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## Research Interests

My interests lie in *compilers*, specifically how we can leverage modern programming languages to design general-purpose *intermediate representations* that (1) improve the precision of *static analysis* by preserving high-level information, (2) enable novel *optimizations* on the layout and organization of memory, and (3) open the door to *compiler-runtime codesigns* that rethink existing hardware abstractions.

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## Education

<b>Northwestern University</b> , Evanston, Illinois, USA	2020 – Present
Ph.D. in Computer Science, <i>Advised by Simone Campanoni</i>	(Expected 2026)
M.Sc. in Computer Science, <i>Advised by Simone Campanoni</i>	2023
<b>Rose-Hulman Institute of Technology</b> , Terre Haute, Indiana, USA	2016–2020
B.Sc. in Computer Engineering and Computer Science	

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## Publications

**Saving Energy with Per-Variable Bitwidth Speculation**, *ASPLOS 2025*.

**Tommy McMichen\***, David Dlott\*, Panitan Wongse-Amat, Nathan Greiner, Hussain Khajanchi, Russ Joseph, and Simone Campanoni.



**Getting a Handle on Unmanaged Memory**, *ASPLOS 2024*.

Nick Wanninger, **Tommy McMichen**, Simone Campanoni, and Peter Dinda.



**Representing Data Collections in an SSA Form**, *CGO 2024*.

**Tommy McMichen**, Nathan Greiner, Peter Zhong, Federico Sossai, Atmn Patel, and Simone Campanoni.



**Program State Element Characterization**, *CGO 2023*.

Enrico A. Deiana, Brian Suchy, Michael Wilkins, Brian Homerding, **Tommy McMichen**, Katarzyna Dunajewski, Peter Dinda, Nikos Hardavellas, and Simone Campanoni



**NOELLE Offers Empowering LLVM Extensions**, *CGO 2022*.

Angelo Matni, Enrico A. Deiana, Yian Su, Lukas Gross, Souradip Ghosh, Sotiris Apostolakis, Ziyang Xu, Zujun Tan, Ishita Chaturvedi, Brian Homerding, **Tommy McMichen**, David I. August, and Simone Campanoni.



**Work-in-Progress: Fine-Grained Acceleration using Runtime Integrated Custom Execution (RICE)**, *CASES 2019*.

Leela Pakanati\*, **Tommy McMichen\***, and Zachary Estrada.

\* Equal contributors

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## Industry Experience

**Texas Instruments**, Dallas, Texas, USA

Summer 2019, Summer 2020

*Digital Design Engineering Intern, Embedded Processors, Analytics Team*

- Performed integration testing for hardware implementation of cache coherence protocol.
- Developed coverage metrics for cache coherence testing.
- Implemented automatic generation of RTL and TLM from descriptor files.

**National Instruments**, Austin, Texas, USA

Summer 2018

*R&D Software Engineering Intern, Digitizers*

- Designed and implemented FPGA logic for new function generator feature with LabVIEW.
  - Added kernel, driver and API support for new function generator feature.
  - Implemented full driver stack support for highly-customisable oscilloscope triggers.
  - Communicated with multiple teams to add new .NET API entry points.
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## Service

<b>Board Member</b> , Computer Science Social Initiative, Northwestern University.	2021 – Present
<b>Member</b> , CS Ph.D. Orientation Planning Committee, Northwestern University.	2022 – 2024
<b>Member</b> , CS Ph.D. Visit Day Planning Committee, Northwestern University.	2022 – 2024
<b>Student Volunteer</b> , MICRO.	October 2022
<b>Chairperson</b> , IEEE, Rose-Hulman Institute of Technology student branch.	Aug. 2019 – May 2020
<b>Corresponding Secretary</b> , Eta Kappa Nu (HKN), Epsilon Eta Chapter.	Aug. 2019 – May 2020
<b>Member</b> , Eta Kappa Nu (HKN), Epsilon Eta Chapter.	May 2018 – May 2020

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## Funding and Awards

NSF Student Travel Grant, <i>ASPLoS</i>	2025
NSF Student Travel Grant, <i>HPCA/PPoPP/CGO</i>	2024
NSF Student Travel Grant, <i>HPCA/PPoPP/CGO</i>	2023
IP/ROP Student Travel Award	2019
NSF Student Travel Grant, <i>ESweek</i>	2019
IP/ROP Student Project Grant	2018

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## Invited Talks

### “Representing Data Collections for Analysis and Transformation”

Computer Architecture Group Meeting, <i>University of Cambridge</i> .	March 2024
Tech Talk Series, <i>Rose-Hulman Institute of Technology</i>	October 2023
Student Seminar Series, <i>Northwestern University</i>	October 2023
Constellation Workshop, <i>Northwestern University</i>	July 2023

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## Advising

Benjamin Ye, <i>Automatically generating MEMOIR from Rust</i>	2024-Present
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