Rodrigo Fonseca

Curriculum Vitæ
January 31, 2019

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1 Name and Title

Name	Rodrigo Lopes Cançado Fonseca
Title	Associate Professor
Department	Computer Science

2 Contact Information

Address	Department of Computer Science Brown University, Box 1910 115 Waterman Street, 4th Floor Providence, RI 02912-1910
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3 Education

Ph.D.	Computer Science, University of California, Berkeley, December 2008. Dissertation title: *Improving Visibility of Distributed Systems through Execution Tracing*. Advisor: Prof. Ion Stoica
	Minor in Management of Technology at the Haas School of Business
M.Sc.	Computer Science, Universidade Federal de Minas Gerais, Brazil, June 2002. Thesis title: *Intrinsic Locality Properties of Web Reference Streams*. Advisors: Prof. Virgilio Almeida and Prof. Mark Crovella
B.Sc.	Computer Science, Universidade Federal de Minas Gerais, Brazil, July 2000.

4 Professional Appointments

07/2017 - present	*Associate Professor*. Computer Science Department, Brown University, Providence, RI.
08/2009 - 06/2017	*Assistant Professor*. Computer Science Department, Brown University, Providence, RI.
06/2017 - 08/2017	*Visiting Researcher*. Flowtune, Inc., Palo Alto, CA
07/2012 - 08/2012	*Visiting Researcher*. Microsoft Research, Redmond, WA

09/2008 - 07/2009 *Postdoctoral Researcher*. Yahoo! Labs, Santa Clara, CA.
Supervisor: Dr. Brian B. Cooper.

03/2003 - 12/2008 *Graduate Student Researcher*. Computer Science Department, University of California, Berkeley. Supervisor: Prof. Ion Stoica.

06/2004 - 09/2004 *Research Intern*. Hewlett-Packard Labs, Palo Alto, CA.
Supervisor: Dr. Sujata Banerjee.

06/2003 - 09/2003 *Research Intern*. Intel Research Lab, Berkeley, CA.
Supervisor: Dr. Sylvia Ratnasamy.

06/2001 - 08/2001 *Research Intern*. Penn State University, State College, PA and NEC Labs, Princeton, NJ.
Supervisors: Prof. C. Lee Giles and Dr. David Pennock.

08/2000 - 07/2002 *Graduate Student Researcher*. Universidade Federal de Minas Gerais, Brazil.
Supervisor: Prof. Virgilio Almeida.

02/1998 - 06/2000 *Undergraduate Student Researcher*. Universidade Federal de Minas Gerais, Brazil.
Supervisor: Prof. Virgilio Almeida.

5 Publications

Refereed Conference & Workshop Papers

2018 Pedro Las-Casas, Jonathan Mace, Dorgival Guedes, and Rodrigo Fonseca. Weighted sampling of execution traces: Capturing more needles and less hay. In *Proceedings of the 9th ACM Symposium on Cloud Computing (SoCC)*, October 2018.

Jonathan Mace and Rodrigo Fonseca. Universal context propagation for distributed system instrumentation. In *Proceedings of the Thirteenth EuroSys Conference*, EuroSys '18, pages 8:1–8:18, New York, NY, USA, 2018. ACM.

2017 Jeff Rasley, Yuxiong He, Feng Yan, Olatunji Ruwase, and Rodrigo Fonseca. Hyperdrive: Exploring hyperparameters with pop scheduling. In *Proceedings of the 18th ACM/IFIP/USENIX Middleware Conference*, Middleware '17, pages 1–13, New York, NY, USA, 2017. ACM.

Nicholas DeMarinis and Rodrigo Fonseca. Toward usable network traffic policies for iot devices in consumer networks. In *Proceedings of the 1st ACM CCS International Workshop on Internet of Things Security and Privacy (IoT S&P'17)*, Dallas, TX, USA, November 2017.

2016 Tim Nelson, Nicholas DeMarinis, Timothy Adam Hoff, Rodrigo Fonseca, and Shriram Krishnamurthi. Switches are Monitors Too! Stateful Property Monitoring as a Switch Design Criterion. In *Proceedings of the Fifteenth ACM Workshop on Hot Topis in Networks (HotNets)*, November 2016.

Raja R. Sambasivan, Ilari Shafer, Jonathan Mace, Benjamin H. Sigelman, Rodrigo Fonseca, and Gregory R. Ganger. Principled workflow-centric tracing of distributed sys-

tems. In *Proceedings of the Seventh ACM Symposium on Cloud Computing*, SoCC '16, pages 401–414, New York, NY, USA, 2016. ACM.

Junyang Chen, Mostafa Ammar, Marwan Fayed, and Rodrigo Fonseca. Client-Driven Network Layer QoE for Encrypted 'DASH-S'. In *Proceedings of the ACM SIGCOMM Workshop on QoE-based Analysis and Management of Data Communication Networks*, Florianopolis, Brazil, August 2016.

Jonathan Mace, Peter Bodik, Madanlal Musuvathi, Rodrigo Fonseca, and Krishnan Varadarajan. 2DFQ: Two-Dimensional Fair Queueing for Multi-Tenant Cloud Services. In *Proceedings of the ACM SIGCOMM Conference*, Florianopolis, Brazil, August 2016.

Da Yu, Luo Mai, Somaya Arianfar, Rodrigo Fonseca, Orran Krieger, and David Oran. Towards a network marketplace in a cloud. In *Proceedings of the 8th USENIX Workshop on Hot Topics in Cloud Computing (HotCloud)*, Denver, CO, June 2016. USENIX Association.

Jeff Rasley, Konstantinos Karanasos, Srikanth Kandula, Rodrigo Fonseca, Milan Vojnovic, and Sriram Rao. Efficient queue management for cluster scheduling. In *Proceedings of the 2016 European Conference on Computer Systems (EuroSys '16)*, London, UK, April 2016.

