



PROF. JANET  
MILLER  
Mount Royal University  
**Student Counselling**




PROF. RANDY  
CONNOLLY  
Mount Royal University  
**Mathematics &  
Computing**




PROF. FAITH-MICHAEL  
UZOKA  
Mount Royal University  
**Mathematics &  
Computing**



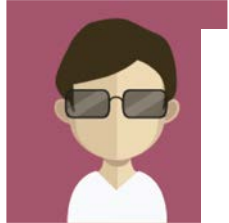
MARC SCHROEDER  
Mount Royal University



BARRY LUNT  
Brigham Young University



ANABELLA HABINKA  
Mbarara University Science & Technology



CRAIG MILLER  
DePaul University

# OVERVIEW

COMPUTING CAREERS TODAY	STUDENT UNDERSTANDING OF THE COMPUTING DISCIPLINES	GUIDE FOR ADVISORS AND CAREER COUNSELLORS
		



Tell us about yourselves

## WHAT ROLE DO YOU HAVE?

- Advisor
- Counsellor
- Educator
- Facilitator
- Administrator

## WHY ARE YOUR CLIENTS INTERESTED IN COMPUTERS?

- Employment prospects
- Interesting work
- Mobility prospects
- High pay
- Cultural coolness

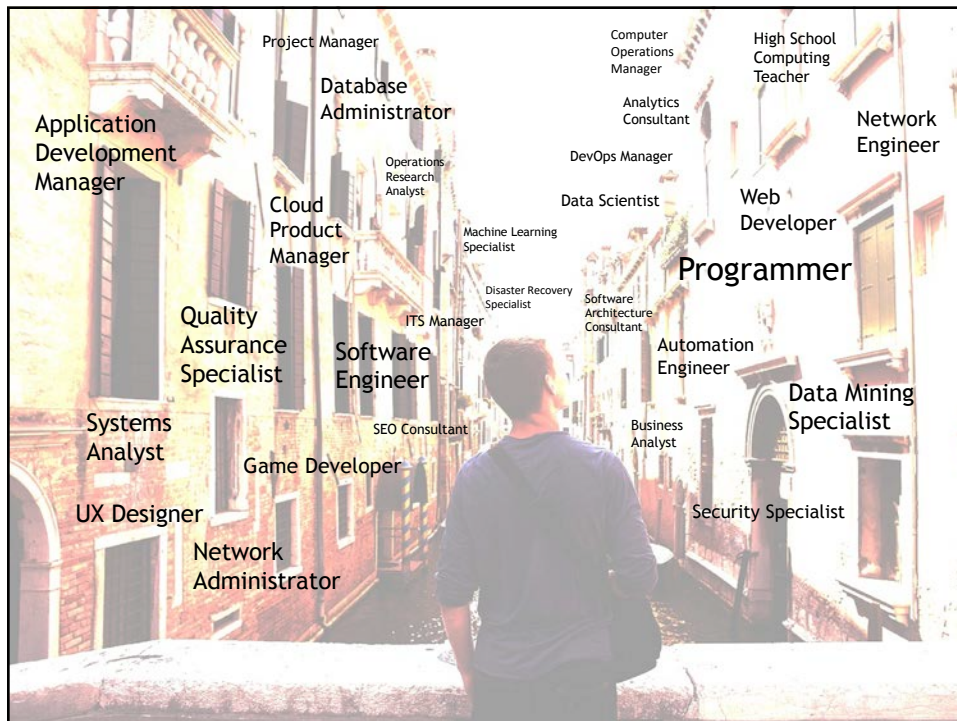
COMPUTER  
CAREERS  
TODAY



# COMPUTING

If you have a client who is interested in a career in computing, what kinds of programs and jobs do you think of?

FIRST WORDS THAT COME TO MIND?





