

# Caroline Lemieux

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## Education

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### University of California, Berkeley

2016–Present (expected 2021)

Ph.D. in Computer Science

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)

## Publications

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

### Refereed Conference Publications

- [1] [pdf](#) Sameer Reddy, [Caroline Lemieux](#), Rohan Padhye, Koushik Sen. *Quickly Generating Diverse Valid Test Inputs with Reinforcement Learning*. In Proceedings of the 42<sup>nd</sup> International Conference on Software Engineering, July 2020.
- [2] [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.
- [3] [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.
- [4] [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**
- [5] [pdf](#) Rohan Padhye, [Caroline Lemieux](#), Koushik Sen, Mike Papadakis, Yves Le Traon. *Semantic Fuzzing with Zest*. In Proceedings of the 28<sup>th</sup> International Symposium on Software Testing and Analysis, July 2019. **Distinguished Artifact Award.**
- [6] [pdf](#) [Caroline Lemieux](#), Koushik Sen. *FairFuzz: A Targeted Mutation Strategy for Increasing Greybox Fuzz Testing Coverage*. In Proceedings of the 33<sup>rd</sup> International Conference on Automated Software Engineering (ASE), September 2018.
- [7] [pdf](#) [Caroline Lemieux](#), Rohan Padhye, Koushik Sen, Dawn Song. *PerfFuzz: Automatically Generating Pathological Inputs*. In Proceedings of the 27<sup>th</sup> International Symposium on Software Testing and Analysis, July 2018. **Distinguished Paper Award.**
- [8] [pdf](#) [Caroline Lemieux](#), Dennis Park, Ivan Beschastnikh. *General LTL Specification Mining*. In Proceedings of the 30<sup>th</sup> International Conference on Automated Software Engineering (ASE), November 2015.

## Refereed Short Papers/Workshop Publications

- [9] [pdf](#) Rohan Padhye, [Caroline Lemieux](#), Koushik Sen. *JQF: Coverage-Guided Property-Based Testing in Java*. In Proceedings of the 28<sup>th</sup> International Symposium on Software Testing and Analysis, July 2019. Tool demo. **Best Tool Demonstration Award**.
- [10] [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 41<sup>st</sup> International Conference on Software Engineering (ICSE), May 2019. (Posters Track).
- [11] [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.
- [12] [pdf](#) [Caroline Lemieux](#), Ivan Beschastnikh. *Investigating Program Behavior Using the Texada LTL Specifications Miner*. In Proceedings of the 30<sup>th</sup> International Conference on Automated Software Engineering (ASE), November 2015. (Tool Demonstration Track)
- [13] [pdf](#) [Caroline Lemieux](#). *Mining Temporal Properties of Data Invariants*. In Proceedings of the 37<sup>th</sup> International Conference on Software Engineering (ICSE), May 2015. (ACM SRC Research Abstract; **won 1<sup>st</sup> place in Undergraduate Category**)

## Invited Talks

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| <b>Expanding the Reach of Fuzzing</b><br>at FuzzCon Europe.  | <i>Sep 2020</i> |
| <b>Quickly Generating Diverse Valid Test Inputs with Reinforcement Learning</b><br>at ISCA workshop on ML for Computer Architecture and Systems.           | <i>May 2020</i> |
| <b>Expanding the Reach of Fuzzing</b><br>at Tutte Institute for Mathematics and Computing.   | <i>Mar 2020</i> |
| <b>Quickly Generating Diverse Valid Test Inputs with Reinforcement Learning</b><br>at Google Brain.  | <i>Feb 2020</i> |
| <b>Expanding the Reach of Fuzzing</b><br>at Facebook.  | <i>Jan 2020</i> |
| <b>Expanding the Reach of Fuzzing</b><br>at Bay Area Fuzzing Meetup 2.   | <i>Dec 2019</i> |
| <b>Expanding the Reach of Fuzz Testing: From Syntax Errors to Program Synthesis</b><br>at University of Massachusetts Amherst Rising Stars Lecture Series. | <i>Nov 2019</i> |
| <b>A View of Programming Languages and Software Engineering for ML Software</b><br>at Workshop on AI Systems at SOSP'19.                                   | <i>Oct 2019</i> |
| <b>Expanding the Reach of Fuzz Testing</b><br>at CISA Helmholtz Center for Information Security.   | <i>Nov 2018</i> |
| <b>DiffFuzz: Making Greybox Fuzzing Incremental</b><br>at Facebook Testing and Verification Symposium.   | <i>Nov 2018</i> |

