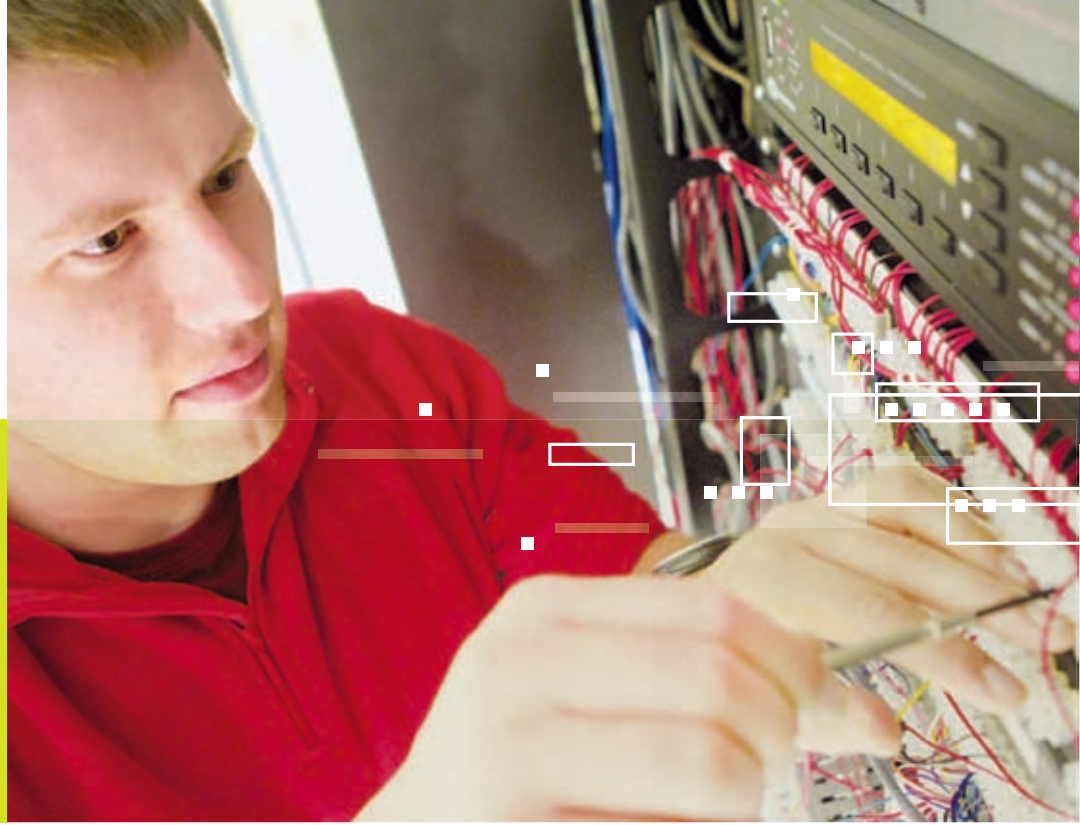


INTERDISCIPLINARY
INSTITUTE
FOR TECHNOLOGICAL
INNOVATION (3IT)

Design, integration and commercialization:
from nanotechnologies to systems and their
applications





OUR VISION

THE INTERDISCIPLINARY INSTITUTE FOR TECHNOLOGICAL INNOVATION (3IT) IS SET TO BE AN ENGINE AND A SHOWCASE FOR INNOVATIVE PRACTICES IN ACADEMIC AND INDUSTRIAL RESEARCH. SOCIALLY AND ECONOMICALLY RESPONSIBLE, 3IT ACCELERATES TECHNOLOGY TRANSFER IN STRATEGIC SECTORS INCLUDING MEDICAL TECHNOLOGIES, INFORMATION AND COMMUNICATION TECHNOLOGIES, TRANSPORTATION AND ENERGY.

3IT can serve businesses seeking:

- solutions that cannot be obtained with existing technologies;
- new technologies for gaining a foothold in emerging markets;
- a state-of-the-art infrastructure for new business start-ups;
- resources to mitigate the risks of a new technology.



