

KEVIN A. ANGSTADT

Computer Science and Engineering • University of Michigan
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ACADEMIC INTERESTS

I have a passion for teaching and mentoring undergraduate students and am particularly interested in developing new teaching practices that broaden the participation of—and improve the climate for—underrepresented demographics in Computer Science.

My research spans the intersection of computer architecture, software engineering, and programming languages. I focus on improving programming support for emerging hardware technologies, including both the development of new programming models as well as automated techniques for adapting existing software.

EDUCATION

- 2020 (exp)** **Ph.D., Computer Science and Engineering**
University of Michigan (Ann Arbor, MI)
Proposed Thesis: Improving Programming Support for Hardware Accelerators Through Automata Processing Abstractions
Advisor: Westley Weimer
Committee: Reetuparna Das, Jean-Baptiste Jeannin, Kevin Skadron (UVA), Westley Weimer (chair)
- 2016** **Master's Degree in Computer Science**
University of Virginia (Charlottesville, VA)
Thesis: RAPID Programming of Pattern-Recognition Processors
Advisors: Westley Weimer, Kevin Skadron
Committee: Andrew Grimshaw, Baishakhi Ray, Gabriel Robins (chair), Kevin Skadron, Westley Weimer
- 2014** **B.S., Computer Science, Mathematics, and German Studies, Summa Cum Laude**
St. Lawrence University (Canton, NY)
Thesis: Accelerating Database Joins Using a General Purpose GPU
Advisors: Edwin Harcourt, Daniel Look, Ingrid Stipa

TEACHING EXPERIENCE

6 semesters experience as primary instructor for Computer Science, facilitated learning in small (8-15 students), medium (30-50 students), and large (70-100+ students) classroom, 4 guest lectures in graduate classes

PROFESSIONAL DEVELOPMENT

- 2019 (exp)** **Graduate Teaching Certificate**, Center for Research on Learning and Teaching, University of Michigan
Certificate program for graduate students focusing on the development of teaching skills at the college level. Includes professional development workshops, practical teaching experience, and mentorship.
- 2016–2017** **Tomorrow's Professor Today**, Center for Teaching Excellence, University of Virginia
Professional development program designed to facilitate the transition from student to professional, with a focus on teaching preparedness. (Partial completion due to move to Michigan)

COURSES TAUGHT (PRIMARY INSTRUCTOR)

EECS 281 (U-M)	Data Structures and Algorithms 4 credit, intermediate-level required course focusing on data representation, asymptotic complexity, and algorithmic design
TEACHING ACTIVITIES	Taught 1 of 5 lecture sections; co-managed team of graduate and undergraduate teaching assistants (24–27); adapted and edited lecture material; changed topic order for all lecture sections to coincide with projects; provided office hours and student meetings for all students; designed and oversaw grading for two exams for all lecture sections; redesigned exam format for improved exam-day logistics and automated grading
TAUGHT	<ul style="list-style-type: none"> • Winter 2018: 685 students enrolled (79 enrolled in Angstadt’s section), Angstadt Median Evaluation: 4.69/5, Engineering Median: 4.5/5 • Winter 2019: 638 students enrolled (48 enrolled in Angstadt’s section), Angstadt Median Evaluation: 4.8/5, Engineering Median: 4.3/5
EECS 398 (U-M)	Practical Skills for Teaching Computing 1 credit, upper-level elective seminar introducing teaching assistants to skills needed to be successful as well as the basics of curriculum design
TEACHING ACTIVITIES	Developed (from scratch) all lecture topics, assignments, and assessments; met with department and college administrators to discuss course role, content, and sustainability
TAUGHT	<ul style="list-style-type: none"> • Fall 2019 (pilot): 9 students enrolled
CS 4610 (UVA)	Programming Languages 3 credit, upper-level elective focusing on functional programming and the implementation of an interpreter for an object-oriented programming language
TEACHING ACTIVITIES	Developed and adapted lectures, five homework assignments, and three exams; managed team of undergraduate teaching assistants (3); modernized autograder submission process
TAUGHT	<ul style="list-style-type: none"> • Spring 2017: 31 students enrolled, Mean Evaluation: 4.80/5 (0.45 std. dev.), Engineering Average: 4.35/5 (0.90 std. dev.)
CS 4640 (UVA)	Programming Languages for Web Applications 3 credit, condensed Summer Session course introducing students to 3-tier architectures, client-server design, and associated languages and features
TEACHING ACTIVITIES	Developed (from scratch) lectures, four homework assignments, two exams, and final project; managed graduate teaching assistant
TAUGHT	<ul style="list-style-type: none"> • Summer 2016: 15 students enrolled, Mean Evaluation: 4.83/5 (0.41 std. dev.), Engineering Average: 4.36/5 (0.84 std. dev.) • Summer 2017: 9 students enrolled, Mean Evaluation: 4.80/5 (0.45 std. dev.), Engineering Average: 4.35/5 (0.90 std. dev.)