WORLD ECONOMIC FORUM  
COMMITTED TO IMPROVING THE STATE OF THE WORLD

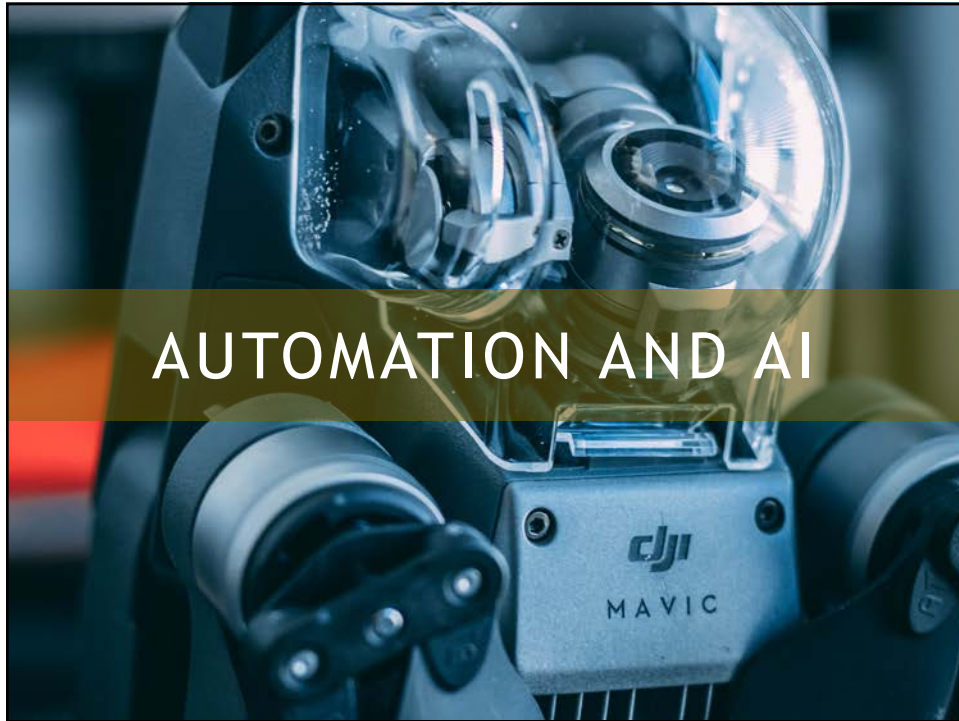
Global Challenge Insight Report

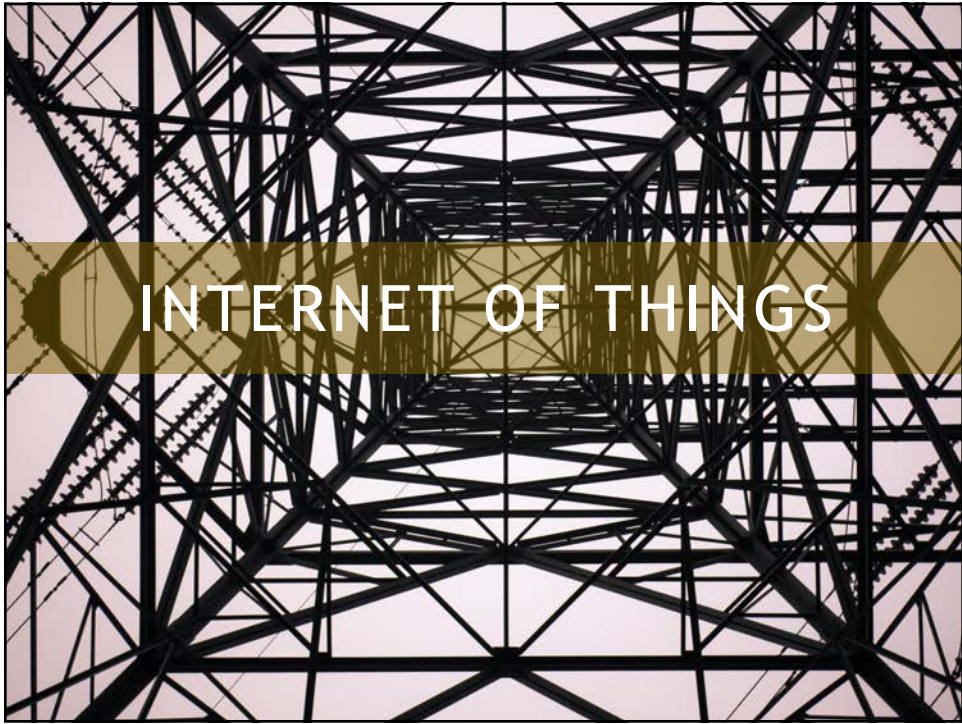
## The Future of Jobs

Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution

January 2016









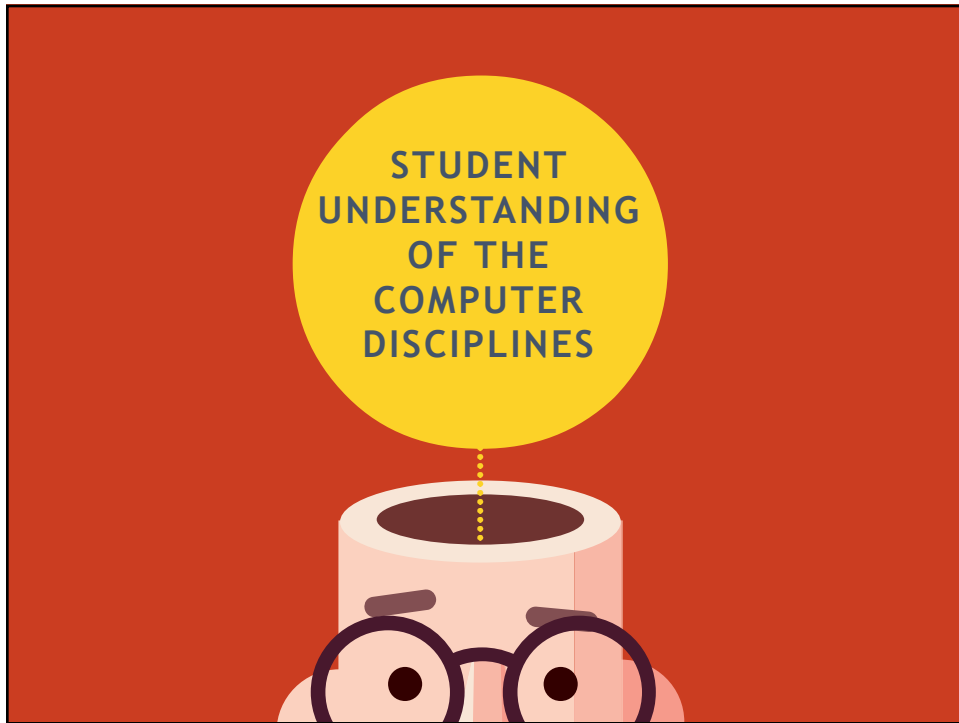




# GIG ECONOMY









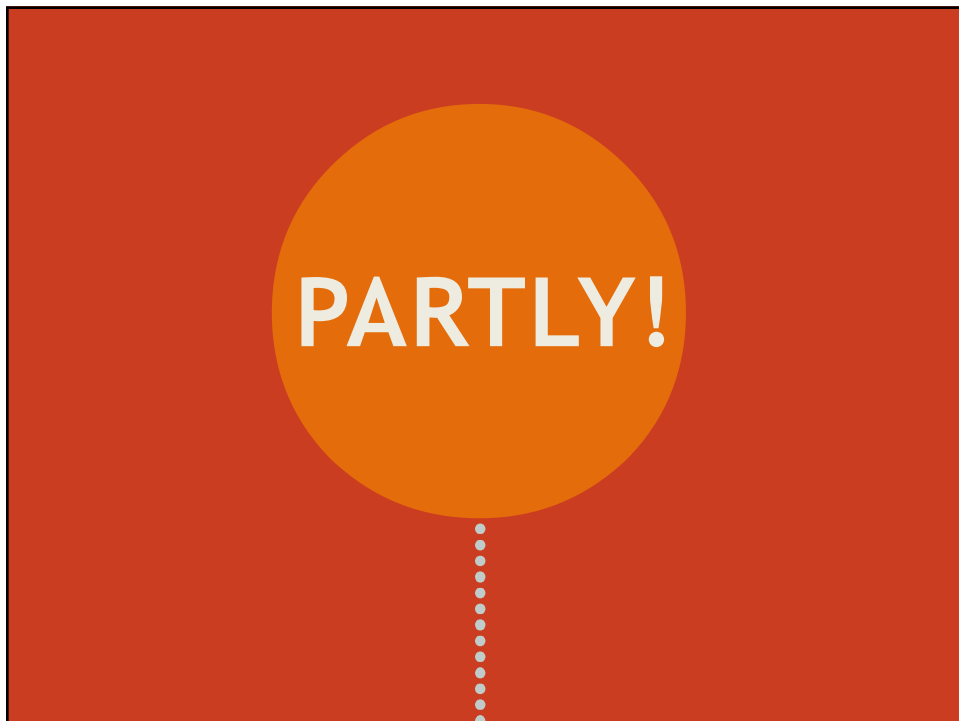
EMPLOYMENT GROWTH IN COMPUTING  
SECTOR CONTINUES TO BE **VERY** STRONG.



# COMPUTING DISCIPLINES

The ACM has identified five computing disciplines, as well as mixed majors combining computing with other areas of expertise.

 <b>COMPUTER ENGINEERING</b>	 <b>COMPUTER SCIENCE</b>	 <b>INFORMATION SYSTEMS</b>
 <b>INFORMATION TECHNOLOGY</b>	 <b>SOFTWARE ENGINEERING</b>	 <b>OTHER SPECIALIZATIONS</b>



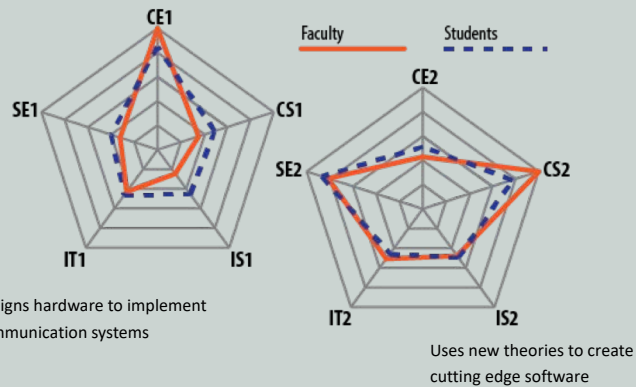
	Computer Engineering	Computer Science	Information Systems	Information Technology	Software Engineering
Designs hardware to implement communication systems	Best Fit → <input checked="" type="checkbox"/> 5	<input type="checkbox"/> 5	<input type="checkbox"/> 5	<input type="checkbox"/> 5	<input type="checkbox"/> 5
	<input type="checkbox"/> 4	<input type="checkbox"/> 4	<input type="checkbox"/> 4	<input type="checkbox"/> 4	<input type="checkbox"/> 4
	<input type="checkbox"/> 3	<input type="checkbox"/> 3	<input type="checkbox"/> 3	<input checked="" type="checkbox"/> 3	<input type="checkbox"/> 3
	<input type="checkbox"/> 2	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 2	<input type="checkbox"/> 2	<input type="checkbox"/> 2
	No Fit → <input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input checked="" type="checkbox"/> 1
Unsure / Don't Know → <input type="checkbox"/> 0	<input type="checkbox"/> 0	<input checked="" type="checkbox"/> 0	<input type="checkbox"/> 0	<input type="checkbox"/> 0	



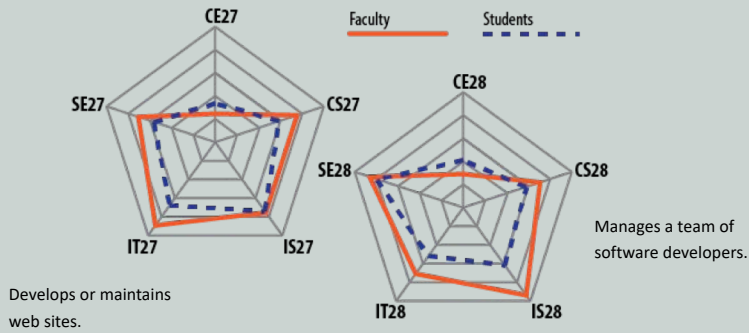
### OUR STUDY

Our study asked faculty and students to choose how much each task fit with each of the five disciplines for over 30 different tasks.

