Welcome!

Computer & Information Sciences
University of Delaware
New Student Orientation
Monday August 29, 2016

Stephen Siegel
Undergraduate Committee Chair

Thanks to my predecessors, Keith Decker and Sandee Carberry, who let me copy a lot of their material for this presentation
• Medicine
  • medical imaging
  • patient monitoring
  • record keeping
  • surgery
  • diagnostics
  • pharmaceuticals
  • prosthetics
  • remote care
  • nanotechnology

• Art
  • digital art
  • virtual reality
  • photography

• Biology
  • genomic research
  • genetic engineering

• Aviation
  • aircraft design
  • flight control
  • air traffic control
  • baggage tracking

• Communications
  • data networks
  • voice
  • cell phones
  • instant messaging
  • multi-media messaging
  • email

• Education
  • course instruction
  • class scheduling
  • remote learning

• Entertainment
  • movie production
  • digital music
  • animation
  • media distribution
  • media playback
  • computer games

• Hospitality
  • hotel management
  • restaurant management
  • reservations
  • ticketing
  • theme park rides

• Finance
  • stock trading
  • banking transactions
  • actuarial analysis

• Manufacturing
  • product production
  • inventory management

• Defense
  • weapons design
  • weapons control
  • battlefield management
  • communications
  • intelligence
  • code breaking

• Security
  • surveillance
  • access control
  • intrusion detection

• Archaeology
  • mapping
  • analysis
  • record keeping

• Transportation
  • scheduling
  • reservations
  • ticketing
  • tracking
  • mapping

• Home Management
  • personal finance
  • security
  • communication
  • web

• Automotive
  • design
  • manufacturing
  • location detection
  • repair and maintenance

• Agriculture
  • financial management
  • crop management
  • crop planning

• Recreation
  • lift tickets

• Energy
  • exploration
  • generation

• News
  • weather forecasting
  • weather measurement
  • newspaper publication

• Publishing
  • subscription services
  • book production

• Retail
  • point of sales
  • inventory control
  • advertising
  • shipping
  • customer service

• Environment
  • energy efficiency
  • water quality
  • air quality
  • animal management
  • environmental monitoring

• Sports
  • scheduling
  • scoreboards
  • scorekeeping
  • training
  • film management
  • statistics
  • race timing

• Government
  • voting
  • legislation
  • regulation
  • taxation
  • licensing

• Fashion
  • design
  • manufacturing
  • smart clothing

• Law
  • law enforcement
  • contracts

PERVASIVE
In Greenville, S.C., G.E. makes giant gas turbines. The turbines can be brought to market in half the usual five years through changes in design and production made possible by digital technology.
DEPARTMENT OF COMPUTER & INFORMATION SCIENCES

DEGREE PROGRAMS OFFERED BY CISC

- B.S. Computer Science
- B.S. Information Systems
- B.A. Computer Science

Total current majors: 314 (including 67 today)

- Computer Science Minor
- Bioinformatics Minor [+ Computational Biology Minor]
- [Interactive Media Minor; Global Enterprise Technology Minor]
Some things you can do with a Computer Science degree...
RECENT GRAD SCHOOLS

U of Washington  U of Maryland
U of Texas Austin  U of Virginia
UMass Amherst  UC Davis
Princeton  UC Santa Cruz
Cornell  U of Wisconsin
Johns Hopkins  Drexel U
Duke and U of Delaware...
Scott Sorensen
PhD student
Imaging arctic sea ice
Trilce Estrada
Assistant Professor
Department of Computer Science
Curriculum Vitae

Education
PhD, Computer Science, University of Delaware, 2012

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Mailing Address
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Albuquerque, NM 87131-1070
Roger Craig
Jeopardy champion
record, single-day winner
MS, PhD, Computer Science
University of Delaware
Mark Lasoff, academy award for visual effects, *Titanic*
Double major: computer science, electrical engineering
RECENT UNDERGRAD H I R E S
Here's the list of Payscale's top 25 computer science colleges (which includes 27 schools due to ties) based on data from its 2015-2016 College Salary Report.

