Porto Alegre

BRAZIL

Rio Grande do Sul
a high technology State
Southernmost State of Brazil
11 million inhabitants
Almost the size of Germany
Land of the Gaúchos
Innovative ICT industry sector, with local R&D centers
Porto Alegre

Capital of the State of Rio Grande do Sul

1.5 million inhabitants

One of the most important cultural, political, and economic centers of Brazil
Porto Alegre

Awarded by the United Nations as top 1 capital city in Brazil in terms of life quality (high HDI)
UFRGS – Main facts and numbers

- First schools founded in 1895
- Approximately 2,700 faculty members
- 27,000 undergraduate and 9,000 graduate students
- **Ranked 1st** in the official assessment of the Brazilian Ministry of Education
UFRGS – Undergraduate Education
UFRGS – Undergraduate Education

• 86 undergraduate programs
• Many programs ranked 1st in Brazil
  e.g. Computer Science, Computer Engineering
• 27,000 undergraduate students
• Among top 2 universities in Brazil in undergraduate education
  – top 1 among large national universities
UFRGS – Graduate Education

• 69 academic and 9 professional Master programs
• 65 PhD programs
• 21 graduate programs considered of international excellence
• 9,000 graduate students
• Among top 5 universities in Brazil in graduate education
Research

• Top 1 in research among Brazilian national universities
• 600+ top Brazilian researchers
  – According to the Brazilian CNPq agency
• More than 700 research groups in all areas of knowledge
• 1,700 undergraduate students working as research assistants
International Rankings

• Shanghai ranking: UFRGS among the top 5 in Brazil, top 10 universities in Latin America, top 500 in the world

• 70th place in the Webometrics ranking
Technology-intensive top research areas

- IT – Software, Automation, Communication
- Microelectronics
- Energy, Oil, Gas
- Bio- and Nanotechnologies
- Mechanical Engineering and Metallurgy
- Health and Life Sciences
- Water Resources, Environment
- Food and Agrarian Sciences
Technology generation and transfer

• More than 200 technology-related projects currently running

• Large number of joint projects with companies

• Funding in excess of U$ 100 millions
  – Various funding sources
Internationalization

- 500+ international students
- Joint research with universities from all continents
- Around 350 undergraduate students study abroad yearly
Science and Technology Park

- A unique model in South Brazil
- Anchored in the scientific excellence of UFRGS
Science Park

• Attraction of R&D centers of private and public companies
  – With strong interaction with research groups from UFRGS
Science Park

• Emphasis on incubation of start-ups

• Based on the long tradition of the University in technology generation, spin-offs, and entrepreneurship

• Network of technology incubators in different areas
Technology incubators

Small business technology incubators

• CEI – Information Technology
• IECBiot – Biotechnology
• HÉSTIA – Engineering and Physics
• ITACA – Food Technology and Agro-Industrial Chains
• ITCP – Popular Cooperatives (social technologies)
Science Park

Located in the UFRGS Valley Campus
Science Park

Phase 1
- 15 ha
- Up to 18,000 sqm of built area

Phase 2
- 15 ha
- Up to 35,000 sqm of built area
Science Park – Phase 1
Science Park – Phase 1

• First building to be built by UFRGS
  – Administration, incubator, shared spaces, amphitheater, restaurant – 3,300 sqm
  – Space to be allocated to companies – 4,000 sqm
Science Park – Phase 1
Institute of Informatics

An international center of excellence in education, research and technology generation in all fields of Computer Science and Computer Engineering
Institute of Informatics

• Graduates that drive innovation
• High-level of scientific research
• Strong international connections in research and education
• Strong cooperation with industry
• Technology generation and transfer
Education

• Computer Science and Computer Engineering undergraduate programs ranked 1st in Brazil by the Ministry of Education

• Graduate program in Computer Science and Engineering with size and coverage unique in Brazil – international level

250 MSc and PhD students currently enrolled

More than 200 PhD degrees already granted

More than 1200 MSc degrees already granted
Research

- Research activities cover all traditional areas of Computer Science and Engineering
- Strong integration among Theory, Hardware, and Software research groups

Computer Networks
Computer Graphics and Image Processing
Microelectronics
Embedded Systems
Artificial Intelligence
Parallel and Distributed Processing
Human-Computer Interaction
Information Systems
Databases
Software Engineering
Formal Methods
Bioinformatics
Distance Learning
Fault Tolerance
Digital TV
Multimedia
Robotics
Technology generation

• Origin of many software and most important hardware companies of the region
• Starting point of the most successful entrepreneurs in the region
• At the root of CEITEC, the Microelectronics Center of Rio Grande do Sul (first foundry in South America)
Institute of Informatics

