



# A Study on Student Experiences

Student Researchers: Danielle Beyer, Sarah Haskew, Alyssa Tamayo

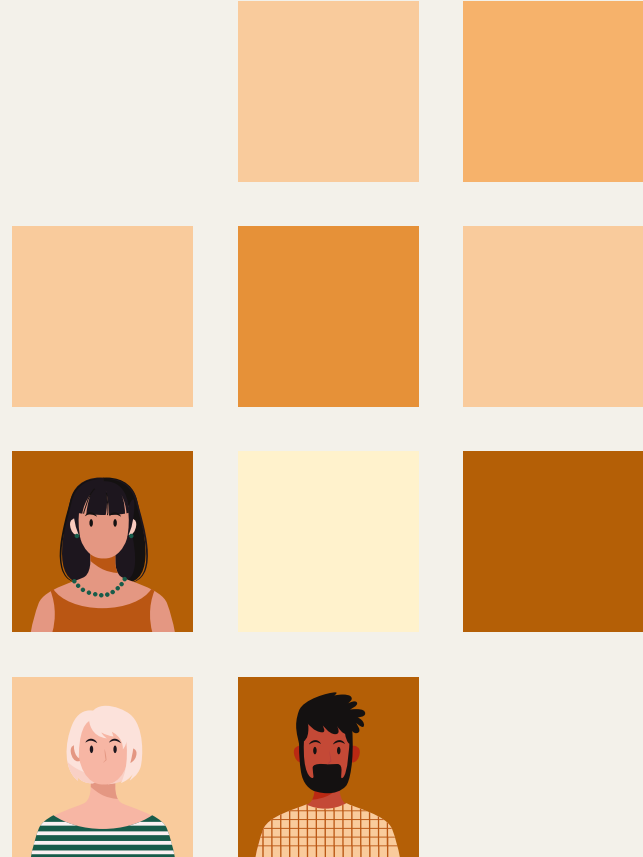
Advisors: Ellie Harmon, Kristin Tufte

# Motivation & Background

We've noticed that we are often one of few women in our classes and this feels uncomfortable. Students of other minority groups feel the same way.

*"I just still didn't feel like I belonged... I step into a room and – I mean I still have the confidence to just... suppress those feelings – but **it's hard to ignore when I walk into a room and I'm the only person that looks like me.**"*

