

# James C. Davis

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## RESEARCH THEME

My research enables safe and secure software engineering for cyber- and cyber-physical systems. My work is grounded in empirical measurements of the software engineering process, product, and usage context. I examine software engineering failures to inform future feats of software engineering.

## EDUCATION

<b>Ph.D, Computer Science and Applications</b> <i>Virginia Tech, Blacksburg, VA</i>	2015–2020
<b>B.Sc. Computer Science, B.Sc. Mathematics</b> <i>Clarkson University, Potsdam, NY</i>	2008–2012

## PROFESSIONAL EXPERIENCE

<b>Assistant Professor</b> <i>Purdue University — Electrical and Computer Engineering</i>	Fall 2020-present
<b>Intern, Microsoft Research (RiSE group: Cloud Security)</b> <i>Microsoft Research, Redmond, WA — Mentored by Patrice Godefroid</i>	Summer 2019
<b>Intern, IBM Research (Storage)</b> <i>IBM Research, Almaden, CA — Mentored by Deepavali Bhagwat</i>	Summer 2018
<b>Graduate Research Assistant</b> <i>Virginia Tech — Advised by Dongyoon Lee</i>	2016–2020
<b>Software Engineer, IBM (GPFS)</b> <i>IBM, Poughkeepsie, NY</i>	2012–2017

## EXTERNAL GRANTS

**TOTAL: \$3,879,234. TOTAL AS PI: \$1,192,326. MY TOTAL SHARE: \$2,121,174.<sup>1</sup>**

[G-1] <b>NSF #2537308: Collaborative Research: Planning: CROSS: Building a Community aROund Securing the Research Software Supply Chain</b> PI (Co-PI: Alexandra Harris-Watson) <i>US National Science Foundation</i> 2025–2027. \$105,113.
[G-2] <b>AutoUP: Automated Unit Proofing</b> PI <i>OpenAI — Cybersecurity Grant Program</i> 2025. API credits valued at \$5,000.

<sup>1</sup>Calculation: Total is the sum of all awards to Purdue on which I have been PI or Co-PI. Total as PI is the sum of all awards to Purdue on which I have been the PI — not all of these funds are managed by me. My total share is the sum of funds I have managed across all awards.

- [G-3] **NSF #2452533: RFE: Research: Developing and Piloting a Prompt Engineering Competency Framework for Software Engineering Education**  
Co-PI (PI: Kirsten Davis)  
*US National Science Foundation*  
2025–2028. \$350,000.
- [G-4] **NSF #2504445: OAC Core: Cyberinfrastructure for Multi-Stream Architectures Applied to Computer Vision: Efficiency via Co-Design of Network Architectures and Framework Operators**  
Co-PI (PI: Yung-Hsiang Lu)  
*US National Science Foundation*  
2025–2028. \$660,000.
- [G-5] **Qualcomm Innovation Fellowship**  
PI — Project Supervisor of winning team: P. Amusuo and D. Anandayuvraj  
*Qualcomm, Inc.*  
2025–2026. \$100,000.
- [G-6] **Unrestricted Gift: Typosquat Detection in Open-Source Ecosystems**  
PI  
*Socket, Inc.*  
2025. \$20,000.
- [G-7] **NSF #2512797: Travel: NSF Student Travel Grant for 2025 International Conference on Software Engineering**  
PI  
*US National Science Foundation*  
2024–2025. \$24,000.
- [G-8] **NSF #2343596: Collaborative Research: EAGER: CET: Exploring The Risks and Rewards of Large Language Models in Enabling Energy-Efficient Data Center Software Infrastructure**  
PI (Co-PI: Yung-Hsiang Lu)  
*US National Science Foundation*  
2024–2026. \$149,976.
- [G-9] **Rolls Royce: Facilitating Effective Dynamic Analysis of Embedded Software**  
Co-PI (PI: Aravind Machiry)  
*Contract with Rolls Royce*  
2024–2025. \$150,000.
- [G-10] **Unrestricted Gift: Improving OSS Supply Chain Security by Promoting Software Signing**  
Co-PI (PI: Santiago Torres-Arias)  
*Google, LLC*  
2023. \$200,000.

- [G-11] **Rolls Royce: Dynamic Security Analysis of Embedded Software Systems**  
Co-PI (PI: Aravind Machiry)  
*Contract with Rolls Royce*  
2023-2024. \$150,000.
- [G-12] **Efficient Computer Vision for Edge Devices**  
Co-PI (PI: Yung-Hsiang Lu)  
*Contract with Cisco*  
2023-2024. \$179,941
- [G-13] **Unrestricted Gift: Machine Learning Reproducibility**  
PI  
*Google, LLC*  
2022. \$80,000.
- [G-14] **NSF #2229703: POSE: Phase I: Scoping An Open-Source Ecosystem Around Proactive Software Supply Chain Monitoring**  
Co-PI (PI: Santiago Torres-Arias)  
*US National Science Foundation*  
2022–2023. \$300,000.
- [G-15] **Cisco: Trustworthy Re-use of Pre-Trained Neural Networks**  
PI (Co-PI: Yung-Hsiang Lu)  
*Contract with Cisco*  
2022–2023. \$179,237.
- [G-16] **Cisco: Monitor and manage security risks in software supply chains with Sigstore**  
Co-PI (PI: Santiago Torres-Arias)  
*Contract with Cisco*  
2022–2023. \$184,536.
- [G-17] **NSF #2135156: Collaborative Research: SaTC: CORE: Small: Improving Sanitization and Avoiding Denial of Service Through Correct and Safe Regexes**  
PI (Co-PI: Dongyoon Lee)  
*US National Science Foundation*  
2022–2025. \$274,000.
- [G-18] **Rolls Royce: Dynamic Analysis of Embedded Firmware**  
Co-PI (PI: Aravind Machiry)  
*Contract with Rolls Royce*  
2021-2022. \$175,000.
- [G-19] **NSF #2107230: Collaborative Research: OAC Core: Advancing Low-Power Computer Vision at the Edge**  
Co-PI (PI: Yung-Hsiang Lu)  
*US National Science Foundation*  
2021–2024. \$258,000.

[G-20] **Unrestricted gift to support research on machine learning reproducibility**

PI (Co-PI: Yung-Hsiang Lu)

*Google, LLC*

*2020. \$80,000 + \$20,000.*

**INTERNAL GRANTS**

**TOTAL: \$234,431.**

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[IG-1] **Exploring the Impact and the Use of Generative Models in Computer Engineering Education**

Co-PI (PI: Machiry, Other Co-PIs: Zoltowski, Hess, Lu)

*Office of the Provost, through the program “AI in teaching and learning grants”*

*2023-2024. \$79,431.*

[IG-2] **Revamping the CompE Curriculum for Secure Software Engineering**

PI (Co-PIs: Machiry, Torres-Arias, Bagchi)

*ECE Agile Reform of Curriculum program, enabled by Elmore Family gift*

*2021-2022. \$150,000.*

[IG-3] **Intercultural Engineering Education for Software Engineers**

PI (Co-PI: Kirsten Davis)

*Purdue University VEIL Program*

*2020. \$5,000.*

**REFEREED CONFERENCE PUBLICATIONS (FULL PAPERS)<sup>2</sup> These venues are CORE2023 rank A or A\*.<sup>3</sup>**

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[C-1] W. Jiang, B. Çakar, M. Lysenko, and **J.C. Davis**. *ConfuGuard: Using Metadata to Detect Active and Stealthy Package Confusion Attacks Accurately and at Scale*. Proceedings of the 48th International Conference on Software Engineering (ICSE’26). 13 pages.

