

# An Introduction to CS 450/550

"Computer Graphics is the world's #1 enabling technology. Computer Graphics is for everyone!" -- Mike Bailey

"What will matter is what you learned and how you used it." -- poster outside my office



**Oregon State**  
University

**Mike Bailey**

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Computer Graphics

## Mike Bailey

- Professor of Computer Science, Oregon State University
- Has been in computer graphics for over 30 years
- Has had over 10,000 students in his university classes
- [mjb@cs.oregonstate.edu](mailto:mjb@cs.oregonstate.edu)

Kelley Engineering Center at Oregon State University, home of CS

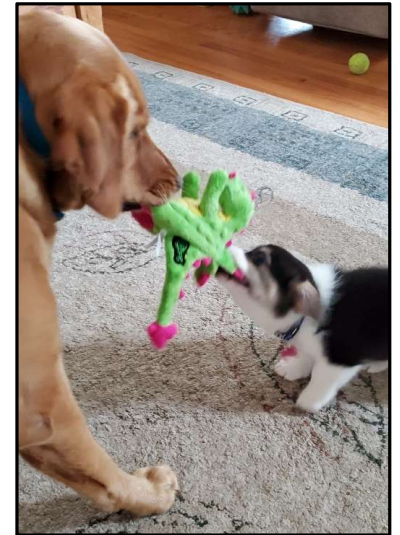
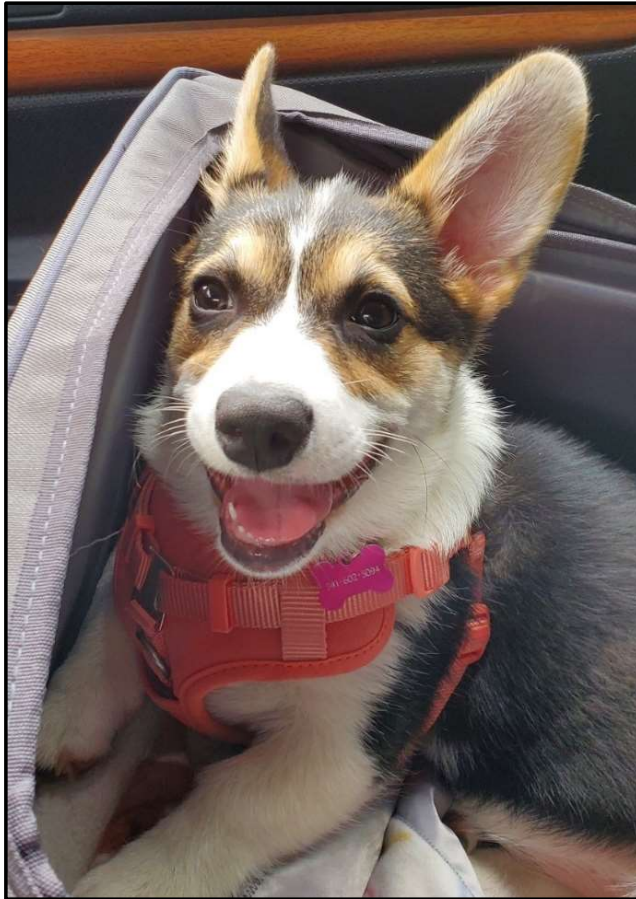
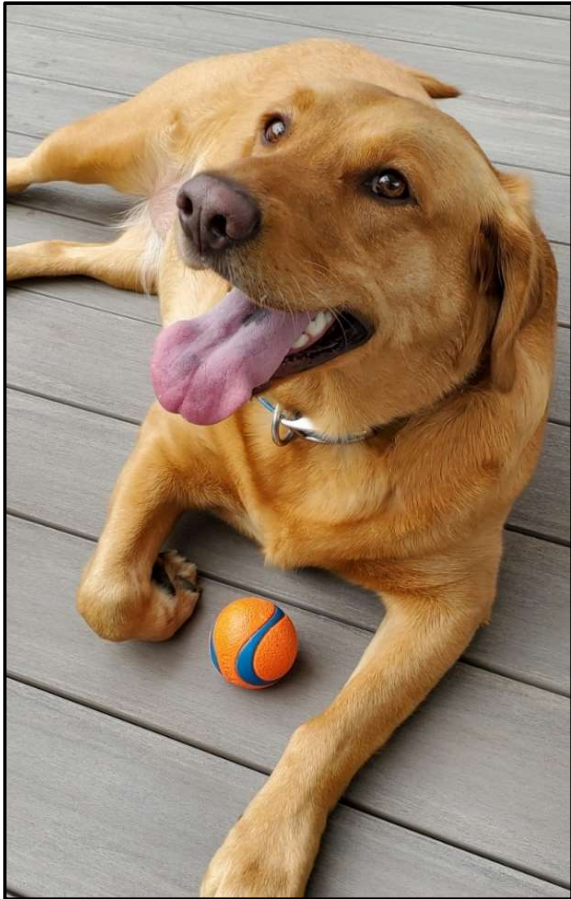
Welcome! I'm  
happy to be here.  
I hope you are too !



