

Research Interests

Software engineering, programming languages, computer security, and systems.

Education

PH.D. COMPUTER SCIENCE *University of California, Davis, CA* • June 2009
Dissertation: The MAGE Programming Model; Advisor: Raju Pandey

Professional Experience

SENIOR LECTURER (ASSOCIATE PROFESSOR) *University College London, London, UK* • 2012–present
Centre for Research on Evolution, Search and Testing (CREST); Software Systems Engineering (SSE)

VISITING ASSISTANT PROFESSOR *University of California, Davis, CA* • 2013–2014

POSTDOCTORAL SCHOLAR *University of California, Davis, CA* • 2010–2012
Mentors: Premkumar Devanbu and Zhendong Su

I3P FELLOW *University of California, Davis, CA* • 2009

LECTURER (TEACHING FELLOW IN UK TERMS) *University of California, Davis, CA* • 2003–2006

SOFTWARE ARCHITECT *MarketAxess, New York, New York* • 2000–2001

Honors

Secondment at Microsoft Research, 2015. EC/FSE'11.

Program Committees of FSE'15, ISSTA'15, and ICSE'15. Finalist (one of six out of 900) for UC Davis Outstanding Postdoctoral Researcher, 2011–2.

Invited attendee of three Dagstuhl, 2014–5 and one Monte Verità Symposium, 2013. Invited attendee of the Microsoft Faculty Summit, 2011.

ACM SIGSOFT Distinguished Papers: ISSTA'13, FSE'14, and ISSTA'15. Institute for Information Infrastructure Protection (I3P) Fellow, 1 of 2 awards given annually, 2009–10.

Nominated for ACM SIGSOFT Distinguished Paper, ES- Technology (CEC), one out of 200 submissions, 2005.

Invited Presentations

Language and Code Workshop, 2015. University of Lille/Inria, 2013 and 2014.

Indian Conference on Software Engineering (ISEC), 2015. CREST Open Workshop: COW'29 and COW'30, 2013.

Mining Software Repositories, Next Generation (MSR-NG), 2014. Imperial College London, 2013.

Mysore Workshop on the Future of Debugging, 2012.

Funding

- CEOI
“Onboard Data Autonomy for Next Generation of EO Nanosatellites” RP10G0435B04

PI; Partners: University of Manchester, Craft Prospect, and Bright Ascension.
£110,000; June 2017.

2. EPSRC
DAASE: Dynamic Adaptive Automated Software Engineering EP/J017515/1
PI; Partners: Birmingham, Queen Mary, Sheffield, Stirling.
£6,834,903; February, 2017.
3. EPSRC
LUCID: Clearer Software by Integrating Natural Language Analysis into Software EP/P005659/1
PI; Partners: Charles Sutton, University of Edinburgh.
£380,000; December, 2016.
4. GCHQ Small Grant Scheme
co-Investigator; PI: David Clark
£35,157; 31 March, 2014.
5. EPSRC/GCHQ
“SeMaMatch: Semantic Malware Matching” EP/K032623/1
co-Investigator; PI: David Clark
£309,000; April 2013.
6. NFS Computing and Communication Foundations Grant CCF-1247280
“EAGER: Exploiting the Naturalness of Software”
co-PI; PI: Premkumar Devanbu; co-PI: Zhendong Su
\$300,000 for 18 months; July 2012.
7. DHS I3P Research Fellowship
“Understanding the Malware Arms Race,”
PI
\$150,000; 2009-2010.
8. NSF, Software and Hardware Foundations (SHF) Medium Grant CCF-0964703
“SHF:Medium:How Do Static Analysis Tools Affect End-user Quality?”
co-PI; PI: P. Devanbu and Z. Su, and co-PI: V. Filkov
\$700,118; 2010–2013.
9. AFOSR DURIP
“Helix Project Testbed: Towards the Self-Regenerative Incorruptible Enterprise”
co-PI; PI: John Knight, University of Virginia and co-PIs from University of Virginia, UC Davis, UCSB, and
University of New Mexico
\$240,000 (UCD portion: \$60,000), 2010–2011.
10. NFS, Software and Hardware Foundations (SHF) Small Grant CCF-1117603
“SHF:Small:Reusing Debugging Knowledge”
co-PI; PI: Zhendong Su
\$499,999; December 2010.

Publications

Conference Articles

1. To Type or not to Type: Quantifying Detectable Bugs in JavaScript. Zheng Gao, Christian Bird, Earl T. Barr.
Proceedings of the 39th International Conference on Software Engineering ISCE, Beunos Aires, Argentina, 2017.

