

## DOCTORATE IN BIOMEDICINE

The Doctorate Program in Biomedicine aims to train scientists who develop a critical spirit and have the ability to identify and address current biomedical problems in the following areas or research lines:

- **Cellular Homeostasis, Immune Response, and Cancer:** This research area within the program focuses on studying cellular processes related to the pathogenesis of cancer and immune-related diseases, as well as innovative therapeutic options. It encompasses sub-lines that investigate cellular and molecular aspects involved in (i) modulation of the immune response, and (ii) the development, progression, and treatment response of chronic disorders such as autoimmune diseases, transplant rejection, and cancer. This line of research aims to understand cellular processes related to cancer pathogenesis and immune-related diseases and explore innovative therapeutic approaches.
- **Reproductive Biology and Maternal-Fetal Medicine:** This research area includes complementary sub-lines aimed at understanding the biology and pathophysiology of women's reproductive health. It covers studies on (i) molecular aspects and pathophysiological mechanisms of gestational pathologies and potential innovative diagnostic and therapeutic options, (ii) the relationship between oral health (periodontitis) and pregnancy-related disorders, (iii) the influence of nutrition and stress during pregnancy on embryonic development, and (iv) the role of metabolism in female fertility. This area is also connected to the field of Neurosciences and Nervous System Diseases, particularly in neurodevelopmental lines of research, as well as the area of Cellular Therapy.
- **Neurosciences and Nervous System Diseases:** This research area addresses various aspects related to the pathogenesis of neuro-psychiatric disorders and neurodevelopmental diseases. It encompasses studies on molecular and cellular mechanisms associated with chronic stress/depression, neurodegenerative diseases, genetic and environmental factors related to nervous system development disorders and their consequences.
- **Systems Pathophysiology and Biomarkers:** This research area includes four sub-lines that investigate the pathophysiology and identification of early diagnostic and prognostic biomarkers in (i) pregnancy and maternal-fetal pathologies, (ii) renal and cardiovascular pathologies, (iii) dental pathologies, (iv) speech and hearing disorders, and (v) neuro-psychiatric disorders. The identification of biomarkers allows direct connections with preclinical and clinical research for the translation of laboratory findings into new diagnosis and treatment strategies.
- **Cellular Therapy and Regenerative Medicine:** This research line/area focuses on two sub-lines: (a) the search for new cellular and molecular pathways to treat human degenerative diseases, and (b) the use of extracellular vesicles in human therapies. The first sub-line investigates mesenchymal stem cells from various sources and their potential for the treatment of inflammatory, cardiovascular, rheumatic, and metabolic diseases. The second sub-line focuses on studying extracellular vesicles from different origins (mesenchymal stem cells) as therapeutic strategies. This line of research is closely linked to the research lines in immune response modulation and the

research lines in biomaterials, nanotechnology, and bioengineering, primarily through tissue engineering approaches.

- **Biomaterials, Nanotechnology, and Bioengineering:** This research area applies a complex approach based on materials science, nanotechnology, and bioengineering to develop applications in tissue engineering, biotechnological products for medicine and dentistry, and food technology. Among these studies are the molecular and biophysical characterization of biopolymers and nanoparticles, the extraction of bioactive compounds from natural products, the development of nanotechnology for drug delivery, and the creation of vascular prostheses and other innovative therapies for medical and dental applications.

The aim of this program is to train students to generate knowledge and innovative projects in the field of biomedicine through the application of fundamental tools from various disciplines within the biological and biotechnological sciences.

DIRECTOR

Dolores Busso

[dbusso@uandes.cl](mailto:dbusso@uandes.cl)

CO-DIRECTOR

Luis Federico Bátiz

[lbatic@uandes.cl](mailto:lbatic@uandes.cl)

COORDINATOR

Daniela Mora

[dmora@uandes.cl](mailto:dmora@uandes.cl)

## DOCTORATE IN ENGINEERING SCIENCES

The program corresponds to studies leading to the highest academic degree awarded by the University of Los Andes, which involves a systematic process of research and/or creation culminating in preparing, defending, and approving a thesis that expands the frontiers of knowledge. The interdisciplinary nature of the Doctorate allows the involvement of academics from various disciplines of Engineering and related areas that contribute to the scientific study of Engineering Sciences, supported by the connection between different research lines.

