UNIVERSIDAD DE LA FRONTERA

R&D PORTFOLIO 2022

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VRIP VICERRECTORÍA DE INVESTIGACIÓN Y POSTGRADO

DIRECCIÓN DE INNOVACIÓN Y TRANSFERENCIA TECNOLÓGICA

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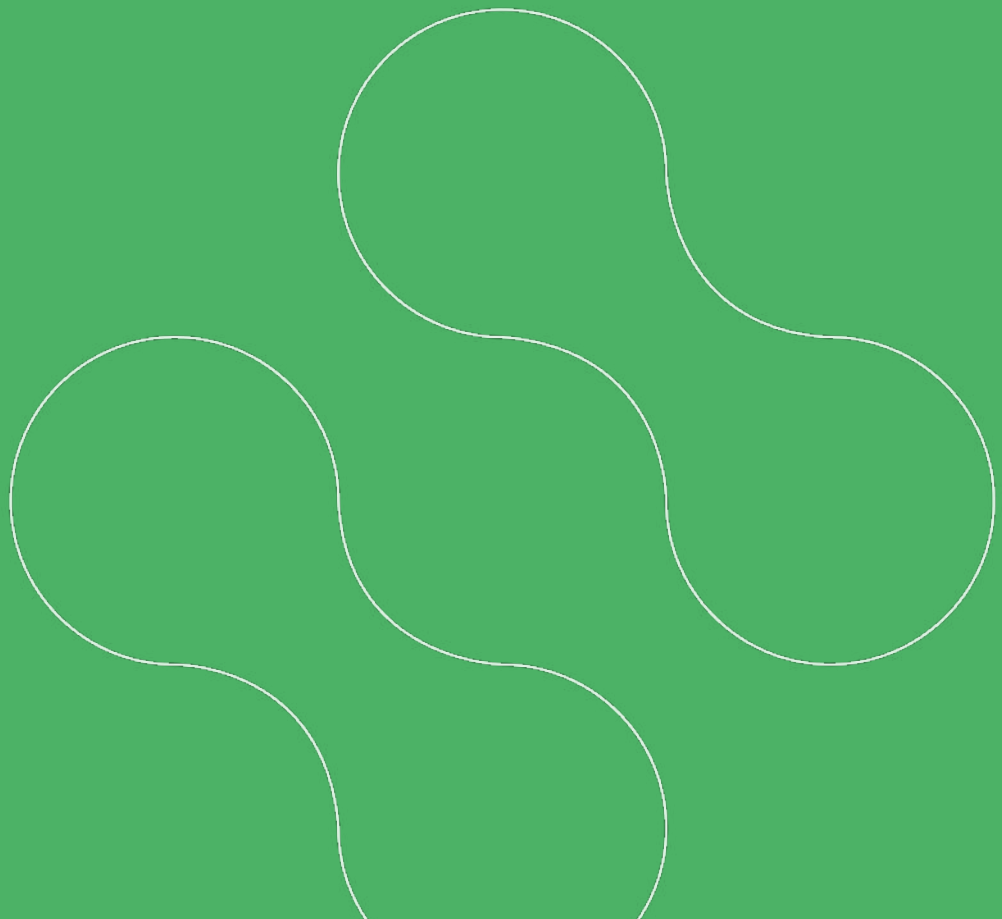
R&D PORTFOLIO 2022



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Chile is the southernmost country in the world, immerse between the Andes to the east and the Pacific Ocean to the west, comprising 4.300 kms of the coastline.

It has the clearest skies in the world, ideal for astronomical observation, and it is expected to contain more than 50% of the global astronomical infrastructure by 2030.

Due to its seismic condition, abundance of renewable energy and natural resources and the geographical proximity to Antarctica, Chile is a great destination for global research and innovation.

TEMUCO, LA ARAUCANÍA REGION, CHILE

Located about 700 kilometers south of Santiago, the Region of La Araucanía is the capital of the Mapuche, indigenous peoples of the south of Chile and a hotspot for biodiversity, where the presence of the Andes mountain, forests, lakes and rivers, makes it an important tourist attraction in Chile.

The main economic activities are agriculture, farming and forestry, given its climate and soil conditions.

Temuco is the regional capital of La Araucanía, with a population of 282.415 habitants, it is marked by multiculturalism, innovation ecosystem, and touristic attractions.

