

# Curriculum Vitae

Peter Alvaro

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Computer Science Department  
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## EMPLOYMENT HISTORY

2015–        Assistant Professor, Computer Science Department, University of California, Santa Cruz  
2018        Consultant, eBay Inc., San Jose, CA  
2016        Consultant, Uber Inc., San Francisco, CA  
2015        Consultant, Netflix Inc., Los Gatos, CA  
2008-2014    Research Assistant, Computer Science Division, University of California at Berkeley  
1999-2008    Senior Software Engineer, Ask.com, Oakland, CA

## EDUCATION

2015        Ph. D., University of California at Berkeley, Computer Science (advisor: Joseph M. Hellerstein)  
              Thesis: *Data-centric Programming for Distributed Systems*  
2010        M. S., University of California at Berkeley, Computer Science  
1997        B. A., Middlebury College, English Literature, *magna cum laude*

## HONORS AND AWARDS

2017        **NSF CAREER** Award: “Lineage-driven Fault Injection.”  
2017        **Facebook Research Award**  
2017        **Keynote Speaker**, O’Reilly Velocity, San Jose, CA, 2017.  
2016        **Keynote Speaker**, Reactive Summit, Austin, TX, 2016.  
2016        **Keynote Speaker**, Qcon London 2016.  
2015        **Keynote Speaker**, Strange Loop, Saint Louis, MO, September 2015.  
2014        **Keynote Speaker**, Ricon, Las Vegas, NV, October 2014.  
2010        **Graduate Research Fellow**, National Science Foundation  
2009        **Finalist**, Qualcomm Innovation Fellowship  
1997        **Phi Beta Kappa**, Middlebury College  
1997        **Highest Honors** in English Literature, Middlebury College  
1997        **Winner**, Reid L. Carr prize, Middlebury College

## RESEARCH FUNDING

### Grants

2018–2022    PI, *CSR: Medium: Declarative Programmable Storage*, National Science Foundation, \$425,000.  
2017–2021    PI, *CAREER: Lineage-driven Fault Injection*, National Science Foundation, \$475,000.

### Gifts

2019        eBay, \$125,000.  
2018        eBay, \$125,000.  
2017        Facebook, \$50,000.  
2017        Huawei, Inc., \$100,000.

## SCHOLARLY AND CREATIVE WORK

*NOTE:* (\*) denotes a student co-author, and (‡) denotes a student co-author who was one of my advisees.

### Journals

- J6. Haryadi S. Gunawi, Riza O. Suminto, Russell Sears, Casey Golliver, Swaminathan Sundararaman, Xing Lin, Tim Emami, Weiguang Sheng, Nematollah Bidokhti, Caitie McCaffrey, Gary Grider, Parks M. Fields, Kevin Harms, Robert B. Ross, Andree Jacobson, Robert Ricci, Kirk Webb, **Peter Alvaro**, Mingzhe Hao, Huaicheng Li, H. Biralı Runesha, “Fail-Slow at Scale: Evidence of Hardware Performance Faults in Large Production Systems”, *ACM Transactions on Storage (TOS)*, Volume 14, Issue 3, October 2018.
- J5. **Peter Alvaro**, Severine Tymon, “Abstracting the Geniuses Away from Failure Testing”, *Communications of the ACM (CACM)*, Volume 61, Issue 1, November 2017.
- J4. **Peter Alvaro**, Neil Conway, Joseph M. Hellerstein, David Maier, “Coordination Analysis and Placement for Distributed Programs”, *Transactions on Database Systems (TODS)*, Volume 42, Issue 4, October 2017 (ACM).
- J3. Tom J. Ameloot, Jan Van den Bussche, William R. Marczak, **Peter Alvaro**, and Joseph M. Hellerstein, “Putting logic-based distributed systems on stable grounds”, *Theory and Practice of Logic Programming*, **16**(2), August 2015.
- J2. Neil Conway, **Peter Alvaro**, Emily Andrews, and Joseph M Hellerstein, “Edelweiss: Automatic Storage Reclamation for Distributed Programming”, *Proceedings of the VLDB Endowment (PVLDB 2014)*, **7**(6), February, 2014.
- J1. **Peter Alvaro**, Tyson Condie, Neil Conway, Joseph M Hellerstein, and Russell Sears, “I do declare: consensus in a logic language”, *ACM SIGOPS Operating Systems Review*, **43**(4), January 2010.