TRUE INDUSTRY-UNIVERSITY SYNERGY FOR TECHNOLOGICAL INNOVATION

FOR OPTIMAL RESULTS, INNOVATION CANNOT TAKE PLACE IN ISOLATION. FOR THAT REASON, 3IT PROVIDES ACADEMIC AND INDUSTRIAL PARTNERS WITH AN OUTSTANDING ECOSYSTEM FOR RESEARCH AND INNOVATION. DYNAMIC, FLEXIBLE, CROSS-CUTTING AND TRANSLATIONAL, THIS ECOSYSTEM LETS YOU:

- Specify needs and innovative ideas requiring top-notch university researchers in the disciplines of nano and micro technologies, biomedical engineering, telecommunications, information systems, robotics, ethics of technological development and innovation management;
- Form interdisciplinary research teams combining all the types of expertise needed to achieve objectives in technological innovation projects;
- Maintain and make available a state-of-the-art physical infrastructure and resources specializing in design, prototyping and evaluation for both new and maturing technologies;
- Host 3IT partners in our facilities in Université de Sherbrooke's Innovation Park, so they can use the infrastructure and work together in proximity to researchers, students and research professionals;
- Associate with partners like Sherbrooke Innopole, SOCPRA and C2MI (MiQro Innovation Collaborative Centre) for the implementation and marketing of technological innovations.

Specializations

- Nanocharacterization and nanofabrication
- Bio-nanotechnology for human health
- Epitaxial growth technologies for semiconductors (GaN, GaAs, InP)
- Advanced assembly and packaging
- Supramolecular nanostructures on the surfaces of quantum semiconductors
- Multimodal molecular imaging (positron emission tomography, tomodesitometry, diffuse optical tomography)
- High-efficiency solar cells
- Design and prototyping in microelectronics (2D and 3D), mechatronics, informatics and embedded systems
- Instrumentation for radiation detectors
- Energetic microsystems (micro fuel cells, thermal and vibration energy harvesting)
- Microfluidics (biomedical, thermal)
- Sensors (optical, carbon nanotube, inertial, MEMS)
- Actuators (polymer, rheological, elastic, MEMS)
- Biomechanics and movement analysis by actimetry and sensors
- Mobile and interactive robotics
- Intelligent habitats
- Speech and audio processing
- Telehealth systems
- Health information systems
- Analysis of ethical and social issues
- Innovation management (strategies, diagnosis, analysis of processes and practices, project management)

OUTSTANDING ACHIEVEMENTS

Medical technologies

- Virtual surgeon using a system of robotic cameras for remote assistance and training in traumatology
- In-home robotic telepresence for remote assistance
- Intelligent habitat for Alzheimer patients
- Carbon nanotube deformation sensors for telemonitoring and prevention of pressure ulcers
- Interdisciplinary analytical framework for studying the impact of nanotechnologies in health and their social acceptability
- Inertial actimeter with GPS receiver for studying mobility in natural environments
- Needleless syringe for subcutaneous injection of therapeutic agents or droplets of liquid solution
- Positron emission tomography (scanner dedicated to small animal imaging)
- PIERCE Internet platform for various types of studies, e.g. of patients' clinical files and the management of collaborative research
- Microfabricated biosensor for dynamic *in situ* measurement of blood metabolite concentrations

Energy

- Production and packaging of concentrated high-efficiency solar cells
- GaN/AlGaIn light-emitting diodes (LEDs) for both white and UV lighting
- High power-density on-chip microturbines for waster heat recovery
- Microfabricated fuel cells that run on hydrogen

Manufacturing sector

- Compliant actuators (elastic, magnetorheological) for safe, cooperative robots
- Fabrication of high-density non-volatile hybrid memory on CMOS

Information and communication technologies (ICT)

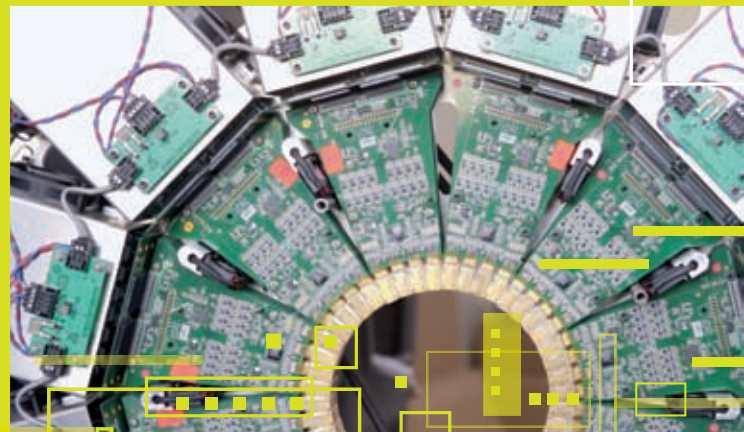
- Compression algorithms for voice and music that are incorporated into many international standards (ITU-T, MPEG, 3GPP, 3GPP2) and used by billions of users around the world
- Location, tracking, separation and identification of sound sources in natural environments

