant, Mechanical Engineering, Universidad del Valle, Cali, Colombia.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

PhD Scholarchip in Brasil supported by Petrobras, Brasil. MSc Scholarchip supported by Universidad del Valle, Colombia.

CONTACT INFORMATION |

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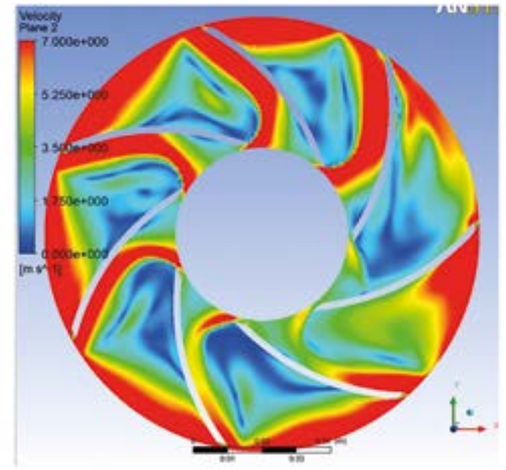

Figure 22. Water velocity on the XY plane in the rotary fluid domain (impeller)

Dr. Manuel Alejandro Rojas Manzano

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Mitigation Strategies for Autogenous Shrinkage in High Strength Concrete
- Use of Alternative and Sustainable Building Materials
- Strengthening of Concrete Structures using Fiber-Reinforced Polymer (FRP) Composites
- Concrete Building Pathology
- Concrete Technology

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Rojas' research focuses on the study of strategies for mitigation of autogenous shrinkage in high strength concretes, especially superabsorbent polymers (SAP). In general, it´s oriented to develop studies on characterization, dosage, application, fresh and hardened properties (mechanical, elastic and durability) of conventional and special concretes (high performance concrete, self-compacting concrete, fiber reinforced concrete and others). Additionally, Professor Rojas promotes researches to characterize sustainable alternative materials using different techniques that enable their use to reduce the emission of global warming gases. Another area of interest is the study of the main pathological manifestations and their associated (related, derived) problems that occur and affect the concrete structures in order to avoid their appearance. Finally, professor Rojas studies the application of rehabilitation techniques of concrete structures.

ES

La investigación del profesor Rojas se enfoca en el estudio de estrategias de mitigación de la retracción autógena en concretos de alta resistencia, especialmente los polímeros superabsorbentes (PSA). En términos generales, está orientada en desarrollar estudios sobre caracterización, dosificación, aplicación, propiedades en estado fresco y endurecido (mecánicas, elásticas y de durabilidad) de concretos convencionales y especiales (concreto de alto desempeño, concreto autocompactante, concreto reforzado con fibras, etc.). Adicionalmente, promueve investigaciones con el objetivo de caracterizar y estudiar, por medio de diferentes técnicas, materiales alternativos sostenibles y así viabilizar su utilización para reducir la emisión de gases de calentamiento global. Otra área de interés es el estudio de las principales manifestaciones patológicas que se producen en las estructuras de concreto con el fin de evitar su aparición y aumentar el conocimiento para el correcto diagnóstico de las causas y el origen de los problemas, así como la aplicación de las técnicas de recuperación de esas estructuras.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/AomcS

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Associate Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

Proposal for a Solution to the Affordable Housing Shortage in Southwest Colombia using Aerated Concrete Blocks Technology – Stage 1: Prototype Design and Wall Evaluation. (Pontificia Universidad Javeriana Cali).

Study on the Reduction of Particle Size of Aluminum Slag Used as Partial Replacement for Cement in the Mechanical Properties of Mortars. (Pontificia Universidad Javeriana Cali).

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate, Master's of Masters of Engineering (Civil Engineering), Civil Engineering undergraduate and Seismic Engineering, Materials and Transportation (SIGMA) research group.

EDUCATION |

EDUCACIÓN

- 2016: Doctor in Structures and Civil Construction, Universidade de Brasilia, Brasilia, Brasil.
- 2012: Master's in Structures and Civil Construction, Universidade de Brasilia, Brasilia, Brasil.
- 2011: Specialization in Construction Business Administration, Universidad del Valle, Cali, Colombia.
- 2004: Bachelor of Science in Civil Engineering, Universidad del Cauca, Popayán, Colombia.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 2016: Pontificia Universidad Javeriana, Cali, Colombia.
- 2013: Part-time Professor, Universidade de Brasilia, Brasilia, Brasil.
- 2005-2011: Constructor Engineer, Comité de Cafeteros del Valle, Cali, Colombia .

CONTACT INFORMATION |

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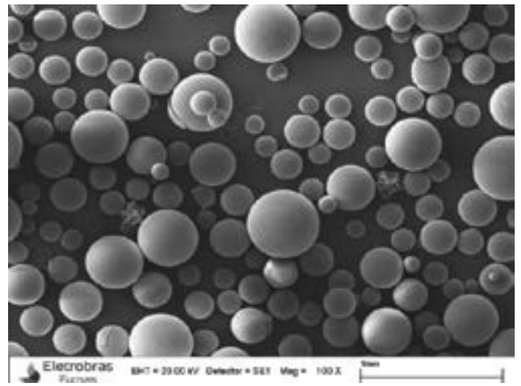
Figure 23. Peeling-off of Glass Fiber Reinforced Polymer (GFRP) laminate and rupture of concrete beam



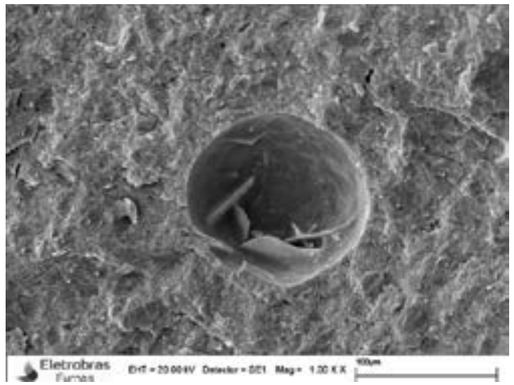


Figure 24. ESEM pictures: a) Superabsorbent Polymer (SAP) in the dry state and b) dry pore left behind by a SAP particle in hardened cement paste after drying

Dr. María Fernanda Serrano Guzmán

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- New Materials Applied in Construction
- Utilization of Industrial Waste
- Cleaner Production Technologies
- Evaluation of Cost Control Systems
- Programming and Private and Public Procurement
- Influence of Logistics in Construction Management
- Teaching Strategies for Civil Engineering

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Serrano is the leader of the DeCoR Research Group which focuses on the use of industrial waste for the preparation of asphalt mixtures, concrete and mortar. Additionally, she has conducted research on water quality, soil improvement and remediation, and environmental and groundwater impact studies.

ES

La profesora Serrano lidera el grupo de investigación DeCoR, enfocado en el uso de desechos materiales para la preparación de mezclas asfálticas, concretos y morteros. También conduce investigaciones sobre calidad de agua, mejoramiento y remediación de suelos y estudios de impacto sobre acuíferos.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/TihvW

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Full Professor

EDUCATION |
EDUCACIÓN

- 2008: Doctor in Civil Engineering, Universidad de Puerto Rico, Mayaguez Campus.
- 2007: Magister in Engineering, Universidad de Puerto Rico, Mayaguez Campus.
- 1999: Especialization in environmental engineering, Universidad Pontificia Bolivariana, Sectional Bucaramanga.
- 1996: Especialization in Construction Project Management, Universidad Industrial de Santander.
- 1993: Civil Engineering, Universidad Industrial de Santander.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 2015-present: Professor, Pontificia Universidad Javeriana, Cali,
- 2008-2015: Director General of Research. Universidad Pontificia Bolivariana. Bucaramanga. January 2008 - June 2015.
- 1995-2015: Lecturer, Universidad Pontificia Boliva¬riana, Bucaramanga. June 1995 - June 2015.

HONORS AND MEMBERSHIPS |
HONORES Y MEMBRESÍAS

- Premio Ecopetrol Innovacion 2009. Otorgado por Ecopetrol y el Instituto Colombiano del Petróleo en Bucaramanga.
- Premio Coronoa Pro-hábitat, 2011. Otorgado por la organización Corona en Bogotá.

CONTACT INFORMATION |
INFORMACIÓN DE CONTACTO

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Electronics and Computer Science Department

3.

Electronics and Computer Science Department

DIRECTOR

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LIST OF PROFESSORS **PAGE**

Dr. Jaime Alberto Aguilar Zambrano

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Engineering Design Methodologies
- Problem Solving in Multi-Disciplinary Teams
- Products for the Disabled
- Product Design

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Aguilar's research focuses on structured engineering design methodologies using interdisciplinary teams working towards a common user- oriented set of goals.

Product design from interdisciplinary teams requires integrating a larger number of methodological viewpoints and expertise in order to validate the effectiveness of the team on the common user-oriented goals. Dr. Aguilar has proposed the Expanded Model of Axiomatic Design, as a converging model between the Theory of Inventive Problem Solving (TRIZ) and Axiomatic Design, as a rational design methodology.

The Expanded Model of Axiomatic Design has been successfully applied to the design of products for the disabled, and is currently being instantiated in other industrial applications.

ES

El profesor Aguilar investiga sobre metodologías de diseño estructurado en ingeniería, particularmente para diseño a cargo de equipos interdisciplinares trabajando para alcanzar objetivos comunes orientados por el usuario.

El diseño de productos a cargo de equipos interdisciplinares requiere de la integración de un gran número de experticias y puntos de vista metodológicos con el fin de validar su efectividad para lograr objetivos.

El profesor Aguilar ha desarrollado el Modelo de Diseño Axiomático Ampliado, el cual converge entre la Teoría de Solución Inventiva de Problemas (TRIZ) y el Diseño Axiomático, como una metodología racional de diseño.

Ha sido aplicado de manera exitosa en el diseño de productos para personas en condición de discapacidad y actualmente está siendo instanciado en otras aplicaciones industriales.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/ZUYtJ

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Full time Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

Respiratory Incentive System For Remote Physiotherapy Of Patients With Covid-19 Sequelae (Minciencias).

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate, Master in Engineering, bachelor in Electronic Engineering and Robotics and Automation Group (GAR).

EDUCATION |
EDUCACIÓN

- 2010: Doctor in Engineering, Projects and innovation, Universidad Politécnica de Valencia, Valencia, España.
- 2006: Specialization in Engineering and Innovation Projects, Universidad Politécnica de Valencia, Valencia, España.
- 1997: Master's in Automation, Universidad del Valle, Cali, Colombia.
- 1991: Bachelor of Science in Electrical Engineering, Universidad del Valle, Cali, Colombia.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

1994-Present: Pontificia Universidad Javeriana, Cali, Colombia.

CONTACT INFORMATION |

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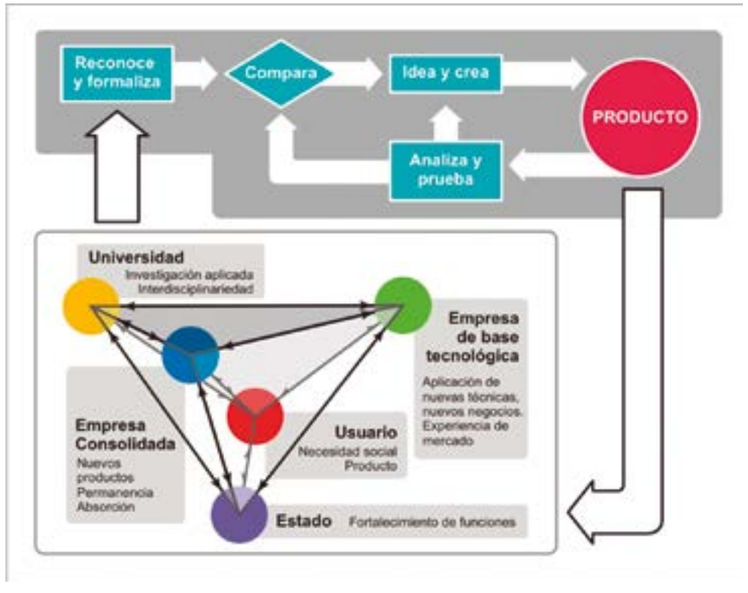

Figure 25. User Centered Multidisciplinary Design.

Figure 26. Wheelchair design for improved mobility, flexibility and comfort (initial sketches, functional design and 3D render shown above).

Dr. Gloria Inés Álvarez Vargas

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Machine Learning
- Natural Language Processing

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Alvarez conducts research on machine learning. She uses grammatical inference methods, neural networks, support vector machines and deep networks. She also researches on natural language processing and the application of machine learning in that area. She has contributed with new algorithms and their application in the solution of prediction problems in a variety of domains.

ES

La profesora Álvarez investiga sobre aprendizaje automático. Para ello utiliza tanto métodos de inferencia gramatical, como redes neuronales, máquinas de vectores de soporte y redes profundas. También investiga sobre procesamiento de lenguaje natural y la aplicación de aprendizaje automático en esa área. Ella ha contribuido con nuevos algoritmos y su aplicación en la solución de problemas de predicción en una variedad de dominios.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

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ACADEMIC TITLE |
TÍTULO ACADÉMICO

Titular Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

Prediction of Therapeutic Outcome in Leishmaniasis Treatment Using Machine Learning Techniques. (Collaboration on the CIDEIM-ICESI Project.).

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate, Master's of data Science, Master's of Engineering (Systems and Computer Engineering emphasis), Bachelor in Systems and Computer Engineering) and DESTINO research group.

EDUCATION |
EDUCACIÓN

- 2007: Doctor in Engineering, Universidad Politécnica de Valencia, Valencia, España.
- 1994: Masters in Systems and Computation, Universidad de los Andes, Bogotá D.C., Colombia.
- 1989: Bachelor in Systems Engineering, Universidad Autónoma de Manizales, Manizales, Colombia.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 1997-Present: Pontificia Universidad Javeriana, Cali, Colombia.
- 1990-1998: Professor. Universidad Autónoma de Manizales, Colombia.

CURRENT POSITION |
POSICIÓN ACTUAL

Director of the Master's Program in Data Science

CONTACT INFORMATION |
INFORMACIÓN DE CONTACTO

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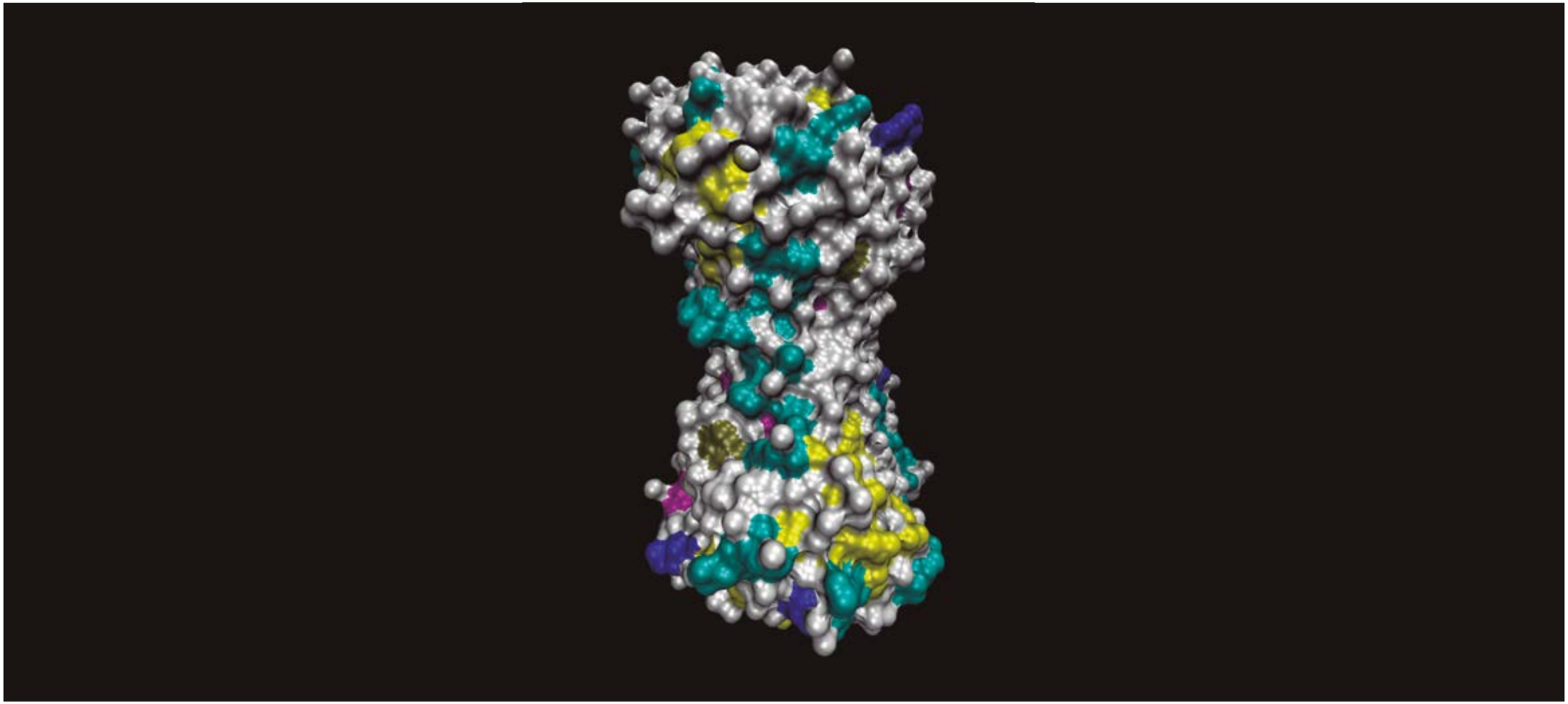

Figure 27. Automatic segmentation of protein complexes from primary structure. Catalytically active proteases of the tobacco etch virus - TEVp (polyvirus)

P1/Hc-Pro: 304 | 609 | 305 | 610 | 295 Hc-Pro/P3: 763 | 904 | 992 | 550 | 764 P3/6k1: 1110 | 1134 6k1/Ci: 1163 | 1162 Ci/6k2: 1796 | 1885 | 1978 | 1956 | 2099 6k2/Vpg: 1849 | 1848 | 1850 | 1847 | 1853 Vpg/Nia-Pro: 2037 | 2038 | 2040 | 2039 | 2425 Nia-Pro/Nib: 2234 | 2235 | 2279 | 2236 | 2283 Nib/CP: 2794 | 2800 | 2805 | 2799 | 2793

Dr. Andrés Jaramillo Botero

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Nanoscale Manipulation and Control
- Modeling of Non-Adiabatic Phenomena (e.g. Highly Excited Electronic States)
- Scalable First-Principles Multiscale Modeling and Simulation Methods
- Low-Temperature Amorphous and Crystalline thin Film Growth
- Characterization and Optimization of Materials for Renewable Energy (e.g. Super-Capacitors)
- Omics Characterization of Tissues and Organisms
- Nanoscale Sensors and Active Systems

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Jaramillo's research involves understanding materials properties and phenomena that emanate from the nanometer scale, and how to optimize and control them for the development of novel processes, materials, devices and systems.

He works on first-principles quantum mechanics based theory and computational methods that can be used to predict what experiments are currently unable to measure, or to perform in-silico design and experimental steering. He also does nanoscale synthesis and characterization of organic and inorganic materials.
He is a member of Xaveriana University honor society and its Engineering Faculty, a Research Scientist in the Chemistry and Chemical Engineering division at Caltech and the Director of Multiscale Science and Simulation at the Materials and Process Simulation Center at Caltech, where he has been the PI and Co-PI on numerous US government and industry funded research projects.
This has included NASA-JPL (Jet Propulsion Laboratory) programs on the effects of hypervelocity impact in space and space instrumentation design, US Department of Energy (NNSA and LLNL) on materials for extreme environments, inertial confinement fusion, novel nano-porous materials for renewable energy storage, US Department of Defense (DARPA, ARL, DURIP) on low-temperature growth of hard crystalline thin films and light-weight shock resistant material shields, US Department of Transportation (FHWA) on the molecular origin of cement fracture and hydration kinetics, National Science Foundation (MRI and CMMI programs) on cartilage tissue engineering and DNA-based electronics, Samsung Electronics (South Korea) on 4th generation DNA sequencing nano-devices, Toshiba (Japan) on atomic characterization of amorphous semiconductors, DOW Chemical on colloidal thin films, and Intel Corporation on novel dielectric materials beyond silicon dioxide.

Professor Jaramillo is currently working on solving the self-assembly gap at the mesoscale for bottom-up manufacturing, and in the characterization and design of new nano-structured materials from agricultural organic waste for: energy harvesting and storage, soft tissue engineering, and greenhouse gas sequestration. His contributions span multiple fields, including high-performance robotics, high-performance computer algorithms and architectures, nanoscale science and engineering, and first-principles based simulation methods, to name a few.

ES

La investigación del profesor Jaramillo involucra comprender las propiedades y los fenómenos de la materia que emanan de la escala nanométrica, y apunta hacia su control y optimización para el desarrollo de nuevos materiales, dispositivos, sistemas y procesos. Él trabaja en teoría y métodos basados en los primeros principios de la mecánica cuántica y en su aplicación para predecir lo que actualmente no se puede medir de manera experimental, para diseño in-silico de nuevos materiales y procesos, o para guiar la exploración experimental. Él también realiza síntesis y caracterización a escala nanométrica de materiales orgánicos e inorgánicos.

Él es miembro del cuadro de honor de la Universidad Javeriana, profesor Titular de la misma institución, e investigador científico en la división de química e ingeniería química y director de la unidad de Ciencia de Multiescala y Simulación del Centro de Simulación de Materiales y Procesos del Instituto Tecnológico de California (Caltech). Ha sido investigador principal y coinvestigador principal en numerosos proyectos de Gobierno e industria, entre otros, con el Laboratorio de Propulsión a Chorro de NASA (JPL) en programas relacionados con los efectos de los impactos a hipervelocidades en el espacio y el diseño de instrumentos críticos en diversas misiones, con el Departamento de Energía (DOE, NNSA) de Estados Unidos, en la caracterización y el diseño de materiales para condiciones extremas, fusión por confinamiento inercial, materiales nanoporosos para almacenamiento de energía renovable y células de combustible por hidrógeno, con el departamento de defensa de los Estados Unidos (DOD, DARPA, ARL) en el crecimiento de películas duras a bajas temperaturas y materiales de alta resistencia a impactos, con el Departamento de Transporte (DOT, FHWA) de los Estados Unidos, en estudios fundamentales sobre el origen de fracturas y la cinética de hidratación del cemento Portland, con la Fundación de Ciencia Nacional de los Estados Unidos (NSF, CMMI) en ingeniería de tejidos para cartílago articular y electrónica basada en ADN, con Samsung Electronics (Korea) en el diseño de nanosecuenciadores de ADN de 4a generación (libres de química), con Toshiba (Japón) en la caracterización de materiales semiconductores amorfos, con DOW Chemical en películas delgadas basadas en coloides, y con Intel Corporation en la caracterización in-silico de nuevos materiales dieléctricos que superen las limitaciones del dióxido de silicio.

