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# PLDI'16

Proceedings of the 37th ACM SIGPLAN Conference on

## **Programming Language Design and Implementation**

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**Chandra Krintz and Emery Berger**

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# Message from the Chairs

Welcome to PLDI 2016, the 37th ACM SIGPLAN Conference on Programming Language Design and Implementation; held this year in Santa Barbara, California. PLDI is the premier research conference on programming languages and their implementation.

This year, there were 304 papers submitted to PLDI -- a record, just beating last year's 303. A number of papers unfortunately violated the formatting or double blind rules and were not considered; the technical program committee ended up reviewing 288 papers. Of these, 48 were accepted for inclusion in the 2016 program. Two papers submitted to TOPLAS were also accepted to appear at PLDI.

This year, we incorporated a number of changes, all aimed at improving the quality and integrity of the process; many of these approaches are time-tested in other communities. In addition to the Program Committee (PC), we added an External Program Committee (EPC) consisting of senior members of the PL community who acted as a "light" program committee; their charge was to review roughly ten papers each, and in particular, to review all PC-authored papers. The EPC met via a day-long teleconference prior to the physical PC meeting. A subset of the EPC (Vikram Adve, Rastislav Bodik, Mike Ernst, Cormac Flanagan, and Manu Sridharan) formed the Distinguished Papers Committee, whose job it was to select the distinguished papers via a conference-like process. The committee selected four Distinguished Paper Awards, which will be announced at the conference. We also changed the way the External Review Committee (ERC) was used. Rather than using the ERC to shed load, as has been done in the past, the ERC specifically this year acted as an expertise pool. We also expanded the membership pool of the ERC to include senior and graduating PhD students; these students were nominated and vetted by the PC and EPC. These students were asked to review papers directly related to their thesis work; the quality of the resulting reviews was indistinguishable from the best reviews provided by PC and EPC members.

Most of the technical program committee members provided excellent, in-depth reviews. The committee was asked to ensure that their reviews were at least 500 words long (an automatic option available in HotCRP) and most reviewers went above and beyond this request. We checked that all reviews provided the appropriate level of detail, gave solid, actionable feedback to authors, and struck the right tone. In addition, reviewers were directed to read and respond to author responses, and a summary of the (often quite extensive) on-line and PC meeting discussions was included with all papers to provide as much feedback as possible to the authors. We hope that the stellar level of engagement and the quality and depth of reviews provided by the committee members sets a benchmark for future conferences.

To ensure that conflicts of interest were handled properly (and early), all committee members were asked to vet any conflicts declared by authors that they had not previously declared. Rather than using traditional bidding, we adopted a "split preference-expertise" approach that has been used by POPL in the past: bidding on all papers was split between a preference grade and an expertise grade (for example, 3X), which HotCRP now supports. This approach helped

to ensure a good match of high expertise to papers. We modified the review form itself to include very precise directions, and added several fields that helped us ensure that papers received as high expertise reviews as possible and to promote productive discussion on-line: (1) a formal explanation of expertise and confidence, (2) an expertise field for reviewers to explain their specific expertise on each paper, which helped us cover expertise gaps, and (3) a championship field for reviewers to explain to other reviewers their reasons for championing a particular paper. We employed a double-blind reviewing process; during reviewing, authorship was only disclosed when deemed absolutely necessary (this happened very rarely), and in general, authorship was only disclosed for accepted papers. This approach avoids implicit bias and prevents compromising future double blind reviewing for rejected papers, which comprise the majority of submitted papers. A robust, on-line discussion led to consensus on most papers before the physical meeting held in Saint Petersburg, Florida. This freed the program committee to focus on contentious papers and to resolve technical questions in an in-person, high bandwidth setting. Finally, we introduced shepherding for all papers to make it easier to accept papers with minor flaws. All but one paper successfully completed the shepherding process, and the consensus was that the process resulted in substantially improved papers.

We thank all of the committee members and expert external reviewers for their hard work and careful reviews, past and future program chairs and others who provided valuable feedback (especially Martin Vechev, Yannis Smaragdakis, Steve Freund, and Eran Yahav), and Eddie Kohler, who promptly fixed several bugs in HotCRP and added some key features that should improve the lives of future program chairs.

The organization of the PLDI conference is the result of the combined efforts of an amazing group of individuals. We especially thank Annabel Satin (ACM SIGPLAN Conference Manager), the ACM Conference support staff, all of our wonderful student volunteers, and the outstanding members of the PLDI16 Organizing Committee: Ben Hardekopf (Student Volunteer and Student Research Competition Chair), Iulian Neamtiu (Posters Chair), John Regehr and Zachary Tatlock (Artifact Evaluation Co-Chairs), Tiark Rompf (Sponsorship Chair), Manu Sridharan (Publicity Chair), and Xiangyu Zhang (Workshops and Tutorials Chair). We thank David Grove (PLDI15 General Chair), Jan Vitek (Past ACM SIGPLAN Chair and PLDI Steering Committee Chair), Mike Hicks (Current ACM SIGPLAN Chair), Conference Publishing, everyone involved in the local arrangements in Santa Barbara, and the PLDI Steering Committee for their help, support, and guidance. Finally, we thank the authors, keynote speakers, and presenters of the conference and its co-located workshops, tutorials, and conferences for helping to make this an engaging and interesting event for our community. We hope you enjoy the conference!

