# Stefan Muller

#### $\bigcirc$ smuller | $\bigoplus$ http://cs.iit.edu/~smuller/ | $\checkmark$ smuller2@iit.edu

# Work Experience

Aug. 2020–present	Gladwin Development Chair Assistant Professor
	Illinois Institute of Technology
O + 0010 I 1 0000	

Oct 2018–Jul 2020 **Post-Doctoral Researcher** Carnegie Mellon University Supervisor: Jan Hoffmann

#### EDUCATION

2012–2018 PhD in Computer Science Carnegie Mellon University Thesis: Responsive Parallel Computation Advisor: Umut A. Acar Thesis Committee: Guy Blelloch, Mor Harchol-Balter, Robert Harper, John Reppy (University of Chicago), Vijay Saraswat (Fidelity Investments)
2012–2015 MS in Computer Science Carnegie Mellon University

2008–2012 AB summa cum laude in Computer Science Harvard University Senior Thesis: SX10: A Language for Parallel Programming with Information Security Advisor: Stephen Chong

### PUBLICATIONS

#### Journal and Peer-reviewed Conference Papers

- [POPL '24b] Jatin Arora, **Stefan K. Muller**, and Umut A. Acar. "Disentanglement with Futures, State, and Interaction". In: *Proc. ACM Program. Lang.* 8.POPL (Jan. 2024).
- [POPL '24a] Francis Rinaldi, june wunder, Arthur Azevedo de Amorim, and Stefan K. Muller. "Pipelines and Beyond: Graph Types for ADTs with Futures". In: Proc. ACM Program. Lang. 8.POPL (Jan. 2024).
- [PPoPP '24] **Stefan K. Muller**. "Language-Agnostic Static Deadlock Detection for Futures". In: *ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming*. PPoPP 2024. 2024.
  - [TOPC] **Stefan K. Muller** and Jan Hoffmann. "Modeling and Analyzing Evaluation Cost of CUDA Kernels". In: *ACM Trans. Parallel Comput.* 11.1 (Mar. 2024).
  - [PLDI '23] Stefan K. Muller, Kyle Singer, Devyn Terra Keeney, Andrew Neth, Kunal Agrawal, I-Ting Angelina Lee, and Umut A. Acar. "Responsive Parallelism with Synchronization". In: Proc. ACM Program. Lang. 7.PLDI (June 2023).
- [POPL '22] **Stefan K. Muller**. "Static Prediction of Parallel Computation Graphs". In: *Proc. ACM Program. Lang.* 6.POPL (Jan. 2022).
- [POPL '21] **Stefan K. Muller** and Jan Hoffmann. "Modeling and Analyzing Evaluation Cost of CUDA Kernels". In: *Proc. ACM Program. Lang.* 5.POPL (Jan. 2021).

- [PLDI '20] Stefan K. Muller, Kyle Singer, Noah Goldstein, Umut A. Acar, Kunal Agrawal, and I-Ting Angelina Lee. "Responsive Parallelism with Futures and State". In: Proceedings of the 41st ACM SIGPLAN Conference on Programming Language Design and Implementation. PLDI 2020. London, UK: Association for Computing Machinery, 2020, pp. 577– 591.
- [SPAA '20] Kyle Singer, Noah Goldstein, Stefan K. Muller, Kunal Agrawal, I-Ting Angelina Lee, and Umut A. Acar. "Priority Scheduling for Interactive Applications". In: Proceedings of the 32nd ACM Symposium on Parallelism in Algorithms and Architectures. SPAA '20. Virtual Event, USA: Association for Computing Machinery, 2020, pp. 465–477.
- [ICFP '19] Stefan K. Muller, Sam Westrick, and Umut A. Acar. "Fairness in Responsive Parallelism". In: Proc. ACM Program. Lang. 3.ICFP (July 2019).
- [ICFP '18] Stefan K. Muller, Umut A. Acar, and Robert Harper. "Competitive Parallelism: Getting Your Priorities Right". In: Proc. ACM Program. Lang. 2.ICFP (July 2018).
- [PLDI '17] Stefan K. Muller, Umut A. Acar, and Robert Harper. "Responsive Parallel Computation: Bridging Competitive and Cooperative Threading". In: Proceedings of the 38th ACM SIGPLAN Conference on Programming Language Design and Implementation. PLDI 2017. Barcelona, Spain: Association for Computing Machinery, 2017, pp. 677–692.
- [SPAA '16] Stefan K. Muller and Umut A. Acar. "Latency-Hiding Work Stealing: Scheduling Interacting Parallel Computations with Work Stealing". In: Proceedings of the 28th ACM Symposium on Parallelism in Algorithms and Architectures. SPAA '16. Pacific Grove, California, USA: Association for Computing Machinery, 2016, pp. 71–82.
- [ICFP '16] Ram Raghunathan, Stefan K. Muller, Umut A. Acar, and Guy Blelloch. "Hierarchical Memory Management for Parallel Programs". In: Proceedings of the 21st ACM SIG-PLAN International Conference on Functional Programming. ICFP 2016. Nara, Japan: Association for Computing Machinery, 2016, pp. 392–406.
- [SNAPL '15] Umut A. Acar, Guy Blelloch, Matthew Fluet, Stefan K. Muller, and Ram Raghunathan. "Coupling Memory and Computation for Locality Management". In: 1st Summit on Advances in Programming Languages (SNAPL 2015). Ed. by Thomas Ball, Rastislav Bodik, Shriram Krishnamurthi, Benjamin S. Lerner, and Greg Morrisett. Vol. 32. Leibniz International Proceedings in Informatics (LIPIcs). Dagstuhl, Germany: Schloss Dagstuhl– Leibniz-Zentrum fuer Informatik, 2015, pp. 1–14.
- [OOPSLA '12] Stefan Muller and Stephen Chong. "Towards a Practical Secure Concurrent Language". In: Proceedings of the ACM International Conference on Object Oriented Programming Systems Languages and Applications. OOPSLA '12. Tucson, Arizona, USA: Association for Computing Machinery, 2012, pp. 57–74.