El profesor Jaramillo trabaja actualmente en soluciones al problema de autoensamble en la meso-escala para procesos de manufactura de abajo-hacia-arriba, en la caracterización y diseño de nuevos materiales nanoestructurados a partir de desechos orgánicos para generación y almacenamiento de energía renovable, ingeniería de tejidos con capacidad de carga viscoelástica, y materiales nano-porosos para secuestración de gases tóxicos y de efecto invernadero. Sus contribuciones abarcan múltiples campos, entre ellos robótica de manipuladores de alto rendimiento, arquitecturas y algoritmos computacionales de alto rendimiento, ingeniería y ciencia de nanoescala, y métodos de primeros principios para la simulación dinámica de sistemas desde la nanoescala, entre otras.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/oGFpT

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Full Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

- Scientific Director of the ÓMICAS Alliance, and international effort involving 17 institutions worldwide (anchored in Colombia) supported by the World Bank PACES program and the Colombian government (Minciencias, Mineducación, MinComercio, ICETEX), focused on developing and implementing new scientific and technological strategies for breeding optimized agricultural varieties using molecular omics characterization of plant tissues under varying environmental conditions (from genome to phenome). Optimization is carried out at the genetic and epigenetic levels geared to improve agronomic traits and tolerance to physical and biological stressors, while reducing environmental impact. The international team uses rice and sugarcane models to validate the strategies, methods, techniques and infrastructure. The results and products from this alliance are contributing novel solutions to the overarching challenges faced by food security and sustainable productivity of agriculture.

- Co-Principal Investigator and member of the hypervelocity sampling research team anchored at the Jet Propulsion Laboratory (JPL-NASA). The search for extraterrestrial biomolecules via flyby or orbiting missions to sample water-rich plumes or exospheres (e.g., Europa, Enceladus, and possibly Triton) requires hypervelocity conditions and complex instruments (e.g. mass spectrometers), meaning relative speeds of km/s, in which molecules may fragment upon impact with spacecraft surfaces or instrument inlets in ways that are not fully understood. This leads to potentially incorrect identification and/or quantitation of molecules/compositions. Our team uses experiments on earth in an attempt to reproduce these fragmentation process, and massive first-principles based models and simulations to establish molecular reaction pathways that are used to correct MS data as a function of spacecraft velocities. This effort is supported by NASA.

- Principal Investigator in the design, development and deployment of nanostructured sensors for the selective and highly-sensitive detection of analytes in fluids and gases. This effort includes sensors based on nanostructure 2D and 3D materials for early detection of molecular markers associated with irregular health conditions in plants and humans, including illnesses such as cancer, pathogenic infections (SARS-CoV2, Influenza, EBV, HPV, and others), emerging contaminants in water and food (antibiotics, pesticides, analgesics, and others), heavy metals in soils and food (cadmium, lead and others), and greenhouse gases (N2O, GH4, CO2). This involves support from multiple sources including the Bezos Earth Fund, UK Royal Engineering Society, and Minciencias.

- Principal Investigator and partner in The Periodic Table of Food Initiative (PTFI) an international effort supported by the Rockefeller Foundation, Foundation for Food and Agriculture Research, the Seerave Foundation and the Fourfold Foundation. PTFI is building a global ecosystem and providing data tools to catalog the biomolecular composition of the world's food supply. We are using advanced analytics and a global coordinated approach to determine all the biomolecules in food, how food compositions varies with environmental conditions and food system practices, and how these molecules affect human nutrition and health.

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate, Chemistry and Chemical Engineering California Institute of Technology (Caltech), OMICAS Program, OMICAS Institute, Member of the Board of Regents, Pontificia Universidad Javeriana, Robotics and Automation (GAR) and Nanoscale Science and Engineering research groups.

EDUCATION |
EDUCACIÓN

- 2004-2005: Postdoctoral scholar in Nanoscale Science (NSF Fellow), California Institute of Technology (Caltech), Materials and Process Simulation Center, Pasadena, California, USA.
- 2002: NSF Fellow in Nanoscale Science and Engineering (NSF Fellow), University of California at Los Angeles (UCLA), Institute of Pure and Applied Mathematics (IPAM), Los Angeles, California, USA.
- 1995-1998: Doctor in Engineering (Multibody Dynamics), Universidad Politécnica de Valencia, Valencia, España.

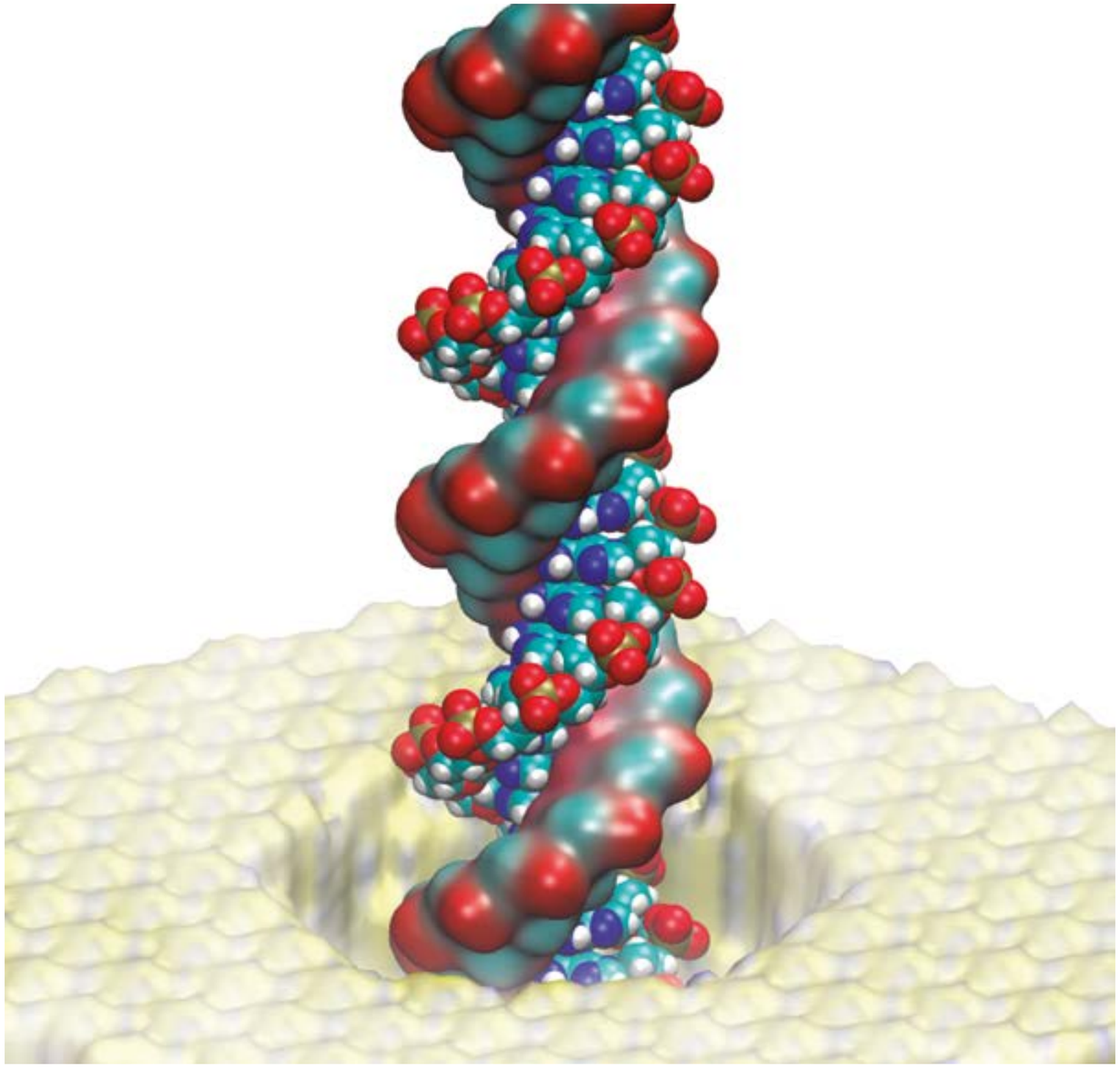

Figure 28. Chemistry-free DNA nano-sequencing devices with electrophoretic translocation of single and double stranded DNA and electronic tunneling base readere. 4949

- 1988-1989: Master's of Science in Computer Science (Fulbright Scholar), State University of New York, Binghamton, New York, USA.
- 1983-1986: Bachelor of Science in Electrical Engineering, Boston University, Boston, Massachusetts, USA.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 1990-Present: Pontificia Universidad Javeriana, Full Professor (elected member of the Xaverian honor society), Engineering Faculty, Cali, Colombia.
- 2006-Present: California Institute of Technology, Lead Scientist and Lecturer, Chemistry and Chemical Engineering Division, Pasadena, California, USA.
- 2004-2005: California Institute of Technology, NSF Fellow in Nanoscale science, Materials and Process Simulation Center, Pasadena, California, USA
- 2002-2004: University of California at Los Angeles (UCLA), NSF Fellow in Nanoscale science, Institute of Pure and Applied Mathematics, Los Angeles, California, USA.
- 1996-1997: Jet Propulsion Laboratory (NASA) and California Institute of Technology, Invited Faculty Associate and Researcher, Pasadena, California, USA.
- 1992-1993: Agency of Industrial Science and Technology, Mechanical Engineering Laboratory, Invited Researcher (JITA Fellow), Robotics and Autonomous Machinery Division, Tsukuba, Ibaraki, Japan.
- 1988: Sistemas de Tecnología Avanzada (Digital Equipment Corporation), Support Engineer and acting manager, Cali, Colombia.
- 1986-1987: Sincrón Diseño Electrónico, Design Engineer, Cali, Colombia.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

Lifetime Achievement Award in Research, Pontificia Universidad Javeriana, September 2023, Recognition of Excellence Fulbright 2019, Fulbright Colombia, and the U.S. Department of State - May 2019, Extraordinary ability alien for scientific merits (EB-1) in Nanoscale Dynamics in the USA (2005), US National Science Foundation (NSF) Fellow (2002) in Nanoscale Science and Engineering at the Institute of Pure and Applied Mathematics (IPAM) of the University of California at Los Angeles (UCLA), NSF Fellow (2004-2005) in Computational Nanotechnology and Molecular Science at the California Institute of Technology (Caltech), "2001 Scientific Merit" awardee from the Colombian Engineering Association (Valle, 2001), "2001 Outstanding Young Professional" awardee for contributions to health and technology from the International Junior Chamber (Cali), inductee into the Honor Order of the Pontificia Universidad Javeriana (2000), listed in "Outstanding Scientists of the XX Century" by the IBC, Cambridge, UK (2000); NSF-NPACI (US National Partnership for Advanced Computational Infrastructure) Fellow at the San Diego Supercomputing Center (1997); Research Fellow in Advanced Robotics from the Japanese Industrial Technology Association (JITA) and the Agency of Industrial Science and Technology (AIST) (1992-1993) at the Japanese Mechanical Engineering Laboratory in Tsukuba, Japan; Japanese International Cooperation Agency (JICA) scholar (1992) in Tsukuba, Japan; and Fulbright Scholar in New York, USA (1988-1989). Senior member of the Institute of Electrical and Electronics Engineers (IEEE), American Physics Society (APS) member, American Association for the Advanced of Science (AAAS) member, and Association for Computing Machinery (ACM) member. Peer reviewer for the US NSF, Department of Energy (DOE), Department of Defense (DOD), the International Federation of Automatic Control (IFAC), the Ibero-American Program Science and Technology for Development (CYTED), Colciencias, and multiple ISI/Scopus level journals.

CURRENT POSITION |

POSICIÓN ACTUAL

- Regents Council member, Pontificia Universidad Javeriana (Colombia)
- Director, Doctoral Program in Engineering and Applied Sciences
- Director, iOMICAS Institute
- Scientific Director, OMICAS Alliance

CONTACT INFORMATION |

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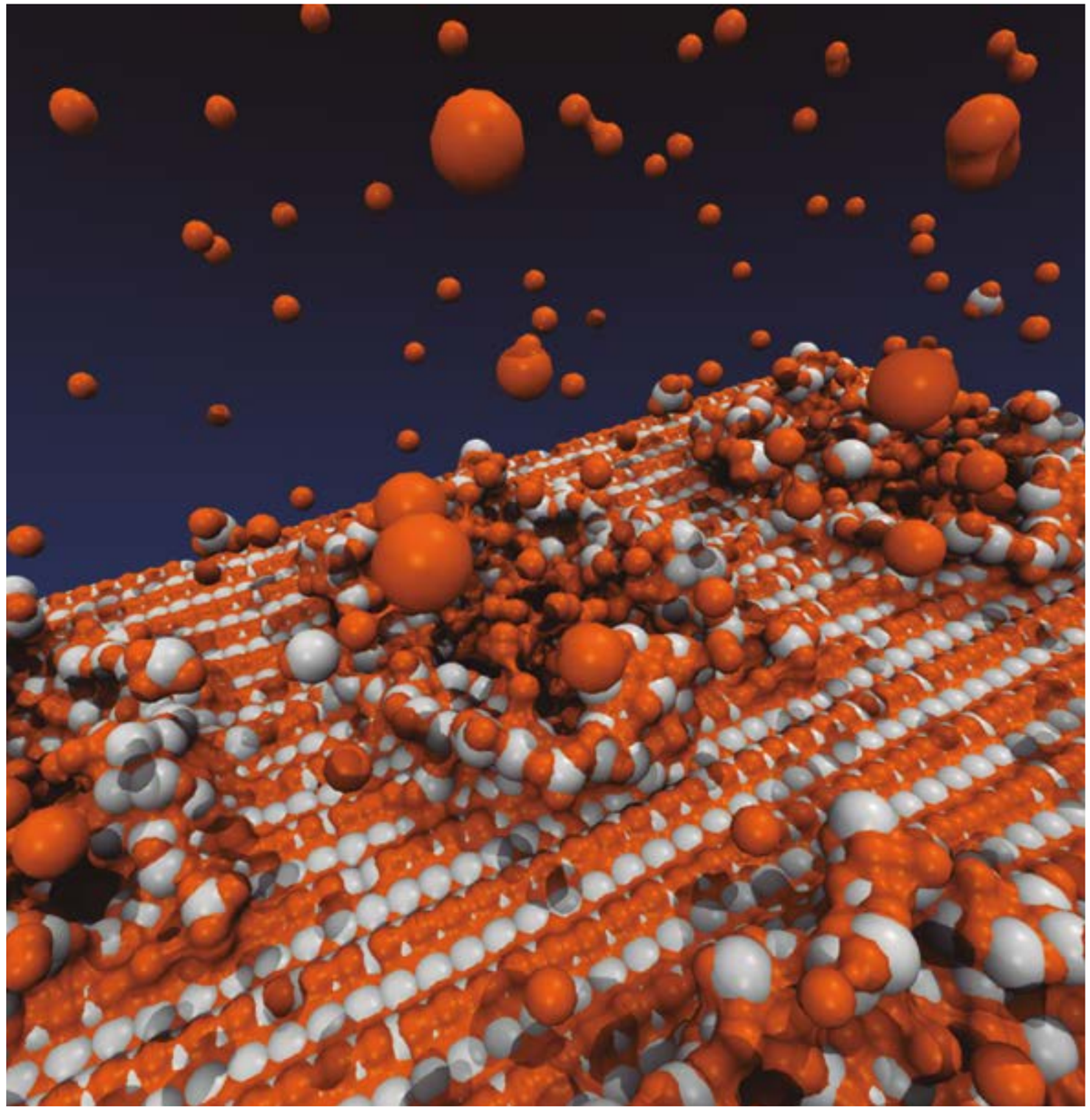

Figure 29. Water cluster impacts on titanium dioxide surfaes from NASA's Cassini-Hyugens Ion and Neutral Mass Spectrometer (INMS) shows titanium sublimation pump that alters spectral data (Phys. Rev. Letters (PRL), 109, 213201, 2012)

Dr. Diego Luis Linares Ospina

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Pattern Recognition and its Application in Real World Problem
- Therapy Rehabilitation

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Linares has been working on creating and developing software that allows children with disabilities to take advantage of technology.

His research is on language models - mathematical tools to help process and recognize natural speech, perform optical character recognition (OCR), and other similar signal processing more effectively. Currently, professor Linares applies these techniques in the design of video games to help children with severe hearing impairments with therapy.

ES

El profesor Linares trabaja en la creación y el desarrollo de software para permitir el aprovechamiento de las ventajas de la tecnología a niños con discapacidades.

Investiga sobre modelos de lenguaje y herramientas matemáticas para ayudar en el procesamiento y el reconocimientos del habla natural, realizar reconocimiento ópticos de caracteres, y otros tipos de procesamiento de señales de manera más efectivamente. Actualmente, el profesor Linares aplica estas técnicas en el diseño de video juegos para ayudar en la terapia de niños con discapacidades auditivas severas.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/u1VD7

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Full Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

Optimizing Surveillance and Treatment for Control of Cutaneous Leishmaniasis, program component P-3: The innate immune response as a therapeutic target for cutaneous Leishmaniasis (Funded by NHS, UK and led by CIDEIM).

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate, Master's of Engineering, Bachelor in Electronics Engineering, and DESTINO research group.

EDUCATION |
EDUCACIÓN

- 2003: Doctorate, Universidad Politécnica de Valencia, Valencia, España.
- 1991: Bachelor Computer Science, Pontificia Universidad Javeriana, Cali, Colombia.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- Director of the research, development and innovation office.
- Professor of Artificial intelligence, data structure and Programming, Electronic and computer department.

CONTACT INFORMATION |
INFORMACIÓN DE CONTACTO

dlinares@javerianacali.edu.co
Engineering Building, No. 2-40

Figure 30. Software platform designed by the DESTINO research group for auditory therapy used at the Institute for Blind and Deaf Children in Cali, Colombia

Dr. Alexander Martínez Álvarez

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Cooperative Robotics and Control
- Nonlinear Control
- AgTech

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Martínez has developed research on the use of non-linear control techniques to control fleets of mobile robots and currently, his interest includes the application of control techniques in the mitigation of seismic effects on structures. Another current field of action of Professor Martinez is the development of technological systems related to precision agriculture, as support for both agroecological production models and the reduction of food losses and waste through projects that have been developed within the framework of an alliance between the Pontificia Universidad Javeriana Cali and some entities, companies and communities in the Colombian Pacific Region.

ES

El Profesor Martínez ha desarrollado investigaciones sobre el uso de técnicas de control no lineal para el control de flotas de robots móviles y actualmente, su interés incluye la aplicación de técnicas de control en la mitigación de efectos sísmicos en estructuras. Otro campo de acción actual del profesor es el desarrollo de sistemas tecnológicos relacionados con la agricultura de precisión, como apoyo tanto a modelos de producción agroecológica, como a la reducción de las pérdidas y el desperdicio de alimentos a través de proyectos que se vienen desarrollando en el marco de una alianza entre la Pontificia Universidad Javeriana Cali y algunas entidades, empresas y comunidades de la Región Pacífico colombiana.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/SbWoW

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Associate Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

- Innovative solutions to increase the use of fruits and vegetables donated to the Cali Food Bank (Pontificia Universidad Javeriana Cali).
- Quantification and valuation of ecosystem services of nature-based solutions on the campus of the Pontificia Universidad Javeriana Cali (Pontificia Universidad Javeriana Cali y Universidad de los Andes).
- Strengthening the innovation and technological development capabilities of the associations of small and medium-sized fruit producers in the departments of Cauca, Chocó, Nariño, Valle del Cauca (Fondo de la asignación de Ciencia, Tecnología e Innovación del Sistema General de Regalías, Colombia).

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate (2016), Master's of Engineering, Bachelor in Electronics Engineering, Robotics and Automation research group (GAR) and "Red Latinoamericana de Control Automático y Robótica" (Red LACAR).

EDUCATION |
EDUCACIÓN

- 2016: Doctor in Automation and Robotics, Polytechnic University of Madrid, España.
- 2007: Advanced Studies Diploma on Automation and Robotics, Polytechnic University of Madrid, Madrid, España.
- 2000: Master's in Automation, Universidad del Valle, Cali, Colombia.
- 1994: Bachelor of Science in Electrical Engineering, Universidad del Valle, Cali, Colombia.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 1999-Present: Associate Professor, Department of Electronics and Computer Science, Engineering School, Pontificia Universidad Javeriana, Cali, Colombia.
- 1995-1998: Assistant Professor, Engineering School, Universidad Autónoma de Occidente, Cali, Colombia.
- 1994: Instructor, Electrical Engineering School, Universidad del Valle, Cali, Colombia.

CONTACT INFORMATION |

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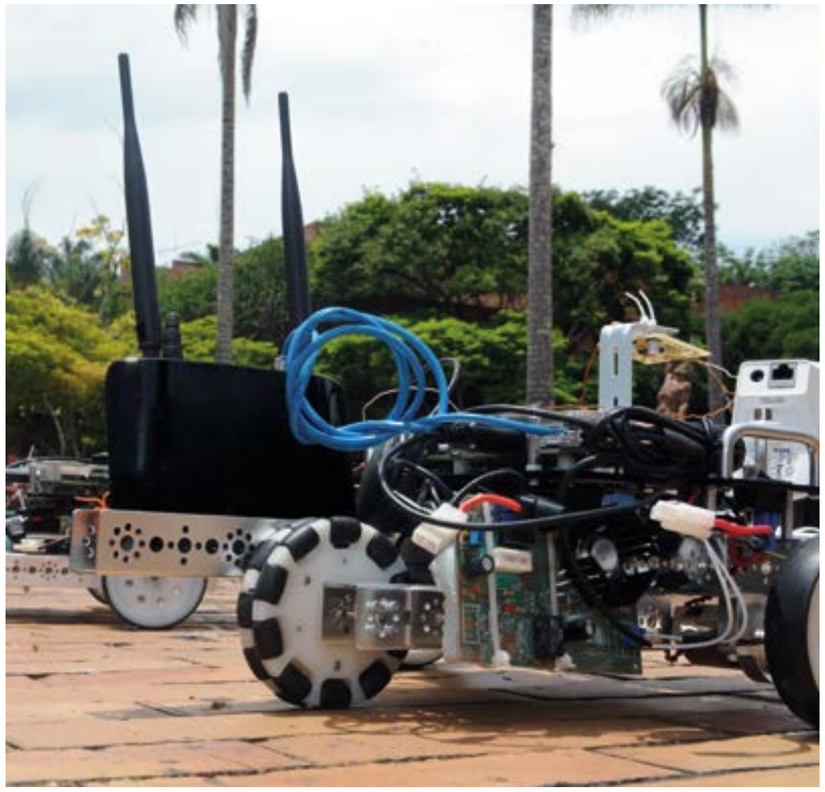

Figure 31. Terrestrial tricycles under collective navigation, bottom: aereal quatri-rotor in fixed Cartesian position

Figure 32. Automated Guided Vehicle (AGV) control and navigation

Dr. Andrés Adolfo Navarro Newball

RESEARCH INTERESTS |

INTERESES DE INVESTIGACIÓN

- Theory and Applications of Computer Graphics
- Videogames
- The Reality-Virtuality Continuum
- Hypermedia Narrative and
- The metaverse

RESEARCH SUMMARY |

RESUMEN DEL TRABAJO INVESTIGATIVO

EN

He carries out projects related to health, therapy, immersive systems for exploring cultural and natural heritage, video game-based systems for social inclusion, and edutainment. Professor Navarro Newball's research involves the use of computer graphics and other human-computer interfaces to improve learning and therapeutic processes, from augmented realities in complex cultural contents (e.g. museums), through surgical simulation systems, to videogames in re - habilitation. Dr. Navarro Newball has identified important contradictions associated with the use of interactive TIC systems for training and education, including a lack of systems integration that impede adequate threading of knowledge, and inadequate interfaces, among others. He argues for the need to personalize knowledge understanding when relying on human-computer interactions and for technology-independence to avoid unnecessary noise and overhead in communications. He has led multiple efforts on the creation of software systems that can transparently (i.e. technology-agnostic) aid in learning and rehabilitation of children, under normal or special circumstances (e.g. auditory, visual, or other perceptive losses). Such systems rely on interactive videogames and technologies from the reality-virtuality continuum.

