ITESO

Universidad Jesuita
de Guadalajara

INNOVATION, TECHNOLOGY MANAGEMENT AND NANOTECHNOLOGY

ITESO, the Jesuit University of Guadalajara

CREATING ADVANCED EDUCATIONAL OPPORTUNITIES
FOR TALENTED AND SOCIALLY RESPONSIBLE CITIZENS

UNIVERSIDAD DE
EXCELENCIA ACADÉMICA
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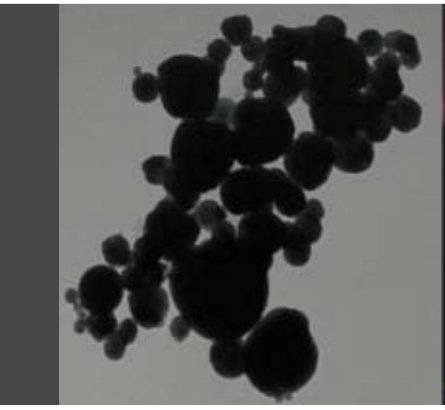
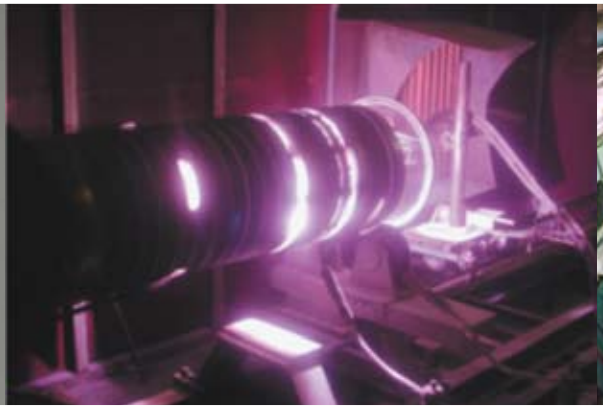
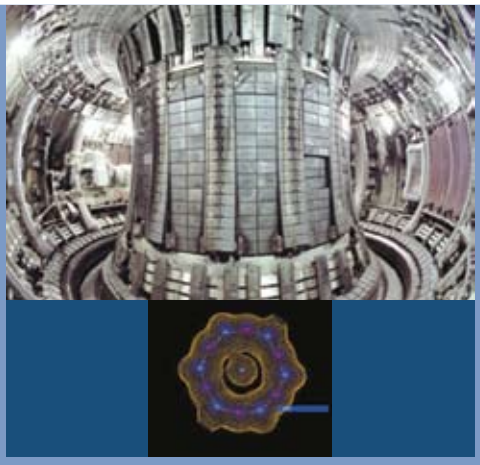
CONTENTS

CREATING ADVANCED EDUCATIONAL OPPORTUNITIES FOR TALENTED AND SOCIALLY RESPONSIBLE CITIZENS

ITESO, founded in 1957, is the Jesuit University of Guadalajara, Mexico. ITESO belongs to the network of over 230 Jesuit colleges and universities around the world. It shares with them an educational tradition of more than 450 years, historically recognized for preparing leaders in all fields of arts and sciences.

ITESO is cooperating with the IT business community, state and federal governments and other educational and research institutions in the development of the industry and the generation of educational programs to transform extraordinary students into high-calibre engineers capable of designing technologically competitive solutions.

The university finds itself working with two extremes in society. On the one hand it is involved in technology, research and economic growth, while on the other it is contributing to erasing poverty in Mexico and Latin America. ITESO is involved in teaching, research and the engagement of engineering and the social sciences for the growth of the electronic technology industry and for economic and social development

