# Saswat PADHI

## Senior SWE, Google LLC

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Interested in building reliable secure systems with strong correctness & performance guarantees.

## Employment

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| **Google**<br>San Jose, CA | Senior Software Engineer<br>chromeOS Performance • chromeOS | Sep '22 — Present |

Investigating performance bottlenecks across critical user journeys on chromeOS devices.

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| **Amazon**<br>Boston, MA | Applied Scientist II<br>Automated Reasoning Group (ARG) • Amazon Web Services (AWS) | Aug '20 — Sep '22 |

Led the *inductive proofs* effort: correctness and termination for loops in C • Built and extended several compiler and verifier primitives • Delivered proofs of correctness for multiple AWS projects • Collaborated with product teams to fix discovered bugs • Mentored 3 PhD interns

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| **Microsoft**<br>Remote | Research SDE  (Part-Time Contract)<br>Research in Software Engineering (RiSE) • Microsoft Research (MSR) | Oct '17 — Aug '18 |

Designed a neural approach to identify *data frames* in Excel • Implemented a neural network (CNN) with near-human accuracy • Prototyped a data-driven *formula recognition* feature

## Education

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| **Ph. D. (UCLA)** | Computer Science  (Advisor: Prof. Todd Millstein)<br>*University of California, Los Angeles* • CA, USA | Fall '14 — Spring '20 |
| **B. Tech. (IIT-B)** | Computer Science and Engineering  (with Honors)<br>*Indian Institute of Technology, Bombay* • India | Fall '10 — Spring '14 |

## Selected Awards

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| **UCLA** | Outstanding Research in CS Award | 2020 |
| **PLDI** | ACM SIGPLAN Distinguished Paper Award | 2020 |
| **UCLA** | Dissertation-Year Fellowship | 2019 — 2020 |
| **SyGuS,FLoC** | Invariant Synthesis (Inv) Competition Winner | 2017, 2018 |
| **Microsoft Research** | PhD Fellowship | 2017 — 2019 |

## Publications

### *Journals & Conference Proceedings*

**1C** • **PLDI '20**  **Data-Driven Inference of Representation Invariants.**  📄
A Miltner, S Padhi, T Millstein, D Walker.
*41st ACM SIGPLAN Conf. on Programming Language Design and Implementation Proc., pages 1 – 15.*

**2C** • **CAV '19**  **Overfitting in Synthesis: Theory and Practice.**  📄
S Padhi, T Millstein, A Nori, R Sharma.
*31st Intl. Conf. on Computer-Aided Verification Proc., pages 315 – 334.*

**3C** • **CC '19**  **A Static Slicing Method for Functional Programs and Its Incremental Version.**  📄
P Kumar, A Sanyal, A Karkare, S Padhi.
*28th Intl. Conf. on Compiler Construction Proc., pages 53 – 64.*

**4J** • **OOPSLA '18**  **FlashProfile: A Framework for Synthesizing Data Profiles.**  📄
S Padhi, P Jain, D Perelman, O Polozov, S Gulwani, T Millstein.
*Proceedings of the ACM on Programming Languages 2 (OOPSLA), 2018, pages 150:1 – 128.*

**5C** • **PLDI '16**  **Data-Driven Precondition Inference with Learned Features.**  📄
S Padhi, R Sharma, T Millstein.
*37th ACM SIGPLAN Conf. on Programming Language Design and Implementation Proc., pages 42 – 56.*

## Workshops & Industrial Case Studies

**6 C** • NeurIPS '23 (ML4Sys) — **Predicting User Experience on Laptops from Hardware Specifications.** 📄
S Padhi, S Bhasin, U K Ammu, A Bergman, A Knies.
*NeurIPS 2023 Workshop on Machine Learning for Systems.*

**7 C** • CAV '23 — **Automated Analyses of IoT Event Monitoring Systems.** 📄
A Apicellii, S Bayless, A Das, A Gacek, D Jaganathan, S Padhi, V Sharma, M Whalen, R Yadav.
*35th Intl. Conf. on Computer-Aided Verification Proc., pages 27 − 39.*

**8 C** • NeurIPS '20 (CAP) — **OASIS: ILP-Guided Synthesis of Loop Invariants.** 📄
S Bhatia, S Padhi, N Natarajan, R Sharma, P Jain.
*NeurIPS 2020 Workshop on Computer-Assisted Programming.*

## Granted Patents

**9 G** • US 10394874 B2 — **Record Profiling for Dataset Sampling.** 🔗
D G Simmons, K D J Grealish, S Gulwani, R Kumar, K M Ellis, S Padhi.

**10 G** • US 10394874 B2 — **Syntactic Profiling of Alphanumeric Strings.** 🔗
S Gulwani, P Jain, D A Perelman, S Padhi, O Polozov.

## Work Experience

**Princeton Univ.** (Visiting PhD RA) — **Verifying Data Structure Implementations**
with *Prof. David Walker*, PL Group • Princeton, NJ — Apr '19 — Jun '19

**Microsoft** (PhD Intern) — **Mitigating Overfitting in Program Synthesis**
with *Rahul Sharma*, Systems Group • Bengaluru, India — Sep '18 — Mar '19

**Microsoft** (PhD Intern) — **Recovering Data Frames and Formulas in Spreadsheets**
with *Ben Zorn*, RiSE Group • Redmond, WA — Jun '17 — Jun '18

**Microsoft** (PhD Intern) — **Synthesizing Pattern-Based Profiles for String Datasets**
with *Sumit Gulwani*, PROSE Group • Redmond, WA — Jun '16 — Dec '16

**IIT-B** (Undergrad RA) — **Lazy Static Slicing of Functional Programs**
with *Prof. Amitabha Sanyal*, Compilers Group • Mumbai, India — Sep '13 — Apr '14

**Google** (Undergrad Intern) — **Automated Testing of Components in Omega Cluster Scheduler**
with *Smeeta Jalan*, Technical Infrastructure Team • Mountain View, CA — May '13 — Jul '13

**TU-Br** (Undergrad Intern) — **Estimating Topical Similarity of Scientific Documents**
with *Prof. Wolf-Tilo Balke*, Institut für Informationssysteme • Germany — May '12 — Jul '12

## Academic Service

**PC** — **Program Committee Member**
PLDI ⟨2021⟩, SYNT (at CAV) ⟨2021⟩, DebugML (at ICLR) ⟨2019⟩

**Reviewer** — **External Reviewer for Research Papers**
CAV ⟨2019⟩, ISEC ⟨2019⟩, PLDI ⟨2020⟩, TSE ⟨2021⟩

**AEC** — **Artifact Evaluation Committee Member**
OOPSLA ⟨2018, 2019⟩, POPL ⟨2020⟩, SAS ⟨2019⟩

**OC** — **Organizing Committee Member**
SyGuS-Comp ⟨since 2019⟩

## Teaching

**UCLA** — **Programming Languages** — Spring '16 • Fall '14
*Graduate Teaching Assistant*

**IITB** — **Abstractions and Paradigms in Programming** — Spring '14
*Undergraduate Teaching Assistant*

**IITB** — **Computer Programming and Utilization** — Fall '13 • Fall '11
*Undergraduate Teaching Assistant*