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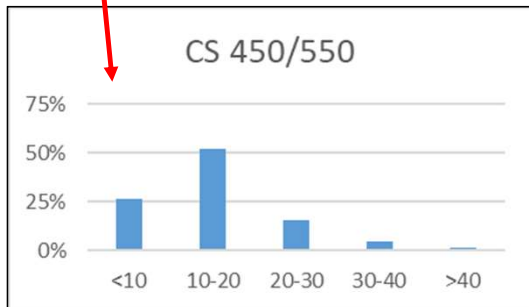
# I Apologize in Advance for What Noise You Might Hear in the Background 😊



## Concerns Taken from our Pre-Quarter Qualtrics Survey, I

### You're concerned with the workload

This is the summary of what several years of this class have told me about the hours/week workload.



### You don't like having to commute 2 hours each day for class

This class is also offered on Ecampus – that might help you some.

### You're concerned about having to do Group Projects

There are no Group Projects in this class – I dislike them too.

### You're concerned that you have no prior background in CG

No problem – that's what I am assuming. We start from zero.

### You're concerned because you're not a CS major

This course has been deliberately tailored so that those outside of CS can still succeed in it. *CG is for everyone!*

### You're concerned that you don't know C++

We will use what I would call "C++-lite", and there will be lots of sample code, and lots of professor/TA help.

### You're concerned because you are not a good test-taker or memorizer

The quizzes and tests are all open-notes.

### You're concerned that OpenGL is complicated to understand quickly

We are *deliberately* starting with the simplest way of using OpenGL so that everyone gets comfortable right away.



## Concerns Taken from our Pre-Quarter Qualtrics Survey, II

### You're concerned that this class will be math-heavy

We will use *some* math, but I wouldn't call it "math-heavy".

### You're concerned that you have no prior background in linear algebra

No problem – we use library functions to handle transformations. The underlying implementation is hidden, and is, frankly, unimportant here. It's the *use* of the transformations that really matter to us.

### You're concerned that the A grade window is small

That's because we do a "soft grade" on your projects. "Did it work as required?" If yes, then full credit. No looking at programming style. No counting the number of comments.

### You're taking care of a 2-month-old baby at the same time

OK, not much I can do to help you with this. But, there is a lot of flexibility in the way the class is structured, so that should help. BTW, send me a photo!

### You're concerned the projects look too challenging

They are challenging, but the challenge is just *with respect to what you will have already done* at the time. You start with Project #1 (easy) and build from there. No projects will look overwhelming when you look at them from the point of view of the preceding project.

### Will there be remote options in case of disease or other emergencies?

By the time the quarter starts, all lectures will have been pre-recorded. If you are an on-campus student, you will still get more out of being class, though. But, this will give you the flexibility to weather emergencies.



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## The CS 450/550 Resources Page

Class materials will be linked into various Canvas pages,  
but you can find *everything* here:

**<http://cs.oregonstate.edu/~mjb/cs550>**

(It doesn't matter if you are in CS 450 or CS 550. It doesn't matter if you are on-campus or online. We *all* use the same Resources Page.)