Research Lines:

- **Operations Management:** This research line involves using mathematical models, statistical methods, algorithms, and simulation tools to support decision-making in the strategic, tactical, and operational planning of manufacturing or service companies. Operations Management is a valuable tool for managing business processes, which may involve real systems of high complexity and large-scale systems aiming to improve or optimize their performance.
- **Environmental Process Engineering:** This research line focuses on studying the different physicochemical and biological phenomena involved in removing gaseous pollutants from different sources of contamination, whether they are stationary or mobile. It also investigates air pollution generated by different sources of stationary and mobile pollutants. It studies mixed systems of technologies (physicochemical and biological) to remove different types of emerging pollutants and their biotransformation into value-added products. This research line integrates reactor engineering principles, separation processes, and process simulation and optimization at different scales, from the reactions that constitute the metabolism of microorganisms to the plant scale, passing through the macroscopic scale of reactors. In particular, the Faculty of Engineering of the University of Los Andes focuses on generating knowledge that improves the operation and design of biological reactors to produce metabolites and treat gases. These challenges are addressed through reactor engineering and biocatalyst design using tools for the analysis of microbial metabolism.
- **Information and Energy Engineering:** The research line of Information and Energy Engineering arises from the interdisciplinary interaction of those areas of electrical engineering that usually converge in advanced electrical and information systems, highlighting the conversion of renewable energies, electronics applied to signal and traction systems, automatic control, transmission and information processing systems, and artificial intelligence. This research line aims to advance scientific and technological knowledge of global relevance, focusing on experimental work. The research seeks to project itself through publications in high-prestige journals,



collaboration with foreign research groups, and searching for applications with high technological innovation. The work carried out by the participating academics has been funded with numerous state funds, allocating most of the resources to developing world-class experimental systems and training young researchers and engineers through projects of high technological complexity and evident relevance for society's development.

- **Civil Engineering Systems:** Civil Engineering studies the cycle of planning, design, construction, and operation of infrastructure works such as buildings, hydraulic works, roads, and transportation. It also encompasses managing integrated systems of these infrastructures, addressing aspects such as disaster prevention, water resource management, traffic control, environmental treatment, and all the necessary works for economic development.

DIRECTOR

Juan Eduardo Pérez

[jperez@uandes.cl](mailto:jperez@uandes.cl)

COORDINATOR

Ana Vial

[avialg@uandes.cl](mailto:avialg@uandes.cl)

## DOCTORATE IN ORAL SCIENCES

The Doctorate Program in Oral Sciences aims to educate doctoral candidates with the skills necessary to design and execute original and impactful research. Through a comprehensive analysis of research findings, they will be prepared to drive innovation and facilitate the transfer of technology by undertaking applied research. The program will focus on seeking novel solutions to significant challenges in oral and maxillofacial health.

Research Lines:

- **Oral Biology**
  - Potential of mesenchymal stem cells derived from dental tissues for application in regenerative therapies.
  - Saliva and crevicular fluid biomarkers for the assessment of preeclampsia and diabetes risk.
  - Pulpal inflammation biomarkers for the diagnosis of dental pulp diseases.
  - New alternatives for cellular stimulation, such as low-level laser therapy.
  - Association between periodontal disease and systemic diseases.
  - Etiopathogenic mechanisms of cancer (carcinogenesis, malignant transformation, epithelial-mesenchymal transition, invasion, migration, tumor immunology, and metastasis).
  - Biomarkers with diagnostic, prognostic, and therapeutic proposals for maxillofacial region pathologies.
  
- **Dental Materials and Cariology**
  - Nanotechnology applied to the development of materials for the treatment of maxillofacial pathologies.
  - Dental restorative materials.
  - Experimental polymeric materials, such as adhesive systems, composite resins, and 3D printing resins, through the incorporation of antimicrobial and remineralizing particles.
  - Modification of dentin bonding protocols to improve the stability of the collagen network, increasing the longevity of the hybrid layer.
  - Epidemiology and prevention of dental caries.
  - Therapeutic alternatives in cariology.
  - Cavity disinfection in Operative Dentistry.

