

Research Lines

The Facultad de Agronomía e Ingeniería Forestal – FAIF (*School of Agricultural and Forestry Sciences*) was founded in May 1904 and has a long history in teaching and in research, having contributed significantly to the development of the Chilean agricultural sector. The school has a complete infrastructure for teaching, extension and research, for 1,188 undergraduate students, 102 master's students and around 50 doctoral students during 2016. The academic staff is composed by 57 full-time and 53 part-time. In the last five years, the school has reinforced its research with emphasis on four multidisciplinary priority areas: Food Safety and Quality, Sustainable Production, Biotechnology and plant breeding, and Natural resources management and global change

1) Sustainable Food Production

Maintaining and recovering agricultural production considering renewable natural resources is a challenge of modern agriculture. Through the understanding of the physiology of crops and animals, along with the biotic and abiotic factors that affect them, we can design integrated management strategies and develop new technologies that increase productivity and, at the same time, produce healthier agricultural products respecting the environment.

2) Natural resources management and global change

The impact of natural resources management on food and feed availability is huge. Our research topics range from governance of water resources, ecosystems services, biodiversity, rural development, forestry resources, ecological restoration, impacts of environmental policies to the development of models to evaluate the impact and adaptation strategies of agriculture and natural systems to climate change.

3) Biotechnology and plant breeding

Biotechnology tools are applied by researchers in many areas: to identify a pathogen strain, to evaluate population diversity, to discover the underlying molecular mechanisms that regulate a metabolic routes, among others. Plant breeding helps to improve plants performance for food, feed, fiber, fuel, shelter, landscaping, eco-systems services and a variety of other human activities. Successful active plant breeding programs on raspberry, cherry, peach, wheat, and native species like *Alstroemeria* and quinoa.

4) Food quality and safety

Chile is an agri-food power that seeks to expand and diversify its offer to the world. Therefore, researching and developing technologies to produce and maintain a high quality of fruits, vegetables and livestock products, is central to the research of our school. The quality and safety of agricultural products range from organoleptic quality from harvest to final consumer (postharvest), which is considered to comply with the standards of pathogenic microorganisms (microbiological safety), chemical residues (chemical safety) and other foreign substances (physical safety).

Below you can find a detailed list of the research lines organized by priority areas.



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Facultad de Agronomía e Ingeniería Forestal Pontificia Universidad Católica de Chile

Research Lines

Area: Sustainable food production

Faculty	Research lines
ALBORNOZ, FRANCISCO fralbornoz@uc.cl	<ul style="list-style-type: none">Plant nutrition.Soilless crops.Nutritional quality of vegetable crops and its agricultural management.
AYALA, MARLENE mayalaz@uc.cl	<ul style="list-style-type: none">Fruit tree physiology and production.Systems of conduction and automation in orchards.Physiology, production and breeding of cherry trees.
BAS, FERNANDO fbas@uc.cl	<ul style="list-style-type: none">Salmon production: estimation of growing curves and growth models according to diet and temperature.Animal Nutrition: Omega 3 / Omega 6 ratio in salmon diets and their impact on growth and immunity.Production of pigs and environment: technologies for the control of odors and flies in pig farms.
BONOMELLI, CLAUDIA cbonomel@uc.cl	<ul style="list-style-type: none">Soil as a productive factor: uses, deterioration, pollution.Needs demands, supplies of nutrients for crops to make sustainable uses of fertilizers, amendments and fertilizers.Soil and fruit quality: relationship between nutrients and exportable fruit.
CHORBADJIAN, RODRIGO rchorba@uc.cl	<ul style="list-style-type: none">Agricultural applications of plant resistance and tolerance to insect pests.Functional ecology of plant secondary metabolites.New pest management tools, with an emphasis on insecticide selectivity.
CONTRERAS, SAMUEL scontree@uc.cl	<ul style="list-style-type: none">Effect of maternal environment on seed production and quality.Seed dormancy and longevity.Productivity and product quality of vegetable crops.
ENRIQUEZ, DANIEL daniel.enriquez@uc.cl	<ul style="list-style-type: none">Methane amendments in dairy cattle.Use of fresh forage to improve the quality of milk.Sustainable management of pastoral systems.
FIGUEROA, RODRIGO rfe@uc.cl	<ul style="list-style-type: none">Population dynamics of weed communities.Sustainability of weed control strategies.Environmental impact of weed management
FIGUEROA, JAIME figueroa.jaime@uc.cl	<ul style="list-style-type: none">Pigs nutrition and management.Feeding behaviour of mammals.Palatability and hedonic reactions during consumption.Innate and learned flavour preferences.
GIL, PILAR pmgil@uc.cl	<ul style="list-style-type: none">Irrigation and efficiency of water use in fruit trees and vines.Mitigation and management of the stress effect by salinity, water deficit and asphyxia in fruit trees.Electrophysiology in fruit trees.



