Career and Employability of IT Graduates

Leong Hon Wai

Soo Yuen Jien
(Chong Hwa 1989—94)

National University of Singapore
School of Computing
Outline

- Computing: What, Why
  - Career opportunities, employability
- Why Computing in NUS?
- Study, Play, and Life in NUS
- How to Apply
- Q & A
Can this be true?

Bill Gates, Microsoft

I used to *flip pancakes* in my undergraduate days @Harvard
Did Bill Gates *really* flip pancakes?

**Pancakes Flipping Problem:**

1. Given an initial pancake configuration...
2. You want to get a “sorted” configuration
3. *Constraints:* can only *flip* those on top

Example …

![Pancakes illustration](image)


2 flips
More pancake-flipping examples...

Abstraction skills
Problem Solving skills
An Initial Algorithm

Simple Idea:
“Sort” the biggest pancake first…

Greedy Algorithm:
Repeatedly “sort” the biggest pancake;
Is Greedy Algorithm the “best”

NO.

A Counter Example:

Flips used by Greedy Algorithm [5 flips]

Better way to flip [4 flips]
Why Computing*?

* Integrates
  - Computer Science
  - Computational Science
  - Computer Engineering
  - Information Systems
  - e-Commerce
  - Computational Biology
Cool Things in CS (past 10 years)
Cool Things in Computing
(in the past 10 years)

- Yahoo, Excite, Google
- VOIP, Skype,
- ebay, Amazon, Dell,
- World of Warcraft, neopets,
- MSN, QQ, Yahoo-Groups, Blogging, YouTube, Facebook, Flicker,…
- Linux, Open Source Movement, Grid Computing,
- GoogleMap, Mapquest, GoogleEarth
And…
there are more cool stuffs to come

Around the World:

– Wearable computing,
– Next generation VR/Gaming
– Networked everywhere, GPS on “everything”,
– Cloud computing
– Even-more Intelligent Buildings
– Intelligent Appliances, Gadgets,
– Quantum Computing, DNA Computing
IT is critical to all economies

According to Gartner Dataquest, IT Spending is forecast to grow:

* by 40% to US$439 Billion
  (for the Asia-Pacific region outside of Japan in 2009)

* by 26% to US$3.1 Trillion
  (Worldwide in 2009)
“Hot Job Opportunities” **BUSINESS 2.0**

**The best jobs in the hottest markets**
The great American hiring boom is slowing down -- but as labor cools with the rest of the economy. A few choice regions will stay red-hot. You just have to know where to look. (more)

1. Orlando, FL
2. Las Vegas, NV
3. Raleigh, NC
4. Charlotte, NC
5. Phoenix, AZ

*See the full list*

**Video: Playing with big kid toys**
Imagine working with robots and getting paid up to six figures for it. Business 2.0 highlights some of the new careers of the 21st century. (more)

**Quiz: Do you deserve a raise?**
Find out if you're getting paid what you're worth -- or if it's time to ask for a salary hike or polish the resume. (more)

**Interactive map**
See where the job hot spots are in high demand! (more)

**Cost of living calculator**
Thinking about moving? See how much you'll need to maintain the lifestyle you want. (more)

**The new new careers**
The United States may keep shedding jobs to foreign countries, but it cranks out new occupations like no one else. Here are just five of the hottest you can get into now. (more)

1. Disease mapper
2. Robot programmer
3. Information engineer

*See the full list*

**The hottest jobs**
Here are the most in-demand professionals nationwide, and the cities where they're most coveted. (more)

1. Computer programmers
2. Health practitioners
3. Financial analysts

*See the full list*

Recent Update from CNN's Money magazine:

**Computing jobs are considered some of the best.**
IT Demand in Singapore

Source: IDA Annual Survey on Infocomm Manpower for 2007
IT Career Path

Source: Infocomm Development Authority of Singapore (IDA)
What kinds of Jobs…

- Core Computer Science
- Information Systems
- Electronic Commerce
- Media and Communications
- Computational Biology
- Computer Engineering
- Engineering
- Arts
- Science
- Business
A “Computing-enabled mind” to take on the World

• CS graduates are versatile people
• Many other domains that can be pursued
  – eg: environment, education, entertainment,
  – more eg: biology, sciences, engineerings,
  – social networking, social enterpreuneurship
  – Other non-CS/IT businesses
• But, their computing-enabled mind-set *stays with them*

