

Jonathan Mace

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CURRENT POSITION

Max Planck Institute for Software Systems 2018 – present
University of Saarland, Saarbrücken, Germany

Tenure-Track Faculty
Head of the Cloud Software Systems group

I lead the Cloud Software Systems research group at the Max Planck Institute for Software Systems (MPI-SWS). My group's interests include cloud systems, distributed systems, systems for machine learning, and operating systems. The main goal of my research is to make it easier to operate large software systems and to understand their behavior at runtime. This entails designing new abstractions for building distributed systems; new runtime techniques for measuring, adapting, and enforcing system behaviors; and new tools for analyzing behaviors both online and offline.

EDUCATION

Ph.D. Computer Science May 2018
Brown University, Providence, Rhode Island, USA

- Dissertation Title: *A Universal Architecture for Cross-Cutting Tools in Distributed Systems*
- Advisor: Prof. Rodrigo Fonseca
- *Honorable Mention for the 2018 Dennis Ritchie Doctoral Dissertation Award*

M.Sc. Computer Science May 2014
Brown University, Providence, Rhode Island, USA

- GPA: 4.0/4.0

Oxford University, Hertford College, Oxford, UK 2005 – 2009
MMathComp Mathematics and Computer Science, May 2009

- 1st Class (Honors)

PROFESSIONAL APPOINTMENTS

Research Contractor. Facebook, Cambridge MA 03/2017 – 03/2018

- Supervisor: Dr. Jonathan Kaldor

Research Intern. Facebook, New York NY 07/2016 – 10/2016

- Supervisor: Dr. Louis Kruger

Research Contractor. Microsoft Research, Cambridge MA 09/2013 – 05/2016

- Supervisor: Dr. Peter Bodik, Dr. Madanlal Musuvathi

Research Intern. Microsoft Research, Redmond WA 06/2015 – 09/2015

- Supervisor: Dr. Peter Bodik

Research Intern. Microsoft Research, Redmond WA 05/2013 – 08/2013

- Supervisor: Dr. Peter Bodik, Dr. Madanlal Musuvathi

Research Intern, Willow Garage 05/2012 – 08/2012

- Supervisor: Dr. Kaijen Hsiao

Software Engineer, IBM UK 09/2009 – 08/2011

HONORS AND AWARDS

- 2020** Distinguished Artifact Award, 14th USENIX Symposium on Operating Systems Design and Implementation (OSDI)
Serving DNNs like Clockwork: Performance Predictability from the Bottom Up
- 2020** Finalist, Systems for Machine Learning Facebook Research Award
Densely Multiplexed and Highly Predictable DNN Serving
- 2018** Honorable Mention, Dennis M. Ritchie Doctoral Dissertation Award
- 2017** SIGCOMM Student Scholar, “50 Years of the ACM Turing Award Celebration”
- 2016** USENIX ATC “Best of the Rest” Invited Speaker
Pivot Tracing: Dynamic Causal Monitoring for Distributed Systems
- 2016** Facebook PhD Fellowship in Distributed Systems
Pervasive Monitoring, Diagnostics, and Analytics of Distributed Systems through Dynamic Causal Tracing.
One of twelve fellowship recipients worldwide and the only recipient for distributed systems.
- 2015** Best Paper Award, 25th ACM Symposium on Operating Systems Principles (SOSP)
Pivot Tracing: Dynamic Causal Monitoring for Distributed Systems
- 2015** Student Scholar, 3rd Heidelberg Laureate Forum
- 2015** Brown University Computer Science “Great TA” Award
Nominated by students of CS138: Distributed Systems, Spring 2015
- 2011** Brown University Graduate School Fellowship
- 2006** Hertford College Scholarship

PUBLICATIONS**Books**

Distributed Tracing in Practice

A. Parker, D. Spoonhower, J. Mace, and R. Isaacs
O’Reilly 2020

Conferences

Serving DNNs like Clockwork: Performance Predictability from the Bottom Up

A. Gujarati, R. Karimi, S. Alzayat, W. Hao, A. Kaufmann, Y. Vigfusson, J. Mace
14th USENIX Symposium on Operating Systems Design and Implementation (OSDI), October 2020
Distinguished Artifact Award

Sifter: Scalable Sampling for Distributed Traces, without Feature Engineering

P. Las-Casas, G. Papakerashvili, V. Anand, J. Mace
10th ACM Symposium on Cloud Computing (SoCC), November 2019

Weighted Sampling of Execution Traces: Capturing More Needles and Less Hay

P. Las-Casas, J. Mace, D. Guedes, R. Fonseca
9th ACM Symposium on Cloud Computing (SoCC), October 2018

Universal Context Propagation for Distributed System Instrumentation

J. Mace and R. Fonseca
13th ACM European Conference on Computer Systems (EuroSys), April 2018

**PUBLICATIONS
CONT.****Canopy: An End-to-End Performance Tracing And Analysis System**

J. Kaldor, J. Mace, M. Bejda, E. Gao, W. Kuropatwa, J. O'Neill, K. Ong, B. Schaller, P. Shan, B. Viscomi, V. Venkataraman, K. Veeraraghavan, Y. Song
26th ACM Symposium on Operating Systems Principles (SOSP), October 2017

Principled Workflow-Centric Tracing of Distributed Systems

R.R. Sambasivan, I. Shafer, J. Mace, B.H. Sigelman, R. Fonseca, and G.R. Ganger
7th ACM Symposium on Cloud Computing (SoCC), October 2016