UNIVERSIDAD DE
LA FRONTERA

Located in the Region of La Araucanía, Chile, the Universidad de La Frontera (UFRO) is a state and public institution of higher learning, considered as one of the best universities in the country based on its remarkable indicators of quality and excellence. Its mission is to cultivate and transfer knowledge in various fields and cultural domains. It recognizes, promotes and integrates the worldview of its indigenous peoples, especially regarding the intercultural relationship with the Mapuche people, promoting respect and equitable development.

UFRO is dedicated to the creation of human capital in undergraduate and graduate studies, in the areas of continuing education development, scientific and technological research, the promotion and creation of the arts and cultural development, and the education of citizens ethically committed to the needs of the region, the country and the international community, for the common good.

In 2018, the Universidad de La Frontera secured its fourth accreditation by the National Accreditation Commission (CNA) in five strategic areas for six years (2018-2024), consolidating its position as a comprehensive university.

With its six faculties, more than 30 departments, six interdisciplinary institutes and its two scientific and technological nuclei, the University is committed to the quality in education and scientific and technological research, and supports a culture of innovation. UFRO fosters R&D as an engine of the development and improvement of people's quality of life and as a contribution to the economic and social impact, protecting and promoting the value of cultural heritage and sustainable development.

Vice-rectorate of Research and Graduate Studies

The Vice-rectorate of Research and Graduate Studies is in charge of generating the policies and instruments that focus resources on areas of excellence related to research, postgraduate studies, innovation and technology transfer.

Innovation Office

The Innovation Office of the Universidad de La Frontera is responsible for the development of applied scientific research, the creation and protection of industrial and intellectual property, technology transfer and the promotion of entrepreneurship and competitiveness through innovation.

CONTACT INFORMATION

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SUSTAINABLE
DEVELOPMENT
GOALS

The 17 Sustainable Development Goals (SDGs), part of the United Nations 2030 Agenda for Sustainable Development, are an ambitious global framework to achieve a better and more sustainable future for people and the planet. They address the interconnected goals of achieving economic prosperity, social justice, and environmental sustainability for all people, with a pledge to leave no one behind.

The 2022 Sustainable Development Report assesses the progress of all 193 UN Member States on the SDGs, using both official and unofficial data and indicators, where Chile ranked 28th and places first in Latin America.

As part of its commitment to social and economic development, the University fosters R&D projects and technologies that contribute to the improvement of people's quality of life.

This research brochure is a selection of the initiatives with highest impact in the SDGs: (2) Zero hunger, (3) Good health and well-being, (4) Quality education (6) Clean water and sanitation, (7) Affordable and clean energy, (9) Industry, Innovation and infrastructure, (11) Sustainable cities and communities, (13) Climate action and (15) Life on land.

SUSTAINABLE DEVELOPMENT GOALS

GOAL 2:
ZERO HUNGER

48 R&D Projects
5 Technologies
4 Patents
1 Copyright

Chilean agriculture is one of the most dynamic industries in the domestic economy with main exports including wine, fresh fruit, dairy, meat, and fishery products.

Due to climate change impacts on crop production, including variations in temperature and precipitation patterns, extreme weather events, effects on soil moisture, among others, the agricultural industry could be one of the most vulnerable economic sectors in the coming decades.

To overcome these challenges, our main research areas are:

1. **Food security**
2. **Biological resources**
3. **Sustainable agriculture**
4. **Land and soil quality**
5. **Nutrition**

TITLE	RESEARCH AREA	RESEARCHER
Improving agricultural production with less nitrogen oxide emissions	Sustainable agriculture, food security	Maribel Parada
HUB SmartFruit-ALC: Strengthening the competitivity and sustainability of family producers of Latin America and the Caribbean (ALC) in the climate change scenario, using smart solutions based on remote sensing	Sustainable agriculture, IoT	Alejandra Ribera
Smart nitrogen fertilizer to face climate change and food security	Soil quality, fertilizers	Marcela Calabi
Improving growth, productivity and fruit quality of *Vaccinium corymbosum* cultivars exposed to Al-toxicity and drought in acid andisol: Phytohormones management as a strategy under a climate change scenario	Food security, climate change	Marjorie Reyes
Production of biogenic silver nanoparticles with antimicrobial activity in a fluidized bed reactor (FBR) coupled to a stirred tank reactor (STR) operated with immobilized fungal biomass	Nanotechnology	Olga Rubilar