ES

Lleva a cabo proyectos relacionados con la salud, la terapia, los sistemas inmersivos para la exploración del patrimonio cultural y natural, los sistemas basados en videojuegos para la inclusión social y el entretenimiento educativo. La investigación del profesor Navarro Newball implica el uso de gráficos por computadora y otras interfaces humano-computadora para mejorar el aprendizaje y los procesos terapéuticos, desde realidades aumentadas en contenidos culturales complejos (por ejemplo, museos), pasando por sistemas de simulación quirúrgica, hasta videojuegos de re - habilitación. El Dr. Navarro Newball ha identificado importantes contradicciones asociadas con el uso de sistemas TIC interactivos para la formación y la educación, incluyendo una falta de integración de sistemas que impidan un adecuado enhebrado de conocimientos e interfaces inadecuadas, entre otros. Argumenta a favor de la necesidad de personalizar la comprensión del conocimiento cuando se confía en las interacciones humano-computadora y de la independencia tecnológica para evitar ruidos innecesarios y sobrecargas en las comunicaciones. Ha liderado múltiples esfuerzos en la creación de sistemas de software que pueden ayudar de manera transparente (es decir, agnóstico de la tecnología) en el aprendizaje y la rehabilitación de los niños, en circunstancias normales o especiales (por ejemplo, pérdidas auditivas, visuales u otras pérdidas perceptivas). Tales sistemas se basan en videojuegos interactivos y tecnologías del continuo realidad-virtualidad.

GOOGLE SCHOLAR |

GOOGLE ACADÉMICO

t.ly/0Pyh-

ACADEMIC TITLE |

TÍTULO ACADÉMICO

Titular Professor

CURRENT RESEARCH |

INVESTIGACIÓN EN CURSO

Collaborative Project Colombia-Quebec: project is structured in four stages: (1) creation of multisensory artistic prototypes; (2) creation and validation of narrative proposal; (3) staging the narrative using XR; (4) validation using DELPHI. We propose the creation of XR narratives for children affected with a hearing and/or visual impairment, using the prototypes of endemic Colombian animals and following an inclusive education approach. Founded by Ce travail a été réalisé avec le soutien financier du Fonds de recherche du Quebec - Société et culture (FRQSC).

PROGRAM/GROUP AFFILIATIONS |

AFILIACIONES

- Engineering and Applied Sciences Doctorate, Master's of Engineering, Bachelor in Systems and Computer Engineering.
- Destino Research Group, Department of Electronics and Computer Science, Center for Games and Interactive Experiences, Pontificia Universidad Javeriana Cali
- External of grupo Museum I+D+C, Universidad Complutense de Madrid. Academic Committee, Connected Universal Experiences Lab.
- Latin American Health and technology Network IAJES

EDUCATION |

EDUCACIÓN

- 2015: Postdoctoral research in Information Sciences, Universidad Complutense de Madrid, España.
- 2010: Doctor in Computer Science, University of Otago, Dunedin, New Zealand.
- 2001: Specialization in Computer Networks and Communications, Universidad ICESI, Cali, Colombia.
- 1998: Master of Science in Computer Graphics and Virtual, University Of Hull, Hull, UK.
- 1994: Bachelor in Engineering Systems and Computation, Pontificia Universidad Javeriana, Cali, Colombia.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 1996- present: Pontificia Universidad Javeriana, Cali, Colombia
- 2004: Part-time Professor, Universidad ICESI, Cali, Colombia.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

- Honorable mention, Pontificia Universidad Javeriana – Cali, Colombia, 1994
- Best In Show Prize, Telemedicine and eHealth Forum, The Royal Society Of Medicine, 2006
- University of Otago Scholarship for PhD Studies. Dunedin, New Zeland, 2008
- COLFUTURO Scholarship for PhD Studies. COLFUTURO, Colombia, 2008
- Coimbra Group Scholarship for Short Research. Universita Degli Studi Di Siena, Siena, Italy, 2006.
- Outstanding Professor, Pontificia Universidad Javeriana Cali, 2012
- Gold Medal for 25 years of service, Pontificia Universidad Javeriana Cali, 2020
- Key Note XRCOL 2020, Bogota – Colombia
- Key Note Jornada de Ciencias Económicas 2020, Argentina.
- CIDESCO Awards. Innovation in health. System to support speech rehabilitation in deaf children. 2020
- Keynote ICVRV 2019, International Conference, Shen Zhen University, 2019-11
- Keynote X Congreso Nacional de Tecnologías Aplicadas a Ciencias de la Salud, national Mexican conference, Universidad Ibero Puebla Mexico, 2019-06.
- Edutainment 2019 conference Chair and Organizer, Pontificia Universidad Javeriana Cali
- AUIP mobility grant. Madrid, Spain, 2016.

CONTACT INFORMATION |

INFORMACIÓN DE CONTACTO

anavarro@javerianacali.edu.co
Engineering Building, No. 2.43

Figure 33. Systematic 3D modeling of living animals enable simulation of their natural motion in time and space

Dr. María Constanza Pabón Burbano

RESEARCH INTERESTS |

INTERESES DE INVESTIGACIÓN

- Data Management Systems, particularly Data Models, Database Query Languages, and Information Integration
- Software Engineering, particularly Software Product Line Engineering

RESEARCH SUMMARY |

RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Pabón's research focuses on proposing and developing database query languages and mechanisms with the aim to facilitate to end users query formulation. In particular, query formulation over graph data models. Graph models have gained relevance for its use on the web, on knowledge representation, and for integration of heterogeneos data sources.

ES

El trabajo de investigación de la Profesora Pabón se enfoca en proponer y desarrollar lenguajes y mecanismos de consulta en bases de datos que faciliten al usuario final la formulación de las consultas. En particular se ha trabajado en consultas sobre modelos de datos basados en grafos. Los modelos de grafos han tenido especial relevancia en los últimos años por su uso en la web, la representación del conocimiento y para la integración de fuentes de datos heterogéneas.

GOOGLE SCHOLAR |

GOOGLE ACADÉMICO

t.ly/BhfIT

ACADEMIC TITLE |

TÍTULO ACADÉMICO

Associate Professor

PROGRAM/GROUP AFFILIATIONS |

AFILIACIONES

Engineering and Applied Sciences Doctorate, Computer Engineering undergraduate.

EDUCATION |

EDUCACIÓN

- 2016: Ph.D. on Engineering with emphasis on Computer Science, Universidad del Valle, Cali, Colombia.
- 2000: MBA, Universidad del Valle, Cali, Colombia.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 2001-present: Teacher, Electronics and Computer Science Department, Pontificia Universidad Javeriana, Cali, Colombia.
- 1995–2001: Software Development Project Coordinator, Financiera FES, Cali, Colombia.
- 1992–1995: Software Analyst and Developer, Transportes Expreso Palmira, Cali, Colombia.

CURRENT POSITION |

POSICIÓN ACTUAL

Director of the Department of Electronics and Computer Science

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Dr. Yoan José Pinzón Ardila

RESEARCH INTERESTS |

INTERESES DE INVESTIGACIÓN

- Cryptography
- Pattern Matching and Processing
- Information Security
- Bioinformatics
- Bit-Parallelism
- Text Searching and Processing
- Computational Complexity

RESEARCH SUMMARY |

RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Design and analysis of algorithms in the area of computer science with emphasis on algorithms based on string pattern matching, bioinformatics, sequence processing and information security.

ES

Diseño y análisis de algoritmos en el área de la informática con énfasis en algoritmos basados en coincidencia de patrones, bioinformática, procesamiento de secuencias y seguridad de la información.

GOOGLE SCHOLAR |

GOOGLE ACADÉMICO

t.ly/BN79e

ACADEMIC TITLE |

TÍTULO ACADÉMICO

Associate Professor

EDUCATION |

EDUCACIÓN

- Bachelor of Science, Computer Science, Universidad Industrial de Santander, Colombia.
- Bachelor of Science, Industrial Engineering, Universidad Industrial de Santander, Colombia.
- Theologian, Unicatolica, Cali, Colombia
- Master of Science, Advanced Computing, University of London, Reino Unido.
- Doctor of Philosophy, Computer Science, University of London, Reino Unido.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 2016 - present: Pontificia Universidad Javeriana Cali.
- Associate Professor, Universidad Nacional de Colombia, full time, 2006-2016.
- Associate Professor, Universidad Pontificia Bolivariana, full time, 2006-2006.
- Lecturer in Computer Science, University of London, full time, 2002-2005.
- Associate Professor, Universidad Autonoma de Bucaramanga, UNAB, full time, 2002-2002.
- Associate Professor, Universidad Pontificia Bolivariana, full time, 1993-1997.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

- Prize for the Best MSc project across the MSc in Advanced Computing, the MSc in Computing and Internet Systems and MSc in Advanced Software Engineering, University of London, 1999.
- Awarded the ORS Award tenable for the duration of 3 years, Secretary of State for Education and Science, London, 2000.
- Academic Trust Funds Committee, Central Research Fund, University of London Scholarship, London, 2000.
- Nominated as Best Lecturer of the School of Physical Sciences & Engineering, University of London, 2004.
- Award for Meritorious Teaching. Distinction granted by the Board of Directors of the Faculty of Engineering, Universidad Nacional de Colombia, 2011.
- Award for Meritorious Teaching. Universidad Pontificia Javeriana, 2011.
- Honor Scholarship, best student of the theology program, Universidad Pontificia Bolivariana, 2019.
- Honor Scholarship, best student of the theology program, Universidad Católica, Lumen Gentium, 2021.
- Honor Degree, best graduate student of the Theology Program, Universidad Católica, Lumen Gentium, 2022.

CONTACT INFORMATION |

INFORMACIÓN DE CONTACTO

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Engineering Building, No. 2-56

Dr. Ana Victoria Prados Arboleda

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Sustainable Design
- Implications of Technology
- Engineering Ethics and Professional Responsibility
- Engineering Education
- Public Policy Related to Engineering

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Prados is interested in understanding the impact of technology on the world, especially in areas that determine the quality of life for humans and the societal development. She focuses particularly on the environmental, economic, social and cultural aspects, expecting to contribute to the improvement of these fields through sustainable technology design and through training of engineers able to initiate and sustain rigorous dialog between the technical savvy and those concerned with ethical and aesthetics reflection.

ES

La profesora Prados está interesada en develar los impactos de la tecnología en el mundo, especialmente en los ámbitos que determinan la calidad de vida de los seres humanos y el desarrollo de su sociedad. Centra especialmente su interés en los ámbitos ambiental, económico, social y cultural. Espera contribuir a que la tecnología mejore el estado de dichos ámbitos mediante el diseño sostenible y la formación de ingenieros capaces de poner en diálogo, de manera rigurosa y profunda, la cosmovisión propugnada por las ciencias y tecnologías y la que proviene de la reflexión ética y estética.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/ufkHx

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Associate Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

Patterns of teachers teaching performance in three universities of AUSJAL and its relationship with learning outcomes, as a basis for the development of a teaching training model.

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate, Master's of Engineering, and Bachelor of Electronics Engineering.

EDUCATION |
EDUCACIÓN

- 2012: Doctor in Human and Social Sciences, Universidad Pontificia Comillas, Madrid, España.
- 2000: Bachelor in Electronics Engineering, Pontificia Universidad Javeriana, Cali, Colombia.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

1999-Present: Pontificia Universidad Javeriana Cali Colombia.

CONTACT INFORMATION |
INFORMACIÓN DE CONTACTO

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Office: Engineering Building, No. 2-50

Dr. Carlos Alberto Ramírez Restrepo

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Algorithms
- Concurrency Theory
- Logic
- Formal Methods for System Modeling and Implementation
- Functional and Constraint Programming

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Ramirez is interested in studying the application and usage of formal models and concurrency theory in the analysis, construction and deployment of Distributed Systems (grid computing, cloud computing, internet of things) and complex systems. He is also interested in the study of algorithms, programming languages and paradigms (theory and practice), constraint programming and competitive programming.

ES

El Profesor Ramirez está interesado en estudiar el uso y aplicación de modelos formales y teoría de concurrencia en el análisis, construcción y despliegue de sistemas distribuidos (computación grid, computación en la nube, internet de las cosas) y sistemas complejos. También está interesado en el estudio de algoritmos, lenguajes y paradigmas de programación (teoría y práctica), programación por restricciones y la programación competitiva.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/zrSdK

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Assistant Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

- Probabilistic and Symbolic Tools for P Program Verification (Amazon Research Awards)
- Computational Models for Social Networks Applied to Polarization in Valle del Cauca (Sistema Nacional de Regalías)

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

AVISPA research group.

EDUCATION |
EDUCACIÓN

- Doctorate of Engineering, Computer Science, Universidad del Valle, Cali, Colombia.
- 2009: Bachelor of Engineering, Computer Science, Universidad del Valle, Cali, Colombia.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 2018-Current: Assistant Professor at Pontificia Universidad Javeriana, Cali, Colombia.
- 2017: Full-time Professor at Pontificia Universidad Javeriana, Cali, Colombia.
- 2015-2016: Pontificia Universidad Javeriana, Cali, Colombia.
- 2013-2017: Universidad del Valle, Cali,
- Colombia.

HONORS AND MEMBERSHIPS |
HONORES Y MEMBRESÍAS

Francisco José de Caldas Scholar (Doctoral studies), Colombian government (2009-2013).

CONTACT INFORMATION |
INFORMACIÓN DE CONTACTO

carlosalbertoramirez@javerianacali.edu.co
Engineering Building, No. 2-42

Dr. Luisa Fernanda Rincón Pérez

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Product Line Engineering
- Software Reuse
- Digital Transformation
- Robotic Process Automation
- No-Code/Low Code Platforms
- Soft Skills in Software Engineering
- Empirical Software Engineering

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Luisa Rincón's research focuses on the evaluation and adoption of Product Line Engineering in industrial contexts. She has developed a framework for evaluating an organization's motivation and preparation for adopting software product lines. She has conducted multiple empirical evaluations to evaluate perceived usefulness, intention to use, completeness, and other quality attributes. Currently, she is interested in topics that aim to enhance operational efficiency in the software industry, especially from a cultural standpoint. These include the DevOps philosophy, Robotic Process Automation (RPA), no-code/low code platforms, software product lines, conversational marketing and digital transformation. With a passion for software engineering, she enjoys programming in various languages and is enthusiastic about learning and applying best practices in software design and architecture. She is also interested in utilizing software solutions to deliver value to organizations.

ES

La investigación de Luisa Rincón se centra en la evaluación y adopción de la Ingeniería de Líneas de Producto en contextos industriales. Ha desarrollado un marco para evaluar la motivación y preparación de una organización para adoptar líneas de productos de software. Ha realizado múltiples evaluaciones empíricas para evaluar la utilidad percibida, la intención de uso, la integridad y otros atributos de calidad.

Actualmente, está interesada en temas que buscan mejorar la eficiencia operativa en la industria del software, especialmente desde un punto de vista cultural. Estos incluyen la filosofía DevOps, la Automatización de Procesos Robóticos (RPA), las plataformas lowcode/noCode, las líneas de productos de software, el marketing conversacional y la transformación digital. Está interesada en iniciar proyectos que fomenten la colaboración entre universidades e industria. Tiene una pasión por el mundo de la ingeniería de software y disfruta programando en varios lenguajes. En particular, le gusta aprender y aplicar las mejores prácticas de diseño y arquitectura de software así como poner las soluciones de software al servicio de las organizaciones.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/UF9lh

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Associate Professor

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate, Master's of Software Engineering, Bachelor in Systems and Computer Engineering, and DESTINO research Group

EDUCATION |
EDUCACIÓN

- Doctorate in Computer Science from Universite De Paris I (Pantheon-Sorbonne)
- Master's in Software Engineering from Universidad Nacional de Colombia
- Bachelor's in Business Informatics from Universidad Nacional de Colombia

CURRENT POSITION |
POSICIÓN ACTUAL

Director of the specialization and master's degree in software engineering

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 2014-Present: Pontificia Universidad Javeriana, Cali, Colombia.
- 2013 – Present: IT Consultant - Star Inmobiliaria
- 2010-2011: Java Software Developer. Heinsohn Business Technology

CONTACT INFORMATION |
INFORMACIÓN DE CONTACTO

lfrincon@javerianacali.edu.co
Engineering Building, Office 2-72

Dr. Hernán Camilo Rocha Niño

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Rewrite-Based Deductive and Algorithmic Verification
- Safety-Critical Systems
- Logic, Computational Logic, and Formal Methods in Computer Science
- Algorithms
- Machine Learning on Graphs

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Rocha main research interests are on techniques for building reliable systems. They include: rewriting logic and, more broadly, formal methods for the specification and analysis of safe-critical systems; both deductive and algorithmic verification for concurrent and probabilistic systems; decision procedures and their combination for the symbolic analysis of large or infinite state systems; and network-based machine learning algorithms applied to blockchain, social networks, and biological systems.

ES

Los principales intereses de investigación del profesor Rocha son técnicas para construir sistemas confiables. Estos incluyen: lógica de reescritura y, más ampliamente, métodos formales para especificar y analizar sistemas de misión crítica; verificación deductiva y algorítmica para sistemas concurrentes o probabilísticos; procedimientos de decisión y su combinación para el análisis simbólico de sistemas con gran o infinita cantidad de estados; y algoritmos de aprendizaje automático sobre grafos aplicados a blockchain, redes sociales y sistemas biológicos.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

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ACADEMIC TITLE |
TÍTULO ACADÉMICO

Associate Professor

CURRENT POSITION |
POSICIÓN ACTUAL

Engineering and Sciences Faculty Dean

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

- In-silico Improvement of Crops from Omic Characterization (MinCiencias, World Bank).
- Probabilistic and Symbolic Tools for P Program Verification (Amazon Research Awards)
- Computational Models for Social Networks Applied to Polarization in Valle del Cauca (Sistema Nacional de Regalías)
- Data analytics learning roadmap courses (Sistema Nacional de Regalías)
- Foundational Approach to Computation in Today's Society (MinCiencias, ECOS Nord)

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate, Engineering Master, DataScience Master, Bachelor of Systems and Computer Engineering, and AVISPA research group.

EDUCATION |
EDUCACIÓN

- 2012: Ph.D. in Computer Science, University of Illinois, Urbana, USA
- 2012: M.Sc. in Mathematics, University of Illinois, Urbana, USA
- 2005: M.Sc. in Computer Science and Engineering, Universidad de los Andes, Bogotá, Colombia
- 2002: Bachelor of Science in Computer Science and Engineering, Univesidad de los Andes, Bogotá, Colombia

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 2016-Current: Associate Professor at Pontificia Universidad Javeriana, Cali, Colombia
- 2002-2015: Assitant Professor at Escuela Colombiana de Ingeniería Julio Garavito, Bogotá, Colombia
- 2008-2012: Summer Intern at National Institute of Aerospace, Hampton, USA
- 2006-2012: Research Assistant, Formal Methods and Declarative
- Languages Laboratory, University of Illinois, Urbana, USA

HONORS AND MEMBERSHIPS |
HONORES Y MEMBRESÍAS

- Francisco José de Caldas Scholar (Doctoral studies), Colombian government (2006-2012).
- Amazon Research Awards Recipient (2022).

CONTACT INFORMATION |
INFORMACIÓN DE CONTACTO

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Dr. Maribel Sacanamboy Franco

RESEARCH INTERESTS |

INTERESES DE INVESTIGACIÓN

- Digital Systems Design
- Heuristic Optimization Algorithms
- Assembly language and Computer Architecture

RESEARCH SUMMARY |

RESUMEN DEL TRABAJO INVESTIGATIVO

EN

La profesora Sacanamboy está interesada en estudiar y plantear modelos para la optimización de recursos hardware a nivel de redes NoC (Network on Chip) utilizando métodos matemáticos (MILP) y heurísticos basados en redes neuronales y algoritmos de población incremental, sobre arquitecturas heterogéneas y homogéneas. También está interesada en lenguajes de máquina, diseño de sistemas digitales en FPGAs y arquitecturas de cómputo.

ES

Professor Sacanamboy is interested in studying and proposing models for the optimization of hardware resources at the Network on Chip (NoC) level using mathematical methods (MILP) and heuristics based on neural networks and incremental population algorithms, on heterogeneous and homogeneous architectures. She is also interested in machine languages, digital system design on FPGAs, and computing architectures.

GOOGLE SCHOLAR |

GOOGLE ACADÉMICO

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ACADEMIC TITLE |

TÍTULO ACADÉMICO

Assistant Professor

PROGRAM/GROUP AFFILIATIONS |

AFILIACIONES

Doctorate in Engineering, Master's in Engineering and, Electronic Engineering undergraduate program, and Robotics and Automation (GAR) research group.

EDUCATION |

EDUCACIÓN

- 2018: Doctorate of Engineering, Electrical and Electronic, Universidad del Valle, Cali, Colombia.
- 2009: Master of Electronic Engineering, Universidad del Valle, Cali, Colombia.
- 2000: Bachelor in Electronics Engineering, Pontificia Universidad Javeriana, Cali, Colombia

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 2007-Current: Assistant Professor at Pontificia Universidad Javeriana, Cali, Colombia.
- 2005-2007: Part- time Pontificia Universidad Javeriana Cali Colombia
- 2003-2005: Pontificia Universidad Javeriana Cali Colombia
- 2000-2003: Project engineer at the multinational company ASCOM Colombia. Activities included project development in pneumatic mail systems, security, and fire network.
- 1997: Development engineer at VELASQUEZ Ltda. Responsibilities at this company included design, implementation, and testing of measurement systems based on microcontrollers.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

Honorific mention for undergraduate thesis, Electronics Engineering, Pontificia Universidad Javeriana, Cali, Colombia.

