

Computer Science
Major and Minor
Information Session
for College Students

Summer 2023

So you're interested in CS? Great!

This presentation:

- **Important:** Info in this presentation designed for **College** students!
- First, a lot of general information about the BACS major and the CS minor
- At the end: special info for transfer students
- We have a major, the BA in Computer Science, you might consider
 - Maybe you already know you want this!
- There's a CS minor, too

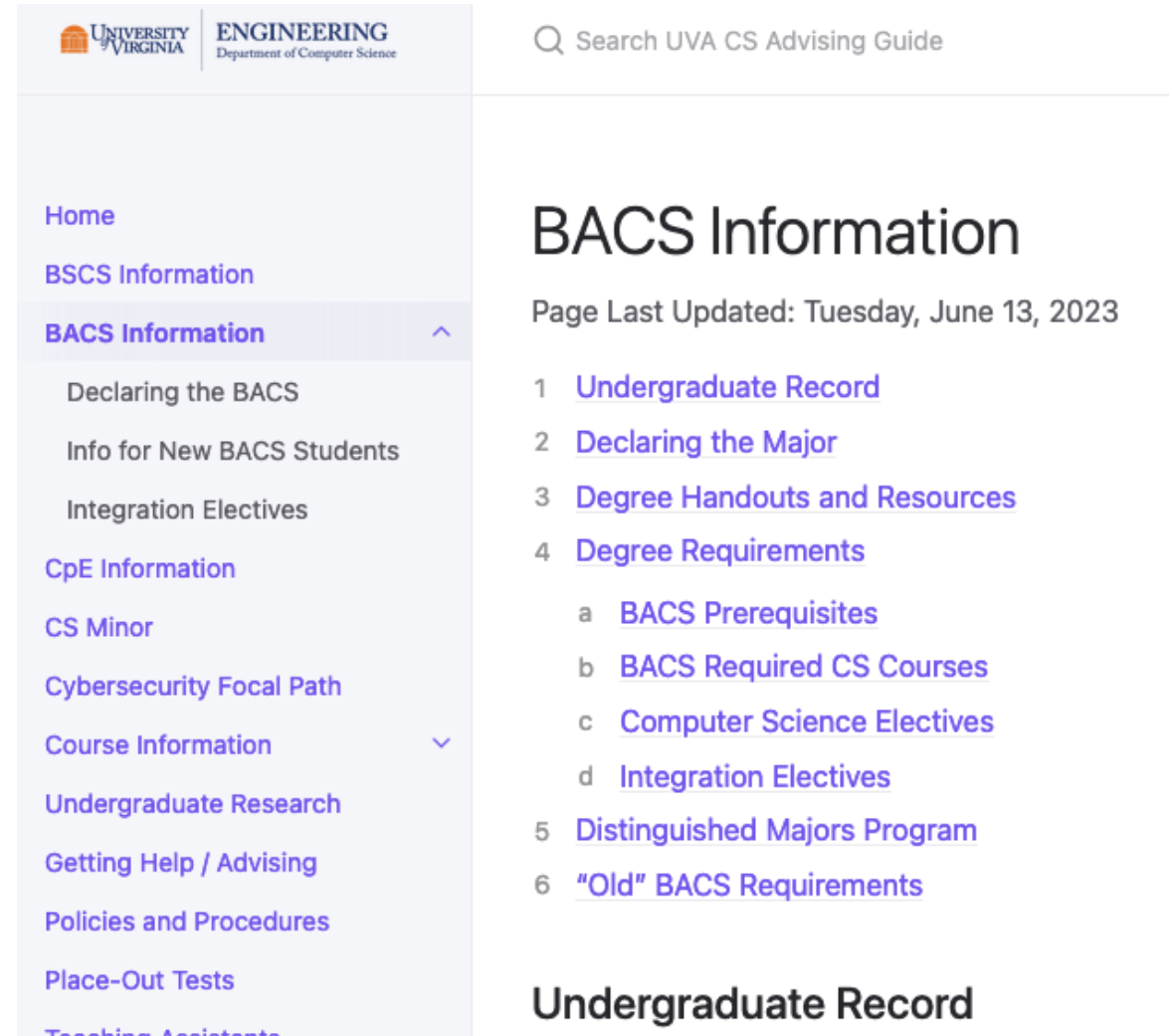
Getting Info, Answers to Questions

- **CS Advising Website:** <http://uvacsadvising.org> (more on this next)
- Tom Horton, BACS Program Director, Associate Dept. Chair
bacsdirector@virginia.edu
Backup: Worthy Martin
- CS Office staff:
 - SJ Jiménez-Calhoun, Amy Harris, Tina Hittinger, others, ...
 - cs-office@virginia.edu
- Non-CS questions?
 - Your contact(s) in the College. You have an Association Dean assigned!
 - Gen ed, leave of absence, graduation applications or delay, course load, financial aid issues, etc.
- CS procedure, process, rules, etc. → check CS Advising website, then email CS staff next
 - Again, don't forget your Association Dean for non-CS issues

Department's CS Advising Website

<http://uvacsadvising.org>

- Look for section “BACS Information” in the menu on the left-side of that page
- Also other sections for all computing majors
- Searchable (at the top)



The screenshot displays the UVA CS Advising Website. At the top left, the University of Virginia logo and the Engineering Department of Computer Science are visible. A search bar at the top right contains the text "Search UVA CS Advising Guide". The left navigation menu includes links for Home, BSCS Information, BACS Information (which is expanded to show sub-links: Declaring the BACS, Info for New BACS Students, and Integration Electives), CpE Information, CS Minor, Cybersecurity Focal Path, Course Information, Undergraduate Research, Getting Help / Advising, Policies and Procedures, Place-Out Tests, and Teaching Assistants. The main content area is titled "BACS Information" and includes a sub-header "Page Last Updated: Tuesday, June 13, 2023". Below this is a numbered list of six items: 1. Undergraduate Record, 2. Declaring the Major, 3. Degree Handouts and Resources, 4. Degree Requirements (with sub-items a. BACS Prerequisites, b. BACS Required CS Courses, c. Computer Science Electives, and d. Integration Electives), 5. Distinguished Majors Program, and 6. "Old" BACS Requirements. At the bottom of the page, the heading "Undergraduate Record" is visible.