TITLE	RESEARCH AREA	RESEARCHER
Design of a biobed for bioremediation of contaminated agricultural soils	Bioremediation, soil quality	Gabriela Briceño
Enhancing pesticides degradation by microbial consortia acting on an efficient biopurification system enriched with biosurfactants	Bioremediation, microbiology	María Cristina Diez
Smart-agro: IoT technologies applied to early detection of lameness and heat in milk cows	IoT, remote sensing	Carlos Muñoz
Smartbins: Using intelligent harvest baskets to estimate the stages of berry harvesting	IoT, agriculture	Patricio Galeas
CeTa: Technology development for food innovation	Food security, industry	Luis Torralbo
Role of organic phosphorus and C:N:P stoichiometry in smart and sustainable agriculture in volcanic soils	Sustainable agriculture	María de la Luz Mora
Study and sensory analysis of food based on a protein isolate of a lupin variety	Encapsulation, bioactive compounds	Mónica Rubilar

TITLE	RESEARCH AREA	RESEARCHER
Elaboration of a functional ginger drink based on Chilean microorganisms	Encapsulation, bioactive compounds	Carolina Shene
Synergistic effects between extremophilic root-associated fungi. An innovative study of rhizosphere fungal communities to improve plant performance under combined drought and metal(loid)s stress	Plant growth, fungi	César Arriagada
Socioecological resilience of traditional and modern agricultural systems: Identification of organizational forms, techniques and cultural practices to face climate change and water scarcity in La Araucanía Region	Agroecology, sustainable agriculture	René Montalba
Safeguarding pollination services in a changing world (SURPASS)	Ecosystem services, pollination	Lorena Vieli
Detecting genomic regions associated with resistance to high-virulence races of stripe rust in durum wheat: Towards more durable resistance and sustainable production	Plant breeding, genetics, biotechnology	Nicolás Cobo
Epigean and hypogeous pest control in grassland of southern Chile: Using cultivars of *Lolium perenne* carriers of endophyte fungus	Agricultural entomology, pest control	Leonardo Bardehle

TITLE	RESEARCH AREA	RESEARCHER
Rhizosphere interactions on wheat plants grown under drought conditions as a strategy to optimize water use efficiency: Importance of potassium uptake	Agricultural microbiology, bioremediation	Leonardo Almonacid
Controlled-release nitrogen and phosphorus in a biochar-based smart fertilizer: A novel holistic approach to sustainable crop production on acid soils	Soil-plant interaction, mycorrhiza, biotechnology applied to agricultural crops	Alex Seguel
Can dietary inclusion of cochayuyo (*Durvillaea antarctica*) and agar-agar waste modify the rumen microbiome, improve productive parameters and preserve the nutritional value and quality of lamb meat?	Animal production and nutrition, meat quality	John Quiñones
Packaging development and commercial strategy for traditional charcuterie made with hazelnut pork	Animal production, animal reproduction, meat quality.	Néstor Sepúlveda
Can probiotics dietary supplementation modify the spermatozoa transcriptome and improve the offspring quality of rainbow trout (*Oncorhynchus mykiss*)?	Veterinary sciences, animal reproduction, cell biology	Rommy Diaz

TITLE	RESEARCH AREA	RESEARCHER	TYPE	REGISTRATION NUMBER
Natural pigment extraction from potato peels and their incorporation into the food industry	Natural food pigments	María Antonieta Ruiz	Patent	CL 202201165
Fungicidal composition for controlling phytopathogenic diseases, inhibiting the growth of the pathogenic fungus *Botrytis cinerea*	Chemical ecology	Andrés Quiroz	Patent	9.974.301 US
Screening of a secondary metabolite producing fungi from the Antarctic and their antagonistic effect against *Gaeumannonyces graminis* as model soil borne pathogen	Microbiology, soil-plant interactions	Paola Durán	Patent	PCT/CL2020/050152
Method for isolation of lactic acid bacteria from complex samples	Microbiology, soil-plant interactions	Paola Durán	Patent	PCT/CL2020/050062
TPAS: Portable technology for soil analysis through diffuse reflectance in the visible-infrared spectrum	Optoelectronics, digital signal processing	César San Martín	Copyright	278.082 CL

GOAL 3:
GOOD HEALTH AND WELL-BEING

41 R&D Projects
9 Technologies
6 Patents
2 Copyrights
1 Trade secret

The Araucanía region in Chile presents the highest mortality due to gallbladder cancer (GBC) in the world, and it is well established that gallstone patients with Mapuche ancestry are at high risk of developing this disease.

The University participates in four HORIZON 2020 initiatives associated to this goal, related to GBC, diagnosis and management of tuberculosis and nanoencapsulation systems.

