Dr. Qin Ding
Professor and Undergraduate Program Director
Department of Computer Science
phone: 252-328-9686
e-mail: dingq@ecu.edu

Ms. Sarah Joyner
Computer Science Academic Advisor
phone: 252-328-9301
e-mail: joynersa21@ecu.edu
We Want You to Graduate in Four Years

- Meet with academic advisor, Ms. Sarah Joyner (joynersa21@ecu.edu), every term through an appointment
- Complete at least 30 credits per year
- Meet priority course registration deadlines
- Set and follow a four-year degree plan using DegreeWorks
- Meet with Computer Science faculty as needed
- Use Peer Tutoring service
- Participate in extracurricular activities and develop leadership skills
What is Computer Science/ Software Engineering?

- Computer Science/ Software Engineering is about helping humanity, not just programming.
- Computer Science/ Software Engineering is engineering complex software systems to solve problems that confront humanity.
- Computer Science/ Software Engineering is the new mathematics and engineering for the 21st century.
- Computer Science is the basis for Software Engineering.
- Software Engineering is more applied and adds project, product, and people management to build and operate complex software systems.
What is Computer Science/Software Engineering?

- Drug discovery
- Personalized medicine
- Clean air, water, and energy
- Power grids, transportation infrastructure, high-value manufacturing
- Games, animation, and entertainment
- Increasing crop yield by micro-monitoring irrigation – precision agriculture
- Self-driving cars
- Keyboard → Touch Screens → Natural Language – Apple Siri, Microsoft Cortana, Amazon Alexa, and Google Now
Natural Language Analysis and Understanding
IBM Watson Healthcare

1st
US rank in Healthcare spending

37th
US rank in quality of care delivered

<5
Hours or less per month spent reading medical journals by 81% of reporting physicians

21.7
Hours required to meet the patient care guidelines each day

$585B (Billion)
Wasted on missed opportunities, unnecessary, error-prone and inefficiently delivered services

$7T+
The cost for health and social programs worldwide ... and it is rising

73
... the number of days it will take for medical data to double by 2020

80%
of the world’s healthcare data is unstructured

An Ocean of Unused Data

---

1. World Health Statistics 2011 from World Health Organization
3. Best Care at Lower Cost: The Path to Continuously Learning Health Care in America from Institute of Medicine / National Academy of Sciences
4. University of Iowa, Carver College of Medicine 2014
Self-driving Cars
Self-driving Cars

- John Jones’ (our department adjunct instructor) self-driving car (level 2 automation)
  https://www.youtube.com/watch?v=HZBZ0On9hK8
- comma.ai openpilot open-source software
  https://github.com/commaai/openpilot
- Ashlee Vance Homemade Self-Driving Car
  https://www.youtube.com/watch?v=YuKAmsMg2ZE
U.S. Workforce through 2020

All Occupations: 164 million

All STEM Jobs: 9.2 million

Computing Jobs: 4.6 million

Where the STEM Jobs Will Be
Projected Annual Growth of Total STEM Job Openings 2010-2020

- Computing: 51%
- Engineering: 27%
- Physical Sciences: 5%
- Life Sciences*: 7%
- Social Sciences: 9%
- Mathematics: 1%

* STEM is defined here to include non-medical occupations.

Where the STEM Jobs Will Be
Projected Annual Growth of NEWLY CREATED STEM Job Openings 2010-2020

- Computing: 62%
- Engineering: 20%
- Mathematics: 1%
- Life Sciences: 6%
- Physical Sciences: 3%
- Social Sciences: 8%

* STEM is defined here to include non-medical occupations.

What is it like to be a Computing Professional?

- https://www.youtube.com/watch?v=nKIu9yen5nc&feature=youtu.be
Student-centered learning environment

State-of-the-art programs on par with national standards

In addition to standard core courses, elective courses include Machine Learning, Artificial Intelligence, Natural Language Processing, Information Retrieval, Visual Analytics, Big Data, Cybersecurity, Computer Graphics, and Digital Image Processing