## Grant Writing Contributions

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All grants had Koushik Sen as PI/Co-PI.

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| <b>Facebook: DiffFuzz: Making Greybox Fuzzing Incremental</b>  | 2018 |
| <b>NSF: Machine Learning for Effective Fuzz Testing</b>        | 2017 |
| <b>NSF: Input Content-Aware Effective Greybox Fuzz Testing</b> | 2017 |

## Service

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| <b>NeurIPS 2020 Workshop on Computer-Assisted Programming Program Committee</b>  | 2020      |
| <b>ASPLOS 2021 External Review Committee</b>                                     | 2020      |
| <b>OOPSLA 2020 Artifact Evaluation Committee</b>                                 | 2020      |
| Distinguished Artifact Reviewer Award  |           |
| <b>Reviewer, IEEE Software</b>   | 2020      |
| <b>ESEC/FSE 2020 Tool Demos Program Committee</b>                                | 2020      |
| <b>ICST 2020 Posters Program Committee</b>                                       | 2020      |
| <b>Reviewer, Transactions on Software Engineering</b>                            | 2019      |
| <b>Reviewer, Software: Testing, Verification and Reliability</b>                 | 2019      |
| <b>TAP 2019 (International Conference on Tests and Proofs) Program Committee</b> | 2019      |
| <b>Student Review Committee, UC Berkeley EECS PhD Admissions</b>                 | 2018      |
| <b>ICSE 2019 Demonstrations Program Committee</b>                                | 2018      |
| <b>ICSE 2018 Poster Session Program Committee</b>                                | 2018      |
| <b>Subreviewer: PLDI 2017, ASPLOS 2018, PLDI 2018, CAV 2018, ICST 2020</b>       | 2016-2019 |

## Experience

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| <b>Graduate Student Researcher</b>  | 2016-Present |
| Working with Koushik Sen at UC Berkeley, on fuzz testing and program synthesis.   |              |
| <b>Graduate Student Instructor</b>  | 2019         |
| For CS164, intro to compilers, taught by Koushik Sen. Ran discussion section and office hours. Created discussion worksheets. Created and graded exam material.       |              |
| <b>Graduate Student Instructor</b>  | 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. |              |
| <b>Google Software Engineering Intern</b>   | 2018         |
| Hosted by Stefan Bucur, built a static analysis tool to automatically generate fuzz targets.  |              |
| <b>Micorosft Research Intern</b>  | 2017         |
| Worked in the CloudBuild team on automated detection of build error anomalies.  |              |
| <b>Research Assistant (Volunteer, USRA)</b>   | 2014-2016    |
| Worked with Ivan Beschastnikh at UBC on specification mining tools.   |              |
| <b>Undergraduate Academic Assistant</b>   | 2013-2014    |
| With Gregor Kiczales at UBC – edited video lectures and online TA for Coursera.   |              |
| <b>Undergraduate Teaching Assistant</b>   | 2013         |
| In-class TA for CPSC 110 (UBC's introductory CS course) taught by Meghan Allen.   |              |

## Organization & Outreach

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**Berkeley Programming Systems Seminar/Social Hour Organizer** 2020-Present  
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

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### International

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

### National

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

### Institutional - UCB

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

### Institutional - UBC

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|---|------|
| 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

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