Dr. Chandra Krintz  
PLDI'16 General Chair  
Univ. of California, Santa Barbara

Dr. Emery Berger  
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# PLDI'16 Keynote Presentations

## **Keynote #1: Dr. Benjamin Zorn, Microsoft Research**

**Title:** Programming Languages and Technical Disruption

**Abstract:** What do cheating on fuel economy, the London Whale, and building a better mosquito trap have in common?

We are constantly bombarded with technical innovations that disrupt business models, social structures, labor markets, etc. Widely visible technical advances such as Internet of Things, Big Data, and Deep Learning are driving markets and creating a huge demand for computer science education. What role, if any, does programming language research have in an age of technical disruptions? In my talk, I argue that historically, as well as today, programming languages are central to major technical disruptions and that language innovation is often driven by technical innovation in other areas. To have the most impact, language researchers have a great opportunity to look beyond problems in their own research area to embrace and understand the impact that their ideas can have on critical societal problems. Increasingly, people are assuming that software will be an essential part of solutions to societal problems. At the same time we know that building an infrastructure on software creates new challenges that threaten to reduce or eliminate the benefits altogether. To make the discussion concrete, I consider three problem domains: global health, financial market stability, and cybersecurity. In each case, I argue that programming language research can and should have a lot of impact. My challenge to the audience is to embrace these problems enthusiastically and bring the great depth of insight and innovation that the field has already created to the broadest audience possible.

Since I will be discussing topics that I have far too limited knowledge of, consider this a great opportunity to hear me say outrageous things that are almost certainly not true but at the same time hopefully provocative and entertaining.

**Brief Biography:** Ben Zorn is a Research Manager and Principal Researcher, co-managing the Research in Software Engineering (RiSE) group, a group of over 30 researchers and developers working on programming languages and software engineering in Microsoft Research, Redmond. After receiving a PhD in Computer Science from UC Berkeley in 1989, he served eight years on the Computer Science faculty at the University of Colorado in Boulder, receiving tenure and being promoted to Associate Professor in 1996. Dr. Zorn left the University of Colorado in 1998 to join Microsoft Research, where he currently works. His research interests include programming language design and implementation for reliability, security, and performance. He has served as both Program Chair (1999) and General Chair (2010) of the PLDI conference, as an Associate Editor of the ACM journals Transactions on Programming Languages and Systems and Transactions on Architecture and Code Optimization. He has also served seven years as a Member-at-Large of the SIGPLAN Executive Committee and four years as a member of the ACM Software Systems Award Committee. He is currently a member of the Computing Community Consortium (CCC) Council, a committee of the Computing Research Association. For more information, visit his web page at: <http://research.microsoft.com/~zorn/>.

**Keynote #2: Dr. Luiz André Barroso**

**Title:** Programming a Warehouse-Scale Computer

**Abstract:** Public clouds are quickly making massive-scale computing capabilities available to an ever larger population of programmers, and are no longer a playground restricted to a handful of institutions, such as national labs or large Internet services companies. In this talk, we will highlight some of the features of this new class of computers, the challenges faced by their programmers, and the tools and techniques that we have developed to address some of those challenges.

**Brief Biography:** I am a Google Fellow, and the VP of Engineering for the Geo Platform team, the group responsible for collecting and curating maps, local and imagery data that powers our consumer products (such as Google Search and Google Maps). My technical interests range from distributed systems software to the design of Google's computing platform. While at Google I have co-authored some well-cited articles on warehouse-scale computing, energy proportionality and storage system reliability. I also co-wrote "The Datacenter as a Computer", the first textbook to describe the architecture of warehouse-scale computing systems, now in its 2nd edition. I was previously a member of the research staff at Digital Equipment Corporation and Compaq, where our group did some of the pioneering research on modern multi-core architectures. Some of those multi-core processors also use variants of the ring-based cache-coherency interconnects that were the subject of my doctoral research.

I am a Fellow of the Association for Computing Machinery (ACM) and the American Association for the Advancement of Science. I was the program chair of ACM ISCA'09, a keynote speaker at FCRC'11, SIGMOD'10, ASPLOS'09, and a National Academy of Engineering Gilbreth Lectureship awardee in 2012. I am currently serving at the National Academies' Computer Science and Telecommunications Board. I hold B.S. and M.S. degrees in Electrical Engineering from the Pontifícia Universidade Católica of Rio de Janeiro, and a Ph.D. in Computer Engineering from the University of Southern California.

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