2015 Jonathan Mace, Ryan Roelke, and Rodrigo Fonseca. Pivot tracing: Dynamic causal monitoring for distributed systems. In *Proceedings of the 25th ACM Symposium on Operating Systems Principles (SOSP)*. ACM Press, October 2015. Best paper award.

Tao Li, Albert Rafetseder, Rodrigo Fonseca, and Justin Cappos. Fence: Protecting device availability with uniform resource control. In *Proceedings of the USENIX Annual Technical Conference (ATC 2015)*. USENIX Association, July 2015.

Marcelo Martins, Justin Cappos, and Rodrigo Fonseca. Selectively taming background android apps to improve battery lifetime. In *Proceedings of the USENIX Annual Technical Conference (ATC 2015)*. USENIX Association, July 2015.

Tim Nelson, Andrew D. Ferguson, Da Yu, Rodrigo Fonseca, and Shriram Krishnamurthi. Exodus: Toward automatic migration of enterprise network configurations to sdns. In *Proceedings of the 1st ACM Sigcomm Symposium on SDN Research (SOSR)*. ACM, June 2015.

Tim Nelson, Da Yu, Yiming Li, Rodrigo Fonseca, and Shriram Krishnamurthi. Simon: Scriptable interactive monitoring for sdns. In *Proceedings of the 1st ACM Sigcomm Symposium on SDN Research (SOSR)*. ACM, June 2015.

Jonathan Mace, Peter Bodik, Madanlal Musuvathi, and Rodrigo Fonseca. Retro: Targeted resource management in multi-tenant distributed systems. In *NSDI '15: Proceedings of the 12th USENIX Symposium on Networked Systems Design and Implementation*. USENIX Association, May 2015.

2014 Jonathan Mace, Peter Bodik, Rodrigo Fonseca, and Madanlal Musuvathi. Towards general-purpose resource management in shared cloud services. In *10th Workshop on*

Hot Topics in System Dependability (HotDep 14), Broomfield, CO, October 2014. USENIX Association.

Jeff Rasley, Brent Stephens, Colin Dixon, Eric Rozner, Wes Felter, Kanak Agarwal, John Carter, and Rodrigo Fonseca. Planck: Millisecond-scale monitoring and control for commodity networks. In *Proceedings of the 2014 ACM Conference on SIGCOMM*, SIGCOMM '14, pages 407–418, New York, NY, USA, August 2014. ACM.

Jeff Rasley, Brent Stephens, Colin Dixon, Eric Rozner, Wes Felter, Kanak Agarwal, John Carter, and Rodrigo Fonseca. Low-latency network monitoring via oversubscribed port mirroring (extended abstract). In *Presented as part of the Open Networking Summit 2014 (ONS 2014)*, Santa Clara, CA, 2014. USENIX.

2013 Andrew Ferguson, Jordan Place, and Rodrigo Fonseca. Growth Analysis of a Large ISP. In *Proceedings of the Internet Measurement Conference*, IMC, October 2013.

Andrew D. Ferguson, Arjun Guha, Chen Liang, Rodrigo Fonseca, and Shriram Krishnamurthi. Participatory Networking: An API for Application Control in SDNs. In *Proceedings of ACM SIGCOMM*, August 2013.

Qiang Li, Marcelo Martins, Omprakash Gnawali, and Rodrigo Fonseca. On the effectiveness of energy metering on every node. In *Proceedings of the Ninth IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS 2013)*, Cambridge, MA, May 2013.

Marcelo Martins and Rodrigo Fonseca. Application Modes: A narrow interface for end-user power management in mobile devices. In *Proceedings of the 14th International Workshop on Mobile Computing Systems and Applications, HotMobile '13*, Jekyll Island, Georgia, USA, February 2013. ACM Press.

2012 Matteo Riondato, Justin DeBrabant, Rodrigo Fonseca, and Eli Upfal. PARMA: A parallel randomized algorithm for approximate association rules mining in mapreduce. In *Proceedings of the 21st ACM International Conference on Information and Knowledge Management (CIKM 2012)*, October 2012.

Andrew D. Ferguson, Arjun Guha, Chen Liang, Rodrigo Fonseca, and Shriram Krishnamurthi. Hierarchical policies for software defined networks. In *Proc. Workshop on Hot Topics in Software Defined Networks (Hot-SDN)*, August 2012.

Nathan Backman, Karthik Pattabiraman, Rodrigo Fonseca, and Ugur Cetintemel. C-mr: Continuously executing mapreduce workflows on multi-core processors. In *Proceedings of the 3rd International Workshop on MapReduce and its Applications, MapReduce '12*, June 2012.

Andrew D. Ferguson, Peter Bodik, Srikanth Kandula, Eric Boutin, and Rodrigo Fonseca. Jockey: Guaranteed job latency in data parallel clusters. In *Proceedings of the European Conference on Computer Systems, Eurosys*, April 2012.

Andrew D. Ferguson, Arjun Guha, Jordan Place, Rodrigo Fonseca, and Shriram Krishnamurthi. Participatory networking. In *Proceedings of the Workshop on Hot Topics in*

Management of Internet, Cloud, and Enterprise Networks and Services (Hot-ICE), April 2012.

Nathan Backman, Rodrigo Fonseca, and Ugur Cetintemel. Managing parallelism for stream processing in the cloud. In *Proceedings of the 1st International Workshop on Hot Topics in Cloud Data Processing, HotCDP '12*, April 2012.

2010 Rodrigo Fonseca, Michael J. Freedman, and George Porter. Experiences with tracing causality in networked services. In *Proc. Internet Network Management Workshop / Workshop on Research on Enterprise Networking (INM/WREN)*, April 2010.

2009 Omprakash Gnawali, Rodrigo Fonseca, Kyle Jamieson, David Moss, and Philip Levis. Collection Tree Protocol. In *Proceedings of the 7th ACM Conference on Embedded Networked Sensor Systems (SenSys)*, Berkeley, CA, November 2009.

Ymir Vigfusson, Adam Silberstein, Brian F. Cooper, and Rodrigo Fonseca. Adaptively Parallelizing Distributed Range Queries. In *Proceedings of the International Conference on Very Large Data Bases (VLDB)*, Lyon, France, August 2009.

