Caroline Lemieux

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Education

University of California, Berkeley *2016-2021*
Ph.D. in Computer Science
Dissertation: Expanding the Reach of Fuzz Testing
Degree Conferred May 14 2021
Advisor: Koushik Sen

University of British Columbia *2012-2016*
B.Sc. in Combined Honours Computer Science and Mathematics
Graduated with highest standing in Faculty of Science (Governor General's Silver Medal)

Employment

Assistant Professor, University of British Columbia *2022-Present*
Department of Computer Science, Starting July 2022

Postdoc Researcher, Microsoft Research *2021-2022*
Worked on projects at the intersection of PL/SE and ML at the NYC lab.

Graduate Student Researcher *2016-2021*
Worked with Koushik Sen at UC Berkeley, on fuzz testing and program synthesis.

Graduate Student Instructor *2019*
For CS164, intro to compilers, taught by Koushik Sen. Ran discussion section and office hours. Created discussion worksheets. Created and graded exam material.

Graduate Student Instructor *2019*
For CS61A, Berkeley's introductory computer science course, taught by Dan Garcia. Ran two discussions for regular CS61A material, as well as an extra lecture series.

Google Software Engineering Intern *2018*
Hosted by Stefan Bucur, built a static analysis tool to automatically generate fuzz targets.

Micorosft Research Intern *2017*
Worked in the CloudBuild team on automated detection of build error anomalies.

Research Assistant (Volunteer, USRA) *2014-2016*
Worked with Ivan Beschastnikh at UBC on specification mining tools.

Undergraduate Academic Assistant *2013-2014*
With Gregor Kiczales at UBC – edited video lectures and online TA for Coursera.

Undergraduate Teaching Assistant *2013*
In-class TA for CPSC 110 (UBC's introductory CS course) taught by Meghan Allen.

Publications

I have published full papers at **ICSE**, **OOPSLA**, **ISSTA**, **ASE**, and **ESEC/FSE Industry Track**.

Refereed Conference Publications

[1] pdf
Neil Kulkarni*, Caroline Lemieux*, Koushik Sen. *Learning Highly Recursive Input Grammars.* In Proceedings of the 36th International Conference on Automated Software Engineering (ASE), November 2021.

[2] pdf
Rohan Bavishi, Caroline Lemieux, Koushik Sen, Ion Stoica. *Gauss: Program Synthesis by Reasoning over Graphs.* In PACMPL, Volume 5, Issue OOPSLA, October 2021.

[3] pdf
Sameer Reddy, Caroline Lemieux, Rohan Padhye, Koushik Sen. *Quickly Generating Diverse Valid Test Inputs with Reinforcement Learning.* In Proceedings of the 42nd International Conference on Software Engineering, July 2020.

[4] pdf
Rohan Bavishi, Caroline Lemieux, Roy Fox, Koushik Sen, Ion Stoica. *AutoPandas: Neural-Backed Generators for Program Synthesis.* In PACMPL, Volume 3, Issue OOPSLA, October 2019.

[5] pdf
Rohan Padhye, Caroline Lemieux, Koushik Sen, Laurent Simon, Hayawardh Vijayakumar. *FuzzFactory: Domain-Specific Fuzzing with Waypoints.* In PACMPL, Volume 3, Issue OOPSLA, October 2019.

[6] pdf
Domagoj Babic, Stefan Bucur, Yaohui Chen, Franjo Ivancic, Tim King, Markus Kusano, Caroline Lemieux, László Szekeres, Wei Wang. *FUDGE: Fuzz Driver Generation at Scale.* In Proceedings of the 2019 27th ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering, August 2019. Industry Track. **Best Paper Award, Industry Track**

[7] pdf
Rohan Padhye, Caroline Lemieux, Koushik Sen, Mike Papadakis, Yves Le Traon. *Semantic Fuzzing with Zest.* In Proceedings of the 28th International Symposium on Software Testing and Analysis, July 2019. **Distinguished Artifact Award**.