CONTACT INFORMATION |

INFORMACIÓN DE CONTACTO

msacanamboy@javerianacali.edu.co
Engineering Building, No.2-45

Dr. Gerardo Mauricio Sarria Montemiranda

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Concurrency Theory, Logic
- Information Retrieval, Pattern Recognition (Classification and Regression by Means of Feature Extraction), Machine Learning (Supervised and Unsupervised Techniques such as k-NN, Decision Trees, Naive Bayes, and SVM), and Data Mining (Clustering and Association Using k-means)
- Concurrency, Constraint Programming, Process calculi, and Logics
- Computer Music and Computer Assisted Composition
- Teaching/learning Methodologies

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Sarria's research involves developing new constraint programming languages based on process calculi, exploring novel teaching/learning methodologies for computer science materials, and developing new theories and tools for solving problems in Security Protocols, Biology and Multimedia Semantic Interaction. He is currently applying artificial intelligence techniques at the intersection of machine learning, pattern recognition and data mining for Computational Characterization of Salsa Music. He is developing a novel approach to perform data mining on a big set of Salsa songs to build a system that models this musical genre and recognizes and classifies them using machine-learning techniques. He has contributed new constraint programming software solutions for enterprises, including the programming language Cordial, and most recently formal models of time musical processes that are currently being applied to characterize, understand and classify musical genres (particularly Salsa).

ES

El profesor Sarria investiga el desarrollo de nuevos lenguajes de programación por restricciones basados en cálculos de procesos, la exploración de nuevas metodologías para la enseñanza de las ciencias de la computación, y en el desarrollo de nuevas teorías y herramientas para la solución de problemas en protocolos de seguridad, biología e interacción semántica en multimedia. El profesor Sarria aplica técnicas de inteligencia artificial en la intersección con el aprendizaje de máquinas, reconocimiento de patrones, y minería de datos para la caracterización computacional de la Salsa. Está desarrollando nuevas estrategias para realizar minería de datos sobre conjuntos de datos grandes en canciones de Salsa para construir un sistema que modela el género y lo clasifica mediante técnicas de aprendizaje de máquina. El profesor Sarria ha contribuido soluciones de software para programación por restricciones en empresas, incluyendo el lenguaje de programación Cordial, y modelos formales de procesos musicales temporales que están siendo aplicados actualmente para caracterizar, comprender y clasificar diferentes géneros musicales.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/qWMro

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Associate Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

Computational Characterization of Salsa Music, a project funded by three universities in Cali, Colombia. An approach to perform data mining on a big set of songs and thus to built a system that models this musical genre and recognizes and classifies old and new Salsa songs using machine learning techniques.

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate, Masters of Engineering, Bachelor of Computer and Systems Engineering, and Automated audio digital signal processing and classification methods and computational techniques.

EDUCATION |
EDUCACIÓN

- 2008: Doctorate of Engineering, Computer Science, Universidad del Valle, Cali, Colombia.
- 2001: Bachelor of Engineering, Computer Science, Pontificia Universidad Javeriana, Cali, Colombia.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 2014- present: Associate Professor, Pontificia Universidad Javeriana Cali, Colombia.
- 2012: Assistant Professor, Pontificia Universidad Javeriana Cali, Colombia.
- 2007: Instructor, Pontificia Universidad Javeriana Cali, Colombia.
- 2004: Researcher and Developer, Institut de Recherche et Coordination Acoustique/Musique (IRCAM), Paris, France.
- 2002: Teaching assistant, Universidad del Valle, Cali, Colombia.

HONORS AND MEMBERSHIPS |
HONORES Y MEMBRESÍAS

Association for Computing Machinery (ACM) - Senior Member; Colombian Computation Society (SCo2) member.

CURRENT POSITION |
POSICIÓN ACTUAL

Director of Undergraduate Studies in Computer Science

CONTACT INFORMATION |
INFORMACIÓN DE CONTACTO

gsarria@javerianacali.edu.co
Engineering Building, No. 2-07

Figure 34. Professor Sarria researching at the intersection between music and artificial intelligence

Dr. Eugenio Tamura Morimitsu

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Real-Time Systems
- Embedded Systems
- High-Performance Computing
- Executable Specifications
- Testing and Verification

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Tamura's research interest is primarily based on custom computing. In particular, dealing with specialized computing platforms tailored to tackle specific applications that are otherwise impossible to solve with conventional, off-the-shelf computing platforms. Custom computer architectures, including parallel systems, hardware accelerators, and reconfigurable hardware platforms, are able to adapt to problems that are not amenable to conventional computers. His contributions have been focused on improving the estimation of predictability in real-time embedded systems, by designing customized locking caches and techniques to choose the instructions that should be locked to maximize performance. He is currently working on distributed computing architectures and adaptive hardware.

ES

El profesor Tamura trabaja en computación a la medida. De manera concreta, en plataformas de computación especializadas para aplicaciones específicas que de otra manera serían imposibles de abordar con plataformas de computo convencionales. Las arquitecturas de cómputo paralelas, los aceleradores de hardware y las plataformas de hardware reconfigurable, pueden adaptarse a problemas que no son dóciles a la computación convencional. Sus contribuciones se han enfocado en mejorar la estimación de previsibilidad en sistemas de tiempo real embebidos, mediante el diseño a la medida de caches protegidos y técnicas de acceso rápido a datos para la selección de instrucciones que deben ser bloqueadas para maximizar el rendimiento. El profesor Tamura está actualmente trabajando en arquitecturas de cómputo distribuidas y hardware adaptivo.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/lu4EP

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Associate Professor

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate, Masters of Engineering (Electronics Engineering emphasis), Bachelor of Electronics Engineering, and Robotics and Automation (GAR) research group.

EDUCATION |
EDUCACIÓN

- 2008: Engineering Doctorate, Architecture and Technology of Informatics Systems, Universitat Politècnica de València, València, España.
- 1990: Bachelor of Engineering, Electronics Engineering, Universidad del Cauca, Popayán, Colombia.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 1995-Present: Associate Professor, Department of Electronics and Computer Science, Engineering School, Pontificia Universidad Javeriana, Cali, Colombia.
- 1994: Part time Instructor, Engineering School, Pontificia Universidad Javeriana, Cali, Colombia.
- 1990: Research Assistant, Electronics Engineering division, Universidad del Cauca, Popayán, Colombia.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

Honorific mention for undergraduate thesis, Electronics and Telecommunications Engineering, Universidad del Cauca, Popayán, Colombia (1990); Distinguished professor recognition, Engineering Faculty, Pontificia Universidad Javeriana, Cali, Colombia (2002); Colombian Engineering Faculty Association award (ACOFI) 2002; Outstanding Cum Laude (Doctorate), Universidad Politécnica de Valencia, Valencia, Spain (2008); Member Institute of Electrical and Electronics Engineers (IEEE).

CONTACT INFORMATION |

INFORMACIÓN DE CONTACTO

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Figure 35. Professor Tamura configuring our HPC cluster through its administration console

Dr. Luis Eduardo Tobón Llanos

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Computational Electromagnetics
- Bioacoustic Signal Analysis in Ecosystems Health
- Underground Object Detection and Characterization (Anti-Personnel Mines)

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Tobon's research work involves using continuum level modeling and simulation to characterize complex electromagnetic systems and phenomena (Maxwell's equations). He focuses on reducing the computational complexity of FETD methods to characterize electrically resolved structures on large-scale systems, with explicit and implicit temporal integration, based on computational domain decomposition. The applications span from 3D microelectronics, from nanometers to millimeters, design of wide band antennas interacting with large electrically active structures, and dispersive media detection (e.g. anti-personnel land mines, improvised explosive devices). Other research interests involve the use of orthogonal functions to perform signal analysis for classification problems. Among these, we are currently studying sound as a means to diagnose health in ecosystems.

ES

El trabajo del profesor Tobón se basa en el diseño y la aplicación de modelos continuos de simulación para caracterizar sistemas y fenómenos electromagnéticos (basados en las ecuaciones de Maxwell). Su foco está en reducir la complejidad computacional de los métodos FETD para caracterizar estructuras eléctricas en sistemas de gran envergadura, con integración temporal implícita y explícita, basado en la descomposición del dominio computacional. Él aplica estos métodos en el diseño y la caracterización de sistemas microelectrónicos en 3D, desde la escala de los nanómetros hasta la escala de los milímetros, en el diseño de antenas de banda ancha interactuando con estructuras eléctricamente activas y en la detección de medios dispersos (e.g. minas anti personales y otros dispositivos explosivos improvisados). El profesor también investiga sobre el uso de funciones ortogonales para el análisis de señales en problemas de clasificación. Actualmente está estudiando el análisis de señales de sonido para el diagnóstico de la salud de sistemas ecológicos.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/auPuY

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Full Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

AgroSolar, Energy for the Field (Pontificia Universidad Javeriana, Cali)

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate, Bachelor of Electronics Engineering, and Robotics and Automation (GAR) research group.

EDUCATION |
EDUCACIÓN

- 2013: Ph.D. in Electrical and Computer Engineering, Duke University, Raleight, North Carolina, USA.
- 2007: Master in Materials Science, Universidad del Quindio, Armenia, Colombia.
- 2002: Bachelor in Electronics Engineering, Universidad del Quindio, Armenia, Colombia.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 2007 - Present: Pontificia Universidad Javeriana, Cali, Colombia.
- 2012–2013, Research Assistant, Duke University, Raleight, North Carolina, USA.

- 2011: Developer, Wave Computation Technology, Inc., Durham, North Carolina, USA.
- 2003–2007: Lecturer in Engineering, Universidad del Quindío, Armenia, Colombia.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

Best Paper Award, IEEE Transactions on Components, Packaging and Manufacturing Technology, Electrical Performance of Integrated Systems Category (2011); graduate with honors, Engineering Faculty, 50 year Universidad del Quindio Anniversary (2010); Fulbright-Colciencias Scholar ((2008); Young Investigator Scholar (Colciencias-BID, 2002); Institute of Electrical and Electronics Engineers member; Applied Computational Electromagnetics Society (ACES) member; Colombian Engineers Association (ACIEM); peer reviewer for IEEE Antennas and Wireless Propagation Letters, IEEE Transactions on Microwave Theory and Techniques, IEEE Transactions on Antennas and Propagation, and the Applied Computational Electromagnetics Journal.

CURRENT POSITION |

POSICIÓN ACTUAL

Undergraduate Director of Electronics Engineering.

CONTACT INFORMATION |

INFORMACIÓN DE CONTACTO

letobon@javerianacali.edu.co
Engineering Building. Undergraduate Electronics Engineering Office.

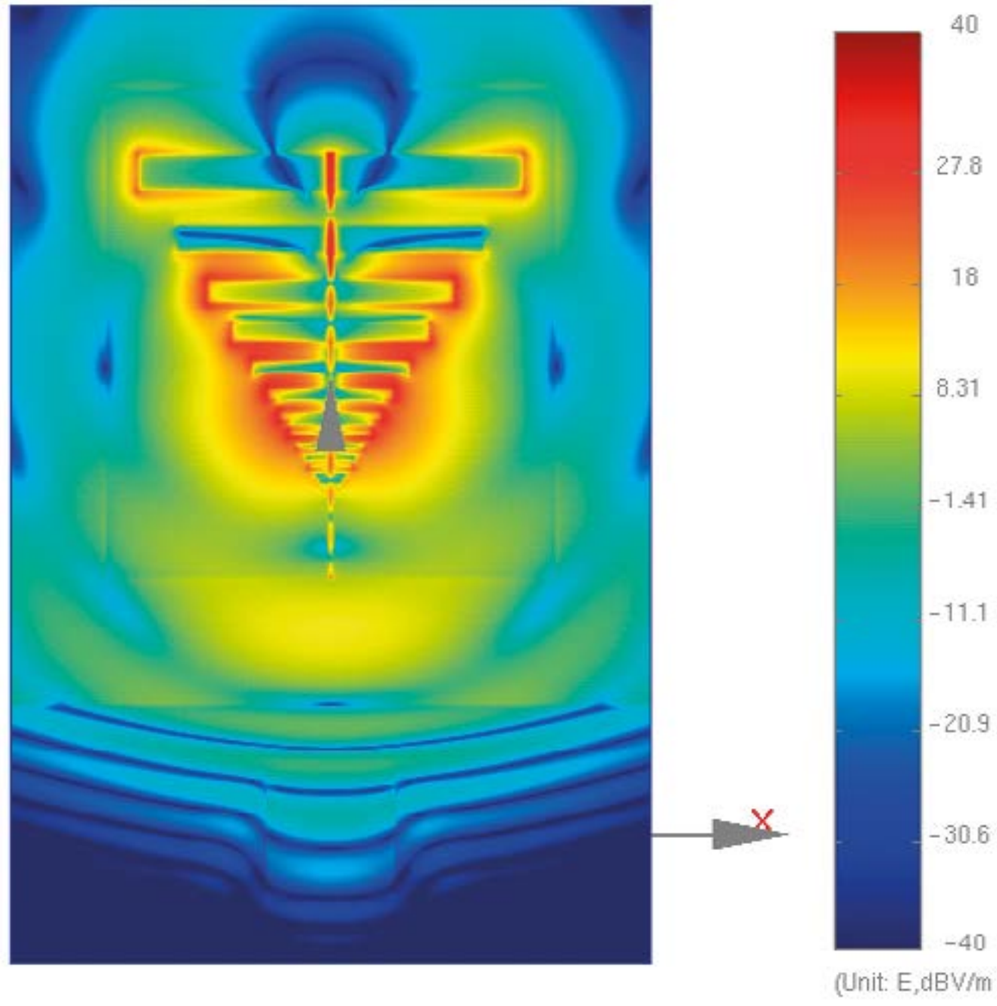


Figure 36. Radiation pattern of a printed log-periodic dipole antenna designed for anti-personnel landmine detection

Dr. Frank Darwin Valencia Posso

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Concurrency Theory
- Logic for Computer Science
- Constraint-Based Formalisms
- Formal Methods in Computer Science

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Frank Valencia's main interests are within Formal Methods in Computer Science, in particular Concurrency Theory and Logic. He has published results on the computational expressiveness of well-stablished process calculi such as CCS (Calculus of Communicating Systems), the π-calculus and CCP (Concurrent Constraint Programming). In particular, he has given expressiveness distinctions between dynamic and static scope as well as replication and recursion in CCS and CCP, a Chomsky-like hierarchy of fragments of CCS, separation results for linear and persistent fragments of the π-calculus, and the Büchi-automata characterization of timed CCP. He has established new connections between the areas of concurrency theory and logic by providing first-order, temporal and epistemic logic interpretations of concurrent phenomena such as mobile, timed and spatial behavior. He has used these connections to prove new results in these areas such as the decidability of the observational equivalence for several fragments of the π-calculus and the decidability of satisfiability for the existential fragment of first-order temporal logic. He has been one of the originators of constraint-based process calculi for analyzing timed, mobile, spatial and epistemic behavior in concurrent systems. Over a decade ago he published work on search and consistency algorithms for CSP (Constraint Satisfaction Problems), and introduced the notion of Infinite (or unbounded) CSP. The professor has published over 50 articles in international peer-reviewed venues.

ES

Los intereses principales de Frank Valencia se encuentran dentro de los métodos formales en ciencias de la computación, particularmente en la teoría de la concurrencia y lógica. Ha publicado resultados sobre la expresividad computacional de cálculos de procesos bien establecidos, como el cálculo de sistemas de comunicación (CCS por sus siglas en inglés), el π-cálculo y la programación de restricciones concurrentes (CCP por sus siglas en inglés). En particular, ha dado distinciones de expresividad entre el ámbito dinámico y el estático, así como la replicación y recursión en CCS y CCP, una jerarquía similar a Chomsky de fragmentos de CCS, separación de los resultados para los fragmentos lineales y persistentes del π-cálculo, y la caracterización Büchi-autómata de tiempo CCP.
Ha establecido nuevas conexiones entre las áreas de la teoría de la concurrencia y la lógica proporcionando interpretaciones de lógica de primer orden, temporal y epistémica de fenómenos concurrentes como el comportamiento móvil, el temporizado y el espacial. Ha utilizado estas conexiones para probar nuevos resultados en estas áreas, tales como la decidibilidad de la equivalencia observacional para varios fragmentos del π-cálculo y la decidibilidad de la satisfacibilidad para el fragmento existencial de la lógica temporal de primer orden. Ha sido uno de los creadores de cálculos de procesos basados en restricciones para analizar el comportamiento temporal, móvil, espacial y epistémico en sistemas concurrentes. Hace más de una década publicó trabajos sobre algoritmos de búsqueda y consistencia para problemas de satisfacción de restricciones (CSP por sus siglas en inglés), e introdujo la noción del CSP Infinito (o no llimitado). El profesor ha publicado más de 50 artículos en lugares internacionales revisados por pares.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/26Rg8

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Full Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

- Computational Models for Social Networks Applied to Polarization in Valle del Cauca (Sistema Nacional de Regalías)
- Foundational Approach to Computation in Today's Society (MinCiencias, ECOS Nord)

PROGRAM/GROUP AFFILIATIONS |

AFILIACIONES

- Engineering and Applied Sciences Doctorate, Master's of Engineering (Computer Engineering emphasis), Bachelor in Systems and Computing Engineering, and AVISPA research group.
- Laboratory of Computer Science at Ecole Polytechnique Paris and INRIA Team Comete.

EDUCATION |

EDUCACIÓN

- 2004: Postdoctoral scholar University of Uppsala, Sweden.
- 2002: PhD in Computer Science from Aarhus University, Denmark.
- 2002: Masters in Computer Science from Aarhus University, Denmark.
- 1998: BSc in Computer Science and Engineering from La Pontificia Universidad Javeriana de Cali, Colombia.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 2007 - Present: Pontificia Universidad Javeriana, Cali, Colombia.
- 2012–2013, Research Assistant, Duke University, Raleight, North Carolina, USA.
- 2011: Developer, Wave Computation Technology, Inc., Durham, North Carolina, USA.
- 2003–2007: Lecturer in Engineering, Universidad del Quindío, Armenia, Colombia.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

Full Fellowship Doctoral Grant University of Aarhus, Denmark. Best Paper Award at the 13 International Conference of Logic Programming. PC Member of: 13th ICTAC International Colloquium on Theoretical Aspects of Computing, 2016; 19th International Symposium on Principles and Practice of Declarative Programming (PPDP 2015), 2016; 2th ICTAC International Colloquium on Theoretical Aspects of Computing, 2016; 18th International Symposium on Principles and Practice of Declarative Programming (PPDP 2015), 2015; 17th International Symposium on Principles and Practice of Declarative Programming (PPDP 2015), 2015.

CONTACT INFORMATION |

INFORMACIÓN DE CONTACTO

fdvalencia@javerianacali.edu.co
Engineering Building, No. 2-47

Dr. Hernán Darío Vargas Cardona

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Signal and Imaging Digital Processing
- Machine Learning Methods
- Stochastic Processes
- Biomedical Applications
- Magnetic Resonance Imaging

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Vargas is interested in digital processing of multivariate data and machine learning methods applied in biomedical problems. He contributed with stochastic methodologies for enhancing spatial resolution in medical images.

ES

El Profesor Vargas está interesado en el procesamiento digital de datos multivariados y en métodos de aprendizaje automático aplicados a problemas biomédicos. Ha contribuido con metodologías estocásticas para mejorar la resolución espacial en imágenes médicas.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/vxx01

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Assistant professor

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate, Master of Engineering (Electronic Engineering), Biomedical Engineering undergraduate, GAR research group.

EDUCATION |
EDUCACIÓN

- 2018, Doctor of Philosophy, Universidad Tecnológica de Pereira, Pereira, Colombia.
- 2013, Master of Science, Universidad Tecnológica de Pereira, Pereira, Colombia.
- 2008, Bachelor of Science, Universidad del Quindío, Armenia, Colombia.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 2019-present, full-time professor, Pontificia Universidad Javeriana Cali, Colombia.
- 2011-2018, lecturer and research assistant, Universidad Tecnológica de Pereira, Pereira, Colombia.
- 2011-2016, lecturer, Universidad del Quindío, Universidad del Quindío.

HONORS AND MEMBERSHIPS |
HONORES Y MEMBRESÍAS

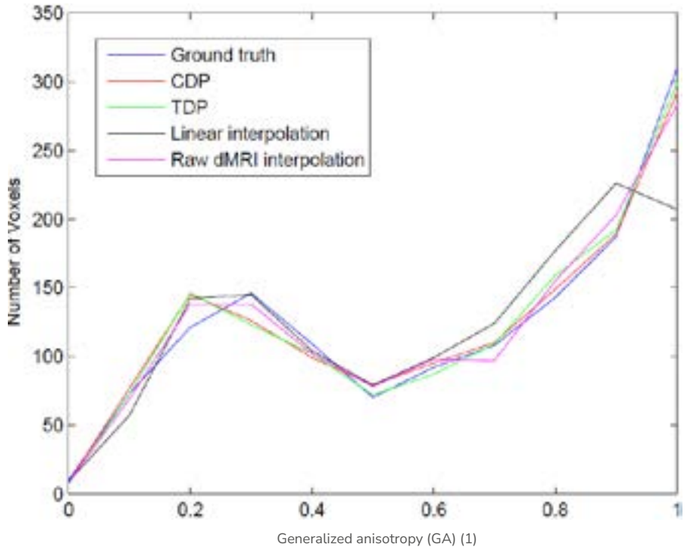
- Springer-Verlag Best Paper Award, ISVC 2018, “Non-stationary generalized Wishart processes for enhancing resolution over diffusion tensor fields”.
- Summa Cum Laude Phd Thesis, 2022.

CURRENT POSITION |
POSICIÓN ACTUAL

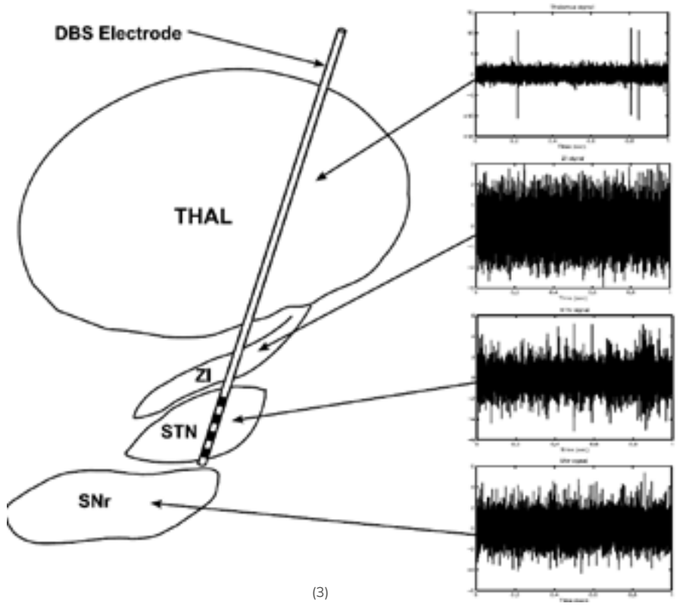
Biomedical engineering program director

CONTACT INFORMATION |
INFORMACIÓN DE CONTACTO

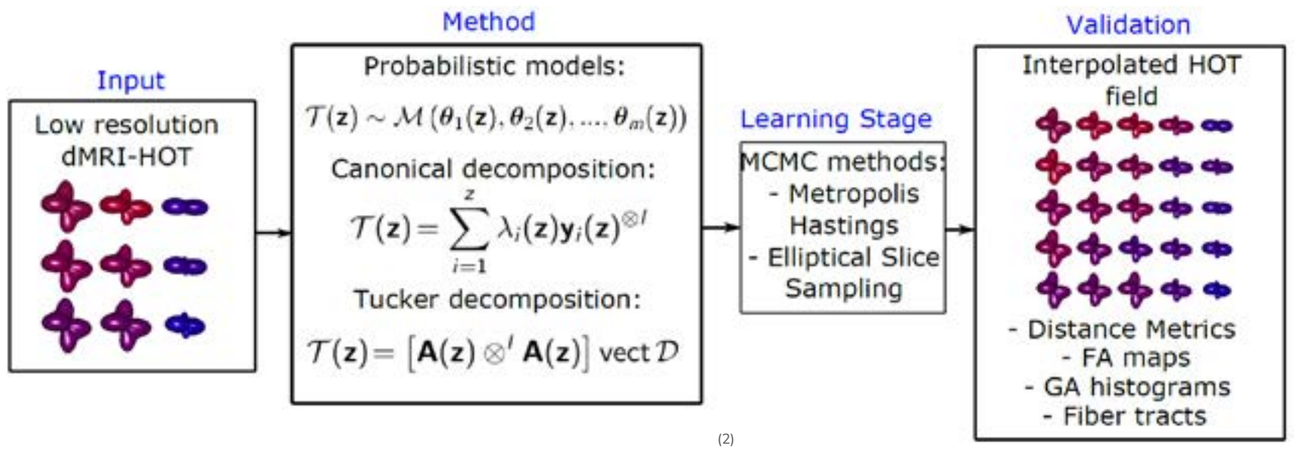
hernan.vargas@javerianacali.edu.co
Engineering Building, No. 2-55



Generalized anisotropy (GA) (1)



(3)



(2)

Figure 37. GA _4 real (1) . Hot method (2). Altas (3).