### FOR SOME QUESTIONS, STUDENT + FACULTY RESULTS WERE SIMILAR

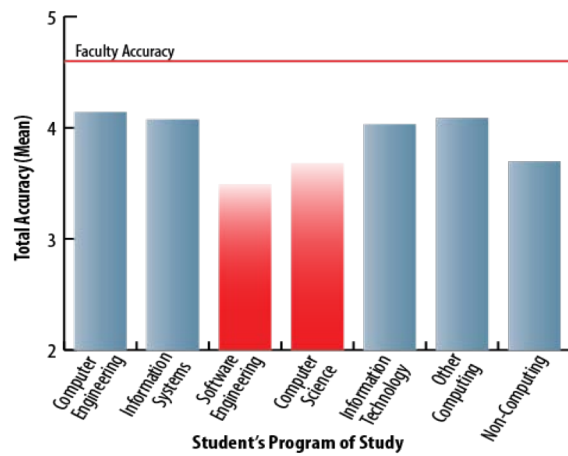


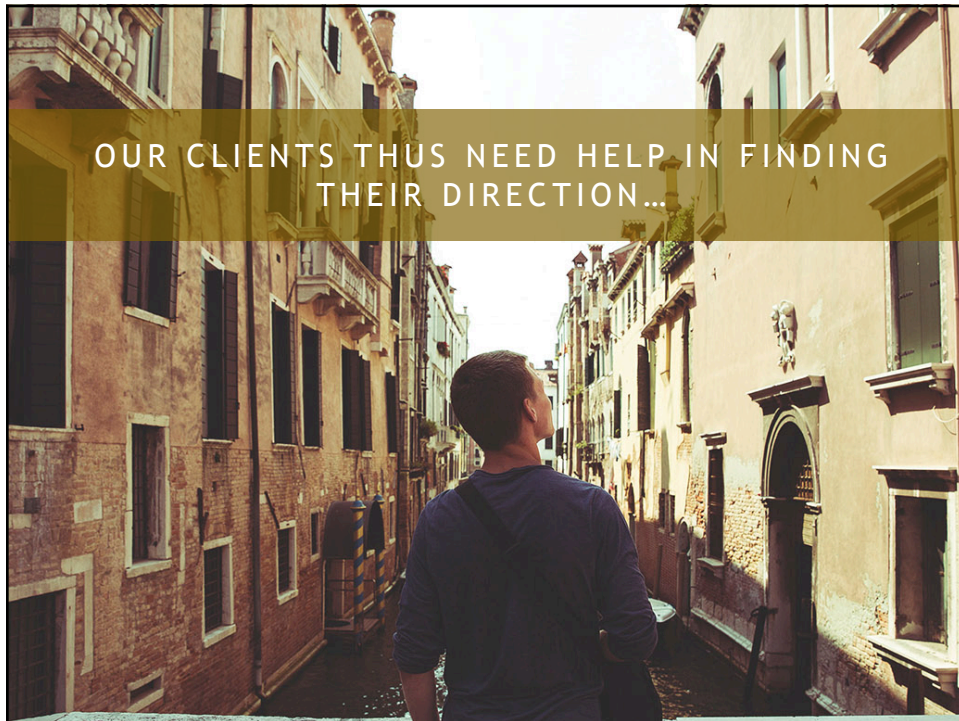
BUT FOR OTHER QUESTIONS, STUDENT + FACULTY RESULTS WERE NOT SIMILAR



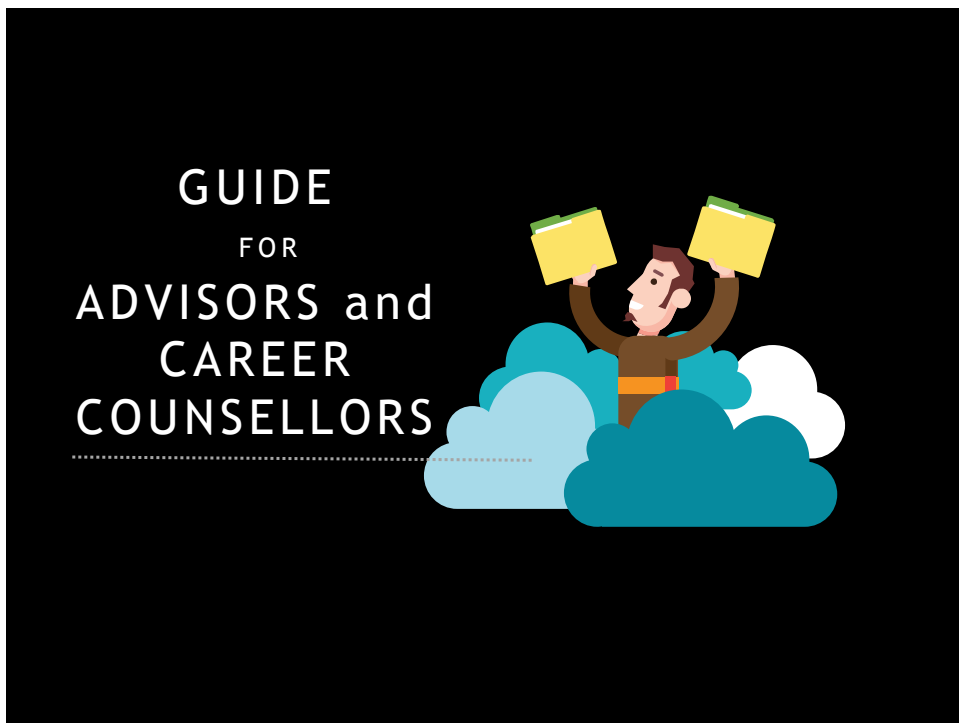
WHY?  
THESE TASKS DO NOT “BELONG” TO ANY ONE DISCIPLINE

INTERESTINGLY, CS AND SE STUDENTS HAD THE LOWEST ACCURACY ... EVEN LOWER THAN THE NON-MAJOR STUDENTS!

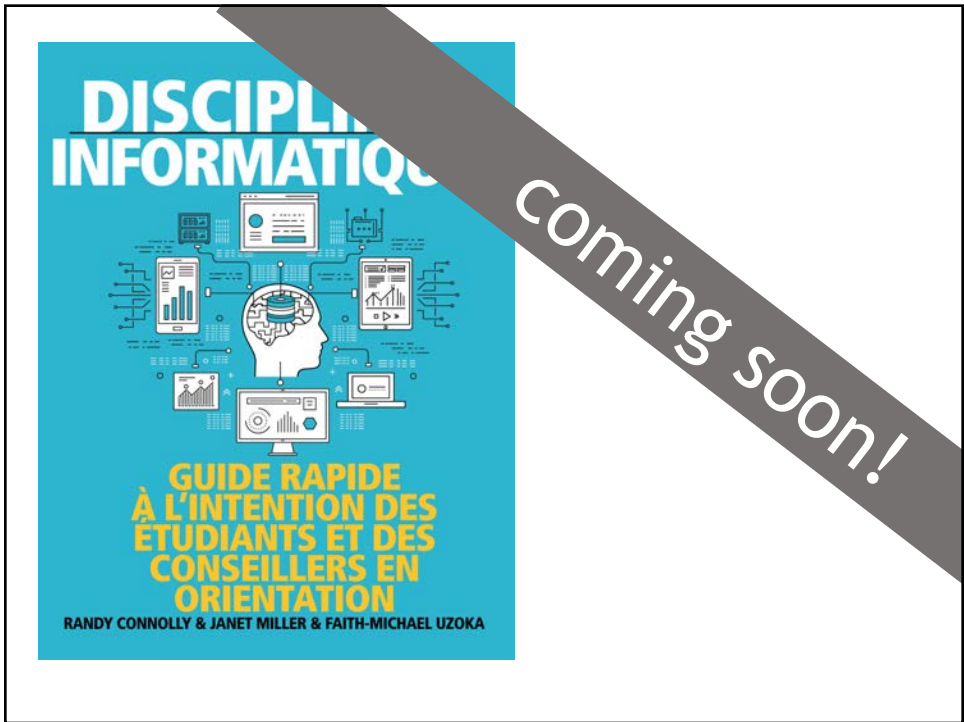
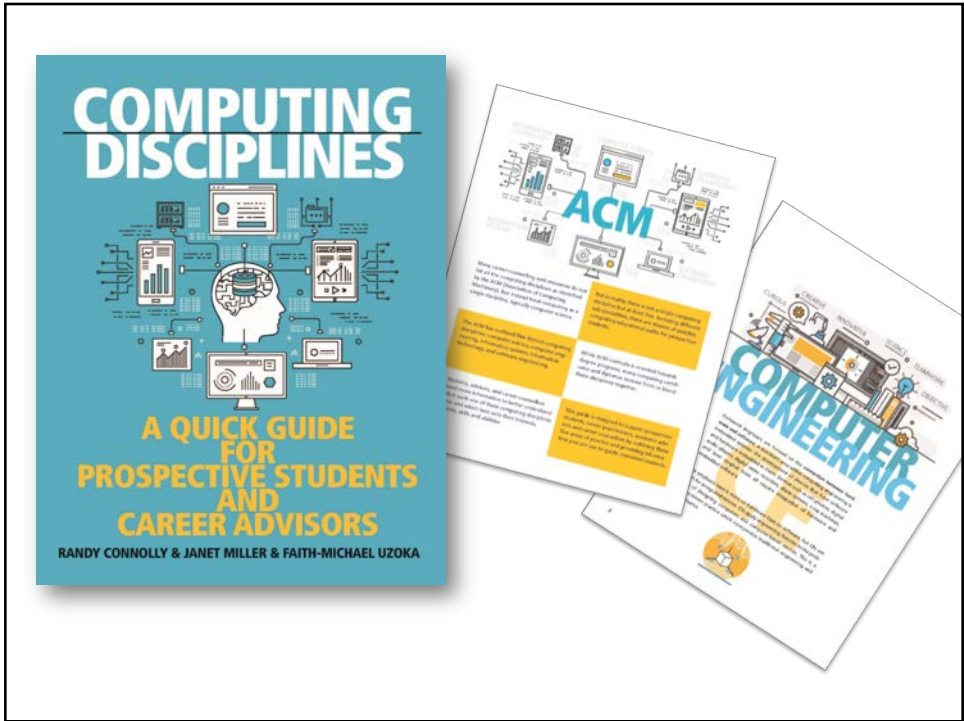




