

**Welcome to the
gem5 bootcamp!**



About the overall structure of the bootcamp

These slides and are available at <https://gem5bootcamp.github.io/lps2024> for you to follow along.

The source for the slides, and what you'll be using throughout the bootcamp can be found on github at <https://github.com/gem5bootcamp/lps2024>

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



A bit about us

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>

I am **Dr. Bobby Bruce** (he/him).
I am a project scientist in the Computer Science Department at UC Davis.
I am the *lead maintainer* of the gem5 project.

UCDAVIS
UNIVERSITY OF CALIFORNIA

DArchR
DAVIS ARCHITECTURE RESEARCH



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



Matt Sinclair



Plan for the week

Tuesday

Introduction

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

Using gem5

- [gem5's standard library](#)
- [gem5 resources](#)
- [Running things in gem5](#)
- [Modeling cores in gem5](#)
- [Modeling caches in gem5](#)
- [Modeling memory in gem5](#)

Wednesday

Using gem5

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

Other simulators

- [SST](#)

Developing gem5 models

- [SimObject intro](#)
- [Debugging and debug flags](#)
- [Event-driven simulation](#)
- [Ports and memory-based SimObjects](#)

Thursday

Developing gem5 models

- [Modeling cache coherence with Ruby and SLICC](#)
- [Using the CHI protocol](#)
- [Modeling the on-chip network with Garnet](#)
- [Modeling Cores](#)



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

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)