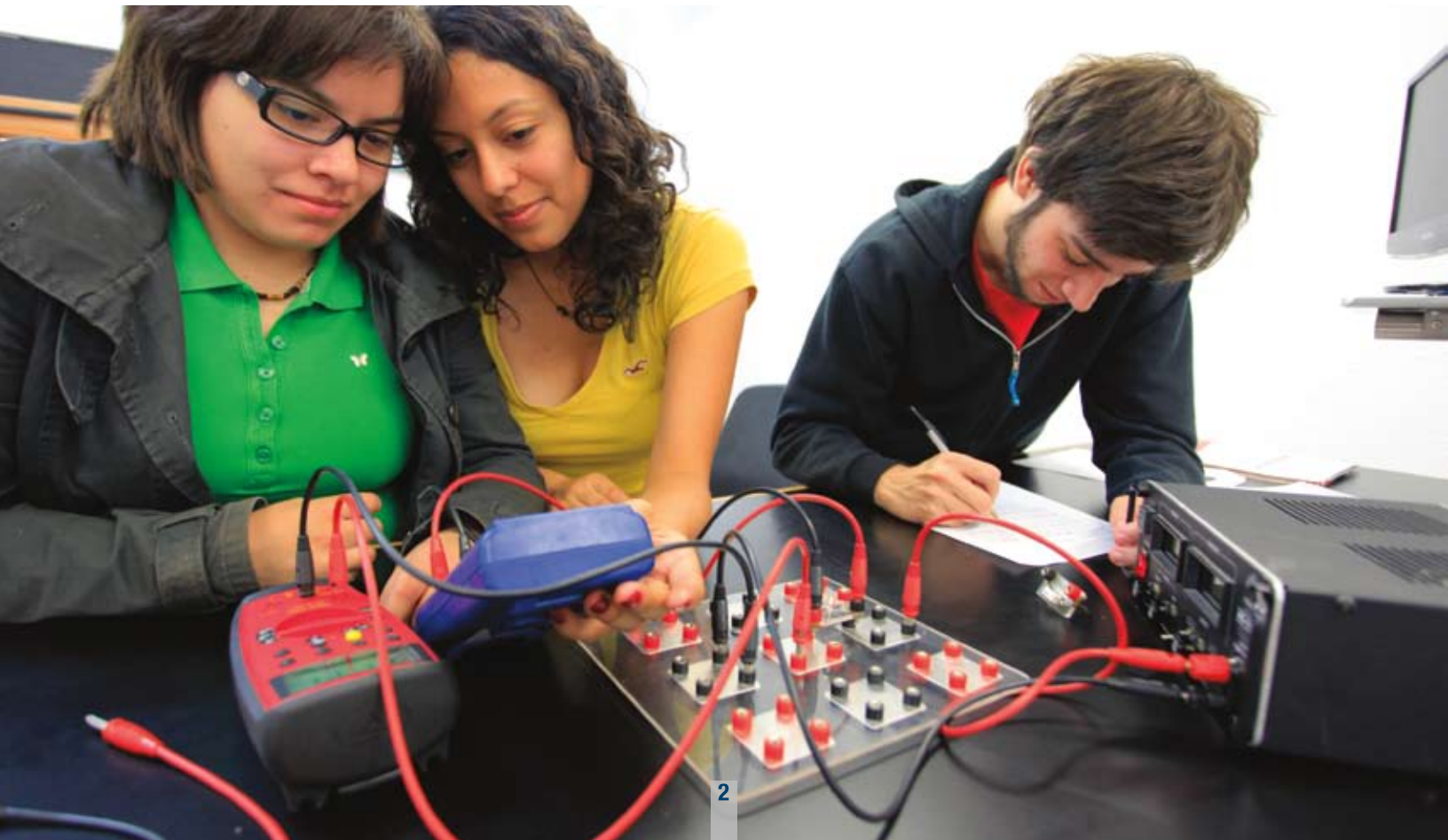
INDUSTRIAL CONTEXT

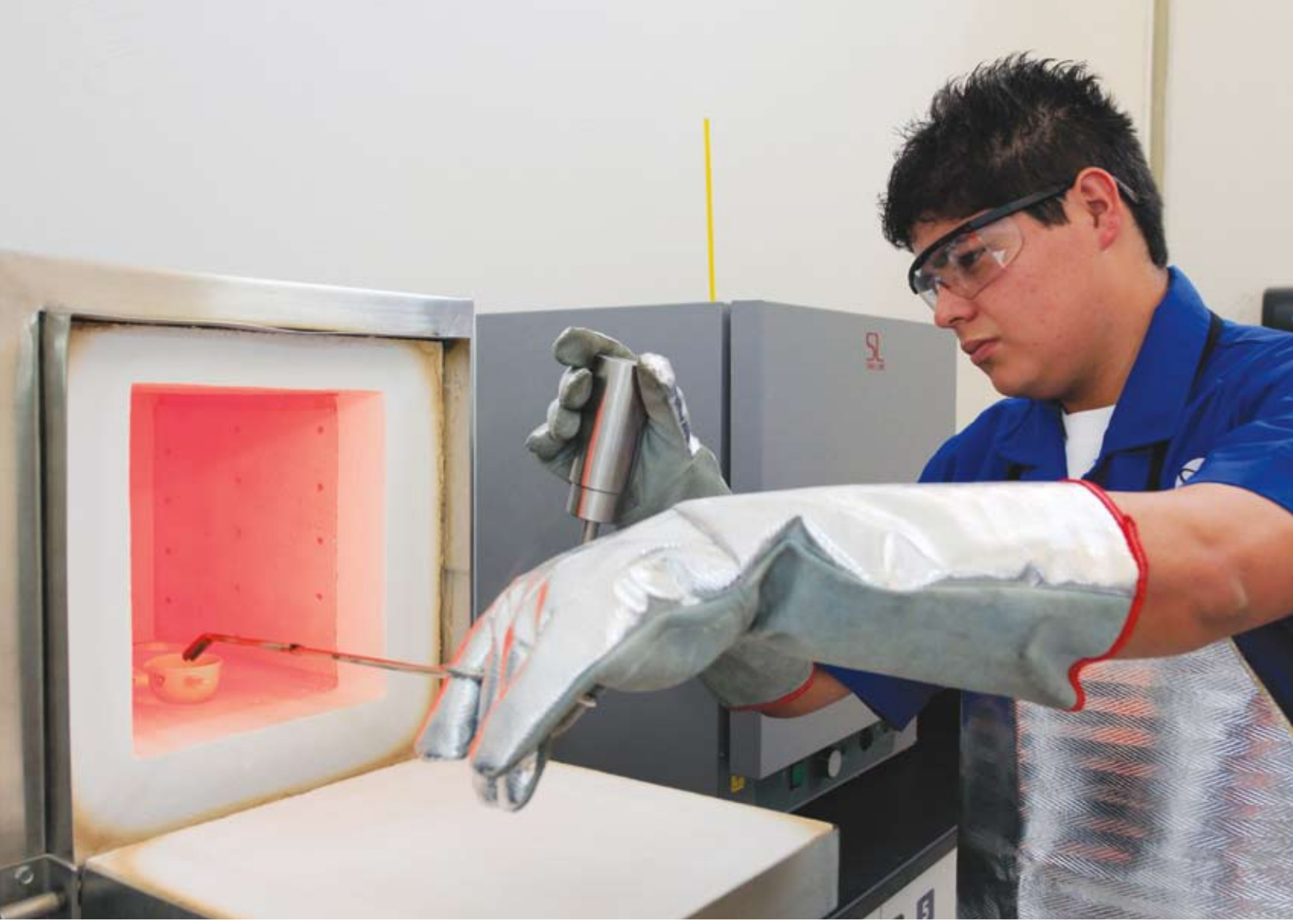
Jalisco, land of Mexican cultural icons such as tequila and mariachis, has also become Mexico's Silicon Valley. Since 1968, when Jalisco became the site of the first semiconductor plant in Latin America, run by Motorola, the state has developed a competitive electronics cluster comprised of twelve companies from among the top 100 makers of global electronics, including Jabil, Flextronics, Sanmina SCI and Solectron. World-class corporations located in Jalisco, such as Hewlett Packard, IBM, Intel y Freescale, have also developed their own research and development centers, where they have invested significant resources and time in nanotechnology. Teaching and research are also carried out at government agencies such as the National Council for Science and Technology (Conacyt, in its initials in Spanish) and the State Council for Science and Technology (Coecytjal). In 2002 Mexico formally recognized nanotechnology research as a strategic area, as set forth in the 2001-2006 Special Science and Technology Program and 2007-2012 National Development Plan. At present, the greatest demand for project development and technological solutions in this area comes from the metalworking and machining industry, medicine (including the pharmaceutical sector) and the electronics industry. The National Council for Science and Technology (Conacyt) and the State Council for Science and Technology (Coecytjal) are government agencies that sponsor teaching, research and technological development in this field.

In Jalisco, according to data from Coecytjal, an average of 2.4 billion pesos are invested annually in science, technology and innovation; 62 per cent of this investment is made by industry. In fact, Jalisco is recognized as one of the national leaders in nanotechnology development.

The need to develop highly specialized engineers and technicians in Jalisco is at the top of government and educational institutions' agendas. In the past thirty years, ITESO has contributed to this industry with professionals from the fields of engineering, business management and the social sciences. It currently promotes engineering programs among young adults throughout western Mexico (*www.ingenierías.iteso.mx*)

FOR OVER FIFTY YEARS, ITESO HAS BEEN A VISIONARY IN THE FIELDS OF ENGINEERING AND TECHNOLOGICAL INNOVATION. THE UNIVERSITY HAS CONSISTENTLY FOCUSED ON THE DEVELOPMENT OF ACADEMICALLY RIGOROUS PROGRAMS TO CONTRIBUTE TO THE GROWTH OF THE TECHNOLOGICAL AND INDUSTRIAL SECTORS.