About the BACS Major

- CS in the context of a liberal arts education
 - But it's a “real” CS degree! 😊

- A description of the BACS:

The BA degree program in Computer Science provides students with a solid foundation in computer science theory and practice. An important goal of the program is to give students the ability to apply computing to other disciplines in the arts and sciences (e.g., life and physical sciences, mathematics, social sciences, visual and performing arts). This idea of studying computer science in the context of a liberal arts education is what distinguishes the BA in Computer Science from computing degrees in the School of Engineering and Applied Sciences. Graduates of this program will be prepared to apply their technical knowledge to analyze and solve computing challenges in a wide range of problem areas, including those faced by today's computing industry. Graduates will also be prepared for graduate study in computer science and other fields that require knowledge of computer science.

College Students Who Want to Declare the BACS

- Completed CS111x and CS2100 (or equivalent) with a grade of C+ or higher?

You will definitely be admitted to the BACS!

- If there's an issue with the grades you have in these classes, we will have to evaluate your situation and discuss what you need to do to be admitted
 - If you took these during a "covid" semester, then a CR is fine too
 - If you took these at another school and have transfer credit, that's fine!
 - If you passed our "place-out" exam, that's fine too!
- If you don't have CS2100 yet:
 - You can apply after you complete CS2100 and have the needed grade

AP, IB credits, and Place-Out Exams

- For details, see CS Advising website
- Advanced Placement
 - For Computer Science - 4 or 5 gives credit for CS 1110
 - For CS Principles - 4 or 5 gives credit for CS 1000T and the student is encouraged to take the CS 1110 Placement Test
- International Baccalaureate, for Computer Science:
 - 5 on High Level gives credit for CS 1110
 - 6 or 7 on High Level gives credit for CS 1110 and CS 2100
- We have “place-out” exams for CS1110 and CS2100 only
 - <https://uvacsadvising.org/placeout.html>
 - You do not get UVA credits, but you can take any courses that require these