The priority research areas of the University include:

1. **COVID and infectious diseases**
2. **Cancer**
3. **Mental health and well-being**
4. **Bio-products for human health**
5. **Reproductive sciences**

PROJECTS / GOAL 3: GOOD HEALTH AND WELL-BEING

TITLE	RESEARCH AREA	RESEARCHER
INNOVA4TB: Innovation for tuberculosis (TB)	Tuberculosis, epidemiology	Isabel Iturrieta
EULAT: Establishment and exploitation of a European-Latin American Research Consortium towards eradication of preventable gallbladder cancer	Gallbladder cancer	Héctor Losada
ENCAP4HEALTH: Innovative sustainable encapsulation systems for improving human health and well-being	Pharmaceutical compounds, bioproducts, biomaterials	Francisca Acevedo
Role of the CCL5/CCR5 axis in the development of platinum drug resistance: An approach for understanding the biological process of chemoresistant phenotype	Chemoresistance	Priscila Brebi
Clinical trials (phase III) of CanSino Biologics COVID-19 vaccine	COVID-19, clinical trials	Fernando Lanas
Development of an antibacterial membrane with bone regenerative capacity for potential use in the treatment of periimplantitis	Bone regeneration, dental implant	Victor Beltrán

TITLE	RESEARCH AREA	RESEARCHER
Resistance study of *Fusarium* spp. clinical isolates to amphotericin B and azoles	Microbiology, antimicrobial resistance	Cledir Santos
Phytopharmaceuticals for depression and the effects of chronic stress: In-vitro and in-vivo evaluation of sesquiterpenes from canelo (*Drimys winteri*)	Mental health, phytopharmaceuticals	Cristian Paz
Chimeric and pegylated L-asparaginase: Study of the conditions of expression, production and purification of an innovative anti-leukemic biopharmaceutical with low immunogenic potential	Applied microbiology, leukemia	Jorge Farías
Mental health in the Mapuche population: perspectives and recommendations of professionals, officials and users for intercultural competencies in mental health teams in Chile	Mental health, indigenous people	Ana María Alarcón
Work-family-nutrition interrelations and life satisfaction in families from three regions of Chile: A cross- sectional and longitudinal study	Well-being, nutrition	Berta Schnettler

TITLE	RESEARCH AREA	RESEARCHER
Thinking a city for children and adolescents: Development of an opportunity index for health and well-being	Well-being, public health	Nicolás Aguilar
Development and analysis of an innovative and biocompatible scaffold of polyhydroxyalkanoates (PHA) with neurotrophic factors to enhance peripheral nerve regeneration	Biomaterials, nerve regeneration	Fernando Dias
Dentinogenic differentiation potential and other biological characteristics of stem cells from the apical papilla and dental pulp isolated from inflamed and healthy tissues and cultured with lipopolysaccharides	Dental pulp regeneration	Cristina Bucchi
Connecting molecular subtypes of colorectal cancer with extracellular vesicle heterogeneity in patient-derived organoids	Cancer, molecular biology, translational medicine	Pamela Leal

TECHNOLOGIES / GOAL 3: GOOD HEALTH AND WELL-BEING

TITLE	RESEARCH AREA	RESEARCHER	TYPE	REGISTRATION NUMBER
CONVERAY™: Development and optimization of a convergent beam device adaptable to a LINAC for use in radiotherapy and radiosurgery	Medical physics	Rodolfo Figueroa	Patent	12774012.4 EP
RED OPA™: Mobile application for the prevention of suicidal behaviors in adolescents of secondary education establishments	Evidence-based medicine	Tamara Otzen	Copyright	2020-A-9483 CL
ULMOPLUS™: Development of a topical product for the healing of venous ulcers based on ulmo honey supplemented with vitamin C	Morphometry	Mariano del Sol	Trade secret	-
VITRISPERM™: Aseptic Straw Vitrification (VAP) technology, protects sperm function and reproductive ability, providing an 80 percent effective of human sperm survival rate	Reproductive biology	Raúl Sánchez	Patent	2 611 290 EP

TITLE	RESEARCH AREA	RESEARCHER	TYPE	REGISTRATION NUMBER
ITS Uridetective™: Kit for detecting silent sexually transmitted diseases (SSTDS) in a urine sample	Reproductive biology	Raúl Sánchez	Patent	EP 17898368.0
FisioSmart: Kinesthetic smart vest that helps patients with respiratory problems	Civil engineering	José Luis Portiño	Copyright	2020-A-9539 CL
OXIRIS: Development of a new energy-dispersive X-ray fluorescent (EDXRF) device for the simultaneous detection and treatment of cancer diseases	Medical physics, cancer	Rodolfo Figueroa	Patent	PCT/IB2020/058387
Cream for topical use during photodynamic therapy in skin cancer treatment	Non-melanoma skin cancer	Priscilla Brebi Daniela León	Patent	US 17/611.136
Instrument for in situ measurement of the angle of convergence in a dental preparation	Medical physics	Marcos Flores Rodolfo Figueroa	Patent	201780092105.6 CN