### Refereed Conference & Workshop Papers

- C24. Daniel Bittman\*, Darrell D. E. Long, **Peter Alvaro** Ethan Miller, “Optimizing Systems for Byte-Addressable NVM by Reducing Bit Flipping”, *Proceedings of the 17th USENIX Conference on File and Storage Technologies (FAST '19)*, Boston, MA, 2019.
- C23. Lennart Oldenburg‡, Xiangfeng Zhu‡, Kamala Ramasubramanian‡, **Peter Alvaro**, “Fixed It For You: Protocol Repair Using Lineage Graphs”, *Proceedings of the 9th biennial Conference on Innovative Data Systems Research (CIDR 2019)*, Asilomar, CA, 2019.
- C22. Michael Whittaker\*, Cristina Teodoropol\*, **Peter Alvaro**, Joseph M. Hellerstein, “Debugging Distributed Systems with Why-Across-Time Provenance”, *Proceedings of the Ninth ACM Symposium on Cloud Computing (SoCC 2018)*, Carlsbad, CA (ACM), 2018.
- C21. Daniel Bittman\*, Matthew Gray\*, Justin Raizes\*, Sinjoni Mukhopadhyay\*, Matt Bryson\*, **Peter Alvaro**, Darrell Long and Ethan Miller, “Designing Data Structures to Minimize Bit Flips on NVM”, *Proceedings of the 7th IEEE Non-Volatile Memory Systems and Applications Symposium (NVMSA 2018)*, Hakodate, Japan (IEEE), 2018.
- C20. Michael A. Sevilla\*, Reza Nasirigerdeh\*, Carlos Maltzahn, Jeff LeFevre, Noah Watkins\*, **Peter Alvaro**, Margaret Lawson, Jay Lofstead, Jim Pivarskia, “Tintenfisch: File System Namespace Schemas and Generators”, *Proceedings of the 10th USENIX Workshop on Hot Topics in Storage and File Systems (HotStorage 2018)*, Boston, MA (USENIX), 2018.
- C19. Michael Sevilla\*, Carlos Maltzahn, **Peter Alvaro**, Reza Nasirigerdeh\*, Bradley Settlemyer, Danny Perez, David Rich and Galen Shipman, “Programmable Caches with a Data Management Language & Policy Engine”, *Proceedings of the 18th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid 2018)*, Washington, DC (IEEE/ACM), 2018.
- C18. Michael Sevilla\*, Ivo Jimenez\*, Noah Watkins\*, Jeff Lefevre, Shel Finkelstein, **Peter Alvaro**, Patrick Donnelly and Carlos Maltzahn, “Cudele: An API and Framework for Programmable Consistency and Durability in a Global Namespace”, *Proceedings of the 32nd IEEE International Parallel and Distributed Processing Symposium (IPDPS 2018)*, Vancouver, BC, Canada (IEEE), May 2018.
- C17. Haryadi S. Gunawi, Riza O. Suminto, Russell Sears, Casey Golliver, Swaminathan Sundararaman, Xing Lin, Tim Emami, Weiguang Sheng, Nematollah Bidokhti, Caitie McCaffrey, Gary Grider, Parks M. Fields, Kevin Harms, Robert B. Ross, Andree Jacobson, Robert Ricci, Kirk Webb, **Peter Alvaro**, Mingzhe Hao,