2. Time-travel debugging for JavaScript/Node.js. Earl T. Barr, M Marron, E Maurer, D Moseley, G Seth. *Proceedings of the 10th Joint Meeting of the European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE) (demo track)*, Seattle, Washington, USA, Italy, 2016.
3. Automated Transplantation of Call Graph and Layout Features into Kate. Alexandru Marginean, Earl T. Barr, Mark Harman, and Yue Jia. *Proceedings of the International Conference on Search-Based Software Engineering*, Bergamo, Italy, 2015.
4. Is the Cure Worse than the Disease? Overfitting in Automated Program Repair. EK Smith, Earl T. Barr, C Le Goues, Y Brun. *Proceedings of the 10th Joint Meeting of the European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE)*, Bergamo, Italy, 2015. (25%)
5. Suggesting Accurate Method and Class Names. Miltos Allamanis, Earl T. Barr, Christian Bird, and Charles Sutton. *Proceedings of the 10th Joint Meeting of the European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE)*, Bergamo, Italy, 2015. (25%)
6. Automated Software Transplantation. Earl T. Barr, Yue Jia, Mark Harman, Alexandru Marginean, Justyna Petke. *Proceedings of the International Symposium on Software Testing and Analysis (ISSTA'15)*, Baltimore, USA, 2015. (28%) **ACM SIGSOFT Distinguished Paper Award.**
7. Learning Natural Coding Conventions. Miltos Allamanis, Earl T. Barr, Christian Bird, and Charles Sutton. *Proceedings of the 22nd International Symposium on the Foundations of Software Engineering (FSE'14)*, Hong Kong, China, 2014. (22%). **ACM SIGSOFT Distinguished Paper Award; the Artifact Evaluation Committee formally recognized the quality of our tool and data.**
8. The Plastic Surgery Hypothesis. Earl T. Barr, Yuriy Brun, Prem Devanbu, Mark Harman, and Federica Sarro. *Proceedings of the 22nd International Symposium on the Foundations of Software Engineering (FSE'14)*, Hong Kong, China, 2014. (22%)
9. TARDIS: Affordable Time-Travel Debugging in Managed Runtimes. Earl T. Barr and Mark Marron. *Proceedings of the 2014 ACM International Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA/SPLASH!'14)*, Portland, Oregon, USA, 2014. (28%)
10. Capturing and Exploiting IDE Interactions. Zhongxian Gu, Drew Schleck, Earl T. Barr, and Zhendong Su. *Proceedings of the 2014 ACM International Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA/ONWARD!'14)*, Portland, Oregon, USA, 2014. (47%)
11. Uncertainty, Risk, and Information Value in Software Requirements and Architecture. Emmanuel Letier, David Stefan, and Earl T. Barr. *Proceedings of the International Conference on Software Engineering (ICSE'14)*, Hyderabad, India, 2014. (20%)
12. Comparing Static Bug Finders and Statistical Prediction. Foyzur Rahman, Sameer Khatri, Earl T. Barr, and Prem Devanbu. *Proceedings of the International Conference on Software Engineering (ICSE'14)*, Hyderabad, India, 2014. (20%)
13. Collecting a Heap of Shapes. Earl T. Barr, Christian Bird, and Mark Marron. *Proceedings of the International Symposium on Software Testing and Analysis (ISSTA'13)*, Lugano, Switzerland, 2013. (26%) **ACM SIGSOFT Distinguished Paper Award.**
14. What Effect Does Distributed Version Control Have on OSS Project Organization? Peter C. Rigby, Earl T. Barr, Christian Bird, Premkumar Devanbu, and Daniel M. German. *Proceedings of the 1st International Workshop on Release Engineering*, San Francisco, CA, USA, May 20, 2013.
15. Automatic Detection of Floating-Point Exceptions. Earl T. Barr, Thanh Vo, Vo Le and Zhendong Su. *Proceedings of the Principles of Programming Languages (POPL'13)*, Rome, Italy, 2013. (18%)