GOAL 4: QUALITY EDUCATION

24 R&D Projects

1 Technology

1 Copyright

La Araucanía is the poorest region of Chile, with high inequality rates, and has the largest Mapuche population in the country, located mainly in rural areas. In the region, 90% of schools have indigenous compositions above the national average, which has led to highly segregated schools and structural inequalities.

The University, as a public Institution of Higher Education, is committed to ensure inclusive and equitable quality education through research and innovation.

The priority research areas of the University are:

1. **Information and Communication Technologies (ICT)**
2. **Quality and inclusive education**
3. **Teacher training strategies**
4. **Educational policy**

TITLE	RESEARCH AREA	RESEARCHER
Digital system to assess skills and abilities that support the transition to higher education of students from vulnerable schools	Equality, high schools	Leonardo López
Collaborative system to reinforce classroom interactions in initial teacher training	Teacher training, ICT	Christian Labbé
Development and evaluation of a teaching method based on problem-solving activities using the internet	Teacher training, ICT	Enrique Hinostroza
Methodology for the governance and management of the university as a complex adaptative system based on three missions: Research, education and community engagement	Higher education, governance	Ronald Cancino
School segregation of indigenous peoples in Chile: Exploring its origins and evolution	Indigenous peoples, educational policies	Álvaro Hofflinger

TITLE	RESEARCH AREA	RESEARCHER
Curriculum development of motor competences in the subject of physical education and health	Physical education, motor development	Jaime Cárcamo
Resilience, self-efficacy and prosociality: Social and emotional education in the classrooms of Chilean public establishments of the 21st century	Public education	Sonia Salvo
Financial and economic literacy, attitudes towards money, consumption patterns and life satisfaction in Chilean high school students	Economic literacy	Marianela Denegri
Fostering positive learning environments in virtual undergraduate contexts in a Chilean University	Teacher training, ICT	Mónica Bravo
Incidence of the social context in the digital competences of high school students: An ecological approach to the study of digital inequalities	Digital inequalities	Carolina Matamala

TITLE	RESEARCH AREA	RESEARCHER	TYPE	REGISTRATION NUMBER
Pedagogical model of economic and financial education	Economic psychology, consumer behavior	Marianela Denegri	Copyright	297.228 CL

GOAL 6:
CLEAR WATER AND SANITATION

12 R&D Projects

Clean water and sanitation are one of the main issues that the world is facing today. La Araucanía Region is not an exception and has presented a megadrought over the last decade.

Moreover, in rural zones, nearly 70% of the rural population of the region is not connected to a drinking water network and they depend on informal sources such as wells, rivers, and tank trucks.

The priority research areas of the University are:

1. **Hydrological modelling**
2. **Drought**
3. **Bioremediation**
4. **Water management**
5. **Water ecosystems**

PROJECTS / GOAL 6: CLEAR WATER AND SANITATION

TITLE	RESEARCH AREA	RESEARCHER
Management of global change impacts on hydrological extremes by coupling remote sensing data and an interdisciplinary modelling approach	Hydrological modelling, drought	Mauricio Zambrano
Designing a continuous remediation process for contaminated water with chlorinated compounds using iron oxide-hydrochar composite	Water remediation	Mara Cea
Unraveling the effect of organic phosphorus on bacterial populations in river and lagoon sediments from La Araucanía Region	Water ecosystems	Marco Antonio Campos
Including the spatial variability of boundary shear stress and grain size distribution in sediment transport predictions applications to mountain streams.	Water ecosystems	Ángel Monsalve
Environmentally and socially sustainable filter for iron, manganese and turbidity removal in water supply wells in rural areas	Water management	Christian Antileo
Water recovery from mining tailings by forward osmosis	Forward osmosis	Juan Carlos Ortega
Remote monitoring platform for rural potable water in La Araucanía Region	Water management	Gustavo Ciudad

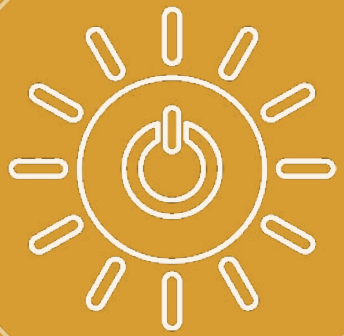
GOAL 7:
AFFORDABLE AND CLEAN ENERGY

9 R&D Projects

3 Technologies

2 Patent

1 Copyright



Chile has an abundance of natural resources that can supply clean energy, such as solar, wind, green hydrogen and tidal power.