- Huaicheng Li, H. Biral Runesha, “Fail-Slow at Scale: Evidence of Hardware Performance Faults in Large Production Systems”, *Proceedings of the 16th USENIX Conference on File and Storage Technologies (FAST 2018)*, Oakland, CA (USENIX), February 2018.
- C16. Kamala Ramasubramanian<sup>‡</sup>, Kathryn Dahlgren<sup>‡</sup>, Asha Karim<sup>‡</sup>, Sanjana Maiya\*, Sarah Borland\*, **Peter Alvaro**, “Growing a Protocol”, *Proceedings of the 9th USENIX Workshop on Hot Topics in Cloud Computing (HotCloud 2017)*, Santa Clara, CA (USENIX), July 2017.
- C15. Noah Watkins\*, Michael A. Sevilla\*, Ivo Jimenez\*, Kathryn Dahlgren<sup>‡</sup>, **Peter Alvaro**, Shel Finkelstein, Carlos Maltzahn, “DeclStore: Layering is for the Faint of Heart”, *Proceedings of the 9th USENIX Workshop on Hot Topics in Storage and File Systems (HotStorage 2017)*, Santa Clara, CA (USENIX), July 2017.
- C14. Michael A. Sevilla\*, Noah Watkins\*, Ivo Jimenez\*, **Peter Alvaro**, Shel Finkelstein, Jeff LeFevre, Carlos Maltzahn, “Malacology: A Programmable Storage System”, *Proceedings of the 12th European conference on Computer systems (Eurosys 2017)*, Belgrade, Serbia, April, 2017.
- C13. **Peter Alvaro**, Kolton Andrus, Chris Sanden, Casey Rosenthal, Ali Basiri, Lorin Hochstein, “Automating Failure Testing Research at Internet Scale”, *Proceedings of the 7th Annual Symposium on Cloud Computing (SoCC 2016)*, Santa Clara, CA: ACM, October, 2016.
- C12. **Peter Alvaro**, Joshua Rosen, and Joseph M Hellerstein, “Lineage-driven fault injection”, *Proceedings of the 2015 ACM SIGMOD International Conference on Management of Data (SIGMOD 2015)*, Melbourne, Victoria, Australia: ACM, May 2015.
- C11. **Peter Alvaro**, Neil Conway, Joseph M. Hellerstein, and David Maier, “Blazes: Coordination analysis for distributed programs”, *Proceedings of the 30th International Conference on Data Engineering (ICDE 2014)*, Chicago, IL: IEEE, April 2014.
- C10. **Peter Alvaro**, Peter Bailis, Neil Conway, and Joseph M Hellerstein, “Consistency without borders”, *Proceedings of the 4th Annual Symposium on Cloud Computing (SoCC 2013)*, Santa Clara, CA: ACM, October, 2013.
- C9. Neil Conway, William R Marczak, **Peter Alvaro**, Joseph M Hellerstein, and David Maier, “Logic and lattices for distributed programming”, *Proceedings of the 3rd Annual Symposium on Cloud Computing (SoCC 2012)*, San Jose, CA: ACM, October, 2012.
- C8. **Peter Alvaro**, Tom J. Ameloot, Joseph M. Hellerstein, William R Marczak, and Jan Van den Bussche, “A declarative semantics for Dedalus”, *Proceedings of the Second international conference on Datalog in Academia and Industry (Datalog2.0 2012)*, Vienna, Austria, September 2012.
- C7. William R Marczak, **Peter Alvaro**, Neil Conway, Joseph M Hellerstein, and David Maier, “Confluence analysis for distributed programs: A model-theoretic approach”, *Proceedings of the Second international conference on Datalog in Academia and Industry (Datalog2.0 2012)*, Vienna, Austria, September 2012.
- C6. **Peter Alvaro**, Andrew Hutchinson, Neil Conway, William R Marczak, and Joseph M Hellerstein, “BloomUnit: Declarative testing for distributed programs”, *Proceedings of the Fifth International Workshop on Testing Database Systems (DBTest 2012)*, Scottsdale, AZ: ACM, May 2012.
- C5. **Peter Alvaro**, Neil Conway, Joe Hellerstein, and William R Marczak, “Consistency Analysis in Bloom: a CALM and Collected Approach”, *Proceedings of the 5th Biennial Conference on Innovative Data Systems Research (CIDR 2011)*, Asilomar, CA, January, 2011.
- C4. Haryadi S Gunawi, Thanh Do, Pallavi Joshi, **Peter Alvaro**, Joseph M Hellerstein, Andrea C Arpaci-Dusseau, Remzi H Arpaci-Dusseau, Koushik Sen, and Dhruba Borthakur, “FATE and DESTINI: a framework for cloud recovery testing”, *Proceedings of the 8th USENIX Symposium on Networked Systems Design and Implementation (NSDI 2011)*, Boston, MA: USENIX, April 2011.
- C3. **Peter Alvaro**, Tyson Condie, Neil Conway, Khaled Elmeleegy, Joseph M Hellerstein, and Russell Sears, “Boom analytics: exploring data-centric, declarative programming for the cloud”, *Proceedings of the 5th European conference on Computer systems (Eurosys 2010)*,
- C2. Tyson Condie, Neil Conway, **Peter Alvaro**, Joseph M Hellerstein, Khaled Elmeleegy, and Russell Sears, “MapReduce online”, *Proceedings of the 7th USENIX Symposium on Networked Systems Design and Implementation (NSDI 2010)*, San Jose, CA: USENIX, April 2010.
- C1. **Peter Alvaro**, William R Marczak, Neil Conway, Joseph M Hellerstein, David Maier, and Russell Sears, “Dedalus: Datalog in time and space”, *Proceedings of the First international Conference on Datalog Reloaded (Datalog 2010)*, Oxford, England, September 2010.

