Saswat Padhi

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Research Interests

Programming Languages, Program Synthesis and Verification, Statistical Learning

Education

2014 — 2020	**Ph.D. advised by Prof. Todd Millstein**, *University of California, Los Angeles* (UCLA), CA, USA. Major: **Computer Science**
2010 — 2014	**B. Tech. with Honors**, *Indian Institute of Technology, Bombay* (IIT-B), India. Major: **Computer Science and Engineering**

Selected Awards

2020	"Outstanding Research in CS" award from UCLA (sponsored by Symantec)
2020	"ACM SIGPLAN Distinguished Paper" award at the 41st PLDI conference
2019	Travel grant to attend the 31st CAV conference
2019 — 2020	Dissertation-year fellowship from UCLA
2017, 2018	Winner of the invariant inference (`Inv`) track of Syntax-Guided Synthesis Competition (Received a FLoC Olympic Games medal at the 2018 Federated Logic Conference in UK)
2017 — 2019	PhD fellowship from Microsoft Research
2013	Winner of the Prezi "Scale" contest hosted by HackerRank
2010 — 2014	FIITJEE scholarship (for achieving national rank 43 in IIT-JEE)

Publications

Conferences and Journals

1C • **PLDI'20** **Data-Driven Inference of Representation Invariants.**
Anders Miltner, Saswat Padhi, Todd Millstein, and David Walker.

📄 *Proceedings of the 41st ACM SIGPLAN Conference on Programming Language Design and Implementation, PLDI 2020. To Appear*

Artifact https://github.com/amiltner/HanoiArtifactEvaluation

2C • **CAV'19** **Overfitting in Synthesis: Theory and Practice.**
Saswat Padhi, Todd Millstein, Aditya Nori, and Rahul Sharma.

📄 *Proceedings of the 31st International Conference on Computer-Aided Verification, CAV 2019, pages 315–334, Springer (2019).*

Artifact https://github.com/SaswatPadhi/2019_CAV_Artifact_100

3C • **CC'19** **A Static Slicing Method for Functional Programs and Its Incremental Version.**
Prasanna Kumar K., Amitabha Sanyal, Amey Karkare, and Saswat Padhi.

📄 *Proceedings of the 28th International Conference on Compiler Construction, CC 2019, pages 53–64, ACM (2019).*

4 J • **OOPSLA '18** **FlashProfile: A Framework for Synthesizing Data Profiles.**
Saswat Padhi, Prateek Jain, Daniel Perelman, Oleksandr (Alex) Polozov, Sumit Gulwani, and Todd Millstein.

📄 *Proceedings of the ACM on Programming Languages 2 (OOPSLA), 2018*, pages 150:1–128.

Artifact https://github.com/SaswatPadhi/FlashProfileDemo

5 C • **PLDI '16** **Data-Driven Precondition Inference with Learned Features.**
Saswat Padhi, Rahul Sharma, and Todd Millstein.

📄 *Proceedings of the 37th ACM SIGPLAN Conference on Programming Language Design and Implementation, PLDI 2016*, pages 42–56, ACM (2016).

Artifact https://github.com/SaswatPadhi/LoopInvGen

Technical Reports and Preprints

6 T • **In Preparation** **Oasis: ILP-Guided Synthesis of Loop Invariants.**
Sahil Bhatia, Saswat Padhi, Nagarajan Natarajan, Rahul Sharma, and Prateek Jain.

7 T • **Under Review** **Neuro-Symbolic Table Detection for Spreadsheet Analyses.**
Saswat Padhi, Dany Rouhana, Pallavi Choudhury, Tim Burrell, Dave DeBarr, Rishabh Singh, Oleksandr Polozov, and Ben Zorn.

Patents Grants and Applications

8 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.

9 A • US 20180121525 A1 **Syntactic Profiling of Alphanumeric Strings.**
🔗 S Gulwani, P Jain, D A Perelman, S Padhi, O Polozov.