#### Workshop Papers and Technical Reports

- [1] Mark Lou and **Stefan K. Muller**. "Automatic Static Analysis-Guided Optimization of CUDA Kernels". In: *The 15th International Workshop on Programming Models and Applications for Multicores and Manycores*. PMAM '24. 2024.
- [2] Stefan K. Muller. "Static Prediction of Parallel Computation Graphs (Abstract)". In: Proceedings of the 2023 ACM Workshop on Highlights of Parallel Computing. HOPC '23. Orlando, FL, USA: Association for Computing Machinery, 2023, pp. 21–22.

- [3] Stefan K. Muller and Hannah Ringler. "A Rhetorical Framework for Programming Language Evaluation". In: Proceedings of the 2020 ACM SIGPLAN International Symposium on New Ideas, New Paradigms, and Reflections on Programming and Software. Onward! 2020. Virtual, USA: Association for Computing Machinery, 2020, pp. 187–194.
- [4] **Stefan K. Muller**. "Responsive Parallel Computation". Available as CMU Technical Report CMU-CS-18-120. PhD thesis. Carnegie Mellon University, 2018.
- [5] Stefan K. Muller and Umut A. Acar. "Coupling Memory and Computation for Locality Management (Extended Abstract)". In: 1st Summit on Advances in Programming Languages (SNAPL 2015). Ed. by Thomas Ball, Rastislav Bodik, Shriram Krishnamurthi, Benjamin S. Lerner, and Greg Morrisett. Vol. 32. Leibniz International Proceedings in Informatics (LIPIcs). Dagstuhl, Germany: Schloss Dagstuhl-Leibniz-Zentrum fuer Informatik, 2015.
- [6] Stefan K. Muller, William A. Duff, and Umut A. Acar. Practical Abstractions for Concurrent Interactive Programs. Tech. rep. CMU-CS-15-131. Carnegie Mellon University, 2015.
- [7] Stefan K. Muller, William A. Duff, and Umut A. Acar. Practical and Safe Abstractions for Interactive Computation via Linearity. Tech. rep. CMU-CS-15-130. Carnegie Mellon University, 2015.
- [8] Umut Acar, Arthur Charguéraud, Stefan Muller, and Mike Rainey. Atomic Read-Modify-Write Operations are Unnecessary for Shared-Memory Work Stealing. Tech. rep. hal-00910130. Inria, 2013.

#### FUNDING

 Collaborative Research: SHF: Medium: Responsive Parallelism for Interactive Applications: Theory and Practice with Umut Acar (Carnegie Mellon, PI), I-Ting Angelina Li (Wash. U. St. Louis, co-PI), and Kunal Agrawal (Wash. U. St. Louis, PI) July 2021–June 2025 Source: National Science Foundation Award Number: 2107289 Role: PI Amount: \$1,079,764 Amount at Illinois Tech: \$262,890

 Collaborative Research: REU Site: BigDataX: From theory to practice in Big Data computing at eXtreme scales with Ioan Raicu (PI), Kyle Hale (co-PI), Zhiling Lan (Mentor), Kyle Chard (U Chicago, PI), Kate Keahey (U Chicago, Mentor) July 2022–June 2025 Source: National Science Foundation Award Number: 2150500 Role: Mentor Amount: \$404,437 Amount at Illinois Tech: \$362,878

