Jedidiah McClurg

Curriculum Vitæ *

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Executive Summary

o **Research:** *My research focuses on* **programming languages and synthesis/verification**, with applications in domains such as HPC, (distributed) systems, and networking, *and my overall goal is to develop tools and techniques to help programmers write better code in security- and safety-critical domains. I have (co-)authored 16 peer-reviewed papers since 2012, including conference papers at top venues like* **DAC'22**, **PACT'22**, **PACT'21**, **CAV'17**, **FMCAD'16**, **PLDI'16**, *and* **PLDI'15**. *My citation count is 400, with h-index of 10 and i10-index of 10. I received* **FMitF** *('21,'20) and* **CRII** *('19) grants from NSF totaling $1,575,000 (my portion $780,000), and an Outstanding Research Award from CU Boulder CS (2017).*

o **Teaching:** *I taught CSCI 400 Programming Languages and CSCI 598 Program Verification & Synthesis at Colorado School of Mines. At UNM, I taught CS 484/585 Computer Networking and CS 341 Computer Architecture. I have served as an undergraduate/graduate teaching assistant 8 times, and I received an Outstanding Teaching Assistant Award at CU (2013).*

o **Service:** *I served on the Program Committee (PC) for PLDI'23, ICCAD'23, PLDI'22, and CAV'20. I was an Artifact Evaluation Committee (AEC) member for CAV'20, POPL'18 and '16, reviewer for TACAS'23, TACAS'21, POPL'19, ATVA'18, ESOP'17, TACAS'16, ASE'14, CAV'14, and NSF Panelist ('23,'22,'19).*

Education

2013 – 2018	**Ph.D. Computer Science**, *University of Colorado Boulder*, Boulder, CO, USA
2011 – 2013	**M.S. Computer Science**, *Northwestern University*, Evanston, IL, USA
2004 – 2009	**B.S.E. Electrical & Computer Eng.**, *University of Iowa*, Iowa City, IA, USA

Professional Experience

Aug 2022 – present	**Assistant Professor**, *Colorado State University*, Fort Collins, CO, USA Tenure-track faculty in the Computer Science department.
Aug 2019 – Aug 2022	**Assistant Professor**, *Colorado School of Mines*, Golden, CO, USA Tenure-track faculty in the Computer Science department.
Aug 2018 – Aug 2019	**Assistant Professor**, *University of New Mexico*, Albuquerque, NM, USA Tenure-track faculty in the Computer Science department.

Mar – Jun 2014	**Research Intern**, *Microsoft Research*, Redmond, WA, USA
	Worked in RiSE group, enabling realtime collaborative code-editing in TouchDevelop.
Jun – Aug 2013	**Graduate Intern**, *Rockwell Collins*, Cedar Rapids, IA, USA
	Worked in the Advanced Technology Center building a translator from LLVM assembly code into ACL2 to facilitate reasoning about binaries.
Jan – Aug 2011	**Graduate Intern**, *Rockwell Collins*, Cedar Rapids, IA, USA
	Worked in the Advanced Technology Center developing/using verification tools.
Nov '09 – Jun '10	**Graduate Co-op**, *Rockwell Collins*, Cedar Rapids, IA, USA
	Worked in the SATCOM department developing test software for a military satellite terminal waveform and writing various scripts and documentation.
Sep – Dec 2008	**Graduate Co-op**, *Rockwell Collins*, Cedar Rapids, IA, USA
	Worked in the Panels department designing hardware/software for commercial airliner cockpit panels and designing/configuring panel test equipment.
Jun – Aug 2004	**Technical Intern**, *Rockwell Collins*, Cedar Rapids, IA, USA
	Worked in the Advanced Technology Center developing GUI frontends related to testing and benchmarking of a software-defined radio.
Jun – Aug 2002	**Technical Intern**, *aJile Systems*, Cedar Rapids, IA, USA
	Developed benchmark applications for a Java bytecode processor.