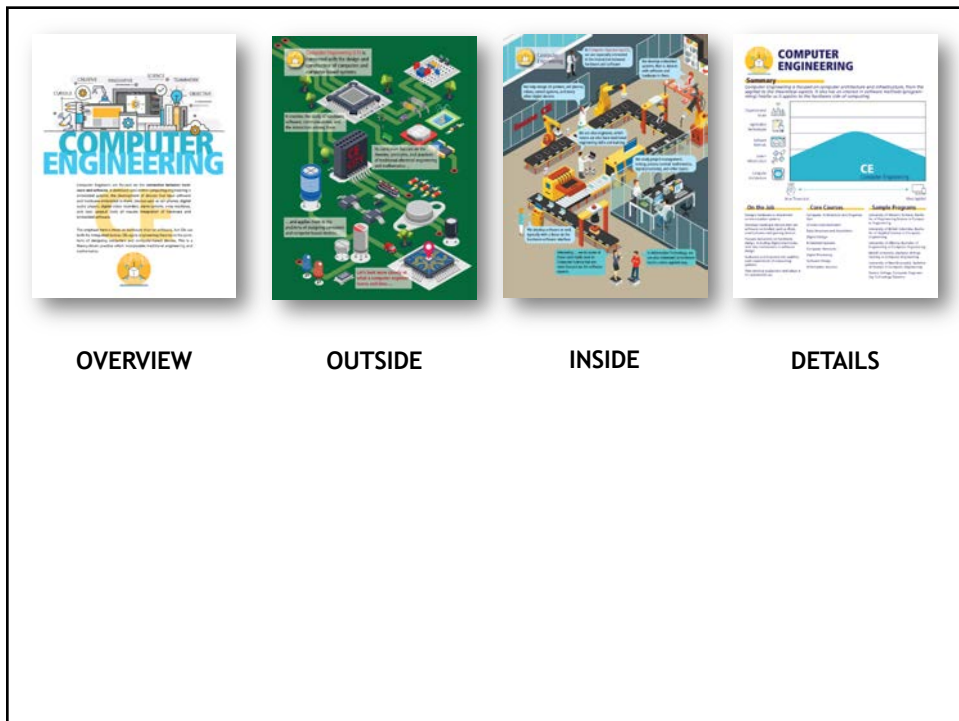
OUR CLIENTS THUS NEED HELP IN FINDING  
THEIR DIRECTION...

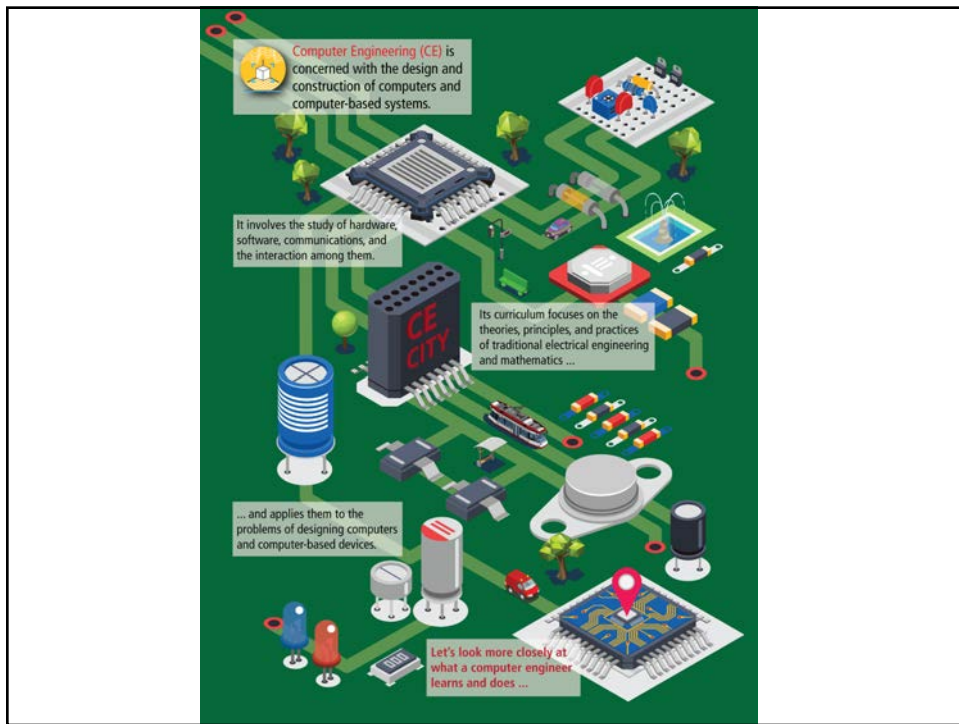
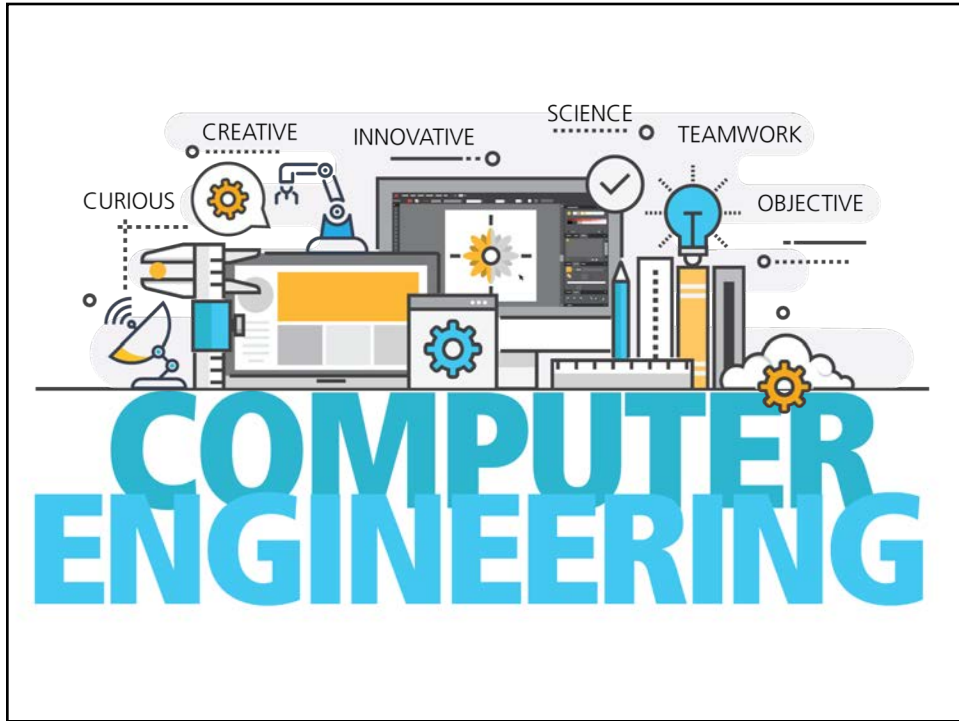