Best Schools for Computer Science Majors

1. University of California, Santa Barbara
   Early career median pay: $71,700
   Mid-career median pay: $147,000

2. University of California, Berkeley (tie)
   Early career median pay: $96,400
   Mid-career median pay: $145,000

4. University of Delaware
   Early career median pay: $66,700
   Mid-career median pay: $143,000

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Software Engineer

**Rank:** 1 of 50
Top job in field: Release Engineer

**Grades:**
- Stress: B
- Flexibility: B
- Creativity: A
- Difficulty: C

**Average pay:** $80,427

75% in this career make more than: $67,362
50% in this career make more than: $76,294
25% in this career make more than: $86,530
Top potential compensation (5% make more): $147,338

**10-year job growth:** 46.07%

Total jobs 2004: 800,050
Forecast 2014: 1,168,639

Average annual growth (including new jobs and net replacement): 44,770

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<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Total, All Occupations</td>
<td>145,355.8</td>
<td>15,628.0</td>
<td>$34,750</td>
</tr>
<tr>
<td>Management Occupations</td>
<td>8,861.5</td>
<td>636.6</td>
<td>$93,910</td>
</tr>
<tr>
<td>Business and Financial Operations Occupations</td>
<td>7,167.6</td>
<td>898.1</td>
<td>$62,500</td>
</tr>
<tr>
<td>Computer and Mathematical Occupations</td>
<td>3,814.7</td>
<td>685.8</td>
<td>$76,270</td>
</tr>
<tr>
<td>Architecture and Engineering Occupations</td>
<td>2,474.5</td>
<td>179.6</td>
<td>$73,540</td>
</tr>
<tr>
<td>Life, Physical, and Social Science Occupations</td>
<td>1,249.1</td>
<td>125.7</td>
<td>$60,100</td>
</tr>
</tbody>
</table>
start a '(...)',
    nest = 1
    while nest:
        # ...finish it
            p = p + 1
            if s[p] == '(': nest = nest + 1
            if s[p] == ')': nest = nest - 1
            p = p + 1

#--------------------------------------------------------
def splitExprs(s):
    # split on delimiters, ignoring those nested in '[[...]]' or '(...)'
    outexpr = []
    outdelim = []
    while s:
        end = endOfExpr(s)
        outexpr.append(s[:end])
        if end >= len(s)-1: outdelim.append('')
        elif end < len(s)-1 and 
            s[end:end+2] in gSymToName.keys():
                outdelim.append(s[end:end+2])
        else:
            outdelim.append(s[end])
        s = s[end+len(outdelim[-1]):]
    return outexpr,outdelim

#--------------------------------------------------------
def subPercent(s):
    """subPercent(s): replace one '%' with Out[-1], 
    '%%' with the Out[-2], etc., and %n (where n is 
    an integer) with the Out[n]."""

    while 1:
        l = len(s)
        pos = string.find(s,'%')
        if pos < 0: return s
        cnt = 1
        while pos+cnt < l and s[pos+cnt] in 
            '0123456789':
            cnt = cnt+1
            substr = s[pos:pos+cnt]
        if len(substr) > 1 and substr[1] != '%':
            rep = 'Out[' + substr[1:] + '])
        else:
            rep = 'Out[-' + str(len(substr)) + ']'
            s = s[:pos] + rep + s[pos+cnt:]
    return s
BS INSY
What if all of these majors sound interesting?