Grant Funding

Oct '21 – Sep '24	Co-PI, National Science Foundation (NSF) FMitF, "Robust Enforcement of Customizable Resource Constraints in Heterogeneous Embedded Systems"	*$250,000 ($750,000 total)*
Oct '20 – Sep '23	PI, NSF FMitF, "Game Theoretic Updates for Network and Cloud Functions"	*$355,000 ($650,000 total)*
Mar '19 – Feb '21	PI, NSF CRII: SHF, "Foundations for Stateful Network Programming"	*$175,000*
Nov '18 – May '20	PI, UNM Research Allocations Committee (RAC), "Hot-Swapping Running Systems via Program Synthesis"	*$10,000*

Awards

Sep 2017	ARCS Scholarship, ARCS Foundation Colorado	*$6,500*
Apr 2017	Outstanding Research Award, CS Dept., CU Boulder	*$600*
Apr 2014	Outstanding Teaching Assistant Award, CS Dept., CU Boulder	*$500*
Oct 2013	Research Community Development (RCD) Award, CU Boulder	*$1,850*
Aug '13 – Jul '14	Dean's Fellowship, University of Colorado Boulder	*$5,000*
Aug '13 – Jul '14	University Fellowship, University of Colorado Boulder	*$1,000*
Sep '11 – Aug '12	Walter P. Murphy Fellowship, Northwestern University	*$16,000*
Aug '04 – May '08	Presidential Scholarship, University of Iowa	*$28,000*
Aug '04 – May '08	National Merit Scholarship, University of Iowa	*$9,500*

| Aug 2004 | National Merit Scholarship, Rockwell Collins | *$2,500* |
| Aug 2004 | Engineering Excellence Scholarship, University of Iowa | *$1,000* |

Travel Grants

Jun 2017	Travel Grant, CAV Student Fellowship	*$2,021*
May 2016	Travel Grant, SIGPLAN, PLDI Conference	*$510*
Feb 2016	CS/Dean's Travel Grant, University of Colorado Boulder	*$1,300*
Apr 2015	Travel Grant, NSF, PLDI/FCRC Conference	*$1,028*
Feb 2015	CS Travel Grant, University of Colorado Boulder	*$1,000*
Sep 2012	TGS/EECS Travel Grant, Northwestern University	*$800*
May 2011	Travel Grant, NSF, Summer School on Formal Techniques at SRI	*$500*

Publications §

📄 Peer-reviewed Conference Papers

PACT '22 [16] Jedidiah McClurg, Miles Claver[†], Jackson Garner[†], Jake Vossen[†], Jordan Schmerge[†], and Mehmet Belviranli. Optimizing Regular Expressions via Rewrite-Guided Synthesis. Accept: **40 / 114 = 35%**. 2022.

DAC '22 [15] Ismet Dagli, Alexander Cieslewicz, Jedidiah McClurg, and Mehmet Belviranli. AxoNN: Energy-Aware Execution of Neural Network Inference on Multi-Accelerator Heterogeneous SoCs. Accept: **223 / 969 = 23%**. San Francisco, 2022.

SOSR '21 [14] Jedidiah McClurg. Correct-by-Construction Network Programming for Stateful Data-Planes. Accept: **12 / 37 = 32%**. Virtual, 2021.

PACT '21 [13] Daniel Mawhirter, Samuel Reinehr, Wei Han, Noah Fields, Miles Claver[†], Connor Holmes, Jedidiah McClurg, Tongping Liu, and Bo Wu. Dryadic: Flexible and Fast Graph Pattern Matching at Scale. Accept: **25 / 96 = 26%**. 2021.

CAV '17 [12] Jedidiah McClurg, Hossein Hojjat, and Pavol Černý. Synchronization Synthesis for Network Programs. Accept: **57 / 191 = 30%**. Heidelberg, Germany, 2017.

FMCAD '16 [11] Hossein Hojjat, Philipp Ruemmer, Jedidiah McClurg, Pavol Černý, and Nate Foster. Optimizing Horn Solvers for Network Repair. Accept: **23 / 64 = 36%**. Mountain View, CA, USA, 2016.