As part of the National Energy Strategy, Chile's energy matrix aims to be 100% zero emissions by 2050.

In order to achieve affordable, reliable, sustainable and modern energy for all, the University focuses on the following priority areas:

1. **Sustainable and clean energy**
2. **Non-Conventional renewable energy**
3. **New Battery technologies**

TITLE	RESEARCH AREA	RESEARCHER
Enzymatic white rot fungi bioreactor pretreatment as a fundamental stage of a biorefinery of olive mill solid waste to produce biogas and a potential biofertilizer	Non-conventional renewable energy	Gustavo Ciudad
Simulation of diffusion and intercalation of lithium into cathodic materials with functionalized surfaces in context with lithium-ion batteries	New battery technologies	Fabian Dietrich
New Ion-Na secondary batteries based on carbon quantum dots anodes and nanostructured sodium rhodizonate cathodes.	New battery technologies	Emilio Navarrete
Multimat: Millennium Nucleus of Multifunctional Materials for Applied Surface Science	Nanotechnology	Eduardo Cisternas
Design and evaluation of an electrical generation system based on a synchronous reluctance machine	Energy, electric energy	Roberto Moncada

TITLE	RESEARCH AREA	RESEARCHER
Development of semiconductor to increase the efficiency in solar photovoltaic cells sensitized with organic pigments	Solar energy	Boris Pavéz
Development of carbon-based materials from kraft lignin using microwave-assisted pyrolysis and hydrothermal carbonization	Clean energy	Rodrigo Navia
Model predictive control of paralleled inverters in a stand-alone microgrid	Inverters, microgrid	Hector Young
Improving the energy efficiency of Temuco's firewood kitchens	Energy efficiency	Robinson Betancourt

TITLE	RESEARCH AREA	RESEARCHER	TYPE	REGISTRATION NUMBER
Integrated predictive maintenance system for high voltage towers and substations oriented to prevent failures in the national electrical system due to environmental conditions	Electrical power engineering	Rodrigo Villalobos	Copyright	2020-A-6449 CL
Combustion control system for the detection and analysis of gas or fuel oil flames using optical devices	Energy efficiency	Robinson Betancourt	Patent	8.070482 US
Power curve optimization of low power wind turbines based on a mechatronic pitch control system	Sustainable energy	Renato Hunter	Patent	408 CL

GOAL 11: SUSTAINABLE CITIES AND COMMUNITIES

17 R&D Projects

2 Technologies

1 Patent

1 Copyright

Temuco has been ranked as one of the cities with the highest pollution levels worldwide; it is related to poverty and residential wood burning.

Financed by the IADB Lab, Temuco aims to be the first smartcity in the country, implementing strategies in transport, recycling and decontamination. It is also considered as one of the cities with the best bike lanes in Chile.

To make the city safer, resilient and sustainable, the University focuses its research areas on:

1. **Air quality**
2. **Sustainable roads and housing**
3. **Smartcities**
4. **Resource efficiency**

TITLE	RESEARCH AREA	RESEARCHER
Dynamic and participatory sustainability assessment for the decision-making on rural basic road projects	Sustainable roads, rural communities	Leonardo Sierra
Promoting the design of multifunctional landscapes in urban-lake contexts: ecosystem services as axes of territorial planning	Sustainable cities	Adison Altamirano
Smart city in a box: Strengthening the citizen participation and urban management in Temuco	Smartcities, IoT	Rodrigo Navia
Real time electrical efficiency system for urban trains	Sustainable cities	Jaime Bustos
Granulated additive based on textile fibers from waste tires for sustainable pavements	Sustainable roads, circular economy	Gonzalo Valdés

TITLE	RESEARCH AREA	RESEARCHER
Social housing policies in cities: From metrocentricity to place-making approaches	Housing policies	Luis Vergara
Aluminé Raq Pu Liwen: Facing COVID-19 through rescue, revitalization and enhancement of Mapuche's pottery cultural heritage in Argentina	Anthropology and environment, interculturality	Alejandro Herrera
Air pollution and health perception in Chile	Environmental economics	Yenniel Mendoza
Air quality, social vulnerability and risk perception in southern Chile	Environmental sociology	Álex Boso