10 A • US 20200019603 A1 **Systems, Methods, and Computer-Readable Media for Improved Table Identification Using a Neural Network.**
🔗 B Zorn, M M J Brockschmidt, P Choudhury, O Polozov, R Singh, S Padhi.

Research Experience

Princeton University (Visiting Student RA)	**Verifying Data Structure Implementations** with *Prof. David Walker*, PL Group · Princeton, NJ	*Apr '19 — Jun '19*
Microsoft (Intern)	**Mitigating Overfitting in Program Synthesis** with *Rahul Sharma*, Systems Group · Bengaluru, India	*Sep '18 — Mar '19*
Microsoft (Intern, Remote RSDE)	**Recovering Data Frames and Formulas in Spreadsheets** with *Ben Zorn*, RiSE Group · Redmond, WA	*Jun '17 — Jun '18*
Microsoft (Intern)	**Synthesizing Pattern-Based Profiles for String Datasets** with *Sumit Gulwani*, PROSE Group · Redmond, WA	*Jun '16 — Dec '16*
UCLA (Graduate RA)	**Automated Synthesis of Specifications and Invariants** with *Prof. Todd Millstein*, PL and SE Lab · Los Angeles, CA	*Sep '14 — Jun '20*
IIT Bombay (Undergraduate RA)	**Lazy Static Slicing of Functional Programs** with *Prof. Amitabha Sanyal*, Compilers Group · Mumbai, India	*Sep '13 — Apr '14*
TU Braunschweig (Intern)	**Estimating Topical Similarity of Scientific Documents** with *Prof. Wolf-Tilo Balke*, Institut für Informationssysteme · Germany	*May '12 — Jul '12*

Professional Experience

Google (Intern)	**Automated Testing of Components in Omega Cluster Scheduler** with *Smeeta Jalan*, Technical Infrastructure Team · Mountain View, CA	*May '13 — Jul '13*
PC	**Program Committee Member** PLDI ⟨2021⟩, DebugML Workshop (at ICLR) ⟨2019⟩	
Reviewer	**External Reviewer for Research Papers** PLDI ⟨2020⟩, CAV ⟨2019⟩, ISEC ⟨2019⟩	
AEC	**Artifact Evaluation Committee Member** POPL ⟨2020⟩, OOPSLA ⟨2019, 2018⟩, SAS ⟨2019⟩	
OC	**Organizing Committee Member** SyGuS-Comp ⟨since 2019⟩	

Talks and Presentations

Overfitting in Program Synthesis

Jul '19	The 2019 CAV Conference	*New York City, NY*

Synthesizing Pattern-Based Data Profiles

Dec '16	Microsoft Research	*Redmond, WA*
Oct '18	Microsoft Research	*Bengaluru, India*
Nov '18	The 2018 ACM SIGPLAN SPLASH (OOPSLA) Conference	*Boston, MA*

Data-Driven Precondition Inference

Dec '15	The 15th SoCalPLS Workshop	*Pomona, CA*
May '16	University of California at Berkeley	*Berkeley, CA*
May '16	Stanford University	*Stanford, CA*
Jun '16	The 2016 ACM SIGPLAN PLDI Conference	*Santa Barbara, CA*
Jan '17	Microsoft Research	*Bengaluru, India*

Teaching Experience

UCLA	**Programming Languages** *Graduate Teaching Assistant*	*Spring '16 · Fall '14*
IIT Bombay	**Abstractions and Paradigms in Programming** *Undergraduate Teaching Assistant*	*Spring '14*
IIT Bombay	**Computer Programming and Utilization** *Undergraduate Teaching Assistant*	*Fall '13 · Fall '11*

Mentoring Experience

Microsoft	Sahil Bhatia *Research fellow* at Microsoft Research, India	*Winter '19 — Summer '19*
UCLA	Brett Chalabian Graduate student (MS in CS) at UCLA	*Fall '17 — Winter '19*
UCLA	Zhouheng (Jeffrey) Sun Undergraduate student (CS) at UCLA	*Fall '17 — Winter '19*
UCLA	Adam Stein Undergraduate student (CS) at UCLA	*Fall '19 — Spring '20*