DISC '16 [10] Pavol Černý, Nate Foster, Nilesh Jagnik, and Jedidiah McClurg. Optimal Consistent Network Updates in Polynomial Time. Accept: **32 / 132 = 24%**. Paris, France, 2016.

PLDI '16 [9] Jedidiah McClurg, Hossein Hojjat, Nate Foster, and Pavol Černý. Event-Driven Network Programming. Accept: **49 / 304 = 16%**. Santa Barbara, CA, USA, 2016.

SecureComm'15 [8] Vaibhav Rastogi, Zhengyang Qu, Jedidiah McClurg, Yinzhi Cao, and Yan Chen. Uranine: Real-time Privacy Leakage Monitoring without System Modification for Android. Accept: **30 / 108 = 28%**. Dallas, TX, USA, 2015.

PLDI '15 ✓ [7] Jedidiah McClurg, Hossein Hojjat, Pavol Černý, and Nate Foster. Efficient Synthesis of Network Updates. Accept: **58 / 303 = 19%**. Portland, OR, USA, 2015.

📄 **Peer-reviewed Workshop/Demo Papers**

RSDHA '21 [6] Jordan Schmerge[†], Daniel Mawhirter, Connor Holmes, Jedidiah McClurg, and Bo Wu. ELI$\mathcal{X}$R: Eliminating Computation Redundancy in CNN-Based Video Processing. In the *1st Workshop on Redefining Scalability for Diversely Heterogeneous Architectures*. St. Louis, MO, USA, 2021.

MobileDeLi '15 [5] J. Protzenko, S. Burckhardt, M. Moskal, and Jedidiah McClurg. Implementing Real-time Collaboration in TouchDevelop using AST Merges. In the *3rd Intl. Workshop on Mobile Dev. Lifecycle*. Pittsburgh, PA, USA, 2015.

PLVNET '15 [4] Hossein Hojjat, Jedidiah McClurg, Pavol Černý, and Nate Foster. Network Updates for the Impatient: Eliminating Unnecessary Waits. In the *1st Workshop on Programming Languages and Verification Technology for Networking*. Mumbai, India, 2015.

ACL2 '14 [3] David S Hardin, Jennifer A Davis, David A Greve, and Jedidiah R McClurg. Development of a Translator from LLVM to ACL2. In the *12th International Workshop on the ACL2 Theorem Prover*. Vienna, Austria, 2014.

LAW '13 [2] Jennifer Davis, David Hardin, and Jedidiah McClurg. Creating Formally Verified Components for Layered Assurance with an LLVM-to-ACL2 Translator. In the *7th Layered Assurance Workshop*. New Orleans, LA, USA, 2013.

Sensys '12 [1] Jedidiah McClurg, Goce Trajcevski, and Jesse Yanutola. Demo Abstract: Collaborative Reactive Behavior in Heterogeneous Wireless Sensor Networks. In the *10th ACM Conf. on Embedded Net. Sensor Sys.* Toronto, Canada, 2012.

Teaching Experience

Colorado State University, Fort Collins, CO, USA

Aug '22 – present *Instructor*
Developed and taught the *CS 557 Network Verification & Synthesis* course (8 graduate students in Spring'23).

Colorado School of Mines, Golden, CO, USA

Aug '19 – Aug '22 *Instructor*
Developed and taught the *CSCI 400 Programming Languages* course (132 undergraduates in Fall'21, 111 in Fall'20, 60 in Fall'19) and the *CSCI 598 Program Verification & Synthesis* course (8 graduate students in Fall'21, 15 in Spring'20).

University of New Mexico, Albuquerque, NM, USA

Aug '18 – Aug '19 *Instructor*
Developed and taught the *CS 485/585 Computer Networking* course (12 undergraduate and 36 graduate students), also cross-listed as *ECE 440*. Worked with an undergraduate student on an object-oriented software design project (*CS 499 Undergraduate Individual Study*). Taught the *CS 341 Computer Architecture* course in Spring 2019 (19 undergraduate students). Worked with 2 graduate students on advanced computer networking projects (*CS 551 Graduate Individual Study*).