Theoretical and applied research

Undergraduate research

Accelerated B.S. + M.S. degree programs

Computer Game Development Certificate
Student Activities

- ACM Student Chapter, Women in Technology (WiT)
- ECU REU Program in Software and Data Analytics
- ECU NSF RED Project https://ppse.ecuresearch.org/
- Support for research presentations at regional and national conferences
- Paid internships
- Graduates work in a range of organizations including IBM, Microsoft, Google, Ernst & Young, SAS, Bank of America, Fidelity, Credit Suisse, Vanguard, and Duke Energy.
- Close to 100% job placements for graduates
<table>
<thead>
<tr>
<th>Component</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 CS Core courses</td>
<td>48</td>
</tr>
<tr>
<td>5 CS Electives</td>
<td>15</td>
</tr>
<tr>
<td>3 Science Cognates</td>
<td>12</td>
</tr>
<tr>
<td>2 Math Cognates</td>
<td>6</td>
</tr>
<tr>
<td>Gen Ed (34 + 8 through Science Cognates)</td>
<td>34</td>
</tr>
<tr>
<td>Free Electives</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>120</strong></td>
</tr>
<tr>
<td>Component</td>
<td>Semester Hours</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>14 SE Core courses</td>
<td>42</td>
</tr>
<tr>
<td>5 SENG/CS Electives</td>
<td>18</td>
</tr>
<tr>
<td>3 Science Cognates</td>
<td>12</td>
</tr>
<tr>
<td>2 Math Cognates</td>
<td>6</td>
</tr>
<tr>
<td>Gen Ed (34 + 8 through Science Cognates)</td>
<td>34</td>
</tr>
<tr>
<td>Concentration Courses</td>
<td>9</td>
</tr>
<tr>
<td>(Data Science or Mobile and Web Development)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>121</td>
</tr>
</tbody>
</table>
BSCS Core Courses

1. CSCI 1010 - Algorithmic Problem Solving
2. CSCI 1011 - Algorithmic Problem Solving Lab
3. CSCI 2400 - Discrete Structures I
4. CSCI 2405 - Discrete Structures II
5. CSCI 2530 - Algorithms and Data Structures
6. CSCI 2540 - Data Abstraction and Object-Oriented Data Structures
7. CSCI 2410 - Digital Electronics
8. CSCI 3000 - Operating Systems
BSCS Core Courses

9. CSCI 3010 - Computer Networks
10. CSCI 3030 - Software Engineering I
11. CSCI 3584 - Computational Linear Algebra
12. CSCI 3650 - Design and Analysis of Algorithms
13. CSCI 3675 - Organization of Programming Languages
14. CSCI 3700 - Database Management Systems
15. CSCI 4230 - Software Engineering II (Senior capstone)
16. CSCI 4235 - Software Engineering II Lab
17. CSCI 4602 - Automata and Formal Languages
BSSE Core Courses

1. SENG 1000 - Software Engineering Foundations and Practice
2. SENG 1010 - Discrete Structures for Software Engineers I
3. SENG 1020 - Data Structures for Software Engineers
4. SENG 1030 - Discrete Structures for Software Engineers II
5. SENG 2000 - Advanced Data Structures and Algorithms
6. SENG 2010 - Requirements Specification and Analysis
7. SENG 2020 - Linear Algebra for Software Engineers
BSSE Core Courses

8 SENG 3000 - Software Architecture and Design
9 SENG 3010 - Software Construction
10 SENG 3020 - Software Verification and Validation
11 SENG 3700 - Database Design and Development
12 SENG 4500 - Software Engineering Capstone Project I
13 SENG 4510 - Software Engineering Capstone Project II
14 ITEC 3290 - Technical Writing
1. MATH 2121/2171 - Calculus
2. MATH 2228 - Statistics or MATH 2283 - Statistics for Business
Select BSCS/ BSSE Elective Courses

1. CSCI 4110 - High Performance Computing
2. CSCI 4120 - Machine Learning
3. CSCI 4130 - Information Retrieval
4. CSCI 4140 - Natural Language Processing
5. CSCI 4150 - Digital Image Processing
6. CSCI 4160 - Cybersecurity: Theory and Practice
7. CSCI 4170 - Cloud Computing
8. CSCI 4180 - Big Data Analytics
Recommended Minors (not required for graduation)

Statistics
Linguistics
Speech and Hearing Sciences
Music
Psychology
Business Administration
Contacts

Ms. Sarah Joyner
Computer Science Academic Advisor
252 - 328 - 9301
joynersa21@ecu.edu

Ms. Traci Brown
Computer Science Administrative Associate
252 - 328 - 9680
lyncht@ecu.edu

Department Website
http://www.ecu.edu/cs-cet/csci/index.cfm
What laptop should I buy?

In the order of preference:

MacBook Air or MacBook Pro

Any Linux laptop

If you already own a Windows laptop, install Linux (e.g., Ubuntu, Fedora, …) for dual boot mode of operation.