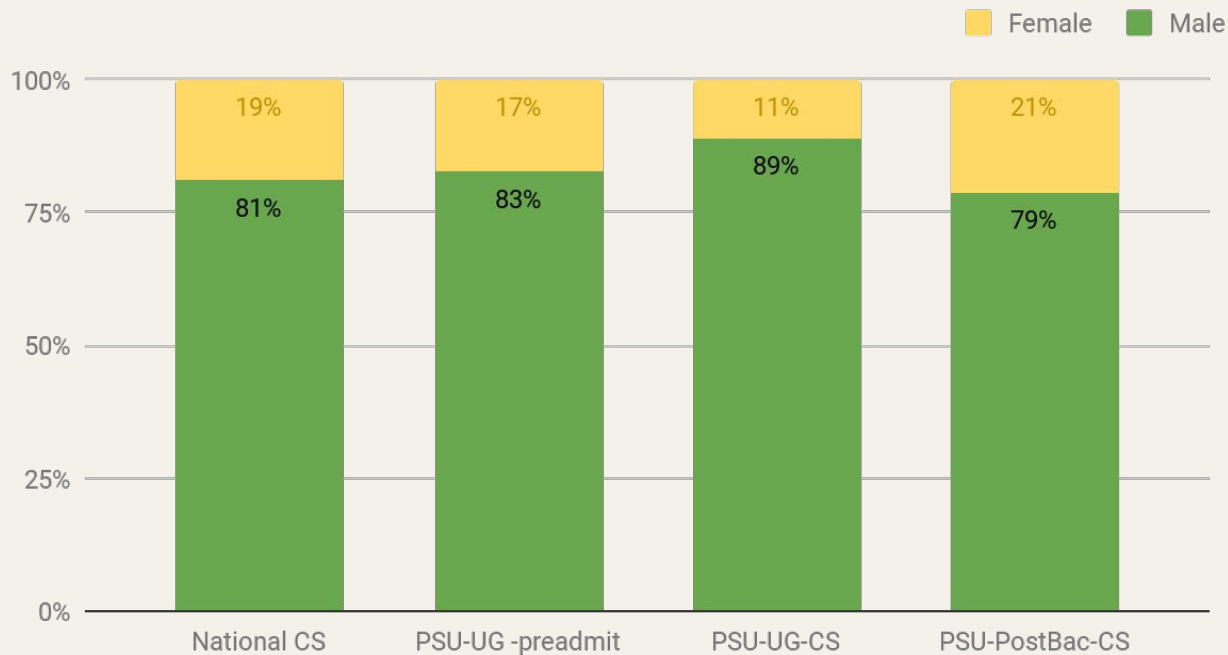
- CS Student of Color



# CS Student Body

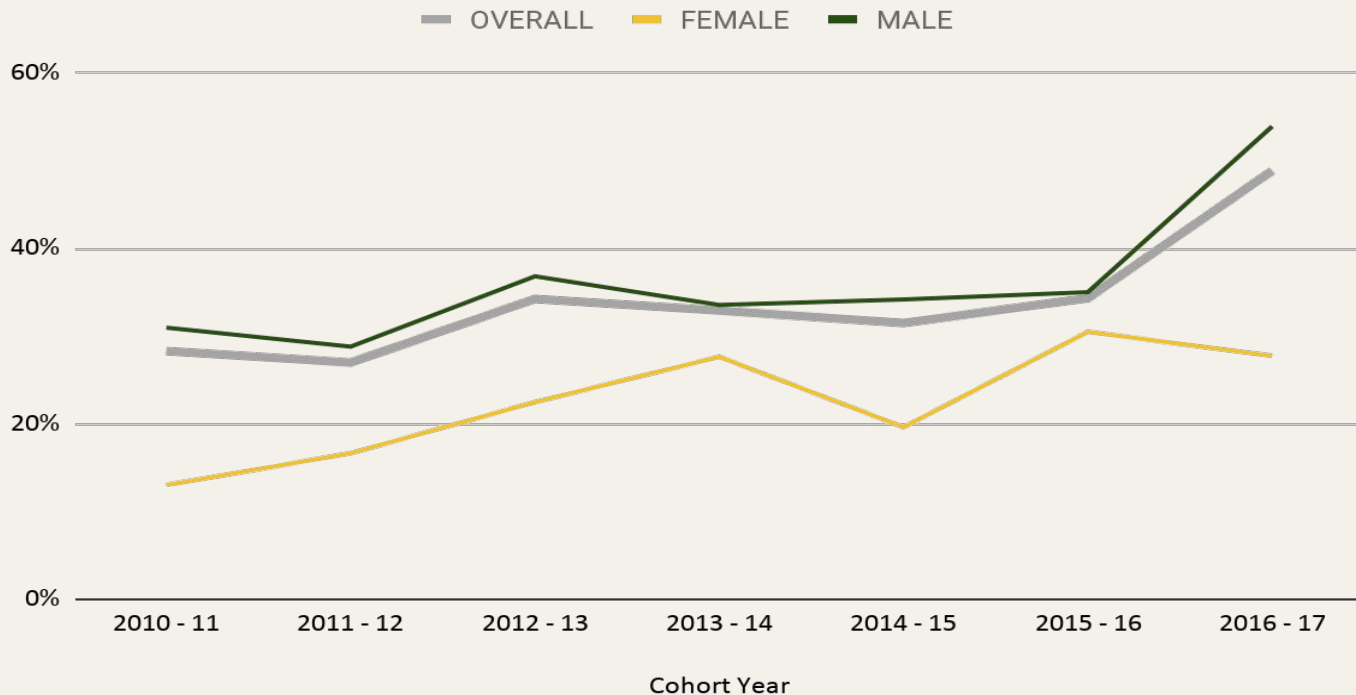
National & PSU

Academic Year 2017-2018



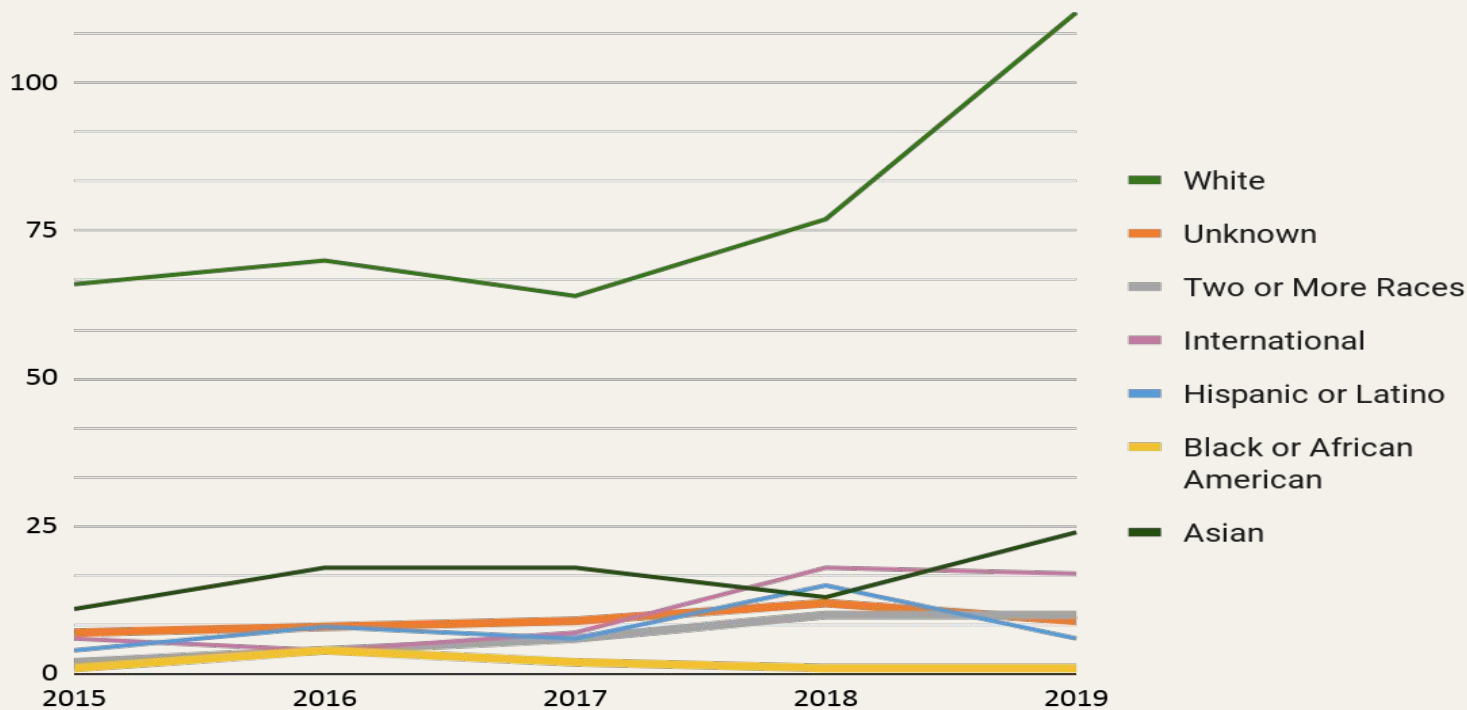
# Persistence/Graduation

By Starting Cohort Year



# PSU CS Undergraduate Degrees

Awarded by Race/Ethnicity



# CS Course Map

**CS 161** - Introduction to Programming...

Course coordinator: David Ely

**CS 162** - Intro to CS-

Course Coordinator: Karla Fant

**CS 163** - Data Structures-

Course Coordinator: Karla Fant

**CS 202** - Programming Systems-

Course Coordinator: Karla Fant

**CS 201** - Computer Systems Programming-

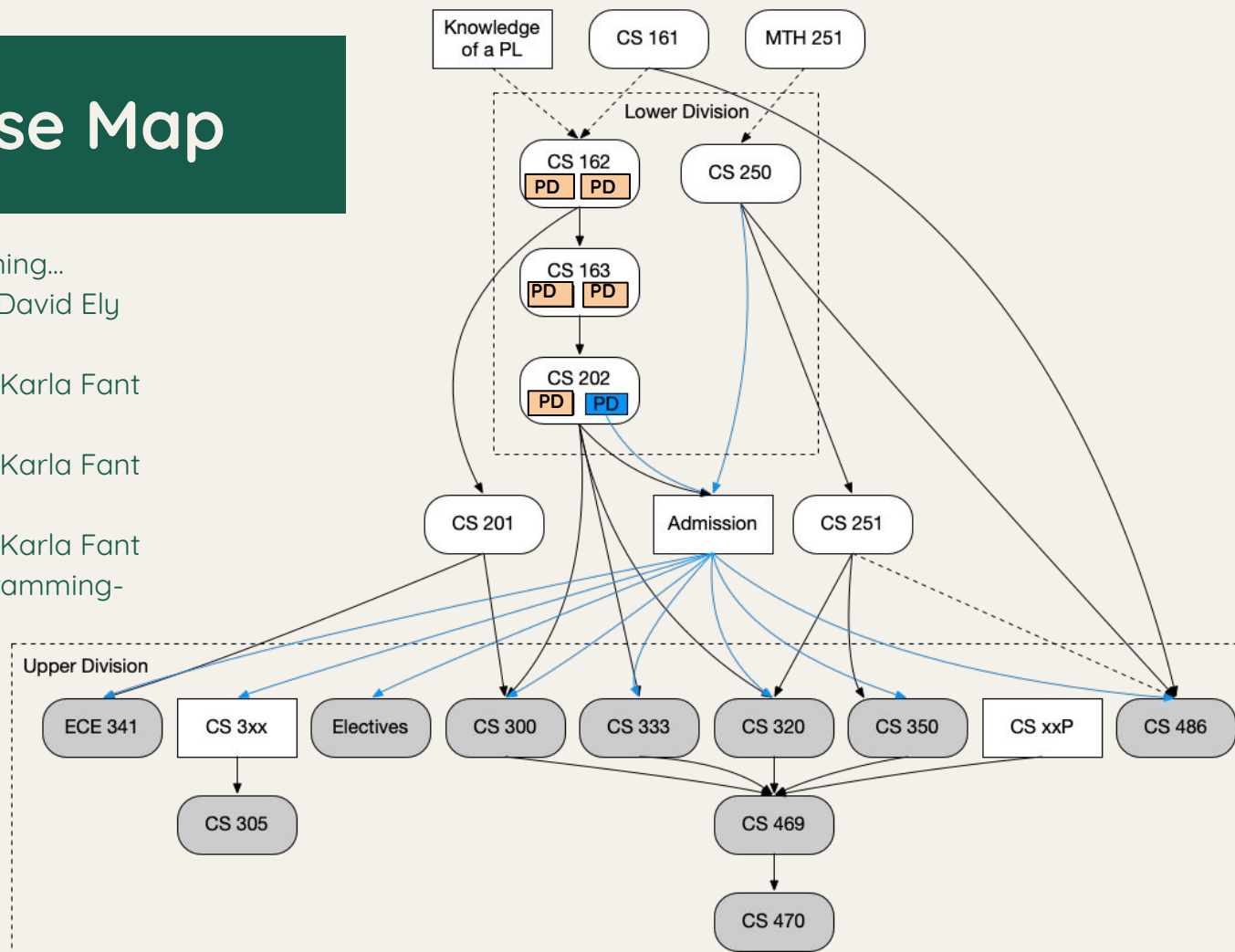
Various instructors

**CS 250** - Discrete Structures I-

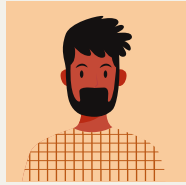