2008 Rodrigo Fonseca, Prabal Dutta, Philip Levis, and Ion Stoica. Quanto: Tracking energy in networked embedded systems. In *Proceedings of the 8th USENIX Symposium on Operating Systems Design and Implementation (OSDI'08)*, pages 323–338, December 2008.

2007 Sukun Kim, Rodrigo Fonseca, Prabal Dutta, Arsalan Tavakoli, David Culler, Philip Levis, Scott Shenker, and Ion Stoica. Flush: A Reliable Bulk Transport Protocol for Multihop Wireless Networks. In *Proceedings of the 5th ACM Conference on Embedded Networked Sensor Systems (SenSys 2007)*, November 2007.

Rodrigo Fonseca, Omprakash Gnawali, Kyle Jamieson, and Philip Levis. Four-Bit Wireless Link Estimation. In *Proceedings of the Sixth ACM Workshop on Hot Topics in Networks (HotNets-VI)*, October 2007.

Rodrigo Fonseca, George Porter, Randy Katz, Scott Shenker, and Ion Stoica. X-Trace: A Pervasive Network Tracing Framework. In *Proceedings of 4th USENIX Symposium on Networked Systems Design & Implementation (NSDI 2007)*, April 2007.

Jorge Ortiz, Chris R. Baker, Daekyeong Moon, Rodrigo Fonseca, and Ion Stoica. Beacon Location Service: A Location Service for Point-to-Point Routing in Sensor Networks. In *Proceedings of the IPSN'07 Track on Sensor Platforms, Tools and Design Methods (SPOTS)*, April 2007.

2006 Cheng Tien Ee, Rodrigo Fonseca, Sukun Kim, Daekyeong Moon, Arsalan Tavakoli, David Culler, Scott Shenker, and Ion Stoica. A Modular Network Layer for Sensornets. In *Proceedings of the 7th USENIX Symposium on Operating Systems Design and Implementation (OSDI'06)*, November 2006.

Rodrigo Fonseca and Joyojeet Pal. Computing Devices for All: Creating and Selling the Low-Cost Computer. In *IEEE Proceedings of the International Conference on Information and Communication Technologies and Development (ICTD 2006)*, Berkeley, CA, May 2006.

Sergiu Nedevschi, Jaspal Sandhu, Joyojeet Pal, Rodrigo Fonseca, and Kentaro Toyama. Bayesian Networks: A Statistical Approach for Understanding ICT Adoption. In *IEEE Proceedings of the International Conference on Information and Communication Technologies and Development (ICTD 2006)*, Berkeley, CA, May 2006.

2005 Rodrigo Fonseca, Sylvia Ratnasamy, Jerry Zhao, Cheng Tien Ee, David Culler, Scott Shenker, and Ion Stoica. Beacon-Vector Routing: Scalable Point-to-Point Routing in Wireless Sensor Networks. In *Proceedings of 2nd USENIX Symposium on Networked Systems Design & Implementation (NSDI 2005)*, April 2005.

David Culler, Prabal Dutta, Cheng Tien Ee, Rodrigo Fonseca, Jonathan Hui, Philip Levis, Joseph Polastre, Scott Shenker, Ion Stoica, Gilman Tolle, and Jerry Zhao. Towards a Sensor Network Architecture: Lowering the Waistline. In *Proceedings of the Tenth Workshop on Hot Topics in Operating Systems (HotOS X)*, September 2005.

Sung-Ju Lee, Puneet Sharma, Sujata Banerjee, Sujoy Basu, and Rodrigo Fonseca. Measuring Bandwidth between PlanetLab Nodes. In *Proceedings of the 6th International Workshop on Passive and Active Network Measurement (PAM 2005)*, pages 292–305, Boston, MA, April 2005.

Rodrigo Fonseca, Puneet Sharma, Sujata Banerjee, Sung-Ju Lee, and Sujoy Basu. Distributed Querying of Internet Distance Information. In *Proceedings of the 8th IEEE Global Internet Symposium (GI 2005)*, Miami, FL, March 2005.

2004 Sukun Kim, Rodrigo Fonseca, and David Culler. Reliable Transfer on Wireless Sensor Networks. In *Proceedings of the First IEEE International Conference on Sensor and Ad hoc Communications and Networks (SECON 2004)*, Santa Clara, CA, October 2004.

Byung-Gon Chun, Rodrigo Fonseca, Ion Stoica, and John Kubiatowicz. Characterizing Selfishly Constructed Overlay Routing Networks. In *Proceedings of the 23rd Joint Conference of the IEEE Computer and Communications Societies (INFOCOM 2004)*, Hong Kong, March 2004.

2003 Rodrigo Fonseca, Virgilio Almeida, Mark Crovella, and Bruno Abrahao. On the Intrinsic Locality Properties of Web Reference Streams. In *Proceedings of the 22nd Joint Conference of the IEEE Computer and Communications Societies (INFOCOM 2003)*, San Francisco, CA, March 2003.

2001 Patricia Saraiva, Edleno Moura, Nivio Ziviani, Wagner Meira Jr., Rodrigo Fonseca, and Berthier Ribeiro-Neto. Rank-Preserving Two-Level Caching for Scalable Search Engines. In *Proceedings of the 21st ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR 2001)*, September 2001.

Daniel Menascé, Virgilio Almeida, Rudolf Riedi, Flavia Ribeiro, Rodrigo Fonseca, and Jr. Wagner Meira. Analyzing Web Robots and their Impact on Caching. In *Proceedings of the Sixth Workshop on Web Caching and Content Distribution*, Boston, MA, June 2001.

Daniel Menascé, Virgilio Almeida, Rudolf Riedi, Rodrigo Fonseca, Wagner Meira Jr., and Flavia Ribeiro. Characterizing and Modeling Robot Workload on E-Business Sites.

In *Proceedings of the Joint International Conference on Measurement & Modeling of Computer Systems (SIGMETRICS 2001)*, Cambridge, MA, June 2001.