### Prior

- Collaborative Research: PPoSS: Planning: SEEr: A Scalable, Energy Efficient HPC Environment for AI-Enabled Science with Zhiling Lan (Lead PI), Romit Maulik (co-PI), Valerie Taylor (U Chicago, PI), Xingfu Wu (U Chicago, co-PI), and Mike Papka (Northern. Ill. U, PI) Oct. 2021–Sep. 2023 Source: National Science Foundation Award Number: 2119294 Role: Co-PI Amount: \$250,000 Amount at Illinois Tech: \$150,000
- SHF: Small: Automatic Qualitative and Quantitative Verification of CUDA Code with Jan Hoffmann (Carnegie Mellon, Lead PI) Oct. 2020–Sep. 2024
   Source: National Science Foundation (Subcontract from Carnegie Mellon) Award Number: 2007784
   Role: Subcontractor Amount: \$500,000
   Amount at Illinois Tech: \$159,235

# INVITED TALKS

"Priodomainslib: Prioritized Fine-grained Parallelism for Multicore OCaml"

OCaml Users and Developers Workshop Sep. 2024

"Static Prediction of Parallel Computation Graphs"

Carnegie Mellon University	Nov.	2023
McGill University	Mar.	2023
Northwestern University	Sep.	2022

"Making Parallelism Abstractions More Practical"

New Jersey Institute of Technology	Feb. 2020
Northwestern University	Feb. 2020
Illinois Institute of Technology	Feb. 2020
Worcester Polytechnic Institute	Feb. 2020
University of Rhode Island	Feb. 2020
Simon Fraser University	Feb. 2020

"Cost Models for Parallel Programs"

Northwestern University	Nov.	2019
Washington University in St. Louis	Sep.	2018
Harvard University	Mar.	2018
Carnegie Mellon University	Feb.	2018

# Illinois Institute of Technology

CS440	Programming Languages and Translators	Sp21, Sp23
CS443	Compiler Construction*	Fa22, Fa24
CS534	Types and Programming Languages <sup>*</sup>	Sp24
CS536	Science of Programming	Sp22, Fa23
CS595	Topics and Applications in Programming Languages (Seminar)*	Fa21
CS695	Doctoral Seminar	Sp23

# Carnegie Mellon University

15 - 150	Principles of Functional Programming	Su18
----------	--------------------------------------	------

\* indicates substantial new course development

# Students Advised

### Current

2024 -	Alex Friedman	PhD
2024 -	Godha Pallavi Bhogadi	MS (with Farzaneh Derakhshan)
2023-	Marelle León	BS

### Former

2023-2024	Edman Alicea-Marrero	BS	
2023	Puya Pakshad	PhD	
2023 - 2024	Anusha Sonte Parameshwar	MS	now at Apple
2023 - 2024	Baoshu Feng	Visiting researcher	
2022 - 2024	Francis Rinaldi	BS	now PhD student at UPenn
	3rd place, Student Research	n Competition (undergrad divis	sion), ICFP 2022
	Honorable Mention, CRA	Outstanding Undergraduate Re	esearcher Award
	Illinois Tech College of Co	mputing Excellence in Underga	raduate Research Award
2023	Isa Muradli	MS	
2023	Pranjal Naik	MCS	
2023	My Dinh	BS	Now at Bloomberg
2023	Mark Lou	BS	Now at American Express
2022	Aman Luqman	BS	Now at physIQ
2022	Xiangwei (Shawn) Li	MS	Now at IGT
2021	Deepika Padmanabhan	MCS	Now at Amazon

# Thesis Committee

2024	Brian Richard Tauro (Advisor: Kyle Hale)	PhD
2024	Jamison Kerney (Advisors: Ioan Raicu, Kyle Hale)	MS
2023	Boyang Li (Advisor: Zhiling Lan)	PhD
2023	Hannah Greenblatt (Advisor: Zhiling Lan)	MS
2022	Yao Kang (Advisor: Zhiling Lan)	PhD
2022	Poornima Nookala (Advisor: Ioan Raicu)	PhD

# DEPARTMENT AND UNIVERSITY SERVICE

2024–present	Co-chair, CS PhD Experience and Recruitment Committee
2024–present	Faculty Search Committee
2023-2024	CS Graduate Studies Committee
2023-2024	CS PhD Experience and Recruitment Committee
2023-2024	CS Strategic and Actionable Planning Committee
2022 - 2023	CS Dept. Chair Search Committee
2022 - 2023	Roundtable discussion leader for Camras Scholarship Admissions event
2022	Co-organizer, faculty research talks for students
2021	College of Computing Strategic Working Group (Research)
2021	CS Department <i>ad hoc</i> committee on diversity in hiring
2021 - 2023	Faculty Search Committee
2020-2021	CS Undergraduate Studies Committee

# PROFESSIONAL SERVICE

2024	Co-organizer, Midwest PL Summit	MWPLS '24
2023-24	Co-chair, PL Mentoring Workshop	ICFP '23, '24
2023	Program Committee Member	POPL '24
2023	Panelist	NSF
2022	Program Committee Member	IPDPS '23
2022	Panelist	NSF
2021	Program Committee Member	PPoPP '22
2021	External Review Committee	OOPSLA '21
2021	Program Committee Member	ICFP '21
2020	External Review Committee	ICFP '20
2019	Artifact Evaluation Committee	POPL '20