Various instructors

**CS 251** - Discrete Structures II-

Various instructors



# Why Students Leave



*“I think I just quit also because I feel like most people who come out of bootcamps are more job ready, as far as like the latest technology goes. [...] **I just didn’t agree with how the curriculum was structured. It was so archaic,** that’s not how the real world works [...] ... **So i just decided to finish my degree and self study the programming i wanted to learn.** Well it was also, i just got this job at Intel and I was realizing that what i learned in school wasn’t really applying. [...]I would have been much further along if I would have just honestly quit sooner.”*

- **Former CS Student**



*“[The proficiency demo] was one of the reasons I left. [...] **It was the proficiency demos that caused the most stress and tears.**”*

- **Former CS Student**

*“**the [advisor] that I was assigned was discouraging,** and I haven’t gone back to her. [...] the first thing she said to me was, “Well, what’s your second option, ‘cause this is a really hard program?” ... You hope from a counselor, that they’ll believe that you’re gonna continue and accomplish what you want. ... – so I’m doing a different path, because I was so close to finishing my degree before, so I’m doing a minor in computer science.”*

- **CS Student**

# Student Experience Themes

01

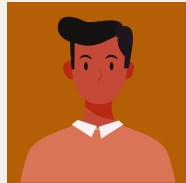
## Asking for Support

Stories about challenges students have experienced when reaching out for help or support in our CS department