Declaring the BACS Major

- **How do I declare?**

- Detailed info and instructions here: <https://uvacsadvising.org/bacs/declaring.html>
- You'll need to complete a very short *CS department declaration form*
- You'll need to then use DocuSign to complete the College's Major Declaration form
- You'll attach the department form when you submit the DocuSign form

- **When can I declare?**

- Any time, but our staff may not necessarily process it immediately. (In particular, those submitted in late-April and May until June, and in December until mid-January)
- Declaration forms will be reviewed on a rolling basis and pending submissions will normally be handled within a few weeks
- We will attempt to process declaration forms submitted at peak times (start of fall term, right before course registration) more promptly

Three UG “Computing” Degrees at UVA

- For SEAS students:
 - BS in Computer Science
 - Computer Engineering
- For College students:
 - BA in Computer Science
- All majors in the same CS courses
 - Though engineering students take some that are not required for the BA

Highlights of UG Degree Differences (New BACS)

Common to BACS/BSCS:

- CS 2120: Discrete Mathematics & Theory 1
- CS 2130: Computer Systems and Organization 1
- CS 3100: Data Structures & Algorithms 2
- CS 3120: Discrete Mathematics & Theory 2
- CS 3130: Computer Systems & Organization 2
- CS 3140: Software Development Essentials

Also in BA:

- Three CS electives
- Four “integration” electives (non-CS College courses that support interdisciplinary nature of degree)
- **Total CS credits: 36**

Also in BSCS:

- CS 3240, Adv. Software Development
- CS senior capstone
- Five CS electives
- **Total CS credits: 48**

Differences in BSCS and BACS

- **BACS degree:**

- Total number CS credits: 36 (11 courses, including 2 CS prereqs)
- Math requirement: Calc 1 (“implied” – high school, college, somewhere)
- “Breadth”: integration electives, College gen ed. (double majors)
- When declared: often later (2 semesters) than BSCS

- **BSCS degree:**

- Total number CS credits: 48
 - 14 courses, 1 capstone
- Math requirement: Calc 3, Prob., plus 2 more
- When declared: end of first year
- “Breadth”: 5 humanities or social science, STS courses, SEAS science requirements

CS Minor

The course requirements for the CS minor are:

- CS 1110 / 1111 / 1112 / 1113 - Introduction to Programming (Credits: 3)
- CS 2100 - Data Structures and Algorithms 1 (Credits: 3)
- CS 2120 - Discrete Mathematics and Theory 1 (Credits: 3)
- CS 2130 - Computer Systems and Organization 1 (Credits: 4)
- CS 3140 - Software Development Essentials (Credits: 3)
- One additional CS course numbered 3000 or higher
- **Notes:**
 - If you place out of CS 1110 or CS2100 via the placement exam, you still have to take 6 CS courses; if you receive course credit for it via the AP exam or transfer credit, then you need not substitute a course in its place.
 - At most 3 credits of CS4993, Independent Study, can count as a CS elective for the minor.

BACS requires 12 cr. of Integration Electives

- The BACS degree:
 - Is offered by the College of Arts and Sciences
 - Has a goal of providing students with a strong foundation in computer science, **and...**
 - ...combining this with courses in arts, humanities, and sciences, in order to develop an understanding of how topics in these areas connect with computing.
- Integration electives are central in supporting this goal of “connecting” CS with other subject areas in the arts and sciences.
- As defined in the Undergraduate Record, Integration Electives are:

...non-CS courses that contribute to this program of study by exploring applications of computing to arts and sciences fields in a significant way or by providing fundamental computing depth and background. Integration electives are courses offered by departments in the College of Liberal Arts and Sciences.