- same first semester
- you can always change (no waitlists or applications)
Differences

- number of technical courses
  - more for BSCS
- number of required breadth courses
  - more for BACS
- foreign language requirement
  - only for BACS
- required business courses
  - only for INSY
- required concentration
  - only for BSCS
UD Catalog

- authoritative source of requirements for your degree
- use it!
- [http://udel.edu/catalog](http://udel.edu/catalog)
- undergrad programs
- College of Engineering
- Computer & Info. Sci.
- your major
- select your year of matriculation (2016–17)

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### Academic Year: 2016-2017

<table>
<thead>
<tr>
<th>DEGREE: BACHELOR OF SCIENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAJOR: COMPUTER SCIENCE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CURRICULUM</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UNIVERSITY REQUIREMENTS</strong></td>
<td></td>
</tr>
<tr>
<td>ENGL 110 Seminar in Composition (minimum grade C-)</td>
<td>3</td>
</tr>
<tr>
<td>First Year Experience (FYE)</td>
<td>0-4</td>
</tr>
<tr>
<td>Breadth Requirement</td>
<td>12</td>
</tr>
<tr>
<td>Discovery Learning Experience (DLE)</td>
<td>3</td>
</tr>
<tr>
<td>Multicultural Courses</td>
<td>3</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>MAJOR REQUIREMENTS</strong></th>
<th></th>
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<tbody>
<tr>
<td>College of Engineering Breadth Requirements</td>
<td>9</td>
</tr>
</tbody>
</table>

The College of Engineering requires 9 additional Breadth Requirement credits (21 credits total including the University Breadth requirements) as specified in the [College of Engineering Breadth Requirement page](http://udel.edu/catalog).

<table>
<thead>
<tr>
<th>Core Courses</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CISC 108 Introduction to Computer Science I (minimum grade C-)</td>
<td>3</td>
</tr>
<tr>
<td>CISC 181 Introduction to Computer Science II (minimum grade C-)</td>
<td>3</td>
</tr>
<tr>
<td>CISC 220 Data Structures (minimum grade C-)</td>
<td>3</td>
</tr>
<tr>
<td>CISC 260 Machine Organization and Assembly Language (minimum grade C-)</td>
<td>3</td>
</tr>
<tr>
<td>CISC 275 Introduction to Software Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CISC 303 Automata Theory</td>
<td>3</td>
</tr>
<tr>
<td>CISC 320 Introduction to Algorithms</td>
<td>3</td>
</tr>
<tr>
<td>CISC 361 Operating Systems</td>
<td>3</td>
</tr>
<tr>
<td>CISC 372 Parallel Computing</td>
<td>3</td>
</tr>
<tr>
<td>CISC 475 Advanced Software Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

An additional twelve credits of computer science technical electives numbered 301 or above, except for CISC 355, CISC 356, CISC 357, CISC 465, CISC 366 and CISC 466. Because of their very nature, Experimental Courses (courses with an x67 number) must be approved beforehand by the CISC Undergraduate Committee before being accepted toward the requirement for twelve additional credits of computer science.

Twelve credits in advanced courses in a concentration approved by the student's CISC advisor and the CISC Undergraduate Coordinator. Students are encouraged to explore how other subject areas impact and are impacted by computer science. Concentration courses must be distinct from other CISC requirements and technical electives.
Matriculation

• this is the academic year you became a UD student

• degree requirements do change occasionally

• your requirements are the ones in effect when you **matriculated** (today)

• you have the option of switching to a **later** version of the degree requirements if you choose
  
  • work with your advisor

• the catalog shows the version from each year
Degree Requirements Structure

- degree requirements emanate from different **units** of the university
  - **university** requirements
  - **college** requirements (College of Engineering)
  - **departmental** requirements (CISC)
- all must be satisfied
- catalog describes them all
- UDSIS progress report and “what-if” report will help you figure them out
Breadth Requirements

• the University requires 3 credits of breadth courses from each of 4 categories

  • A: Creative Arts & Humanities
  • B: History & Cultural Change
  • C: Social & Behavioral Sciences
  • D: Math, Natural Sciences & Technology

• these must come from 4 different subject areas

• details: catalog! Follow the links from your major page
“Double dipping”

• in many cases, two requirements can be satisfied by one course

• this is usually the case when the two requirements emanate from different units

