James C. Davis

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Elmore Family School of Electrical and Computer Engineering
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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

Ph.D, Computer Science and Applications 2015–2020
Virginia Tech, Blacksburg, VA

B.Sc. Computer Science, B.Sc. Mathematics 2008–2012
Clarkson University, Potsdam, NY

PROFESSIONAL EXPERIENCE

Assistant Professor Fall 2020-present
Purdue University — Electrical and Computer Engineering

Intern, Microsoft Research (RiSE group: Cloud Security) Summer 2019
Microsoft Research, Redmond, WA — Mentored by Patrice Godefroid

Intern, IBM Research (Storage) Summer 2018
IBM Research, Almaden, CA — Mentored by Deepavali Bhagwat

Graduate Research Assistant 2016–2020
Virginia Tech — Advised by Dongyoon Lee

Software Engineer, IBM (GPFS) 2012–2017
IBM, Poughkeepsie, NY

EXTERNAL GRANTS

TOTAL: $3,879,234. TOTAL AS PI: $1,192,326. MY TOTAL SHARE: $2,121,174.[1]

[G-1] **NSF #2537308: Collaborative Research: Planning: CROSS: Building a Community aROund Securing the Research Software Supply Chain**

PI (Co-PI: Alexandra Harris-Watson)

US National Science Foundation

2025–2027. $105,113.

[G-2] **AutoUP: Automated Unit Proofing**

PI

OpenAI — Cybersecurity Grant Program

2025. API credits valued at $5,000.

[1] 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. Anandayuvaraj

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.

[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)[2] *These venues are CORE2023 rank A or A*.[3]*

[C-1] 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-2] 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.

[C-3] P.C. Amusuo, K.A. Robinson, T. Singla, H. Peng, A. Machiry, S. Torres-Arias, L. Simon, and **J.C. Davis**. *ZTD_{JAVA}: 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-4] 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.

[2] 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.

[3] 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] 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-6] 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-7] 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-8] M.H.M. Bhuiyan*, B. Cakar*, 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-9] 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-10] 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-11] D. Anandayuvaraj, 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-12] 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-13] 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-14] 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-15] J. Chen, D. Anandayuvaraj, **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-16] 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-17] 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-18] 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-19] 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-20] 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-21] 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-22] 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-23] 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-24] 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-25] 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-26] **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-27] 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-28] L. Rupprecht, **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-29] **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-30] 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-31] **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-32] 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-33] 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-34] **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-35] **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-36] **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[4]

[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.

[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.

[4] 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-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. Aldaeej, 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

[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

[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. Anandayuvaraj, 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. Anandayuvaraj, 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. Anandayuvaraj 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. Anandayuvaraj, 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 "DeepBugs: 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. Rupprecht, **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

[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

[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

[R-1] **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-2] 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-3] 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-4] 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-5] 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-6] 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-7] B. Cakar, 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-8] 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-9] 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-10] W. Jiang, B. Cakar, M. Lysenko, and **J.C. Davis**. *ConfuGuard: Using Metadata to Detect Active and Stealthy Package Confusion Attacks Accurately and at Scale*. `https://arxiv.org/pdf/2502.20528`. 2025.

[R-11] 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-12] 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-13] 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-14] 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-15] 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

[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. Cakar, 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 Launched Fall 2021
Purdue University

***ECE 595 – Advanced Software Engineering** Launched Spring 2021
Purdue University

†ECE 30862 – Software Engineering Tools Revamped Fall 2021
Purdue University

COURSES TAUGHT

ECE 461 – Software Engineering Fall 2021, Spring 2023, Fall 2023, Fall 2024, Fall 2025
Purdue University

ECE 595 – Advanced Software Engineering Spring 2021, Spring 2022, Spring 2024
Purdue University

ECE 368 – Data Structures Fall 2020
Purdue University

Vertically Integrated Project: Open-Source TensorFlow Software F20, S21, F21, S22, F22, S23, F23
Purdue University

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

DOCTORAL STUDENTS, AS COMMITTEE CHAIR

Dr. Wenxin Jiang	PhD	Graduated 2025
Paschal Amusuo		Fall 2021–present, expected Spring 2026
Dharun Anandayuvaraj		Fall 2021–present, expected Fall 2026
Purvish Jajal (with Y.H. Lu)		Fall 2022–present
Kelechi Gabriel Kalu		Spring 2023–present, expected Fall 2027
Berk Çakar		Fall 2024–present, expected Spring 2029
Huiyun Peng		Fall 2024–present, expected Spring 2029
Nicholas J. Eliopoulous (with Y.H. Lu)		Fall 2024–present
Daniel Lugo, US Space Force		Fall 2024–present, expected Spring 2027
Andrew Rozema		Fall 2024–present, expected Spring 2028
Ricardo Andrés Calvo Méndez		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
Chinenye Okafor		Fall 2022–present
Akul Pillai		Fall 2022–present
Mingjie Shen		Fall 2021–present
Andreas Kellas (Columbia University)		

