

MILLENNIUM INSTITUTE FOR INTELLIGENT HEALTHCARE ENGINEERING, **IHEALTH**

Impact Area: Engineering and technology, medical sciences and health.
Speciality: Medical imaging, artificial intelligence and biomedical engineering.

Health systems and medical imaging services are under great pressure due to high costs, shortages of trained personnel, ineffective early diagnosis, and limited access to advanced medical imaging technologies. The general objective of the iHEALTH Millennium Institute is to develop innovative methods that integrate engineering and artificial intelligence (AI) to improve health care based on medical images with the long-term objective of making it more affordable and accessible to all Chileans.

Medical images are essential for the non-invasive evaluation of many pathologies; however, these are expensive and do not yet fully and objectively characterize many diseases. The vision is to improve medical imaging, making it more affordable (time/cost efficient), as well as improving the clinical value of medical imaging systems, making it fully quantitative (comprehensive disease characterization, necessary for precision medicine); efficient (faster and more comprehensive exams); effective (early, reliable and accurate diagnosis) and more accessible.

The goal is to develop integrated solutions that exploit synergies across the entire medical imaging flow (acquisition, image reconstruction, analysis, diagnosis and reporting), including various modalities and technologies, as well as other patient clinical data (e.g., physiological sensors and health records), and thus optimize them for various clinical problems.

Research lines:

- Medical imaging technologies for early and non-invasive diagnosis of human diseases.
- Inverse problems for medical image reconstruction, reduction of acquisition times and costs.
- Artificial intelligence methods based on the physics of medical images for diseases diagnosis.
- Reliable and explainable artificial intelligence methods that integrate medical images and other clinical patient data.
- Biomarkers based on imaging and physiological sensors for early diagnosis and characterization of cardiovascular, liver and cancer diseases.

Millennium Institute



>> SCIENTIFIC PRODUCTIVITY:

ISI-WOS: 58

Scielo: 2

Scopus: 3

Books or chapters: 5

Other publications: 13





>> CONTACT:

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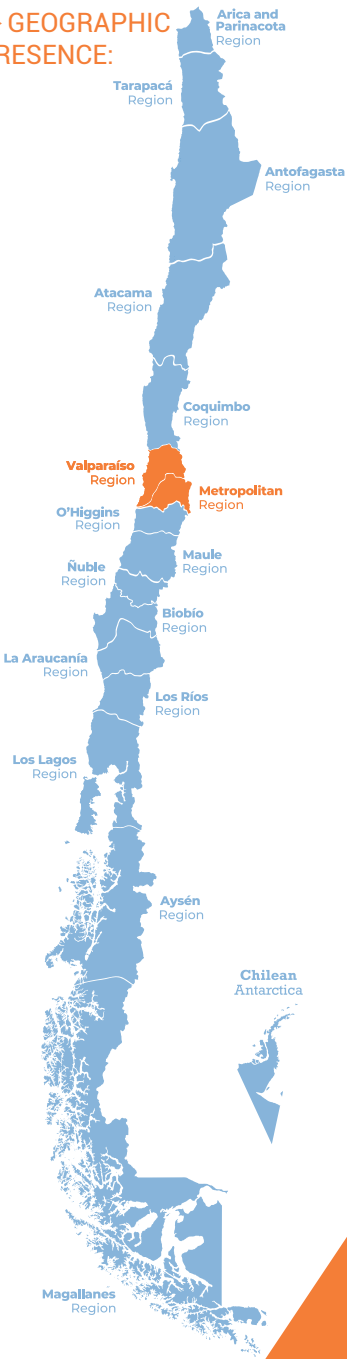
>> RESEARCHERS:

Associate Researchers:
Cecilia Besa Correa, Rene Botnar, Steren Chabert, Pablo Estévez Valencia, Domingo Mery Quiroz, Denis Parra Santander, María Rodríguez Fernández, Francisco Sahli Costabal, Rodrigo Salas Fuentes.

Assistant Researchers:
Julio Sotelo, Cristián Tejos, Rodrigo Cádiz, Claudio Pérez.

Senior Researchers:
Catterina Ferreccio Read, Marco Arrese Jiménez, Pablo Irrarrazaval Mena, Julia Schnabel, Daniel Rueckert, Marcus Makowski.

>> GEOGRAPHIC PRESENCE:



>> MAIN ACHIEVEMENTS:

- Assemble a multidisciplinary team to address health care problems in Chile.
- Generate a support program for the training of young researchers: 28 projects awarded for financing students and young researchers.
- Establishment of national and international collaboration networks: Academic (King's College Munich, Technical University of Munich, Centro Basal CENIA, among others), Industry (SIEMENS, PHILIPS, Verasonics) and Hospitals (Center for the Prevention and Control of CECAN Cancer, Carlos Van Buren Hospital, South Metropolitan Mammography Center).
- Installation and accessibility to cutting-edge research equipment: 0.55T low-field Magnetic Resonator, MAGLife Serenity cardiac monitor, Vantage LE32 Ultrasound, iHEALTH Cluster: server, processing and storage.



>> OUTREACH ACTIVITIES:

- Participation of the Institute in a chapter of "The Science that Communicates", UC Research, and participation of the director Dr. Claudia Prieto in Protagonistas 2030 El Mercurio.
- Organization of the discussion "AI in Health: an ethical approach in the labyrinth of artificial intelligence" and participation in panels on gender, ethics, health and AI organized by ANID, UNESCO and FCFM UChile.
- Children's drawing contest "What is the Human Body like inside?" and singing contest "To be a scientist is to be brave."
- Workshop "Together and Scrambled: how AI and medicine mix for better health" aimed at schoolchildren from the SUMA STEM UC program.
- Participation in FECI 2023, Fête de la Science, "Future Congress in your commune" and other science fairs with a mobile laboratory, implementing audiovisual experiences and using medical instruments for an immersion in the institute's work.