16. Liberating the Programmer with Prorogued Programming. Mehrdad Afshari, Earl T. Barr, and Zhendong Su. *Proceedings of the ACM International Symposium on new ideas, new paradigms, and reflections on programming and software (Onward!)*, Tucson, Arizona, USA, 2012. (26%)
17. Reusing Debugging Knowledge via Trace-based Bug Search. Zhongxian Gu, Earl T. Barr, Drew Schleck, and Zhendong Su. *Proceedings of the 3rd Systems, Programming, Languages, and Applications: Software for Humanity (OOPSLA/SPLASH'12)*, Tucson, Arizona, USA, 2012. (25%)
18. On the “Naturalness” of Software. Abram Hindle, Earl T. Barr, Zhendong Su, Premkumar Devanbu, and Mark Gabel. *Proceedings of the 2012 International Conference on Software Engineering (ICSE'12)*, Zürich, Switzerland, 2012. (21%)
19. Cohesive and Isolated Development with Branches. Earl T. Barr, Christian Bird, Peter C. Rigby, Abram Hindle, Daniel M. German, and Premkumar Devanbu. *Proceedings of the 15th International Conference on Fundamental Approaches to Software Engineering (FASE'12)*, Tallinn, Estonia, 2012. (25%)
20. BQL: Capturing and Resuing Debugging Knowledge . Zhongxian Gu, Earl T. Barr, and Zhendong Su. *Proceedings 33rd International Conference on Software Engineering — Demonstrations Track*, Waikiki, Honolulu, Hawaii, 2011. (37%)
21. On the Shoulders of Giants. Earl T. Barr and Christian Bird and Eric Hyatt and Tim Menzies and Gregorio Robles. *Proceedings 2010 FSE/SDP Workshop on the Future of Software Engineering Research*, Santa Fe, New Mexico, 2010.
22. Perturbing Numerical Calculations for Statistical Analysis of Floating-Point Program (In)Stability. Enyi Tang, Earl T. Barr, Xuandong Li, and Zhendong Su. *Proceedings of the International Conference on Software Testing and Analysis (ISSTA'10)*, Trento, Italy, 2010. (23%)
23. Has the Bug Really Been Fixed? Zhongxian Gu, Earl T. Barr, David J. Hamilton, and Zhendong Su. *Proceedings of the 2010 International Conference on Software Engineering (ICSE'10)*, Cape Town, South Africa, 2010. (14%)
24. Trust is in the Eye of the Beholder. Dimitri DeFigueiredo, Earl T. Barr, and S. Felix Wu. *Proceedings of the 2009 International Conference on Information Privacy, Security, Risk and Trust (PASSAT'09)*, Vancouver, Canada, 2009. (14%)
25. The Promises and Perils of Mining Git. Christian Bird, Peter C. Rigby, Earl T. Barr, David J. Hamilton, Daniel M. German, and Prem Devanbu. *Proceedings of the Sixth Working Conference on Mining Software Repositories (MSR 09)*, Vancouver, Canada, 2009. (28%)
26. Structure and Dynamics of Research Collaboration in Computer Science. Christian Bird, Earl T. Barr, Andre Nash, Vladimir Filkov, Prem Devanbu, and Zhendong Su. *Proceedings of the 2009 SIAM International Conference on Data Mining. (SDM 2009)*, Sparks, NV, April–May 2009. (30%)
27. ConceptDoppler: A Weather Tracker for Internet Censorship. Jedidiah R. Crandall, Daniel Zinn, Michael Byrd, Earl T. Barr, and Rich East. *Proceedings of the 14th ACM Conference on Computer and Communications Security (CCS'07)*, October 2007. (18%)
28. TrustDavis: A Non-Exploitable Online Reputation System. Dimitri do B. DeFigueiredo and Earl T. Barr. *Proceedings of the 7th International IEEE Conference on E-Commerce Technology (CEC)*. Munich, Germany, July 2005. (21%) **Best Paper Award.**
29. Handling Catastrophic Failures in Internet Applications. Michael Haungs, Earl T. Barr, and Raju Pandey. *Proceedings of the International Symposium on Applications and the Internet (SAINT 2004)*, Tokyo, Japan, January 2004. (28%)
30. A Fast Connection-Time Redirection Mechanism for Internet Application Scalability. Michael Haungs, Raju Pandey, Earl T. Barr, and J. Fritz Barnes. *Proceedings of the Ninth International Conference on High Performance Computing (HiPC)*, Bangalore, India, December 2002. (39%)

31. MAGE: A Distributed Programming Model. Earl T. Barr, Raju Pandey and Michael Haungs. *Proceedings of the 21th International Conference on Distributed Computing Systems (ICDCS)*, Phoenix, Arizona, April 2001. (32%)
32. Runtime support for type-safe dynamic Java classes. Scott Malabarba, Raju Pandey, Jeff Gragg, Earl T. Barr, and J. Fritz Barnes. *Proceedings of the European Conference on Object-Oriented Programming (ECOOP)*, Sophia Antipolis and Cannes, France, June 2000 (20%)

Journal Articles

1. Understanding the Syntactic Rule Usage in Java. D Qiu, B Li, Earl T. Barr, Z Su. *Journal of Systems and Software* 123, 2017.
2. Casper: Automatic Tracking of Null Dereferences to Inception with Causality Traces. B Cornu, Earl T. Barr, L Seinturier, M Monperrus. *Journal of Systems and Software* 122, 2016.
3. On the Naturalness of Software. A Hindle, Earl T. Barr, M Gabel, Z Su, P Devanbu. *Communications of the ACM* 59 (5), May 2016. **Research Highlight.**
4. The Oracle Problem in Software Testing: A Survey. Earl T. Barr, Mark Harman, Phil McMinn, Shahbaz Muzammil, and Shin Yoo. *IEEE Transactions on Software Engineering*, 41(5), 507–525, 2015.
5. Fixing the 2006 Federal Voting Standards. Earl T. Barr, Matt Bishop, and Mark Gondree. *Communications of the ACM* 50(3) pp. 19-24, March 2007.