02

## Belonging & Confidence

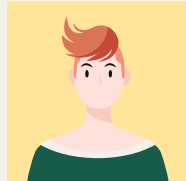
Feeling unsure if you belong in CS or doubting your own abilities



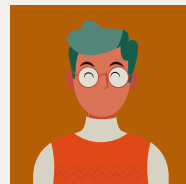
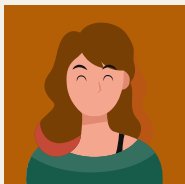
03

## Culture of Isolation

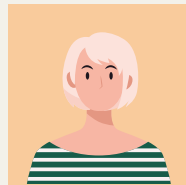
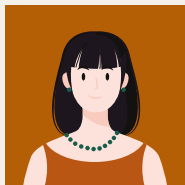
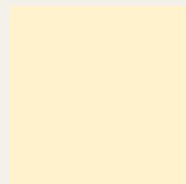
Expectation of figuring things out on your own or having prior knowledge







# Asking for Support

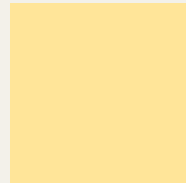
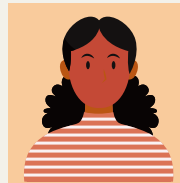


## Asking for Support

A lot of students aren't getting the support they need from the tutor lounge...

“...He was like, you know, like this is such a simple problem, like **how can you not know this.**”

- Former CS Student



“ Okay so one of them was just one of the CS lounge tutors, like you know when people help you and they feel like they think like you should know this by now? A lot of that. **Just condescending and not helpful,** which is hard when you're fighting all this other self doubt.”

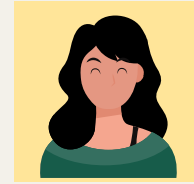
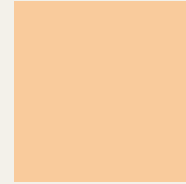
- Former CS Student

“ I just overall never enjoyed the experience. **I felt like I was being talked down to** [...] I would kind of avoid the tutor lounge as much as I could. ”

- CS Student

## Asking for Support

Students can feel like their questions aren't valid or welcomed...



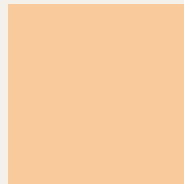
*“ Then the professor [...] was always very intimidating. [They] never seemed like the person that you want to go ask for help. Like [they] had very specific rules about the type of questions we could ask and like the type of knowledge we had to have in order to go ask [them] some questions and **how [they weren't] going to explain some things.***

***[They] would just exclaim in class that ‘you should know this?’ ‘I don’t want to receive questions like this.’ ”***

- Former CS Student

## Asking for Support

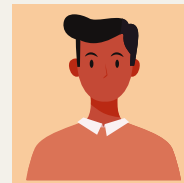
# Lesson content can be alienating...



*“ There was one instance where I was forced to code a program that actually asked for gender options and they only had male or female. And it was a class focused on unit tests. And so that meant that **I also had to write a test that said that my own gender identity was invalid.** And that, like, honestly really truly f\*\*\* me up for like a long time. [...] But like that really still hurts to even think about it now...”*

- *Agender CS Student*

## Asking for Support

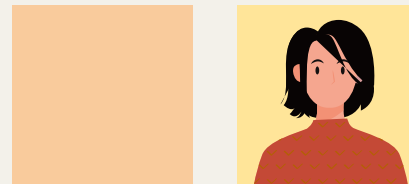


When students feel alienated they are not always comfortable speaking up...

*“It’s also stressful trying to decide if something is actually worth talking about to a professor like am I going to get anything retaliatory? Is a person going to start examining my code that much more in depth?”*

- *Agender CS Student*

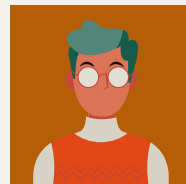
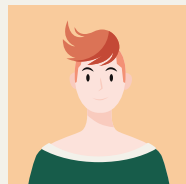
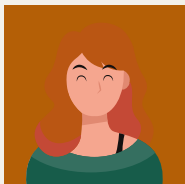
## Asking for Support



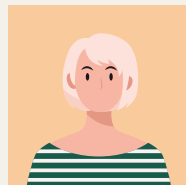
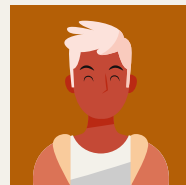
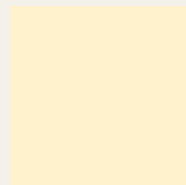
## Students want to feel supported...