Some Success Stories:
1. NLB use of RFID
## IT Salaries

<table>
<thead>
<tr>
<th>JOB TITLE</th>
<th>SALARY PER ANNUM (US$) IN 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIO/CTO</td>
<td>$240,000+</td>
</tr>
<tr>
<td>IT Director</td>
<td>$150,000-$240,000</td>
</tr>
<tr>
<td>MIS Manager</td>
<td>$89,000-$130,000</td>
</tr>
<tr>
<td>ERP Project Manager (7+ yrs exp)</td>
<td>$89,000-$137,000</td>
</tr>
<tr>
<td>Consultant (3-5 yrs exp)</td>
<td>$68,500-$103,000</td>
</tr>
<tr>
<td>Project Manager (3-5 yrs exp)</td>
<td>$62,000-$89,000</td>
</tr>
<tr>
<td>Business Analyst (1-3 yrs exp)</td>
<td>$38,000-$62,000</td>
</tr>
</tbody>
</table>

Source: Robert Walters Salary Survey 2008 for Singapore
Outline

• Why Computing
• Why Computing in NUS?
• Study, Play, and Life in NUS
• How to Apply
• Q & A
Established at a School in July 1998, to provide high-quality infocomm education and high-impact infocomm research for service to country and society.

Departments:
- Computer Science
- Information Systems

Staff: **120** core faculty

Students: **2035** (total)
- **1535** undergrads
- **500** grad students (~350 PhD + 150 MComp)
Faculty Qualification

Faculty trained in the world’s best CS PhD programs

<table>
<thead>
<tr>
<th>Australian National Univ.</th>
<th>NUS</th>
<th>Univ. of Leeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown University</td>
<td>New York Univ.</td>
<td>Univ. of Lille</td>
</tr>
<tr>
<td>CMU</td>
<td>Purdue Univ.</td>
<td>Univ. of Manchester</td>
</tr>
<tr>
<td>Columbia Univ.</td>
<td>Rensselaer Polytechnic Inst.</td>
<td>Univ. of Maryland</td>
</tr>
<tr>
<td>Cornell Univ.</td>
<td>Rice Univ.</td>
<td>Univ. of North Carolina</td>
</tr>
<tr>
<td>Duke Univ.</td>
<td>Saarland Univ.</td>
<td>Univ.of Pennsylvania</td>
</tr>
<tr>
<td>Essex Univ.</td>
<td>Simon Fraser Univ.</td>
<td>Univ. of Queensland</td>
</tr>
<tr>
<td>ETH Zurich</td>
<td>Stanford Univ.</td>
<td>Univ. of Sydney</td>
</tr>
<tr>
<td>Harvard Univ.</td>
<td>SUNY at Buffalo</td>
<td>Univ. of Texas-Austin</td>
</tr>
<tr>
<td>Hong Kong Univ.</td>
<td>SUNY at Stony Brook</td>
<td>Univ. of Tsukuba</td>
</tr>
<tr>
<td>Hong Kong Univ. Sci. Tech.</td>
<td>Univ. of British Columbia</td>
<td>Univ. of Virginia</td>
</tr>
<tr>
<td>Imperial College of London</td>
<td>Univ. of Chicago</td>
<td>Univ. of Warwick</td>
</tr>
<tr>
<td>Indiana Univ.</td>
<td>Univ. of Delhi</td>
<td>Univ. of Wisconsin-Madison</td>
</tr>
<tr>
<td>KAIST</td>
<td>Univ. of Florida</td>
<td>Warsaw University</td>
</tr>
<tr>
<td>MIT</td>
<td>Univ. of Illinois at UC</td>
<td>Waterloo University</td>
</tr>
<tr>
<td>Monash Univ.</td>
<td></td>
<td>Yale University</td>
</tr>
</tbody>
</table>
Why NUS School of Computing?

Professors are internationally recognised

SoC Professor Honoured for Sustained Contribution to Science and Technology

SoC Professor Wong Lim Soon has been awarded the Singapore Youth Awards (SYA) Medal. He received the medal from Minister Heng Swee Kiat at a ceremony on 2 July 2005.

The medal is recognition that Professors make significant achievements in intervening years since he was conferred with the award for Science and Technology.

He received the award in 1999 for contributions to database theories and the Kleisi query system, which also received NUS Inventors' Gold Award.