2000 Daniel Menascé, Virgilio Almeida, Rudolf Riedi, Flavia Ribeiro, Rodrigo Fonseca, and Wagner Meira Jr. In search of Invariants for E-Business Workloads. In *Proceedings of the Second ACM Conference on Electronic Commerce*, Minneapolis, MN, October 2000.

Wagner Meira Jr, Daniel Menascé, Virgílio Almeida, and Rodrigo Fonseca. E-Representatives: A Scalability Scheme for E-Commerce. In *Proceedings of the Second International Workshop on Advanced issues of E-Commerce and Web-Based Information Systems (WECWIS 2000)*, Milpitas, CA, June 2000.

1999 Marcio Cesário, Wagner Meira Jr, Rodrigo Fonseca, and Nívio Ziviani. Integrating WWW Caches and Search Engines. In *Proceedings of the IEEE Global Telecommunications Conference (Globecom 99)*, Rio de Janeiro, Brazil, December 1999.

Daniel Menascé, Virgilio Almeida, Rodrigo Fonseca, and Marco Aurélio Mendes. A Methodology for Workload Characterization of E-commerce Sites. In *Proceedings of the First ACM Conference on Electronic Commerce*, Denver, CO, November 1999.

Daniel Menascé, Virgilio Almeida, Rodrigo Fonseca, and Marco Aurélio Mendes. Resource Management Policies for E-Commerce Servers. In *Proceedings of the Second Workshop on Internet Server Performance (WISP 99)*, Atlanta, GA, May 1999.

Refereed Journal Articles

2018 Jonathan Mace, Ryan Roelke, and Rodrigo Fonseca. Pivot tracing: Dynamic causal monitoring for distributed systems. *Communications of the ACM*, To Appear, 2017.

Jonathan Mace, Ryan Roelke, and Rodrigo Fonseca. Pivot tracing: Dynamic causal monitoring for distributed systems. *ACM Trans. Comput. Syst.*, 35(4):11:1–11:28, December 2018.

2013 Omprakash Gnawali, Rodrigo Fonseca, Kyle Jamieson, Maria Kazandjieva, David Moss, and Philip Levis. CTP: An efficient, robust, and reliable collection tree protocol for wireless sensor networks. *ACM Transactions on Sensor Networks (TOSN)*, 10(1), December 2013.

2009 Brian F. Cooper, Eric Baldeschwieler, Rodrigo Fonseca, James J. Kistler, P. P. S. Narayan, Chuck Neerdaels, Toby Negrin, Raghu Ramakrishnan, Adam Silberstein, Utkarsh Srivastava, and Raymie Stata. Building a Cloud for Yahoo! *IEEE Data Engineering Bulletin*, 32(1):36–43, 2009.

2005 Rodrigo Fonseca, Virgilio Almeida, and Mark Crovella. Locality in a Web of Streams. *Communications of the ACM*, 48:82–88, January 2005.

2003 Daniel Menascé, Virgilio Almeida, Rudolph Riedi, Flavia Ribeiro, Rodrigo Fonseca, and Wagner Meira Jr. A Hierarchical and Multiscale Approach to Analyze E-Business Workloads. *Performance Evaluation*, 54(1):33–57, September 2003.

2000 Daniel Menascé, Virgilio Almeida, Rodrigo Fonseca, and Marco Aurélio Mendes. Business-oriented Resource Management Policies for E-commerce Servers. *Performance Evaluation*, 42:223–239, September 2000.

1998 Virgilio Almeida, Márcio Cesário, Rodrigo Fonseca, Wagner Meira Jr, and Cristina Murta. The Influence of Geographical and Cultural Issues on the Cache Proxy Server Workload. *Computer Networks and ISDN Systems*, 30:601–603, 1998.

Technical Reports

2018 Linnan Wang, Wei Wu, Yiyang Zhao, Junyu Zhang, Hang Liu, George Bosilca, Jack J. Dongarra, Maurice Herlihy, and Rodrigo Fonseca. Superneurons: Fft-based gradient sparsification in the distributed training of deep neural networks. *CoRR*, abs/1811.08596, 2018.

Nicholas DeMarinis, Stefanie Tellex, Vasileios Kemerlis, George Konidaris, and Rodrigo Fonseca. Scanning the internet for ROS: A view of security in robotics research. *CoRR*, abs/1808.03322, 2018.

Alex Galakatos, Michael Markovitch, Carsten Binnig, Rodrigo Fonseca, and Tim Kraska. A-tree: A bounded approximate index structure. *CoRR*, abs/1801.10207, 2018.

2014 Raja R. Sambasivan, Rodrigo Fonseca, Ilari Shafer, and Gregory R. Ganger. So, you want to trace your distributed system? Key design insights from years of practical experience. Technical Report CMU-PDL-14-102, Parallel Data Laboratory, Carnegie Mellon University, Pittsburgh, PA 15213-3890, April 2014.

2011 Marcelo Martins and Rodrigo Fonseca. The Case for Device Power States. Technical Report 2011-03, Brown Computer Science, October 2011.

2006 Sukun Kim, Rodrigo Fonseca, Prabal Dutta, Arsalan Tavakoli, David Culler, Philip Levis, Scott Shenker, and Ion Stoica. Flush: A Reliable Bulk Transport Protocol for Multihop Wireless Networks. Technical Report UCB/EECS-2006-169, UC Berleley EECS, December 2006.

2005 Rodrigo Fonseca, George Porter, Randy H. Katz, Scott Shenker, and Ion Stoica. IP Options are not an Option. Technical Report UCB/EECS-2005-24, UC Berkeley EECS, December 2005.

Claudio Ferraz, Rodrigo Fonseca, Joyojeet Pal, and Manisha Shah. Shared Computing in Brazil: A Study of the Center for Democracy in Information Technology. UC Berkeley/UNIDO Bridging the Divide Conference, April 2005.

