

# Stefan Muller

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## WORK EXPERIENCE

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- Aug. 2020–present **Gladwin Development Chair Assistant Professor**  
Illinois Institute of Technology
- Oct 2018–Jul 2020 **Post-Doctoral Researcher**  
Carnegie Mellon University  
Supervisor: Jan Hoffmann

## EDUCATION

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- 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

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### Peer-reviewed Conference Papers

- [POPL '24a] Jatin Arora, **Stefan K. Muller**, and Umut A. Acar. “Disentanglement with Futures, State, and Interaction”. In: *Proc. ACM Program. Lang.* 8.POPL (2024). To Appear.
- [POPL '24b] 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 (2024). To Appear.
- [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. To Appear. 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 Implemen-*

tation. 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 SIGPLAN 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] **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.
- [2] **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.
- [3] **Stefan K. Muller**. “Responsive Parallel Computation”. Available as CMU Technical Report CMU-CS-18-120. PhD thesis. Carnegie Mellon University, 2018.

- [4] **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.
- [5] **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.
- [6] **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.
- [7] 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.

## AWARDS AND HONORS

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2014	NSF Graduate Research Fellowship	Honorable Mention
2013	NSF Graduate Research Fellowship	Honorable Mention
2014	CRA Outstanding Undergraduate Researcher	Honorable Mention
2011	Harvard University Certificate of Distinction in Teaching	
2008	Intel (now Regeneron) Science Talent Search	Finalist

## FUNDING

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1. 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
  
2. 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
  
3. 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

1. 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

## INVITED TALKS

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### “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

# TEACHING

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## Illinois Institute of Technology

CS440	Programming Languages and Translators	Sp21, Sp23
CS443	Compiler Construction*	Fa22
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
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\* indicates substantial new course development

# STUDENTS ADVISED

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## Current

2023–	Marelle León		BS
2023–	Edman Alicea-Marrero		BS
2023–	Puya Pakshad	PhD (with Farzaneh Derakhshan)	
2023–	Anusha Sontе Parameshwar		MS
2023–	Baoshu Feng		visiting researcher
2022–	Francis Rinaldi	BS 2022; now visiting researcher	
	<i>3rd place, Student Research Competition (undergrad division), ICFP 2022</i>		
	<i>Honorable Mention, CRA Outstanding Undergraduate Researcher Award</i>		
	<i>Illinois Tech College of Computing Excellence in Undergraduate Research Award</i>		

## Former

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

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

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2023–present	CS Graduate Studies Committee
2023–present	CS PhD Experience and Recruitment Committee
2023–present	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

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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