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Research Lines

Area: Sustainable food production

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LARRAIN, RAFAEL larrain@uc.cl	<ul style="list-style-type: none">• Factors affecting beef quality.
MARTIZ, JOHANNA jmartiz@uc.cl	<ul style="list-style-type: none">• Plant breeding of citrus fruits without seed.• Citrus production• Development of sustainable techniques for pollination in citrus and avocado.
MUJICA, ANA MARIA amujicar@uc.cl	<ul style="list-style-type: none">• Botanical genetic diversity of native plants.
MUÑOZ, ALEJANDRA aemunoz@uc.cl	<ul style="list-style-type: none">• Field biodiversity indicators.• Conflict of wild life and farming activities.• Functional biodiversity in agroecosystems
PEÑA, IVAN ipena@uc.cl	<ul style="list-style-type: none">• Names and definitions of databases for analysis.• Statistical methodology for analysis and modeling.
PEREZ, ALONSO agperez@uc.cl	<ul style="list-style-type: none">• Plant water relations: water use efficiency, vascular physiology.• Use (sustainable) of growth regulators in grape production.• Viticulture and productivity / quality of grapes
RIVEROS, JOSE LUIS jlriverosf@uc.cl	<ul style="list-style-type: none">• Animal reproduction in ruminants.• Production and rural development in small ruminant systems.• Food security.
STEINFORT, URSULA usteinfo@uc.cl	<ul style="list-style-type: none">• Plant physiology and flowering control.• Genotype by environment interactions.• Ornamental plant adaptation to climate change.
TORO, PAULA pmtoro@uc.cl	<ul style="list-style-type: none">• Management of animal production systems.• Simulation models of animal production system.• Animal feed and nutrition.• Evaluation of the efficiency and sustainability of livestock systems.
VALDES, HECTOR hevaldes@uc.cl	<ul style="list-style-type: none">• Fruit plant protection.• Grapevine sustainability.• Modelling of agricultural systems.
ZAVIEZO, TANIA tzaviezo@uc.cl	<ul style="list-style-type: none">• Biological control of pests.• Alternatives to pesticides, particularly pheromones.• Ecology of pests and natural enemies.



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Research Lines

Area: Natural resources management and global change

Faculty	Research lines
ANRIQUEZ, GUSTAVO gustavo.anriquez@uc.cl	<ul style="list-style-type: none"> Productivity, adoption of technology, stochastic frontier models. Evaluation and welfare of environmental policies. Impact of CC on agricultural productivity. Spatial convergence of income.
ARELLANO, EDUARDO eduardoarellano@uc.cl	<ul style="list-style-type: none"> Restoration ecology. Ecosystem services in agriculture systems. Soil conservation. Organic waste management.
ARRIAGADA, RODRIGO rariagadac@uc.cl	<ul style="list-style-type: none"> Evaluation of the impact of environmental policies (causal influence). Spatially explicit econometric models of land use change. Causal relations between poverty and forest. Economics of ecosystem services.
BECERRA, PABLO pablobecerra@uc.cl	<ul style="list-style-type: none"> Restoration ecology: evaluation of factors influencing natural regeneration and assisted by sowing and planting of native species. Biological invasions: effects and consequences of exotic species of plants and animals on native species.
BOBENRIETH, EUGENIO ebobenrieth@uc.cl	<ul style="list-style-type: none"> Prices of agricultural products. Empirical identification of long-term trends in consumption, prices and stocks of agricultural products. Relationship between food prices and fuel prices.
BONACIC, CRISTIAN bona@uc.cl	<ul style="list-style-type: none"> Wildlife conservation. Conflicts between carnivores and livestock. Feral animals and global impact. Sustainable use of wildlife.
BONOMELLI, CLAUDIA cbonomel@uc.cl	<ul style="list-style-type: none"> Soil as a productive factor: uses, deterioration, pollution. Needs demands, supplies of nutrients for crops to make sustainable uses of fertilizers, amendments and fertilizers.
BORQUEZ, RICARDO rborquec@uc.cl	<ul style="list-style-type: none"> Arbitrage theory (commodity prices). Statistics and time series. Applied economics (dynamic models).
DONOSO, GUILLERMO gdonosoh@uc.cl	<ul style="list-style-type: none"> Water Economics. Governance of water resources. Analysis of the economic and social state of water resources. Self-government and specialized resolution of conflicts.
FERNANDEZ, M. PAULINA pfernan@uc.cl	<ul style="list-style-type: none"> Functional-structural plant modeling. Forest dynamics, growth and yield. Wood quality and silviculture. Urban forestry.
FOSTER, WILLIAM wfooster@uc.cl	<ul style="list-style-type: none"> Poverty and small farming. Economic geography. Value of agricultural land.



