

Stanford



Cynthia Lee

Lecturer, Computer Science

 Curriculum Vitae available Online

CONTACT INFORMATION

- **Media Inquiries**

Michael Freedman - Chief Communications Officer, School of Engineering

Email mikefree@stanford.edu

Tel (650) 724-3714

Bio

BIO

Cynthia Lee is a Lecturer in the Computer Science Department at Stanford. She specializes in team-based and question-based course design, and founded peerinstruction4cs.org to support educators in flipping their computer science classrooms using peer instruction. She has a PhD in high-performance computing from UC San Diego and also taught there before moving to Stanford. Her industry work experience includes NASA Ames and startups.

Her industry, research, and teaching experience includes the areas of computer science pedagogy, programming, machine learning, mobile/iOS applications, mathematical foundations of computer science, high-performance and distributed systems, and cybersecurity education.

She lives in Palo Alto with her husband and two children.

ACADEMIC APPOINTMENTS

- Lecturer, Computer Science

HONORS AND AWARDS

- Lloyd W. Dinkelspiel Award, Stanford University (2019)
- Top 10 Papers of All Time (#4), ACM SIGCSE (2019)
- Best Paper Award, ACM SIGCSE (2016)
- Professor of the Year, Stanford Society of Women Engineers (2015)

PROFESSIONAL EDUCATION

- Ph.D., University of California, San Diego, Computer Science (2009)
- B.S., University of California, San Diego, Computer Science (2001)

LINKS

- Google Scholar Publications List: <https://scholar.google.com/citations?user=m7XfezkAAAAJ&hl=en>

- LinkedIn Profile: <https://www.linkedin.com/in/cynthia-lee-00498a54/>
- Wikipedia Page: https://en.wikipedia.org/wiki/Cynthia_B._Lee

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

I have a PhD in Computer Science from the University of California, San Diego, in the area of High-Performance Computing (HPC), specifically market-based scheduling algorithms. My graduate research was done as part of San Diego Supercomputer Center (SDSC)'s Performance Modeling and Characterization Lab (PMAc), where I investigated economic models of scheduling on high performance computing systems. My adviser was Allan Snaveley of SDSC.

My dissertation abstract is as follows: Effective management of Grid and HPC resources is essential to maximizing return on the substantial infrastructure investment these resources entail. An important prerequisite to effective resource management is productive interaction between the user and scheduler. My work analyzes several aspects of the user-scheduler relationship and develops solutions to three of the most vexing barriers between the two. First, users' monetary valuation of compute time and schedule turnaround time is examined in terms of a utility function. Second, responsiveness of the scheduler to users' varied valuations is optimized via a genetic algorithm heuristic, creating a controlled market for computation. Finally, the chronic problem of inaccurate user runtime requests, and its implications for scheduler performance, is examined, along with mitigation techniques.

My current research projects are in the area of Computer Science Education, with an emphasis on assessment and the use of Peer Instruction pedagogy in lecture. With colleagues Mark Guzdial, Leo Porter, and Beth Simon, I run the New CS Faculty Teaching Workshop, an annual "bootcamp" on how to teach effectively that draws attendees from dozens of the top CS programs in the country. The short-term goal is to give newly-hired faculty entering their first year of teaching the skills they need to succeed for themselves and their students. The long-term goal is to transform undergraduate education in CS by seeding our best rising stars with best practices so they can create communities of practice as their institutions and mentor their students in active learning strategies, creating a culture where these are the new norm.

PROJECTS

- New Faculty Workshop
- Instructor tips for creating inclusive CS classrooms - Stanford University

Teaching

COURSES

2018-19

- Computer Organization and Systems: CS 107 (Aut)
- Evaluating Education Technology: Developing Frameworks to Make Sense of EdTech: CS 19SI (Spr)
- Mathematical Foundations of Computing: CS 103 (Win, Spr)
- Mathematical Problem-solving Strategies: CS 103A (Win)
- Race and Gender in Silicon Valley: CS 80Q (Aut)

2017-18

- Mathematical Foundations of Computing: CS 103 (Win, Spr)
- Mathematical Problem-solving Strategies: CS 103A (Spr)
- Problem-Solving for the CS Technical Interview: CS 9 (Aut)
- Programming Abstractions: CS 106B, ENGR 70B (Aut)

2016-17

- Computer Organization and Systems: CS 107 (Aut, Win, Spr)
- Problem-Solving for the CS Technical Interview: CS 9 (Aut)

