INNOVATION CAMPUS
AN EDUCATIONAL ENVIRONMENT

The National University of San Martín (UNSAM) is a tuition-free national public university founded in 1992. The University offers a variety of undergraduate and graduate degree programs aimed at promoting education in science and innovation.

13 ENGINEERING DEGREE PROGRAMS

In Argentina, industrial sector contributes 20% of the country’s GDP. According to the United Nations Economic Commission for Latin America and the Caribbean (ECLAC), it is the highest contribution in the region. Moreover, domestic industry has almost doubled since 2003, increasing its output by 55%. In this context, over 10,000 new engineers are needed to meet demand.

The National University of San Martín offers the best engineering degrees, which include 13 undergraduate engineering programs: Environmental, Biomedical, Electronic, Agrobiotechnology, Energy, Materials, Telecommunication, Industrial, Aerospace, Nuclear (specialization in Applications), Transportation, Food, and Aquacultural.

Many of the faculty members are also active researchers.

GRADUATE PROGRAMS

UNSAM currently offers 68 graduate degree programs consisting of 30 master's degree programs, 13 doctoral degree programs, and 25 areas of specialization. This unique academic offer includes a variety of areas such as humanities, social sciences, medicine, law, biotechnology, and other sciences: Astrophysics, Industrial and Food Quality, Nuclear Technology, Radiochemistry and Nuclear Applications, Chemical, Physical and Materials Science and Technology, Pest Control, Environmental Resource Management, Environmental Pollution Analysis, Petro-chemistry, Technology and Environmental Impact Assessment, Molecular Biology, Biotechnology, Molecular Microbiology and Non-destructive Testing.
FONARSEC PROJECTS

Antennas and fiber-optic modems

UNSAM and Infracom S.A. support the design and manufacture of satellite TV antennas and fiber-optic modems. In addition to incorporating value-added, the project encourages import substitution and provides new telecommunication services. Currently, domestic industry produces only outdoor antennas. With this project, which includes an amplifier that maximizes the signal quality, the antenna is placed indoors, resulting in an easier installation and a longer useful life. In regard to the modem, it allows Internet connections of up to 100 GB provided by the Argentina Connected program. Currently, this technology is only available through importation. Accordingly, this project represents a promising niche for domestic industry. At the same time, connectivity will help small- and medium-sized enterprises (SMEs) by boosting their competitiveness.

Solar energy for the power grid

The IRESUD project is meant to develop the application of photovoltaic technology to generate electricity in urban areas, in order to supply the power grid. Companies, individuals and institutions will be able to use solar energy to generate electricity and deliver it to the low-voltage power line.

The consortium has connected a pilot photovoltaic power system to the grid in Buenos Aires city and 16 other provinces. It has also successfully installed solar panels at Marambio Base (Antarctica). Solar energy stands to be a feasible alternative: In developed countries, 5% of their electricity is generated with it. IRESUD was born in 2011 sponsored by UNSAM, the National Atomic Energy Commission (CNEA), Edenor, Aldar, Eurotec, QMax, and Tyco.
The continuation of the IRESUD Project constitutes another step toward a new generation of modern, clean and flexible energy distribution networks. The project is also aimed at promoting the incorporation of renewable energies into the power grid system in order to develop microgrid-based smart grids that will allow for a better management of the intermittency of renewable energy sources. To this end, a pilot experiment combining remote monitoring and control of the low-voltage distribution network with photovoltaic distributed generators will be launched in Centenario (Neuquén Province). UNSAM, the Neuquén Energy Authority, and Aldar S.A. are part of the project.

The innovation of the ERGES (Manageable Renewable Energies) project lies in the fact that two different kinds of renewable energy work in tandem in order that through their accumulation in a hydraulic circuit, the energy produced during the hours of sun can be released by the electric system operator when it is needed. This is a solution to one of the biggest problems in the generation of solar energy: its management. The pilot plant will be located in Pinchas, La Rioja Province, with a nominal capacity of 1MW. This project is developed in collaboration with Eurotec.
The dairy industry provides the input for a new biogas and electricity production system. It is a new concept in intensive cattle management, which at the same time solves the problem of waste management, an activity that requires large amounts of water and space. The project not only provides a substitute for petroleum products but also is capable of reducing environmental impact. Additionally, new incomes will be generated by the sale of the surplus electric energy. Sponsored by UNSAM and Adeco Agropecuaria S.A., the development will improve competitiveness and environmental and sanitary conditions.