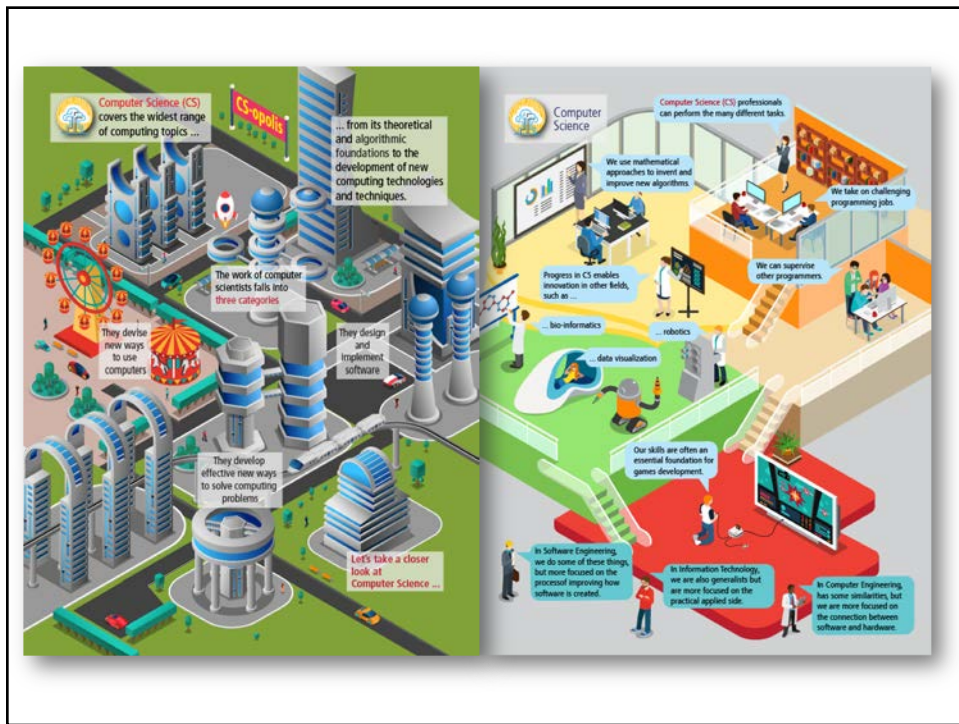
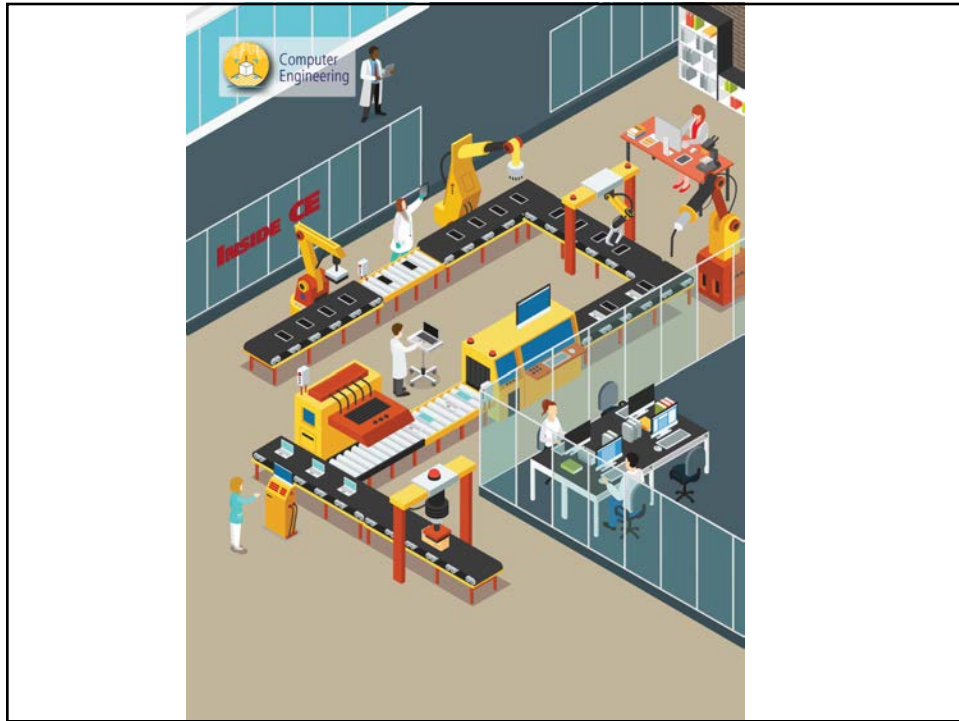
GUIDE  
FOR  
ADVISORS and  
CAREER  
COUNSELLORS

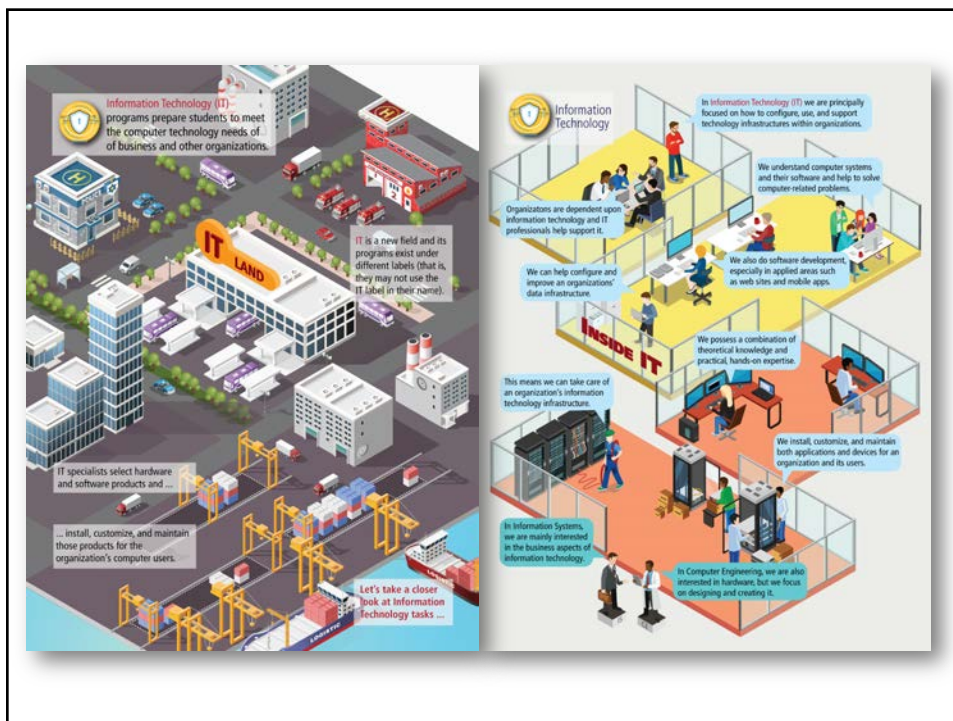


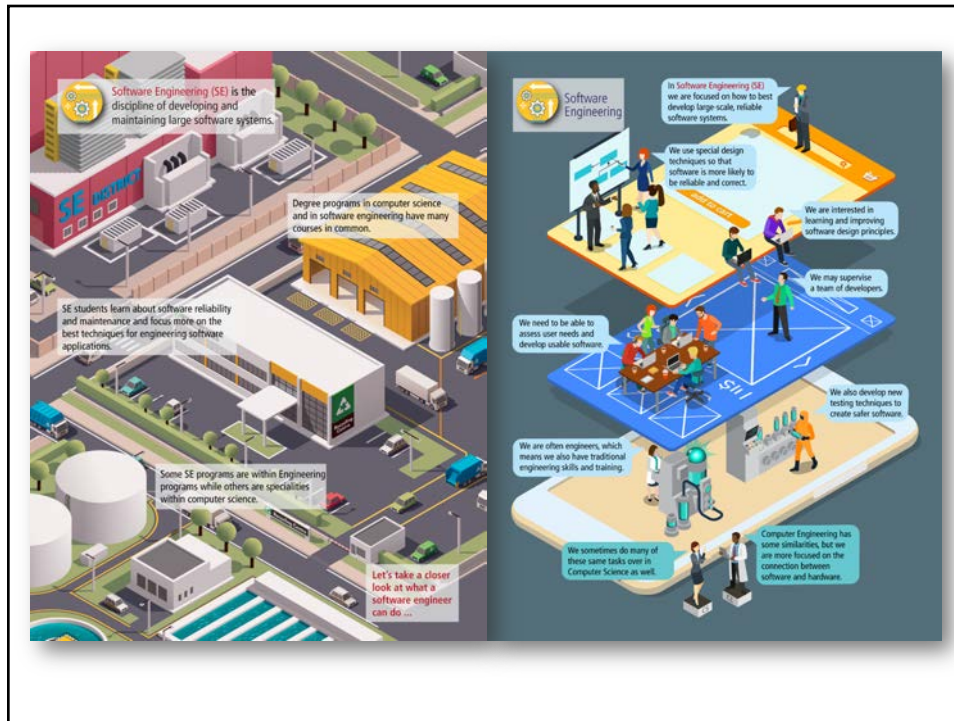











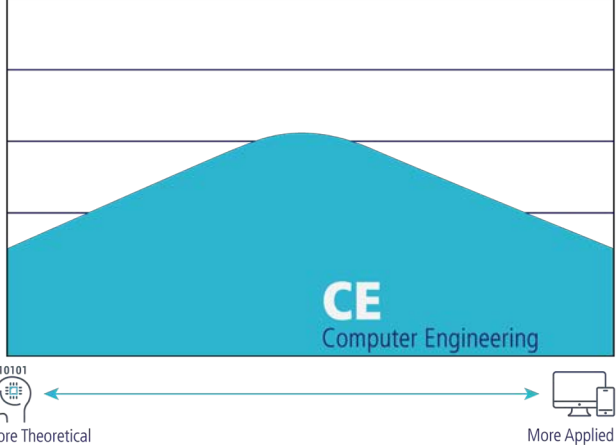





# COMPUTER ENGINEERING

**Summary**  
*Computer Engineering is focused on computer architecture and infrastructure, from the applied to the theoretical aspects. It also has an interest in software methods (programming) insofar as it applies to the hardware side of computing.*

