Jonathan Mace

jcmace@mpi-sws.org
+49 (0)1511 170 8810
https://people.mpi-sws.org/~jcmace/

CITIZENSHIP

New Zealand. United Kingdom. Resident in Germany.

CURRENT POSITION

Max Planck Institute for Software Systems Sept. 2018 – present
University of Saarland, Saarbruücken, Germany

Tenure-Track Faculty
Head of the Cloud Software Systems group

I currently 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. We design and implement systems with a focus on end-to-end reliability.
Current research statement: https://people.mpi-sws.org/~jcmace/research_statement_2021.pdf

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 M. 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 May 2009
MMathComp Mathematics and Computer Science
- 1st Class (Honors)

PROFESSIONAL APPOINTMENTS

Research Contractor. Facebook, Cambridge MA	03/2017 – 03/2018
Research Intern. Facebook, New York NY	07/2016 – 10/2016
Research Contractor. Microsoft Research, Cambridge MA	09/2013 – 05/2016
Research Intern. Microsoft Research, Redmond WA	06/2015 – 09/2015
Research Intern. Microsoft Research, Redmond WA	05/2013 – 08/2013
Research Intern, Willow Garage	05/2012 – 08/2012
Software Engineer, IBM UK	09/2009 – 08/2011

CODE

All software artifacts from my research group can be found at https://gitlab.mpi-sws.org/cld.

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.

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

Refereed Conference Publications

GroundHog: Reconciling Efficiency and Request Isolation in FaaS
M. Alzayat, J. Mace, P. Druschel, D. Garg
to appear in 18th ACM European Conference on Computer Systems (EuroSys), May 2023

The Benefit of Hindsight: Tracing Edge-Cases in Distributed Systems
L. Zhang, Z. Xie, V. Anand, Y. Vigfusson, J. Mace
to appear in 20th USENIX Symposium on Networked Systems Design and Implementation (NSDI), April 2023

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

PUBLICATIONS CONT.

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

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

Refereed Workshop Publications

The Odd One Out: Energy is not like Other Metrics
V. Anand, Z. Xie, M. Stolet, R. De Viti, T. Davidson, R. Karimipour, S. Alzayat, and J. Mace
1st Workshop on Sustainable Computer Systems Design and Implementation (HotCarbon), July 2022

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

Refereed Journal Publications

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

PUBLICATIONS CONT.

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

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

Non-Refereed Publications

ACT now: Aggregate Comparison of Traces for Incident Localization
K. Ramasubramanian, A. Raina, J. Mace, P. Alvaro
arXiv preprint arXiv:2205.06933, May 2022

I Don't Know What You Did Last Summer: The Missing Role of Humans in Systems Research
T. Davidson, J. Mace
Technical Report, February 2021

Aggregate-driven trace visualizations for performance debugging
V. Anand, M. Stolet, T. Davidson, I. Beschastnikh, T. Munzner, J. Mace
arXiv preprint arXiv:2010.13681, October 2020

No DNN left behind: Improving inference in the cloud with Multi-Tenancy
A. Samanta, S. Shrinivasan, A. Kaufmann, J. Mace
arXiv preprint arXiv:1901.06887, January 2019

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*

PUBLICATIONS CONT.

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
SOSP 2023, OSDI 2023, OSDI 2022, NSDI 2022, SOSP 2021, OSDI 2021, Eurosys 2021, ATC 2021, SOCC 2020, and various workshops and journals.

Mentorship
OSDI 2021, Eurosys 2021, OSDI 2020

Committees
EuroSys Roger Needham PhD Award Committee 2022

Organization
Co-General Chair, SOSP 2023
Lead Organizer, Cornell, Maryland, Max Planck Summer School 2022
Web Chair, SOSP 2021
Systems Trivia Event, HotOS 2021 and SOSP 2021

TEACHING

Distributed Systems, Core Lecture, University of Saarland, Summer Semester 2021

Advanced Topics in Cloud and Datacenter Systems, 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

Visiting PhD Students

Joao Loff, *IST Lisboa*	2021
Kamala Ramasubramanian, *UC Santa Cruz*	2020
Reza Karimi, *Emory University*	2019
Pedro Las Casas, *UFMG*	2019

Masters Students

Zhiqiang Xie	2021
Franco Caspe (Erasmus)	2021
Nicolas Schäfer	2019 – 2020
Giorgi Papakerashvili	2019
Suhas Shrinivasan	2019
Samim Zahoor Taray	2019