Natural Sciences and Mathematics Department

3.

Natural Sciences and Mathematics Department

DIRECTOR

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SECRETARY

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LIST OF PROFESSORS **PAGE**

Dr. Abel Álvarez Bustos

RESEARCH INTERESTS |

INTERESES DE INVESTIGACIÓN

- Systems of Balance Laws in Fluid Dynamics
- Riemann Problem in Hyperbolic Equations
- Epidemic Models with Spactial Spread

RESEARCH SUMMARY |

RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Abel concentrates his research on mathematical modeling and computer methods for the numerical solution of fluid dynamic equations in heterogeneous porous media. His research focuses on the creation of novel numerical methods for solving hyperbolic partial differential equations, with applications to nonconventional one- and two-dimensional transport systems. This type of research has numerous engineering applications, such as increased oil recovery, aquifer cleansing, and epidemic modeling.

ES

La investigación del profesor Abel se centra en modelos matemáticos y enfoques computacionales para las soluciones de ecuaciones de dinámica de fluidos en medios porosos heterogéneos. Su investigación se centra en el desarrollo de métodos numéricos innovadores para la resolución de ecuaciones diferenciales parciales hiperbólicas, con aplicaciones a sistemas de transporte no convencionales en una y dos dimensiones. Este tipo de investigación tiene una amplia gama de aplicaciones en el campo de la ingeniería, incluido la recuperación de petróleo, la limpieza de acuíferos y modelos epidémicos.

GOOGLE SCHOLAR |

GOOGLE ACADÉMICO

t.ly/U34T0

ACADEMIC TITLE |

TÍTULO ACADÉMICO

Associate professor

CURRENT RESEARCH |

INVESTIGACIÓN EN CURSO

- Systems of balance laws in fluid dynamics
- Riemann Problem in hyperbolic equations

PROGRAM/GROUP AFFILIATIONS |

AFILIACIONES

Engineering and Applied Sciences Doctorate, Undergraduate programs and Applied Mathematics and Statistics (EMA) group.

EDUCATION |

EDUCACIÓN

- 2015: Doctor in Applied Mathematics, University of Campinas, Department of Applied Mathematics, UNICAMP, Campinas, Brazil.
- 2009: Master of Science in Mathematics, Universidad Nacional de Colombia, Bogotá, Colombia.
- 2004: Bachelor in Mathematics, Universidad Pedagógica Nacional de Colombia, Bogotá, Colombia.
- 1993: Bachelor in Mathematical

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 2017 - present: Associate professor, Department of Natural Science and Mathematics, Pontificia Universidad Javeriana, Cali, Colombia.
- 2015 -2016 Researcher in the Laboratório Nacional de Computação Científica, Petropolis Brazil.
- 2009-2011: Associate professor, Department of Natural Science, Universidad Manuela Beltran, Bogotá, Colombia.
- 2007-2009: Assistant professor, Department of Mathematics, Universidad Nacional de Colombia, Bogotá, Colombia.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

The São Paulo Research Foundation FAPESP Scholarship, Brasil (2011-2015). Brasil government and The Laboratorio Nacional de Computacão Científica (LNCC), Scholarship. Brasil (2015-2016)

CONTACT INFORMATION |

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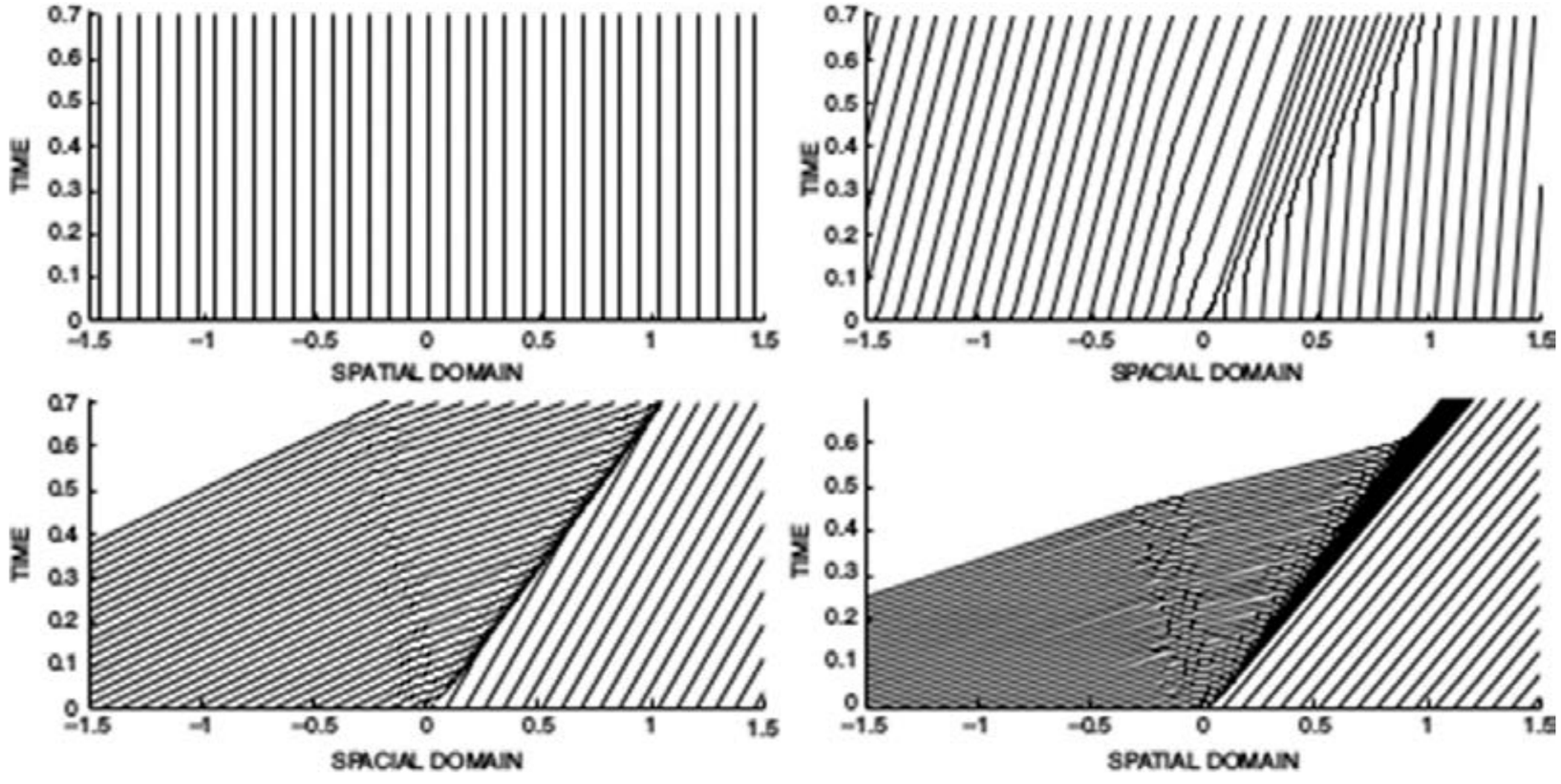

Figure 38. A solution of the Riemann problem to a specific equation of Euler

Dr. Andrés Felipe Amador Rodríguez

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Piecewise Dynamical Systems
- Mathematical Modeling

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Amador's research focuses on the study of piecewise dynamical systems that are common in mathematical modeling of various systems, including population dynamics, disease models, neural networks, mechanical and electronic devices, demographics and economics, and robotics and control equipment.
He uses traditional mathematical tools and non-conventional techniques like Bifurcation theory, Liénard systems, stability of piecewise systems, limit cycles and hidden attractors and numerical continuation methods.

ES

La investigación del Profesor Amador se centra en el estudio de sistemas dinámicos por tramos que son comunes en la modelización matemática de diversos sistemas, incluyendo dinámica de poblaciones, modelos de enfermedades, redes neuronales, dispositivos mecánicos y electrónicos, demografía y economía, así como robótica y equipos de control.
Utiliza herramientas matemáticas tradicionales y técnicas no convencionales como la teoría de bifurcaciones, sistemas Liénard, estabilidad de sistemas por tramos, ciclos límite, atrayentes ocultos y métodos de continuación numérica.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/gZs2Z

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Associate Professor

CURRENT POSITION |
POSICIÓN ACTUAL

Mathematics undergraduate program director.

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate, Undergraduate programs and Applied Mathematics and Statistics (EMAP) group.

EDUCATION |
EDUCACIÓN

- 2018: Doctor in Mathematics, Universidad de Sevilla. Sevilla, España
- 2009: Master's in Applied Mathematics, Universidad Nacional de Colombia Sede Manizales
- 2005: Bachelor's in Mathematics, Universidad Nacional de Colombia Sede Manizales.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

2011- Present: Pontificia Universidad Javeriana, Cali, Colombia.

HONORS AND MEMBERSHIPS |
HONORES Y MEMBRESÍAS

- Cum Laude Doctoral Thesis, Universidad de Sevilla. Sevilla, España, 2018
- Meritorious Master's Thesis, Universidad Nacional de Colombia Sede Manizales, 2009

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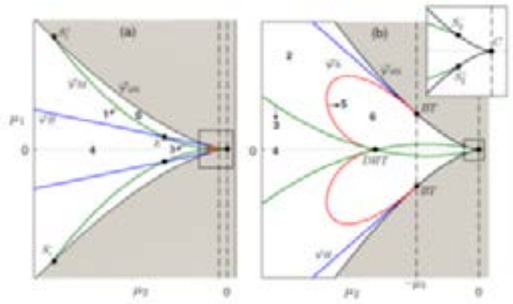

Figure 39. Aproximaciones analíticas para las curvas de bifurcación mediante el uso de funciones de Melnikov

Dr. Diana Haidive Bueno Carreño

RESEARCH INTERESTS |

INTERESES DE INVESTIGACIÓN

- Error-Correcting Coding Theory
- Algebraic Codes
- Abelian Codes
- Algebraic Function Fields

RESEARCH SUMMARY |

RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Bueno works on error-correcting coding theory (coding theory, for short), a sub-field of information theory. Coding theory intersects mathematics and engineering, with applications to many areas of communication such as satellite and cellular phone transmission, data storage, etc. The main challenge in coding theory is to find codes having the largest number of words and error-correcting capabilities for optimum communication efficiency. Constructing such optimal codes is still an open problem. In practice, one or two parameters are fixed in order to find codes having the best possible value for the other(s) parameter(s).

She develops techniques to design and construct codes whose parameters satisfy specific coding and error correcting needs. Specifically, development of techniques for computing bounds for the minimum distance of algebraic codes as well as for designing and constructing codes with certain parameters. All this from the study of the current bounds and the analysis of their construction, based on algebraic coding theory and techniques she developed. She is also interested in the study of classic codes such as Reed-Solomon, Goppa, etc. with the aim of extending them to multiple variables.

Her work involves studying the properties of codes and their fitness for specific applications, including data compression, cryptography, error-correction and network coding.

ES

La profesora Bueno trabaja en teoría de códigos, un sub campo de la teoría de la información. La teoría de códigos intersecta las matemáticas y la ingeniería, con aplicaciones a muchas áreas de comunicación como las transmisiones satelitales y celulares, el almacenamiento de datos, entre otros. El principal reto de la teoría de códigos es encontrar códigos que tengan el mayor número de palabras y capacidad de corrección de errores para una comunicación eficiente. La construcción de tales códigos es aún un problema abierto. En la práctica, se fijan uno o dos parámetros con el fin de encontrar códigos que tengan el mejor valor posible para los otros parámetros.

Ella desarrolla técnicas de diseño y construcción de códigos cuyos parámetros satisfacen necesidades específicas de codificación y corrección de errores. Específicamente, el desarrollo de técnicas para calcular cotas para la distancia mínima de los códigos algebraicos y para el diseño y la construcción de códigos con parámetros determinados. Todo esto a partir del estudio de las cotas existentes y el análisis de su construcción, basado en la teoría de códigos algebraicos y sus propias técnicas. Ella también está interesada en el estudio de códigos clásicos como Reed-Solomon, Goppa, entre otros, con el propósito de extenderlos a múltiples variables.

Su trabajo involucra el estudio de las propiedades de los códigos y su aptitud para aplicaciones específicas, incluyendo compresión de datos, criptografía, corrección de errores y codificación de redes (network coding).

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/oMnKE

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Associate Professor

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate and Undergraduate programs.

EDUCATION |
EDUCACIÓN

- 2014: Ph.D. in Mathematics, Universidad de Murcia, Murcia, España. (Colciencias Scholar).
- 2010: Master's in Advanced Mathematics, Universidad de Murcia, Murcia, España.
- 2007: Master's in Science and Mathematics, Universidad del Valle, Cali, Colombia.
- 2002: Bachelor in Mathematics, Universidad Industrial de Santander, Bucaramanga, Colombia.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 2008: Present: Pontificia Universidad Javeriana, Cali, Colombia.
- 2007: Universidad del Valle, Cali, Colombia.
- 2003: Universidad Industrial de Santander, Bucaramanga, Colombia.

HONORS AND MEMBERSHIPS |
HONORES Y MEMBRESÍAS

- Selected as one of the 25 Colombian women mathematicians who participated in the project Mujeres matemáticas en Colombia. Un testimonio gráfico. https://www.mujeresmatematicas.com/
- Representative for the Pontificia Universidad Javeriana Cali in the Board of Directors of the Instituto GeoGebra Cali (IGCali).
- Vice President of the Board of Directors of the Society for Industrial and Applied Mathematics CoSIAM https://www.cosiam.net/

CONTACT INFORMATION |
INFORMACIÓN DE CONTACTO

dhbuejo@javerianacali.edu.co
Engineering Building, No. 1-18

Dr. Nicola Sian Flanagan

RESEARCH INTERESTS |

INTERESES DE INVESTIGACIÓN

- Evolutionary Biology
- Molecular Ecology
- Conservation Genetics

RESEARCH SUMMARY |

RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Flanagan is an evolutionary biologist applying molecular ecology and conservation genetics approaches for biodiversity conservation and ecosystem restoration in the neo-tropics. She has a broad taxonomic experience, including birds, insects and plants, and actively participates in programs for community based conservation, with emphasis on vanilla as a component for sustainable forest-based agro-ecosystems. She has contributed biotechnology applications for conservation of neo-tropical orchid diversity.

ES

La profesora Flanagan es una bióloga evolucionista que aplica métodos de ecología molecular y genética de la conservación para la conservación de la biodiversidad y la restauración de ecosistemas neotropicales. Tiene una experiencia amplia en taxonomía, incluyendo pájaros, insectos y plantas, y participa de manera activa en programas comunitarios, con énfasis en la vainilla como componente para la sostenibilidad de agro-ecosistemas basados en bosques. Ha contribuido con aplicaciones en biotecnología para la conservación de la diversidad de las orquídeas neotropicales.

GOOGLE SCHOLAR |

GOOGLE ACADÉMICO

t.ly/hVrJE

ACADEMIC TITLE |

TÍTULO ACADÉMICO

Full Professor

CURRENT RESEARCH |

INVESTIGACIÓN EN CURSO

- Treasures in the Forest: Participatory Research and Social Appropriation of Knowledge for the Valuation of Biocultural Heritage in Nature Tourism Ventures (Funded by the WWB Foundation).
- Does the spatial distribution of free-living orchid mycorrhizal fungi determine the local distribution of tropical epiphytic orchids? (Pontificia Universidad Javeriana Cali).
- Co-construction of a Strategy for Participatory Conservation of Orchids in the Tropical Dry Forest of Valle del Cauca (Pontificia Universidad Javeriana. Cali)

PROGRAM/GROUP AFFILIATIONS |

AFILIACIONES

Engineering and Applied Sciences Doctorate, Bachelor in Biology, and Orchids and Vegetable Ecology (OESV), and Biodiversity Conversation Group (Lead).

EDUCATION |

EDUCACIÓN

- 1998: Doctor in Biology, University of East Anglia, Norwich,UK.
- 1993: Bachelor of Science in Biology University of Leeds, Leeds, UK.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 2010–Present: Professor, Pontificia Universidad Javeriana, Department of Natural Science and Mathematics, Cali, Colombia.
- 2009: Postdoctoral Research Fellow (Visiting), Consultative Group on International Agricultural Research (CIAT), Genetic resources of vanilla, Cali, Colombia.
- 2006: Postdoctoral Research Associate, Australian National University, Canberra, Australia.
- 2003: Postdoctoral Researcher, Universidad de Puerto Rico at Rio Piedras, Departament of Biological Science, San Juan, Puerto Rico.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

Colombian Botanical Association member; Professional Council of Biology member; Society for Conservation Biology member; Association for Tropical Biology and Conservation member; and Latinamerican Botanical Association member.

CONTACT INFORMATION |

INFORMACIÓN DE CONTACTO

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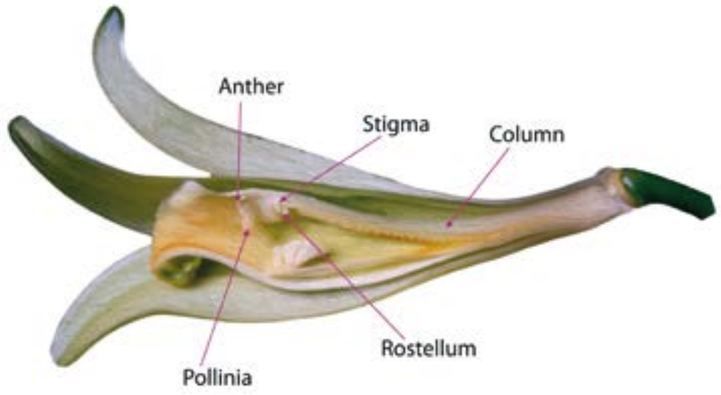

Figure 40. Parts of an orchid flower of the Vanilla gender.

Figure 41. Vanilla calyculata flower of the natural population found in Atuncela, Dagua, Valle del Cauca, Colombia

Dr. Isabel Cristina García Arboleda

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Statistical Inference for Stochastic Processes
- Mathematical Statistics and Probability
- Specifically Asymptotic Methods in Probability and Statistics: Branching processes
- Time Series
- Dependent Sata
- U-Statistics
- Change Point Problems

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Garcia's research lie in the fields of statistical inference for stochastic processes. Her current research projects are to investigate the interactions between Dependence and asymptotic methods in order to describe the behaviour of some types of populations. For example, individuous, electricity prices, etc.

Overall, her current and future research projects reflect her strong interest in a broader research agenda that seeks to study methods to detect change point in a data set characterized with dependence. Some applications of her work could be in finance, economy, biology, physics and engineering.

ES

La investigación de la profesora García se enmarca en el campo de la inferencia estadística para los procesos estocásticos. Sus proyectos investigan la interacción entre la dependencia y los métodos asintóticos, con el fin de describir el comportamiento de algunos tipos de poblaciones; por ejemplo, especies, precios de electricidad, etc.

En general, sus proyectos de investigación actuales y futuros reflejan su gran interés en una agenda de investigación más amplia que busca estudiar métodos para detectar puntos de cambio en un conjunto de datos caracterizado por la dependencia. Algunas aplicaciones de su trabajo podrían ser en finanzas, economía, biología, física e ingeniería

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/7L1lw

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Assistant Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

Math Girls' Circles in Nariño (Funded by the WWB Foundation)

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate and Undergraduate programs. Statistics area.

EDUCATION |
EDUCACIÓN

- 2017: Doctorate at Ruhr-Universität Bochum, Probability and its Applications.
- 2008: Master in Sciences with speciality in Probability and Statistics, Centro de Investigación en Matemáticas CIMAT A.C., Guanajuato, México.
- 2003: Bachelor in Mathematics, Universidad de Antioquia, Medellín, Colombia.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 2017-present. Professor Pontificia Universidad Javeriana, Cali, Colombia.
- 2016: Part time assistant professor Universidad del Valle. Fullt time professor Universidad Santiago de Cali, Cali, Colombia.
- 2010-2015: Academic staff Lehrstuhl XII Stochastik, Ruhr University Bochum, Bochum, Germany.
- 2009: Full time professor visitor, Universidad de Antioquia, Medellín, Colombia.
- 2008: Junior academic visitor, Technische Universitaet Muenchen, Munich, Germany.
- 2007: Instructor professor, Universidad de Guanajuato, Guanajuato, México.
- 2003-2005: Instructor professor, Universidad de Antioquia, Medellín, Colombia.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

Grants: CIM Integrated experts, Centre for International Migration and Development, awarded from 2017 to 2018; COLFUTURO awarded from 2013 to 2014; European Science Foundation, ESF. Advanced Mathematical Methods for Finance, awarded in 2008; Centro de Investigación en Matemáticas, CIMAT A.C., awarded from 2006 to 2007; Banco Industrial Colombiano awarded from 1997 to 2003; ICETEX awarded from 1991 to 1996; Member of Sociedad Colombiana de Estadística since 2015.

CONTACT INFORMATION |

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Dr. Mateo López Victoria

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Island Ecology
- Conservation
- Biogeography (Mostly from Remote Island Ecosystems)

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor López-Victoria has done research at different scales, from organisms to communities. Particular effort during his first ten years of research was oriented to coral reefs and adjacent ecosystems (seagrass beds and mangroves), mostly in the Caribbean. During the last ten years he has been focused on both marine and island ecology and biogeography, mostly in the Pacific. Current research projects include competition for space among coral reef organisms (i.e., encrusting excavating sponges vs. stony corals), coral reef development under suboptimal conditions (as potential source of information to be used for coral reef restoration, using resilient species or populations of keystone species), ecology and biogeography of insular fauna (i.e., food web of Malpelo Island, ecology and impact of introduced species in oceanic islands). He has done collaborative research with scientists from Germany (where he lived for seven years), the UK, Australia, USA, Mexico, and Taiwan.