- Organizational Issues
- Application Technologies
- Software Methods
- System Infrastructure
- Computer Architecture

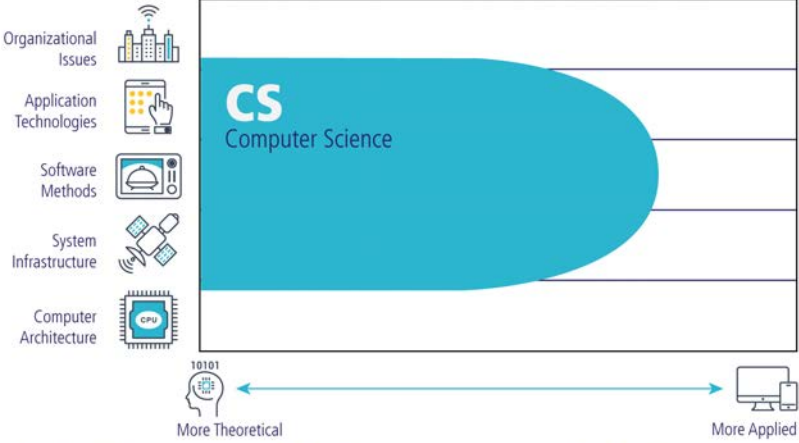




# COMPUTER SCIENCE

**Summary**

*Computer science has the widest range of computing topics. It focuses especially on the theoretical aspects of computing, leaving the more applied topics (and organizational and architecture issues) to other disciplines.*



Organizational Issues

Application Technologies

Software Methods


System Infrastructure

Computer Architecture

**CS**  
Computer Science

10101  
More Theoretical

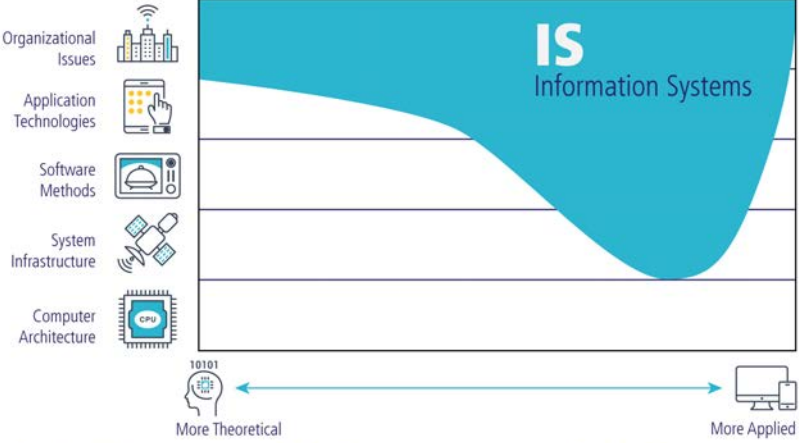
More Applied



# INFORMATION SYSTEMS

**Summary**

*Information Systems is focused on the organizational issues of computing. Information Systems also has an interested in the applied aspects of application technologies and software development.*



Organizational Issues

Application Technologies

Software Methods


System Infrastructure

Computer Architecture

**IS**  
Information Systems

10101  
More Theoretical


More Applied





# INFORMATION TECHNOLOGY


**Summary**


*Information Technology is focused on the applied side of computing. It covers all aspects of technology infrastructure, including hardware, operating systems, applications, data storage and communication systems.*

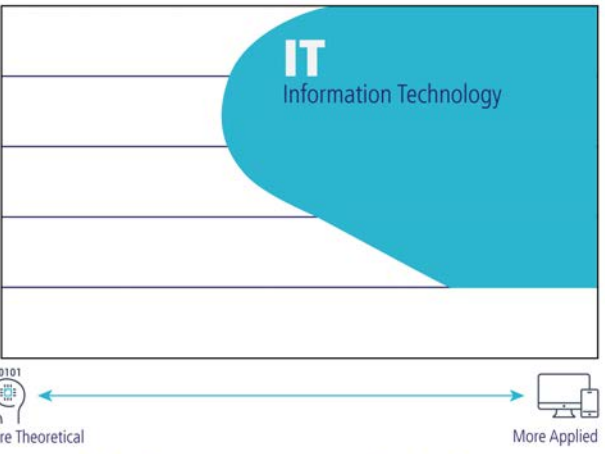
Organizational Issues 


Application Technologies 

Software Methods 

System Infrastructure 

Computer Architecture 








# SOFTWARE ENGINEERING


**Summary**


*Software Engineering is focused on everything (from applied to theoretical) related to software methods, that is, writing software. Infrastructure and application technologies are also part of software engineering.*

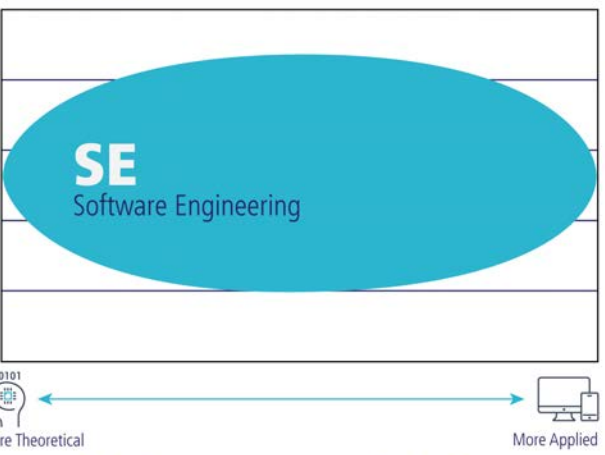
Organizational Issues 

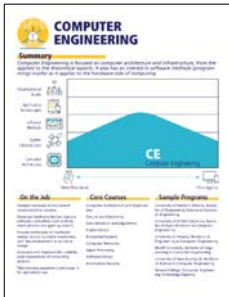
Application Technologies 

Software Methods 

System Infrastructure 

Computer Architecture 





### On the Job

- Designs hardware to implement communication systems.
- Develops hardware devices that are software-controlled, such as iPods, smart phones and gaming devices.
- Focuses exclusively on hardware design, including digital electronics, with less involvement in software design.
- Evaluates and improves the usability (user experience) of computing systems.
- Take existing equipment and adapt it for specialized use.

### Core Courses


- Computer Architecture and Organization
- Circuits and Electronics
- Data Structure and Algorithms
- Digital Design
- Embedded Systems
- Computer Networks
- Signal Processing
- Software Design
- Information Security

### Sample Programs

- University of Western Ontario, Bachelor of Engineering Science in Computer Engineering
- University of British Columbia, Bachelor of Applied Science in Computer Engineering
- University of Alberta, Bachelor of Engineering in Computer Engineering
- McGill University, Bachelor of Engineering in Computer Engineering
- University of New Brunswick, Bachelor of Science in Computer Engineering
- Seneca College, Computer Engineering Technology Diploma

THESE ACM DISCIPLINES  
ARE PATHWAYS TO JOBS...

BUT SOME DESTINATIONS  
(JOBS) HAVE MULTIPLE  
PATHS LEADING TO THEM.



