SOURADIP GHOSH

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EDUCATION

Carnegie Mellon University   Pittsburgh, PA

Ph.D in Computer Science   Aug '21 – Present

Advisors: Brandon Lucia and Nathan Beckmann

Northwestern University   Evanston, IL

B.A. in Computer Science   Sep '17 – Jun '21

Advisors: Peter Dinda and Simone Campanoni

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. **UDIR: Towards a Unified Compiler Framework for Reconfigurable Dataflow Architectures**   CAL '24
   Nikhil Agarwal, Mitchel Fream, **Souradip Ghosh,** Brian C. Schwedock, Nathan Beckmann.

2. **Pipestitch: An Energy-Minimal Dataflow Architecture With Lightweight Threads**   MICRO '23
   Nathan Serafin, **Souradip Ghosh,** Harsh Desai, Nathan Beckmann, Brandon Lucia.

3. **UDIR: Towards a Unified Compiler Framework for Reconfigurable Dataflow Architectures**   WDDSA '23
   Nikhil Agarwal, Mitchel Fream, **Souradip Ghosh,** Brian C. Schwedock, Nathan Beckmann.

4. **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.

5. **FPVM: Towards a Floating Point Virtual Machine**   HPDC '22
   Peter Dinda, Nick Wanninger, Jiacheng Ma, Alex Bernat, Charles Bernat, **Souradip Ghosh,**
   Christopher Kraemer, Yehya Elmasry.

6. **WARio: Efficient Code Generation for Intermittent Computing**   PLDI '22
   Vito Kortbeek, **Souradip Ghosh,** Josiah Hester, Simone Campanoni, Przemysław Pawełczak.

7. **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.

8. **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.

9. Compiler-Based Timing For Extremely Fine-Grain Preemptive Parallelism SC '20
   Souradip Ghosh, Michael Cuevas, Simone Campanoni, Peter Dinda.

TALKS AND POSTERS

1. **Ripple: Asynchronous Programming for Energy-Minimal Edge Devices**
   DOE CSGF Program Review, July '23. Washington, D.C.

2. **RipTide: A Programmable, Energy-Minimal Dataflow Compiler and Architecture**
   SRC Artificial Intelligence and Hardware Annual Review, August '22. San Diego, CA.

3. **RipTide: A Programmable, Energy-Minimal Dataflow Compiler and Architecture**
   DOE CSGF Program Review, July '22. Arlington, VA.

4. **Compiler-Based Timing For Extremely Fine-Grain Preemptive Parallelism**
   SC, November '20. Virtual.

PROFESSIONAL EXPERIENCE

Graduate Research Assistant Aug '21 – Present
Computer Science Department, Carnegie Mellon University Pittsburgh, PA

- Researching programming models, optimizing compilers, and spatial dataflow architectures (e.g. coarse-grained reconfigurable arrays) for energy-efficient devices at the "extreme edge".

Research Intern May '24 – Present
Efficient Computer Company Pittsburgh, PA

- Building compilers for highly-energy efficient dataflow architectures.

Visiting Researcher Jun '23 – Sep '23
Pacific Northwest National Lab (PNNL) Richland, WA

- Working on the SODA-OPT framework and HLS toolchains for sparse linear algebra workloads.
- Supervised by Antonino Tumeo.

Undergraduate Researcher Jun '19 – Aug '21
Department of Computer Science, Northwestern University Evanston, IL

- Worked on 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 Nov '18 – Sep '21
Karen Lynn + Associates Inc. Evanston, IL

Programming Aide Mar '21 – Jun '21
Office of Graduate Studies, Department of Computer Science, Northwestern University Evanston, IL

Front-End Web Developer Mar '19 – Sep '19
Lurie Medical Research Center Chicago, IL

Technical Computing Aide Mar '19 – Jun '19
IT Department, Kellogg School of Management, Northwestern University Evanston, IL

TEACHING EXPERIENCE

Student Instructor   Winter '21
Department of Computer Science, Northwestern University   Evanston, IL

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

Peer Mentor   Jan '20 – Present
Department of Computer Science, Northwestern University   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   Oct '17 – Jun '19
School of Education, Northwestern University | Evanston Township High School   Evanston, IL

Private Tutor   Jun '16 – Present
Greater Chicago and St. Louis Area