Princeton Computer Science
Undergraduate Program

JP Singh and Brian Kernighan
Directors of Undergraduate Studies
March, 2020
Why Computer Science?

• it's **fun** and it's **interesting**
• computers are a **part of everything**
  – daily life: mail, web, Facebook, phones, ...
  – lots of hidden computing too: phones, cars, ...
  – unlimited applications, always something new
• so everything is a potential topic for
  – CS courses
  – independent work
  – summer jobs
  – permanent jobs, doing a startup
  – grad school
What do majors do next?

- software companies both large and small
- Wall St, consulting
- grad school in CS
- grad school in law, medicine, business, ...
- their own startups
- teaching
- ...

...
Princeton Computer Science Faculty

• 45 regular faculty, 13 lecturers
  – theory
  – operating systems & networks
  – programming languages
  – graphics & vision
  – artificial intelligence, machine learning
  – computational biology
  – security & privacy, policy, ...
  – ...

Other important people

Brian Kernighan

Director of Undergraduate Studies
- Pre-majors
- Non-majors
- Study Abroad
- Transferring In to COS

JP Singh

Director of Undergraduate Studies
- Ugrad Curriculum
- Honors, Awards
- Certificate Program
Current Students

- COS is the most popular major with 454 concentrators
- 162 seniors
  - 128 BSE, 34 AB
  - 53 females (33%)
- 171 juniors
  - 114 BSE, 57 AB
  - 62 females (36%)
- 121 sophomores (BSEs only)
  - 51 females (42%)
  - AB sophomores declare in late April
- COS 126 is Princeton’s most popular course
  - Nearly 70% of all students take at least one CS course

Nearly 70% of all students take at least one CS course
Undergrad CS Majors by Class Year
Upper-Level Courses

Theory
- reasoning about computation
- algorithms
- computational geometry
- programming language theory
- cryptography

Applications
- graphics
- music
- computational biology
- information retrieval
- computing for the social and physical sciences
- AI
- machine learning

Systems
- architecture
- operating systems
- networks
- Compilers

Other
- Technology and policy
- Courses in related departments
- ...

https://www.cs.princeton.edu/ugrad/becoming-cs-major/requirements
Basics for AB Concentrators

Three components:

- Prerequisites
  - COS 126: general computer science
    - intro to programming and fundamentals (eg, computability)
  - COS 226: algorithms and data structures
    - intro to searching, sorting, hashing, string, graph algorithms
  - COS 217: systems programming
    - intro to low-level programming in C, assembly, Unix, testing, debugging
  - MAT 103, 104 and one of 202, or 204 or EGR 154

- Upper-level courses (8 minimum)
  - 2 Theory
  - 2 Systems
  - 2 Applications

- Independent work
  - 2 junior iw projects + thesis for AB Students

https://www.cs.princeton.edu/ugrad/becoming-cs-major/requirements
AB’22 Academic Advisers

Class of 2022

– AB'22 Surname A – J  Arora, Sanjeev  258-3869  arora@princeton.edu

– AB'22 Surname K – R  Narayanan, Arvind  258-9302  arvindn@princeton.edu

– AB'22 Surname S – Z  Chen, Danqi.  danqic@princeton.edu
Basics For BSE Concentrators

Three components:

- Prerequisites
  - COS 126: general computer science
    - intro to programming and fundamentals (eg, computability)
  - COS 226: algorithms and data structures
    - intro to searching, sorting, hashing, string, graph algorithms
  - COS 217: systems programming
    - intro to low-level programming in C, assembly, unix, testing, debugging
  - MAT 103, 104 and one of 202 or 204 or EGR 154

- Upper-level courses (8 minimum)
  - 2 Theory
  - 2 Systems
  - 2 Applications

- Independent work
  - At least 1 semester; more (including thesis) if desired

- https://www.cs.princeton.edu/ugrad/becoming-cs-major/requirements
# BSE’23 Academic Advisers

## Class of 2023

<table>
<thead>
<tr>
<th>Surname</th>
<th>Adviser</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-F</td>
<td>Levy, A</td>
<td>258-8701</td>
<td><a href="mailto:aalevy@cs.princeton.edu">aalevy@cs.princeton.edu</a></td>
</tr>
<tr>
<td>G-L</td>
<td>Gupta, A.</td>
<td>258-8017</td>
<td><a href="mailto:aartig@princeton.edu">aartig@princeton.edu</a></td>
</tr>
<tr>
<td>M-Q</td>
<td>Narasimhan, K.</td>
<td>258-8702</td>
<td><a href="mailto:karthikn@princeton.edu">karthikn@princeton.edu</a></td>
</tr>
<tr>
<td>R-Z</td>
<td>Zhandry, M.</td>
<td>258-5135</td>
<td><a href="mailto:mzhandry@princeton.edu">mzhandry@princeton.edu</a></td>
</tr>
</tbody>
</table>
“Paths Through the Major” is where you will find information on a BSE General Path (Fall & Spring Start) and AB General Path (Fall & Spring Start).