Patents

2010 R. Fonseca, B.F. Cooper, A. Silberstein, and Y. VIGFUSSON. Adaptive resource allocation for parallel execution of a range query, December 30 2010. US Patent App. 12/495,550.

B.F. Cooper, A. Silberstein, U. Srivastava, R. Ramakrishnan, and R. Fonseca. System for providing scalable in-memory caching for a distributed database, July 8 2010. US Patent App. 12/724,260.

2006 P. Sharma, R. Fonseca, S. Banerjee, S.J. Lee, and S. Basu. Distributed storing of network position information for nodes, September 21 2006. US Patent App. 11/082,135.

Invited Talks

Networking a First-Class Cloud Resource

October 17th, 2018, Invited talk at the Red Hat Colloquium at Boston University.

June 15th, 2018, Invited talk at the 13th Cloud Control Workshop. Skåvsjöholm, Sweden

The Design and Applications for a Tracing Plane for Distributed Systems

September 16th, 2017, Invited Keynote at the The 17th International Conference on Runtime Verification, RV'17. Seattle, WA, USA

How do we talk to the network?

October 27th, 2016, Stanford University, guest lecture for CS 144, Introduction to Computer Networking

Towards a Tracing Plane for Distributed Systems

October 14th, 2016, University of Wisconsing, Madison

July 15th, 2016, University of Washington

Monitoring as a Design Target for Programmable Switches

August 22nd, 2016, invited talk at the ACM SIGCOMM Workshop on Networking and Programming Languages (NetPL 2016), Florianopolis, Brazil

Towards a Layered Architecture for Distributed Tracing

January 22nd, 2016, Universidade do Minho, Portugal

We are Tracing as if it is 1973

October 5th, 2015, Pivotal, Inc.

We are Losing Track: a Case for Causal Metadata in Distributed Systems

September 29th, 2015, 16th International Workshop on High Performance Transactions Systems (HPTS)

Dynamic Causal Monitoring for Distributed Systems

August 17th, 2015, University of Cambridge, UK

Targeted Resource Management in Multi-tenant Distributed Systems

February 17th, 2015, University of South California, Los Angeles, CA

February 6th, 2015, Cornell University, Ithaca, NY

Participatory Networking

August 8th, 2012, Microsoft Research, Redmond, WA

May 25th, 2012, Universidade Federal de Minas Gerais, Belo Horizonte, Brazil

Experiences with Causal Tracing Using X-Trace

July 11th, 2011, Carnegie Mellon University

Tracking Energy in Embedded Wireless Platforms

October 14th, 2010, Invited talk at the 2010 Green NEM Workshop, Barcelona, Spain

Experiences with tracing causality in networked services

April 27th, 2010, Conference Presentation, INM/WREN 2010, San Jose, CA

Improving the Visibility of Real Distributed Systems

March 11th, 2008, Google Inc., Seattle, WA

March 20th, 2008, Brown University, Providence, RI

March 31st, 2008, University of Minnesota, Minneapolis, MN

April 10th, 2008, Microsoft Research, Redmond, WA

April 14th, 2008, Yahoo! Research, Santa Clara, CA

April 21st, 2008, Intel Research, Berkeley, CA

X-Trace: A Pervasive Network Tracing Framework

January 30th, 2007, Tech Talk, Google Inc. Mountain View, CA

April 12th, 2007, Conference presentation, NSDI 2007, Boston, MA

April 18th 2007, Cisco Systems, Inc., Santa Clara, CA

May 2nd 2007, Nortel Networks, Inc., Santa Clara, CA

Jan 30th 2008, Sun Labs, Inc., Palo Alto, CA

4-Bit Link Estimation

September 6th, 2007, Invited talk, Prof. Phillip Levis' Research Group, Stanford University. Palo Alto, CA

Computing Devices for All: Creating and Selling the Low-Cost Computer

May 25th, 2006, Conference presentation, ICTD 2006, Berkeley, CA.

Any-to-any Routing in Sensor Networks

October 25th, 2005, Guest Lecturer, CS-294-11, Graduate Seminar on Sensor Actuator Networks. UC Berkeley. Berkeley, CA.

Beacon Vector Routing: Scalable Point-to-Point Routing in Wireless Sensornets

April 4th, 2005, Conference presentation, NSDI 2005, Boston, MA.

Distributed Querying of Internet Distance Information

March 19th 2005, Symposium presentation, Global Internet 2005, Miami, FL.

Bringing Devices to the Masses: A Comparative Study of the Brazilian Computador Popular and the Indian Simputer

February 11th, 2005, in panel "Trends in Computing for Human Development in India". 20th Annual South Asia Conference, UC Berkeley, 2005, Berkeley, CA.

Beacon Vector Routing in Sensor Networks

September 15, 2004, International Computer Science Institute, Berkeley, CA.

On the Intrinsic Locality Properties of Web Reference Streams

Apr 1st, 2003, Conference presentation, Infocom 2003, San Francisco, CA.

Analyzing the Impact of Robots on Performance of Web Caching Systems

May 22nd, 2001, Workshop Presentation, Sixth Workshop on Web Caching and Content Distribution (WebCache 2001), Boston, MA.

E-representatives: A Scalability Scheme for E-Commerce

Jun 9th, 2000, Workshop presentation, WECWIS 2000, Milpitas, CA.

Integrating WWW Caches and Search Engines

Dec 7th, 1999, Conference presentation, Globecom 1999, Rio de Janeiro, Brazil.

6 Research Grants and Awards

Current Grants and Awards

2018 NSF *NeTS: Small: Network-centric IoT Security*. PIs: Rodrigo Fonseca and Theophilus Benson. Start date: October 1st, 2018; End data: February 30th, 2021.

2017 IBM Research Award

2016 Facebook Distinguished Faculty Gift, Awarded February, 2015.

2015 NSF *CAREER: Understanding the Performance of Distributed Systems Through Causal Tracing*. PI: Rodrigo Fonseca. Start date: March 1st, 2015; End date: February, 29th, 2020.