[C-2] D. Anandayavaraj, T. Singla, Z. Hammadeh, A. Lund, A. Holloway, and **J.C. Davis**. *Learning From Software Failures: A Case Study at a National Space Research Center*. Proceedings of the 48th International Conference on Software Engineering (ICSE’26). 13 pages.

[C-3] P.C. Amusuo, O. Cochell, T. Le Lievre, P.V. Patil, A. Machiry, and **J.C. Davis**. *Do Unit Proofs Work? An Empirical Study of Compositional Bounded Model Checking for Memory Safety Verification*. Proceedings of the 48th International Conference on Software Engineering (ICSE’26). 13 pages.

[C-4] A. Kellas, N. Christou, W. Jiang, P. Li, L. Simon, Y. David, V. Kemerlis, **J.C. Davis**, and J. Yang. *PickleBall: Secure Deserialization of Pickle-based Machine Learning Models*. Proceedings of the 32nd ACM Conference on Computer and Communications Security (CCS’25). 16 pages.

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<sup>2</sup>Here and elsewhere, my research mentees are underlined. These are students whose work I supervised during the research project. My name is given in **bold**. In these publication venues, the final author (“anchor author”) provides the primary intellectual supervision of the work.

<sup>3</sup>In my research areas, top-tier conferences are the most prestigious venues for publication, with some journals considered comparable. The ICORE rankings are an international ranking system of conferences in which A\* venues are “best” and A venues are “reputable” venues; for either category, the peer reviewers are recognized experts in the field. Acceptance rates of ~10-25% across 100+ submissions are a good indicator of conference quality.

- [C-5] P.C. Amusuo, K.A. Robinson, T. Singla, H. Peng, A. Machiry, S. Torres-Arias, L. Simon, and **J.C. Davis**. *ZTD<sub>JAVA</sub>: Mitigating Software Supply Chain Vulnerabilities via Zero-Trust Dependencies*. Proceedings of the 47th International Conference on Software Engineering (ICSE'25). 24% acceptance rate (248/1031). 13 pages.
- [C-6] B.S.H. Chou, P. Jajal, N.J. Eliopoulos, T. Nadolsky, C.Y. Yang, N. Ravi, **J.C. Davis**, K.Y.J. Yun, and Y.H. Lu. *A Musician's Muse: Detecting Performance Errors with Transformers*. Proceedings of the 39th Annual AAAI Conference on Artificial Intelligence (AAAI'25). 23% acceptance rate (3,032/12,957). 11 pages.
- [C-7] S.R. Tanksalkar, S. Muralee, D.M.S.H. Danduri, P. Amusuo, A. Bianchi, **J.C. Davis**, and A. Machiry. *LEMIX: Enabling Testing of Embedded Applications as Linux Applications*. Proceedings of the 34th USENIX Security Symposium (USENIX Security'25). 17.1% acceptance rate (407/2,385). 30 pages.
- [C-8] K. Kalu, T. Singla, C. Okafor, S. Torres-Arias, and **J.C. Davis**. *An Industry Interview Study of Software Signing for Supply Chain Security*. Proceedings of the 34th USENIX Security Symposium (USENIX Security'25). 17.1% acceptance rate (407/2,385). 18 pages.
- [C-9] M. Shen, A. Pillai, B.A. Yuan, **J.C. Davis**, and A. Machiry. *Finding 709 Defects in 258 Projects: An Experience Report on Applying CodeQL to Open-Source Embedded Software (Experience Paper)*. Proceedings of the 34th ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA'25). 21% acceptance rate (115/553). 22 pages.
- [C-10] M.H.M. Bhuiyan\*, B. Çakar\*, E. Burmane, **J.C. Davis**, and C.A. Staicu. *SoK: A Literature and Engineering Review of Regular Expression Denial of Service*. Proceedings of the 20th ACM ASIA Conference on Computer and Communications Security (AsiaCCS) Cycle 2 (AsiaCCS'25). 20% acceptance rate (53/269). 22 pages.
- [C-11] N. Eliopoulos, P. Jajal, **J.C. Davis**, G. Liu, G.K. Thiruvathukal, and Y.H. Lu. *Pruning One More Token is Enough: Leveraging Latency-Workload Non-Linearities for Vision Transformers on the Edge*. Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV'25). 12 pages.
- [C-12] P. Jajal, N. Eliopoulos, B. Chou, G.K. Thiruvathukal, **J.C. Davis**, and Y.H. Lu. *Token Turing Machines are Efficient Vision Models*. Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV'25). 12 pages.
- [C-13] D. Anandayavaraj, M. Campbell, A. Tewari, and **J.C. Davis**. *FAIL: Analyzing Software Failures from the News Using LLMs*. Proceedings of the 38th IEEE/ACM International Conference on Automated Software Engineering (ASE'24). 26% acceptance rate (154/587). 13 pages.
- [C-14] P. Jajal, W. Jiang, A. Tewari, E. Kocinare, J. Woo, A. Sarraf, Y.H. Lu, G.K. Thiruvathukal, and **J.C. Davis**. *Interoperability in Deep Learning: A User Survey and Failure Analysis of ONNX Model Converters*. Proceedings of the 33rd ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA'24). 21% acceptance rate (143/694). 13 pages.
- [C-15] J. Jones, W. Jiang, N. Synovic, G.K. Thiruvathukal, and **J.C. Davis**. *What do we know about Hugging Face? A systematic literature review and quantitative validation of qualitative claims*. Proceedings of the 18th ACM/IEEE International Symposium on Empirical Software Engineering and Measurement (ESEM'24). 24% acceptance rate (34/139). 12 pages.
- [C-16] L. Franke, H. Liang, S. Farzanehpour, A. Brantly, **J.C. Davis**, and C. Brown. *An Exploratory Mixed-methods Study on General Data Protection Regulation (GDPR) Compliance in Open-Source Software*. Proceedings of the 18th ACM/IEEE International Symposium on Empirical Software Engineering and Measurement (ESEM'24). 24% acceptance rate (34/139). 12 pages.