GUEST LECTURES

Winter 2018 (U-M)	EECS 483 (Compiler Construction) , Lexical Analysis Foundations and Lexical Analyzer Generators (1.5 hour lecture, 59 students enrolled)
Fall 2017 (U-M)	EECS 590 (Advanced Programming Languages) , Designing and Presenting Programming Languages in the Broader Research Community (1.5 hour lecture, 19 students enrolled)
Spring 2016 (UVA)	CS 4501-005 (Compilers Practicum) , Data-Flow Analysis (1 hour lecture, 16 students enrolled)
Spring 2016 (UVA)	CS 6354 (Computer Architecture) , Accelerating Pattern Searches with Hardware (1.25 hour lecture, 29 students enrolled, supplied question for final exam)
Fall 2015 (UVA)	CS 6610 (Programming Languages) , Designing and Presenting Programming Languages in the Broader Research Community (1.25 hour lecture, 16 students enrolled)

OTHER EXPERIENCE

TEACHING ASSISTANT (ST. LAWRENCE UNIVERSITY)

2013–2014 German 103/104 (Lab for Intermediate German)

2011–2014 German 101/102 (Lab for Elementary German)

Taught a total of 11 sections. Responsibilities included: assisting in course planning, developing curriculum from scratch for and teaching an additional two contact hours per week of language instruction, facilitating exam review sessions, assigning and grading homework exercises. Language instruction included grammar constructs (via lectures, worked examples, and written exercises), vocabulary (via in-class conversations, skits, and games), and culture (via films, discussion, and German mass media). Class sizes ranged from 5 to 20 students.

PUBLICATIONS


12 publications +2 submissions: 6 conference +1 submission (ASPLOS, MICRO, HPCA, ISCA, HPC), 2 journal +1 submission (TPDS, CAL, TAAS), 2 workshop (DSN-W, WAX), 1 invited (CODES), 1 technical report; 3 publications +1 submission with undergraduate co-authors


[†] Undergraduate Co-author


CONFERENCE PROCEEDINGS (6 PEER-REVIEWED)


ASPLOS '20 Kevin Angstadt, Jean-Baptiste Jeannin, and Westley Weimer. Accelerating Legacy String Kernels via Bounded Automata Learning. In *Proceedings of the 25th International Conference on Architectural Support for Programming Languages and Operating Systems*, Lausanne, Switzerland, 2020. ACM, to appear.

ASPLOS '19 Matthew Casias[†], Kevin Angstadt, Tommy Tracy II, Kevin Skadron, and Westley Weimer. Debugging Support for Pattern-Matching Languages and Accelerators. In *Proceedings of the 24th International Conference on Architectural Support for Programming Languages and Operating Systems*, Providence, Rhode Island, 2019. ACM. (21% acceptance rate)
 <https://doi.org/10.1145/3297858.3304066>



MICRO 51 Kevin Angstadt, Arun Subramaniyan, Elaheh Sadredini, Reza Rahimi, Kevin Skadron, Westley Weimer, and Reetuparna Das. ASPEN: A Scalable In-SRAM Architecture for Pushdown Automata. In *Proceedings of the 51st Annual IEEE/ACM International Symposium on Microarchitecture*, Fukuoka, Japan, 2018. IEEE. (21% acceptance rate)
 <https://doi.org/10.1109/MICRO.2018.00079>

HPCA '18 Jack Wadden, Kevin Angstadt, and Kevin Skadron. Characterizing and Mitigating Output Reporting Bottlenecks in Spatial Automata Processing Architectures. In *Proceedings of the 24th IEEE International Symposium on High-Performance Computer Architecture*, Vienna, Austria, 2018. IEEE. (21% acceptance rate)
 <https://doi.org/10.1109/HPCA.2018.00069>