Transportation and aerospace

- Rotary ramjet engine for high power-density applications and low cost
- Intelligent transportation systems
- MEMS pressure and flow speed sensors for harsh environments

Defence and security

- Mobile all-terrain and grouped robots for site surveillance
- Fabrication and characterization of devices for the emission and detection of pulsed terahertz radiation for spectroscopy and THz imaging



A UNIQUE WORK FACILITY

IN A BUILDING OF OVER 7000 M², ACADEMIA AND INDUSTRY WORK SIDE BY SIDE USING 3IT'S STATE-OF-THE-ART INFRASTRUCTURE. FROM DESIGN TO IMPLEMENTATION, ALL THE COMPONENTS OF A COMPLETE INNOVATION CHAIN ARE BROUGHT TOGETHER UNDER THE SAME ROOF, A FIRST IN NORTH AMERICA!

3IT'S LABORATORIES

• Nanofabrication and Nanocharacterization Laboratory

This Class-100 clean-room laboratory conducts fundamental and applied research in micro-electronics, nanoelectronics, optoelectronics, telecommunications, microelectromechanical systems (MEMS), sensors and biomedical microdevices.

• Materials Characterization and Synthesis Laboratory

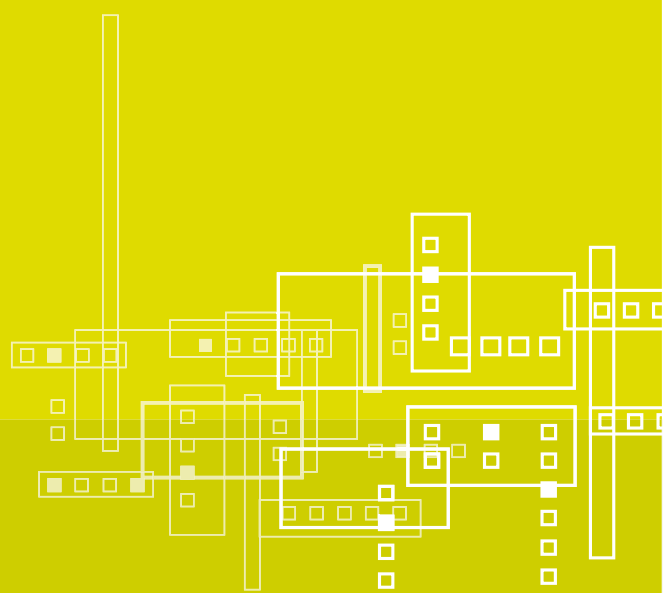
This clean environment facility offers a wide range of equipment and expertise devoted to the synthesis, processing and fine analysis of devices and the advanced materials of which they are composed.

• Design and Prototyping Laboratory

This infrastructure serves for the design of advanced prototypes involving expertise in microelectronics (including packaging for device integration in nanotechnologies), mechanics (thanks to rapid prototyping equipment), and computing. Prototypes can then be used in real implementations and for technological evaluation.

• Usability and Ergonomics Laboratory

This laboratory is designed for the study of interactions between users and various technologies, in conditions that are as close as possible to reality. It combines modular spaces that can reproduce the various environments and usage conditions of these technologies with complex measurement systems to capture user behaviors and actions. This laboratory also has a telecommunication network emulator for the reproduction of network transmission conditions.