DIRECTOR  
Wilfredo González  
[wgonzalez@uandes.cl](mailto:wgonzalez@uandes.cl)

## DOCTORATE IN COMMUNICATION

The Doctorate Program in Communication at the University de Los Andes aims to develop systematic and rigorous research in the field of communication, understood as an activity centred on the person and their action. For this reason, the program addresses studies in different fields: information, entertainment, fiction, advertising, and strategic communication; using various media formats and considering the relationships established with social, commercial, business, and legal contexts in which these fields operate and which, in turn, have an impact on them.

### Research Lines:

- **Communication:** This research line focuses on the critical study of public interest content - both in terms of its construction and its impact on society - disseminated through various media platforms. As part of this interest, it also encompasses the research stream access and adoption of ICT in everyday life and media audiences.
- **Ethics and Communication Law:** This line promotes research from the normative perspective of the discipline, encompassing self-regulation and legislation. It is conceived as a cross-cutting line of thought. It encompasses studies that debate and reflect on the principles of communicative activity, concerning information, persuasion, fiction, and their intersection with the principles related to human dignity and the value of the social dimension of communication.
- **Narrative and Fiction:** This work line focuses on the critical analysis of imaginary or constructed worlds and their communication. It is approached from different narrative elements and/or the different stages of the creative production process, following an approach that ranges from the more philosophical dimension to the more technical and formal aspects.
- **Strategic Communication and Management:** This research area focuses on the analysis and reflection of communication from a strategic and management perspective. It brings together studies on the function and relevance of communication in organizations, as well as everything related to the direction and management of media and communication companies.

DIRECTOR

Pedro Anguita

[panguita@uandes.cl](mailto:panguita@uandes.cl)

COORDINATOR

Patricia Vila

[pvilae@uandes.cl](mailto:pvilae@uandes.cl)

## DOCTORATE IN PHILOSOPHY

The Doctorate Program in Philosophy at the University of Los Andes aims to contribute to the training of qualified researchers who can integrate into national and international academic activities. The Institute of Philosophy at UANDES has a faculty entirely trained in foreign universities (Germany, Spain, France, and Ireland), in addition to a group of distinguished foreign researchers from different continents. They all guarantee the development of a program based on internationally valid standards, as well as satisfactory levels of competence, diversity, and integration in research. In the area of practical philosophy, the Doctorate Program in Philosophy at UANDES aims to become a reference in South America.

Research Lines:

- **Ancient Philosophy:** Metaphysics, Psychology, Peripatetic Logic, and Theory of Action / Platonic Practical and Theoretical Philosophy.
- **Practical Philosophy:** Ethics and Political Philosophy.
- **Medieval Philosophy:** Augustine and the Augustinian Tradition.

DIRECTOR

José Patricio Domínguez  
[jdominguez@uandes.cl](mailto:jdominguez@uandes.cl)

COORDINATOR

Andrea Davanzo  
[adavanzo@uandes.cl](mailto:adavanzo@uandes.cl)

## DOCTORATE IN LAW

The Doctorate in Law Program at the University of Los Andes provides specialized training of researchers dedicated to the study and systematic dissemination of legal sciences, promoting the exchange of scientific advances in the legal field.

Research Lines:

- **Private Law**
  - Contract Law: María Sara Rodríguez, Hernán Corral, Gian Franco Rosso, Isabel Zuloaga, María Ignacia Vial, Yasna Otarola.
  - Family Law: María Sara Rodríguez, Hernán Corral.
  - Consumer Law: María Sara Rodríguez, Hernán Corral.
  - Tort Law (Non-Contractual Liability): María Sara Rodríguez, Hernán Corral, Gian Franco Rosso, Isabel Zuloaga, Yasna Otarola.
  - Roman Private Law: Gian Franco Rosso, Manuel Grasso.
  - Commercial and Insolvency Law: Manuel Bernet, Pablo Manterola.
  - Corporate Law: Pablo Manterola.
  - Intellectual Property Law: Manuel Bernet, Alfredo Sierra.
  - Labor Law: Alfredo Sierra.
  
