Our life style will produce 1.2 zettabyte of information this year!

**INCREASINGLY DIGITAL**

### Outline

- SITE Overview
- For each of the 4 programs
  - Admissions
  - Program Information
  - Student life
  - Challenges

### One School :: Four Complementary Programs

- Computer Engineering (CEG)
- Computer Science (CSI)
- Electrical Engineering (ELG)
- Software Engineering (SEG)

### Going beyond Google

A team of professors from the University of Ottawa has created software that takes the Internet giant’s Street View to the next level.

By Vito Pilieci, *The Ottawa Citizen* May 15, 2010

### Statistics

- Number of undergraduate students: 675
- Number of professors: 66 (full-time), 12 (part-time)
- Students/professor ratio: 9/1
- Number of programs: 4
Admission 2008-10*

<table>
<thead>
<tr>
<th>Year</th>
<th>CEG</th>
<th>ELG</th>
<th>CSI</th>
<th>SEG</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008-2009</td>
<td>45</td>
<td>71</td>
<td>52</td>
<td>27</td>
</tr>
<tr>
<td>2009-2010</td>
<td>45</td>
<td>86</td>
<td>59</td>
<td>27</td>
</tr>
<tr>
<td>2010-2011</td>
<td>31</td>
<td>77</td>
<td>51</td>
<td>20</td>
</tr>
</tbody>
</table>

* Number of first year registered students
(Aug 12/2010)

Enrollment 2008-10

<table>
<thead>
<tr>
<th>Year</th>
<th>CEG</th>
<th>ELG</th>
<th>CSI</th>
<th>SEG</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008-2009</td>
<td>133</td>
<td>276</td>
<td>144</td>
<td>110</td>
<td>663</td>
</tr>
<tr>
<td>2009-2010</td>
<td>170</td>
<td>256</td>
<td>130</td>
<td>118</td>
<td>674</td>
</tr>
<tr>
<td>2010-2011</td>
<td>173</td>
<td>241</td>
<td>102</td>
<td>104</td>
<td>620</td>
</tr>
</tbody>
</table>

Challenges

- Low enrollment
- Women and francophone students
- Retaining students

Number of first year CSI students

<table>
<thead>
<tr>
<th>Year</th>
<th>Women</th>
<th>Francophone</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009-2010</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td>2010-2011</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

Scholarships

- Dean’s Merit Scholarship (35)
  - 95-100% ($5,000), 90-94% ($4,000)
- Faculty of Engineering Memorial Scholarship (7)
  - Women, 80+% ($2,000)
- Nortel Founding Scholarship for SITE (2)
  - 80+% ($2,500)
- Ontario Professional Engineers Foundation for Education (2)
  - $1,000
- Undergraduate Research Opportunity Program (UROP)
  - $1,000, 50 hours
  - www.research.uOttawa.ca/urop

Supportive environment

- Study Groups
  - Available for all first year courses
  - Organized by students
  - Highly popular
  - Help with assignments, examination review, etc.
- Mentorship Services
  - To support students with their transition to university life
  - Guiding and answering students questions
  - Mentors are 4th year students
- Student Academic Success Service
Co-operative Education Programs

- Since 1980
- 2nd largest in Ontario, 4th largest in Canada
- 70 programs, 8 faculties
- Competitive program (6.0+ for SITE students)
- 4 work terms, starting in the second year (alternating between study and work)
- 1,700 students enrolled each year
- Placement rate 98%
- Accredited program

Co-operative Education Programs

- Recent graduates (…) enter the labour market with a good grounding in technical skills
- The skills gap arises from the additional skill depth and skill breadth that employers require
- Skills depth consists of specific industry or technology skills
- Skill breadth encompasses various non-technical skills – written and oral communications, experience administering contracts, project management, the ability to work in a team, knowing how to prepare a business case analysis, and communicating technical issues to non-technical colleagues

School of Information Technology and Engineering (SITE)

Skill depth and skill breadth are acquired principally through experience

The Engineering and Technology Labour Market: Final Report. Engineers Canada and Canadian Council of Technicians and Technologists. May 2009

Innovation

- Faculty of Engineering
  - Entrepreneurship and Innovation Fund (EIEF)
  - Prizes in Entrepreneurship and Innovation (PEI)
- Technology Transfer and Business Enterprise (TTB)
  - Start up garage (office space, laptop, services…)
  - Lunch and learn
- Entrepreneurs Student Club (Telfer School of Management)
- Ottawa Centre for Research and Innovation (OCRI)
  - Entrepreneurship Centre (EC)
  - TalentBridge
- The Code Factory

School of Information Technology and Engineering (SITE)
**Engineering Profession**

- Engineering is:
  - the application of science and mathematics for problem solving and for the creation of products.
  - A engineered product in general terms, is a system designed to satisfy a particular need and that meets stringent specifications.
- In Canada, engineering is a self-regulated profession.
  - Regulatory bodies, that have a provincial jurisdiction, is responsible for licensing professional engineers.
  - In Canada, engineering has the same status as medicine and law; they have an ethical responsibility to protect the public.