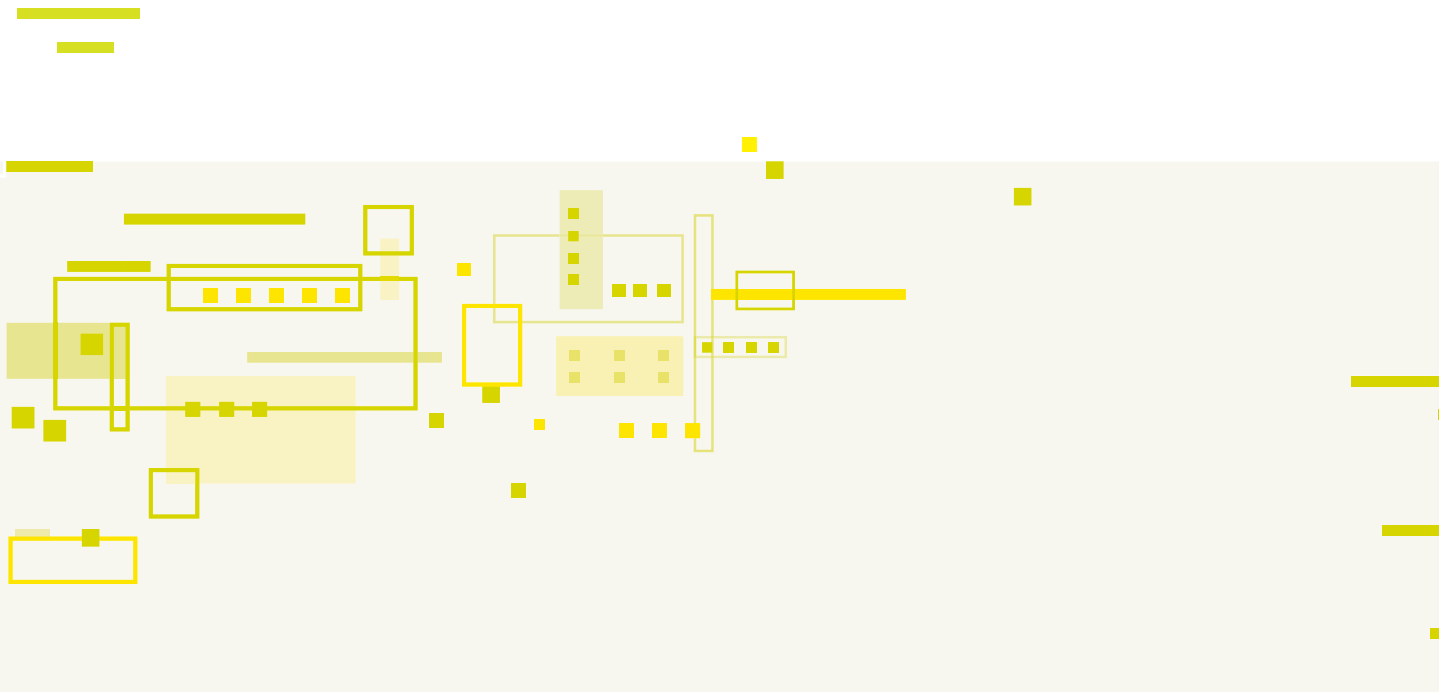


Services offered

- Nanofabrication and nanocharacterization processes
- Treatment of solids with low-intensity IR and UV lasers
- Characterization of MEMS, RF components and photonics
- Rapid prototyping in ABS and polycarbonate, and of MEMS, microfluidic, microelectronic and optoelectronic devices
- Design of sensors, actuators, software, electronic circuits, user interfaces and robots
- Emulation of telecommunication networks
- Testing of interactive technologies in realistic usage environments
- Industrial space for working jointly with academic researchers
- Strategic analysis and evaluation of innovation projects

UNIVERSITÉ DE SHERBROOKE'S INNOVATION PARK

A partner in innovation excellence for over half a century, Université de Sherbrooke created the first university innovation park in Quebec in 2007. Innovation Park promotes scientific initiatives in regional, national R&D by supporting the interaction and synergy of specialists in cutting-edge research and development. Covering an area of 500 000 m², Innovation Park is recognized by the prestigious International Association of Science Parks (IASP), with some 400 members in 73 countries.



INTERDISCIPLINARY INSTITUTE FOR TECHNOLOGICAL INNOVATION
Université de Sherbrooke, Sherbrooke (Québec) J1K 2R1 CANADA

Toll-free: 1-800-267-8337, ext. 62107
info3IT@USherbrooke.ca ■ www.3IT.ca