- [C-17] J. Chen, D. Anandayuvraj, **J.C. Davis**, and S. Rahaman. *On the Contents and Utility of IoT Cybersecurity Guidelines*. Proceedings of the ACM on Software Engineering (PACMSE), Issue FSE 2024 (FSE'24). 26% acceptance rate (121/474). 24 pages.
- [C-18] T.R. Schorlemmer, K.G. Kalu, L. Chigges, K.M. Ko, E.A.M.A. Ishgair, S. Bagchi, S. Torres-Arias, and **J.C. Davis**. *Signing in Four Public Software Package Registries: Quantity, Quality, and Influencing Factors*. Proceedings of the 45th IEEE Symposium on Security and Privacy (IEEE S&P'24). 18% acceptance rate (261/1463). 16 pages.
- [C-19] W. Maxam and **J.C. Davis**. *An Interview Study on Third-Party Cyber Threat Hunting Processes in the U.S. Department of Homeland Security*. Proceedings of the 33rd USENIX Security Symposium (USENIX Security'24). 18% acceptance rate (382/2176). 18 pages.
- [C-20] W. Jiang, J. Yasmin, J. Jones, N. Synovic, J. Kuo, N. Bielanski, Y. Tian, G.K. Thiruvathukal, and **J.C. Davis**. *PeaTMOSS: A Dataset and Initial Analysis of Pre-Trained Models in Open-Source Software*. Proceedings of the 21st Annual Conference on Mining Software Repositories (MSR'24). 29% acceptance rate (42/146). 13 pages.
- [C-21] W. Jiang, N. Synovic, M. Hyatt, T.R. Schorlemmer, R. Sethi, Y.H. Lu, G.K. Thiruvathukal, and **J.C. Davis**. *An Empirical Study of Pre-Trained Model Reuse in the Hugging Face Deep Learning Model Registry*. Proceedings of the ACM/IEEE 45th International Conference on Software Engineering (ICSE'23). 26% acceptance rate (208/796). 13 pages.
- [C-22] P.C. Amusuo, R.A.C. Méndez, Z. Xu, A. Machiry, and **J.C. Davis**. *Systematically Detecting Packet Validation Vulnerabilities in Embedded Network Stacks*. Proceedings of the 38th IEEE/ACM International Conference on Automated Software Engineering (ASE'23). 21% acceptance rate (134/629). 13 pages.
- [C-23] S.A. Hassan, Z. Aamir, D. Lee, **J.C. Davis**, and F. Servant. *Improving Developers' Understanding of Regex Denial of Service Tools through Anti-Patterns and Fix Strategies*. Proceedings of the 44th IEEE Symposium on Security and Privacy (IEEE S&P'23). 18 pages.
- [C-24] A. Goel, C. Tung, N. Eliopoulos, X. Hu, G.K. Thiruvathukal, **J.C. Davis**, and Y.H. Lu. *Directed Acyclic Graph-based Neural Networks for Tunable Low-Power Computer Vision*. Proceedings of the ACM/IEEE International Symposium on Low Power Electronics and Design (ISLPED'22). 6 pages.
- [C-25] E. Barlas, X. Du, and **J.C. Davis**. *Exploiting Input Sanitization for Regex Denial of Service*. Proceedings of the ACM/IEEE 44th International Conference on Software Engineering (ICSE'22). 26% acceptance rate (197/751). 13 pages.
- [C-26] Q. Xu, **J.C. Davis**, Y.C. Hu, and A. Jindal. *An Empirical Study on the Impact of Parameters on Mobile App Energy Usage*. Proceedings of the 29th IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER'22). 36% acceptance rate (72/199). 12 pages.
- [C-27] A. Goel, C. Tung, X. Hu, H. Wang, **J.C. Davis**, Thiruvathukal, and Lu. *Low-Power Multi-Camera Object Re-Identification using Hierarchical Neural Networks*. Proceedings of the ACM/IEEE International Symposium on Low Power Electronics and Design (ISLPED'21). 6 pages.
- [C-28] **J.C. Davis**, F. Servant, and D. Lee. *Using Selective Memoization to Defeat Regular Expression Denial of Service (ReDoS)*. Proceedings of the 42nd IEEE Symposium on Security and Privacy (IEEE S&P'21). 12% acceptance rate (115/952). 17 pages.
- [C-29] A. Cha, E. Wittern, G. Baudart, **J.C. Davis**, L. Mandel, and J. Laredo. *A Principled Approach to GraphQL Query Cost Analysis*. Proceedings of the 28th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE'20). 28% acceptance rate (101/360). 12 pages. *ACM Distinguished Paper Award*.

- [C-30] L. Rupperecht, **J.C. Davis**, C. Arnold, Y. Gur, and D. Bhagwat. *Improving Reproducibility of Data Science Pipelines through Transparent Provenance Capture*. Proceedings of the 46th International Conference on Very Large Data Bases (VLDB'20 Industry track). 15 pages.
- [C-31] **J.C. Davis**, D. Moyer, A. Kazerouni, and D. Lee. *Testing Regex Generalizability And Its Implications: A Large-Scale Many-Language Measurement Study*. Proceedings of the 34th IEEE/ACM International Conference on Automated Software Engineering (ASE'19). 21% acceptance rate (91/435). 13 pages.
- [C-32] L. Michael, J. Donohue, **J.C. Davis**, D. Lee, and F. Servant. *Regexes are Hard: Decision-making, Difficulties, and Risks in Programming Regular Expressions*. Proceedings of the 34th IEEE/ACM International Conference on Automated Software Engineering (ASE'19). 21% acceptance rate (91/435). 12 pages. **ACM Distinguished Paper Award**.
- [C-33] **J.C. Davis**, L. Michael, C. Coghlan, F. Servant, and D. Lee. *Are Regular Expressions a Lingua Franca? An Empirical Study on the Re-use and Portability of Regular Expressions*. Proceedings of the 27th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE'19). 24% acceptance rate (97/371). 12 pages.
- [C-34] E. Wittern, A. Cha, **J.C. Davis**, G. Baudart, L. Mandel. *An Empirical Study of GraphQL Schemas*. Proceedings of the 17th International Conference on Service-Oriented Computing (ICSOC'19). 15% acceptance rate (28/183). 16 pages.
- [C-35] X. Fu, T. Ghaffar, **J.C. Davis**, and D. Lee. *EdgeWise: A Better Stream Processing Engine for the Edge*. 2019 USENIX Annual Technical Conference (USENIX ATC'19). 20% acceptance rate (71/356). 17 pages.
- [C-36] **J.C. Davis**, C. Coghlan, F. Servant, and D. Lee. *The Impact of Regular Expression Denial of Service (REDOS) in Practice: an Empirical Study at the Ecosystem Scale*. Proceedings of the 26th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE'18). 21% acceptance rate (61/289). 11 pages. **ACM Distinguished Paper Award**.
- [C-37] **J.C. Davis**, E.R. Williamson, and D. Lee. *A Sense of Time for JavaScript and Node.js: First-Class Timeouts as a Cure for Event Handler Poisoning*. Proceedings of the 27th USENIX Security Symposium (USENIX Security'18). 19% acceptance rate (100/520). 17 pages.
- [C-38] **J.C. Davis**, A. Thekumparampil, and D. Lee. *Node.fz: Fuzzing the Server-Side Event-Driven Architecture*. Proceedings of the Twelfth European Conference on Computer Systems (EuroSys'17). 21% acceptance rate (41/200). 16 pages.

## REFEREED JOURNAL ARTICLES<sup>4</sup>

- [J-1] W. Jiang, M. Kim, C. Cheung, H. Kim, G.K. Thiruvathukal, and **J.C. Davis**. *"I see models being a whole other thing": An Empirical Study of Pre-Trained Model Naming Conventions and A Tool for Enhancing Naming Consistency*. Empirical Software Engineering, 2025 (EMSE'25). 67 pages.
- [J-2] G. Cramer, W. Maxam, and **J.C. Davis**. *Engineering Patterns for Trust and Safety on Social Media Platforms: A Case Study of Mastodon and Diaspora*. Journal of Systems and Software, 2025 (JSS'25). 22 pages.
- [J-3] D. Özkan, K. Davis, **J.C. Davis**, J. Deters, and H. Murzi. *Fostering Systems Thinking through Engineering Study Abroad Programs*. European Journal of Engineering Education, 2024 (EJEE'24). 26 pages.
- [J-4] W. Jiang, V. Banna, N. Vivek, A. Goel, N. Synovic, G.K. Thiruvathukal, and **J.C. Davis**. *Challenges and Practices of Deep Learning Model Reengineering: A Case Study on Computer Vision*. Empirical Software Engineering, 2024 (EMSE'24). 63 pages.

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<sup>4</sup>In the field of software engineering research, four journals are considered peers of the top conferences, as evidenced by their inclusion in "journal first" tracks at those conferences: ACM TOSEM, IEEE TSE, Springer EMSE, and Elsevier JSS.