Integration Electives and Other Common Questions

- What counts as an integration elective?
 - The true official list is in the UG Record. There's a link and more info in the BACS section on the CS Advising website (direct link is <https://uvacsadvising.org/bacs.html#integration-electives>)
- Can I petition for some other course to count?
 - Some courses aren't on the official list but will count.
You can petition for some other course to count if it meets the criteria.
See *Integration Electives* page on CS Advising website for lots of detail.
- Can a course in Commerce, Engineering, Data Science, Batten or Education count?
 - Not usually, but see the doc above for exceptions
 - But never more than one non-College course (3 credits)
- Can a CS course count as an integration elective?
 - No
- Can a non-CS course count as a CS elective?
 - No

New Majors, Acceptances

- History: “Caps” put in place for Spring 2014
- But since 2017 essentially all students accepted
- Now: any student who meets pre-reqs are accepted!
 - CS 1110 with C+ or higher (an intro CS course)
 - CS 2100 with C+ or higher (a 2nd CS course with a programming focus)

Number of Majors by Program and Year

<i>(as of 10/4/2022)</i>	2nd Yr	3rd Yr	4th Yr	Total		Prev. Year	Total
BS Computer Science	266	260	309	835		2021-22	1589
BA Computer Science	119	306	343	768		2020-21	1508
BS Computer Engin	57	51	60	168		2019-20	1430
Total	442	617	712	1771		2018-19	1298
						2017-18	1079
CS Minors	1	11	53	65			

Women in UG Programs

	2nd Year		3rd Year		4th Year		Total	
	Count	%	Count	%	Count	%	Count	%
BS Computer Science	66	24.8%	58	22.3%	64	20.7%	188	22.5%
BA Computer Science	43	36.1%	122	39.9%	134	39.1%	299	38.9%
BS Computer Engin	18	31.6%	4	7.8%	10	16.7%	32	19.0%
Total	127	28.7%	184	29.8%	208	29.2%	519	29.3%

- **Taulbee report (2021, CS degrees): 22.3%** **SEAS overall: 33.7%**
- UVA recognized as 6th best in 4-year public universities (Feb. 2019)
<https://www.chronicle.com/article/Which-Colleges-Are-Best-and/245758>
 after: Salisbury Univ., Univ. of Washington; CUNY; UW Bothell; Penn State
- Note impact of BACS program

Diversity in UG Programs

	Asian	Black/ Afr Amer	Hispanic	Multi Racial	NonRes Alien	Unknown	White
BS Computer Science	39.2%	4.9%	4.4%	5.9%	4.1%	6.9%	34.6%
BA Computer Science	32.8%	3.9%	4.4%	4.9%	8.5%	8.5%	37.0%
BS Computer Engin	24.4%	7.7%	7.1%	6.5%	4.2%	6.0%	44.0%
Total	35.0%	4.7%	4.7%	5.5%	6.0%	7.5%	36.5%
UVA SEAS	24.7%	5.3%	5.6%	6.0%	3.2%	6.6%	48.6%
UVA College	16.0%	6.9%	6.7%	5.4%	4.9%	4.8%	55.1%
Taulbee '21 (degrees)	23.6%	2.7%	7.6%	2.8%	13.5%	17.0%	32.5%

Double-majors, minors

- Doing a 2nd major: 48%
 - CogSci, Comm, Econ, Spanish, Statistics, Math, ...
- Doing a minor: 36%
 - Philosophy, Econ, many others

Important: The College has a rule that a course **cannot** count for both a minor and a major.

However, it **is** possible to count some number of credits for each of two majors

Some Things to Know

(See the CS Advising website for full info)

- Majors are assigned a CS faculty advisor to help with CS questions
 - Required to meet with them before course registration
 - Also a CS staff advisor: SJ Jiménez Calhoun cs-office@virginia.edu
- Distinguished Majors Program (DMP)
 - Student research opportunities (CS 4993)
- Study Abroad (see CS Advising website for how to get approvals)
- CS clubs and organizations
- Center for Engineering Career Development (yes, for you!)