“...the consensus with students is that **the lower division courses are the weeder classes, and that’s obviously discouraging to hear when you’re first starting, is that that’s the kind of mentality that the school takes on...** **It’s a much better environment to have your professors rooting for you to get through,** not hoping that students will fall off because they’re not smart enough... or creating an environment where students succeed.”

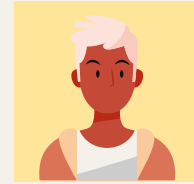
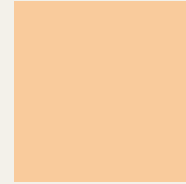
- CS Student



# Belonging & Confidence



## Racial stereotypes affect whether students feel comfortable speaking up in class...



*“As a Black [person] taking computer science classes, one of the things that holds me back, and partially it’s internal but I believe there is some external-like forces there too, is the **stereotype of being perceived as unintelligent because I am Black.***

*...it’s like a **crippling self-consciousness** about how I come across in terms of intelligence, which makes it really hard for me to over[come] ... things like asking for help, going to office hours, talking to professors one-on-one, asking a question, being the only person raising my hand and asking a question and just wondering, well, maybe everyone else already knows this or maybe they’re thinking X, Y, Z about me.”*

**- CS Student of Color**



## Proficiency Demos

Student confidence is undermined by proficiency demos.

*“But how can you be successful when you are doing the technical portion of the midterm or final and someone is breathing over you. And you make a mistake and you can hear their pen writing down your mistake. So it's like super nerve racking. And again, if you have anxiety you go into a block. It's like 2+2 you put that in a calculator because your mind is going into overdrive.”*

- *Former CS Student of Color*

## Proficiency Demos

Students who earn high grades can still not pass proficiency demos.

“ I took this course three times. And, **I took it three times because of the proficiency demo.** [I scored between 80 and 95 on all programs and tests.] So, **it wasn't the course content it was the mid-term demo specifically.** I was kind of dumb-founded when I got to the end of the second class and I realized I wasn't going to pass. I was like 'I'm doing all the practice problems... and I'm still not passing. And then, I talked to other people about it and they were like 'yeah the questions you get in the demo are just different'. ”

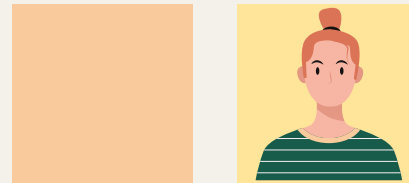
- CS Student [with a pending job offer from a major software company]

## Belonging & Confidence

# Retaking courses has financial impacts on students...

“ Had I not passed the third time, I don’t know what I would have done. [...] **there was a lot of money that would have gone to waste** and time and I just couldn’t get past that. ”

- CS Student of Color



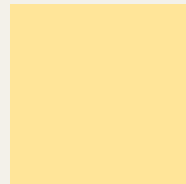
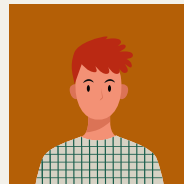
*A quote from a first-generation student who took CS 163 three times and wasn’t admitted to upper division.*

“ It kinda sucks because I feel like I wasted my money. **Because 3 classes for an out of state student is a lot. I am still paying that out of pocket with my family.** [...] Also, I didn’t know that would count against my credits. So I then became behind in credits. ”

- Former CS Student of Color

## Belonging & Confidence

# Representation in faculty matters and affects students' sense of belonging...



“ I think another thing is [...] representation within the department. **Faculty that have different identities are able to relate to students with our identities, able to really connect with us.**”

That's something that I'm highly surprised. **I couldn't find any Latino professor** or it's very, I mean obviously sexual orientation is a little harder to find in a sense. **But there are no pride flags just waving outside my professor's office.**”

- CS Student of Color

“ The belong[ing] part is ... it's complicated, at least for me, I feel it's complicated. **I haven't seen one Black professor or instructor.**”

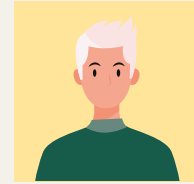
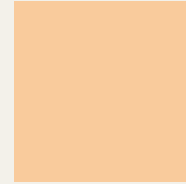
- CS Student of Color