- [J-5] K. Davis, J. Deters, D. Özkan, **J.C. Davis**, and H. Murzi. *Applying Experiential Learning Theory to Understand Study Abroad Leaders' Experiences Using Real-Time Perspectives*. Frontiers: The Interdisciplinary Journal of Study Abroad, Vol. 34, No. 2, 2022 (Frontiers'22). 31 pages.
- [J-6] S. Herbold, A. Trautsch, B. Ledel, A. Aghamohammadi, T.A. Ghaleb, K.K. Chahal, T. Bossenmaier, B. Nagaria, P. Makedonski, M.N. Ahmadabadi, K. Szabados, H. Spieker, M. Madeja, N. Hoy, V. Lenarduzzi, S. Wang, G. Rodriguez-Perez, R. Colomo-Palacios, R. Verdecchia, P. Singh, Y. Qin, D. Chakroborti, W. Davis, V. Walunj, H. Wu, D. Marcilio, O. Alam, A. Aldaej, I. Amit, B. Turhan, S. Eismann, A.K. Wickert, I. Malavolta, M. Sulir, F. Fard, A.Z. Henley, S. Kourtzanidis, E. Tüzün, C. Treude, S.M. Shamasbi, I. Pashchenko, M. Wyrich, **J.C. Davis**, A. Serebrenik, E. Albrecht, E.U. Aktas, D. Strüber, and J. Erbel. *A Fine-grained Data Set and Analysis of Tangling in Bug Fixing Commits*. Empirical Software Engineering, 2022 (EMSE'22). 55 pages.
- [J-7] A. Kazerouni, **J.C. Davis**, A. Basak, C. Shaffer, F. Servant, and S. Edwards. *Fast and Accurate Incremental Feedback for Students' Software Tests Using Selective Mutation Analysis*. Journal of Systems and Software, 2021 (JSS'21). 22 pages.
- [J-8] D. Özkan, K. Davis, **J.C. Davis**, M. James, H. Murzi, and D. Knight. *Expectations and Experiences of Short-Term Study Abroad Leadership Teams*. Journal of International Engineering Education, 2020 (JIEE'20). 34 pages.

## REFEREED MAGAZINE ARTICLES

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- [M-1] T.R. Schorlemmer, E. Burmane, K. Kalu, S. Torres-Arias, and **J.C. Davis**. *Establishing Provenance Before Coding: Traditional and Next-Gen Software Signing*. IEEE Security & Privacy Magazine, special issue "Secure Software Before Codeing", 2025 (IEEE S&P Magazine'25). 8 pages.
- [M-2] X. Hu, Z. Jiao, A. Kocher, Z. Wu, J. Liu, **J.C. Davis**, G.K. Thiruvathukal, and Y.H. Lu. *Evolution of Winning Solutions in the 2021 Low-Power Computer Vision Challenge*. IEEE Computer, 2023 (Computer'23). 6 pages.
- [M-3] A. Goel, C. Tung, N. Eliopoulos, A. Wang, **J.C. Davis**, G.K. Thiruvathukal, and Y.H. Lu. *Tree-based Unidirectional Neural Networks for Low-Power Computer Vision*. IEEE Design & Test, 2022 (IEEE D&T'22). 6 pages.

## OTHER REFEREED WORKS: VISIONS, TOOLS, PRELIMINARY WORKS, COMPETITIONS

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- [W-1] P.C. Amusuo, P.V. Patil, O. Cochell, T. Le Lievre, and **J.C. Davis**. *A Unit Proofing Framework for Code-level Verification: A Research Agenda*. Proceedings of the ACM/IEEE 47th International Conference on Software Engineering — New Ideas and Emerging Results track (2025). 26% acceptance rate (25/97). 5 pages.
- [W-2] P.V. Patil, W. Jiang, H. Peng, D. Lugo, K.G. Kalu, J. LeBlanc, L. Smith, H. Heo, N. Aou, and **J.C. Davis**. *Recommending Pre-Trained Models for IoT Devices*. Proceedings of the 7th International Workshop on Software Engineering Research & Practices for the Internet of Things (2025). 5 pages.
- [W-3] S. Joshi, P. Mukherjee, K.A. Davis, and **J.C. Davis**. *Introducing Systems Thinking as a Framework for Teaching and Assessing Threat Modeling Competency*. Proceedings of the 2024 Annual Conference and Exposition of the American Society for Engineering Education (ASEE'24). ~50% acceptance rate (12 papers presented). 31 pages. *Best Paper Award, Software Engineering Division (given to 1 out of 12 papers)*.
- [W-4] B.A. Tanay, L. Arinze, S. Joshi, K.A. Davis, and **J.C. Davis**. *An Exploratory Study on Upper-Level Computing Students' Use of Large Language Models as Tools in a Semester-Long Project*. Proceedings of the



2024 Annual Conference and Exposition of the American Society for Engineering Education (ASEE'24). ~50% acceptance rate (12 papers presented). 27 pages.

- [W-5] **J.C. Davis**, P. Jajal, W. Jiang, T.R. Schorlemmer, N. Synovic, and G.K. Thiruvathukal. *Reusing Deep Learning Models: Challenges and Directions in Software Engineering*. Proceedings of the IEEE John Vincent Atanasoff Symposium on Modern Computing (JVA'23). 12 pages.
- [W-6] J. Srinivasan, S.R. Tanksalkar, P. Amusuo, **J.C. Davis**, and A. Machiry. *Towards Rehosting Embedded Applications as Linux Applications*. Proceedings of the 53rd Annual IEEE/IFIP International Conference on Dependable Systems and Networks — Disrupt track (DSN-Disrupt'23). 47% acceptance rate (17/36). 5 pages.
- [W-7] M. Shen, **J.C. Davis**, and A. Machiry. *Towards Automated Identification of Layering Violations in Embedded Applications (WIP)*. Proceedings of the 24th ACM SIGPLAN/SIGBED International Conference on Languages, Compilers, and Tools for Embedded Systems — Work-In-Progress Track (LCTES-WIP'23). 40% acceptance rate (14/35). 5 pages.
- [W-8] K.G. Kalu, T.R. Schorlemmer, S. Chen, K.A. Robinson, and **J.C. Davis**. *Reflecting on the use of the Policy-Process-Product Theory in Empirical Software Engineering*. Proceedings of the 31st ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering — Ideas, Visions, and Reflections track (ESEC/FSE-IVR'23). 48% acceptance rate (13/27). 5 pages.
- [W-9] W. Jiang\*, N. Synovic\*, P. Jajal, T.R. Schorlemmer, A. Tewari, B. Pareek, G.K. Thiruvathukal, and **J.C. Davis**. *PTMTorrent: A Dataset for Mining Open-source Pre-trained Model Packages*. Proceedings of the 20th Annual Conference on Mining Software Repositories — Data and Tool Showcase Track (MSR-Data'23). 54% acceptance rate (23/42). 5 pages.
- [W-10] T. Singla, D. Anandayuvraj, K.G. Kalu, T.R. Schorlemmer, and **J.C. Davis**. *An Empirical Study on Using Large Language Models to Analyze Software Supply Chain Security Failures*. Proceedings of the 2nd ACM Workshop on Software Supply Chain Offensive Research and Ecosystem Defenses (SCORED'23). 67% acceptance rate (14/21). 11 pages.
- [W-11] D. Anandayuvraj, P. Thulluri, J. Figueroa, H. Shandilya, and **J.C. Davis**. *Incorporating Failure Knowledge into Design Decisions for IoT Systems: A Controlled Experiment on Novices*. Proceedings of the 5th International Workshop on Software Engineering Research & Practices for the Internet of Things (SERP4IoT'23). 5 pages.
- [W-12] W. Jiang, N. Synovic, R. Sethi, A. Indarapu, M. Hyatt, T.R. Schorlemmer, G.K. Thiruvathukal, and **J.C. Davis**. *An Empirical Study of Artifacts and Security Practices in the Pre-trained Model Supply Chain*. Proceedings of the 1st ACM Workshop on Software Supply Chain Offensive Research and Ecosystem Defenses (SCORED'22). 57% acceptance rate (12/21). 10 pages.
- [W-13] A. Goel, C. Tung, X. Hu, G.K. Thiruvathukal, **J.C. Davis**, and Y.H. Lu. *Efficient Computer Vision on Edge Devices with Pipeline-Parallel Hierarchical Neural Networks*. Proceedings of the 27th Asia and South Pacific Design Automation Conference (ASP-DAC'22). 37% acceptance rate (95/260). 6 pages.
- [W-14] D. Anandayuvraj and **J.C. Davis**. *Reflecting on Recurring Failures in IoT Development*. Proceedings of the 37th IEEE/ACM International Conference on Automated Software Engineering — New Ideas and Emerging Results track (ASE-NIER'22). 36% acceptance rate (18/50). 5 pages.
- [W-15] D. Montes, P. Peerapatanapokin, J. Schultz, C. Guo, W. Jiang, and **J.C. Davis**. *Discrepancies among Pre-trained Deep Neural Networks: A New Threat to Model Zoo Reliability*. Proceedings of the 30th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering — Ideas, Visions, and Reflections track (ESEC/FSE-IVR'22). 25% acceptance rate (7/28). 5 pages.

