Computer Science @CSI

New Student Orientation
Overview

- Our degree programs
- Jobs in the Computing Field
- Student Projects
- Faculty Research
Programs in Computer Science

- Bachelor’s program: Nationally accredited since 1989
- Interdisciplinary degrees: Math; Bio Informatics;
- MS degree – 30 credits; Network Security
- PhD program with CUNY
Accreditation

- Rigorous review every few years
- Interview faculty, students, administrators
- One of four accredited programs in NYC
- One of ten in NY State
- Continuous assessment leading to...
- Program improvement
Employment Outlook

- The top job in America in 2011 is in Computing according to CareerCast.com:
  - “The geeks strike back… Software Engineer ranks as the Best Job of 2011.”

- “Software Engineer: job that involves the design and creation of software for everything from operating systems to cell phone "apps" to interactive games.”
US Govt: Computing Jobs Forecast


The fastest growing jobs: **Network Systems and Data Communications Analysts**, projected to grow 53.4%, **Computer Software Engineers for Applications** (34%) and **Systems Software** (30.4%).

For the foreseeable future, nearly 3 out of 4 new STEM jobs in the U.S. are going to be in computing! 27% (295,200 jobs) of the new STEM jobs will be in **software engineering** alone.

The Computer Research Association (CRA) reported, "according to the United States Department of Labor, computer science graduates on average **earn 13 percent more** than the average college graduate. According to the Bureau of Labor Statistics, future job prospects for computer science graduates are higher than for any other science."
CS Course Electives

Game Development – iPhone/iPad/Windows 7
- Introduction to Game Development CSC 227
- Advanced Game Development CSC 427
- Artificial Intelligence CSC 480
- Computer Graphics CSC 470

Networking and Security
- Hacking CSC 223
- Internet Security CSC 421
- Computer Networking CSC 435

High Performance Computing
- Introduction to HPC CSC 229
- Advanced HPC CSC 429
CSC 227 Introductory Computer Game Programming

Game development principles
2D Game Creation
Game Testing
Our Graduates

- Avenue Capital Group
- NewYork-Presbyterian
- Google
- CSI
- Penn State
- Lockheed Martin
CSC 427 Advanced Computer Game Programming

Game Genres

Game Design

Setting

Graphics,

Audio,

Motion control,

Agents

Scripting

Projects
Faculty Research

- Image Processing
- Neural Networks
- Computer Performance Evaluation
- Mobile Computing
- Machine Learning
- Artificial Intelligence – Data Mining
- Operating Systems – Scheduling
- Graph Theory
- Cryptography
Real-Time Automatic Target Tracking

• Air force needs automatic target tracking capability in order to
  – drop a bomb on a ground target
  – locate, identify, catalog targets
  – analyze motion/behavior pattern

• Challenge
  – Complex environment
  – Noisy images, occluded targets
  – Abrupt target motion
  – Real-time implementation

• Approach
  – Fuse multiple tracking methods
  – Develop fast algorithm
Medical Image Segmentation for Clinical Applications

• Medical image segmentation
  – is to partition a medical image into distinct anatomical regions
  – helps to identify anatomical and pathological boundaries for diagnosis or operative planning
  – can dramatically reduce doctor workload

• Challenge
  – Noisy images
  – Boundaries poorly defined
  – Structures have complex shapes
  – Signs of clinical interest are subtle

• Approach
  – Curve evolution & snake deformation

MRI Brain Slice
Extracting white matter…

white matter  gray matter  cerebro-spinal  meninges

original
Wireless Computing

• A Wireless Sensor Network (WSN) is a low-cost, rapid deployable, self-organizing, and fault tolerant networked sensors.
• Sensor nodes carry out simple computations and transmit the required data via wireless connections in multi-hops.
• Large number of sensor nodes are densely deployed in most of applications.
• Powered by external batteries.
• A wide range of applications, environment monitoring, homeland security, EMS/first response team, health care.
Advisement – new students

- Take CSC 126 and MTH 123 or higher
- As early as possible