ITESO's commitment to technological development is manifest in its engagement and collaborative agreements with both businesses and national and international organizations that seek innovation, technological development and commitment to society. To this end, the university:

- Set up its own Technology Park, a facility devoted to the research, design and development of high-quality, technology-based projects and businesses, bringing together the varied initiatives of academics, researchers, students, private, national and international business developers, and government agencies. It is the Mexican headquarters of ten companies in software and hardware development, aeronautics, electronic design, video games and others. The park is now in its second phase of development with the construction of a new building.
- Promoted the creation of the Biocluster of Western Mexico, a conglomerate of biotechnology-oriented businesses and organizations in the region.
- Set up the Technology Center for Electronic Prototypes, where high-quality prototypes are designed and produced for developers, ranging from university projects to international corporations.
- Knowledge Transfer Center: promotes and facilitates knowledge generation and protection.
- Is the first university in Latin America to sign a collaborative agreement with Cadence and Mosis, worldwide leaders in the design and manufacture of integrated circuits, which allows ITESO students the opportunity to create their own designs with CAD tools, in line with industry standards, and then manufacture the finished product.
- Involves students, professors and researchers in Professional Application Projects, taking knowledge developed at the university and channeling it to businesses, organizations and institutions, both public and private, that need support for implementing their development projects.
- Has a food engineering lab with equipment for product analysis, innovation and development.

PROGINNT ITESO

INNOVATION AND TECHNOLOGY MANAGEMENT PROGRAM

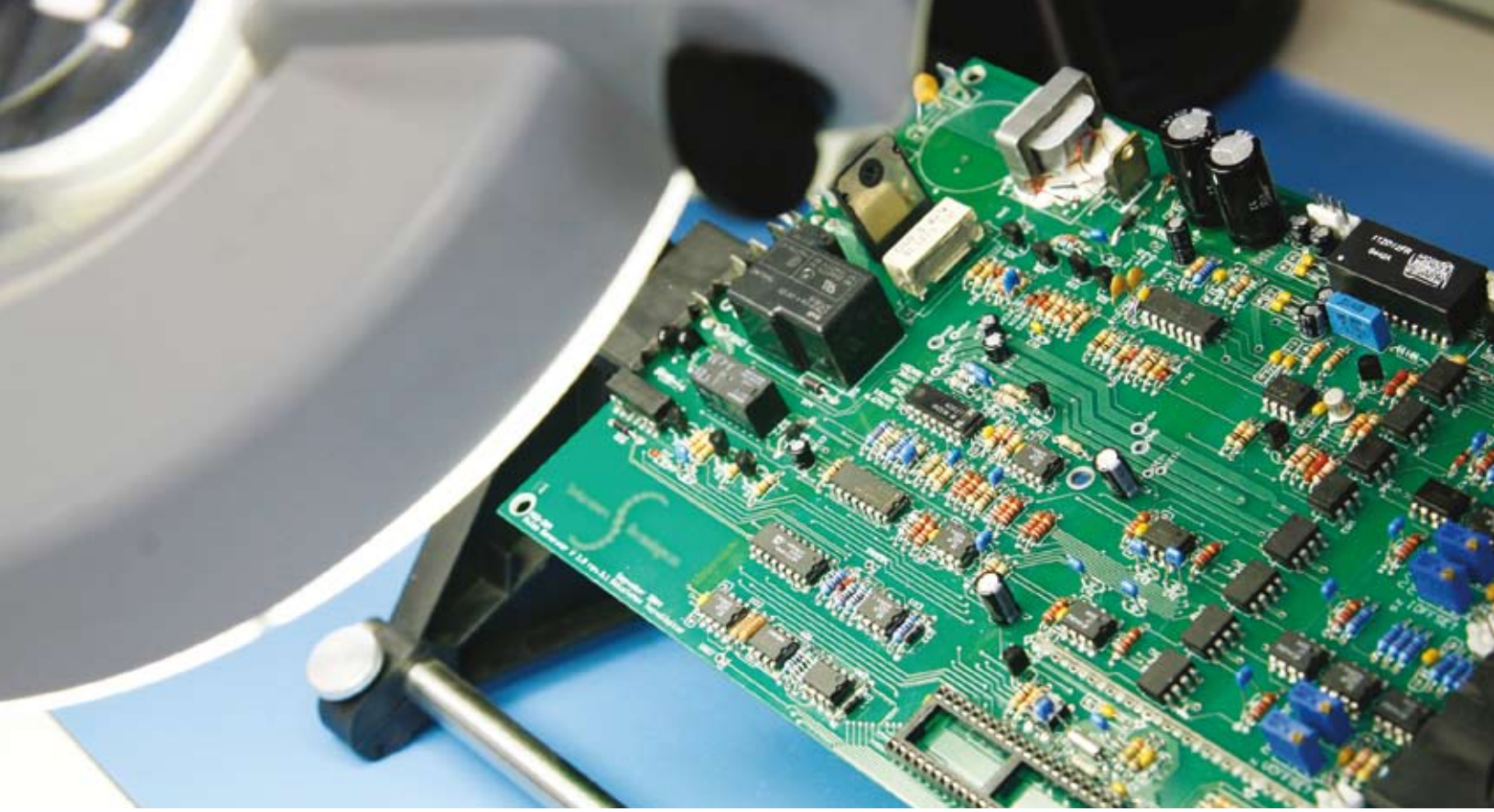
ITESO is firmly committed to innovation and determined to contribute to the generation of new technologies for the development of businesses in the region. Through its business school, workshops and certificate courses, business incubator, technology management consultancies, and strategic, technological and market studies, university experts, academics, researchers and technological project leaders offer valuable services to the business sector.