- [W-16] P. Amusuo, A. Sharma, S.R. Rao, A. Vincent, and **J.C. Davis**. *Reflections on Software Failure Analysis*. Proceedings of the 30th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering — Ideas, Visions, and Reflections track (ESEC/FSE-IVR’22). 25% acceptance rate (7/28). 6 pages.
- [W-17] C. Okafor\*, T.R. Schorlemmer\*, S. Torres-Arias, and **J.C. Davis**. *SoK: Analysis of Software Supply Chain Security by Establishing Secure Design Properties*. Proceedings of the 1st ACM Workshop on Software Supply Chain Offensive Research and Ecosystem Defenses (SCORED’22). 57% acceptance rate (12/21). 10 pages.
- [W-18] N. Synovic, M. Hyatt, R. Sethi, S. Thota, Shilpika, A.J. Miller, W. Jiang, E.S. Amobi, A. Pinderski, K. Läufer, N.J. Hayward, N. Klingensmith, **J.C. Davis**, and G.K. Thiruvathukal. *Snapshot Metrics Are Not Enough: Analyzing Software Repositories with Longitudinal Metrics*. Proceedings of the 37th IEEE/ACM International Conference on Automated Software Engineering — Demonstrations track (ASE-Tool Demonstrations’22). 56% acceptance rate (23/41). 4 pages.
- [W-19] N. Gopalakrishna, D. Anandayuvraj, A. Detti, F. Bland, S. Rahaman, and **J.C. Davis**. *“If security is required”: Engineering and Security Practices for Machine Learning-based IoT Devices*. Proceedings of the 4th International Workshop on Software Engineering Research & Practices for the Internet of Things (SERP4IoT’22). 8 pages.
- [W-20] **J.C. Davis**, P. Amusuo, and J.R. Bushagour. *Experience Paper: A First Offering of Software Engineering*. Proceedings of the 1st International Workshop on Designing and Running Project-Based Courses in Software Engineering Education (ICSE-DREE’22). 5 pages.
- [W-21] N. Veselsky, J. West, I. Ahlgren, A. Goel, W. Jiang, K. Lee, Y. Kim, **J.C. Davis**, G.K. Thiruvathukal, and N. Klingensmith. *Establishing Trust in Vehicle-to-Vehicle Coordination: A Sensor Fusion Approach*. Proceedings of the 2nd Workshop on Data-Driven and Intelligent Cyber-Physical Systems for Smart Cities (DI-CPS) (DI-CPS’22). 6 pages.
- [W-22] J.M. Winkler, A. Agarwal, C. Tung, D.R. Ugalde, Y.J. Jung, and **J.C. Davis**. *A Replication of “Deep-Bugs: A Learning Approach to Name-based Bug Detection”*. Proceedings of the 29th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE’21 Artifact). 1 pages.
- [W-23] **J.C. Davis**. *On the Impact and Defeat of Regex DoS*. ACM Student Research Competition, 2019-2020 Grand Finals. **Second place, graduate student division**.
- [W-24] **J.C. Davis**. *Rethinking Regex Engines to Address ReDoS*. ACM Student Research Competition, 2019-2020 at ESEC/FSE’19. **First place, graduate student division**.
- [W-25] L. Rupperecht, **J.C. Davis**, C. Arnold, A. Lubbock, D. Tyson, and D. Bhagwat. *Ursprung: Provenance for Large-Scale Analytics Environments*. Proceedings of the 2019 International Conference on Management of Data (SIGMOD’19 Demo). 4 pages.
- [W-26] **J.C. Davis**, G. Kildow, and D. Lee. *The Case of the Poisoned Event Handler: Weaknesses in the Node.js Event-Driven Architecture*. Proceedings of the 10th European Workshop on Systems Security (EuroSec’17). 38% acceptance rate (9/24). 6 pages.

## PATENTS

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- [Pa-1] W. Jiang, C. Cheung, H. Kim, M. Kim, and **J.C. Davis**. *A method for identifying naming mismatches in neural networks based on their architectural properties*. Purdue University, U.S. provisional patent application 63/813,549. Filed May 28, 2025.

- [Pa-2] **J.C. Davis** and W. Davis. *Determining a validity of an event emitter based on a rule*. IBM, US Patent 11,875,185 B2. Granted Jan. 16, 2024.
- [Pa-3] W. Davis and **J.C. Davis**. *Verification of the Integrity of Data Files Stored in Copy-on-Write (CoW) Based File System Snapshots*. IBM, U.S. patent 11,176,090 B2. Granted Nov. 16, 2021.
- [Pa-4] **J.C. Davis** and W. Davis. *Injection of Simulated Hardware Failure(s) in a File System for Establishing File System Tolerance-to-Storage-Failure(s)*. IBM, U.S. patent 11,023,341 B2. Granted Jun. 1, 2021.
- [Pa-5] **J.C. Davis**, L. Rupprecht, D. Bhagwat, C. Arnold, and W. Sawdon. *Performing Hierarchical Provenance Collection*. IBM, U.S. patent 10,891,174 B1. Granted Jan. 12, 2021.
- [Pa-6] **J.C. Davis**, W. Davis. *File Metadata Verification in a Distributed File System*. IBM, U.S. patent 10,678,755 B2. Granted Jun. 9, 2020.
- [Pa-7] W. Davis and **J.C. Davis**. *Testing of Lock Managers in Computing Environments*. IBM, U.S. patent 10,061,777 B1. Granted Aug. 28, 2018.
- [Pa-8] **J.C. Davis**, W. Davis, and F. Knop. *Detection of File Corruption in a Distributed File System*. IBM, U.S. patent 10,025,788. Granted Jul. 17, 2018.

## BOOK CHAPTERS

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- [B-1] **J.C. Davis**. (2023). *Epilogue: The Computer Engineer as Tool-User*. In Y.H. Lu & G.K. Thiruvathukal, *Intermediate C Programming* (2nd edition, pp. 439–442). CRC Press.