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Area: Natural resources management and global change

Faculty	Research lines
GIL, PILAR pmgil@uc.cl	<ul style="list-style-type: none"> • Irrigation and efficiency of water use in fruit trees and vines. • Mitigation and management of the stress effect by salinity, water deficit and asphyxia in fruit trees.
GILBERT, HORACIO hgilab@uc.cl	<ul style="list-style-type: none"> • Biometry of renewable natural resources. • Mathematical models in renewable natural resources. Optimization applied to environmental problems. • Quantitative ecology.
GINOCCHIO ROSANNA rosanna.ginocchio@uc.cl	<ul style="list-style-type: none"> • Environmental restoration / rehabilitation. • Integrated management of mining, agricultural and depurative waste. • Bioavailability of inorganic pollutants in terrestrial environments and environmental enrichment of metals. • Use of humic substances in the recovery of metals by foam flotation.
GOMEZ, MIGUEL mgomezu@uc.cl	<ul style="list-style-type: none"> • Anatomy and morphology of plants. • Adaptations of plants in the Mediterranean area of Chile. • Plant diversity.
MAO, LUCA lmao@uc.cl	<ul style="list-style-type: none"> • Fluvial geomorphology. • Hydrology. • Management of watersheds. • Use of rural / urban land / water and climate change.
MELO, OSCAR omelo@uc.cl	<ul style="list-style-type: none"> • Quality and attributes of products and services and their effects on the market. • Aquaculture and fisheries: bioeconomic models / expansion.
MEZA, FRANCISCO fmeza@uc.cl	<ul style="list-style-type: none"> • Climate risk management and use of climatic information for decision-making. • Micrometeorology: study of carbon and water fluxes, to understand water use efficiency and carbon/water footprint. • Mitigation and adaptation to climate change in agriculture: development of models to evaluate the impact and adaptation strategies and promote Climate Smart Agriculture. • Intercomparison of crop simulation models (hydrological climatic, etc.): vulnerability analysis to climate change at farm and regional level.
MIRANDA, MARCELO mmirands@uc.cl	<ul style="list-style-type: none"> • Dynamics of landscape and territory. • Dynamics of natural and urban vegetation productivity • Spatial statistics. • Sensors and GIS
MUJICA, ANA MARIA amujicar@uc.cl	<ul style="list-style-type: none"> • Botanical genetic diversity of native plants.
REYES, SONIA sonia.reyes@uc.cl	<ul style="list-style-type: none"> • Architecture urbanism and geography.
VIANNA, JULIANA jvianna@uc.cl	<ul style="list-style-type: none"> • Molecular evolution of wild native animals. • Adaptation of penguins to climate change in Antarctic.