Completed Grants

2013-2017 NSF *NeTS: Small: Participatory Software Defined Networking*. PI: Rodrigo Fonseca. Award Number CNS-1320397. Start date: August 30th, 2013; End date: September 30th, 2017.

2010-2015 NSF Trustworthy Computing Collaborative Research Award #1012060 *Towards Trustworthy Interactions in the Cloud*. PIs: Jonathan Appavoo (BU), Azer Bestavros (BU), Ro-

	drigo Fonseca (Brown), Michael T. Goodrich (UC Irvine), Anna Lysyanskaya (Brown), Leonid Reyzin (BU), Roberto Tamassia (Brown) and Nikos Triandopoulos (Brown/BU). Start date: September 15th, 2010; End date: August 31st, 2015.
2011	Google Research Award, *Effcient Sampling of Causal Execution Graphs*. PI: Rodrigo Fonseca. Awarded November 30th, 2011.
2011-2013	Richard B. Solomon Faculty Research Award, *Energy Efficiency Exploration in Sensor Network Protocols*. PI: Rodrigo Fonseca. Submitted November 1st, 2010. Awarded January 21st, 2011.
2011	Rhode Island STAC Collaborative Grant Proposal. *Tracking Business-Critical Web Applications.* PI: Rodrigo Fonseca, co-PIs: Chris Erway (Tracelytics, Inc.). Submitted October 28th, 2010, Awarded February 3rd, 2011.
2010	Intel Research Award, *Whole-Platform Energy Usage of Software Activities*. PI: Rodrigo Fonseca.

7 Academic Honors

2017	USENIX NSDI Test of Time Award, 'X-Trace: A Pervasive Network Tracing Framework'. Award recognizes "papers that have had a lasting impact on their fields, published at least 10 years before."
2015	SOSP Best Paper Award, for 'Pivot tracing: Dynamic Causal Monitoring for Distributed Systems'.
2007	HotNets VI Student Travel Grant
2004	UC Berkeley/UNIDO (United Nations Industrial Development Organization) Summer Research Fellowship
2002	James B. Duke Ph.D. Fellowship, Duke University (declined)
	Presidential Ph.D. Fellowship, Boston University (declined)
	Admitted to Ph.D. programs at UC Berkeley, UT Austin, Duke University, Brown University, Rutgers University, Boston University
2000	First in admission for UFMG CS Master's program, among 300 applicants
1999	Finalist in national undergraduate research competition, Brazil.
1995	First in entrance examination to UFMG, among 42,000 candidates

8 Service

University/Departmental Service

2018/19	Academic Code Review Committee, standing member; Curricular Committee, chair; Programming Contest Committee; PhD Admissions Support; Bearcore

2017/18	Academic Code Review Committee, standing member; Curricular Committee; Programming Contest Committee; PhD Admissions Support; Bearcore
2016/17	PhD Admissions, Co-Chair; Lecture Committee; Bearcore Liaison
2015	PhD Admissions Committee Chair
2014	Co-organizer, inaugural lecture of the Brazil Initiative Seminar Series with Prof. Virgilio Almeida, IT Secretary for the Science, Technology and Innovation Ministry, Brazil. Programming Team Coach
2013	PhD Admissions Committee Chair, Programming Team Coach, Systems Seminar Series Organizer
2012	Programming Exams Committee Chair, Programming Team Coach, Systems Seminar Series Organizer
2011	Computing Vision Committee, Programming Exams Committee Chair, Programming Team Coach, Undergraduate Recruiting Committee, Systems Seminar Series Organizer
2010	Computing Vision Committee, Programming Exams Committee Chair, Programming Team Coach, Undergraduate Recruiting Committee
2010	42nd IPP Symposium on Cloud Computing, Organizer
2010	Admissions Committee, Brown University
2009	Exams Committee
2003, '05, '07	Graduate Student Member, UC Berkeley CS PhD Admissions Committee
2004	Systems Lunch, Berkeley

Professional Service

Conference Organizing

SoCC 2020	General Chair, Symposium on Cloud Computing.
HotNets 2019	Program Committee Co-Chair, Workshop on Hot Topics in Computer Networking.
NENS 2017	Co-chair, Fourth New England Networking and Systems Day.
NENS 2016	Co-chair, Third New England Networking and Systems Day.
NENS 2015	Co-chair, Second New England Networking and Systems Day.
NENS 2014	Co-chair, First New England Networking and Systems Day.
IC2E 2014	Co-chair, Doctoral Symposium of the IEEE International Conference on Cloud Engineering
HotCloud 2012	Co-chair, 4th USENIX Workshop on Hot Topics in Cloud Computing, co-located with the USENIX Annual Technical Conference

Technical Program Committees

Eurosys 2018	13th European Conference on Computer Systems
HotCloud 2018	10th USENIX Workshop on Hot Topics in Cloud Computing
SBRC 2018	36th Brazilian Symposium on Computer Networks and Distributed Systems
ICDCS 2018	38th IEEE International Conference on Distributed Computing Systems
IEEE Cloud 2018	IEEE International Conference on Cloud Computing
SBAC-PAD 2018	30th International Symposium on Computer Architecture and High Performance Computing
NSDI 2017	14th USENIX Symposium on Networked Systems Design & Implementation
SOSR 2017	3rd Symposium on SDN Research
SBRC 2017	35th Brazilian Symposium on Computer Networks and Distributed Systems
NSDI 2016	13th USENIX Symposium on Networked Systems Design & Implementation
IMC 2016	16th ACM Internet Measurement Conference
USENIX ATC 2016	USENIX Annual Technical Conference
SBRC 2016	34th Brazilian Symposium on Computer Networks and Distributed Systems
SOSR 2016	2nd Symposium on SDN Research
ICDCS 2016	36th IEEE International Conference on Distributed Computing Systems
EuroSys 2016	11th European Conference on Computer Systems
HotMobile 2016	17th ACM Workshop on Mobile Computing Systems and Applications
HotPower 2015	8th Workshop on Power-Aware Computing and Systems, co-located with the 25rd ACM Symposium on Operating Systems Principles (SOSP'15)
HotCloud 2015	7th USENIX Workshop on Hot Topics in Cloud Computing, co-located with the USENIX Annual Technical Conference
NSDI 2015	12th USENIX Symposium on Networked Systems Design & Implementation
DSN 2015	45th Annual IEEE/IFIP International Conference on Dependable Systems and Networks
DCOSS 2015	International Conference on Distributed Computing in Sensor Systems
SBRC 2015	33rd Brazilian Symposium on Computer Networks and Distributed Systems
Sigcomm 2014	ACM SIGCOMM 2014 Conference on Data Communication
SBAC-PAD 2014	26th International Symposium on Computer Architecture and High Performance Computing, Brazilian Computer Architecture Society
IMC 2014	2014 ACM Internet Measurement Conference