[8] pdf
Caroline Lemieux, Koushik Sen. *FairFuzz: A Targeted Mutation Strategy for Increasing Greybox Fuzz Testing Coverage.* In Proceedings of the 33rd International Conference on Automated Software Engineering (ASE), September 2018.

[9] pdf
Caroline Lemieux, Rohan Padhye, Koushik Sen, Dawn Song. *PerfFuzz: Automatically Generating Pathological Inputs.* In Proceedings of the 27th International Symposium on Software Testing and Analysis, July 2018. **Distinguished Paper Award.**

[10] pdf
Caroline Lemieux, Dennis Park, Ivan Beschastnikh. *General LTL Specification Mining.* In Proceedings of the 30th International Conference on Automated Software Engineering (ASE), November 2015.

Refereed Short Papers/Workshop Publications

[11] pdf
Rohan Padhye, Caroline Lemieux, Koushik Sen. *JQF: Coverage-Guided Property-Based Testing in Java.* In Proceedings of the 28th International Symposium on Software Testing and Analysis, July 2019. Tool demo. **Best Tool Demonstration Award**.

[12] pdf
Rohan Padhye, Caroline Lemieux, Koushik Sen, Mike Papadakis, Yves Le Traon. *Validity Fuzzing and Parametric Generators for Effective Random Testing.* In Proceedings of the 41st International Conference on Software Engineering (ICSE), May 2019. (Posters Track).

[13] pdf
Rohan Bavishi, Caroline Lemieux, Neel Kant, Roy Fox, Koushik Sen, Ion Stoica. *Inference of API Functions from Input-Output Examples.* In Workshop on ML for Systems at NeurIPS 2018, December 2018.

[14] pdf — Caroline Lemieux, Ivan Beschastnikh. *Investigating Program Behavior Using the Texada LTL Specifications Miner.* In Proceedings of the 30th International Conference on Automated Software Engineering (ASE), November 2015. (Tool Demonstration Track)

[15] pdf — Caroline Lemieux. *Mining Temporal Properties of Data Invariants.* In Proceedings of the 37th International Conference on Software Engineering (ICSE), May 2015. (ACM SRC Research Abstract; **won 1st place in Undergraduate Category**)

Invited Talks

Expanding the Reach of Fuzz Testing *Apr 2022*
Galois Tech Talk.

Towards Learning Input Structures *Feb 2022*
Future of Software Seminar, ETH Zurich

Expanding the Reach of Fuzz Testing *Oct 2021*
Boston University.

Expanding the Reach of Fuzzing *Sep 2020*
at FuzzCon Europe.

Quickly Generating Diverse Valid Test Inputs with Reinforcement Learning *May 2020*
at ISCA workshop on ML for Computer Architecture and Systems.

Expanding the Reach of Fuzzing *Mar 2020*
at Tutte Institute for Mathematics and Computing.

Quickly Generating Diverse Valid Test Inputs with Reinforcement Learning *Feb 2020*
at Google Brain.

Expanding the Reach of Fuzzing *Jan 2020*
at Facebook.

Expanding the Reach of Fuzzing *Dec 2019*
at Bay Area Fuzzing Meetup 2.

Expanding the Reach of Fuzz Testing: From Syntax Errors to Program Synthesis *Nov 2019*
at University of Massachusetts Amherst Rising Stars Lecture Series.

A View of Programming Languages and Software Engineering for ML Software *Oct 2019*
at Workshop on AI Systems at SOSP'19.

Expanding the Reach of Fuzz Testing *Nov 2018*
at CISPA Helmholtz Center for Information Security.

DifFuzz: Making Greybox Fuzzing Incremental *Nov 2018*
at Facebook Testing and Verification Symposium.