SoC Assistant Professor Wins Prestigious Research Award

6 FEBRUARY 2006

Information Mining for Digital Libraries Project Wins HP Grant

An NUS School of Computing (SoC) research project aimed at easing the burden of information retrieval for educators and students has clinched a prestigious grant. Worth more than US$50,000 in total value, the grant is given by HP to higher education institutions to promote innovation in teaching and learning. Only 14 institutions from around the world have been selected in 2006 to...
# World University Rankings 2007

## Top Universities in Technology

*Times Higher Education Supplement (UK)*

<table>
<thead>
<tr>
<th>Rank</th>
<th>School Name</th>
<th>Country</th>
<th>Engineering Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MASSACHUSETTS Institute of Technology (M...</td>
<td>United States</td>
<td>100.0</td>
</tr>
<tr>
<td>2</td>
<td>University of California, BERKELEY</td>
<td>United States</td>
<td>94.5</td>
</tr>
<tr>
<td>3</td>
<td>STANFORD University</td>
<td>United States</td>
<td>84.7</td>
</tr>
<tr>
<td>4</td>
<td>CALIFORNIA Institute of Technology (Calt...</td>
<td>United States</td>
<td>80.0</td>
</tr>
<tr>
<td>5</td>
<td>University of CAMBRIDGE</td>
<td>United Kingdom</td>
<td>75.6</td>
</tr>
<tr>
<td>6</td>
<td>Imperial College LONDON</td>
<td>United Kingdom</td>
<td>72.1</td>
</tr>
<tr>
<td>7</td>
<td>CARNEGIE MELLON University</td>
<td>United States</td>
<td>71.0</td>
</tr>
<tr>
<td>8</td>
<td>GEORGIA Institute of Technology</td>
<td>United States</td>
<td>68.0</td>
</tr>
<tr>
<td>9</td>
<td>University of TOKYO</td>
<td>Japan</td>
<td>65.1</td>
</tr>
<tr>
<td>10</td>
<td>National University of SINGAPORE</td>
<td>Singapore</td>
<td>63.8</td>
</tr>
<tr>
<td>11</td>
<td>University of TORONTO</td>
<td>Canada</td>
<td>60.4</td>
</tr>
<tr>
<td>12</td>
<td>University of OXFORD</td>
<td>United Kingdom</td>
<td>60.2</td>
</tr>
<tr>
<td>13</td>
<td>ETH Zurich (Swiss Federal Institute of T...</td>
<td>Switzerland</td>
<td>59.6</td>
</tr>
<tr>
<td>14</td>
<td>PRINCETON University</td>
<td>United States</td>
<td>59.2</td>
</tr>
<tr>
<td>15</td>
<td>HARVARD University</td>
<td>United States</td>
<td>58.3</td>
</tr>
<tr>
<td>16</td>
<td>TSINGHUA University</td>
<td>China</td>
<td>58.2</td>
</tr>
<tr>
<td>17</td>
<td>DELFT University of Technology</td>
<td>Netherlands</td>
<td>57.7</td>
</tr>
<tr>
<td>18</td>
<td>University of CALIFORNIA, Los Angeles (U...</td>
<td>United States</td>
<td>57.4</td>
</tr>
<tr>
<td>19</td>
<td>University of ILLINOIS</td>
<td>United States</td>
<td>57.3</td>
</tr>
<tr>
<td>20</td>
<td>CORNELL University</td>
<td>United States</td>
<td>56.7</td>
</tr>
</tbody>
</table>
Strong Emphasis on Teaching

Recent class featured in *Channel News-Asia*
SoC Facebook Course
Our Degree Programmes
Undergraduate Degrees Offered

Bachelors in Computing

Six (6) Degree Programmes

*Computer Science*

*Computer Engineering*

*Communications and Media*

*Information Systems*

*Computational Biology*

*Electronic Commerce*
Double and Concurrent Degrees

For exceptional students!

NUS SoC

B.Comp (Hons)

5 yr

B.Sc (Hons) Mathematics
NUS Science Faculty

BBA (Acct/ Hons)
NUS Business School

Masters of Management
NUS Business School

Masters of Entertainment Technology
CMU Entertainment Technology Centre

NUS Business School

4.5 or 5 yr

3.5 + 1.5 yr

For exceptional students!
Overseas Exchanges

• **NUS Overseas College (NOC)**
  – Each year, about 30 SoC students participate in NOC

• **Student Exchange Programme**
  Melbourne University, Stanford University, University of British Columbia, University of California L.A., University of Southern California, University of Texas-Austin, etc.
Opportunities for Internships
How well do foreign students do in NUS SoC?
Our Foreign Students

Cheong Kah Meng (2nd from right), Malaysian. Won award for entrepreneurship whilst still an undergraduate with SoC
Our Foreign Students

Luong Minh from Vietnam
(Undergraduate – Computer Science)

Winner of eGENTING Programming Competition 2007
Our Foreign Students

Hoang Viet Tung from Vietnam
(Undergraduate – Computer Science)

Presenting research paper at NUROP’2007 Conference
Our Foreign Students

Deepa Ramanathan from India
(Undergraduate – Computer Science)

SoC 2007 Class Valedictorian
Our Foreign Students

Mozat unleashes the potential in mobile devices

By CHO HUI FENG

"Still beginnings of a new era in mobile technology," says Michael Yin, people working on their phones are already an idea. "Basically, we want to provide people with the potential of mobile devices.