ICDCS 2014	34th International Conference on Distributed Computing Systems, Cloud Computing and Data Center Systems Program Committee
Eurosys 2014	9th European Conference on Computer Systems
HotMobile 2014	15th ACM Workshop on Mobile Computing Systems and Applications
SoCC 2013	4th ACM Symposium on Cloud Computing
NSDI 2013	10th USENIX Symposium on Networked Systems Design & Implementation
DaMNet 2013	3rd ICDM Workshop on Data Mining in Networks
OSDI 2012	(External Review Committee) Operating Systems Design & Implementation
VLDB 2012	38th International Conference on Very Large Data Bases
DSN-DCCS 2012	Dependable Computing and Communications Symposium, co-located with the 42st Annual IEEE/IFIP International Conference on Dependable Systems and Networks
Middleware 2012	13th ACM/IFIP/USENIX International Conference on Middleware.
IGCC 2012	Third International Green Computing Conference.
MAD 2012	1st USENIX Workshop on Managing Systems Automatically and Dynamically.
HotDep 2012	8th USENIX Workshop on Hot Topics in System Dependability.
NSDI 2011	8th USENIX Symposium on Networked Systems Design & Implementation
DSN-DCCS 2011	Dependable Computing and Communications Symposium, co-located with the 41st Annual IEEE/IFIP International Conference on Dependable Systems and Networks
CoNEXT 2011	7th International Conference on emerging Networking EXperiments and Technologies
HotPower 2011	4th Workshop on Power-Aware Computing and Systems, co-located with the 23rd ACM Symposium on Operating Systems Principles (SOSP'11)
HotCloud 2011	3rd USENIX HotCloud 2011 Workshop, co-located with the USENIX Annual Technical Conference
NetDB 2011	6th International Workshop on Networking Meets Databases, co-located with SIGMOD 2011
CoNext 2010 Student Workshop	
Smartphone 2010	Program Committee Member, International Workshop on Smartphone Applications and Services

Reviewing: Panels

2018	2 NSF Panels, CISE

2017	2 NSF Panels, CISE
2016	2 NSF Panels, CISE
2015	2 NSF Panels, CISE
2014	3 NSF Panels, CISE

Reviewing: Journals

ACM-TWEB	ACM Transactions on the Web
ACM-CCR	ACM SIGCOMM Computer Communications Review
IEEE-IC	IEEE Internet Computing
IEEE-Pervasive	IEEE Pervasive Computing
IEEE-TKDE	Transactions on Knowledge and Data Engineering
IEEE-Micro	
IEEE-TMC	Transactions on Mobile Computing
IEEE-TPDS	Transactions on Parallel and Distributed Systems
ACM-TOSN	Transactions on Sensor Networks

Reviewing: Conferences & Workshops

Sensys 2010	External Reviewer 8th ACM Conference on Embedded Networked Sensor Systems
NSDI 2008	External Reviewer 5th USENIX Symposium on Networked Systems Design & Implementation
NSDI 2007	External Reviewer 4th USENIX Symposium on Networked Systems Design & Implementation
SOSP 2007	External Reviewer 21st ACM Symposium on Operating Systems Principles
HotOS 2007	External Reviewer 11th Workshop on Hot Topics in Operating Systems
Sensys 2006	External Reviewer 4th ACM Conference on Embedded Networked Sensor Systems
SECON 2006	External Reviewer 3rd Annual IEEE Communications Society Conference on Sensor, Mesh, and Ad Hoc Communications and Networks
ICCCN 2006	External Reviewer 15th International Conference on Computer Communications and Networks 2006

Tutorials

IPSN 2009	*Energy Metering and Tracking with iCount and Quanto*, with Prabal Dutta (Michigan) and Thomas Schmid (UCLA). At the 8th ACM/IEEE International Conference on Information Processing in Sensor Networks, April 16,2009, San Francisco, CA.

Working Groups

2007-2008	Member, TinyOS 2.0 Networking Group
2006	Chair, TinyOS 2.0 Networking Group

9 Teaching and Advising

Courses

2011,12,14, 16, 17, 18 CSCI-1680 *Computer Networks*. This is an advanced undergraduate class that covers networking from the principles that allow two computers to communicate to the protocols that allow the Internet to work.

- Fall 2018 enrollment: 38
- Fall 2017 enrollment: 9
- Fall 2016 enrollment: 34
- Fall 2014 enrollment: 28
- Fall 2012 enrollment: 38
- Spring 2012 enrollment: 16
- Spring 2011 enrollment: 25

2015, 16 CSCI-1380 *Distributed Computer Systems* (Co-taught with Prof. Thomas Doeppner). This is an undergraduate in distributed computer systems, exploring the fundamental principles and practice underlying networked information systems. It covers basic distributed computing mechanisms, such as naming, replication, security, and then discusses how these mechanisms fit together to realize distributed databases, file systems, web-based, and mobile information systems.

- Spring 2017 enrollment: 76
- Spring 2016 enrollment: 58
- Spring 2015 enrollment: 63

2009,10,11,13,14,17,18 CSCI 2950-u *Special Topics on Networking and Distributed Systems*.