Technology Innovation and Partnerships with Industry

Examples
Partner companies in the last 5 years

Brazilian companies of the ICT cluster in Rio Grande do Sul
- Altus
- CP by Schneider-Electric
- Datacom
- Digistar
- Digitel

Other Brazilian companies
- Petrobras
- Cianet
- Genius
- Itautec
- Leader Tech

Public companies
- CEEE
- INMETRO
- Procempa

International companies
- Dell
- HP
- Microsoft

Companies hosted in the University
- Endeeper
- Nangate
- Surya

Hospitals
- Santa Casa
Current technology-intensive projects

• Health

<table>
<thead>
<tr>
<th>Project</th>
<th>Partnership</th>
</tr>
</thead>
</table>
| SIM - Low-cost, modular, intelligent surgery room with remote access - Using Brazilian technology | 2 local hospital  
2 small companies  
Funding: FINEP – Brazilian Innovation Agency |
| TVDMED - system for the convergence of telemedicine applications | 1 local hospital  
Funding: FINEP – Brazilian Innovation Agency |
Current technology-intensive projects

- **Energy**

<table>
<thead>
<tr>
<th>Project</th>
<th>Partnership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numerical modeling of processes and diagenetic patterns and its impact on the quality and heterogeneity of oil reservoirs</td>
<td>Petrobras</td>
</tr>
<tr>
<td>Reliable solutions for web access, using embedded http server and SNMP agent to remotely monitor and control UPS equipment</td>
<td>CP by Schneider-Electric (Brazilian company)</td>
</tr>
</tbody>
</table>
### Current technology-intensive projects

**Computer Networks and Data Communication**

<table>
<thead>
<tr>
<th>Project</th>
<th>Partnership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware and software for a platform offering access to services of a phone operator</td>
<td>Digistar (Brazilian company) Funding: FINEP – Brazilian Innovation Agency</td>
</tr>
<tr>
<td>Improving MPLS (Multiprotocol Label Switching) equipment - Virtual Private Networks, Tunneling and Signaling, Label Switch Paths</td>
<td>Digistar</td>
</tr>
<tr>
<td>SNMP-based software for modular management of VoIP equipment</td>
<td>Digistar</td>
</tr>
<tr>
<td>Firmware for WAN protocols in routers</td>
<td>Digitel (Brazilian company)</td>
</tr>
<tr>
<td>Adapting the NetMetric tool to the W-CDMA network</td>
<td>Vivo (largest mobile phone service provider in Brazil and in South America)</td>
</tr>
</tbody>
</table>
Current technology-intensive projects

- **Microelectronics**

<table>
<thead>
<tr>
<th>Project</th>
<th>Partnership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transient faults in FPGAs and in SRAM, flash, and EEPROM technologies</td>
<td>Brazilian Space Agency</td>
</tr>
<tr>
<td>Development of an ASIC implementing EDD (Ethernet Demarcation device) access switch</td>
<td>Datacom (Brazilian company) Funding: FINEP – Brazilian Innovation Agency</td>
</tr>
</tbody>
</table>
## Current technology-intensive projects

- **Information Systems**

<table>
<thead>
<tr>
<th>Project</th>
<th>Partnership</th>
</tr>
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</table>
| COMUNICA - automatic voice answering system accessing a data base and using data mining with contents summarization | 3 spin-off companies: Conexum, Intext Mining, DFL  
Funding: FINEP – Brazilian Innovation Agency |
## Current technology-intensive projects

- **Image and Signal Processing**

<table>
<thead>
<tr>
<th>Project</th>
<th>Partnership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obtaining 3D models from movement and multimodal analysis</td>
<td>HP Brazil</td>
</tr>
<tr>
<td>Passive removal of background and location of active speaker using</td>
<td>HP Brazil</td>
</tr>
<tr>
<td>multimodal analysis</td>
<td></td>
</tr>
<tr>
<td>Algorithms for detecting retinal reference structures and for tracking</td>
<td>Optoeletrônica (Brazilian</td>
</tr>
<tr>
<td>retinal movement</td>
<td>company)</td>
</tr>
</tbody>
</table>

## Current technology-intensive projects

### • Industrial Automation

<table>
<thead>
<tr>
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<th>Partnership</th>
</tr>
</thead>
<tbody>
<tr>
<td>HART (Highway Addressable Remote Transducer) interfaces for Profibus in a Programmable Logic Controller</td>
<td>Altus (Brazilian company) Funding: FINEP – Brazilian Innovation Agency</td>
</tr>
</tbody>
</table>

### • Open Software

<table>
<thead>
<tr>
<th>Project</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Interoperability and Open-Source Development Lab</td>
<td>Microsoft Brazil</td>
</tr>
</tbody>
</table>
Spin-offs – a brief history