University of Colorado Boulder, Boulder, CO, USA

Aug – Dec 2013 *Graduate Teaching Assistant*
Taught discussion section, created/graded exams, and held office hours for the *CSCI 3155 Principles of Programming Languages* class.

Northwestern University, Evanston, IL, USA

Sep '12 – Mar '13 *Graduate Teaching Assistant*
Assisted with grading, office hours, etc. for *EECS 317 Data Management and Information Processing*, and *EECS 211 Fundamentals of Computer Programming II*.

University of Iowa, Iowa City, IA, USA

Jan – May 2010 *Graduate Teaching Assistant*
Provided general lab support and assisted the *055:089 EE Senior Design* class instructor with grading.

Aug '07 – May '09 *Undergraduate Teaching Assistant*, *3 semesters (Fall'07, Spring'08, Spring'09)*
Provided instruction and assistance to students in the lab, maintained/updated lab equipment, and graded lab reports and homework for the *055:032 Digital Design* (introduction to digital logic) class.

Jan – May 2007 *Undergraduate Teaching Assistant*
Hosted weekly tutorial/discussion sessions with students, graded homework, wrote exam questions, and presented exam review sessions for the *059:006 Engineering Problem Solving II* (introduction to C programming) class.

Advising/Mentoring

o **M.S. Thesis Advisor**: Ronaldo Canizales (Fulbright Scholar), Lauren (Zoe) Baker (NSF GRFP), Dilochan Karki

o **M.S. Project Advisor**: Jake Vossen (Mines '22, first employment: Apple), Jackson Garner (Mines '21, first employment: Salesforce)

o **M.S. Thesis Committee Member**: Noah Fields, Justin McGowen, Kevin Spevak

o **Ph.D. Thesis Committee Member**: Corentin Ferry, Eric Enos, Sirui (Alex) Qi, Zhang Liu (CU '21, first employment: Google), Geoffrey Alexander (UNM '19, first employment: Sandia National Labs)

o **Ph.D. Proposal Committee Member**: William Stout (UNM '19, first employment: Sandia National Labs)

- ○ **Ph.D. Qualifier Committee Member**: Akshit Sharma, Qingzao Zhu, Sihui Li, Xiangyu Li, Ruchen Wen
- ○ **Undergraduate Research Internship Advisor**: Christopher Muller, Miles Claver (first position: HP)
- ○ **Research Practicum Advisor**: David Collins (UNM '18, first employment: Sandia National Labs)
- ○ **Informal M.S. Research Advisor**: Nilesh Jagnik (CU '16, first employment: Google)
- ○ **CS Major Advisor at Mines**: ∼20 undergraduate students and ∼5 graduate students per semester

Talks

● *Program Synthesis to the Rescue!*

Aug 29, 2022	Colorado State University	*Fort Collins, CO, USA*

● *Scalable Synthesis for Software/Hardware Systems*

Feb 28, 2022	Colorado State University	*Fort Collins, CO, USA*

● *Correct-by-Construction Netw. Programming for Stateful Data-Planes*

Oct 11, 2021	SOSR 2021	*Virtual*

● *Program Synthesis for Software-Defined Networking*

Mar 14, 2019	Colorado State University	*Fort Collins, CO, USA*
Feb 12, 2019	University of Vermont	*Burlington, VT, USA*
Jan 31, 2019	Colorado School of Mines	*Golden, CO, USA*
Jul 13, 2018	CU Boulder, CUPLV Group	*Boulder, CO, USA*
Feb 28, 2018	University of New Mexico, CS Dept. Colloquium	*Albuquerque, NM, USA*
Feb 2, 2018	Amherst College	*Amherst, MA, USA*
Jan 18, 2018	Carleton College	*Northfield, MN, USA*

● *Synchronization Synthesis for Network Programs*

Jul 27, 2017	CAV 2017	*Heidelberg, Germany*
Jun 30, 2017	CU Boulder, CUPLV Group	*Boulder, CO, USA*