TITLE	RESEARCH AREA	RESEARCHER	TYPE	REGISTRATION NUMBER
Aerator device with improved passive and / or active ventilation capacity for application in sustainable buildings	Sustainable buildings, energy efficiency	Juan Pablo Cárdenas	Patent	589 CL
Development and design of asphalt mixtures with high energy efficiency and low environmental impact for sustainable pavements	Sustainable roads, circular economy	Gonzalo Valdés	Copyright	277.190 CL

GOAL 13: CLIMATE ACTION

10 R&D Projects

1 Technologies

1 Copyright

Due to its unique geography, Chile is highly exposed to the incidence of natural disasters, such as earthquakes, volcanic activity, and tsunamis.

Moreover, Chile ranked 29th out of 181 countries in the 2020 ND-GAIN Index, which reviews a country's vulnerability to climate change and global challenges. Climate change could increase the frequency and magnitude of hazards like wildfires, floods, landslides, droughts, and impact precipitation and sea level, affecting key sectors such as aquaculture, forestry, agriculture and livestock.

The University promotes the development of R&D to strengthen prevention, resilience and adaptation to climate-related hazards and natural disasters in the following priority areas:

1. **Natural disasters**
2. **Climatology**
3. **Early warning systems**

TITLE	RESEARCH AREA	RESEARCHER
Exchange and collaboration of experiences and research capacities for the estimation of the carbon footprint in two South American hospitals	Carbon footprint	Waldo Merino
The social dimensions (trust and communication) of ecological risks in socio-environmental conflicts over energy in Chile: The cases of Castilla and Hidroaysén	Socio-environmental conflicts	Arturo Vallejos
Rainfall-induced landslide variations under extreme hydrometeorological conditions: New insights under climate change in South America (Rilex)	Natural disasters, climate change	Ivo Fustos
Cascade landslide-mudflow hazards and risk-based resilient alleviation across different scales	Natural disasters	Marcelo Somos
Efficient seismic identification system based on multi-sensor observations	Natural disasters, IoT	Fernando Huenupan
Environmental assistance clinics: Learning in real contexts, for the comprehensive training of engineers	Socio-environmental conflicts	Marcia Zambrano

TITLE	RESEARCH AREA	RESEARCHER	TYPE	REGISTRATION NUMBER
Dosel: Forest monitoring and quantification system	Landscape ecology	Adison Altamirano	Copyright	267.879 CL

OTHER R&D PROJECTS

OTHER R&D PROJECTS

SDG	TITLE	RESEARCH AREA	RESEARCHER
5 GENDER EQUALITY	Marisqueiras (shellfish picking) women and gender violence: Research for community action. Comparing women experiences from the coastal communities of the state of Sergipe in Brazil and the Mapuche communities of Boyeko of La Araucanía region in Chile	Gender, Indigenous Peoples	Lucy Ketterer
	Socio-emotional competencies and antisocial behavior in adolescent-girls exposed to adverse experiences: Comparative analysis between Chile and Brazil	Antisocial behavior in adolescents	Paula Alarcón
	Divorce or break-up in relationships: Processes, meanings, experiences and reconfigurations of parenthood in Chile	Gender, family and community	Cecilia Mayorga

OTHER R&D PROJECTS

SDG	TITLE	RESEARCH AREA	RESEARCHER
8 DECENT WORK AND ECONOMIC GROWTH	Integrated multidimensional model for the labor inclusion of people with disabilities in Chile	Labor inclusion	Cecilia Bastías
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	End effector for robotic intelligent sanding operations for the manufacture of value-added wood products	Smart manufacturing, automation	Eduardo Diez
	Impact of the Covid-19 crisis on the export competitiveness of food companies in southern Chile	International business, export	Valeska Geldres

OTHER R&D PROJECTS

SDG	TITLE	RESEARCH AREA	RESEARCHER
10 REDUCED INEQUALITIES	Extractivism and migration: Links between wood industry expansion, internal migration and the transformation of rural spaces in southern Chile	Migration, rural communities	Lindsey Carte
	Contested territories: From contested territories to alternatives of development - Learning from Latin America	Territorial inequalities, public policies	Hugo Zunino
	Copyright and artistic expressions of the Mapuche people: the case of poetry	Intellectual property	Joan Ramos Sulan Wong
	Community psychosocial dynamics in Chile and Brazil: Divergences and convergences in neighborhoods of socially vulnerable conditions	Social vulnerability, community psychology	Alba Zambrano