In the late 70’s and early 80’s
• ICT cluster in the State resulting from spin-offs of UFRGS
• Mainly data communication and industrial automation companies
• Digitel and Altus – examples of great success histories
Spin-offs

Solutions for Management of Information and Knowledge for the Oil Exploration Industry
Spin-offs

i9Access is a pioneer company in e-health

Innovative solutions in Telemedicine

Year of Incubation: 2010

www.i9access.com.br
CEI

Center for Entrepreneurship in Information Technology
CEI – Center for Entrepreneurship in Information Technology

- First incubator dedicated to IT in Southern Brazil, considered a model to be followed by most Brazilian programs
- 58 companies assisted in 15 years of activity

27 companies still acting in the market

07 start-up companies in incubation
CEI – Center for Entrepreneurship in Information Technology

- Infrastructure and support for new innovative companies
- Support in management, business plans, market analysis, marketing, legal consulting
- Support in building and submitting projects for funding
CEI – Our start-ups

Industrial and commercial solutions based on Image Processing
CEI – Our start-ups

- 12 years in game development
- Recently incorporated by a large European company
CEI – Our start-ups

Casual games
CEI – Our start-ups

Robots for inspection of restricted areas

Areas of interest:
segments of Oil and Mining Safety

Key Partners: Petrobras, Nitro Tecnologia, SIMEROS, SIMEX

Year of Incubation: 2009; Graduated in 2012

www.instor.com.br
CEI – Our start-ups

- Development of mechanical engineering projects
- Focused on the application of new technologies to the development of technical products and processes

Key Partners: John Deere, Flexomarine, TBG

Year of Incubation: 2010
CEI – Our start-ups

Supplier of smart cards and biometry solutions

Created in 1999 and today located in São Paulo, it is the main leader in the national market in biometry solutions
School of Engineering
School of Engineering

• Founded in 1896
• 13 undergraduate programs
  – among them: Electrical Eng, Mechanical Eng, Control and Automation, Energy Eng, Computer Eng, Industrial Eng
• 7 graduate programs
  – all rated high-quality by the Ministry of Education
• 230 faculty members
• More than 7,000 students
• ICT sub-areas are research subjects in different departments
  – mainly Electrical Eng, Mechanical Eng, Industrial Eng
School of Engineering

Technology Innovation and Partnerships with Industry

Examples
WSN: Development of a WirelessHART End Device

- Collaboration with Petrobras and Coester
- IEEE 802.15.4 compliant device to communicate using WirelessHART protocol
- Range extended up to the standard limit: 20 dBm (100 mW)
- Two chips (SoC) solution: Integrated MCU + RF Transceiver plus LNA/PA
- Low cost, small size and small weight solution
Simulation systems applied to the automotive sector

- Numerical analysis and simulation of critical components (e.g. gear ring)
- Car crashing impact (side impact test)
- Conformance tests (homologation)
Internet-of-Things – Integrating Digital TV and Home Automation

Smart Home Appliances
- Multiple Communication Interface (PLC, Wireless)
- DigitalTV as HMI
- Service-Oriented / Object-oriented architecture
- Energy Management, Comfort, Safety, ...

Whirlpool Innovation Award 2009
Unmanned Aerial Vehicles (UAVs)

• UAVs for carrying sophisticated sensors
• Development
  – Guiding and trajectory control
  – Wireless communication
  – Cooperation and coordination with the ground sensor nodes
• Cooperation with the Brazilian Army
Industrial Communication for Oil & Gas Applications

- Development of wired (Profibus/Foundation Fieldbus) and wireless (W-HART) industrial communication protocols for oil refinery applications

- Ongoing collaborations with Petrobras, Coester, Novus, and Altus (South-Brazilian industrial automation companies)
e-Energy / SmartGrid

- Smart appliances (embedded systems, communication protocols, ...)
- Energy management and optimization
- Proactive maintenance (6-sigma based)
- Grid integration of renewable energy sources, energy storage
- Sensors networks
- Collaboration with IMS Center USA
Intelligent Maintenance Systems

- Algorithms for analysis of behavior and degradation, diagnostics, prognostics
- Embedded watchdog agent
- Cooperation with IMS Center - USA

- Right Information to Right People at Right Time—“3Rs”
- Autonomous Service Request for Spare Parts
- Near-Zero-Downtime Service
School of Engineering

Spin-offs

Examples
Spin-offs

• Falker – precision agriculture
• Instrumentation + image processing
• Integration of various wireless sensors
Spin-offs

PONFAC

- image processing systems for automation
Spin-offs

Fueltech

- Electronic injection
Come to visit us!

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