Service

Reviewer, IEEE TSE (Transactions on Software Engineering) *2022*
1 paper reviewed

ASE 2022 Review Process Co-Chair *2022*

ESEC/FSE 2022 Diversity & Inclusion and Hybridization Co-Chair *2022*

FUZZING'22 Program Committee *2022*
2 papers reviewed

ISSTA 2022 Program Committee *2022*
13 papers reviewed

PLDI 2022 Program Committee *2021-2022*
12 papers reviewed

Reviewer, ACM TOSEM (Transactions on Software Engineering and Methodology) *2021*
3 papers reviewed

Reviewer, IEEE TSE (Transactions on Software Engineering) *2021*
1 paper reviewed

ISSTA 2021 Tool Demonstrations Program Committee *2021*

NeurIPS 2020 Workshop on Computer-Assisted Programming Program Committee *2020*

ASPLOS 2021 External Review Committee *2020*
2 papers reviewd

OOPSLA 2020 Artifact Evaluation Committee *2020*
Distinguished Artifact Reviewer Award

Reviewer, IEEE Software *2020*
1 paper reviewed

ESEC/FSE 2020 Tool Demos Program Committee *2020*

ICST 2020 Posters Program Committee *2020*

Reviewer, IEEE TSE (Transactions on Software Engineering) *2019*
2 papers reviewed

Reviewer, Software: Testing, Verification and Reliability *2019*
1 paper reviewed

TAP 2019 (International Conference on Tests and Proofs) Program Committee *2019*

Student Review Commitee, UC Berkeley EECS PhD Admissions *2018*

ICSE 2019 Demonstrations Program Committee *2018*

ICSE 2018 Poster Session Program Committee *2018*

Subreviewer: PLDI'17, ASPLOS'18, PLDI'18, CAV'18, ICST'20, ICST'21 *2016-2020*

Organization & Outreach

Berkeley Programming Systems Seminar/Social Hour Organizer *2020-2021*
Coordinating student presentations for weekly seminar series. Bootstrapped virtual social hour to increase engagement in research group for first-year graduate students.

Berkeley Programming Systems Virtual Visit Days Organizer *2020*
Organized *virtual* days activities for admitted students, on short notice. Coordinated faculty talk format. Organized 1-1s for each admitted student with 3-4 existing graduate students. Heard from several admitted students that it was the best organized virtual visit days.

Treasurer, Berkeley Women in Computer Science and Electrical Engineering *2018-2019*
Treasurer functions included applying for funding, coordinating with industry sponsors, organizing the budget and handling reimbursement. Helped organize Berkeley-Stanford research and mentorship meetup.

Berkeley Programming Systems Visit Days Organizer *2018*
Organized visit day activities for admitted students, including choosing social activities, coordinating talks, and helping coordinate catering.

Social Chair, Berkeley Women in Computer Science and Electrical Engineering *2017-2018*
Social chair functions included organizing the first-year grad mentoring program, the EECS-wide grad student holiday party and WICSE brunch for prospective students at visit days.

Awards and Scholarships

International

Google PhD Fellowship in Programming Technology and Software Engineering **2019**
Finalist, CRA Outstanding Undergraduate Researcher Award **2016**
1st Place Undergraduate, ACM Student Research Competition at ICSE 2015 **2015**
Honorable Mention, CRA Outstanding Undergraduate Researcher Award **2015**

National

NSERC CGS D (declined) **2016**
NSERC Undergraduate Student Research Award (supervisor: Ivan Beschastnikh) **2014, 2015**

Institutional - UCB

Demetri Angelakos Memorial Achievement Award **2019**
Berkeley Fellowship for Graduate Study **2016**
EECS Excellence Award **2016**

Institutional - UBC

Governor General's Silver Medal (best in the graduating class for the B.Sc. degree) **2016**
Markus Meister Memorial Prize in Computer Science **2016**
G C Webber Memorial Prize **2016**
Daniel Buchanan Scholarship in Mathematics (highest standing in Honours Math) **2015**

Natural Languages

French (Fluent), English (Fluent), Spanish (Basic)