## Representation in the classroom matters and affects students' sense of belonging...

*“[A professor] had this weird habit of always singling out [white male] students for their work using them as an example really. One instance [they were] showing off the work of a particular student and literally had them go to the front of the class and talk about their code, and at one point [they] mentioned, ‘Oh, are the rest of you following this?’ **Like, clearly putting this particular student on a pedestal while also demeaning the rest of us.**”*

- CS Student of Color

## Representation in TAs and TCSSs matters and affects students' sense of belonging...

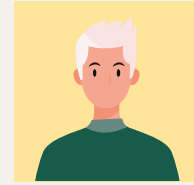
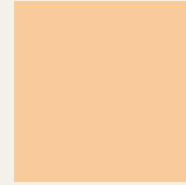


“With [most of] the [TAs and TCSSs] that I've had so far, they all happen to be white. And so it makes me wonder how are these students being selected for these roles. [...] **I would imagine that there are plenty of students who represent other identities who would be perfectly suitable for these positions** where we could increase representation in the department..

It's challenging to see myself as being successful without people [who look like me and are] successful... **I think my biggest challenge right now is just that mental conflict of like 'do I actually belong here?'**”

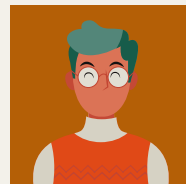
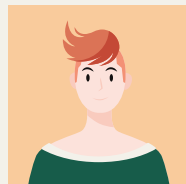
- Female CS Student of Color

## Representation in TAs and TCSSs matters and affects students' sense of belonging...

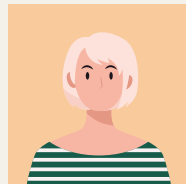
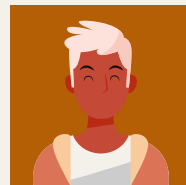
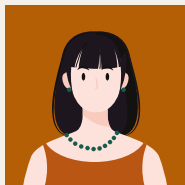
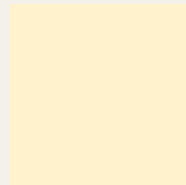


*A quote from a student who feels like they were passed up for a TCSS position due to their race.*

*“ And it just seemed like, and I had heard rumors, that **[professors] play favorites with [their] students** and [they] basically choose who [they] want to [hire]... and **it's also really bad to not be transparent with your hiring process.** ”*



# Culture of Isolation





## Culture of Isolation

Students say that the expectation to figure things out on their own doesn't actually help them learn...

“ [In] this [class] we're just not shown almost any code. It's kind of like here [are] the concepts, now figure it out on your own. [...] When you're stuck and you try to ask for help, **they're like it's a learning process, figure it out, and there is no concrete help given.** And I feel like I've learned so much from seeing other people's code, [just] small things I never even thought about, but it's so discouraged, I guess because of the copying aspect, but then **how do you learn if you don't see an example of something?** ”

- CS Student

## Culture of Isolation

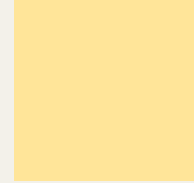
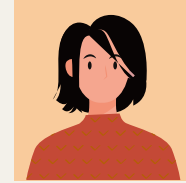
# Students say that working with peers could help them learn...

*“Our curriculum is largely based on individual work and not group work [...] **You’re not really expected to work with anybody... I don’t know if anyone can learn that way, and that does affect underrepresented folks more because they don’t have external support.** They didn’t grow up with maybe extra money for a tutor or they didn’t grow up with parents who were in engineering. So just being allowed to talk to your peers, I feel like is a big [help] for underrepresented folks.”*

- Female CS Student of Color

## Culture of Isolation

Students feel unwelcome and untrusted by others because of their identity...



*“And there was a time when I was trying to get into the fab room for lab but **my I.D. wasn't working, ... And there's a couple students inside and it seemed like they're deciding whether or not they should open up the door [and no one ever did].***

*... And one of the things that I talked to my friend about was that a lot of times we have to second guess ourselves because of our identity and that **if we were just like white men, we'd never have to second guess anything that we did based on our identity. Like, oh, did they act that way because I'm Black, did they act that way because I'm female, did they act that way because I am Hispanic?**”*

- CS Student of Color

# Student Experience Themes

01

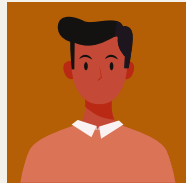
## Asking for Support

- Some students don't get the support they need in the way that they need it
- Getting support can be disproportionately difficult for students who belong to underrepresented groups