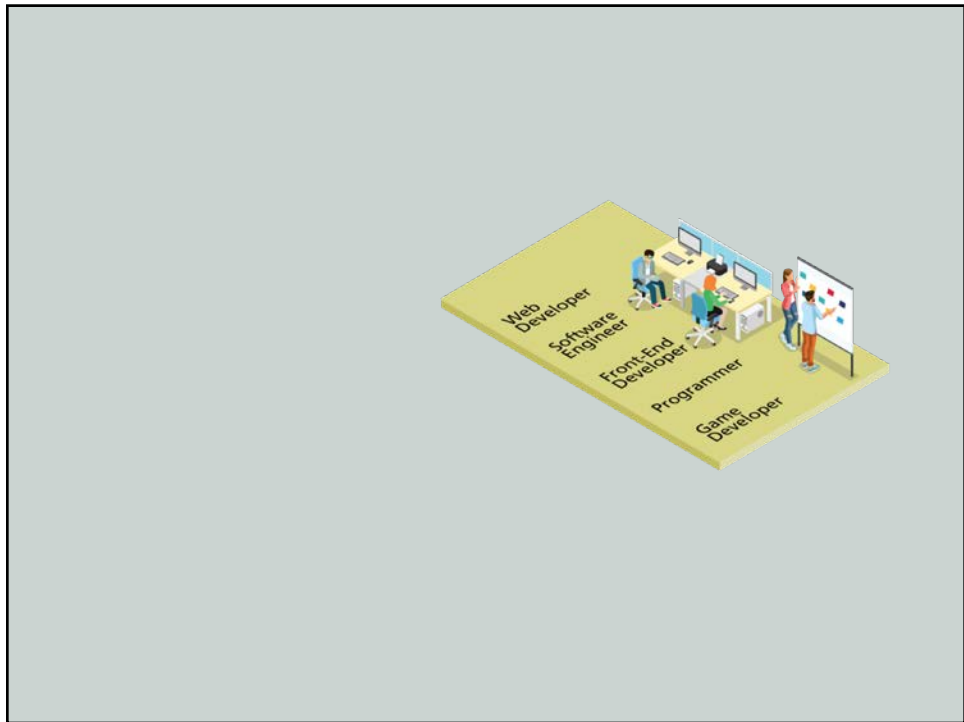
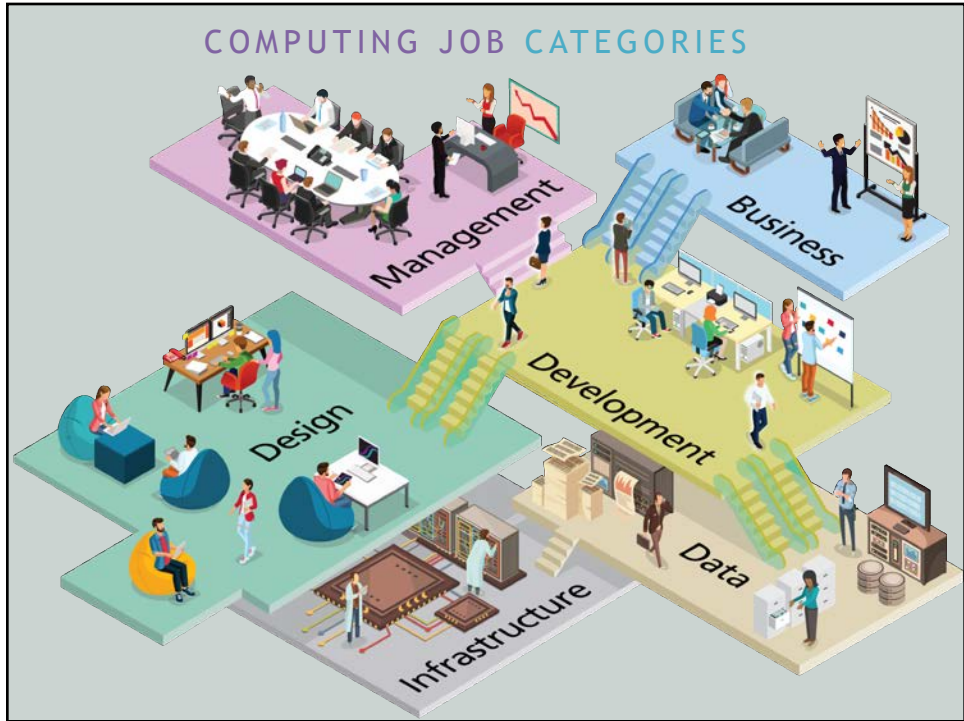


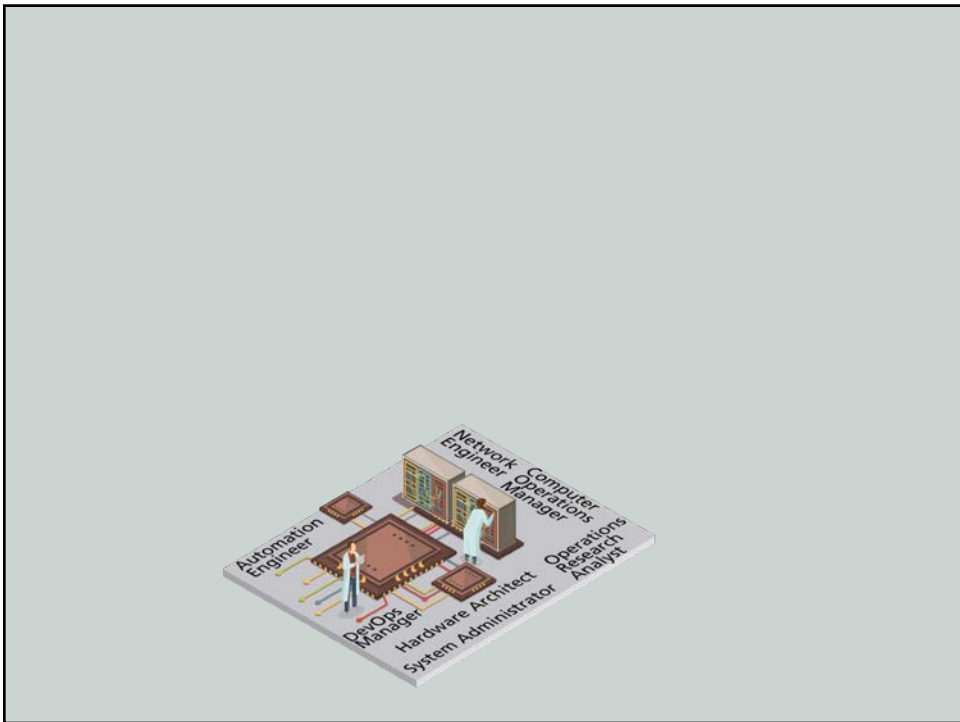
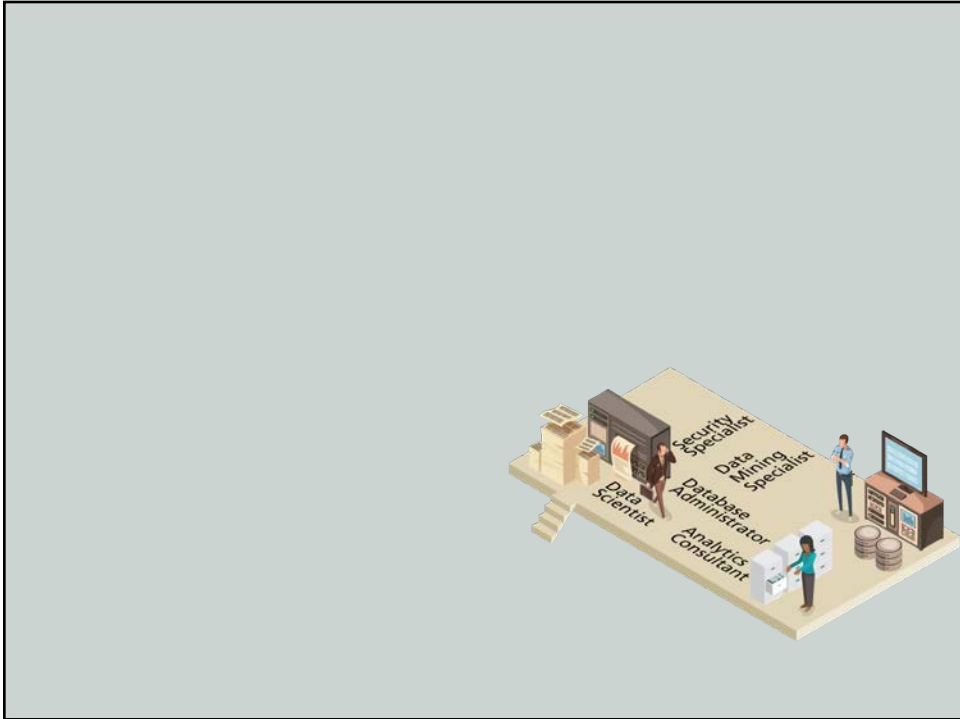
Job Title	Computing Discipline					Possible Additional Training
	CE	CS	IS	IT	SE	
Business System Analyst			★		★	Business/Commerce
Computational Scientist		★				Mathematics, Sciences
Computer Network Support Specialist	★			★		
Data Analyst		★	★			Statistics
Database Administrator		★	★	★		
Gaming & Multimedia Specialist		★			★	Graphic Design, Creative Writing
Hardware Engineer	★					Electrical/Electronic Engineering
Information Security Analyst		★	★	★		
IT/IS Consultant		★	★	★		
Medical Computing / Bioinformatics		★				Biology, Health Sciences, Statistics
Project Manager	★	★	★	★	★	
Quality Assurance Specialist	★	★	★	★	★	
Software Developer	★	★	★	★	★	
Systems Administrator	★			★		