This class is a graduate seminar structured to expose students to a selection of current research topics in networking, distributed, and operating systems. There are two major components: reading and discussion of research papers, and a semester-long research project. Topics include, to various extents, large-scale internet system architectures, p2p, consistency versus availability tradeoffs; datacenter system architectures such as GFS and Map Reduce; datacenter networking architectures; troubleshooting distributed systems; the browser and mobile clients as new execution platforms; and energy as a limiting resource. The main goal for this class is to prepare students to do research in systems and networking. At the end of the semester a student should have a good idea of some of

the current research challenges in these areas, be comfortable with reading the systems research literature critically, and be able to conduct, evaluate, and write about their own research project in systems.

- Spring 2018 Enrollment: 13. Topic: 'Cloud 3.0 Infrastructure'.
- Spring 2017 Enrollment: 8. Topic: 'Advanced Networking'.
- Spring 2014 Enrollment: 8. Topic: 'Software-Defined and Datacenter Networking'.
- Spring 2013 Enrollment: 11. Topic: 'Advanced Networking: Datacenter and Software-Defined Networking'.
- Fall 2011 Enrollment: 20. Topic: 'Data-Intensive Scalable Computing'.
- Fall 2010 Enrollment: 15
- Fall 2009 Enrollment: 14

2015 Reading and Research

- Marcelo Martins (PhD), Jeffrey Rasley (PhD), Jonathan Mace (PhD), Da Yu (PhD), Nicholas DeMarinis (PhD), Ryan Roelke (ScM), Junyang Chen (ScM), Albert Brown (Undergraduate)

2014 Reading and Research

- Andrew Ferguson (PhD), Marcelo Martins (PhD), Jeffrey Rasley (PhD), Jonathan Mace (PhD), Da Yu (PhD), Ray Zhou (ScM)

Honor's Thesis

- Jonathan Leavitt - *End-to-End Tracing Models: Analysis and Unification*

2013 Reading and Research

- Andrew Ferguson (Phd), Marcelo Martins (PhD), Jeffrey Rasley (PhD), Jonathan Mace (Phd), Da Yu (PhD), Ray Zhou (ScM)

Individual Independent Study

- Jonathan Leavitt

2012 Reading and Research

- Andrew Ferguson (Phd), Marcelo Martins (PhD), Jeffrey Rasley (PhD), Jonathan Mace (Phd), Chen Liang (ScM)

Individual Independent Study

- Sanford Ryza

2011 Reading and Research

- Andrew Ferguson (PhD), Marcelo Martins (PhD), Basil Crow (ScM), Jacob Eagle (ScM), Li Jin (ScM)

Individual Independent Study

- Walter Blaurock, Sanford Ryza

2010 Reading and Research.

- Matteo Riondatto (PhD), Marcelo Martins (PhD), Andrew Ferguson (PhD), Sunil Mallya (ScM)

Ph.D. advising

Current

2018-	Linnan Wang
2016-	Michael Markovitch
2015-	Nicholas DeMarinis
2013-	Da Yu

Graduated

2012-2018	Jeffrey Rasley, PhD Thesis: "Application-Aware Cluster Resource Management". Now at Microsoft.
2012-2018	Jonathan Mace, PhD Thesis: "A Universal Architecture for Cross-Cutting Tools in Distributed Systems". Now at Max Planck Institute for Software Systems.
2009-2017	Marcelo Teixeira Martins, PhD Thesis: "Software Analysis and Development for Energy Effciency in Mobile Devices". Now at Apple, Inc.
2009-2014	Andrew Ferguson, PhD. Thesis: "Policy Delegation and Migration for Software-Defined Networks". Now at Google, Inc.

Sc.M. Advising

2018	Sumukha Tumkur Vani, now at Microsoft.
	Joey Genfi.
	Yunheng Mong.
2015	Junyang Chen, now at Microsoft.
	George Hongkai Sun, now at Google.
	Ryan Roelke, now at Vertica. *Pivot Tracing: Dynamic Causal Monitoring for Distributed Systems*

2013, 14	Ray Zhou, now at Google. *Datacenter Network Large Flow Detection and Scheduling from the Edge*
2012	Chen Liang, now at LinkedIn. *Software Defined Network Support for Real Distributed Systems*
	Basil Crow, now at Delphix. *Time and Energy Profiling in Production Sensor Networks with Quanto*.
2011	Li Jin, now at Two Sigma. *Locality Aware Fair Scheduling for Hammr*.
	Jacob Eagle, now at Teespring. *Xtracing Java RMI*.
	Sunil Mallya, now at Amazon. *Entracker: Energy Tracker for Homes*.

Undergraduate Research Advising

2018	William Maleta
	Joseph Romano
2015, 16	Wilson Cusack. *SMS-Based Commodity and Transport Exchange*. Nominated by CS Department as Distinguished Honors Thesis.
2015	Albert Brown.
2013, 14	Jonathan Leavitt, now at Google. *End-to-End Tracing Models: Analysis and Unification*.
2012	Sanford Ryza, now at Cloudera. *Solving Hard Problems with Lots of Computers*.
2011	Walter Blaurock, now at Next Big Sound. *Automatic Scaling of Cloud-Based Web Applications*.
	Son Nguyen, now at Two Sigma. *QLocation - An indoor location based multipurpose apps*.

Ph.D. Thesis Committee Member

2015	Irina Calciu. Proposal: 10/29/2013. Defense: 03/30/2015.
2014	Alexander Tarvo. Proposal: 02/06/2013. Defense: 05/27/2014.
	James Kelley. Proposal: 10/01/2013. Defense: 04/12/2014.
2013	Ellie Krevat (CMU). Proposal: 08/23/2013.
	Jamie Jablin. Proposal: 05/08/2012 . Defense: 08/09/2013.
	Raja Sambasivan (CMU). Proposal: 10/18/2011. Defense: 05/06/2011.
2011	Jie Mao. Proposal: 12/21/2009, Defense: 8/26/2011.

Sc.M. Academic Advising

2009-	Damon Hsu-Hung

2009-	Venkatasubramanian (Venkat) Jayaraman