ASPLOS '16 Kevin Angstadt, Westley Weimer, and Kevin Skadron. RAPID Programming of Pattern-Recognition Processors. In *Proceedings of the 21st International Conference on Architectural Support for programming Languages and Operating Systems*, Atlanta, Georgia, 2016. ACM. (22% acceptance rate)
 <https://doi.org/10.1145/2872362.2872393>

HPC '15 Kevin Angstadt and Ed Harcourt. A Virtual Machine Model for Accelerating Relational Database Joins using a General Purpose GPU. In *Proceedings of the High Performance Computing Symposium*, Alexandria, VA, 2015. Society for Computer Simulation International.
 <https://dl.acm.org/citation.cfm?id=2872615>


JOURNAL MANUSCRIPTS (2 PEER-REVIEWED)

- TPDS '19** Kevin Angstadt, Jack Wadden, Westley Weimer, and Kevin Skadron. Portable Programming with RAPID. In *Transactions on Parallel and Distributed Systems*, vol. 30, no. 4, pp. 939-952, 1 April 2019. IEEE. (4.181 journal impact factor)
 <https://doi.org/10.1109/TPDS.2018.2869736>
- CAL '18** Kevin Angstadt, Jack Wadden, Vinh Dang, Ted Xie, Dan Kramp[†], Westley Weimer, Mircea Stan, and Kevin Skadron. MNCaRT: An Open-Source, Multi-Architecture Automata-Processing Research and Execution Ecosystem. In *Computer Architecture Letters*, vol. 17, no. 1, pp. 84-87, Jan.-June 1 2018. IEEE. (~24% acceptance rate)
 <https://doi.org/10.1109/LCA.2017.2780105>


WORKSHOP PROCEEDINGS (2 PEER-REVIEWED)

- WAX '18** Sihang Liu, Kevin Angstadt, Mike Ferdman, and Samira Khan. ARMOR: Towards Restricted Approximation with a Worst-Case Guarantee. In: *Proceedings of the 2018 Workshop on Approximate Computing Across the Stack*, Williamsburg, VA, 2018.
 <http://approximate.computer/wax2018/papers/wax2018-paper10.pdf>
- DSN-W '16** Kate Highnam[†], Kevin Angstadt, Kevin Leach, Westley Weimer, Aaron Paulos, and Patrick Hurley. An Uncrewed Aerial Vehicle Attack Scenario and Trustworthy Repair Architecture. In *Proceedings of the 46th International Conference on Dependable Systems and Networks*, Industrial Track, Toulouse, France, 2016. IEEE.
 <https://doi.org/10.1109/DSN-W.2016.63>

INVITED PAPERS

- CODES '16** Ke Wang, Kevin Angstadt, Chunkun Bo, Nathan Brunelle, Elaheh Sadredini, Tommy Tracy, II, Jack Wadden, Mircea Stan, and Kevin Skadron. An overview of Micron's Automata Processor. In *Proceedings of the Eleventh IEEE/ACM/IFIP International Conference on Hardware/Software Codesign and System Synthesis*, Pittsburgh, PA, 2016. ACM.
 <http://doi.org/10.1145/2968456.2976763>

TECHNICAL REPORTS

- Kevin Angstadt, Jack Wadden, Westley Weimer, and Kevin Skadron. MNRL and MNCaRT: An Open-Source, Multi-Architecture State Machine Research and Execution Ecosystem. Technical Report CS-2017-01, Department of Computer Science, University of Virginia, May 2017.
 <https://doi.org/10.18130/V3FN18>

SUBMISSIONS AND UNDER REVIEW

- ISCA 47** Yujun Qin[†], Samuel Gonzalez[†], Kevin Angstadt, Xiaowei Wang, Stephanie Forrest, Reetuparna Das, Kevin Leach, and Westley Weimer. MARTINI: Detecting Architectural Side-Channel Attacks Efficiently Using Memory Access Traces. In *Proceedings of the International Symposium on Computer Architecture*, Valencia, Spain, 2020. ACM.
(submission)
- TAAS '19** Kevin Leach, Kevin Angstadt, Anh Nguyen-Tuong, Christopher S. Timperley, Aaron Paulos, Zech Bertilson, Partha Pal, Christopher Hall, Jacob Wende, Padraic Cashin, Stephanie Forrest, Claire Le Goues, Jack W. Davidson, Westley Weimer, Patrick Hurley, and Carl Thomas. A Framework for Trusted and Resilient Autonomous Vehicles. In *Transactions on Autonomous and Adaptive Systems*, 2019. ACM.
(under review)