2015-16

- Computer Organization and Systems: CS 107 (Win)
- Problem-Solving for the CS Technical Interview: CS 9 (Aut)
- Programming Abstractions: CS 106B, ENGR 70B (Spr)
- Programming Abstractions (Accelerated): CS 106X, ENGR 70X (Aut)
- Standard C++ Programming Laboratory: CS 106L (Spr)

STANFORD ADVISEES

Master's Program Advisor

Arnelle Ansong, Miguel Ayala, Jeffrey Barratt, Jack Humphries, Liza Murdoch, Ansh Shukla, Hayk Tepanyan

Undergraduate Major Advisor

Anna Verwillow

Publications

PUBLICATIONS

- **Peer instruction: do students really learn from peer discussion in computing?** *ICER '11*
Porter, L., Lee, C. B., Simon, B., Zingaro, D.
- **Experience report: CS1 in MATLAB for non-majors, with media computation and peer instruction** *SIGCSE'13*
Lee, C. B.
- **Experience report: a multi-classroom report on the value of peer instruction** *ITiCSE '11*
Porter, L., Lee, C. B., Simon, B., Cutts, Q., Zingaro, D.
- **Halving fail rates using peer instruction: a study of four computer science courses** *SIGCSE '13*
Porter, L., Lee, C. B., Simon, B.
- **Precise and realistic utility functions for user-centric performance analysis of schedulers** *ICER '11*
Lee, C. B., Snavey, A. E.
- **Development of Peer Instruction Questions for Cybersecurity Education** *Advances in Security Education (ASE'16)*
Johnson, W. E., Luzader, A., Ahmed, I., Roussev, V., Richard III, G. G., Lee, C. B.
- **Peer instruction in computing: the role of reading quizzes** *SIGCSE '13*
Zingaro, D., Lee, C. B., Porter, L.
- **Peer Instruction for Digital Forensics** *USENIX Workshop on Advances in Security Education (ASE17)*
Johnson, W., Ahmed, I., Roussev, V., Lee, C. B.
- **New CS1 pedagogies and curriculum, the same success factors?** *SIGCSE '14*
Alvarado, C., Lee, C. B., Gillespie, G.
- **Applying an automated framework to produce accurate blind performance predictions of full-scale HPC applications** *Department of Defense Users Group Conference*
Carrington, L., Wolter, N., Snavey, A., Lee, C. B.
- **Are user runtime estimates inherently inaccurate?** *Workshop on Job Scheduling Strategies for Parallel Processing*
Lee, C. B., Schwartzman, Y., Hardy, J., Snavey, A.

- **A multi-institutional study of peer instruction in introductory computing**
Porter, L., Bouvier, D., Cutts, Q., Grissom, S., Lee, C., McCartney, R., Zingaro, D., Simon, B.
ACM Inroads. New York, NY, USA .
2016 ; Volume 7 (Issue 2): 76–81
- **Computer science concept inventories: past and future** *Computer Science Education*
Taylor, C., Zingaro, D., Porter, L., Webb, K., Lee, C. B., Clancy, M.
2014; 24 (4)
- **Active Learning in Lecture with Peer Instruction**
Lee, C. B.
AI Magazine. Association for the Advancement of Artificial Intelligence.
2014 ; Volume 35 (2):
- **Adapting to Pervasive Computing, and Making Great Pedagogy Pervasive**
Lee, C. B.
National Science Foundation.
2013 ; Future Directions in Computing Education Summit white papers
- **Can peer instruction be effective in upper-division computer science courses?** *ACM Transactions on Computing Education (TOCE)*
Lee, C. B., Garcia, S., Porter, L.
2013; 13 (3)
- **On the User–Scheduler Dialogue: Studies of User-Provided Runtime Estimates and Utility Functions** *The International Journal of High Performance Computing Applications*
Lee, C. B., Snively, A.
2006; 20 (4)
- **Performance modeling of HPC applications** *Advances in Parallel Computing*
Snively, A., Gao, X., Lee, C., Carrington, L., Wolter, N., Labarta, J., Gimenez, J., Jones, P.
2004; 13
- **Parallel job scheduling algorithms and interfaces**
Lee, C.
Department of Computer Science and Engineering. University of California, San Diego. La Jolla, CA.
2004
- **Detection and characterization of port scan attacks**
Lee, C. B., Roedel, C., Silenok, E.
University of California, Department of Computer Science and Engineering. La Jolla, CA.
2003