## TECHNICAL REPORTS

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- [R-1] P. Amusuo, D. Liu, R.A.C. Méndez, J. Metzman, O. Chang, and **J.C. Davis**. *FalseCrashReducer: Mitigating False Positive Crashes in OSS-Fuzz-Gen Using Agentic AI*. <https://arxiv.org/pdf/2510.02185>. 2025.
- [R-2] S. Muralee, S. Cherupattamoolayil, **J.C. Davis**, A. Bianchi, and A. Machiry. *Reactive Bottom-Up Testing*. <https://arxiv.org/pdf/2509.03711>. 2025.
- [R-3] **J.C. Davis**, S. Chen, H. Peng, P. Amusuo, and K. Kalu. *A Guide to Stakeholder Analysis for Cybersecurity Researchers*. <https://arxiv.org/pdf/2508.14796>. 2025.
- [R-4] M. Ahmed, M. Abdelmouty, M. Kim, G. Kandula, A. Park, and **J.C. Davis**. *Advancing Jailbreak Strategies: A Hybrid Approach to Exploiting LLM Vulnerabilities and Bypassing Modern Defenses*. <https://arxiv.org/pdf/2506.21972>. 2025.
- [R-5] K.G. Kalu, S. Okorafor, B. Durak, K. Laine, R.C. Moreno, S. Torres-Arias, and **J.C. Davis**. *ARMS: A Vision for Actor Reputation Metric Systems in the Open-Source Software Supply Chain*. <https://arxiv.org/pdf/2505.18760>. 2025.
- [R-6] P. Jajal, N. Eliopoulos, B.S.H. Chou, G.K. Thiruvathukal, **J.C. Davis**, and Y.H. Lu. *Inference-Time Alignment of Diffusion Models with Evolutionary Algorithms*. <https://arxiv.org/pdf/2506.00299>. 2025.
- [R-7] H. Peng, A. Gupte, R. Hasler, N. Eliopoulos, C. Ho, R. Mantri, L. Deng, K. Läufer, G.K. Thiruvathukal, and **J.C. Davis**. *SysLLMatic: Large Language Models are Software System Optimizers*. <https://arxiv.org/pdf/2506.01249>. 2025.
- [R-8] C. Okafor, T. Kuppusamy, **J.C. Davis**, and S. Torres-Arias. *DiVerify: Hardening Identity-Based Software Signing with Programmable Diverse-Context Scopes*. <https://arxiv.org/pdf/2406.15596>. 2025.

- [R-9] B. Çakar, C. Sale, S. Chen, E. Burmane, D. Lee, and **J.C. Davis**. *Is Reuse All You Need? A Systematic Comparison of Regular Expression Composition Strategies*. <https://arxiv.org/pdf/2503.20579>. 2025.
- [R-10] K.G. Kalu, S. Okorafor, T. Singla, S. Torres-Arias, and **J.C. Davis**. *Why Johnny Signs with Sigstore: Examining Tooling as a Factor in Software Signing Adoption in the Sigstore Ecosystem*. <https://arxiv.org/pdf/2503.00271>. 2025.
- [R-11] H. Gao, M. Zahedi, W. Jiang, H.Y. Lin, **J.C. Davis**, and C. Treude. *AI Safety in the Eyes of the Downstream Developer: A First Look at Concerns, Practices, and Challenges*. <https://arxiv.org/pdf/2503.19444>. 2025.
- [R-12] A. Rozema and **J.C. Davis**. *Anti-Phishing Training Does Not Work: A Large-Scale Empirical Assessment of Multi-Modal Training Grounded in the NIST Phish Scale*. <https://arxiv.org/pdf/2506.19899>. 2025.
- [R-13] N. Ravi, A. Goel, **J.C. Davis**, and G.K. Thiruvathukal. *Improving the Reproducibility of Deep Learning Software: An Initial Investigation through a Case Study Analysis*. <https://arxiv.org/pdf/2505.03165>. 2025.
- [R-14] H. Peng, A. Gupte, N. Eliopoulos, C. Ho, R. Mantri, L. Deng, W. Jiang, Y.H. Lu, K. Läufer, G.K. Thiruvathukal, and **J.C. Davis**. *Large Language Models for Energy-Efficient Code: Emerging Results and Future Directions*. <https://arxiv.org/pdf/2410.09241>. 2024.
- [R-15] V. Purohit, W. Jiang, A.R. Ravikiran, and **J.C. Davis**. *A Partial Replication of MaskFormer in TensorFlow on TPUs for the TensorFlow Model Garden*. <https://arxiv.org/pdf/2404.18801>. 2024.
- [R-16] V. Banna, A. Chinnakotla, Z. Yan, A. Vegesana, N. Vivek, K. Krishnappa, W. Jiang, Y.H. Lu, G.K. Thiruvathukal, and **J.C. Davis**. *An Experience Report on Machine Learning Reproducibility: Guidance for Practitioners and TensorFlow Model Garden Contributors*. <https://arxiv.org/abs/2107.00821>. 2021.

## POSTERS

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- [Ps-1] M. Ahmed, M. Abdelmouty, M. Kim, G. Kandula, A. Park, and **J.C. Davis**. *Advancing Jailbreak Strategies: A Hybrid Approach to Exploiting LLM Vulnerabilities*. Poster Session of the IEEE Secure Development Conference (**IEEE SecDev–Poster’25**).
- [Ps-2] K.G. Kalu and **J.C. Davis**. *Investigating Software Provenance Consistency in the Open Source Publishing Pipeline*. Poster Session of the 34th USENIX Security Symposium (**USENIX Security–Poster’25**).
- [Ps-3] B. Çakar, C. Sale, S. Chen, E. Burmane, D. Lee, and **J.C. Davis**. *Is Reuse All You Need? A Systematic Comparison of Regular Expression Composition Strategies*. The 12th Greater Chicago Area Systems Research Workshop (**GCASR’25**).
- [Ps-4] H. Peng, A. Gupte, R. Hasler, K. Laufer, G.K. Thiruvathukal, and **J.C. Davis**. *Towards Scalable and Performance-Aware Code Optimization with LLMs*. The 12th Greater Chicago Area Systems Research Workshop (**GCASR’25**).
- [Ps-5] L. Yadava, P. Kumar, Z. Homrich, R. Potta, P. Kapila, and **J.C. Davis**. *Optimizing Multi-Agent Collaboration in Software Engineering*. The 12th Greater Chicago Area Systems Research Workshop (**GCASR’25**).
- [Ps-6] K.G. Kalu, S. Torres-Arias, and **J.C. Davis**. *Software Signing: Practical Adoption, Challenges, and Tooling Usability*. 2025 Purdue CERIAS Symposium (**CERIAS’25**). *Award: Best Poster — 1st-place*.

- [Ps-7] N. Synovic, K. Ryzka, A.V. Solari, **J.C. Davis**, and G.K. Thiruvathukal. *Exploring Deep Neural Network Reuse in Computational Natural Science*. The Loyola University Chicago Undergraduate Research and Engagement Symposium (**2025**).
- [Ps-8] L. Franke, H. Liang, A. Brantly, **J.C. Davis**, and C. Brown. *A First Look at the General Data Protection Regulation (GDPR) in Open-Source Software*. Proceedings of the ACM/IEEE 46th International Conference on Software Engineering — Poster Track (**ICSE-Poster'24**).
- [Ps-9] S.R. Tanksalkar, J. Srinivasan, S. Danduri, P. Amusuo, **J.C. Davis**, and A. Machiry. *LeMix: Rehosting Embedded Systems at Linux Applications for Effective Vulnerability Detection*. 2024 Purdue CERIAS Symposium (**CERIAS'24**). *Award: Best Poster — 1st-place*.
- [Ps-10] K.G. Kalu, S. Torres-Arias, and **J.C. Davis**. *Navigating Software Supply Chain Risks: Practitioner Perspectives on Software Signing*. 2024 Purdue CERIAS Symposium (**CERIAS'24**).
- [Ps-11] T.R. Schorlemmer, W. Jiang, and **J.C. Davis**. *Machine Learning Supply Chain Security*. 2023 Purdue CERIAS Symposium (**CERIAS'23**). *Award: Best Poster — 2nd-place*.
- [Ps-12] W. Jiang, T.R. Schorlemmer, and **J.C. Davis**. *Trustworthy Re-use of Pre-trained Neural Networks*. 2023 Purdue CERIAS Symposium (**CERIAS'23**).
- [Ps-13] W. Maxam and **J.C. Davis**. *Plan for an evaluation of government cyber threat hunting processes*. 2022 Purdue CERIAS Symposium (**CERIAS'22**).
- [Ps-14] N. Hornbrook and **J.C. Davis**. *An Intercultural Engineering Module for Software Engineers*. 2021 Annual Colloquium for International Engineering Education (**ACIEE'21**).
- [Ps-15] N. Vivek, A. Chinnakotla, V. Banna, A. Vegesana, Z. Yan, **J.C. Davis**, Y.H. Lu, and G.K. Thiruvathukal. *Exemplars for Machine Learning: Towards Software Engineering & Reproducibility*. SIAM Conference on Computational Science and Engineering (**CSE'21**).