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Research Lines

Area: Biotechnology and plant breeding

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CARRASCO, BASILIO bcarrasco@uc.cl	<ul style="list-style-type: none">• Biotechnology applied to the exploration, use and protection of natural vegetal resources.• Traditional and assisted plant breeding.
FUENTES, FRANCISCO ffuentesc@uc.cl	<ul style="list-style-type: none">• Plant breeding of quinoa.
GAMBARDELLA, MARINA mgambardella@uc.cl	<ul style="list-style-type: none">• Plant breeding of raspberries and strawberries.• Plant health in propagation.
GEBAUER, MARLENE mgebauer@uc.cl	<ul style="list-style-type: none">• In vitro culture tools for plant breeding of recalcitrant species.• Plant breeding of <i>Alstroemeria</i>.• Wheat breeding program to improve quality.
MARTIZ, JOHANNA jmartiz@uc.cl	<ul style="list-style-type: none">• Plant breeding of citrus fruits without seed.• Citrus production.• Development of sustainable techniques for pollination in citrus and avocado.
O'BRIEN, JOSÉ jobrieno@uc.cl	<ul style="list-style-type: none">• Regulatory factors of hormonal responses during root organogenesis.• Transcriptional responses mediated by auxin and cytokinins during abiotic and biotic stress.• Role of reactive oxygen species and its role in defense systems during root organogenesis and stress responses.
ROSALES, MARLENE irosalesv@uc.cl	<ul style="list-style-type: none">• Molecular diagnosis of viruses and pathogens using a metagenomic approach (potato, liliium, tomato, pine, among others).• Molecular techniques for virus and viroids diagnosis and identification in ornamental species.• Molecular approach to study the population biology of phytopatogenic agents• Seed pathology.
SCHWEMBER, ANDRES aschwember@uc.cl	<ul style="list-style-type: none">• Genetic diversity of legumes for food and industrial purposes.• Wheat breeding program to improve yields and grain quality.
VIANNA, JULIANA jvianna@uc.cl	<ul style="list-style-type: none">• Molecular studies of evolution of native fauna (birds, reptiles).• Migrations associated with evolution.



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Area: Food quality and safety

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ALCALDE, JOSE ANTONIO jalcalde@uc.cl	<ul style="list-style-type: none">• Environmental control of the synthesis of phenolic compounds in wine and table wine.• Brewing.• Conservation and ethnoornithology of the <i>Mapuche</i> hen.
BORDEU, EDMUNDO ebordeu@uc.cl	<ul style="list-style-type: none">• Wine microbiology, malolactic fermentation and microbiological stability.• Microclimate and quality of the wine.• Physicochemical stability of wine.
BROSSARD, NATALIA ndbrossa@uc.cl	<ul style="list-style-type: none">• Grape phenolic ripeness and harvest date assessments.• Red wine astringency: tannins and its interaction with wine components.• Mouthfeel perception of wine: components and instrumental characterization.
FELLENBERG, M. ANGELICA mafellen@uc.cl	<ul style="list-style-type: none">• Microbiological food safety.• Public policies associated with safety
FUENTES, FRANCISCO frfuentesc@uc.cl	<ul style="list-style-type: none">• Molecular studies of the anticancer effect of quinoa.
GODOY, LILIANA liliana.godoy@uc.cl	<ul style="list-style-type: none">• Study of microorganisms associated with the fermentation of alcoholic beverages, with emphasis on the microbiology of wine and beer.• Yeast genetics, and study of evolutionary forces associated with the microbial ecology and genomes of other microorganisms present in fermented beverages.• Development of new starter cultures for the production of wine and beer.• Yeasts as potential biocontrol.
IBAÑEZ, RODRIGO rodrigo.ibanez@uc.cl	<ul style="list-style-type: none">• Dairy chemistry and biochemistry.• Modification of processing techniques to improve cheese quality.• Milk proteins and peptides with bioactive properties.• Functionality of milk and dairy products, based on the use of rheological analyses.• Evaluation of novel ingredients and their potential use in dairy products.• Changes in the physicochemical properties of milk during lactation and its effect on the properties of dairy products.
MONTENEGRO, GLORIA gmonten@uc.cl	<ul style="list-style-type: none">• Antimicrobial properties of extracts of honey, with applications in food.
MELO, GRACE grace.melo@uc.cl	<ul style="list-style-type: none">• Food and nutrition policy analysis.• Consumer and producer choice.• Experimental and development economics.
SCHWEMBER, ANDRES aschwember@uc.cl	<ul style="list-style-type: none">• Genetic diversity of legumes for food and industrial purposes.
SILVA, FRANCISCA fsilvat@uc.cl	<ul style="list-style-type: none">• Agrifood policies.
ZOFFOLI, JUAN PABLO zoffolij@uc.cl	<ul style="list-style-type: none">• Modified atmosphere packaging.• Non-destructive analysis tools.• Non-chemical alternatives to the control of phenological disorders.