In addition, there are area focused paths that include Applications, Systems, Theory, and AI / Machine Learning.
Welcome to Computer Science!

The Computer Science Council, a body comprised of COS majors whose job it is to represent student interests in the department, has put together a short pamphlet to introduce you to majoring in COS at Princeton.

Here is the link to the pamphlet:

Please let us know if you have any questions:
Zoya Shoiaib AB’20  zshoaib@Princeton.edu
Rebecca Barber BSE’20  rb25@Princeton.edu
Robert Liu BSE’20  rrliu@Princeton.edu
Haley Zeng  AB’21  hhzeng@princeton.edu
Junior Independent Work

Option #1 – One-on-One Advising
meet with faculty advisor weekly
project proposal
1-page mid-semester checkpoint write-up
20-25 page end-of-semester report

Option #2 – Independent Work Seminars
meet with seminar advisor weekly
project proposal
1-page mid-semester checkpoint write-up
20-25 page end-of-semester report

Option #3 – COS 333i – This Option is for AB students only
Enroll in COS 333i
Fulfill all requirements for COS 333 – lectures, homework, final project
Grade for the course will be placed into COS 981 – JIW
Course will count as JIW – no credit or course count

https://www.cs.princeton.edu/ugrad/independent-work
Senior thesis

Meet with faculty advisor weekly
Progress reports
40-50 page paper
Second reader
Presentation to faculty and other students

Visit the Undergraduate Research Topics and Thesis

Visit the Mudd Library – Catalog of Princeton University Senior Theses
Recognition

- CRA Outstanding Undergraduate Researcher Awards
  - Siddhartha Jayanti’17 (male runner-up)
  - Katherine Ye’16 (female winner)
  - Valentina Shin '11 (female winner),
  - Patrick Wendell '11 (male winner)
  - Rebecca Pottenger '12, Katherine Pogrebniak '14 (finalist)
  - Lavanya Jose '12 (runner-up)
  - K. Petrova’17, J. Shi’17, E. Rolf’16, Ben Spar’16, Kay Ousterhout '11, Michael Ty '11, Faaez Ul Haq '12, Zhihong Xu '12, Hana Snow '14, Noah Apthorpe '14 (honorable mention)

- Hertz Fellowship
  - Kay Ousterhout '11, Amy Ousterhout '13

- Gates Fellowship
  - Katie Stouffer '13

- Churchill Scholarship
  - Katherine Pogrebniak '14 (who was also valedictorian)

- Anita Borg Memorial Scholarship
  - Erica Portnoy’15
Goldwater Scholarship Recipient
Spring 2017

• COS concentrator Jonathan Lu’18 has been awarded a Goldwater Scholarship, the premier award for outstanding undergraduates interested in careers in mathematics, the natural sciences and engineering
• He is working toward a certificate in statistics and machine learning
• Interested in pursuing research applied to medicine and computational biology and also teaching at the university level.
Accenture Award 2019
Other programs of interest

Certificate in Applications of Computing

• 2 of COS 217, 226, 323
• one COS departmental at the 300- or 400-level
• one additional 300- or 400-level course with substantial computing content
• Senior thesis with significant use of computer science
  – Mapline: An interactive map+timeline tool for learning and exploring history.
  – Domesticating the internet: China’s impact on the international social media and internet service landscape
Student Organizations
The Computer Science Council is a body comprised of COS majors whose job it is to represent the interests in the department, we have prepared a short pamphlet to introduce you to majoring in COS at Princeton.

- Link -

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- Rebecca Barber BSE’20 rb25@Princeton.edu
- Robert Liu BSE’20 rrliu@Princeton.edu
- Haley Zeng  AB’21  hhzeng@princeton.edu
Grace Hopper Celebration 2019
PRINCETON WOMEN IN COMPUTER SCIENCE

https://www.princetonwics.com/
Questions?
Please contact Colleen Kenny
ckenny@princeton.edu
Why COS?

Figuring out what you want to study at Princeton is one of the most important decisions you'll make here. With so many options, it can seem difficult to have a sense of what your academic path will look like. Rest easy: you have a ton of time to figure it out. In the meantime, though, here are some reasons you might consider concentrating in COS.

Link -