**Engineering Education**

- Technology will expand and change rapidly throughout your career.
  - The important thing is to obtain an engineering education that will not simply enable you to blindly use the latest novelties, but to be able to understand in depth the significant developments in modern technology and be prepared to play a role in shaping its future.
- Year 1: Foundation in mathematics, physics, chemistry, engineering applications, and computing.
- Year 2 and 3: More on fundamentals but, engineering content predominates.
- Year 4: Engineering content (with options) and capstone project.
- Throughout the program: non-engineering courses, such as communication skills, economics, studies of ethical issues, and the impact of technology on society.
- Compared to other Faculties, our students have to attend many hours of courses and labs, weekly – around 30 hours.

**Computer Engineering (CEG)**

- Computer engineers provide society with its information systems: computers, digital cards, computer chips, operating systems, real-time systems...
- **Embedded systems**, in cell phones, multimedia players, tomography equipments, etc., are an important domain of application for computer engineering
- Programming focuses on digital devices and their interfaces with other devices
- Courses include:
- Domains of application include:
  - Chip design, networks, biomedical devices, robotics

**Electrical Engineering (ELG)**

- Electrical engineers provide society’s electrical, electronic and telecommunications infrastructure: power generation and delivery systems, electrical motors and machines, telecommunications equipment, digital equipment...
- Four options: communications, systems, electronics, microwave and photonics (power systems option under review)
- Courses include:
  - Electronics, Signals and Systems Analysis, Introduction to Control Systems, Electrical Machines and Power Systems
- Domains of application include:
  - Wireless “cell phone” networks and optical fiber communications systems, avionics, power, antennas, medical equipments
  - Alternative energy sources, e.g. solar energy, smart grids, etc.
Study programs at SITE

Options

- Engineering Management and Entrepreneurship Option
  - BASc in Electrical Engineering
  - BASc in Computer Engineering
- BSc in Computing Technology
  - BASc in Electrical Engineering and other engineering programs (e.g. Mechanical Engineering)
- Co-op Program
  - Available with all ELG and CEG programs (including options).
  - Study terms and 4 paid work terms alternate.
  - End up with a degree and a year or more of practical work experience.

CO-OP Placement 2010 CEG+ELG

<table>
<thead>
<tr>
<th>Work term</th>
<th>No. of students placed</th>
<th>Placement rate</th>
<th>Ratio of postings per student</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter 2010</td>
<td>17</td>
<td>100%</td>
<td>4</td>
</tr>
<tr>
<td>Summer 2010</td>
<td>38</td>
<td>95%</td>
<td>2.5</td>
</tr>
<tr>
<td>Fall 2010</td>
<td>15</td>
<td>100%</td>
<td>3.6</td>
</tr>
<tr>
<td>Totals for 2010</td>
<td>70</td>
<td>98%</td>
<td>Yearly Average: 3.4 postings per student</td>
</tr>
</tbody>
</table>

Employment Prospects

Ottawa Telecommunications and Wireless

Ottawa Clean Technology (2009)

Ottawa Photonics (2009)

Ottawa Photonics Companies by Subcategory
January 2009


CEG and ELG Undergraduate Projects

CEG Alarm System
- Lab project for CEG3136 – Computer Architecture II
- Students learn to design and implement software that manipulates the various hardware components on the Dragon-12 card to create an alarm system.

Robotic Projects
- A robot that plays Guitar Hero
- Controlling a robot with the iPhone

Mechatronics Learning Studio Projects
- http://www.g9toengineering.com/MechatronicsStudio/main.htm
- Myoelectric Controlled Prosthetic Hand
  - Part of ELG3339 ( Electronics for Mechanical Engineers) and ELG4139 ( Electronics III)

ARISE: Advanced Robotic Innovations Society in Engineering
- Student group involved in autonomous robot design and development projects and competitions.
- Previous 4th year project teams have worked on:
  - Sonar Digital Signal Processing
  - FPGA Helicopter Fuzzy Autonomous Control Systems Implementation and Interfacing
  - Helicopter Autonomous Control Systems Fuzzy Logic Design
  - Autonomous Underwater Vehicle Control Systems and Navigation

Unmanned Aerial Vehicle

Autonomous Underwater Vehicle
Lunar Rover Power Subsystem

- Fourth-year undergraduate students Ante Bulat, Ryan King, Mark Njau, and Viktar Tatsiankou
- Awarded the Best Innovation and Commercial Application prize at the PEO Ottawa Chapter 2010 Student Papers Night.
- Their paper, entitled Lunar Rover Power Subsystem, developed concept designs and two working demonstrators of photovoltaic power subsystems designed for use on rover vehicles intended for the moon.
- Their fourth-year project was a collaboration between Neptec Design Group Ltd. and the SUNLab, under subcontract from the Canadian Space Agency.