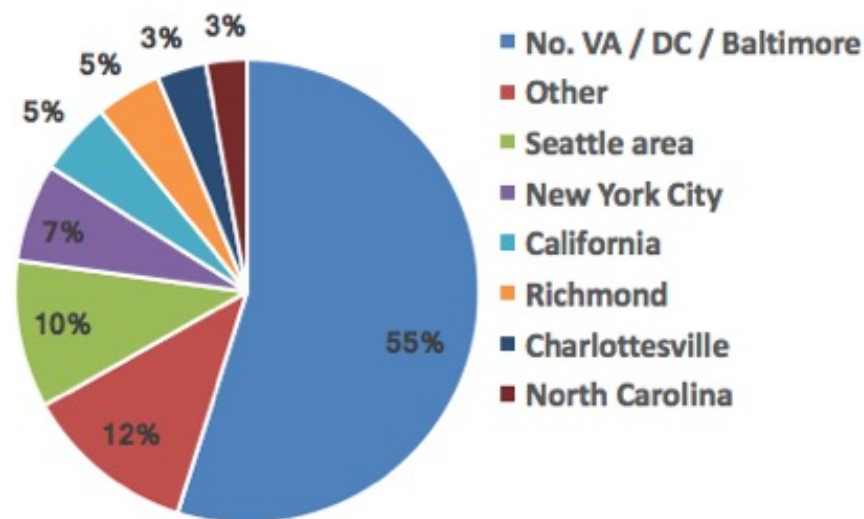
After Graduation:

Companies hiring undergrads (ordered):

Capital One	Epic Systems
Microsoft	IBM
Amazon	Accenture
Google	Applied Predictive Technologies
Appian Corporation	Booz Allen Hamilton
Facebook	BTI360
Alarm.com	Macedon Technologies
Yext	MITRE
CGI	

Graduate School?

About 8%. UVA, USC, Stanford, Carnegie Mellon, MIT, Washington, Cornell, Columbia, UC Santa Cruz, ...



Salaries after Graduation:

BS in CS:	\$100K median
BA in CS:	\$87.5K median
Range:	\$60K-\$153K
All SEAS:	\$73K median
PhD:	\$70-165K

BACS Students after Graduation

Post-graduate	All Students		All Responses	
	Count	Percentage	Count	Percentage
Grad School	8	4.7%	8	6.5%
Military	1	0.6%	1	0.8%
no response	46	27.1%		
Still Looking	18	10.6%	18	14.5%
Working	97	57.1%	97	78.2%
Total	170		124	

Graduate School:

Stanford (Masters), Latin American Studies

Carnegie Mellon (Masters), Software Engineering

Univ. of Southern California (Masters), Data Informatics

Univ. of California Santa Cruz (PhD), Ecology, Evolution, and Marine Biology

University of Virginia (Masters), Computer Science

University of Virginia (Masters), Public Policy

University of Washington (PhD), Astronomy

What Kind of Work?

Employment Type	Number	Percentage
Internet & Software	47	49.0%
Scientific and Technical Consulting	9	9.4%
Commercial Banking & Credit	7	7.3%
Management Consulting	7	7.3%
Defense	6	6.3%
Electronic & Computer Hardware	5	5.2%
Other Industries	4	4.2%
Computer Networking	2	2.1%
K-12 Education	2	2.1%
Accounting	1	1.0%
Government - Local, State & Federal	1	1.0%
Investment / Portfolio Management	1	1.0%
Investment Banking	1	1.0%
Non-Profit - Other	1	1.0%
Retail Stores	1	1.0%
Sports & Leisure	1	1.0%
Total	96	

Some BACS Alumni Profiles

- Michael Lew (2010)
 - Law degree, GMU. Now Patent Attorney
<https://www.linkedin.com/in/michaelwlew/>
- Brielin Brown (2011) CS, Physics
 - PhD at Berkeley. Now computational biologist
 - <https://www.linkedin.com/in/brielin-brown-73745878/>
- Muzzammil Zaveri (2011)
 - Forbes Magazine: one of the top 30 venture capitalists under 30
 - <https://www.linkedin.com/in/mzaveri/>

Some BACS Alumni Profiles

- Sara Alspaugh (2009) CS, Math
 - PhD at Berkeley, now data scientist
 - <https://www.linkedin.com/in/salspaugh/>
- Richard McPherson (2010) CS, Physics
 - PhD Texas, now Google (security)
 - <https://www.linkedin.com/in/richard-mcpherson-50379b48/>
- Christina Gadala-Maria (2010)
 - VP, Senior Software Engineer at TD
 - <https://www.linkedin.com/in/christinagadala/>

Questions?