02

## Belonging & Confidence

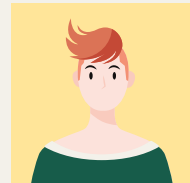
- Proficiency demos can undermine confidence
- Racial stereotypes, representation and other factors out of student control contributes to lack of confidence and sense of belonging

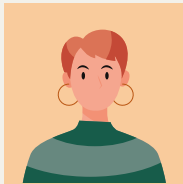
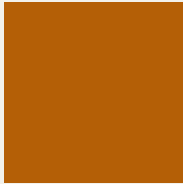
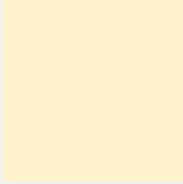
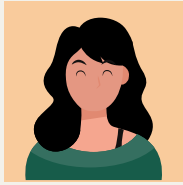
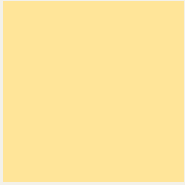


03

## Culture of Isolation

- Students want more guidance and collaboration
- Working with peers can help students learn

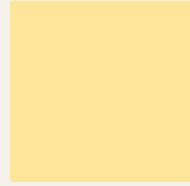
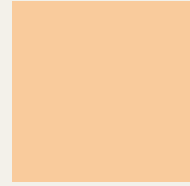




### Special Thanks:

- Ellie Harmon
- Jim Hook
- Mark Jones
- Kristin Tufte

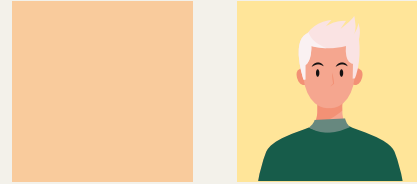
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# Addendums

## Lower Division Curriculum

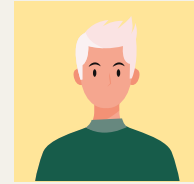
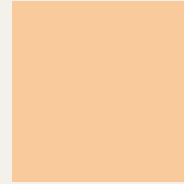
# Lower division courses paint a narrow view of what's possible in CS ...



*“Without getting too much off track I think that sort of once the way **the world of CS opens up when you get into upper division courses and it becomes more apparent it’s not all C++**. Some people hate C++. **It’s not all individual projects**, it’s frequently not. If anything in the before times it was pair programming, lightning talks and tech crawls. **There’s so much more to CS than lower division leads you to believe.** ...*

*[In lower division, you think] maybe this isn’t for me. When in fact most of these thoughts are **true for most professionals I know**. Like “c++?? Ughh”. You know there’s just so much and occasionally **I would recommend that people just look around at tech meetups**. Not just because they need to network but **so they can hear and see what it looks like. This is tech! Rather than lectures and really scary programs.**”*

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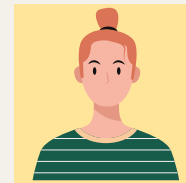
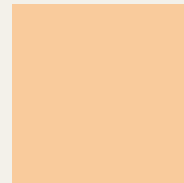
*“Another thing that’s lacking is the knowledge of a wider range of jobs that are computer science related. Like there’s more than just programming ... [In my CS classes, the professor] would talk down in classes, “awww look I’m a designer, I have to put on my designer hat. Blah blah”. Then when it came to the programmer [they] would be like “Now I have my programmer hat and I can think clearly.” **It was like [they were] demeaning designers. I didn’t even think twice about it. I am a programmer, I had to have a programmer hat to be successful.** ...*

*I always kinda like “but the designer part looks so fun”. I use to focus more on the front-end of my programs. I would always make it super intuitive and spend time on the menu. That was always very important to me I would test it on friends. “Hey can you click around my program and tell me if you break it.” **So I was like doing moderated user testing before I even knew this was a career path. But it never got shown to me so I didn’t know.** ...*

*It just would have been nice to have been shown this other career path. Because it probably isn’t just me. I would just like to tell [them] that I can be successful without [their] success rules. Like it’s crazy! **When I was in [their] class I felt dumb. Like imposter syndrome to the max! But right now in my new major and new college my gpa is 3.95.”***



## Student Experiences



# Time expectations are not in line with our student's lives ...

*“ So [a professor] taught some of my classes and I’ve developed a really good rapport with [them] mostly because in order to pass any of [their] classes, **you have to be able to go to [their] office hours and just sit there for hours. Which is unfair to students who are part-time, are parents, have literally anything else to do.**”*

END