Other Research Outputs

1. The naturalness of software. Earl T. Barr and P. Devanbu. In "Perspectives on Data Science for Software Engineering", edited by Tim Menzies, Laurie Williams, and Thomas Zimmermann". 2016. Morgan Kaufmann, 978-0-12-804206-9.
2. MAGE: A Distributed Programming Model. Earl T. Barr. Doctoral Dissertation, University of California, Davis, Spring 2009.

Advising

University College London

- Iason Papapanagiotakis-Bousy (co-first with David Clark), 2017–.
- David Kelly (co-first with David Clark), 2017–.
- Michail Basios (with Donald Lawrence as second), 2017–.
- Profir-Petru Partachi (with David Clark as second), 2017–.
- Carlos Gavidia, co-first supervisor with Mark Harman, 2015–.
- Alexandru Marginean, co-first supervisor with Mark Harman, 2014–.
- Zheng Gao, first supervisor, with Mark Harman second, 2014–.
- Irene Vlasi-Pandi, second supervisor, with Charles Sutton first and Andy Gordon co-second, 2017–.
- Glen Anderson, second supervisor, with Peter Coveney first, 2016–.
- Oni Olawole, second supervisor, with Emmanuel Letier first, 2015–.
- Saheed Busari, second supervisor, with Emmanuel Letier first, 2014–.
- Robert Bruce, second supervisor, with Mark Harman first, 2014–.
- Nigel Harold, second supervisor, with Mark Harman first, 2012–2014.

University of California, Davis

I was second supervisor, with Zhendong Su first, for the following students:

- Mehrdad Afshari (PhD), 2010–2012
- Andreas Sæbørjensen (PhD), 2010–2014
- Zhongxian Gu (PhD), 2009–2012
- Martin Velez (BA) 2010–2012
- Enyi Tang (PhD), 2009–2010
- Thanh Vo (Masters), 2010–2011
- Jonathan Hollenbeck, Scotty Waggoner (BS) 2011
- Tim Xiao, Steven Hillman (BS) 2009–2010

Examination and Assessment

- Internal Examiner for Fokion Zervoudakis' Thesis Defense, 2014
- Assessor for Efstathios Panayi, 2013
- Qualifying exam committee member (internal examiner) for Vu Le (UC Davis 2011) and Andreas Sæbjørnsen (UC Davis 2011)
- Internal Examiner for Fokion Zervoudakis (UCL 2014)
- External Examiner for Benoit Cornu (University of Lille 2015)

Teaching

University College London Research Seminar in Software Engineering (COMPGS11,COMPGS12,COMPGS98), 2013–7; Master Projection Supervision (COMPGS99), 2013–7; Compilers (COMP207P), 2013–7; and Validation and Verification (COMPGS03/COMPM023), 2013–7.

University California Davis Discrete Mathematics for Computer Science (ECS 20), Summer05; Introduction to Programming and Problem Solving (ECS 30), F06; Computer Organization and Machine-Dependent Programming (ECS 50): F03, S03, F04, S04, S05, W06, S06; Data Structures and Programming (ECS 60): Summer03, Summer04; Introduction to the Theory of Computation (ECS 120): W06; Introduction to Software Engineering (ECS 160): W04, S06; and Ethics in an Age of Technology (ECS 188), F04, F05, W05, S05, W06, S06.

Professional Activities

Program Committees

- FSE'15, ISSTA'15, ICSE'15
- ICSE Workshops, 2015
- Indian Software Engineering Conference (ISEC), 2015
- Haifa Verification Conference (HVC), 2014
- Theoretical Aspects of Software Engineering (TASE), 2014
- Source Code Analysis and Manipulation (SCAM), 2014
- Search-based Software Testing (SBST), 2014
- Workshop on Evolutionary Computation for the Automated Design of Algorithms (ECADA), 2014
- European Conference on Software Maintenance and Reengineering/Working Conference on Reverse Engineering (CSMR/WCRE), 2014
- Student Contest on Software Engineering (SCORE) 2013
- ICSE Student Research Competition (SRC) 2013
- International Conference on Program Comprehension (ICPC) 2013

External Review Committee

Automated Software Engineering (ASE) 2013

Journal Reviewing

- ACM Transactions on Software Engineering and Methodology (TOSEM)
- IEEE Transactions on Software Engineering (TSE)
- Empirical Software Engineering (EMSE)

Proposal Reviewing

- Engineering and Physical Sciences Research Council (EPSRC) 2013
- United States Army Research Office (ARO) 2010

External Connections

VISA Europe

Member of UCL's Research Scientific Computing Steering Committee, which supports the computing needs of academics at UCL.