- **CS Advising Website:** <http://uvacsadvising.org>
 - In particular, page on “Info for New BACS Students”
- Tom Horton, BACS Program Director, Associate Dept. Chair
bacsdirector@virginia.edu
- CS Office staff: cs-office@virginia.edu (especially about procedures, process, rules)
- Non-CS questions? Your contact(s) in the College. E.g. your Association Dean

Information for Transfer Students

- **Welcome to UVA! We're very glad to have you here!**
 - We want to help you get a good start. Transitions like this can be a challenge, both academically and socially. But you can do it! 😊
- **Starting in Fall?**
 - Participate in College's summer orientation if you can
 - As part of orientation, you'll have a chance to talk to CS staff about advising, course equivalencies, help getting into CS courses
 - If you don't participate in summer orientation, contact the Program Director in August. (No later than the week before classes start.)
- **Starting in January?**
 - Contact the Program Director ASAP for advising, course equivalencies, help getting into CS courses

Can you Complete the BACS Degree?

- If you're a third-year, what if you have not had much CS yet?
- UVA's UG Record and website have an important warning
 - Ideally you should have equivalents of CS1110 and CS2100 before 5th semester
 - UVA's College has a rule: only 8 full-time semesters (can do summer or part-time after that)
- What if you only have CS1110 already? Yes, it's possible!
 - Take CS2100 and either CS2120/CS2130 your first term
 - You'll have to "defer" a major declaration until you complete CS2100 in Fall
 - You may find out CS is not a good match for you. Have a "Plan B"!

Possible Schedule of CS courses

If you only have had CS1110:

- 5th semester: CS2100, CS2120
- 6th semester: CS2130, CS3140
- 7th semester: CS3100, CS3130, CS elective #1
- 8th semester: CS3120, CS elective #2, CS elective #3

Also, must include needed integration electives for the BACS major, plus any needed Gen Ed requirements

Course Equivalencies

- For those transferring from Virginia Community Colleges
 - Equivalencies for CS1110, CS2100, CS2120, and CS2130
 - See next page or link below
 - For 2100 and 2130, if you're worried about your preparation, consider re-taking the UVA course here
 - Place-out tests: we will grade these in summer for transfer students, but grading may not be immediate due to faculty travel
- College website has a transfer equivalency analyzer
<http://ascs8.eservices.virginia.edu/AsEquivs>
 - If you don't find your school's course listed there, don't worry:
 - Email the BACS Program Director info about the course, including an online syllabus or outline of topics if possible (or a scanned version of those)

Virginia Community College Courses	UVA CS Course
CSC 1XX	No equivalent transfer
CSC 200 – Introduction to Computer Science	CS 1010 - Introduction to Info. Technology
CSC 201 – Computer Science I (<i>older course</i>) CSC 221 – Intro. to Problem Solving & Progr. EGR 125 – Introduction to Engineering Methods	CS 1110 - Introduction to Programming
CSC 222 – Object-oriented Programming	CS 2000T
CSC 202 – Computer Science 2 (<i>older course</i>) CSC 223 – Data Structures & Analysis of Algor.	CS 2100 – Data Structures and Algorithms 1
CSC 205 – Computer Organization	CS 2000T
CSC 215 – Computer Systems	CS 2130
CSC 208 – Introduction to Discrete Structures MTH 288 – Discrete Mathematics	CS 2120 - Discrete Math and Theory 1 (Same as CS 2102 – Discrete Math)
CSC 210 – Programming with C++	CS 2000T
Other courses (including Seminar and Project, Co-Op, etc)	CS 2000T or CS 2501 (must be evaluated by CS faculty)

Help Getting into CS Courses

- For newly arriving transfer students, we have saved some spots in CS courses for you
 - For fall semester: CS2100, CS2120, CS2130, CS3140
 - For a CS elective, consider CS3205 (human-computer interaction)
 - Other electives: probably need to wait until next term, but no harm getting on the waiting list
- Work with the Program Director for help getting into these courses

Final Comments for Transfer Students

- Getting courses for your first semester can be challenge
- Adjusting to how we do things at UVA can be a challenge
 - Pace of courses, amount of work, size of classes, etc.
- Things get better!
- DO NOT be afraid to ask for help!
 - Instructors, but especially TAs for classes
 - There are many other resources that can help, give you advice
 - Contact CS staff advisor: SJ Jiménez Calhoun cs-office@virginia.edu
 - Contact Program Director and/or your Association Dean