

**Welcome to the  
gem5 bootcamp!**



# About the overall structure of the bootcamp

These slides and are available at <https://bootcamp.gem5.org/> for you to follow along.

(Note: They will be archived at <https://gem5bootcamp.github.io/2024>)

The source for the slides, and what you'll be using throughout the bootcamp can be found on github at <https://github.com/gem5bootcamp/2024>

Note: Don't clone that repo, yet. We'll do that in a bit.



## A bit about me

I am **Prof. Jason Lowe-Power** (he/him).  
I am an associate professor in the Computer Science Department and the *Project Management Committee chair* for the gem5 project.

I lead the Davis Computer Architecture Research (DArchR) Group.

<https://arch.cs.ucdavis.edu>



# The bootcamp team

Bobby Bruce



Ivana Mitrovic



Harshil Patel



Erin Le



Mahyar Samani



Zhantong Qiu



William Shaddix



Yuyi Li



Leo Redivo



Mitha Mysore



Alyssa Vallejo



Noah Krim



Saili Karkare



# Plan for the week

## Day 1

### Introduction

- [Background on simulation](#)
- [Getting started with gem5](#)
- [Background on Python and gem5](#)

### Using gem5

- [gem5's standard library](#)
- [gem5 resources](#)

## Day 2

### Using gem5

- [Running things in gem5](#)
- [Modeling cores in gem5](#)
- [Modeling caches in gem5](#)
- [Modeling memory in gem5](#)
- [Full system simulation](#)

## Day 3

### Using gem5

- [Accelerating simulation](#)
- [Sampled simulation with gem5](#)
- [Power modeling](#)
- [Multisim](#)

### Developing gem5 models

- [SimObject intro](#)
- [Debugging and debug flags](#)
- [Event-driven simulation](#)

## Day 4

### Developing gem5 models

- [Modeling Cores](#)
- [Modeling cache coherence with Ruby and SLICC](#)
- [Extending gem5](#)

### [GPU modeling](#)

## Day 5

### Developing gem5 models

- [Ports and memory-based SimObjects](#)
- [Using the CHI protocol](#)
- [Modeling the on-chip network with Garnet](#)

### Other simulators

- [SST](#)
- [DRAMSim/DRAMSys](#)
- [SystemC](#)

### Contributing to gem5

- [gem5 contributing process](#)
- [gem5 testing](#)



# Our goals for the gem5 bootcamp

- Make gem5 less painful and flatten the learning curve
- Give you a vocabulary for asking questions
- Provide a reference for the future
- Give you material to take back and teach your colleagues

## Other likely outcomes

- You will be overwhelmed by the amount of information and how large gem5 is
  - That's OK! You can take these materials with you and refer back to them
- You will not understand everything
  - That's OK! You can ask questions as we go



# How this is going to work

- We'll be going mostly top-down
  1. How to use gem5
  2. How to each model can be used
  3. How to develop your own models and modify existing models
- Highly iterative:
  - You'll see the same thing over and over
  - Each time it will be one level deeper
- Lots of coding examples
  - Both live coding and practice problems



# Coding examples

You can write the following code

```
print("Hello, world!")  
print("You'll be seeing a lot of Python code")  
print("The slides will be a reference, but we'll be doing a lot of live coding!")
```

And you'll see this output.

```
Hello, world!  
You'll be seeing a lot of Python code  
The slides will be a reference, but we'll be doing a lot of live coding!
```



# Bootcamp logistics

We'll be here from 9am - 4pm each day.

Lunch will be ~12 - 1pm.

We'll have a breaks in the morning and afternoon.

Afternoon break will have coffee/snacks.

Tonight: Reception at [Dunloe Brewing](#) (Olive Drive Brewery)  
5:30pm - 8:00pm. Walking over at 5pm from here.

Wednesday: Social event at UC Davis ["Games Area"](#) (Bowling, pool, video games, etc.)  
6:30pm - 9:30pm.

## Other admin things

# Important resources

## Bootcamp links

- [Bootcamp website](#) (Maybe you're here now)
  - [Bootcamp archive](#) (If you're coming to this later)
- [Source for bootcamp materials](#) (You'll work here)
- [GitHub Classroom](#) (Needed to use codespaces)

## gem5 links

- [gem5 code](#)
- [gem5 website](#)
- [gem5 YouTube](#)
- [gem5 Slack](#) (for asking offline questions)