## Technical Reports

- C1. Noah Watkins, Michael Sevilla, Ivo Jimenez, Neha Ojha, **Peter Alvaro**, Carlos Maltzahn, “Brados: Declarative, Programmable Object Storage”, Technical Report UCSC-SOE-16-12, December 2016.

## Invited Papers

- C1. **Peter Alvaro** “OK, but why? Tracing and debugging distributed systems”, *Research for Practice, ACM Queue*, January 2018.

## SOFTWARE

- SW2. LDFI: Lineage-driven fault injection simulator.  
 SW1. BUD: The Bloom disorderly programming language, implemented as a ruby DSL.

## PROFESSIONAL ACTIVITIES

### Conference Organization

- 2019 **Core Program Committee:** ACM SIGMOD 2019  
 2018 **Program Committee:** ACM SIGMOD 2018  
           ACM SoCC 2018  
**External Reviewer:** USENIX FAST 2018  
**Poster co-Chair:** ACM SoCC 2018  
 2017 **Program Committee:** ACM SIGMOD 2017  
           ACM SoCC 2017  
           O’Reilly Velocity 2017  
           DBPL 2017  
           FADS 2017  
**Session Chair:** ACM SoCC 2017  
 2016 **Program co-Chair:** Workshop on Principles and Practice of Consistency for Distributed Data (PaPoC) 2016.  
**Program Committee:** ACM SIGMOD 2016  
           PVLDB 2016  
           PMLDC 2016  
**Travel Award Selection Committee co-Chair:** ACM SIGMOD 2016  
 2015 **Program Committee:** PaPoC 2015

### Membership in Professional Associations

- 2015-present Member, Association for Computing Machinery.  
 2016-present Member, USENIX.

### Talks

- 2018 “3 things I wish I knew when I started designing languages”, QCon, San Francisco, November 2018.  
 “The Future of Observability”, o11ycon, San Francisco, CA, August 2018.  
 “Does your fault-tolerant distributed system tolerate faults?”, Data Consistency in Distributed Systems: Algorithms, Programs, and Databases, Schloss Dagstuhl, Germany, February 2018.  
 “Does your fault-tolerant distributed system tolerate faults?”, eBay, San Jose, CA, January 2018.  
 2017 “The Twilight of the Experts”, HPTS 2017, Asilomar, CA, October 2017.  
 “The Twilight of the Experts”, Chaos Community Day, San Francisco, CA, September 2017.  
 “Orchestrating Chaos”, Apple, Sunnyvale, CA, June 2017.  
**Keynote:** “Orchestrated Chaos (with a prelude of myths and an appendix of dreams)”, O’Reilly Velocity, San Jose, CA, June 2017.