STUDENT MENTEES

12 undergraduate students: 3 current, 9 previous; 4 students with associated manuscripts

UNDERGRADUATE STUDENTS

[†] Associated Publication or Submitted Manuscript

- 2019–present** Ian Bertram, Collaborated on project involving capturing and modeling damage patterns in disk drives.

2019–present	Fee Christoph , Mentored and collaborated on a conference submission studying archival academic data to determine relationships between academic program retention, performance in intermediate Computer Science courses, and demographics.
2019–present	Michael Flanagan , Collaborated on project involving capturing and modeling damage patterns in disk drives.
2018–2019	Samuel Gonzalez[†] , Mentored and collaborated on a conference submission that leverages hardware acceleration to detect malicious software behavior (ISCA 47).
2018–2019	Linh Le , Mentored undergraduate research project to understand if memory traces could be used differentiate programs.
2018–2019	Yujun Qin[†] , Mentored and collaborated on a conference submission that leverages hardware acceleration to detect malicious software behavior (ISCA 47).
2018	Aniruddh Agarwal , Mentored undergraduate research project modeling hard disk failure patterns.
2016–2017	Emma Fass (UVA '18), Mentored undergraduate research project for running surface detection using wearable sensors. Moved on to Pariveda Solutions.
2016–2017	Luke Merrick (UVA '18), Mentored undergraduate research project for running surface detection using wearable sensors. Moved on to Fiddler Labs.
2016–2017	Joe Tidwell (UVA '18), Mentored undergraduate research project for running surface detection using wearable sensors. Moved on to Peace Corps.
2016–2018	Matthew Casias[†] (UVA '19), Mentored and collaborated on human study of an interactive debugger for a domain-specific language resulting in published conference paper (ASPLOS '19). Moved on to Capital One.
2015–2016	Kate Highnam[†] (UVA '16), Mentored and collaborated on autonomous quadcopter project resulting in published workshop paper (DSN '16). Moved on to Capital One and now PhD student at Imperial College London.

FUNDING AND GRANTS

2018–2020	University of Michigan \$30,000 Diverse Voices in Computer Science Speaker Series (Rackham Faculty Allies and Student Ally Diversity Grants), included 50% department matching funds. Responsibilities included: writing proposal and reports, selecting candidate speakers, organizing visitor schedules and meetings, and collecting student feedback to improve program.
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SERVICE

2019–present	Engineering Teaching Consultant , Center for Research on Learning and Teaching in Engineering, University of Michigan Consult with and mentor undergraduate and graduate teaching assistants for the College of Engineering. Responsibilities include: conducting classroom observations, one-on-one consultations, and professional development.
2019	Diversity Workshop Facilitator , Computer Science and Engineering Division, Department of Computer Science and Electrical Engineering, University of Michigan Developed and facilitated 90 minute workshops for 114 student instructors in core CS courses. Topics included stereotype threat, implicit bias, and impostor syndrome.
2017	Co-Chair, Graduate Student Group , Department of Computer Science, University of Virginia Attended and participated in Computer Science faculty meetings to represent student interests within the department.
2015–2017	Tea Time Tsar , Department of Computer Science, University of Virginia Organized and oversaw weekly social gathering for graduate students and faculty

- 2015** **Member, Graduate Student Orientation Committee**, Department of Computer Science, University of Virginia
Planned and organized orientation for incoming graduate students. Worked with department staff to arrange advising meetings and photographs for website.
- 2015** **Summer Camp Instructor**, LEAD Computer Science Program, University of Virginia
Co-led computer science and programming classes for week-long camp for middle- and high-school students.

