

**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.

UC DAVIS
UNIVERSITY OF CALIFORNIA

DArchR
DAVIS ARCHITECTURE RESEARCH



The bootcamp team

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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)