ES

El profesor López-Victoria ha realizado investigaciones a diferentes escalas, desde los organismos a las comunidades. Un esfuerzo especial durante sus primeros diez años de investigación se orientó a los arrecifes de coral y los ecosistemas adyacentes (lechos de algas marinas y manglares), sobre todo en el Caribe. Durante los últimos diez años se ha centrado en la ecología y biogeografía insular y marina, sobre todo en el Pacífico. Sus proyectos de investigación actuales incluyen la competencia por el espacio entre los organismos de los arrecifes de coral (es decir, las esponjas incrustantes frente a los corales pétreos-excavar), el desarrollo de arrecifes de coral en condiciones sub-óptimas (como potencial fuente de información que se utilizará para la restauración de los arrecifes de coral, utilizando especies resistentes o poblaciones de especies clave), ecología y biogeografía de la fauna insular (es decir, la red alimentaria de la isla de Malpelo, la ecología y el impacto de las especies introducidas en las islas oceánicas). Él ha hecho la investigación en colaboración con científicos de Alemania (donde vivió durante siete años), del Reino Unido, Australia, EE.UU., México y Taiwán.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/EGq3a

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Full Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

- One Million Corals for Colombia, Pacific Alliance (Gorgona and Utría National Natural Parks) (Funded by Conservation International Foundation)
- Connectivity between Reefs, Reproductive Isolation, and Historical Changes in the Holobiont: The Three Species of the Orbicella Genus as a Case Study (Funded by Penn State University - Parques Naturales de Colombia)
- Ecological Integrity and Biodiversity of the Reef and Island Ecosystems of the Oceanic Coral Complexes of Colombia in the Caribbean - Seaflower Reserve (Comisión Colombiana del Océano)
- Monitoring of the Coral Reefs in Gorgona National Natural Park - SIMAC – Gorgona (PNN - Conservation International Foundation)
- Reef Fish of the Colombian Pacific: Multifaceted Biodiversity and Potential Economic and Nutritional Benefits for Colombia (Pontificia Universidad Javeriana Cali y Universidad del Valle)

PROGRAM/GROUP AFFILIATIONS |

AFILIACIONES

- Engineering and Applied Sciences Doctorate, Biology Program, Department of Natural Sciences and Mathematics. Research Group in Ecology of Coral Ree¬fs. Research Group in Conservation and Biotechnology.

EDUCATION |

EDUCACIÓN

- 2009: Doctor in Biology, Justus-Liebig de Giessen University, Gieben, Hesse, Germany.
- 2003: Master of Science in Marine Biology, Universidad Nacional de Colombia, Santa Marta, Colombia.
- 1999: Bachelor of Science in Biology (Marine Biology), Universidad del Valle, Cali, Colombia.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 2012-Present Associate Professor, Department of Natural Sciences and Mathematics, Biology Program, Pontificia Universidad Javeriana Cali, Colombia.
- 2009-2012 Junior Teacher and Science Unit-Just´us (Post-Doctoral Program at the Justus-Liebig University in Giessen, Germany.
- 2005-2009 Teacher Assistant (Ph.D.-Student) at the Justus-Liebig University in Giessen, Germany. 2012-Present Associate Professor, Department of Natural Sciences and Mathematics, Biology Program, Pontificia Universidad Javeriana Cali, Colombia.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

- 2012-2015 Beneficiary of the “Returning Expert Program”, Centre for International Migration and Development, Germany.
- 2012-to date. Member of the Research Group in Ecology of Coral Reefs (an initiative of Universidad del Valle and Pontificia Universidad Javeriana Cali).
- Young Investigator award from the Administrative Department of Science, Technology and Innovation, Colciencias (2002), Scholar from the Mono Hernandez Scholarship program on Initiative of Threatened Species (2003), Scholar from the German Service of Academic Exchange (DAAD) (2005), Scholar from the Post-doctoral program Just´us,Universitat Giessen (November 2009), Returning Experts from Germany Program (CIM), German Agency for Technical Cooperation (January, 2013).

CURRENT POSITION |

POSICIÓN ACTUAL

Biology undergraduate program director.

CONTACT INFORMATION |

INFORMACIÓN DE CONTACTO

malov@javerianacali.edu.co
Engineering Building, No. 2-10

Figure 42. Long-term studies of interactions among coral reef organisms let us discriminate between natural dynamics (i.e, seasonal fluctuations) and man-induced changes that affect these strategic ecosystems. Professor López shown in picture

Figure 43. The scientific and systematic studies of marine ecosystems under different climate change scenarios provide the information needed to face the environmental challenges in conservation and restoration associated with global warming.

Dr. Ana Teresa Mosquera Espinosa

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Interactions Between Microorganisms and Plants, among Microorganisms, and Between Microorganisms and Insect Pests

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Ana Teresa's research focuses on finding alternatives for plant health in agricultural systems or wild terrestrial environments to minimize the use of synthetic chemicals. Her emphasis is on studying interactions between microorganisms-plants, as well as microorganism-microorganism, microorganism-pest insects, microorganism-phytonematodes. The projects she has developed with significant results include: isolation and identification of arbuscular mycorrhizal fungi as well as orchidioids for plant nutrition and protection; endophytic fungi for the conservation and sustainable use of commercially potential plants; soil erosion recovery; plant diagnosis and integrated pest and disease management (IPM); identification of phytonematodes and their biocontrol. She has also worked on agroecology for the production of healthy foods, providing support to rural and ethnic communities in the departments of Valle del Cauca, Cauca, and Boyacá. Likewise, for the past 15 years, she has emphasized her research in vanilla and orchid mycorrhizae.

ES

La investigación de la profesora Ana Teresa, se centra en encontrar alternativas para la sanidad vegetal en sistemas agrícolas o ambientes terrestres silvestres, para minimizar el uso de químicos sintéticos. Su énfasis está en estudiar interacciones entre microorganismos-plantas, así como, microorganismos–microorganismos, microorganismos-insectos plaga, microorganismos-fitonematodos. Los proyectos que ha desarrollado con resultados de importancia están en: aislamiento e identificación de hongos micorrízicos del tipo arbusculares como también orquidiodes para la nutrición y protección vegetal; hongos endófitos para la conservación y uso sostenible de plantas con potencial comercial; recuperación de suelos erosionados; diagnóstico vegetal y manejo integrado de insectos plagas y enfermedades-MIPE; identificación de fitonematodos y su biocontrol. También ha trabajado en agroecología para la producción de alimentos sanos, dando apoyo a comunidades rurales y étnicas en los departamentos del Valle del Cauca, Cauca y Boyacá. Igualmente, los últimos 15 años ha enfatizado su investigación en vainilla y micorrizas de orquídeas.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/6tgVf

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Assistant Professor

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Asociación Colombiana de Fitopatología y Ciencias Afines (Ascolfi); Asociación de Ingenieros Agrónomos del Valle (Asiava); Asociación Colombiana de Botánica (ACB).

EDUCATION |
EDUCACIÓN

- 2011: Doctor in Agricultural Sciences, Universidad Nacional de Colombia, Palmira, Colombia.
- 2001: Master of Science Crop Protection, Universidad de Puerto Rico, Mayagüez, Puerto Rico.
- 1995: Agronomy Engineering, Universidad Nacional de Colombia, Palmira, Colombia.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 2017- Present: Pontificia Universidad Javeriana, FORJA Program, Cali, Colombia.
- 2015- Present: Pontificia Universidad Javeriana, Biology Program, Cali, Colombia.
- 2013 – 2015: Universidad Pedagógica y Tecnológica de Colombia, Agricultural Engineering, Tunja, Colombia. Plant pathologist in charge of the Plant Diagnostics Laboratory (Agricultural Sciences Faculty). Assistant Professor.
- 2012-2013: Pontificia Universidad Javeriana, Biology Program, Cali, Colombia.
- 2012-2013: Universidad Nacional de Colombia, Palmira, Postgraduate, Agricultural Sciences Faculty. Courses: Agricultural nematology. Teaching faculty (contract).
- 2003-2007: Universidad del Pacífico, Buenaventura, Agronomy in the Humid Tropics Program.
- 2011: Private consultant. Phytopathologist, Vegetal Diagnosis Laboratory. Instituto Colombiano Agropecuario (ICA). Efficacy tests of synthetic fungicides for control of coffee leaf rust. Andina de Negocios S.A-ANDINESA.
- 2002-2013: Private consultant, Tech transfer to small farmers in agroecology for crop production.

HONORS AND MEMBERSHIPS |
HONORES Y MEMBRESÍAS

Homologous evaluator recognized by Minciencias, Senior Researcher (IS).

CONTACT INFORMATION |
INFORMACIÓN DE CONTACTO

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Guayacanes Building, 3rd floor, biology offices

Dr. Daniel Elias Núñez López

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Dynamics of Economic Models
- Stability and Dynamics of Hamiltonian Systems
- Applied Stochastic Calculus

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Nuñez works on mathematical techniques for analyzing the stability of Hamiltonian systems (i.e. a Hamiltonian system is a mathematical formalism de - veloped by Hamilton to describe the dy - namical evolu- tion equations of a physi - cal system). Currently, these techniques have been refined for systems that have no integrable solutions using non-linear analysis methods and an improved un - derstanding of stability conditions. He focuses on extending these techniques to study problems in celestial mechanics, control systems, vortex dynamics, ecological envi - ronments, economic models and other areas of applied interest (e.g. periodic solutions for 3-body interactions.) He and his group have made important contributions to magnetic stabilization models of terrestrial satellites, forced and inverted pendulums, oscillators with variable mass, among others.

ES

El professor Núñez trabaja en técnicas matemáticas para analizar la estabilidad de los sistemas hamiltonianos, es decir, aquellos que describen las ecuaciones de evolución dinámica de sistemas físicos empleando componentes de energía. Estas técnicas han sido refinadas para sistemas que no tienen soluciones integrables empleando métodos de análisis no lineal y una comprensión mejorada de las condiciones de estabilidad. Él se enfoca en la extensión de estas técnicas para estudiar problemas de la mecánica celeste, sistemas de control, dinámica de vórtices, am- bientes ecológicos, modelos económicos y otras áreas de interés aplicado (e.g. soluciones periódicas a interacciones de 3 cuerpos). Con su grupo han contribuido al campo con nuevos modelos de estabilización magnética para satéli- tes terrestres, péndulos forzados e invertidos, osciladores de masa variable, entre otros.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/dDV8l

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Associate Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

Symmetric Periodic Oscillations and Their Stability in a Restricted 3-Body Problem and in MEMS (Micro-Elec- tro-Mechanical Systems) Devices.

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Dynamical Systems Group. Instituto de Matemáticas de La Universidad de Sevilla España (IMUS).

EDUCATION |
EDUCACIÓN

- 2001: Doctor in Mathematics, Universidad de Grana- da, Granada, España.
- 1991: Bachelor in Mathematics, Universidad del Zulia, Maracaibo, Venezuela.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 2012-Present: Pontificia Universidad Javeriana, Cali, Colombia.
- 2014: Universidad del Zulia, Maracaibo, Venezuela.

CONTACT INFORMATION |
INFORMACIÓN DE CONTACTO

denunez@javerianacali.edu.co
Engineering Building, No. 1-08

Dr. Luis Gerardo Pedraza Saavedra

RESEARCH INTERESTS |

INTERESES DE INVESTIGACIÓN

- Quantum Field Theory
- General Relativity Theory
- Applied Mathematics
- Physics Education, History and Philosophy
- Special Relativity Theory

RESEARCH SUMMARY |

RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Pedraza investigates the consequences of different mathematical formalisms in quantum theories of measurement of physics unification programs. His current effort is focused on the constraints on measurability of one component of the free quantum electromagnetic field and its relevance with respect to the energy-time indetermination. Such constraints are obtained with the Feynman's formalism of restricted integrals. Their fundamental aspect is confirmed because the condition associated with a measurement of the field has the form of the energy-time indeterminant relationship. This indeterminant condition is imposed on the field as a condition for detectability and applied to the analysis of how an exploratory near-field scanning microscope operates. He believes that thought experiments provide an avenue for testing the compatibility of concepts in situations that are simple enough to permit a comprehensive analysis. Current measurement technology is so precise that quantum effects become the main cause of restrictions in sensitivity. He has made multiple contributions to the field, including the study and comparison of the orders of magnitude between critical electromagnetic fields and their consequence when measuring information about the electromagnetic field.

ES

El profesor Pedraza está trabajando en comprender las consecuencias del uso de diferentes formalismos matemáticos en las teorías cuánticas de medición, en programas de unificación de la física. Su esfuerzo actual está enfocado en las restricciones de medición de una componente del campo electromagnético cuántico libre y su relevancia con respecto a la indeterminación energía-tiempo. Dichas restricciones se obtienen con el formalismo de las integrales restringidas de Feynman. Su aspecto fundamental se confirmará por el hecho de que la condición asociada a la medición del campo tiene la forma de la relación de indeterminación energía-tiempo. Dicha relación de indeterminación energía-tiempo se impone al campo como condición para ser detectable y se aplicará entonces al análisis de cómo es que funciona el microscopio de exploración de campo próximo (Near-Field Scanning Microscope). Él considera que los experimentos mentales proporcionan una estrategia para probar la compatibilidad de conceptos en situaciones que son suficientemente sencillas para permitir un análisis comprensivo. La tecnología de medición actual es tan precisa que los efectos cuánticos se convierten en la principal causa de restricción a la sensibilidad de la medida. Ha logrado múltiples contribuciones al campo, incluyendo el estudio y la comparación de los órdenes de magnitud entre campos electromagnéticos críticos y su consecuencia sobre la medida de información sobre el campo mismo.

GOOGLE SCHOLAR |

GOOGLE ACADÉMICO

t.ly/GQCo0

ACADEMIC TITLE |

TÍTULO ACADÉMICO

Full time Professor

CURRENT RESEARCH |

INVESTIGACIÓN EN CURSO

- 2023-2024: ¿Are the Brachistochrone and the Tautochrone Cycloid? Yes, according to Mathematics. No, according to Physics.

PROGRAM/GROUP AFFILIATIONS |

AFILIACIONES

Engineering and Applied Sciences Doctorate, Bachelors in Engineering, Bachelor in Philosophy and De Humanitate Research Group.

EDUCATION |

EDUCACIÓN

- 2012: Postdoctoral Scholar in Physics, University of Puerto Rico, Mayagüez, USA.
- 2000: Doctor in Physics, Universidad del Valle, Cali, Colombia. Homologated by WES Inc. in USA and Canada.
- 1995: Master in Physics, Universidad del Valle, Cali, Colombia. Homologated by WES Inc. in USA and Canada.
- 1992: Bachelor in Physics, Universidad del Valle, Cali, Colombia. Homologated by WES Inc. in USA and Canada.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 1996-Present. Full Time Physics Professor, Pontificia Universidad Javeriana, Cali, Colombia.
- 1998-2001: Part-Time Assistant Professor, Universidad ICESI, Cali, Colombia.
- 1997-1998: Part-Time Assistant Professor, Universidad de San Buenaventura, Cali, Colombia.
- 1994-1995: Instructor Professor, Universidad Autónoma de Occidente, Cali, Colombia.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

- Scholar Mazda Foundation for Arts and Science (1994)
- Distinguished professor recognition at the Pontificia Universidad Javeriana, Cali, Colombia, (2002, 2007, 2009, 2010)
- Silver medal award for more than 15 years of service at the Pontificia Universidad Javeriana, Cali, Colombia (2012)
- Gold medal award for more than 25 years of service at the Pontificia Universidad Javeriana, Cali, Colombia (2022)
- Member UNESCO (United Nations Educational, Scientific and Cultural Organization)
- Inclusion in the book The Worldwide List of Alternative Theories and Critics, 2016, 2018, 2020, 2022, ISBN 978-2-9024-2517-4, © Editions d'Assailly, France, Jean de Climont Ltd. Associated Engineers.

CONTACT INFORMATION |

INFORMACIÓN DE CONTACTO

lugepesa@javerianacali.edu.co
Engineering Building, No. 1-17

Dr. Mauricio Alberto Quimbaya Gómez

RESEARCH INTERESTS |

INTERESES DE INVESTIGACIÓN

- Systems Biology
- Comparative Genomics
- Cell Cycle Regulation
- Cancer Research
- Plant Biotechnology
- Epigenetic Regulation

RESEARCH SUMMARY |

RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Prof. Quimbaya is an expert biotechnologist from Ghent University (Belgium) with experience in both, experimental biotechnology, and computational biology. His research focuses on the development of systemic and integrative strategies applied to plant genomics, epigenomics, comparative genomics, cell cycle regulation and cancer. Dr. Quimbaya has developed and implemented different strategies to elucidate and characterize potential oncogenes associated with the development of different types of cancer and, has recently focused, on the development of integrative methods for the study of genomic stability, a distinctive cancer hallmark, of paramount importance in colorectal carcinomas. Similarly, he is working on abiotic stress responses in agronomically relevant crops as rice, specifically studying epigenomic and transcriptional regulation associated with aluminum genotoxic stress.

ES

El Profesor Quimbaya es un biotecnólogo experto de la Universidad de Ghent (Bélgica) con experiencia tanto en biotecnología experimental como en biología computacional. Su investigación se centra en el desarrollo de estrategias sistémicas e integrativas aplicadas a la genómica de plantas, epigenómica, genómica comparativa, regulación del ciclo celular y cáncer. El Dr. Quimbaya ha desarrollado e implementado diferentes estrategias para dilucidar y caracterizar potenciales oncogenes asociados con el desarrollo de diferentes tipos de cáncer y, recientemente, se ha centrado en el desarrollo de métodos integrativos (teoría de grafos y métodos de aprendizaje de máquina) para el estudio de la inestabilidad genómica, una marca distintiva del cáncer, de suma importancia para el desarrollo de carcinomas colorrectales. Del mismo modo, el profesor Quimbaya está trabajando en la comprensión de las respuestas moleculares a estreses abióticos en cultivos agronómicamente relevantes como el arroz, estudiando particularmente la regulación epigenómica y transcripcional asociada al estrés genotóxico por aluminio.

GOOGLE SCHOLAR |

GOOGLE ACADÉMICO

t.ly/mRQHK

ACADEMIC TITLE |

TÍTULO ACADÉMICO

Associate Professor

CURRENT RESEARCH |

INVESTIGACIÓN EN CURSO

- OMICAS: Optimización Multiescala In-silico de Cultivos Agrícolas Sostenibles. P1 (genomics, epigenomics and genetic networks) PI.
- Convocatoria 808 COLCIENCIAS (PUJ – CENICAÑA): Use of sugarcane by-products (phenolic and Maillard reaction compounds) to obtain value-added products: molasses and vinasses with antioxidant and anticarcinogenic potential.

PROGRAM/GROUP AFFILIATIONS |

AFILIACIONES

Department of Natural Sciences and Mathematics, Faculty of Engineering and Sciences, Pontificia Universidad Javeriana Cali, Cali, Colombia.

EDUCATION |

EDUCACIÓN

- 2011: Ph.D. in Biotechnology, Ghent University, in association with the Vlaams Instituut voor Biotechnologie (VIB), Ghent, Belgium.
- 2004: Biologist, Universidad Nacional, Bogotá D.C., Colombia.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 2012 - Present: Associate professor, Pontificia Universidad Javeriana, Cali, Colombia.
- 2012: Adjunct lecturer, Universidad del Rosario, Bogotá, Colombia.
- 2007-2011: Student and researcher, Vlaams Instituut voor Biotechnologie (VIB), Ghent, Belgium.
- 2004-2006: Research assistant, International Center for Tropical Agriculture (CIAT), Cali, Colombia.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

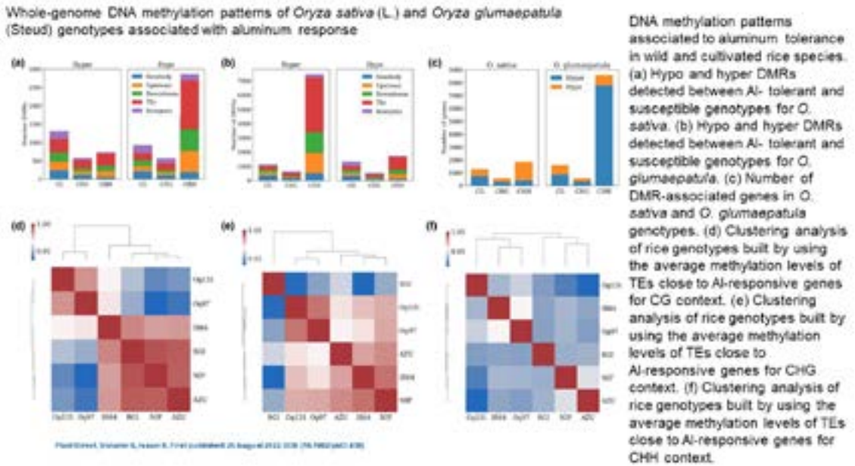
Selected among 250 candidates from around the world to be part of the 2007-VIB doctoral call, for which the VIB institute (Vlaams Instituut voor Biotechnologie), selected four scholarship holders to carry out doctoral studies in association with Ghent University.

CONTACT INFORMATION |

INFORMACIÓN DE CONTACTO

maquimbaya@javerianacali.edu.co
Office 2.46 Faculty of Engineering and Sciences and iOMICAS genomics lab.

Figure 44. In vitro growing of Arabidopsis thaliana cell cycle mutants. A selection procedure is being performed in which only mutant plants carrying a specific transgene survive under the conditions of the selection medium



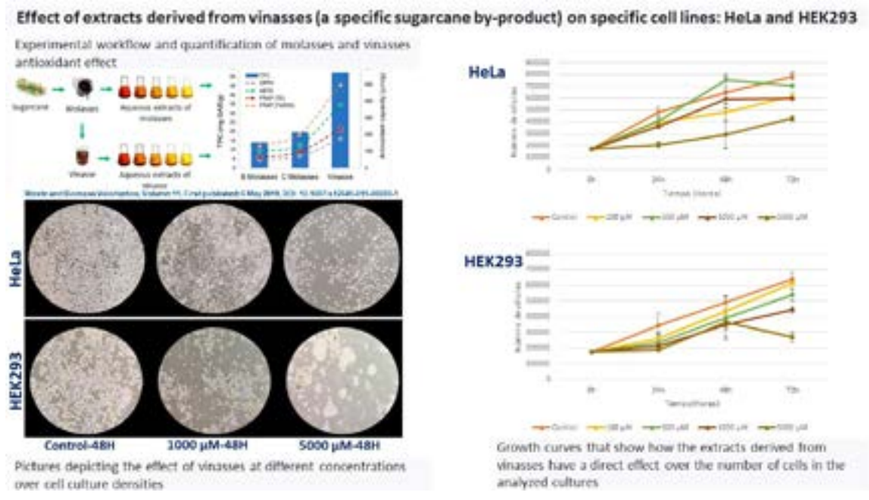


Figure 45. Effect of extracts derived from vinasses (a specific sugar cane by-product) on specific cell lines: HeLa and HEK293

Dr. Oscar de Jesús Ramírez Góngora

RESEARCH INTERESTS |

INTERESES DE INVESTIGACIÓN

- Nonlinear Fiber Optics
- Supercontinuum Laser Light Applications
- Biophotonics Metrology

RESEARCH SUMMARY |

RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Ramírez-Góngora is doing research in the field of fiber optics with emphasis on the nonlinear dynamics of ultrashort laser pulses while they propagate in a photonic crystal fiber. Today he is particularly interested in the characterization and uses of a Supercontinuum Laser Light Source (SLLS). There are a wide range of fundamental implications & technological applications that are now emerging from basic and applied research on this light source, some recent developments about SLLS uses, include and are not limited to: optical clocks, spectroscopy, telecommunications, material characterization, optical coherence tomography and microscopy apparatus, and many more.

