DAVID O'HALLARON

Professor of CS and ECE, Carnegie Mellon University, Pittsburgh, PA.

Professional Preparation

University of Virginia, Ph.D., Computer Science, *An Investigation of Models of Concurrent Programs*, 1986. M.S., Computer Science, 1983.

Virginia Tech, B.S., Computer Science, 1979.

Appointments

Carnegie Mellon University. *Professor*, CS and ECE, 2010–present. *Associate Professor with tenure*, CS and ECE, 2002–2010. *Associate Professor*, CS and ECE, 1998–2002. *Research Scientist*, CS, 1992–1998. *Systems Scientist*, CS, 1989–1992.

Intel Labs, Pittsburgh. *Director*, 2007–2010.

General Electric Research and Development Center, Schenectady, NY, Staff Scientist, 1986-1989.

Products

Products most closely related to the proposed project:

- AKCELIK, V., BIELAK, J., BIROS, G., IPANOMERITAKIS, I., FERNANDEZ, A., GHATTAS, O., KIM, E., O'HALLARON, D., AND TU, T. High resolution forward and inverse earthquake modeling on terasacale computers. In *SC2003* (Phoenix, AZ, Nov. 2003). *Winner, 2003 Gordon Bell Award for Special Achievement.*
- TU, T., YU, H., RAMIREZ-GUZMAN, L., BIELAK, J., GHATTAS, O., MA, K.-L., AND O'HALLARON, D. From mesh generation to scientific visualization: An end-to-end approach to parallel supercomputing. In *Proceedings of SC2006* (Tampa, FL, Nov. 2006). *Winner, 2006 HPC Analytics Challenge. Finalist for best student paper.*
- STEVEN W. SCHLOSSER, MICHAEL P. RYAN, RICARDO TABORDA, JULIO LOPEZ, DAVID O'HALLARON, JACOBO BIELAK, Materialized community ground models for large-scale earthquake simulation, In *Proceedings of SC2008* (Austin, TX, Nov. 2008). *Describes the e-tree method for encoding 3D velocity models in a searchable database, later adopted by the Southern California Earthquake Center (SCEC).*
- SATYANARAYANAN, M., KOZUCH, M., HELFRICH, C., AND O'HALLARON, D. R. Towards seamless mobility on pervasive hardware. *Pervasive & Mobile Computing 1*, 2 (June 2005), 157–189. `Describes the ISR system that was the precursor for the proposed work.`
- NATH, P., KOZUCH, M. A., O'HALLARON, D. R., SATYANARAYANAN, M., TOLIA, N., AND TOUPS, M. Design tradeoffs in applying content addressable storage to enterprise-scale systems based on virtual machines. In *Usenix 2006 Annual Technical Conference* (Boston, MA, June 2006). *Analyzes the remote paging technique used by the ISR systems.*

Other significant products:

- TU, T., O'HALLARON, D. R., AND GHATTAS, O. Scalable parallel octree meshing for terascale applications. In *Proceedings of SC2005* (Seattle, WA, Nov. 2005). *Describes a new 3D mesh generation algorithm that scales to tens of thousands of nodes.*

- BRYANT, R., AND O'HALLARON, D. *Computer Systems: A Programmer's Perspective, 2nd Edition*. Prentice-Hall, 2011, `http://csapp.cs.cmu.edu`. *Best-selling textbook adopted by hundreds of schools worldwide.*
- BRYANT, R., AND O'HALLARON, D. Introducing computer systems from a programmer's perspective. In *Proc. of the 32nd Technical Symposium on Computer Science Education (SIGCSE)* (Charlotte, NC, Feb. 2001), ACM. *Introduces the basic ideas that spawned the CS:APP text.*
- NICK PARLANTE, JULIE ZELENSKI, DANIEL ZINGARO, KEVIN WAYNE, DAVE O'HALLARON, JOSHUA T. GUERIN, STEPHEN DAVIES, ZACHARY KURMAS, DEBBY KEEN, Nifty Assignments, In *SIGCSE 2012*, pp 475-476. *Describes the CMU Bomb Lab, which is used by hundreds of schools around the world.*
- DAVID O'HALLARON, Autograding in the Cloud, In *IEEE Internet Computing*, Jan, 2011. *Describes the Autolab service, a hosted service for autograding programming assignments, currently used by more than 3000 CMU students in more than 20 courses each semester.*

Synergistic Activities

Prof. O'Hallaron's work has had significant impact on both education and industry.

- With Randy Bryant, he developed a new core computer systems course, *Introduction to Computer Systems* (ICS), and wrote a textbook based on the course, *R. Bryant and D. O'Hallaron, Computer Systems: A Programmers Perspective, 2nd Edition, Prentice-Hall, 2011* (CS:APP). Hundreds of schools on five continents have adopted the CS:APP textbook since its initial publication in August, 2003.
- To support the ICS course, he also developed a new service, called *Autolab*, that allows instructors to offer autograded programming assignments over the Internet. Each semester, Autolab is used by over 3000 CMU students in over 20 different undergrad and graduate courses. An open-source distribution is being prepared for use by schools world-wide.
- While at Intel, he was a founder of the Open Cirrus cloud computing testbed, sponsored by Intel, HP, and Yahoo, dedicated to cloud computing research and open source, with 14 academic and business business and academic partners from around the world.
- He also developed the SPEC CPU2000 and CPU2000omp `183.equake` benchmarks, which influenced system design for years, primarily by forcing manufacturers to improve the ability of the memory systems to handle irregular reference patterns.

Collaborators and Other Affiliations

External collaborators: Jacobo Bielak (CMU CEE), Andrew Chien (Univ Chicago), Omar Ghattas (U Texas), Thomas Gross (ETH Zurich), Gerd Heber (Cornel), Tom Jordan (USC/SCEC), Carl Kessleman (USC/ISI), Michael Kozuch (Intel), Thomas Kwan (Yahoo), Dejan Milojicic (HP), Marcus Pueschel (ETH Zurich), Jonathan Shewchuk (UC Berkeley), John Wilkes (Google).

PhD Advisor: Paul Reynolds, Univ. of VA.

PhD Students advised (9 total students and postdocs): Thomas Warfel, Jonathan Shewchuk (Professor, UC Berkeley), Bwolen Yang, Bruce Lowekamp (Skype), Peter Dinda (Professor, Northwestern University), Yxinglian Xie (MSR Research), Julio López (Maginatics), Tiankai Tu (Jump Systems), Hyang-Ah Kim (Google).