- “Does your fault-tolerant data management system tolerate faults?” Norcal DB Day, San Francisco, CA, April 2017.
- “Orchestrating Chaos”, Erlang Factory, San Francisco, CA, March 2017.
- “Orchestrating Chaos”, Facebook Developer Infrastructure Tech Talk Series, Menlo Park, CA, March 2017.
- “GeneralStore: Declarative Programmable Storage”, CIDR 2017, Santa Cruz, CA, January 2017.
- 2016 **Keynote:** “Orchestrated Chaos”, Reactive Summit 2016.
- Keynote:** “Monkeys in Lab Coats: Applying Failure Testing Research @Netflix”, QCon London 2016.
- “Cause, that’s why”, Papers We Love, San Francisco, CA, December 2016.
- “Applying Database Research in the Wild”, Stanford University DAWN Seminar, Stanford, CA, November 2016.
- “Applying Database Research in the Wild”, UC Berkeley Database Seminar, Berkeley, CA, November 2016.
- “Applying Failure Testing Research @Netflix”, QCon San Francisco, San Francisco, CA, November 2016.
- “Orchestrated Chaos”, Chaos Community Day, Amazon, Seattle, WA, August 2016.
- “Lineage-driven Fault Injection”, VMWare Research Group Chat, VMWare, Palo Alto, CA, August 2016.
- “Databases are dead: long live databases!”, Norcal DB Day, Google, Inc. Mountain View, CA May, 2016.
- 2015 **Keynote:** “I see what you mean”, Strange Loop 2015, Saint Louis, MO, September, 2015.
- “Lineage-driven fault injection”, ACM SIGMOD 2015, Melbourne, Victoria, Australia, June, 2015.
- “Lineage-driven fault injection”, Pivotal, Palo Alto, CA, November, 2015.
- “Lineage-driven fault injection”, Arista Networks, San Francisco, CA, November, 2015.
- 2014 **Keynote:** “Outwards from the middle of the maze”, RICON 2014, Las Vegas, NV.
- “Blazes: coordination analysis for distributed programs”, ICDE 2014, Chicago, IL, April, 2014.
- “Ineluctable modality of the distributed”, Papers We Love SF, San Francisco, CA, August, 2014.
- 2013 “Consistency without borders”, ACM SoCC 2013, Santa Clara, CA, October, 2013.
- “Bloom and CALM: Programming the Cloud”, Norcal DB Day 2013, Stanford, CA, April, 2013.
- “Disorderly Distributed Programming with Dedalus and Bloom”, UCLA Programming Language Seminar, March, 2013.
- Panelist, *Think Distributed* Panel, Ricon 2012, San Francisco, CA, December, 2013.
- 2012 “BloomUnit: Declarative testing for distributed programs”, ACM DBTest 2012, Scottsdale, AZ, May 2012.
- “Bloom: disorderly programming for a distributed world”, lang.next, Microsoft, Inc., Redmond, WA, April, 2012.
- 2011 “Bloom: disorderly programming. CALM analysis”, Ask.com, Oakland, CA, March, 2011.
- “Bloom: CALMly building skyscrapers on quicksand”, Twitter, Inc., San Francisco, CA, January 2011.
- 2010 “Show and Tell: Building a consistent, replicated shopping cart in bloom”, TDS Research Group, MIT, Cambridge, MA, November 2010.
- “I Do Declare: Consensus in a Logic Language”, OSQ Retreat, Santa Cruz, CA, May 2010.
- 2009 “I Do Declare”, NetDB 2009, Big Sky, MT, October 2009.
- “BOOM: Data-Centric Programming For The Data Center”, Infolunch, Stanford University, Stanford, CA, April 2009.

## UNIVERSITY SERVICE

### School Service

2018–19 BSOE Council on Diversity, Equity and Inclusion.

## Departmental Service

2018–19	Diversity Liason, Computer Science Dept. Faculty Search Committee.
2018–19	Computer Science Dept. Faculty Search Committee.
2017–18	Chair, Computer Science Dept. Faculty Search Subcommittee (Distributed Systems)
2017–18	Computer Science Dept. Faculty Search Committee.
2017	Curriculum development: <i>Computer Systems Fundamentals</i>
2016–17	Computer Science Dept. Faculty Search Committee.
2015–16	Computer Science Dept. Graduate Admission Committee.