2DFQ: Two-Dimensional Fair Queuing for Multi-Tenant Cloud Services

J. Mace, P. Bodik, R. Fonseca, M. Musuvathi, and K. Varadarajan
ACM SIGCOMM Conference, August 2016

Pivot Tracing: Dynamic Causal Monitoring for Distributed Systems

J. Mace, R. Roelke, R. Fonseca
25th ACM Symposium on Operating Systems Principles (SOSP), October 2015
Best Paper Award

Retro: Targeted Resource Management in Multi-Tenant Distributed Systems

J. Mace, P. Bodik, R. Fonseca, and M. Musuvathi
12th USENIX Symposium on Networked Systems Design and Implementation (NSDI), May 2015

Workshops

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

R. Fonseca and J. Mace
15th International Workshop on High Performance Transaction Systems (HPTS), October 2015

Towards General-Purpose Resource Management in Shared Cloud Services

J. Mace, P. Bodik, R. Fonseca, and M. Musuvathi
10th Workshop on Hot Topics in System Dependability (HotDep), October 2014

Journals

Pivot Tracing: Dynamic Causal Monitoring for Distributed Systems

J. Mace, R. Roelke, R. Fonseca
Communications of the ACM (CACM), Volume 63 Issue 3, March 2020

Pivot Tracing: Dynamic Causal Monitoring for Distributed Systems

J. Mace, R. Roelke, R. Fonseca
ACM Transactions on Computer Systems (TOCS), Volume 35 Issue 4, December 2018

Theses

A Universal Architecture for Cross-Cutting Tools in Distributed Systems

J. Mace
Ph.D. Thesis, Brown University, May 2018

Revisiting End-to-End Trace Comparison with Graph Kernels

J. Mace
Master's Project, Brown University, May 2014

**PUBLICATIONS
CONT.****Supervised Theses**

Efficient DNN Serving: Evaluating the feasibility of FPGAs for multi-tenant model serving

Franco Caspe

*M.Sc. Thesis, Pazmany Peter Catholic University (Erasmus Program), June 2021***Pathfinder: Exploiting Inter-Thread Communication for Request Flow Instrumentation**

Nicolas Schäfer

*M.Sc. Thesis, University of Saarland, January 2021***Miscellaneous**

End-to-End Tracing: Adoption and Use Cases

J. Mace

*Survey, Brown University, March 2017***Pivot Tracing: Dynamic Causal Monitoring for Distributed Systems**

J. Mace, R. Roelke, R. Fonseca

- *USENIX ;login: Magazine, Spring 2016*
- *Brown University Conduit Magazine, Spring 2016*

Patents

A. Bridgen, A. Flatt, J. Mace, R. Pilot. **Multi-Modal Journey Planner** *US Patent 9,594,772, 2017*

S. Horsman, M. Kockott, J. Mace, and A. Moger. **Representing a Graphical User Interface using a Topic Tree Structure** *US Patent 9,046,982, 2015*

A. Armstrong, J. Mace, and R. Pilot. **Dynamic Setting of Increments on an Amplitude Scale** *US Patent 9,037,276, 2015*

A. Armstrong, J. Mace, and R. Pilot. **Presenting a Custom View in an Integrated Development Environment based on a Variable Selection** *US Patent 8,959,479, 2015*

A. Bridgen, A. Flatt, J. Mace, and R. Pilot. **Flattening a Subset of Configuration UI Panels in a Hierarchy of UI Panels** *US Patent 8,898,589, 2014*

A. Armstrong, J. Mace, and R. Pilot. **Method for modifying a User Interface** *US Patent 8,751,871, 2014*

A. Armstrong, S. Burns, and J. Mace. **Configuration of Widgets in a Mashup Environment** *US Patent App. 13/943,450, 2013*

A. Bridgen, A. Flatt, J. Mace, and R. Pilot. **Dynamic File Retrieving for Web Page Loading** *US Patent App. 13/679,103, 2012*

A. Armstrong, J. Mace, and M. Whitbourne. **Translating User Interface Sounds into 3D Audio Space** *US Patent App. 13/462,740, 2012*

A. Armstrong, J. Mace, and R. Pilot. **Adaptive Touch-Sensitive Displays and Methods** *US Patent App. 12/982,700, 2010*

SERVICE	Program Committees OSDI 2022, NSDI 2022, SOSP 2021, OSDI 2021, Eurosys 2021, ATC 2021, SOCC 2020, and various workshops and journals.	
	Mentorship OSDI 2020, Eurosys 2021, OSDI 2021	
	Organization Cornell, Maryland, Max Planck Summer School 2022 Web Chair, SOSP 2021	
ARTIFACTS	All software artifacts from my research group can be found at https://gitlab.mpi-sws.org/cld .	
TEACHING	<i>Distributed Systems</i> , Core Lecture, University of Saarland, Summer Semester 2021	
	<i>Advanced Topics in Cloud and Datacenter Systems</i> , Seminar, University of Saarland, Summer Semester 2020	
SUPERVISED STUDENTS	Postdoctoral Researchers	
	Arpan Gujarati	2020-2021
	PhD Students	
	Matheus Stolet	2021 – present
	Vaastav Anand	2020 – present
	Safya Alzayat	2019 – present
	Thomas Davidson	2019 – present
	Reyhaneh Karimipour	2019 – present
	Masters Students	
	Zhiqiang Xie	2021
Franco Caspe (Erasmus)	2021	
Nicolas Schäfer	2019 – 2020	
Giorgi Papakerashvili	2019	