OTHER R&D PROJECTS

SDG	TITLE	RESEARCH AREA	RESEARCHER
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	Development of a new recycled concrete aggregate of higher quality based on CO2 absorption treatments	Sustainable materials, Circular economy	Viviana Letelier
14 LIFE BELOW WATER	MACH: Characterization of fish-killing algae bloom holobiome and the development of a detection/prediction system for Industry/Government/ Academia aquaculture	Applied microbiology, sustainable aquaculture	Milko Jorquera

SDG	TITLE	RESEARCH AREA	RESEARCHER
16 PEACE, JUSTICE AND STRONG INSTITUTIONS 	Transparency in public electronic processes	Transparency, informatics	Jorge Hochstetter
	Danger to the safety of society? A research on the dangerousness of using preventive detention	Criminal law, criminology	Javier Velásquez
	Limits to exercising children and adolescents' rights and their adaptation to the theory of Fundamental rights	Fundamental rights	Estefanía Esparza Juan Pablo Zambrano

SDG	TITLE	RESEARCH AREA	RESEARCHER	TYPE	REGISTRATION NUMBER
10 REDUCED INEQUALITIES	MMIDA®: Development and validation of an integrated management system for differentiated interventions with young offenders, based on the multidimensional model of differentiated intervention with adolescents	Legal and forensic psychology, psychometrics	Ricardo Pérez-Luco	Copyright	2021-A-11477 CL
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	Bio-additive for heavy oils for reducing polluting emissions and combustion efficiency	Fluid mechanics, heat transfer, CFD	Tomás Mora	Patent	ZL201580082145.3 CN

CENTERS OF EXCELLENCE, SCIENTIFIC AND TECHNOLOGICAL NUCLEI AND INSTITUTES

The University generates knowledge and excellent research, through Scientific and Technological Nuclei, Centers of Excellence and Interdisciplinary Institutes, responding to the challenges of a dynamic and demanding environment.

The Scientific and Technological Nuclei provide the integration, coordination and management of research activities, postgraduate programs and technology development, enhancing priority areas for the university, such as bioresources, social sciences and humanities.

The Institutes generate and transfer knowledge in interdisciplinary areas, such as agroindustry, innovation, environment or intercultural studies, while the Centers of Excellence promote R&D in specific areas, including reproductive biotechnology, translational medicine, physics and health engineering, among others.

SCIENTIFIC NUCLEI	CONTACT INFORMATION	SDGs
BIOREN: Scientific and Technological Bioresource Nucleus	bioren.ufro.cl	
Scientific and Technological Nucleus in Social Sciences and Humanities	nucleocienciasociales.ufro.cl	

CENTERS OF EXCELLENCE	CONTACT INFORMATION	SDGs
CEBIOR: Center of Excellence for Reproductive Biotechnology	cebior.ufro.cl/	
CEMCC: Center of Excellence for Modeling and Scientific Computing	cemcc.ufro.cl/	
CEMYQ: Center of Excellence in Morphological and Surgical Studies	www.cemyq.cl/es/	

CENTERS OF EXCELLENCE	CONTACT INFORMATION	SDGS
CIBAMA: Center of Excellence in Biotechnology Research Applied to the Environment	cibama.ufro.cl	
CEMT: Center of Excellence in Translational Medicine	med.ufro.cl/cemt	
CFIS: Center of Excellence in Physics and Health Engineering	-	
CIGES: Center of Excellence for Training, Research and Management for Evidence-Based Health	ciges.cl	
CEPEC: Center of Excellence for Economic and Consumer Psychology	cepec.ufro.cl/	
Center of Excellence Geometry at the Frontier	geometryrc.ufro.cl	

INSTITUTES	CONTACT INFORMATION	SDGs
Institute of Agroindustry	agroindustria.ufro.cl	
IDER: Institute for Local and Regional Development	ider.cl	
IMA: Institute of the Environment	ima.ufro.cl	
IIEI: Institute of Indigenous and Intercultural Studies	estudiosindigenas.ufro.cl	
IIE: Institute of Educational Informatics	iie.cl	
IDEA: Institute of Innovation and Entrepreneurship	ideaufro.cl	

TECHNOLOGY CENTERS	CONTACT INFORMATION	SDGs
HubTec: Center for Scientific and Technological Transfer	hubtec.cl	
CRHIAM: Center of Water Resources for Agriculture and Mining	crhiam.cl	
CRT+IC: Center for the Technological Revolution in Creative industries	crtic.cl	
CTEC: Technological Center for Innovation in Construction	ctecinnovacion.cl	

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