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## Course Topics

1. Summary of the computer graphics process
2. Coordinate systems and the graphics pipeline
3. Drawing a 3D scene using OpenGL
4. Single and hierarchical transformations
5. Projection from 3D to 2D
6. Altering the 3D viewing
7. Framebuffers and color
8. Lighting
9. Texture mapping
10. Transparency (blending)
11. Various approaches to 3D modeling
12. Various approaches to 3D rendering
13. Various approaches to 3D animation
14. Vertex Buffer Objects
15. GLM
16. Shaders (Vertex and Fragment)
17. Shadows
18. Stereographics
19. Virtual and Augmented Reality
20. A look into the computer graphics future -- Vulkan



## Grading: Points and Cutoffs

- 10 Quizzes @ 10 points each
- 2 Tests @ 100 points each
- 7 Projects, worth a total of 650 points
- CS 550ers will also do a 100-point Paper Review Project (450ers get a free 100 points for that assignment)

**Total Points = 1050**

*Note that this is not 90-80-70-60!*

I do it this way because we do such a soft grade on the programming projects.



Grade cutoffs will be no higher than:

| Points | Grade |
|--------|-------|
| 1020   | A     |
| 1000   | A-    |
| 980    | B+    |
| 960    | B     |
| 940    | B-    |
| 920    | C+    |
| 900    | C     |
| 880    | C-    |
| 860    | D+    |
| 840    | D     |
| 820    | D-    |



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## Quizzes

- Quizzes will go live on Canvas every Friday at 12:01 AM Pacific Time (one minute after midnight).
- Each quiz is due at 23:59 Pacific Time Sunday evening (one minute before midnight).
- *Exception:* Quiz #0 is due at 4:00 PM on Friday, September 30.
- There is *no quiz on* the Friday of Thanksgiving week (Week #9).
- Part of what is being quizzed is the time management skill to remember to take the quizzes. If you forget to take the quiz, there is no make-up.
- I *really* recommend that you take the quiz ***before the end of Friday!*** That way, your weekend activities won't distract you from getting the grade.



## EECS Information for You:

### **Calendar of Events:**

(EECS events are in orange, career events for students are in green )

<https://eecs.oregonstate.edu/eecs-calendar>

### **Resources for students looking for internships and jobs:**

<https://eecs.oregonstate.edu/eecs-student-portal>



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## More Information, I:

### Link to the Code of Student Conduct:

<https://beav.es/codeofconduct>



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## More Information, II:

### Students With Disabilities

Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at <http://ds.oregonstate.edu>. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

### Religious Holidays

Oregon State University strives to respect all religious practices. If you have religious holidays that are in conflict with any of the requirements of this class, please see me immediately so that we can make alternative arrangements.



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## More Information, III:

### Life Events

As {John Lennon? Allen Saunders?} has said: "Life is what happens to you while you're busy making other plans". I care about you as a person. When life happens to you, send me an email and come see me. I might be able to help, I might not. But I surely can listen. You are not alone.

### Reach Out for Success

University students encounter setbacks from time to time. If you encounter difficulties and need assistance, it's important to reach out. Consider discussing the situation with me or an academic advisor. Learn about resources that assist with wellness and academic success at <http://oregonstate.edu/ReachOut>. If you are in immediate crisis, please contact the Crisis Text Line by texting OREGON to 741-741 or call the National Suicide Prevention Lifeline at 1-800-273-TALK (8255)



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## More Information, IV:

### Basic Needs

Success at OSU means knowing and using your resources. One helpful resource is the community of staff available at the Basic Needs Center (BNC) for support ([bnc@oregonstate.edu](mailto:bnc@oregonstate.edu), 541-737-3747). Students can drop in during open hours and talk with a BNC student leader for resources, ideas and strategies connected to basic needs challenges. The BNC is often known for its [food pantry](#) but there are other resources connected to groceries and affording food often available and staff who can help you work through housing stressors. Undergraduate students, living in Oregon, are especially encouraged to explore SNAP (up to \$236 in grocery money each month for eligible students) as a resource. Domestic undergraduate students living in Oregon are more likely than not to be eligible for SNAP. BNC staff are skilled with helping students navigate this process.

Additionally, the BNC [Textbook Lending Program](#) offers students the opportunity to check out required textbooks for the academic term.

Furthermore, if you are comfortable doing so, please talk with Professor Bailey. He will do everything he can to help you.



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mjb – September 12, 2022