The idea behind Mozat was to provide people with the potential of mobile devices. With the growth of smartphones and the Internet, people are now capable of doing tasks on their devices that were previously only possible on a desktop. The key to Mozat is to harness the potential of mobile devices and provide a user-friendly experience.

Mozat was founded by Michael Yin and his partner, Mr. Hong, both Chinese engineers. The company started with the development of mobile applications and began to expand into other areas such as advertising and social media.

Mozat's founder, Michael Yin, says, "I believe that the future of mobile technology lies in the development of mobile applications that can be used in a variety of different contexts, from entertainment to education. Our goal is to provide people with a seamless mobile experience that they can use in their daily lives."
Outline

• Why Computing
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150-hectare Campus
Student Population

24,000 Undergraduate Students
7,000 Graduate Students
31,000 Students

Students from over 100 countries

28% International Students
Campus

Faculty of Engineering
Campus

Business School
Campus

School of Computing
Student Residence

Raffles Hall
Guaranteed 2 years stay for foreign students
National University of Singapore

14 Faculties

Faculty of Arts and Social Sciences
School of Business
School of Computing
Faculty of Dentistry
School of Design and Environment
Faculty of Engineering
Faculty of Law
Yong Loo Lin School of Medicine
Yong Siew Toh Conservatory of Music
Lee Kuan Yew School of Public Policy
Faculty of Science
University Scholars Programme
Outline

• Why Computing
• Why Computing in NUS?
• Study, Play, and Life in NUS
• How to Apply
• Q & A
How to apply to SoC?
Minimum to Apply (UEC)

**Good pass certificate**

- At least 6 subjects:
  - Including English Language and Chinese Language

**Minimum in English Language**

- \( EL1119: C6 \checkmark \) IELT: 6.0 \( \checkmark \) MUET: 221 \( \checkmark \) TOEFL: 550
Minimum to Apply (UEC)

University Entrance Exam? **NO**
(only for Medicine/Dentistry/Law/Nursing/Pharmacy)

SATS I & SAT II? **NO**
Deadline (UEC)

Apply online:

http://www.nus.edu.sg/oam/apply/

By:

31 December 2008
At least B for all subjects, with at least 4 advanced level subjects

Minimum in English Language: **MUET 221**

TOEFL: NO
IELTS: NO
University Entrance Exams: NO
Deadline (STPM)

Apply online:

http://www.nus.edu.sg/oam/apply/

By:

28 March 2009
Deadline
(Australian High School Exams)

Apply online:

http://www.nus.edu.sg/oam/apply/

By:

28 March 2009
Minimum scores needed?

We do not have minimum scores. Each year we look at all the students who apply and select the top students.

If you are a top student in your High School, we encourage you to apply!

Also list any achievements:
examples: prize in maths contest, prize in programming, etc.
Funding Available at NUS

NUS adopts a need-blind admissions policy

- If you are admitted, we will make sure that you can pay for your education!

Scholarships
- ASEAN undergraduate Scholarships
- National Infocomm Scholarships

Financial Aids
- Tuition Fee Loans
- NUS Study Loans
- Work-study programs
- Bank Loans
To Learn More

visit:

http://www.comp.nus.edu.sg/prospective_students/

email:

bcomp@comp.nus.edu.sg
So, is computing *really* interesting?!?!
Thank you!
Any Questions?

visit:

http://www.comp.nus.edu.sg/prospective_students/

email:

bcomp@comp.nus.edu.sg
Category D

Definition of Category D applicants

International applicants with qualifications other than Singapore-Cambridge A-levels and Polytechnic diplomas.

Admission requirements and closing dates

Applicants seeking admission to NUS must have completed or are completing high school, that is, at least twelve years of general education in the year of application. You may view the list of acceptable high school qualifications here.

Application closing dates apply according to your high school qualification. Unless otherwise specified, your complete application must reach the Office of Admissions by the application closing date.

Information on tuition fees, living expenses and hostels are found here.