## COURSES DESIGNED\* OR RE-DESIGNED†

†ECE 461 – Software Engineering <i>Purdue University</i>	Launched Fall 2021
*ECE 595 – Advanced Software Engineering <i>Purdue University</i>	Launched Spring 2021
†ECE 30862 – Software Engineering Tools <i>Purdue University</i>	Revamped Fall 2021

## COURSES TAUGHT

ECE 461 – Software Engineering <i>Purdue University</i>	Fall 2021, Spring 2023, Fall 2023, Fall 2024, Fall 2025
ECE 595 – Advanced Software Engineering <i>Purdue University</i>	Spring 2021, Spring 2022, Spring 2024
ECE 368 – Data Structures <i>Purdue University</i>	Fall 2020
Vertically Integrated Project: Open-Source TensorFlow Software <i>Purdue University</i>	F20, S21, F21, S22, F22, S23, F23
Vertically Integrated Project: Software Engineering w/Pre-Trained Models	Spring 2024, Fall 2024

*Purdue University*

**Vertically Integrated Project: SafeRegex**

Fall 2020, Spring 2021

*Purdue University*

**CS 3114 – Data Structures and Algorithms**

Fall 2019

*Virginia Tech*

**CS 1064 – Introduction to Programming in Python**

Spring 2019

*Virginia Tech*

**Rising Sophomore Abroad Program (Track Leader)**

Spring 2018, Spring 2019

*Virginia Tech*

## **GRADUATE STUDENT ADVISING**

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### **DOCTORAL STUDENTS, AS COMMITTEE CHAIR**

Dr. Wenxin Jiang	PhD	Graduated 2025
Paschal Amusuo	PhD candidate	Fall 2021–present, expected Spring 2026
Dharun Anandayuvraj	PhD student	Fall 2021–present, expected Fall 2026
Purvish Jajal (with Y.H. Lu)	PhD student	Fall 2022–present
Kelechi Gabriel Kalu	PhD student	Spring 2023–present, expected Fall 2027
Berk Çakar	PhD student	Fall 2024–present, expected Spring 2029
Huiyun Peng	PhD student	Fall 2024–present, expected Spring 2029
Nicholas J. Eliopoulous (with Y.H. Lu)	PhD student	Fall 2024–present
Daniel Lugo, US Space Force	PhD student	Fall 2024–present, expected Spring 2027
Andrew Rozema	PhD student	Fall 2024–present, expected Spring 2028
Ricardo Andrés Calvo Méndez	PhD student	Fall 2025–present, expected Spring 2030

### **MSC-THESIS STUDENTS, AS COMMITTEE CHAIR**

William Maxam, US Coast Guard	MSc	Graduated 2023
Geoffrey Cramer	MSc	Graduated 2023
Jason Jones	MSc	Graduated 2024
Taylor Schorlemmer, US Army	MSc	Graduated 2024
Parth V. Patil		Spring 2024–present, expected Fall 2025
Tanmay Singla		Fall 2024–present, expected Spring 2026
Sofia Okorafor, US Navy		Fall 2024–present, expected Spring 2026

## DOCTORAL STUDENTS, AS COMMITTEE MEMBER

Abhinav Goel	PhD	Graduated 2022
Qiang Xu	PhD	Graduated 2024
Andreas Kellas (Columbia University)	PhD candidate	
Chinenye Okafor	PhD student	Fall 2022–present
Akul Pillai	PhD student	Fall 2022–present
Mingjie Shen	PhD student	Fall 2021–present

## MSC-THESIS STUDENTS, AS COMMITTEE MEMBER

Xiao Hu	MSc	Graduated 2022
Jayashree Srinivasan	MSc	Graduated 2023

## INVITED TALKS

<b>Software Engineering for Machine Learning: Re-using Pre-Trained Neural Networks</b> <i>Purdue University</i>	2025
<b>Reusing Pre-Trained Neural Networks: A Software Engineering Perspective</b> <i>McGill University, Montreal, Canada</i>	2025
<b>Reusing Pre-Trained Neural Networks: A Software Engineering Perspective</b> <i>Concordia University, Montreal, Canada</i>	2025
<b>Regular Expression Denial of Service: Past, Present, and Future</b> <i>Dagstuhl seminar on “Regular Expressions: Matching and Indexing”</i>	2024
<b>Quick and Dirty or Slow and Steady? Two Techniques for Validating Embedded Software</b> <i>Rolls Royce Headquarters, Derby, UK</i>	2024
<b>Reusing Pre-Trained Neural Networks: A Software Engineering Perspective</b> <i>The University of Arizona. Tucson, AZ</i>	2024
<b>Failure-Aware SW Development Lifecycles: Opportunities for Intra-/Inter-Org. Learning</b> <i>Purdue CERIAS External Advisory Board</i>	2024
<b>An Interview Study on Third-Party Cyber Threat Hunting Processes in the U.S. Department of Homeland Security</b> <i>Purdue CERIAS Annual Symposium</i>	2024
<b>Practices and Hazards in Reusing Pre-Trained Neural Networks: A SWEng Perspective</b> <i>Michigan Technical University. Houghton, MI</i>	2024
<b>Practices and Hazards in Reusing Pre-Trained Neural Networks: A SWEng Perspective</b> <i>Carnegie Mellon University. Pittsburgh, PA</i>	2023
<b>Software reuse practices and hazards in the pre-trained neural network supply chain</b> <i>The University of Notre Dame. South Bend, IN</i>	2023
<b>Missing Links in the Pre-Trained Neural Network Supply Chain</b> <i>Argonne National Laboratories. Lemont, IL</i>	2023
<b>Analysis of Failures and Risks in Deep Learning Model Converters<sup>5</sup></b>	2023

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<sup>5</sup>Joint presentation by me (virtual) and my student Purvish Jajal (physical).

<i>ONNX Community Meetup, NVIDIA Headquarters. Santa Clara, CA</i>	
<b>Towards a Trustworthy Pre-Trained Neural Network Supply Chain</b> <i>Loyola University Chicago. Chicago, IL</i>	2022
<b>Challenges in Global Software Development</b> <i>University of Wisconsin–Stout. Menomonie, WI</i>	2021
<b>Regexes Awry: Characterizing and Defeating Regex-based Denial of Service</b> <i>Clemson University. Clemson, SC</i>	2020
<b>Regex-based Denial of Service</b> <i>Clarkson University. Potsdam, NY</i>	2020
<b>Improving Software Security Through Empiricism: A DoS Case Study in Regex</b> <i>Colorado School of Mines. Golden, CO</i>	2020
<b>Improving Software Security Through Empiricism: A DoS Case Study in Regex</b> <i>Pennsylvania State University. State College, PA</i>	2020
<b>Improving Software Security Through Empiricism: A DoS Case Study in Regex</b> <i>University of Nebraska. Lincoln, NE</i>	2020
<b>Improving Software Security Through Empiricism: A DoS Case Study in Regex</b> <i>York University. Toronto, Canada</i>	2019
<b>Regexes are Hard: Qualitative and Quantitative Perspectives</b> <i>North Carolina State University. Raleigh, NC</i>	2019
<b>The Dangers of Copy/Pasting Code</b> <i>Episode of the Podcast “The Secure Developer”: <a href="https://tinyurl.com/DavisResearchPodcast">https://tinyurl.com/DavisResearchPodcast</a></i>	2019
<b>Regexes in the Wild</b> <i>Virginia Tech. Blacksburg, VA</i>	2019
<b>Academic Perspectives on Node.js</b> <i>Node.js Collaborator Summit. Vancouver, Canada</i>	2018
<b>International Engineering</b> <i>Rising Sophomore Abroad Program, Virginia Tech. Blacksburg, VA</i>	Annual, 2015–2019

## ACADEMIC COMMUNITY SERVICE

### REVIEWER: MAJOR CONFERENCE TECHNICAL TRACKS<sup>6</sup>

PC Member, AAAI	2026
PC Member, ICSE	2025, 2026
PC Member, USENIX Security	2025, 2026
PC Member, ESEC/FSE	2023, 2025
PC Member, ASE	2021, 2024
PC Member, ISSTA	2024, 2025

<sup>6</sup>In my research areas, service on the technical program committees (“PC member”) is the most respected form of peer review service. This typically involves the review of 5-15 papers per conference.