ES

El profesor Ramírez-Góngora realiza investigación en el campo de las fibras ópticas con interés en la dinámica no lineal de pulsos ultracortos, mientras ellos se propagan en una fibra de cristal fotónico. Hoy día él está particularmente interesado en la caracterización y usos de la fuente de luz láser súper continua (SLLS). Existe un gran potencial de implicaciones fundamentales y aplicaciones tecnológicas que se encuentran emergiendo fruto de la actual y efervescente investigación fundamental y aplicada basada en esta fuente laser súper continua, algunos de los desarrollos recientes no se limitan e incluyen entre otros a: los relojes ópticos, la espectroscopía, las telecomunicaciones, la caracterización de materiales, la tomografía óptica de luz coherente y la microscopía entre otras muchas.

RECENT PUBLICATIONS |

PUBLICACIONES RECIENTES

- Couairon, A., Brambilla, E., Corti, T., Majus, D., Ramírez- Góngora, O. D. J., Kolesik, M. (2011) Practitioner's guide to laser pulse propagation models and simulation. The European Physical Journal Special Topics. 199(1), 5-76.
- Ramírez-Góngora, O. D. J., Abachi, S. (1995) Inclusive u and b-Quark production cross sections in ppbar collisions at sqrt(s) = 1.8 TV. En: Colombia, Physical Review Letters. ISSN: 0031-9007 ed: The American Physical Society, v.74 fasc.18 p.3548 - 3552.
- Ramírez-Góngora, O. D. J., Abachi, S. (1995) Observation of the Top Quark. En: Estados Unidos, Physical Review Letters. ISSN: 0031-9007 ed: The American Physical Society, v.74 fasc.14 p.2632 - 2637.

ACADEMIC TITLE |

TÍTULO ACADÉMICO

Associate Professor

CURRENT RESEARCH |

INVESTIGACIÓN EN CURSO

Development of an automated system (hardware, electronic and photonic instrumentation, and software) for the induction, monitoring, and study of the photobiomodulation phenomenon using cellular or microbial cultures in a liquid medium (Pontificia Universidad Javeriana Cali).

PROGRAM/GROUP AFFILIATIONS |

AFILIACIONES

Doctorate in Engineering, undergraduate program in Biology, and Biology research group.

EDUCATION |

EDUCACIÓN

- 2016: Doctor of Science in Physics, Universidad del Valle, Cali, Colombia.
- 1994: Master of Science in Physics, University of Puerto Rico, Mayagüez, Puerto Rico.
- 1989: Bachelor in Physics, Universidad del Valle, Cali, Colombia.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 1998-present: Professor of Physics, Pontificia Universidad Javeriana, Cali, Colombia.
- 1999-2006: Professor of Physics, Universidad ICESI, Cali, Colombia.
- 2005-2006: Professor of Physics, Universidad Libre, Cali, Colombia.
- 1996-2000: Professor of Mathematics & Material Science, Universidad del Valle, Cali, Colombia.
- 1994: Teaching Assistant at University of Illinois at Chicago, Chicago, Illinois, USA.
- 1993-1994: Research Assistant at Fermi National Accelerator Laboratory, Batvia, Illinois, USA.
- 1989-1992: Teaching Assistant at University of Puerto Rico, Mayagüez, Puerto Rico.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

Society Red Colombiana de Óptica, SRCO. Optical Society of America, OSA

CONTACT INFORMATION |

INFORMACIÓN DE CONTACTO

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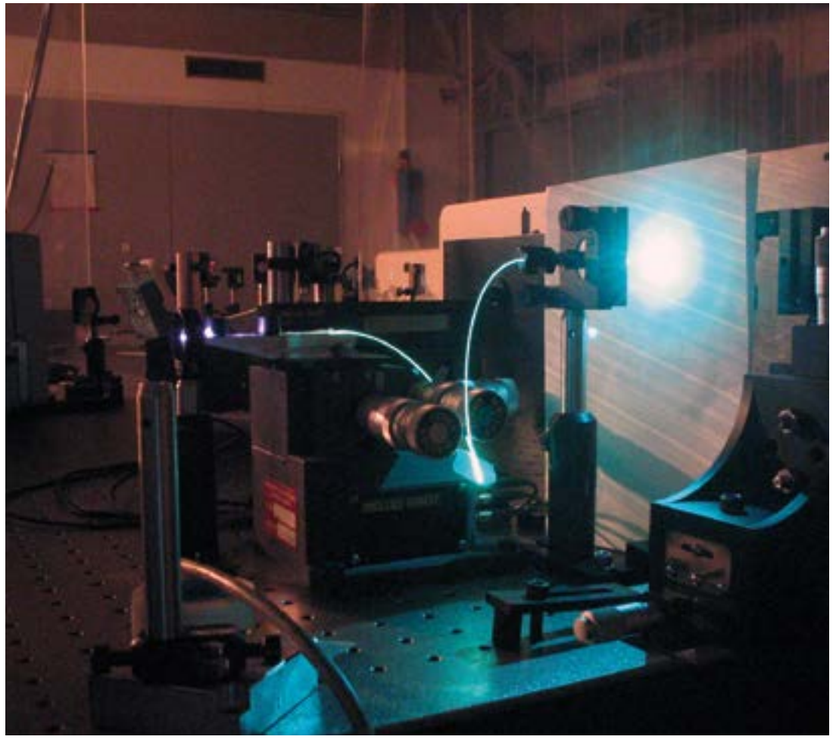
Engineering Building, No. 1-29



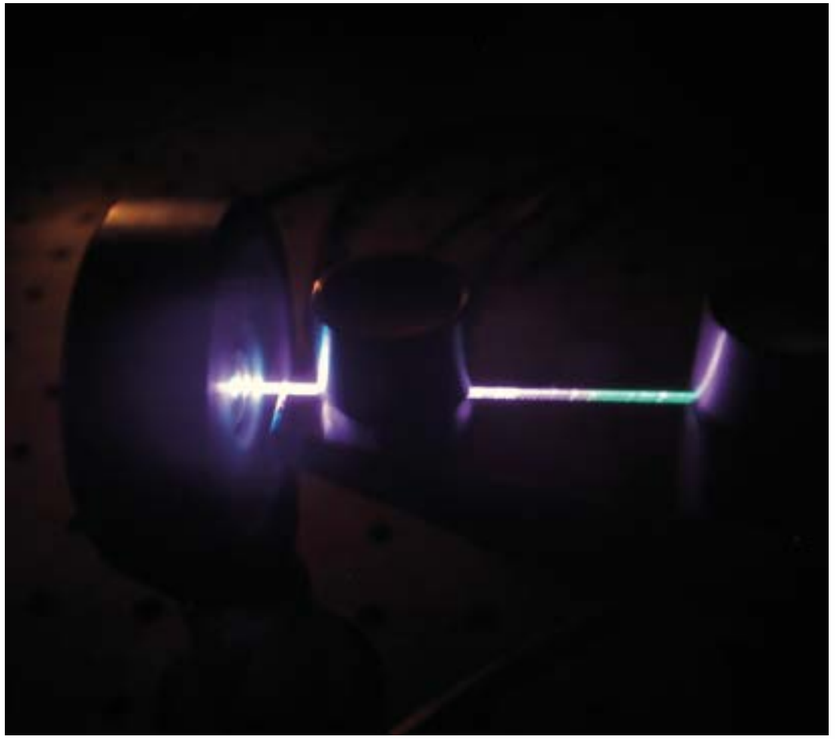


Figure 46 and Figure 47. Testing the modular invariance property for the cut-off rule in linear logic with subexponentials

Dr. Sandra Milena Ramírez Buelvas

RESEARCH INTERESTS |

INTERESES DE INVESTIGACIÓN

- Time Series
- Clustering of Time Series
- Sparse Partial Least Squares Regression
- Classification Algorithms

RESEARCH SUMMARY |

RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Ramírez's research is focused on the application and development of methodologies to group and classify time series. Some of the applications of her interest are those related to the climate, the microclimate in buildings, and chronic diseases such as cancer. She has worked on projects with the goal of studying the relationship between precipitation and ENSO index, and factors relating to the survival of patients with breast cancer. Additionally, she has proposed methodologies for classifying time series in the context of microclimates in buildings with the goal of art conservation.

ES

La investigación de la profesora Sandra Ramírez se centra en la aplicación y desarrollo de metodologías para agrupar y clasificar series temporales. Algunas de las aplicaciones de su interés están relacionadas con el clima, el microclima en edificios y enfermedades crónicas como el cáncer. Ha trabajado en proyectos con el objetivo de estudiar la relación entre la precipitación y el índice ENSO, así como factores relacionados con la supervivencia de pacientes con cáncer de mama. Además, ha propuesto metodologías para clasificar series temporales en el contexto de microclimas en edificios con el propósito de conservación artística.

GOOGLE SCHOLAR |

GOOGLE ACADÉMICO

t.ly/FB5vJ

ACADEMIC TITLE |

TÍTULO ACADÉMICO

Assistant Professor

PROGRAM/GROUP AFFILIATIONS |

AFILIACIONES

Undergraduate programs and master's in data science / applied mathematics and statistics (EMA) group.

EDUCATION |

EDUCACIÓN

- 2022: Doctorate in Statistics and Optimization, Universidad Politécnica de Valencia, Valencia, España.
- 2007: Master in Applied Statistics, Universidad de Concepción, Concepción, Chile.
- 2001: Postgraduate specialized in 'Education in Mathematics', Universidad Distrital Francisco José de Caldas, Bogotá, Colombia.
- 1997: Bachelor in Mathematics, Universidad de Sucre, Sincelejo, Colombia.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 2017-Current: Assistant Professor at Pontificia Universidad Javeriana, Cali, Colombia
- 2010-2016: Instructor Professor at Pontificia Universidad Javeriana, Cali, Colombia
- 2009: Part-time Professor at Pontificia Universidad Javeriana, Cali, Colombia
- 2005-2006: Part-time Professor at Universidad de Concepción, Concepción, Chile
- 2003-2004: Part-time Professor at Universidad Nacional Abierta y a Distancia, Cauca, Colombia
- 2001-2002: Part-time Professor at Universidad Nacional Abierta y a Distancia, Sucre, Colombia
- 2002: Instructor at Servicio Nacional de Aprendizaje SENA, Sucre, Colombia
- 1998-2002: Part-time Professor at Corporación Universitaria del Caribe – CECAR, Sucre, Colombia

HONORS AND MEMBERSHIPS |
HONORES Y MEMBRESÍAS

- ‘Pasaporte a la Ciencia’ Scholar (Doctoral studies), ‘Colombia Científica’ program, Colombian government (2019-2021).
- Graduate scholarship for Universidad de Concepción (Master studies), Chile (2006-2007).
- Universidad de Sucre Scholar (undergraduate studies), Colombia (1993-1997).

CONTACT INFORMATION |
INFORMACIÓN DE CONTACTO

smramirez@javerianacali.edu.co
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Figure 48. Location of the 2.5 x 2.5° grid points

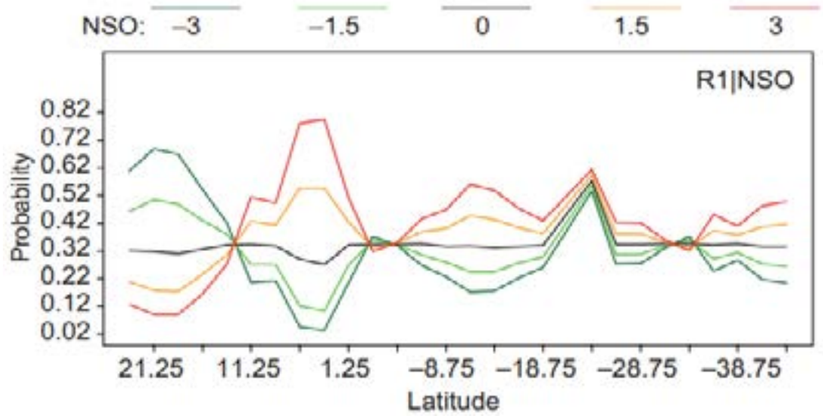

Figure 49. Latitudinal profiles of conditional probabilities for the first tercile of rain for DJF given different values of NSO.

Dr. Carlos Ernesto Ramírez Ovalle

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Graph Theory and Nets
- Applications of Order Theory
- Categorical Semantics for Logics
- Proof Theory

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Construction of a categorical model for linear logic with subexponentials. Use of the Knaster-Tarsky theorem to determine winning regions in an accessibility game. Construction of an institution for propositional linear logic. Graph-based recommendation methods. Formal verification of a transportation system using hybrid systems.

ES

Construcción de un modelo categórico para lógica lineal con subexponenciales. Uso del teorema de Knaster-Tarsky Para determinar regiones ganadoras en un juego de accesibilidad. Construcción de una institución para lógica lineal proposicional. Métodos de recomendación basados en grafos. Verificación formal de un sistema de transporte usando sistemas híbridos.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/uSsiU

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Assistant Professor

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate, Masters of Engineering, applied mathematics undergraduate and EMAP Research Group

EDUCATION |
EDUCACIÓN

- 2016: Doctor of Philosophy Mathematical Sciences, Universidad del Valle, Cali Colombia.
- 2005: Bachelor of Science, Mathematics, Universidad del Valle, Cali, Colombia.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 2016-Present: Professor, Pontificia Universidad Javeriana, Cali, Colombia.
- 2005-2012: Professor Universidad ICESI, Cali, Colombia.
- 2010-2012: Professor Institución universitaria Antonio José Camacho, Cali, Colombia.
- 2015-2016: Professor Universidad Santiago de Cali, Cali, Colombia.

HONORS AND MEMBERSHIPS |
HONORES Y MEMBRESÍAS

Best graduate promotion 2005 Bachelor of Science, Mathematics.

CONTACT INFORMATION |
INFORMACIÓN DE CONTACTO

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Engineering Building, No. 1-06

Dr. Andrés Mauricio Rivera Acevedo

RESEARCH INTERESTS |

INTERESES DE INVESTIGACIÓN

- Qualitative Theory of Differential Equations
- Stability and Dynamicts in Hamiltonian Systems

RESEARCH SUMMARY |

RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Rivera's research focuses on the use of concepts of mathematical analysis and differential equations to understand physical, biological, and economic problems. He uses mathematical tools like Perturbation theory, Bifurcation theory, Brouwer and Leray-Schauder degree theory, and Global Continuation Methods to predict and explain the complex motion of several differential equations and dynamical systems, most of them coming from nonlinear oscillators such as satellites (In Celestial Mechanics: Restricted and special N-body problems), Nonlinear circuits with passive elements (e.g. Memristors, which behave as resistance with non-linear memory by relating electric charge with magnetic flux). Currently, Rivera's research considers the dynamics of micro/nano-mechanical systems (MEMS/NEMS) with and without delayed feedback controllers. His contributions include the mathematical proof of the existence of families of symmetric periodic solutions of the N-body problem, such as the Hip-hop periodic solutions, and oscillatory motions in the generalized Sitnikov (N+1)-body problem. Existence of periodic motions in canonical MEMS actuators under the effects of feedback controllers. Existence of limit cycles in discontinuous piecewise linear systems with two zones and a straight line of discontinuity. For driven nonlinear oscillators with parametric external force, he obtains a quantification for the interval of parameters where the linear stability of periodic solutions is obtained as bifurcations of the trivial one.

ES

La investigación del profesor Rivera se centra en el uso de los conceptos del análisis matemático y las ecuaciones diferenciales para entender los problemas físicos, biológicos y económicos. Utiliza herramientas matemáticas como la teoría de la perturbación, la teoría de la bifurcación, la teoría de grados de Brouwer y Leray-Schauder, y los métodos de continuación global para predecir y explicar el complejo movimiento de varias ecuaciones diferenciales y sistemas dinámicos, la mayoría de ellos procedentes de osciladores no lineales como los satélites (En Mecánica Celeste: Problemas de N-cuerpos restringidos y especiales), circuitos no lineales con elementos pasivos (por ejemplo, los Memristores, que se comportan como resistencias con memoria no lineal al relacionar la carga eléctrica con el flujo magnético). Actualmente, la investigación de Rivera considera la dinámica de los sistemas micro/nano-mecánicos (MEMS/NEMS) con y sin controladores de retroalimentación retardada. Sus contribuciones incluyen la demostración matemática de la existencia de familias de soluciones periódicas simétricas del problema de N cuerpos, como las soluciones periódicas de Hip-hop, y los movimientos oscilatorios en el problema generalizado de Sitnikov (N+1)-cuerpos. Existencia de movimientos periódicos en actuadores MEMS canónicos bajo los efectos de controladores de retroalimentación. Existencia de ciclos límite en sistemas lineales discontinuos a trozos con dos zonas y una recta de discontinuidad. Para osciladores no lineales conducidos con fuerza externa paramétrica, obtiene una cuantificación para el intervalo de parámetros donde la estabilidad lineal de las soluciones periódicas obtenidas como bifurcaciones de la trivial.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

t.ly/WUP9U

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Full Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

Name of the research Project. Existence, multiplicity, and stability of periodic solutions for Liénard differential equations modelling nonlinear actuators under time delayed feedback controllers. 2022-2023.

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

President of the Colombian section of the Society for Industrial and Applied Mathematics SIAM. January 2020 - currently https://www.cosiam.net/

EDUCATION |
EDUCACIÓN

- 2013: Postdoctoral scholar in Applied Mathematics, Universidad de Sevilla, Sevilla, España.
- 2012: Doctor in Physics and Mathematics, Universidad de Granada, Granada, España.
- 2004-2007: Master's in Mathematical Sciences, Universidad del Valle, Cali, Colombia.
- 1999-2003: Bachelor in Mathematics, Universidad del Valle, Cali, Colombia.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 2006-Present. Pontificia Universidad Javeriana, Cali, Colombia
- 2011, Universidad del Zulia, Maracaibo, Venezuela.
- 2006. Universidad del Valle, Cali, Colombia.

HONORS AND MEMBERSHIPS |
HONORES Y MEMBRESÍAS

Outstanding Cumm-Laude graduate, Universidad de Granada, Granada, España (2012); Carolina Foundation Scholar (2007); Training and research scholar, ISAS International School for Advanced Studies, SISSA, Italy (2006); Best ranked undergraduate, Universidad del Valle, Cali, Colombia (2003).

CONTACT INFORMATION |
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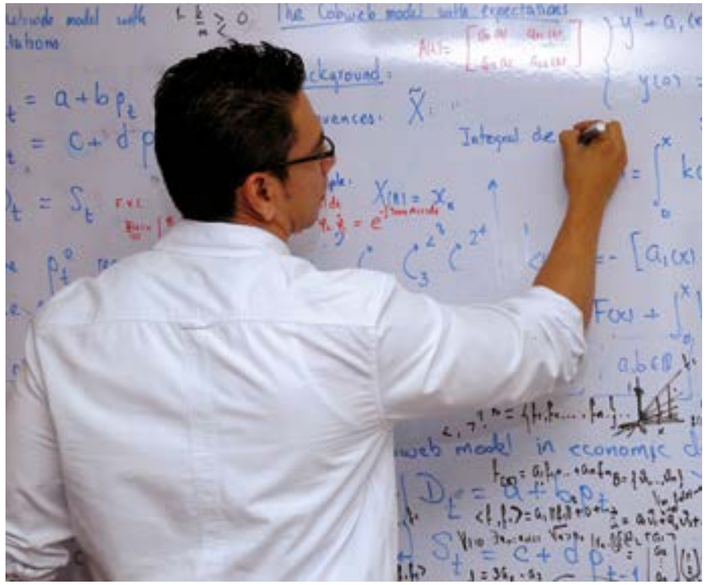


Figure 50. Professor Rivera in front of the board reflecting his research

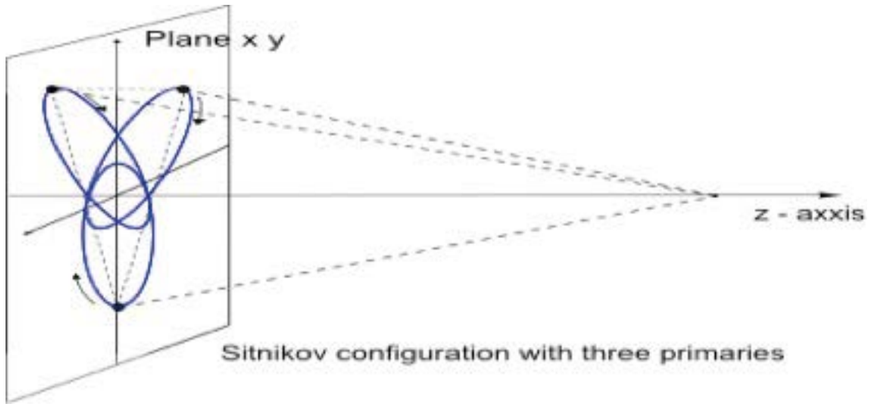
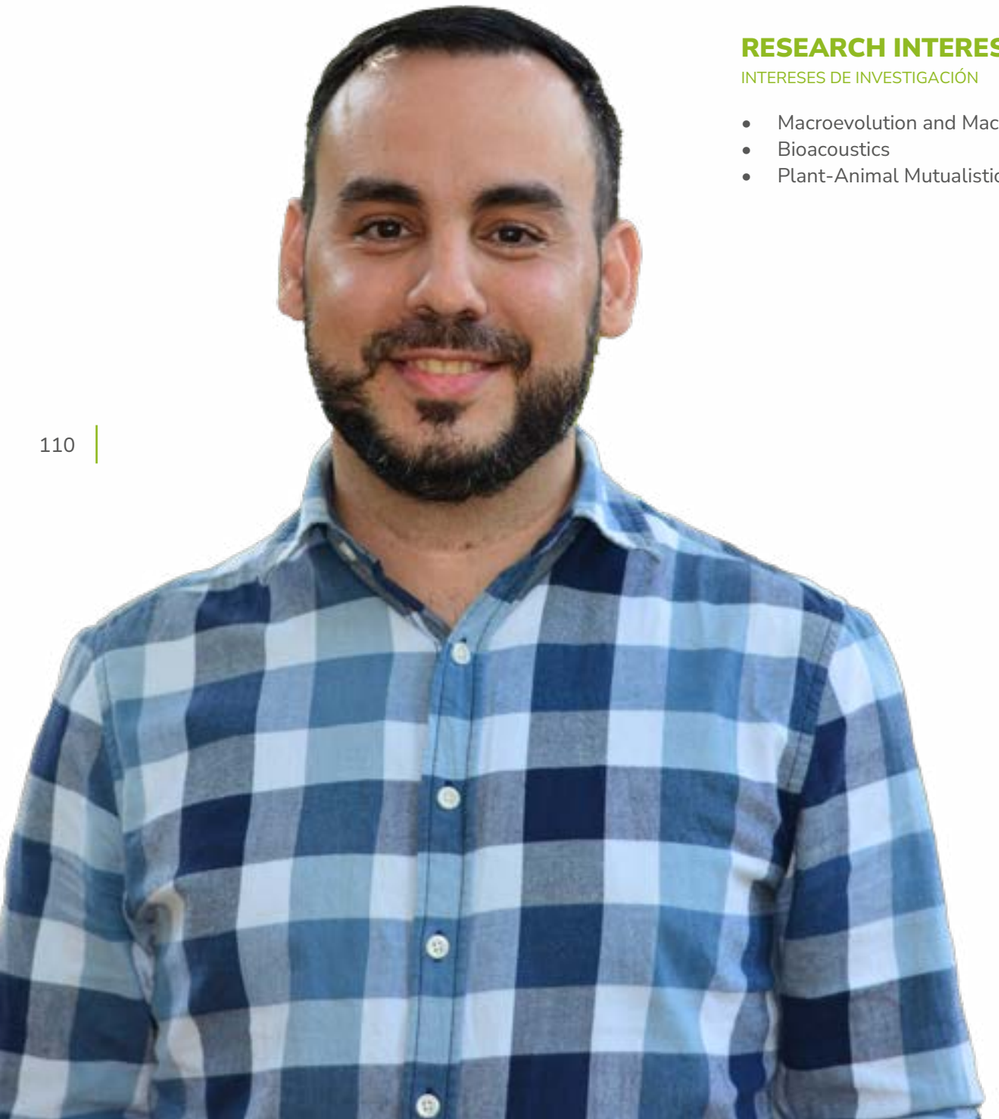


Figure 51. Sitnikov configuration with three primaries

Dr. Danny Rojas Martin



RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Macroevolution and Macroecology
- Bioacoustics
- Plant-Animal Mutualistic Interactions

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

The research conducted by the professor aims to address why the American tropics exhibit such high biodiversity. To achieve this, the researcher integrates morphological, functional, ecological, climatic, and species distribution data with comparative phylogenetic methods to detect patterns and evaluate hypotheses. One specific research line investigates evolutionary changes in the ecological niche at broad scales to elucidate species diversity patterns and comprehend how species respond to new environmental conditions. The primary study system to which this researcher has dedicated the majority of his academic career is the phyllostomid bats. However, he has also collaborated with various other diverse groups of terrestrial vertebrates.