HONORS AND AWARDS

- 2017** Graduate Student Award for Outstanding Teaching, UVA Department of Computer Science (One award among 150 graduate students, voted on by faculty)
- 2017** Graduate Student Award for Outstanding Service, UVA Department of Computer Science (Two awards among 150 graduate students, voted on by faculty)
- 2014–2017** Olive B. and Franklin C. Mac Krell Fellow, Jefferson Scholars Foundation (3 fellowships awarded among 394 offers of admission to graduate programs in the School of Engineering and Applied Science at the University of Virginia; nomination only)
- 2014–2015** Virginia Commonwealth Fellowship, School of Engineering and Applied Science, University of Virginia (nomination only)
- 2008** Eagle Scout, BSA Troop 162, Latham, NY

SOFTWARE TOOLS

- StatKey** Web-based statistics tools associated with *Statistics: Unlocking the Power of Data* by Robin Lock, Patti Lock, Kari Lock Morgan, Eric Lock, Dennis Lock. Wiley, 2013 (developed with Ed Harcourt, Rich Sharp and the authors of the book). Usage (as of 2019-09-05): **1,114,402 users** and 18,222,418 page views.
🌐 <http://www.lock5stat.com/statkey>
- MNRL** Specification language and API for finite state machines.
🌐 <https://github.com/kevinaangstadt/mnrl>
- MNCaRT** An end-to-end ecosystem for research on, and execution of, finite automata across multiple computing architectures (developed with Jack Wadden, Vinh Dang, Ted Xie, Dan Kramp, Westley Weimer, Mircea Stan, and Kevin Skadron).
🌐 <https://github.com/kevinaangstadt/MNCaRT>
- RAPID** A C- or Java-like language for specifying inexact pattern matches in sequences of input data.
🌐 <https://github.com/kevinaangstadt/rapid>
- hscompile** An extension to the Hyperscan regular expression processing engine to support direct loading and execution of finite automata.
🌐 <https://github.com/kevinaangstadt/hscompile>
- START** Automated software framework for diversification, repair, and monitoring of autonomous vehicle control systems (developed with Kevin Leach, Christopher Timperley, Aaron Paulos, Zech Bertilson, Anh Nguyen-Tuong, and Jonathan Dorn).
- VASim-dpda** An engine for execution and transformation of pushdown automata for large-scale automata processing applications (developed with Jack Wadden [author of original VASim]).
🌐 <https://github.com/kevinaangstadt/VASim/tree/dpda>

PRESENTATIONS AND POSTERS

- 2018** **MNRL and MNCaRT: An Open-Source, Multi-Architecture State Machine Research and Execution Ecosystem**, GOMACTech 2018, Miami, Florida

- 2016** **START: UAVs—Software Techniques for Automated Resiliency and Trustworthiness in Uncrewed Aerial Vehicles**, Thornton Society Reception, University of Virginia (*public outreach*)
- 2016** **RAPID: Accelerating Pattern Search Applications with Reconfigurable Hardware**, TECH-CON 2016, Austin, Texas (Best in Session, selected from among 5 presentations)
- 2016** **RAPID Programming of Pattern-Recognition Processors**, Center for Automata Processing Webinar Series, University of Virginia
- 2016** **Quadcopter Basics: Opportunities and Challenges**, Rivanna Radio Control Club, Charlottesville, Virginia
Presented overview of quadcopter software and resiliency research to group of 15 club members (*public outreach*)
- 2016** **Self-Healing Autonomous Vehicles: Increasing System Resiliency with Automated Program Repair**, Public Days, University of Virginia (*public outreach*)
- 2016** **Getting Started with the Micron Automata Processor**, Center for Automata Processing Webinar Series, University of Virginia
- 2016** **Self-Healing Autonomous Vehicles: Increasing System Resiliency with Automated Program Repair**, 14th Annual Jefferson Fellows Symposium, Jefferson Scholars Foundation (*public outreach*)
- 2014** **Accelerating Database Joins Using a General Purpose GPU**, Festival of Science, St. Lawrence University
- 2012** **Developing Interactive Web Tools for Statistics Students**, Honors Reception, St. Lawrence University (*public outreach*)

PROFESSIONAL AND HONORARY SOCIETIES

Student Member (SIGMICRO, SIGCSE), Association for Computing Machinery (ACM)

Phi Beta Kappa

Tau Beta Pi (MI-Gamma, nominated Fall 2019)

Pi Mu Epsilon (Honorary National Mathematics Society)

Delta Phi Alpha (National German Honor Society)

MISCELLANEOUS

Languages Native English, Proficiency in German

Citizenship United States

REFERENCES

Available upon request.

Ann Arbor, Michigan, 19. November 2019