This is a new method for producing alternative fuel for cement kilns, using non-hazardous industrial waste that can be treated as municipal waste. The development, called RyVERI (Recycling and Energetic Valorization of Industrial Waste), has been conceived for recycling packaging and laminated materials, wood, textiles, plastics, and others. The cement manufacturing industry is an energy-intensive process that uses petroleum products. In turn, solid waste reduction, reuse and recycling requires economically feasible solutions. The program, developed by UNSAM and Recycomb S. A., will offer a solution to both problems.
Patagonian clay with modified nanometric structure is an effective wastewater treatment method. A small amount of the product is enough to clean water on a large scale. A second step consists in recovering valuable resources from the metals and other contaminants captured by the nanoclays. Apart from offering SMEs an alternative for effluent treatment, this product is highly versatile because of its improved characteristics in terms of selectivity, reversibility, and waste sorting and treatment potential. UNSAM, Alloys S.R.L, Castiglioni, Pes & Cia, and the Mineral Resource and Ceramic Technology Center in La Plata (CETMIC) are part of the project.

This technology consists in a bioabsorbible patch to treat skin burns and ulcers. Unlike other dermal regeneration matrices, which require a complex, multistep surgical treatment, this kit repairs the skin tissue in record time and in a single application, using a membrane that allows high cell-expansion and absorption rates. In order to implement the initiative, a public-private consortium was created in 2012. Biomatter, as it was called, is a technology-based company that was incubated at UNSAM; the National Scientific and Technical Research Council (CONICET) and Medipharma S.A. are also part of the consortium. Biomatter provides an outstanding interdisciplinary environment for developing high demand and value-added products that are socially relevant. This is a great opportunity for innovation in tissue engineering.
This device, named “Nanopoc,” is capable of diagnosing Hemolytic-uremic syndrome, Chagas disease, Brucellosis and Hand, Foot and Mouth Disease (HFMD), among others. It can detect up to 8 different diseases in only 15 minutes, which makes it ideal for rural areas, since its in-situ diagnostic technology avoids the transport of samples. The information is processed using nano- and biotechnology, and the results can be sent via Bluetooth to any portable device. Nanopoc is easy to handle and does not require advanced technical knowledge. Developed by a public-private consortium consisting of UNSAM, the National Institute of Industrial Technology (INTI), Agapharma Salud Animal S.A., Biochemiq S.A., and AADEE S.A. The device was awarded the Innovar de Oro by the Ministry of Science, Technology and Productive Innovation in 2014.

Argentina has the highest Hemolytic-uremic syndrome (HUS) rate. In tackling this problem, the consortium formed by UNSAM, the ANLIS-Malbrán Institute, and Imunova S.A. promotes the development of antigens capable of a quick and accurate detection of E. Coli 0157:H7, the most common cause of HUS. Additionally, Chagas disease affects more than 2 million people in Argentina. UNSAM, together with Biochemiq S.A and Agropharma S.A., has developed a research project on Trypanosoma cruzi biomarkers that not only enhances the reliability of current detection tests but also prevents false-positive results.
The project, aimed at optimizing the livestock industry value chain, has been implemented at Credit Agrodanadera S.A., in collaboration with Biochemiq S.A. and Agropharma S.A. It was designed to determine semen quality and increase pregnancy rates as well as developing different vaccines and diagnostic kits for Bovine leukemia virus and tuberculosis. The initiative also includes the construction of a reproductive service center to foster biotechnology transfer.

**A SUCCESSFUL INCUBATION EXPERIENCE**

**Non-toxic biologic pesticide**

Biotecnova is a company that has been incubated at UNSAM in order to develop a non-toxic pesticide with long residual action. Unlike other commonly used synthetic pesticides, this is a fully biological, environmental-friendly product that prevents mass destruction of insect populations. It is made from a fungus that can be easily grown under natural conditions. This product can also be used to replace synthetic pesticides currently used on animals. After a year of incubation, a joint venture between Biotecnova and an inoculant company has been successfully created at Pilar Industrial Park (Buenos Aires Province).
OTHER PROJECTS

New and more effective vaccine against Brucellosis

The S19 vaccine is commonly used to fight Bovine brucellosis. However, among other limitations, cattle can receive only one dose of the vaccine before the age of 6 months, because, otherwise, the animal may have a false positive serological reaction. If this happens, it is impossible to distinguish between infected and non-infected animals. To tackle this problem, researchers at UNSAM developed the Delta-pgm vaccine, which has been proved to be safer and more efficient than the S19 vaccine, thus enhancing cattle immunity.

Disposable syringe manufacturing project

Incubated at UNSAM, Jeringas Cóndor has evolved as a company that recycles virgin PVC material from pharmaceutical packaging industry. PVC is a high-quality material that meets the strictest purity standards. The first step in the development is processing the raw material. Then, the barrel and the plunger are built. Finally, the product is packed and sterilized. The syringe has a double safety lock that makes it self-disposable. It is suitable for use in human beings and animals and for research purposes. Currently, Argentina imports 750 million syringes every year, which represents about 80% of the market. The remaining 20% is produced within the country, but available technology makes these syringes unsuitable for certain uses. The project is aimed at developing a competitive product in a market that depends almost exclusively on imports.
Patagonian sheep population has been affected by drought in 2009 and by the eruption of the Puyehue volcano in 2011. The sanitary barrier established at Río Colorado prevents animals from being transported by foot to an area that has been declared free of foot-and-mouth disease. Funded by the IDB, UNSAM and the Provincial Agricultural Services Program (PROSAP) are working together in the construction of a biotechnology center that will be able to produce 4,000 embryos and 100,000 doses of semen per year, which will be used in the insemination and embryo transfer in sheep. As a result, the overall quality of the sheep population in Patagonia, which represents 67% of the sheep population of the country, will be considerably improved.

