

SOURADIP GHOSH

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EDUCATION

Carnegie Mellon University

Ph.D in Computer Science

Advisors: Brandon Lucia and Nathan Beckmann

Pittsburgh, PA

Aug '21 – Present

Northwestern University

B.A. in Computer Science

Advisors: Peter Dinda and Simone Campanoni

Evanston, IL

Sep '17 – Jun '21

HONORS AND AWARDS

Department of Energy Computational Science Graduate Fellowship (DOE CSGF)

Sep '21 – Present

NSF REU Fellowship, Northwestern University

Jun '19 – Aug '21

Outstanding Senior in CS, Weinberg School of Arts and Sciences

Jun '21

Outstanding Undergraduate Researcher – Honorable Mention, CRA

Dec '20

PUBLICATIONS

1. **Ripple: Asynchronous Programming for Spatial Dataflow Architectures** PLDI '25
Souradip Ghosh, Yufei Shi, Brandon Lucia, Nathan Beckmann.
2. **NUPEA: Optimizing Critical Loads on Spatial Dataflow Architectures via Non-Uniform Processing-Element Access** ISCA '25
Souradip Ghosh, Graham Gobieski, Tom Jackson, Keyi Zhang, Brandon Lucia, Nathan Beckmann, Tony Nowatzki.
3. **The TYR Dataflow Architecture: Improving Locality by Taming Parallelism** MICRO '24
Nikhil Agarwal, Mitchell Fream, **Souradip Ghosh**, Brian C. Schwedock, Nathan Beckmann.
4. **UDIR: Towards a Unified Compiler Framework for Reconfigurable Dataflow Architectures** CAL '24
Nikhil Agarwal, Mitchell Fream, **Souradip Ghosh**, Brian C. Schwedock, Nathan Beckmann.
5. **Pipestitch: An Energy-Minimal Dataflow Architecture With Lightweight Threads** MICRO '23
Nathan Serafin, **Souradip Ghosh**, Harsh Desai, Nathan Beckmann, Brandon Lucia.
6. **UDIR: Towards a Unified Compiler Framework for Reconfigurable Dataflow Architectures** WDDSA '23
Nikhil Agarwal, Mitchell Fream, **Souradip Ghosh**, Brian C. Schwedock, Nathan Beckmann.
7. **RipTide: A Programmable, Energy-Minimal Dataflow Compiler and Architecture** MICRO '22
Graham Gobieski, **Souradip Ghosh**, Marijn Heule, Todd C. Mowry, Tony Nowatzki, Nathan Beckmann, Brandon Lucia.
8. **FPVM: Towards a Floating Point Virtual Machine** HPDC '22
Peter Dinda, Nick Wanning, Jiacheng Ma, Alex Bernat, Charles Bernat, **Souradip Ghosh**, Christopher Kraemer, Yehya Elmasry.

9. **WARio: Efficient Code Generation for Intermittent Computing** PLDI '22
Vito Kortbeek, **Souradip Ghosh**, Josiah Hester, Simone Campanoni, Przemysław Pawełczak.
10. **CARAT CAKE: Replacing Paging via Compiler/Kernel Cooperation** ASPLOS '22
Brian Suchy, **Souradip Ghosh**, Drew Kersnar, Siyuan Chai, Zhen Huang, Aaron Nelson, Michael Cuevas, Gaurav Chaudhary, Alex Bernat, Nikos Hardavellas, Simone Campanoni, Peter Dinda.
11. **NOELLE Offers Empowering LLVM Extensions** CGO '22
Angelo Matni, Enrico Armenio Deiana, Yian Su, Lukas Gross, **Souradip Ghosh**, Sotiris Apostolakis, Ziyang Xu, Zujun Tan, Ishita Chaturvedi, Brian Homerding, Tommy McMichen, David I. August, Simone Campanoni.
12. **Compiler-Based Timing For Extremely Fine-Grain Preemptive Parallelism** SC '20
Souradip Ghosh, Michael Cuevas, Simone Campanoni, Peter Dinda.
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TALKS AND POSTERS

1. **Ripple: Asynchronous Programming for Spatial Dataflow Architectures**
DOE CSGF Program Review, July '24. Washington, D.C.
 2. **Ripple: Asynchronous Programming for Energy-Minimal Edge Devices**
DOE CSGF Program Review, July '23. Washington, D.C.
 3. **RipTide: A Programmable, Energy-Minimal Dataflow Compiler and Architecture**
SRC Artificial Intelligence and Hardware Annual Review, August '22. San Diego, CA.
 4. **RipTide: A Programmable, Energy-Minimal Dataflow Compiler and Architecture**
DOE CSGF Program Review, July '22. Arlington, VA.
 5. **Compiler-Based Timing For Extremely Fine-Grain Preemptive Parallelism**
SC, November '20. Virtual.
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PROFESSIONAL EXPERIENCE

Graduate Research Assistant

Computer Science Department, Carnegie Mellon University

Aug '21 – Present
Pittsburgh, PA

- *Topic*: Post-von Neumann computer architectures.
- Designing and implementing spatial dataflow architectures and dataflow programming languages.

Research Intern

Efficient Computer Company

May '24 – Present
Pittsburgh, PA

- Architecting highly energy-efficient and general-purpose dataflow processors.

Visiting Researcher

Pacific Northwest National Lab (PNNL)

Jun '23 – Sep '23
Richland, WA

- Extended the SODA-OPT compiler and HLS toolchains for sparse tensor algebra workloads.
- Supervised by Antonino Tumeo.

Undergraduate Researcher

Department of Computer Science, Northwestern University

Jun '19 – Aug '21
Evanston, IL

- Built optimizing compilers co-designed with operating systems and embedded devices.
- Contributed to the Interweaving Project, Nautilus, Noelle, TimeSqueezer, and more.

Lead Software Developer, IT Manager

Karen Lynn + Associates Inc.

Nov '18 – Sep '21
Evanston, IL

Programming Aide

Office of Graduate Studies, Department of Computer Science, Northwestern University

Mar '21 – Jun '21
Evanston, IL

Front-End Web Developer

Lurie Medical Research Center

Mar '19 – Sep '19
Chicago, IL

Technical Computing Aide

IT Department, Kellogg School of Management, Northwestern University

Mar '19 – Jun '19
Evanston, IL

TEACHING EXPERIENCE

Graduate Teaching Assistant

Department of Computer Science, Carnegie Mellon University

Fall '24
Pittsburgh, PA

- 15-749 – Post-Von Neumann Computer Architectures

Student Instructor

Department of Computer Science, Northwestern University

Winter '21
Evanston, IL

- Student-led course – “Crash Course on UNIX and Systems Tools”

Peer Mentor

Department of Computer Science, Northwestern University

Jan '20 – Present
Evanston, IL

- CS 322 – Compiler Construction, Winter '21
- CS 323 – Code Analysis and Transformation, Fall '20
- CS 343 – Operating Systems, Winter '20

Academic Mentor – Project Excite

School of Education, Northwestern University / Evanston Township High School

Oct '17 – Jun '19
Evanston, IL

Private Tutor

Greater Chicago and St. Louis Area

Jun '16 – Present