Wrap-up:
Large-Scale Computational and Data Science

CS205: Computing Foundations for Computational Science
Dr. David Sondak
Spring Term 2020

HARVARD
School of Engineering
and Applied Sciences

INSTITUTE FOR APPLIED
COMPUTATIONAL SCIENCE
AT HARVARD UNIVERSITY

CS205: Aim and Objectives

Learn Parallel Computational Thinking and Tools

Practical overview of:

- Foundations of "parallel thinking"
- Aspects to consider when designing large-scale applications
- Parallel programming models for compute- and data-intensive applications, and
- Existing platforms, open-source tools and cloud services to support their execution

After the course, you will be in a great position to:

- Make effective use of the diverse, and rapidly changing, landscape of programming models, platforms and computing architectures for high performance computing and big data
- Decide which kind of programming model and platform is appropriate to meet your scalability and performance
- Apply the enduring principles behind these rapid changes in technology that remain true, no matter which version of a particular platform you are using

CS205: Contents

A Practical View: From Design to Implementation

INTRO: LARGE-SCALE COMPUTATIONAL AND DATA SCIENCE

A. PARALLEL PROCESSING FUNDAMENTALS

A.1. Parallel Processing Architectures

A.2. Large-scale Processing on the Cloud

A.3. Practical Aspects of Cloud Computing

A.4. Application Parallelism

A.5. Designing Parallel Programs

B. PARALLEL COMPUTING

B.1. Foundations of Parallel Computing

B.2. Performance Optimization

B.3. Accelerated Computing

B.4. Shared-memory Parallel Processing

B.5. Distributed-memory Parallel Processing

C. PARALLEL DATA PROCESSING

C.1. Foundations of Data Processing

C.2. Batch Data Processing

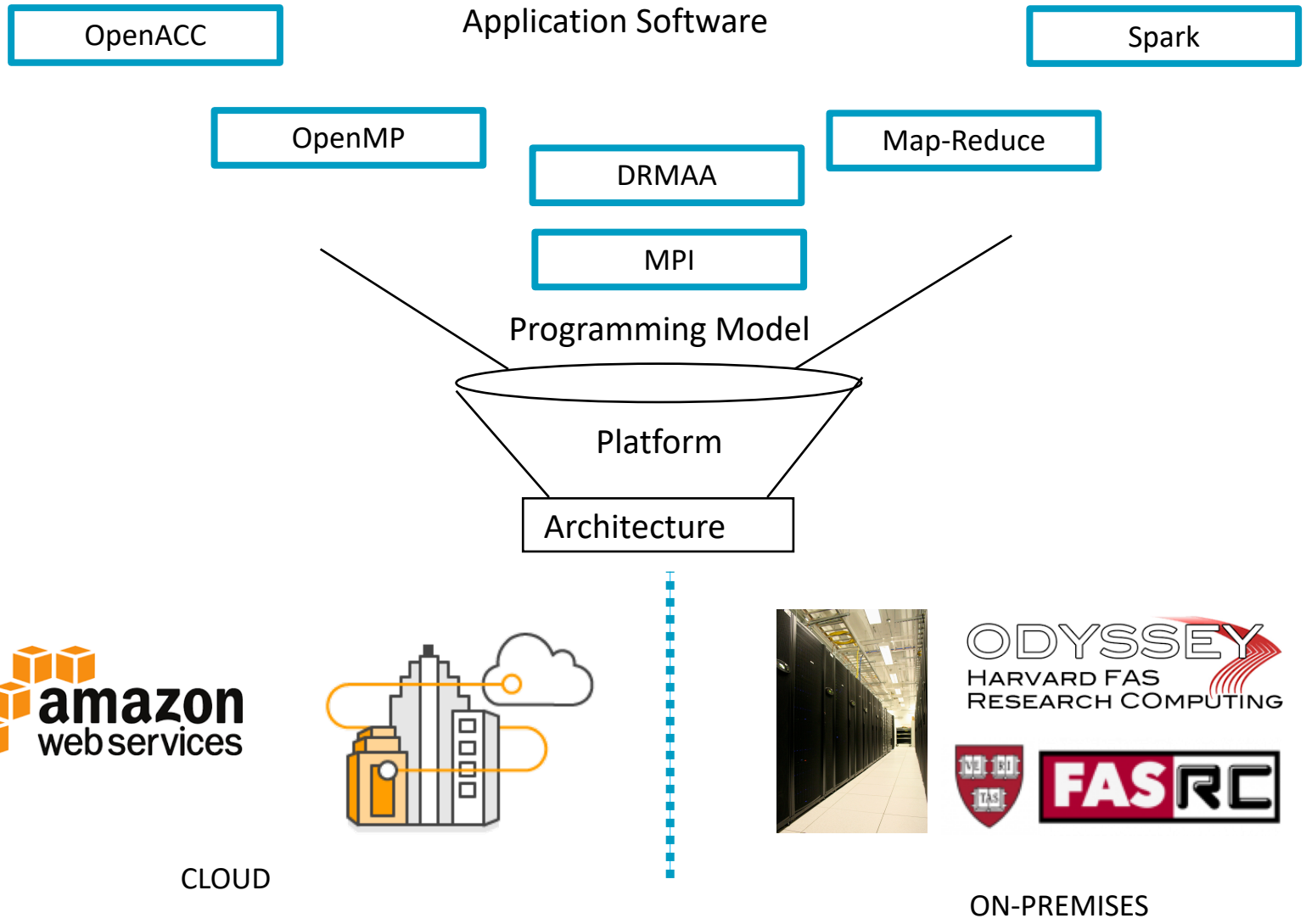
C.3. Dataflow Processing

C4. Stream Data Processing

WRAP-UP: ADVANCED TOPICS

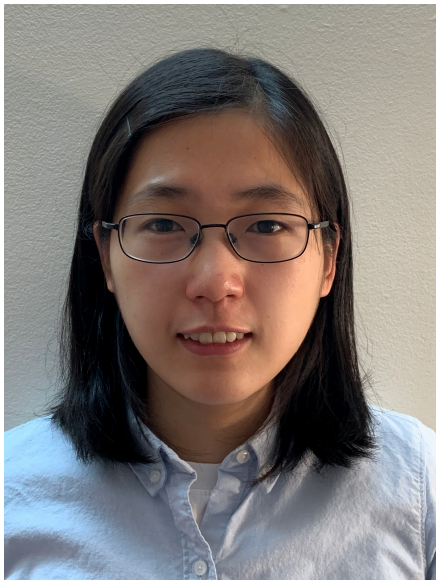
CS205: Contents

Programming Models, Platforms and Infrastructures



CS205: Staff

Teaching Fellows



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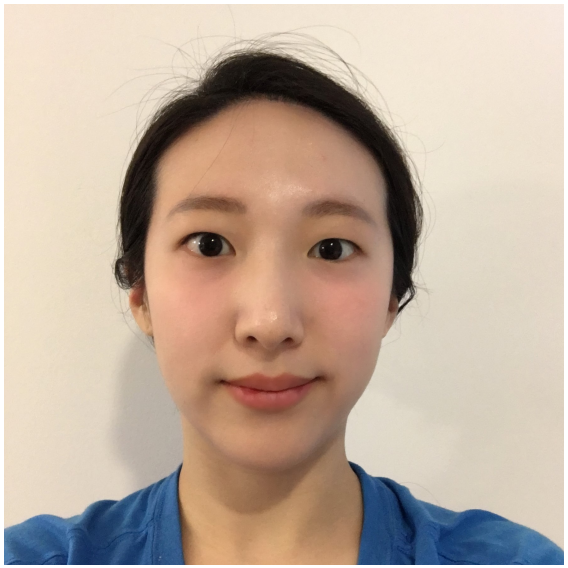

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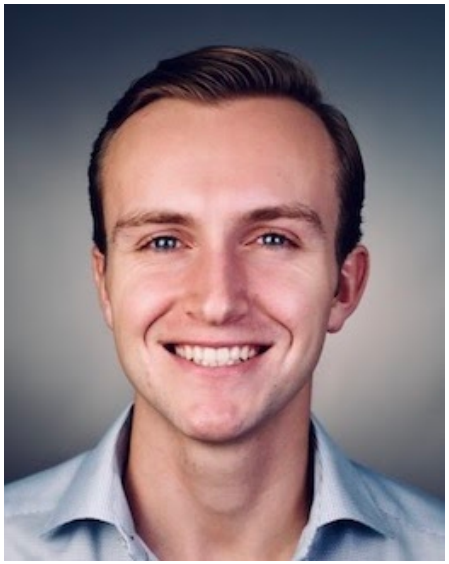

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Final Reminders

Course Wrap-up

- **Final presentations**
  - **Monday, May 11th from 2:00 PM – 5:50 PM EDT**
  - **Select a presentation block and presentation slot**
  - **Sign-up link is on Piazza**
  - **Read instructions when you sign up!**