- **Public Law**
  - Constitutional Theory and the Rule of Law: José Ignacio Martínez, Raúl Bertelsen, Marcela Peredo.
  - Fundamental Rights and Constitutional Justice: José Ignacio Martínez, Raúl Bertelsen, Soledad Bertelsen, Marcela Peredo.
  - Administrative Procedures: Jaime Arancibia, Juan Carlos Flores, Maite Aguirrezabal.
  - Administrative Contract Law: Jaime Arancibia, Juan Carlos Flores, Rosa Gómez.
  - Administrative Sanctions: Jaime Arancibia, Juan Carlos Flores, Rosa Gómez.
  - General Theory of Criminal Law: Tatiana Vargas, Rodrigo Guerra, Gonzalo García.
  - Special Offenses: Tatiana Vargas, Rodrigo Guerra, Gonzalo García.
  - Due Process and the Right to Effective Judicial Protection: Alejandro Romero, Maite Aguirrezabal, Priscila Machado.
  - General Theory of the Legal Process and Judicial Procedure: Alejandro Romero, Maite Aguirrezabal, Priscila Machado.
  - International Human Rights Law: Silvia Bertazzo, Soledad Bertelsen.
  - Environmental Law: Rosa Gómez.



- **Foundations of the Law**

- Ethics: Alejandro Miranda, Joaquín García Huidobro.
- Political and Legal Philosophy: Alejandro Miranda, Sebastián Contreras, Joaquín García Huidobro.
- Legal Methodology: Alejandro Miranda, Sebastián Contreras, Hernán Corral.
- Legal History: Enrique Brahm, Sebastián Contreras.

DIRECTOR

Gonzalo García

[ggarcia@uandes.cl](mailto:ggarcia@uandes.cl)

COORDINATOR

Jacqueline Koch

[jkoch@uandes.cl](mailto:jkoch@uandes.cl)

## DOCTORATE IN HISTORY

The Doctorate Program in History at the University of Los Andes aims to contribute to the preparation of qualified researchers who can successfully engage in national and international academic activities. This includes a systematic training process that culminates in the preparation and defense of an original doctoral thesis, which contributes to historical knowledge. Likewise, students are provided with the necessary tools to contextualize their research within the framework of history of the Americas and its interrelation with the world. Based on the theoretical foundations of a Christian view of history, an interdisciplinary, critical, and rigorous approach to sources is pursued. The Institute of History has an academic faculty trained in national and foreign universities, along with a group of distinguished visiting professors from Europe, the United States, and Latin America.

### Research Lines:

- **Religion and Culture:** The research area of Religion and Culture combines the interests of several professors at the Institute. Temporally, it covers the period from the High Middle Ages to the contemporary era, and geographically, it encompasses Europe and the Americas. Thematically, it focuses on the relationship between Christian religion and culture, considering culture in a broad sense, including everyday life, material culture, art, politics, and law.
- **History of Chile and the Americas:** The research area of History of Chile and America promotes the development of studies on national and American themes from various perspectives, including political, social, cultural, and religious history. While not neglecting the analysis of specific local aspects, it emphasizes a comparative and transnational approach, especially in areas related to the other two lines of the program, namely "Religion and Culture" and "Contemporary History." It also seeks to develop an Americanist current that establishes connections with institutions and historians specialized in the region.
- **Contemporary History:** The research field of Contemporary History primarily focuses on the European developments of the 20th century, with special emphasis on studying cultural phenomena and their influences within the context of the latest advancements in European and American history. Furthermore, this research area explores the portrayal, interactions, and reception of significant events in European history during the 20th century in Latin America, particularly in the history of Chile. Thus, this line of research aims to move beyond a purely Eurocentric perspective and actively engage in the broader scope of global history.

### DIRECTOR

Alexandrine de la Taille  
[adelataille@uandes.cl](mailto:adelataille@uandes.cl)

### COORDINATOR

Rosario Martínez  
[rmartinezl@uandes.cl](mailto:rmartinezl@uandes.cl)