In 2003, ITESO created the Innovation and Technology Management Program, through its alliances with industry and public and private organizations, devises specific strategies and programs for technological improvement and innovation that spur the development of entrepreneurs, small and medium enterprises, and international corporations that together drive the country's economic and social progress. (*www.proginnt.iteso.mx*)

CONSULTING CENTER IN INNOVATION AND TECHNOLOGY MANAGEMENT

Proginnt experts diagnose the status of businesses, and help them implement improvements and innovate processes, products and services, thereby increasing the value offered to clients and enhancing the business's competitiveness and profitability. The experience and know-how of Proginnt consultants represent a valuable resource that clients can tap into for the design and implementation of growth strategies for their business, by means of consulting, training and collaborative agreements that put the business in contact with the university and government agencies.

The Consulting Center has worked with 54 projects in 36 different size companies, from micro to large. Over 95 students from diverse degree programs have worked to develop their professional academic



project in a real life situation. Twenty-five of these projects were successful with a significant increase in sales; the remaining twenty-nine projects reported benefits in six areas: economic, operations, innovation, management, competitiveness, human resources.

COMPETITIVE INTELLIGENCE CENTER

The Competitive Intelligence Center experts are strategic collaborators in bringing ongoing innovation and high performance to organizations. Their services help enterprises keep abreast of their competitive environment and attain better business results on the basis of timely, relevant and useful information for decisionmaking and the dynamic and systematic creation of value proposals for their customers.

Since Proginnt was first created in 2003, the Competitive Intelligence Center has conducted 42 market studies for 13 companies with the participation of more than 96 students.

TECHNOLOGICAL BUSINESS INCUBATOR

With the incubation of innovative companies and new technology-based businesses in the booming fields of information technology, electronic, food processing, agricultural technology, recycling and biotechnology, among others, the Technological Business Incubator participates in the generation of wealth, combats unemployment in the region, and foments the development of new Mexican technologies for the world.

The Technological Business Incubator was granted the PYME award (small and medium-size companies) as the best of its type in the country in 2009, and its coordinator was certified as an Incubation Manager by the NBIA (National Business Incubation Association). An average of ten companies conclude the program every year.

Some of the incubated companies include:

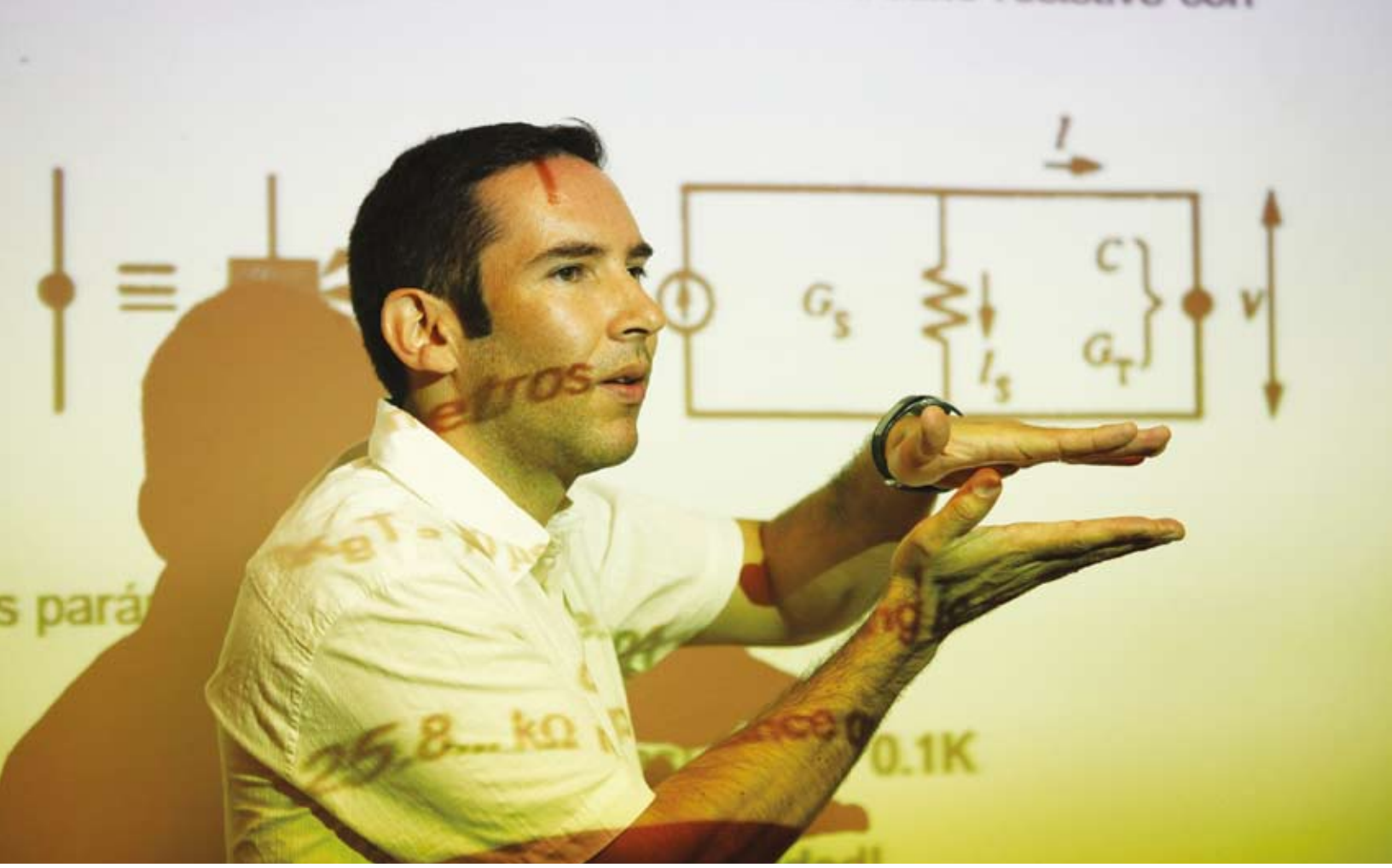
- Compostamex (agrotechnology)
- Beek (GPS)
- Salamandra (software)
- Socialdot (internet/software)
- Étto (engineering and manufacturing)
- Marcom Logix (electronics online).

PROGINNT ITESO

Students, professors and researchers work side by side on Professional Application Projects that contribute knowledge developed at the university to companies, organizations and public or private institutions that require support to achieve their development projects.

The program has contributed to the development of:

Continental Automóvil ■ NEOX ■ SILIJAL ■ ARVA ■ LALA ■ Verde Valle ■ V-TEK ■ Índice ■ Fragamex ■ Restaurant Shangai ■ Bio ZOO ■ Pharmacos Exakta ■ Pura Santa ■ Copyroyal ■ Smart Drinks ■ SIAC ■ Mercantil Doméstica ■ Wintel ■ World Trade Center (WTC) ■ E-Quallity ■ Club Hacienda San Javier ■ Micro Herros ■ Instituto Fray Pedro de Gante ■ Recubrimientos Metálicos Metal Speed ■ American All Medics



ITESO'S DEPARTMENTS OF ELECTRONICS, SYSTEMS AND INFORMATION TECHNOLOGIES; AND OF MATHEMATICS AND PHYSICS

Undergraduate programs in electronics, information technologies, computer systems, networks and telecommunications, nanotechnology, and financial engineering (702 students). ITESO's academic programs in engineering are ranked among the best in Mexican universities. Ranking: Best universities 2011, El Universal newspaper, March 2011.

Research projects in nanotechnology, electronics, systems and information technologies:

- Growth of clusters in plasma discharges.
- Chemical-quantum computer simulation of the physical-chemical properties of metal oxides.
- Astrophysics and cosmology. Quantum effects on electrical transport in molecular transistors
- New materials with optical properties, with applications in electornics and telecommunications.
- Design of an inter-automobile wireless communication system to avoid collisions.
- Development of new algorithms and computer architectures for wireless communication with very high spectral efficiency time-space codes.
- Efficient electromagnetic optimization methods for computer aided modeling and design for high velocity interconections.
- Optical image processing.
- Extraction of inherent properties and aberrations in optical surfaces on the basis of the analysis of experimentally obtained images.
- Energy dissipation control in batteries for portable devices as a way to reduce their production and related pollution.
- Methodology for redesigning processes and their relation to the implementation and use of information systems in medium-sized businesses.
- Technological strategy: Study and analysis of business strategies and methodologies with an eye to their implementation.
- Methods for acquiring and exploiting virtual ontologies and tools, and constructivist teaching methods.
- Nanoantennas, nanophotonics, medical applications of nanotechnology.