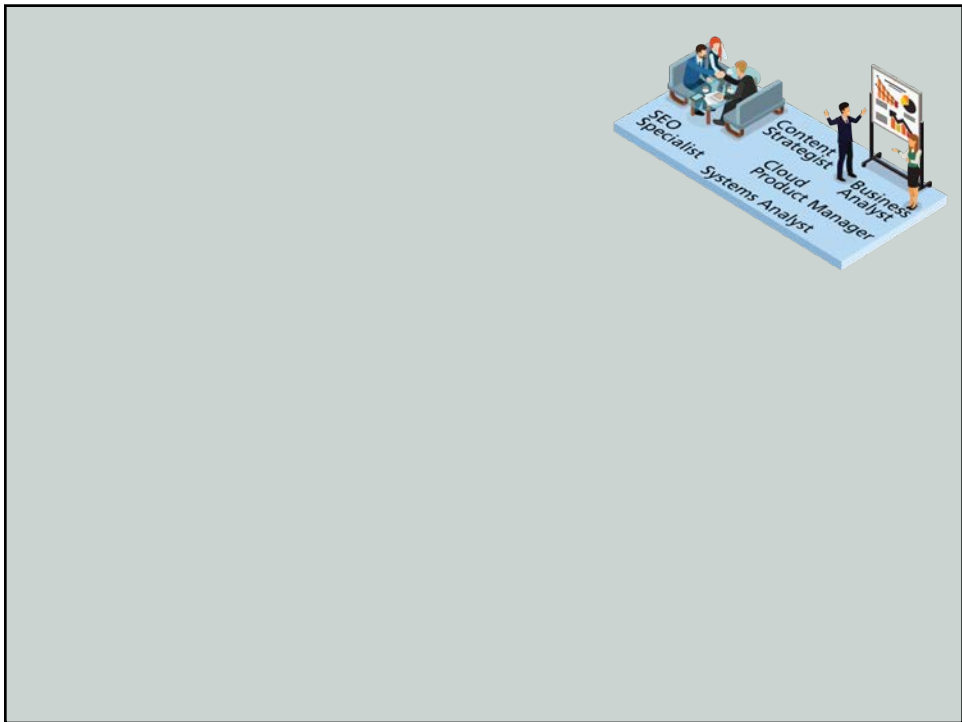
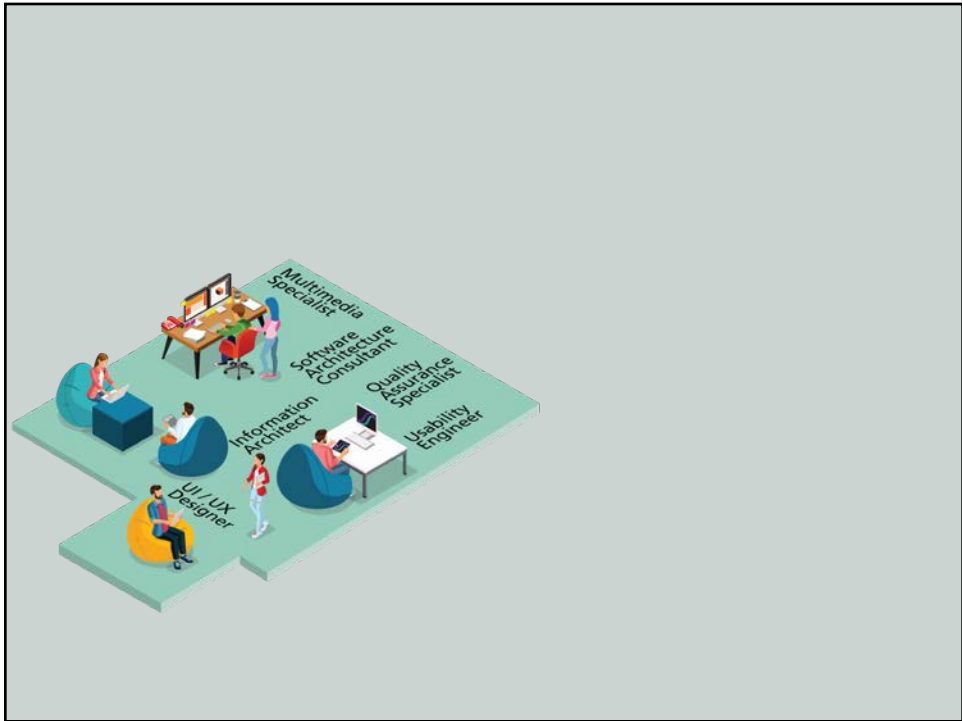
FOR THIS REASON, WE  
RECOMMEND ASKING  
YOUR CLIENTS ...

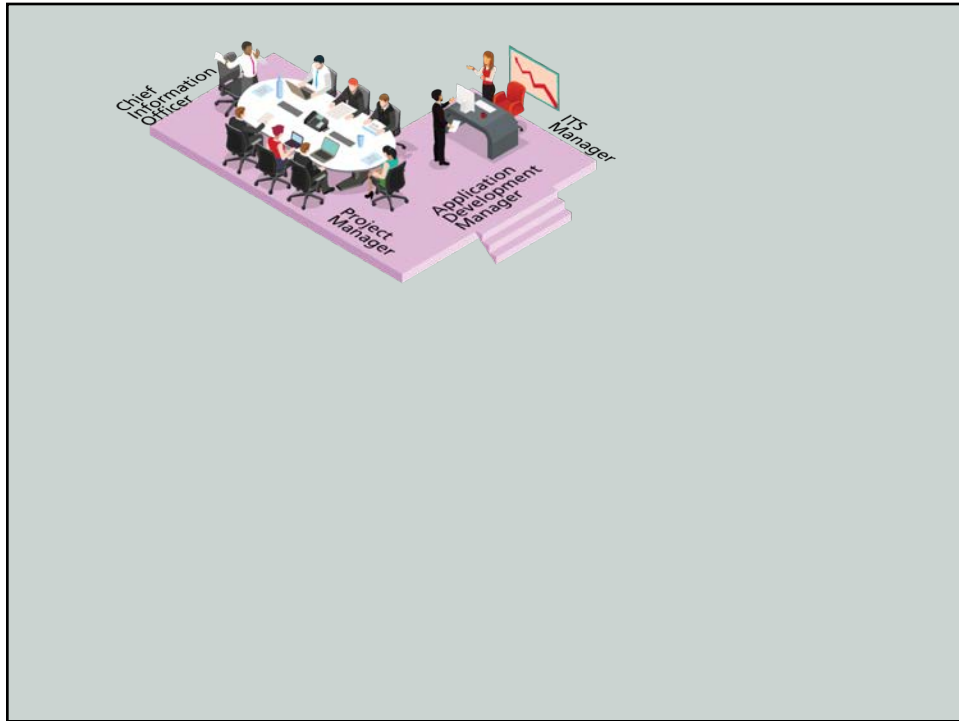


... WHAT KIND OF  
COMPUTING WORK ARE  
THEY INTERESTED IN









FINALLY, REMEMBER  
THAT EMPLOYERS  
CONSISTENTLY SAY  
THEY ARE **LOOKING**  
FOR THE SAME KEY  
SKILLS, REGARDLESS OF  
THE COMPUTING JOB  
CATEGORY.

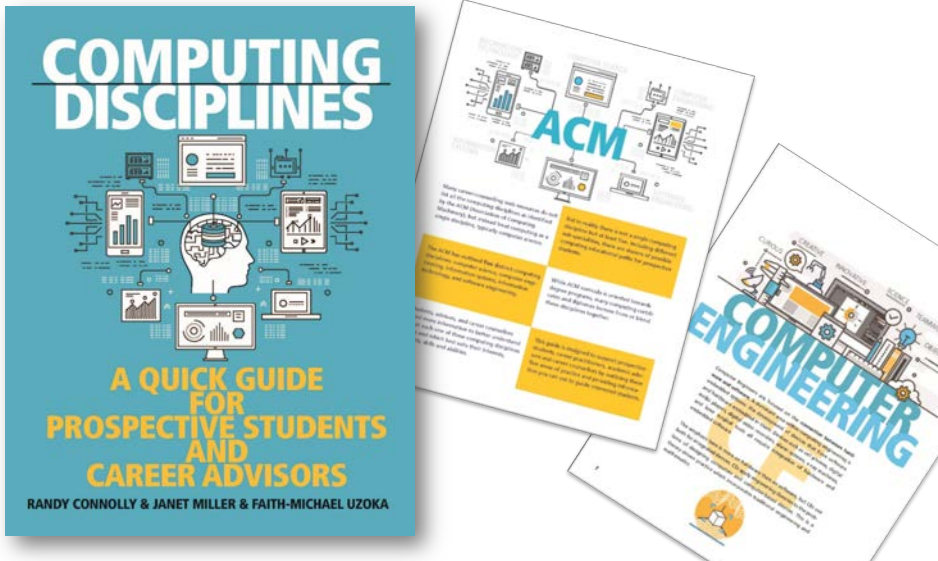












**COMPUTING DISCIPLINES**

**A QUICK GUIDE FOR PROSPECTIVE STUDENTS AND CAREER ADVISORS**

RANDY CONNOLLY & JANET MILLER & FAITH-MICHAEL UZOKA

<http://ceric.ca/publications>



Final poll

DO YOU FEEL MORE  
CONFIDENT ADVISING  
ABOUT COMPUTING?

- No way, still too confusing
- Not quite, but this will help
- Undecided
- Yes, this has helped
- Already was pretty confident



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