ES

La investigación que desarrolla el profesor busca responder por qué los trópicos americanos son tan biodiversos. Para ello, el investigador combina datos morfológicos, funcionales, ecológicos, climáticos, y de distribución de las especies con métodos comparativos filogenéticos para detectar patrones y evaluar hipótesis. Una de las líneas específicas de investigación aborda los cambios evolutivos del nicho ecológico en escalas amplias para explicar los patrones de diversidad de especies y entender cómo las especies responden a nuevas condiciones ambientales. El principal sistema de estudio al que este investigador ha dedicado la mayor parte de su vida académica son los murciélagos filostómidos, pero también ha trabajado con otros grupos diversos de vertebrados terrestres.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

http://t.ly/M9giQ

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Associate Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

- 2021: An island in the clouds: establishing a baseline for monitoring an isolated paramo against climate change (1251-866-75985). Funding Agency: MINCIENCIAS (Colombia).
- 2019–2020: The role of biotic interactions in generating and maintaining the latitudinal diversity gradient. Funding Agency: Pontificia Universidad Javeriana (Colombia).

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Engineering and Applied Sciences Doctorate, Biology Program, Research Group in Conservation and Biotechnology, Research Seedbed in Bat Ecology and Evolution.

EDUCATION |
EDUCACIÓN

- 2012: PhD in Biology, University of Vigo, Spain.
- 2009: Master's degree in Advanced Studies, University of Vigo, Spain.
- 2008: Master's degree in Vertebrate Ecology and Zoology, University of Havana, Cuba.
- 2004: Bachelor's degree in Biology, University of Havana, Cuba.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 2017-present: Pontificia Universidad Javeriana, Cali
- 2014-2017: University of Aveiro, Portugal
- 2010-2012: University of Vigo, Spain
- 2006-2010: Instituto de geografía Tropical, Cuba
- 2004-2006: National Department of Forest Ranger Corps, Cuba

CURRENT POSITION |
POSICIÓN ACTUAL

Director of the Department of Natural Sciences and Mathematics

HONORS AND MEMBERSHIPS |
HONORES Y MEMBRESÍAS

Distinguished Professor, Pontificia Universidad Javeriana Cali, April 2019
Doctoral Thesis, Cum Laude
Bachelor's degree in Biology, Summa Cum Laude

CONTACT INFORMATION |
INFORMACIÓN DE CONTACTO

danny.rojas@javerianacali.edu.co
Engineering Building, Office 1-24

Dr. Andrés Mauricio Salazar Rojas

RESEARCH INTERESTS |

INTERESES DE INVESTIGACIÓN

- Partial Differential Equations
- Functional Analysis

RESEARCH SUMMARY |

RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Salazar's research involves qualitative characterization of elastic structure properties using numerical simulations and analytical techniques based on partial differential equations. He studies the set of critical points and the curvature of solutions to elliptic problems with zero boundary conditions.

ES

El profesor Salazar emplea herramientas analíticas y numéricas para caracterizar las propiedades cualitativas de la solución a problemas elípticos de orden dos y cuatro, como: la configuración del conjunto de puntos críticos y la curvatura de las curvas de nivel de la solución de los problemas, en relación con la geometría del dominio sobre el que estos se resuelven. Sus trabajos tienen una particular relación con el análisis matemático de la deflexión de estructuras elásticas.

GOOGLE SCHOLAR |

GOOGLE ACADÉMICO

t.ly/IggEi

ACADEMIC TITLE |

TÍTULO ACADÉMICO

Assistant Professor

PROGRAM/GROUP AFFILIATIONS |

AFILIACIONES

Bachelor in Applied Mathematics, and Applied Mathematics and Statistics (EMA) group.

EDUCATION |

EDUCACIÓN

- 2017: Doctor in Mathematical Sciences, Universidad del Valle, Cali, Colombia.
- 2011: Master's in Mathematical Sciences, Universidad del Valle, Cali, Colombia.
- 2007: Bachelor in Mathematics, Universidad del Valle, Cali, Colombia.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 2012 - Present. Pontificia Universidad Javeriana Cali, Colombia.
- 2009. Universidad del Valle, Cali, Colombia.
- 2007. Universidad de San Buenaventura, Cali, Colombia.

CONTACT INFORMATION |

INFORMACIÓN DE CONTACTO

andresmsalazar@javerianacali.edu.co
Engineering Building, No. 1-31

Dr. Harold Geovanny Suárez Barón

RESEARCH INTERESTS |

INTERESES DE INVESTIGACIÓN

- Plant Evolutionary Developmental Biology (Evo-Devo)
- Cellular and Molecular Biology
- Molecular Biotechnology
- Evolutionary Genetics of Invasive Plant Species
- Plant Adaptation to Climate Change

RESEARCH SUMMARY |

RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Suárez is a molecular biologist with broad interests in molecular genomics and evolutionary developmental biology, from gene regulatory networks to functional diversity and plant adaptation. His research focuses on understanding the molecular and evolutionary bases of plant development, emphasizing the molecular mechanisms controlling different floral traits, plant diversity, and ontogeny. He is especially interested in implementing new experimental and theoretical approaches to study non-model plant species, analysis of the genes and transcription factors responsible for floral organ identity, flower shape, color patterns, and trichome (plant hairs) initiation and elaboration. He is currently working on an ecological evolutionary developmental biology (Eco-Evo-Devo) approach to understanding the evolution and genetics underlying the success of invasiveness of introduced species, the molecular mechanisms of plant adaptation to climate change, environmentally controlled developmental processes, and other complex biological interactions in the neotropical ecosystems. Professor Suárez-Baron applies different approaches at both structural and molecular levels: phylogenetics methods, morpho-anatomical techniques, gene expression analyses, transcriptomics, in situ hybridization experiments, biotechnological methodologies, and bioinformatics tools.

ES

El profesor Suárez-Baron es un biólogo molecular con intereses en genómica molecular y biología evolutiva y del desarrollo, desde redes genéticas reguladoras hasta el estudio de la diversidad funcional y la adaptación en plantas. Su investigación se enfoca en el entendimiento de las bases moleculares y evolutivas del desarrollo en plantas, con énfasis en los mecanismos moleculares que controlan diferentes características florales, la diversidad vegetal y la ontogenia. Además, tiene especial interés en la implementación de nuevas aproximaciones experimentales y teóricas para el estudio de especies de plantas no-modelo, análisis de genes y de los factores de transcripción responsables de la identidad de los órganos florales, la forma de la flor, patrones de coloración y la iniciación y elaboración de los tricomas (pelos en plantas). Actualmente, se encuentra trabajando en una aproximación de ecología evolutiva y del desarrollo (Eco-Evo-Devo) para entender la evolución y las bases genéticas que subyacen el éxito de la invasividad en las especies introducidas, los mecanismos moleculares de la adaptación de las plantas al cambio climático, procesos del desarrollo controlados ambientalmente y otras interacciones biológicas complejas en los ecosistemas neotropicales. El profesor Suárez-Baron emplea diferentes aproximaciones a nivel estructural y molecular: métodos filogenéticos, técnicas morfo-anatómicas, análisis de expresión de genes, transcriptómica, experimentos de hibridación in situ, metodologías biotecnológicas, y herramientas moleculares.

GOOGLE SCHOLAR |

GOOGLE ACADÉMICO

t.ly/I5uQc

ACADEMIC TITLE |

TÍTULO ACADÉMICO

Associate Professor

CURRENT RESEARCH |

INVESTIGACIÓN EN CURSO

- Project: Developmental and genetic mechanisms underlying trichome formation in the Aristolochia perianth. MinCiencias/Colfuturo.
- Project: La microbiología como un elemento integrador del diálogo de saberes: innovación al servicio de los sistemas agroecológicos tropicales. Fratelli Tutti, Pontificia Universidad Javeriana Cali.

PROGRAM/GROUP AFFILIATIONS |

AFILIACIONES

Engineering and Applied Sciences Doctorate; Undergraduate Program of Biology; Research Group in Conservation and Biotechnology; Ecological Evolutionary Developmental Biology Group (Eco-Evo-Devo).

EDUCATION |

EDUCACIÓN

- 2021: Doctor of Philosophy (Ph.D.) in Biology, Universidad de Antioquia, Medellín, Colombia.
- 2017: Master of Science (M.Sc.) in Biology, Universidad de Antioquia, Medellín, Colombia.
- 2008: Bachelor of Science (B.Sc.) in Biology, Universidad del Quindío, Armenia, Colombia.

PROFESSIONAL EXPERIENCE |

EXPERIENCIA PROFESIONAL

- 2022-Present: Associate Professor, Pontificia Universidad Javeriana Cali, Colombia.
- 2014-2021: Adjunct Professor, Universidad de Antioquia, Medellín, Colombia.
- 2018: Deland Fellow, Harvard University - Arnold Arboretum, Boston, MA, USA.
- 2015 and 2017: Visiting Researcher, The New York Botanical Garden (NYBG), Bronx, NY, USA.
- 2014: Teaching Assistant, The University of South Dakota, Vermillion, SD, USA.
- 2012: Visiting Researcher, MCDB, Yale University, New Haven, CT, USA.
- 2008-2014: Research Assistant, International Center for Tropical Agriculture (CIAT), Cali, Colombia.

HONORS AND MEMBERSHIPS |

HONORES Y MEMBRESÍAS

- **Honors:** Shizu & Yu Takeuchi Award (honor mention) in Biology (2022); The Maynard F. Moseley Award: Best Research on Developmental & Structural and Paleobotany - Botanical Society of America (2021); Doctoral dissertation awarded as Summa Cum Laude - University of Antioquia (2021); Deland Award - Plant Biology Research, Harvard University & Arnold Arboretum, Boston, USA (2018-2019); Master's thesis awarded as Magna Cum Laude - Universidad de Antioquia (2017); LASDB Award in Plant Developmental Biology (2017); MicroMORPH full scholarship: Plant Morphology, Linking Phenotype to Development - Harvard University (2016); Full Fellowship Doctoral Grant – MinCiencias, Colombia (2016); MicroMORPH full scholarship: Plant Anatomy, Development, Function, and Form - Harvard University (2015); Full Fellowship Master Grant – Universidad de Antioquia (2014); Junior Chamber International (JCI), Ten Outstanding Young Persons of Quindío – Category: Scientific and Technological Development (2013); Award for Best Research Work - XII National Conference on Plant Breeding and Crops Protection (2013); Awarded as Best Young Scientist in Plant Molecular Biology and Biotechnology, 10th Anniversary – Biology Program, Universidad de Quindío (2012); Meritorious Mention Award – Undergraduate thesis, Universidad de Quindío (2008); Best ranked undergraduate, Universidad de Quindío (2007); CIAT – Scientific Award – Best Science for Ecological Benefit (2007).
- **Memberships:** American Association for the Advancement of Science; Asociación Colombiana de Ciencias Biológicas; Society for the Study of Evolution; Asociación Colombiana de Botánica; The Pan-American Society for Developmental Biology; Latin American Society for Developmental Biology; Botanical Society of America.

CONTACT INFORMATION |

INFORMACIÓN DE CONTACTO

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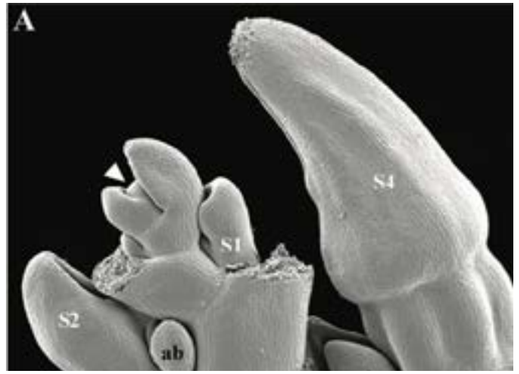

Figure 52. Aristolochia floral development: early perianth differentiation (doi: 10.3389/fpls.2015.01095)

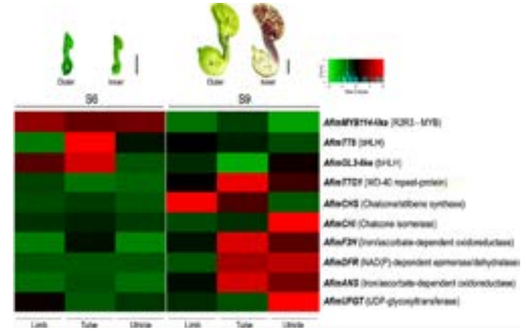

Figure 62. . Expression analysis of genes involved in flavonoid production in Aristolochia frimbriata (doi: 10.3389/fpls.2021.633227).

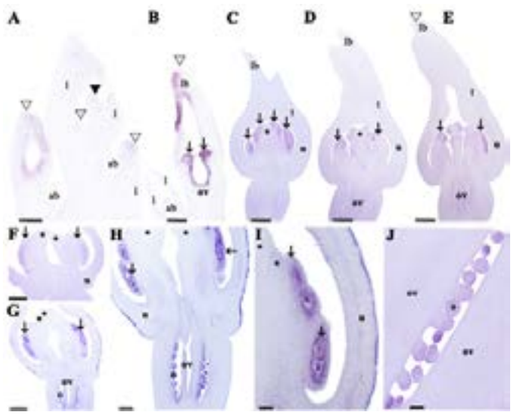

Figure 53. In situ hybridization of AfimSEP2 transcription factor in the Aristolochia perianth, including the shoot apical meristem and ovary (doi: 10.1002/jez.b.22686)

Basic Science of Health Department

5.

Basic Science of Health Department

DIRECTOR

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LIST OF PROFESSORS — PAGE

Dr. H. Fabián Tobar Tosse

RESEARCH INTERESTS |
INTERESES DE INVESTIGACIÓN

- Bioinformatics
- Microbiome Analysis

RESEARCH SUMMARY |
RESUMEN DEL TRABAJO INVESTIGATIVO

EN

Professor Tobar studies the structure and function of the human genome, based on mathematical and statistical descriptions, where the emergent properties could be associated to biomedical and biotechnological approaches. He contends that decoding the structural organization of the genomic elements shows periodic properties associated with molecular processes that have inherent applicability in medicine and biotechnology.

ES

La investigación del profesor Tobar estudia la estructura y función del genoma humano, basado en descripciones matemáticas y estadísticas, donde las propiedades emergentes pueden asociarse con enfoques de la biomedicina o la biotecnología. Sostiene que la decodificación de la estructura organizacional de los elementos genómicos muestra propiedades periódicas asociadas con procesos moleculares que tienen aplicabilidad inherente en medicina y biotecnología.

GOOGLE SCHOLAR |
GOOGLE ACADÉMICO

http://t.ly/2y_ji

ACADEMIC TITLE |
TÍTULO ACADÉMICO

Assistant Professor

CURRENT RESEARCH |
INVESTIGACIÓN EN CURSO

Implementation and evaluation of a predictive model of genomic association for Rare Diseases based on DNA repeat configurations and structural variants. Precision Medicine Grant – MINCIENCIAS 2022.

PROGRAM/GROUP AFFILIATIONS |
AFILIACIONES

Coordinator of the Bioinformatics and Genomics Unit at the Basic Sciences and Clinical Research Group

EDUCATION |
EDUCACIÓN

- 2013: Doctor in Biomedical Sciences, Universidad del Valle, Cali, Colombia.
- 2007: Bachelor of Science in Biology, Universidad del Cauca, Popayán, Colombia.

PROFESSIONAL EXPERIENCE |
EXPERIENCIA PROFESIONAL

- 2013-Present: Department of Basic Sciences for Health, Pontificia Universidad Javeriana, Cali, Colombia.
- 2011: Bioinformatics and biocomputational group, Universidad del Valle, Cali, Colombia.
- 2010: Colombian Center for Genomics and Bioinformatics of Extreme Environments GeBiX Colciencias Scholar.

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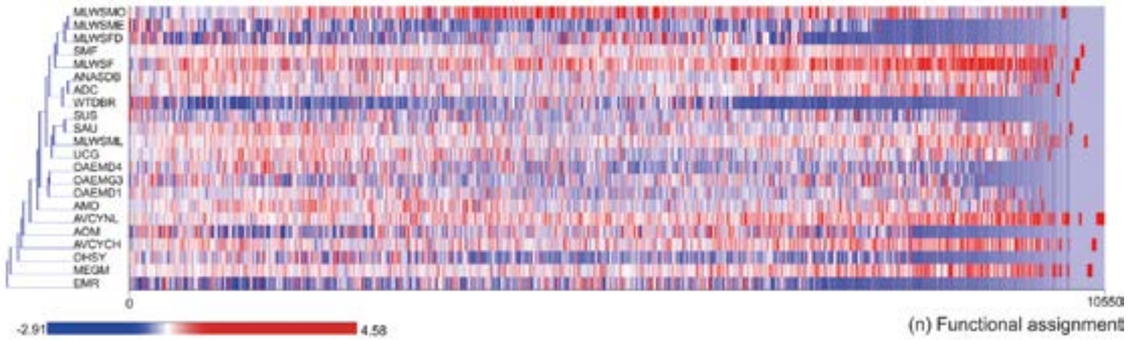

Figure 54. Hierarchical tree constructed by functional assignments from genomes and metagenomes

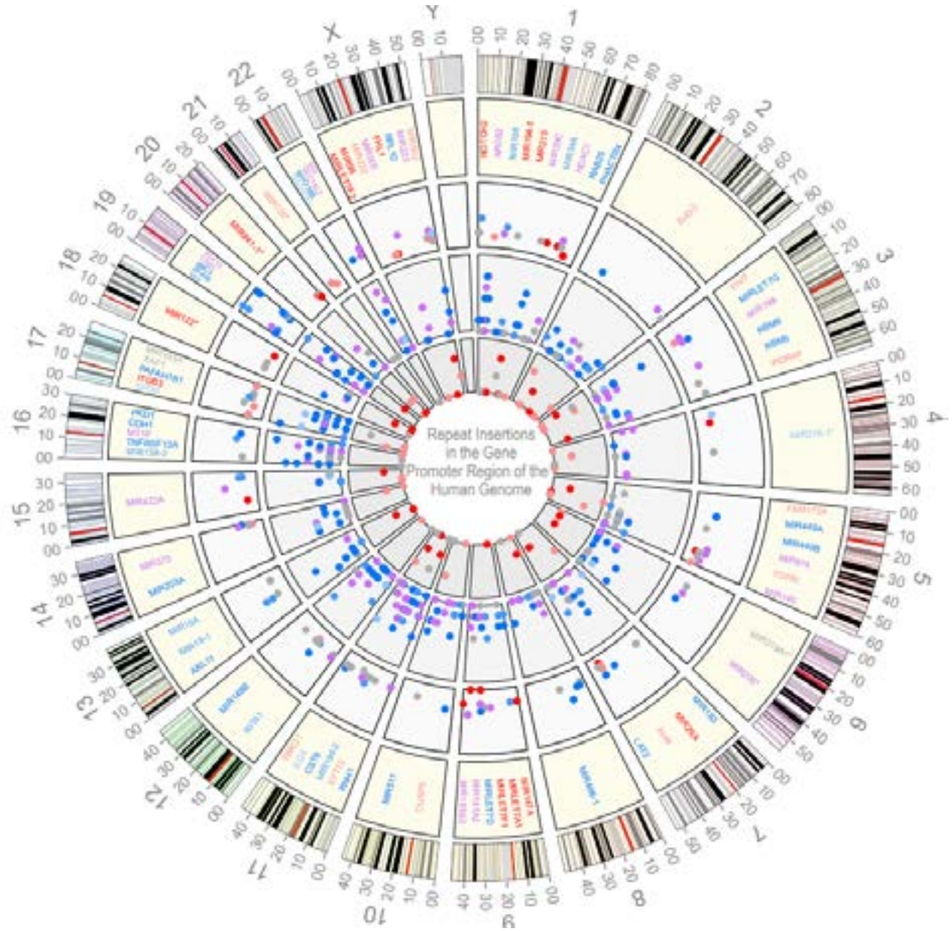

Figure 55. Repetitive genome analysis of cancer-related genes.

Engineering and Applied Sciences Doctorate Program

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