ITESO HAS MORE ACADEMIC PERSONNEL REGISTERED IN THE CONACYT NATIONAL SYSTEM OF RESEARCHERS THAN ANY OTHER PRIVATE UNIVERSITY IN THE REGION.

MEMBERS OF THE CONACYT NATIONAL SYSTEM OF RESEARCHERS:

- Francisco Javier González Contreras, Ph.D.
- Gabriel González Contreras, Ph.D.
- José Ernesto Rayas Sánchez, Ph.D.
- Yuri Martínez Samaguey, Ph.D.
- Hugo Iván Piza Dávila, Ph.D. Candidate
- Iván Rodrigo Padilla Cantoya, Ph.D. Candidate
- Mildreth Isadora Álcaraz Mejía, Ph.D. Candidate
- Omar Humberto Longoria Gándara, Ph.D. Candidate
- Raúl Campos Rodríguez, Ph.D. Candidate
- Zabdiel Brito Brito, Ph.D. Candidate

NANOTECHNOLOGY RESEARCHERS WITH SPECIALIZATIONS IN:

- Nuclear physics and condensed matter physics
- Anisotropic characterization of magnetic transition-metal clusters
- Gravitation and relativity
- Computer modeling of the electronic structure of carbon nanoparticles
- Molecular simulation
- Medical applications of nanotechnology
- Nanoantennae and nanophotonics

LABORATORIES AND WORKSHOPS

Four basic physics labs (mechanical, electromagnetism, optics, oscillations and waves).

- Mathematics lab, with specialized software for teaching math.
- Electronics lab.
- Chemistry lab.
- Food-related microbiology lab.

Mechanics lab.

A MODEL OF UNIVERSITY-ENTERPRISE-ACADEMIC RELATIONSHIP

ITESO is developing cooperation projects with world-class IT and electronic companies. Universities in Mexico need to play a much more active role in developing applied science through cooperation with industry.

Intel: With its sponsorship, the department has organized two international conferences on signal integrity. Currently there are several students doing internships at this company. A three-year research project has produced three Masters degree dissertations plus several papers by Professor Ernesto Rayas.

Hewlett Packard: This renowned enterprise has donated equipment for RFID technology applications. ITESO has maintained a close relationship with this firm with projects such as HP LABS, which started at HP Headquarters in California, where research is conducted and undergraduate students develop software with excellent results.

Texas Instruments: Having assigned ITESO the "elite university" status, it donated electronic equipment (such as development tools) for student and faculty use at the undergraduate and graduate levels and taught free courses.

Freescale: There is a strong relationship that has produced an abundant exchange of ideas. The most important is the Integrated Circuit Design Program. Besides, there are about twenty students doing internships and several alumni working there.

Jabil: Faculty and students have contributed with projects for their production line, and there are some students doing internships.