Incubated as a start-up company at UNSAM, mAbiaLabs is developing a highly-specific immunoassay that measures the presence of allergenic proteins in food. This technology is expected to replace current existing tools, which are imported and therefore expensive. The device, similar in function to home pregnancy tests, provides the food industry with a method for identifying allergens in egg and milk before the product is released to the market. Today, 4% of adults and 8% of children have some form of allergy. In 2013, the initiative was awarded a prize by the Empretec Foundation.

Nanotechnology and its multiple applications have a great potential for addressing and solving industry’s and society’s main problems. In view of this, UNSAM has embarked on a project to develop a nanotechnology-based optical sensor for detecting pollutants. This sensor allows for quick and precise taking of measurements using a portable device.

Funded by the European Union and other national institutions, the initiative is managed by UNSAM, the National University of San Luis, and the National Atomic Energy Commission.
FURTHER INITIATIVES

Generic devices
The National Military Industry Authority has commissioned UNSAM to develop two prototypical generic devices, one to be used for the detection of ion-mobility detection and the other in radio frequency circuits.

Ion-mobility spectrometer
This technology is commonly referred to as IMS. UNSAM is currently working on the development of a prototype for analyzing and monitoring the presence of organic compounds in air. The spectrometer can be applied to multiple industrial processes.

Transistor
Transistors used in radio frequency integrated circuits are not currently manufactured in the country. They can be used in satellite communications as well as microchips for telephones. The technology developed under the project will be transferred to the National Military Industry Authority, who will then be able to produce the transistors.

Comprehensive strategy for Bovine Brucellosis control
UNSAM and the Ministry of Defense are developing a strategy to control the disease. The plan consists of two stages: diagnosis by Glyco-ELISA test followed by vaccination with Delta-pgm. To that end, a pilot program to control the disease has been launched at cattle farms owned by of the Argentine Army. Additionally, the initiative provides valuable information that will help to promote a national strategy for the eradication of the disease; this, in turn, will help increase cattle exports.

Antigens and immunoassays for the diagnosis of infectious diseases
In order to assist the public and private sectors in the development of reagents and biomedical diagnosis, UNSAM applies bio- and nanotechnology to the design of antigens and immunoassays. The initiative is aimed at improving, through the use of ELISA and immunochromatographic methods, the diagnosis of Chagas disease, Dengue, Brucellosis and Chikungunya in areas where the Ministry of Defense is engaged in providing humanitarian aid. The reason is that in these areas there are neither quick detection systems nor controlled exposure techniques that can be used in situ.
UNSAM, AN INNOVATION UNIVERSITY

The National University of San Martín is a leading institution that welcomes collaboration with public and private sectors in order to promote technological innovation projects. Strategically located in the metropolitan area of Buenos Aires, the University campus (Campus Miguelete) is a 54-acre (22-ha) land that offers an exclusive environment not only for free public education but for local development. It also hosts the Argentine Nanotechnology Foundation (FAN) and the Argentine Antarctic Institute. In addition to the areas for educational purposes, the Campus includes laboratories with the latest equipment for research in technological development and biotechnology. The University is also part of Polo Tecnológico Constituyentes, a technology park in Buenos Aires Province, and has forged alliances with the most prestigious research institutions in the country: the National Scientific and Technical Research Council (CONICET), the National Atomic Energy Commission (CNEA), the National Commission for Space Activities (CONAE), the National Institute of Industrial Technology (INTI) and the National Agricultural Technology Institute (INTA).

The University's infrastructure and facilities, partnership policies and highly-qualified faculty and staff all enable the consolidation of the productive capacity in its scope of influence, the transfer of knowledge, and the emergence of new companies and businesses.

A FRONT-RUNNER IN PUBLIC-PRIVATE COOPERATION

Today, UNSAM has partnerships with 18 national companies and 5 public scientific and technological institutions in 12 projects concerning energy generation, medical and veterinary diagnosis, and electronic device design. All these initiatives are developed through the Argentine Sector Fund (FONARSEC), managed by the National Agency for the Promotion of Science and Technology at the Ministry of Science, Technology and Productive Innovation.

The University also has other projects with different partners, such as the Sheep Biotechnology Center, which is being developed in collaboration with the Provincial Agricultural Services Program (PROSAP). Additionally, through its business incubation program, the University is actively engaged in the development of domestic industry.