MSC-THESIS STUDENTS, AS COMMITTEE MEMBER

Xiao Hu	MSc	Graduated 2022
Jayashree Srinivasan	MSc	Graduated 2023

INVITED TALKS

Reusing Pre-Trained Neural Networks: A Software Engineering Perspective 2025
McGill University, Montreal, Canada

Reusing Pre-Trained Neural Networks: A Software Engineering Perspective 2025
Concordia University, Montreal, Canada

Regular Expression Denial of Service: Past, Present, and Future 2024
Dagstuhl seminar on "Regular Expressions: Matching and Indexing"

Quick and Dirty or Slow and Steady? Two Techniques for Validating Embedded Software 2024
Rolls Royce Headquarters, Derby, UK

Reusing Pre-Trained Neural Networks: A Software Engineering Perspective 2024
The University of Arizona. Tucson, AZ

Failure-Aware SW Development Lifecycles: Opportunities for Intra-/Inter-Org. Learning 2024
Purdue CERIAS External Advisory Board

An Interview Study on Third-Party Cyber Threat Hunting Processes in the U.S. Department of Homeland Security 2024
Purdue CERIAS Annual Symposium

Practices and Hazards in Reusing Pre-Trained Neural Networks: A SWEng Perspective 2024
Michigan Technical University. Houghton, MI

Practices and Hazards in Reusing Pre-Trained Neural Networks: A SWEng Perspective 2023
Carnegie Mellon University. Pittsburgh, PA

Software reuse practices and hazards in the pre-trained neural network supply chain 2023
The University of Notre Dame. South Bend, IN

Missing Links in the Pre-Trained Neural Network Supply Chain 2023
Argonne National Laboratories. Lemont, IL

Analysis of Failures and Risks in Deep Learning Model Converters[5] 2023
ONNX Community Meetup, NVIDIA Headquarters. Santa Clara, CA

Towards a Trustworthy Pre-Trained Neural Network Supply Chain 2022
Loyola University Chicago. Chicago, IL

Challenges in Global Software Development 2021
University of Wisconsin–Stout. Menomonie, WI

Regexes Awry: Characterizing and Defeating Regex-based Denial of Service 2020
Clemson University. Clemson, SC

Regex-based Denial of Service 2020
Clarkson University. Potsdam, NY

Improving Software Security Through Empiricism: A DoS Case Study in Regex 2020
Colorado School of Mines. Golden, CO

Improving Software Security Through Empiricism: A DoS Case Study in Regex 2020
Pennsylvania State University. State College, PA

Improving Software Security Through Empiricism: A DoS Case Study in Regex 2020
University of Nebraska. Lincoln, NE

Improving Software Security Through Empiricism: A DoS Case Study in Regex 2019

[5] Joint presentation by me (virtual) and my student Purvish Jajal (physical).

York University. Toronto, Canada

Regexes are Hard: Qualitative and Quantitative Perspectives 2019
North Carolina State University. Raleigh, NC

The Dangers of Copy/Pasting Code 2019
Episode of the Podcast "The Secure Developer": `https://tinyurl.com/DavisResearchPodcast`

Regexes in the Wild 2019
Virginia Tech. Blacksburg, VA

Academic Perspectives on Node.js 2018
Node.js Collaborator Summit. Vancouver, Canada

International Engineering Annual, 2015–2019
Rising Sophomore Abroad Program, Virginia Tech. Blacksburg, VA

ACADEMIC COMMUNITY SERVICE

REVIEWER: MAJOR CONFERENCE TECHNICAL TRACKS[6]

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

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)

[6] 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: 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

US National Science Foundation, Panelist 2025

US National Science Foundation, Panelist 2023

UNIVERSITY SERVICE

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

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

Senior Member, Institute of Electrical and Electronics Engineers (IEEE) *Elevated to Senior in 2022*

Member, Association for Computing Machinery (ACM)

Member, American Society for Engineering Education (ASEE)

AWARDS AND RECOGNITION

FOR RESEARCH

Best Paper Award, Software Engineering Division, ASEE 2024 (educational research)	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 (Regex DoS)	2018
IBM Significant Contributor Award (Node.js)	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" *(did not win)*	2023, 2024
2022 Ruth and Joel Spira Outstanding Teacher Award	2022
One of the "Outstanding Engineering Teachers" (COE) *(course evaluation scores)*	F'21, S+F'22, S'24

FOR SERVICE

FSE 2025 Distinguished Reviewer Award *(∼15/201 PC members)*	2025
USENIX 2025 Distinguished Reviewer Award *(20/490 PC members)*	2025
Nominated for "Purdue Favorite Faculty Award" *(did not win)*	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