How to choose?

Software Engineering (SEG)

- For students who want to focus on the process of writing software applications
- Software Engineering applies engineering principles to the entire software life-cycle: requirements analysis, design, validation, implementation, testing, documentation, and management
- Courses include:
  - Software Requirements Analysis, Software Design and Architecture, Software Quality Assurance
- Domains of application include:
  - E-commerce, financial management and healthcare

The Google Test

- When you think about Google, what comes to mind?
  - Google has developed many Web applications, including Google Search, Google Mail, Google Doc, Google Reader, etc.
  - How do you design such complex software systems?
  - How can they built reliable software systems?
  - This must involve a lot of software testing.
  - How does one manage such large projects, so many employees, etc.
- Software Engineering is your program!
Guide to the Software Engineering Body of Knowledge

- Software Requirements
- Software Design
- Software Construction
- Software Testing
- Software Maintenance
- Software Configuration Management
- Software Engineering Management
- Software Engineering Process
- Software Engineering Tools and Methods
- Software Quality

Computer Science (CSI)

- Computer scientists are problem-solvers
- For students who want to organize information, build faster and more secure software systems
- Courses include:
  - Data Structures and Algorithms, Databases, Programming Paradigms, Design and Analysis of Algorithms
- Domains of application include:
  - Designing and building software, developing effective ways to solve problems, devising new and effective ways of using computing technologies and addressing particular challenges for the arts, healthcare, sciences, banking, government, etc.

Options

- Software Engineering (SEG)
  - BASc in Software Engineering
  - BASc in Software Engineering, Engineering Management and Entrepreneurship option
  - BASc in Software Engineering, Biomedical option

Computer Science (CSI)

- Honours BSc with specialization in Computer Science
- Honours BSc with specialization in Computer Science, Bioinformatics option (Started May 2010)
- Honours BSc with specialization in Computer Science, Management and Entrepreneurship option
- Joint Honours BSc in Computer Science and Mathematics
- Major in Computer Science
- Minor in Computer Science
- Minor in Computer Science for Scientists

Options

- Honours BSc with specialization in Computer Science
- Honours BSc with specialization in Computer Science, Bioinformatics option (Started May 2010)
- Honours BSc with specialization in Computer Science, Management and Entrepreneurship option
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Cooperative education CSI + SEG

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<td>13</td>
<td>100%</td>
<td>14</td>
</tr>
<tr>
<td>Total for 2010</td>
<td>75</td>
<td>99%</td>
<td>11</td>
</tr>
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</table>

“Serait-il possible de demander aux agents de liaison de passer le message qu’il y a une pénurie d’étudiants en logiciel (CSI et SEG) et que les opportunités de stages sont nombreuses pour ces étudiants?”

Danielle Delorme
Directrice adjointe, Relations employeurs/Régime coop

4th year Computer Science projects

- 1 semester
- Individually or small group
- Some examples:
  - Efficient algorithms for solution SUDOKU problems
  - Acquisition of a 3D model of a human based on cameras in a multi-view stereo arrangement
  - Improving the distributed search structure of P2P networks
  - Network and computer security
4th year projects: mobile devices

School of Information Technology and Engineering (SITE)

Fourth Year Projects

- 8 month project
- Teams of 4-6 students
- Must build a real system for a real customer
- Own and direct project from initial concept through analysis, design, development, testing to final deployment to the customer
- Example Customers:
  - IBM Cognos, Adobe, Eclipse Foundation, Ottawa Hospital, Department of National Defence

Innovation

- Some projects are used by students to launch their own companies or new websites and applications
  - www.diumsolution.com sells scheduling and management software for school boards across Canada
  - Winner Faculty of Engineering Award 2009 - $10,000
  - Winner Engineering Ontario Innovation Award 2010 - $3,500

Dium Solution: Suite Delphin

- [Image of Dium Solution: Suite Delphin]
Alumni

- Souheil Gallouzi
  - BSc, MSc Computer Science
  - "Senior Vice President & General Manager of Mobile Products & Development" at Intrinsyc
  - Qualcomm and Leap Wireless International
  - Newbridge Networks
  - Nortel Networks
  - Bell Northern Research

Alumni (continued)

- Jason Kealey, CEO LavaBlast Inc
- Francois De Bellefeuille, CEO Dum Solutions (Winner of 2009 Faculty of Engineering Innovation award)
- Rhana Khatib, International Consultant, Spot On Systems (ex of Cognos)
- Xuyen On, International Consultant, Accenture
- Arim Abizadeh, Product Manager RadialPoint (ex of Cognos)
- Jean Genest, Executive Vice President, Top Aces Inc. (Defense & Space)
- Jason Kealey – 2005 BASc Software Engineering
  2007 MCS Computer Science
- Etienne Tremblay – 2005 BASc Software Engineering
- Co-founders of LavaBlast
- 2008 "Microsoft Startup of the Day"
- 2008 Finalistes « Red Herring Top 50 Canada »