  • example: MATH 241 required by CISC dept. for BSCS and satisfies university’s Group D breadth requirement

• other cases: example: university multicultural and breadth requirements

  • PHIL 204: World Religions (Group A and multicultural)

  • ANTH 101: Introduction to Social and Cultural Anthropology (Group B and multicultural)

  • LING 101: Introduction to Linguistics (Group C and multicultural)

• always check!: read the catalog, use UDSIS, or ask your advisor
Exceptions

- exceptions to the rules can sometimes be made
  - with approval of your advisor
- course substitutions, prerequisites, …
- but: get all exceptions in writing (email)
- otherwise we have to track down your advisor…
BSCS CURRICULUM OVERVIEW

Intro Sequence: Programming, Basic Data Structures and Algorithms, Intro to Team Software Engineering


Technical Electives and Concentration Courses

Advanced Software Engineering & Senior Capstone Project
CONCENTRATIONS
Concentrations

• BSCS students must select a concentration

• 12 credits of advanced courses with common theme

• you propose the concentration to your advisor
  • advisor will accept or reject
  • get it accepted **before** you take the courses!!!
  • advisor will enter an official “note” into advising system approving it

• the classes do **not** have to be from CISC
  • usually a mix of CISC and other departments

• examples…
CISC CONCENTRATIONS

ARTIFICIAL INTELLIGENCE
CISC CONCENTRATIONS

BIOINFORMATICS
INTELLIGENT ROBOTS

CISC CONCENTRATIONS

INTELLIGENT ROBOTS
ETC.
Cognitive Science
Computational Economics
Web Design
Mgmt. Information Systems
Internet Applications
Network & Distributed Computing
Vision & Graphics
Software Engineering
Technical Writing
Better yet…minors!

• just a little more work than the concentration: double dip!
  • typical minor: 6 courses

• popular minors
  • mathematics (much overlap with BSCS),
  • interactive media, computational biology,
  • management & information systems (MIS), business administration,
  • cybersecurity, game design,
  • Global Enterprise Technology (GET)
    • 1-semester paid internship with local company, e.g., JP Morgan Chase
    • pay is substantial
Better still: double major or double degree

- just need to fulfill all requirements for both majors
- double dip a lot
- common double majors with CS:
  - math, electrical and computer engineering, business
- some substitutions can be made to make it easier
- often courses that are considered roughly equivalent to a required course in the other major are allowed to count for both
Important Dates

• Last day to add or drop a class (and not pay)
  • Tuesday, Sep. 13, 2016

• Midterm grades released for first-year students
  • Friday, Oct. 14, 2016

• Last day to withdraw from a class
  • Tuesday, Oct. 25, 2016

• Registration begins
  • for winter term: Monday, Oct. 31, 2016
  • for spring term: Monday, Nov. 7, 2016

http://www.udel.edu/registrar/cal/
Advising

• see your advisor early and often!

• how?
  • email! phone! drop in his or her office!

• don’t know who your advisor is?
  • contact Undergraduate Coordinator, Samantha Fowle, samfowle@udel.edu

• what to bring with you to advising appointment…
Preparing for advising appointment

- UDSIS progress report
- anticipated schedule
  - try planning ahead a few years
- ideas on concentration
BEYOND THE CLASSROOM
CAGD
Cypher Prime Studios
BEYOND THE CLASSROOM

CISTERS
BEYOND THE CLASSROOM

UNDERGRAD RESEARCH
UNDERGRADUATE RESEARCH

- Machine learning for code vulnerabilities
- Analyzing Mixed Text/Code for Improved Software Maintenance Tools
- Exploiting Information Graphics in a Digital Library Queries
- Automatic Test Generation for Web Applications
- Multi-level Biological Pathway Browser
Designing a Tablet-based Test for Spatial Training in Preschool

Exploring The Xo Laptop As A Platform For Encouraging Creative Writing By Children
WHERE IS CIS?

101 SMITH HALL
Thanks

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