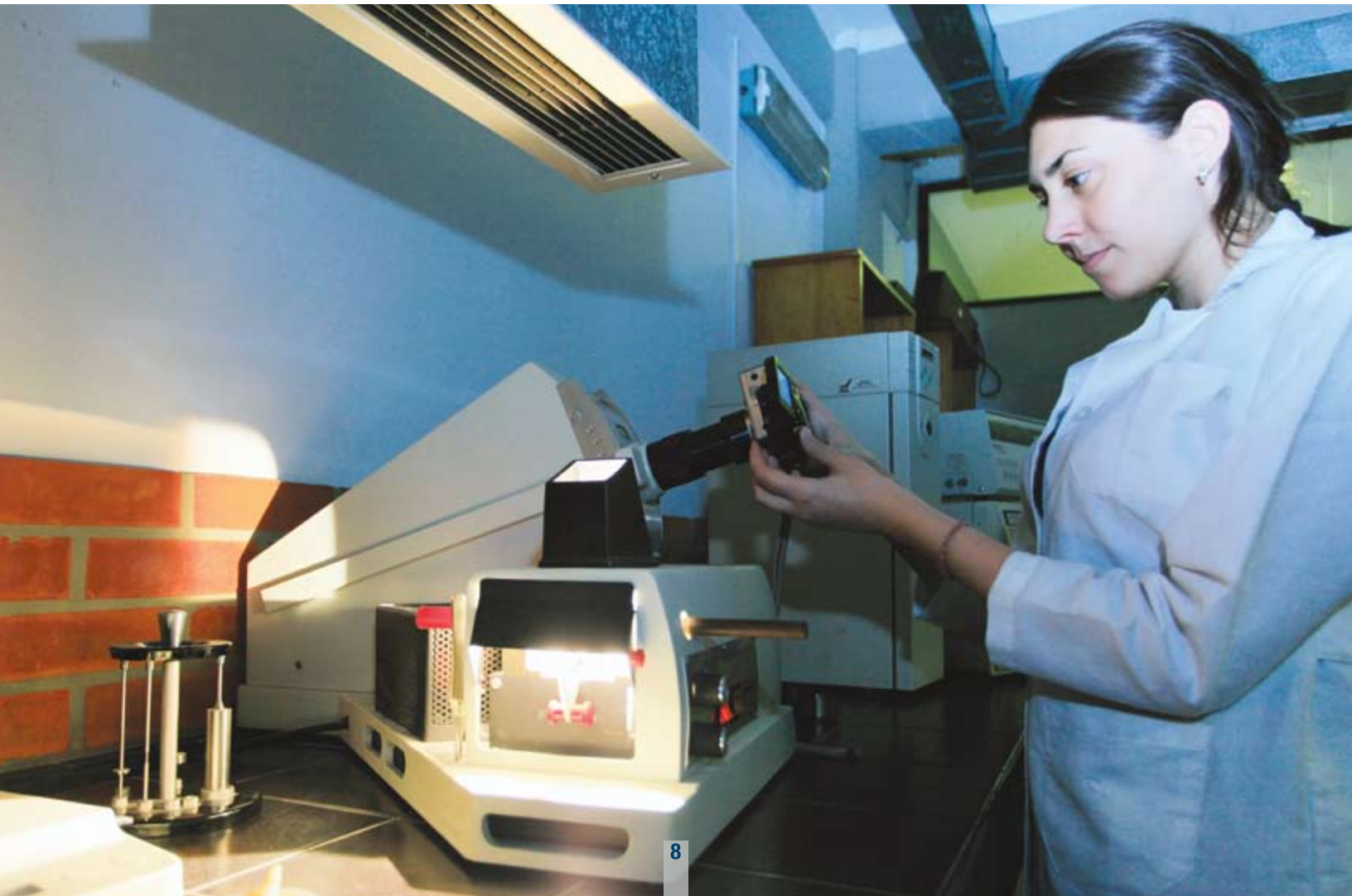
IBM: There is an exchange program in which students participate in software development, both here and at Rochester University. IBM also has donated equipment and software.

Pegasus Control: An ITESO student is doing a professional practicum there.

Sanmina-SCI: ITESO students are doing internships in this company. An ITESO alumnus is now Regional Vicepresident of Sanmina.

Cadence Design Systems: The goal of the Cadence® University Software programs is to grant easy access to leading electronic design automation (EDA) tools for educational institutions around the world. Cadence customers rely on skilled engineers entering the work force. ITESO has become the first educational institution in Mexico and Latin America granted a Cadence University software license.

Mosis Integrated Circuits: The university had access to the Mosis integrated circuit program that enabled the production of ten integrated circuits in the fall of 2007.



ITESO IS ASSOCIATED WITH THE FOLLOWING ELECTRONIC INDUSTRY ASSOCIATIONS:

CANIETI
(Cámara Nacional de la Industria Electrónica de Telecomunicaciones e Informática) / (Electronic, Telecommunication and Information System Chamber) *www.canieti.org*

UNIVERSITRÓNICA
www.universitronica.org

CADELEC
(Supplier Development Chamber)
www.cadelec.com.mx

IEEE
(Institute of Electronic and Electric Engineers) *www.ieee.org*

CINVESTAV
(Public Research Center, Guadalajara)
www.gdl.cinvestav.mx

CENIDET
(Public Research Center, Cuernavaca, Morelos)

CIATEJ
(Public Research Center, Guadalajara)

ITESO, the Jesuit University of Guadalajara

ITESO
Universidad Jesuita de Guadalajara

Office of Institutional Relations
vinculacion@iteso.mx
Tel. + 52 (33) 3669 3563
Periférico Sur Manuel Gómez Morín #8585
Tlaquepaque, Jalisco, México.
C.P. 45604

iteso.mx

Sistema Universitario Jesuita

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