Alumni (continued)

- Information Systems Analysts and Consultants
  - Information Systems Business Analysts and Consultants
  - Systems Security Analysts
  - Information Systems Quality Assurance Analysts
  - Systems Auditors
- Database Analysts and Data Administrators
  - Database Analysts
  - Data Administrators
- Software Engineers
- Computer Programmers and Interactive Media Developers
  - Computer Programmers
  - Interactive Media Developers
- Web Designers and Developers

Quizz

- Which sector contributes the most to Canada’s GDP?
  - Oil & Gas
  - Aerospace
  - Automotive
  - ICT (Information and Communications Technologies)
  - Bio-based

BIOTECanada, 2010
“According to the Conference Board of Canada, a “perfect storm” of socio-demographic factors, negative perceptions of the tech sector following the bubble burst of 2002, and a significant drop in university enrolment in IT programs across Canada have combined to create a situation where more than 90,000 jobs in the information technology sector will need to be filled in the next two to four years and could potentially impact the Canadian economy to the tune of $10.8 billion, or $120,000 per job, if they can’t be filled.”

Source: Ottawa’s Lead Economic Development Corporation – OCRI
June 3, 2009
Ottawa High School Technology Program: Pilot Project 2008-09

- Led by the industry (IBM, Nortel, Dell, Cisco, Macadamian Software, Microsoft)
- Objective: address the declining enrollment in post-secondary technology courses
- Format: 1 day per week, students create, with the help of industry experts, a final project that will run on the XO laptop
- www.ottawatechstudents.com

Students initiatives

- OSBootcamp, End of School with Linux!
- Open Source Awareness Campaign
- LAN parties (games)
- Video contest
- Guest Speakers from companies such as Google, Adobe, and Microsoft
- Advanced Robotics Innovations Society in Engineering (ARISE)
- ...

Awesome Ottawa

- Instigator: Cate Huston, M.Sc. Student
- Supports people doing awesome things
- Gives $1,000 in cash each month
- Aired on CBC Radio One
  All in a day hosted by Alan Neal on May 12, 2010

Students associations

- Computer Science Student Association (CSSA-AEI) (http://www.cssa-aei.ca/)
- uOttawa IEEE Student Branch (http://www.ottawa.ieee.org/ottawa)
- Women in Science & Engineering (WISE) - Ottawa Chapter (http://www.wise-ottawa.ca)
- Women in Engineering (WIE) - Ottawa Chapter (http://ottawa.wie.org/)
- uOttawa Engineering Students’ Society (http://www.uottawaess.ca/drupal/)
10 Reasons to Major in Computing

1. Computing is part of everything we do!
2. Expertise in computing enables you to solve complex, challenging problems.
3. Computing enables you to make a positive difference in the world.
5. Computing jobs are here to stay, regardless of where you are located.

Visit http://computingcareers.acm.org

6. Expertise in computing helps you even if your primary career choice is something else.
7. Computing offers great opportunities for true creativity and innovativeness.
8. Computing has space for both collaborative work and individual effort.
9. Computing is an essential part of well-rounded academic preparation.
10. Future opportunities in computing are without boundaries.

Visit http://computingcareers.acm.org

CNN Money FORTUNE Rankings

- World's most admired companies: 1. Apple, 2. Google
- Blue-Ribbon Companies: 1. Apple, 2. CISCO, 5. Microsoft
- Best companies to work for: 1. SAS, 3. Qualcomm, 4. CISCO
- Top 5 best-paying, low-stress jobs: 3. Computer software engineer

Top Reasons for Studying at SITE

- Four complementary programs in one school
- Fantastic support for learning and innovation
- Flexible programs, many options
- Cooperative education (high placement rate)
- State-of-the-art environment (laboratories, building…)
- Strong IT industry (IBM, OpenText, Adobe…), booming smart phone industry
- Multitude of students initiatives

Resources

- Marcel Turcotte
turcotte@site.uottawa.ca
www.site.uottawa.ca/~turcotte/promotion
(613) 562-5600, 6660
- Why Join SITE
www.ca.uottawa.ca/why
- Co-operative education
www.coop.uottawa.ca
- ACM Computing Degrees and Careers
computingcareers.acm.org
Computing Research that Changed the World (videos)

- The Internet and the World Wide Web
- Evolving Foundations
- The Transformation of the Sciences via Computation
- Computing Everywhere!
- tinyurl.com/cs-changed-world

www.uccblog.org/2009/06/07/computing-research-that-changed-the-world-videos