## REVIEWER: JOURNALS

Reviewer, IEEE Transactions on Software Engineering (TSE)  
Reviewer, ACM Transactions on Software Engineering and Methodology (TOSEM)  
Reviewer, Springer Empirical Software Engineering (EMSE)  
Reviewer, Journal of Systems and Software (JSS)  
Reviewer, Journal of Online Trust & Safety (JOTS)

## REVIEWER: OTHER SERVICE AS REFEREE (MINOR VENUES OR NON-TECHNICAL TRACKS)

PC Member, European Workshop on Systems Security (EuroSec) 2024, 2025  
PC Member, IEEE SecDev 2024  
Reviewer, IEEE-CS SWEBOK Guide V4 (Guide to the Software Engineering Body of Knowledge) 2024  
Reviewer, SANER–Early Research Achievement Track 2024  
PC Member, Twelfth Workshop on Education for High-Performance Computing (EduHPC) 2024  
PC Member, LCTES 2023  
Reviewer, SCAM–Engineering track 2023  
PC Member, ACM Workshop on Software Supply Chain Offens. Res. and Ecosystem Def. 2022, 2023  
Reviewer, ASE–Doctoral Symposium Track 2022  
Reviewer, ICSE–Demonstrations Track 2021  
Reviewer, ESEC/FSE–Artifact Track 2020, 2021  
Judge, CSAW’21 Best Paper Competition 2021, 2023  
Reviewer, CGO–Artifact Track 2019  
Sub-reviewer: Middleware’17, ASPLOS’18, EuroSys’18, MASCOTS’18, HPCA’19, CGO’19 2016–2019

## ORGANIZATIONAL SERVICE

Organizing Committee, ICSE 2025 Student Mentoring Workshop (ICSE-SMeW) 2024-2025  
Panelist and Mentor, ICSE Student Mentoring Workshop (ICSE-SMeW) 2024  
Mentor, ICSE Student Mentoring Workshop (ICSE-SMeW) 2023

## NATIONAL SERVICE

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US National Science Foundation, Panelist 2025  
US National Science Foundation, Panelist 2023

## UNIVERSITY SERVICE

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ECE Representative on the COE Graduate Education Award Selection Committee	2025
Lead for BSc.-Computer Engineering, Purdue ECE ABET Committee 5-year self-evaluation	2024–2025
Organizer, Junior Faculty Peer Mentoring Teatime	2024
Organizer, CAREER writing group	2024, 2025
Organizer, Software Systems Reading Group	2024
Member, Committee to Create MSc-Software Engineering	2024
Breakout session discussion lead: LLMs in education — ECE ADVANCE	2024
Member, Purdue ECE Faculty Search Committee – Prof. of Practice in Software Engineering	2023–2024
Member, Purdue ECE ABET Committee	2023
Member, Purdue ECE Ad Hoc Faculty Search Committee	2023
Member, Purdue ECE Faculty Search Committee — Software Engineering	2022–2023
Host, Computer Engineering Seminar Series — Dr. Joanna C. S. Santos (Notre Dame)	2022
Host, Purdue Engineering Distinguished Lecture Series (PEDLS) — Dr. Nancy Leveson (MIT)	2022
Member, Purdue ECE Undergraduate Curriculum Committee	2020–2022
Panelist, CS@Virginia Tech Academic Jobs Panel	2021
President, Virginia Tech CS Graduate Student Council	2018–2019
Organizer, Virginia Tech Systems Reading Group	2017–2020

## SHORT COURSES AND WORKSHOPS ATTENDED

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Dagstuhl seminar on “Regular Expressions: Matching and Indexing”	2024
Generative AI Assistance in Grant Proposal Writing (Purdue University–Internal)	2024
Inclusive Research as a Pathway to Broadening Participation and Instit. Excellence (NSF+ODIB)	2024
Leadership Skills for Engineering and Science Faculty (Leiserson and McVinney)	2024
NSF Grand Challenges in Resilience Workshop, Purdue University	2023
Tools to Foster Students’ (Cross-)cultural Sensitivity in Engineering Ethical Decision-Making (ASEE’22, Clancy & Qiu)	2022
Effective College Teaching (Brent & Felder)	2020
Intercultural Pedagogy Grant Training Program, Purdue CILMAR	2020

## PROFESSIONAL MEMBERSHIPS

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Senior Member, Institute of Electrical and Electronics Engineers (IEEE)	<i>Elevated to Senior in 2022</i>
Member, Association for Computing Machinery (ACM)	
Member, American Society for Engineering Education (ASEE)	

## AWARDS AND RECOGNITION

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### FOR RESEARCH

Paul C. Krause Faculty Research Award ( <i>ECE Young Faculty Research</i> )	2025
PickleBall: Best Artifact Award, CCS	2025
Best Paper Award, Software Engineering Division, ASEE 2024 ( <i>Educational research</i> )	2024
ACM Distinguished Paper Award, ESEC/FSE 2020	2020
Second place, Grand Finals of the ACM Graduate Student Research Competition	2020
First place, Graduate Student Research Competition, ESEC/FSE 2019	2019
ACM Distinguished Paper Award, ASE 2019	2019
Pratt Fellowship, Virginia Tech College of Engineering	2017–2019
Davenport Fellowship, Virginia Tech College of Engineering	2019
Graduate Fellow, VT Academy for Global Engineering	2019–2020
Microsoft Security Researcher Acknowledgments ( <i>for Regex DoS discoveries</i> )	2018
IBM Significant Contributor Award ( <i>for Node.js</i> )	2018
ACM Distinguished Paper Award, ESEC/FSE 2018	2018

### FOR TEACHING

ECE's nominee for "COE Faculty Excellence Award in Exceptional Early Career Teaching"	2025
Nominated for "HKN Outstanding Faculty Member" ( <i>did not win</i> )	2023, 2024
2022 Ruth and Joel Spira Outstanding Teacher Award	2022
One of the "Outstanding Engineering Teachers" (COE) ( <i>course evaluation scores</i> )	F'21, S+F'22, S'24

### FOR SERVICE

FSE 2025 Distinguished Reviewer Award ( <i>~15/201 PC members</i> )	2025
USENIX 2025 Distinguished Reviewer Award ( <i>20/490 PC members</i> )	2025
Nominated for "Purdue Favorite Faculty Award" ( <i>did not win</i> )	2024
ASE 2021 Distinguished PC Member Award	2021
Outstanding Graduate Student Service Award, CS@VT	2020

### FOR MENTORING

Outstanding Faculty Mentor — School of Electrical & Computer Engineering	2024
VIP Outstanding Team Mentor Award, Purdue TensorFlow Team	2021