● *Event-Driven Network Programming*

Jun 16, 2016	PLDI 2016	*Santa Barbara, CA, USA*
May 27, 2016	CU Boulder, CUPLV Group	*Boulder, CO, USA*

● *Efficient Synthesis of Network Updates*

Jun 16, 2015	PLDI 2015	*Portland, OR, USA*
Jun 5, 2015	CU Boulder, CUPLV Group	*Boulder, CO, USA*
Mar 6, 2015	(with Pavol Černý) CU Boulder, NGN Group	*Boulder, CO, USA*

● *AST-based Collaborative Editing*

June 25, 2014	Microsoft Research, RiSE Group	*Redmond, WA, USA*
	● *Reasoning About LLVM Assembly Code via .LL-to-ACL2 Translation*	
Aug 8, 2013	Rockwell Collins, Advanced Technology Center	*Cedar Rapids, IA, USA*
	● *Virtual Machine Support for Parallel Language Runtimes*	
May 30, 2012	Northwestern EECS 441 Class Final Presentation	*Evanston, IL, USA*
	● *Detecting Android Privacy Leaks via Dynamic Taint Analysis*	
May 28, 2012	(with J. Friedman and W. Ng) Northwestern EECS 450	*Evanston, IL, USA*
	● *Industrial Verification Using the KIND Model Checker*	
Jun 14, 2011	(with Lucas Wagner) AFRL S5 Symposium	*Dayton, OH, USA*

Academic Service

- **Program Committee (PC) Co-Chair**: RSDHA'22
- **Web Co-Chair**: PLDI'24, PLDI'23
- **PC Member**: PLDI'23, ICCAD'23, FSEN'23, SOSR'22, ICCAD'22, PLDI'22, SOSR'21, RSDHA'21, CAV'20
- **Artifact Eval. Committee (AEC) Member**: CAV'20, POPL'18, POPL'16
- **Conference Reviewer**: TACAS'23, TASE'22, TACAS'21, POPL'19, ATVA'18, ESOP'17, TACAS'16, CAV'14, ASE'14
- **Journal Reviewer**: ACM Trans. on Arch. and Code Opt. (TACO) '23, Science of Computer Programming (SciCo) '22, IEEE Trans. on Reliability (TR) '22, IEEE Trans. on Networking (ToN) '21, SciCo '21, IEEE Trans. on Software Engineering (TSE) '19, ToN '17
- **Panelist**: NSF (2023, 2022, 2019)

Unversity/Departmental Service

- Graduate Recruiting Committee (GRC) Member, CSU, 2022-present
- Linux Users Group (LUG) Faculty Advisor, Mines, 2021
- Graduate Committee Member, Mines, 2021-2022
- Curriculum Committee Member, Mines, 2020-2021
- Undergraduate Committee Member, Mines, 2019-2020

Skills

desktop environments	Ubuntu (Linux), Solaris, Windows, Cygwin
embedded platforms	Android, SunSPOT, TelosB, Microchip, Freescale
programming langs.	OCaml, Scala, Java, C, C++, Rust, Python, SML, Racket, Perl
formal verification	Z3, Yices, SPIN, NuSMV, MiniSat, ACL2, HOL, Lustre, Alloy
compiler construction	Xtext, OCamlLex/Yacc, LLVM, X86

hardware design	VHDL, Verilog, Xilinx, PSpice, I^{2}C, SPI, SD/MMC, USB
networking	nesC, TinyOS, Sockets, TCP/IP, ZigBee (802.15)
web development	PHP, MySQL, HTML, CSS, JavaScript, Apache, JSP, Tomcat
mathematical tools	Mathematica, MATLAB, LaTeX, Gnuplot

Miscellaneous

memberships	Association for Computing Machinery (ACM)
citizenship	United States
Erdős number	≤ 4
typing speed	80 wpm
StackOverflow level	7990+ reputation, 29 badges (top 5% overall, member since Aug 2012)
AskUbuntu level	570+ reputation, 7 badges (top 33% overall, member since Aug 2012)
hobbies	hiking, rock climbing, unicycling