## MENTORING AND STUDENT ADVISING

### Doctoral Students

Dates	Relationship	Degree Year	Name and Activities
2015 Fall - Present	Primary Supervisor		Kamala Ramasubramanian
2016 Fall - Present	Primary Supervisor		Tuan Tran
2016 Fall - 2018 Spring	Primary Supervisor		Kathryn Dahlgren
2018 Fall - Present	Primary Supervisor		Aldrin Montana
2018 Fall	Other Advisor	2016	Daniel Bittman <b>Member:</b> Qualifying Examination Committee
2018 Fall	Other Advisor	2018	Dustin Rhodes <b>Member:</b> Dissertation Committee
2018 Fall	Other Advisor	2018	Noah Watkins <b>Member:</b> Dissertation Committee
2018 Spring	Other Advisor	2018	Michael Sevilla <b>Member:</b> Dissertation Committee
2016 Fall	Other Advisor	2016	Richard Halpert <b>Member:</b> Dissertation Committee
2016 Fall	Other Advisor	2016	Kun Qian <b>Member:</b> Dissertation Committee
2016 Spring	Other Advisor	2016	Dustin Rhodes <b>Member:</b> Qualifying Examination Committee
2016 Spring	Other Advisor	2016	Christine Strong <b>Member:</b> Dissertation Committee

**Masters Students**

<b>Dates</b>	<b>Relationship</b>	<b>Degree Year</b>	<b>Name and Activities</b>
2018 Spring	Other Advisor		Austen Barker <b>Member:</b> Masters Project Committee
2018 Spring	Other Advisor		James Byron <b>Member:</b> Masters Thesis Committee
2017 Fall - 2018 Spring	Primary Supervisor	2018	Lennart Oldenburg
2018 Spring	Other Advisor		Devashish Purendare <b>Member:</b> Masters Project Committee
2018 Spring	Other Advisor		Kenneth Chang <b>Member:</b> Masters Project Committee
2018 Spring	Other Advisor		Oceane Bell <b>Member:</b> Masters Project Committee
2018 Winter	Other Advisor	2018	Umang Sardesai <b>Chair:</b> Masters Project Committee
2016 Fall - 2017 Fall	Primary Supervisor	2017	Ashutosh Raina
2017 Fall	Other Advisor		Zheyuan Chen <b>Member:</b> Masters Project Committee
2017 Fall	Other Advisor	2017	Haiyu Yang <b>Member:</b> Masters Project Committee
2017 Fall	Other Advisor	2017	Bettie Jea <b>Member:</b> Masters Project Committee
2017 Fall	Other Advisor	2018	Pinglei Guo <b>Chair:</b> Masters Project Committee
2017 Fall	Other Advisor	2017	Nikhil Kini <b>Member:</b> Masters Project Committee
2017 Winter	Other Advisor	2016	Neha Ojha <b>Member:</b> Masters Project Committee
2017 Winter	Other Advisor	2016	Greeshma Swaminathan <b>Member:</b> Masters Project Committee
2016 Fall	Masters Project Supervisor	2016	Sanjana Maiya <b>Chair:</b> Masters Project Committee
2017 Winter	Other Advisor	2017	Trivikram Bollempalli <b>Member:</b> Masters Project Committee
2016 Fall	Other Advisor	2017	Abishek Grover <b>Member:</b> Masters Thesis Committee
2016 Spring	Other Advisor		Kathryn Dahlgren <b>Member:</b> Masters Thesis Committee

**Undergraduate Students**

<b>Dates</b>	<b>Relationship</b>	<b>Degree Year</b>	<b>Name and Activities</b>
2017 Winter-2017 Fall	Primary Supervisor	2017	Asha Karim

## COURSES TAUGHT

Courses in bold italics are those for which I either developed or significantly revised the curriculum.

### Undergraduate

Winter 2018 CMPS 128: Distributed Systems  
Fall 2017 CMPS 128: Distributed Systems  
Winter 2017 CMPS 128: Distributed Systems  
Spring 2016 ***CMPS 128: Distributed Systems***  
Spring 2013 CS 194-017: Programming the Cloud (UC Berkeley)  
Spring 2011 ***CS 194-017: Programming the Cloud*** (UC Berkeley)

### Graduate

Spring 2018 CMPS 232: Graduate Distributed Systems  
Fall 2016 ***CMPS 232: Graduate Distributed Systems***  
Winter 2015 ***CMPS 290S: Advanced Topics in Computer Systems: Distributed Storage Systems and Programming Models***