English Language Requirement

The medium of instruction at NUS is English. Applicants are expected to have achieved a minimum level of English proficiency to enable them to benefit from an NUS education. For certain qualifications, applicants are also required to furnish additional English Language test scores. Please check here.
Application outcome

If you have submitted a complete application before the application closing date, your application will be processed and you will be informed officially of your application outcome in writing, by post. Outcome of applications for most applicants (except India and IB) will be released periodically, up to end May. If successful, you will receive an admissions package containing a Freshmen Guide, detailed instructions on how to complete your Student’s Pass application, application forms for campus accommodation, various loan schemes, together with your letter of offer.

Rejection of application

Inaccurate or false information or omission of material information will render your application invalid. The Office of Admissions reserves the right to reject applications that are incomplete or inaccurate. Persons admitted on the basis of inaccurate or false information may be expelled.

To submit an application for admission online, please click on the button below for the Category D Online Application Form

Apply Online
Application for the admission of international candidates to undergraduate courses in academic year 2009-2010

The application form consists of the following sections. Please complete all sections.

1. Personal Particulars
2. Contact Information
3. Academic Qualifications
4. Exceptional talents and achievements
5. Exemptions and Scholarships
6. Choice of Courses
7. Employment History
8. Disabilities and Special Needs
9. Next-of-Kin Information
10. Other Information
11. Admission PIN
12. Application Fee
13. Declaration

Fields that are marked with * are mandatory.

1. Personal Particulars

Name *
Date of Birth *
Gender
Citizenship *
Passport Number
Marital Status
Race/Ethnic Group
Religion

(leave blank if unavailable; if you are a Malaysian, please enter your Malaysian IC number)
6. Choice of Courses

In this section, in (a), please tell us your preferred choice of major. You need to complete (a) before you proceed to (b) to choose your preferred programmes. Please note that you must complete at least one of the faculties offering the double degree programme.

2. The faculties of:
   - COMPUTING
   - BIOENGINEERING
   - BUSINESS ADMINISTRATION
   - BUSINESS ADMINISTRATION (ACCOUNTANCY)
   - CHEMICAL ENGINEERING
   - CIVIL ENGINEERING
   - COMPUTER ENGINEERING
   - ELECTRICAL ENGINEERING
   - ELECTRONIC ENGINEERING
   - ENVIRONMENTAL ENGINEERING
   - INDUSTRIAL DESIGN
   - INDUSTRIAL & SYSTEMS ENGINEERING
   - MEDICINE
   - MECHANICAL ENGINEERING
   - NURSING
   - PHARMACY
   - PROJECT & FACILITIES MANAGEMENT
   - REAL ESTATE
   - SCIENCE
   - YOGA

First Choice
Second Choice
Third Choice
Fourth Choice
Fifth Choice

Note: For each choice, there is a drop-down menu comprising all single-degree courses which NUS offers. Application for the Music course should be filed separately. Please refer to the Yong Siew Toh Conservatory of Music (NUS) website at http://music.nus.edu.sg.

Students reading common Engineering will be streamed at the end of Year 1 to Bioengineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Engineering Science, Environmental Engineering, Industrial & Systems Science Engineering, Mechanical Engineering or Materials Science & Engineering.

For applicants who wish to apply for the Graduate LLB Programme, please opt for Law. You must have completed or are
Graduate Programme (PhD)

Generous financial support for PhD students

• Research Scholarship
  (Fee + Stipend $2,000 & above/month)
• PhD Top-up ($500)
• President’s Graduate Fellowship ($3,000 /month)
• Support for traveling to overseas conferences
• Research & Teaching Assistantships
# Graduate Programmes (PhD)

## Research Areas

### Computer Science
- Algorithms and Theory
- Artificial Intelligence
- Biomedical Computing
- Database Management Systems
- Information Security
- Media, Graphics and HCI
- Programming/Software Engineering
- Systems and Networking

### Information Systems
- Culture and Information Systems
- Economics of Information Technology
- Electronic Commerce
- Electronic Government
- Group Support Systems
- Negotiation Support Systems
- Information Privacy
- User-Database Interaction
PhD Requirements

1. Bachelors Degree in Computing or Related Field (2\textsuperscript{nd} Class Upper)

2. TOEFL/IELTs: YES

3. GRE/GMAT: YES
   GRE (CS subject) if Bachelors is not CS

4. Referee Reports: 3 sealed referee reports
PhD Deadlines

August’09 Intake: 15 Nov 2008

January’10 Intake: 15 May 2009

VISIT URL:
http://www.comp.nus.edu.sg/graduateprog/graduate.shtml