Daniel E. Krutz

Rochester Institute of Technology
Department of Software Engineering
ESL Global Cybersecurity Institute
Golisano Building 70
Rochester, NY 14623-5608
Director: Autonomy, WARfare, and Engineering (AWARE) Lab

Phone: (585) 475-2896
Email: dxkvse@rit.edu
Homepage: https://danielkrutz.github.io
Lab: http://aware.rit.edu

RESEARCH INTERESTS

Strategic Reasoning, Autonomic Computing, Computing Education

EDUCATION

Ph.D. Computer Science, Nova Southeastern University, 2013.
Dissertation: Code Clone Discovery Based on Concolic Analysis
M.S. Software Design & Management, Rochester Institute of Technology, 2007.
B.S. Computer Science & History (Military History Specialization), St. John Fisher College, 2004.

EMPLOYMENT

- Assistant Professor, Department of Software Engineering, RIT 2017–Present
- Lecturer, Department of Software Engineering, RIT 2010–2017

APPOINTMENTS

Research Fellow, US Air Force Office of Scientific Research (AFRL/RI), 2018

RESEARCH GRANTS

[PI: $2.5M+; Co-PI: $1.7M+ in federal funding]

G1: NSF, "CPS: Small: Informed Contextual Bandits to Support Decision-Making for Intelligent CPS", $499,899 (PI: **Daniel Krutz**; Co-PI: Travis Desell, Alex Ororbia; 9/22 - 9/25).
G2: NSA, "GenCyber @ RIT: Secure Computing", $150,361 (PI: **Daniel Krutz**; Co-PI: Bruce Herring, Robert St. Jacques; 7/22 - 7/24).
G3: NSF, "CAREER: Investigating the Use of Empathy-Building Interventions in Experiential Computing Education", $588,426 (PI: **Daniel Krutz**; Co-PI: None; 10/22 - 9/27).
G4: NSA, "GenCyber @ RIT: Secure Computing", $71,160 (PI: **Daniel Krutz**; Co-PI: Robert St Jacques, Bruce Herring; 8/21 - 8/22).
G5: NSF, "Intervention-Based Experiential Education Labs", $749,926 ($671,070 RIT + $78,856 Bethune-Cookman University) (PI: **Daniel Krutz**; Co-PI: Samuel Malachowsky; 9/21 - 9/24).
G6: NSA, "GenCyber @ RIT: Secure Computing", $60,184 (PI: **Daniel Krutz**; Co-PI: Stacey Watson, Sumita Mishra; 4/20 - 3/22).
G7: NSA, "GenCyber @ RIT: Secure Computing", $106,023 (PI: **Daniel Krutz**; Co-PI: Stacey Watson, Jayalaxmi Charavarthy, Robert St. Jacques; 4/19 - 4/20).

G8: AFRL, "Uncertainty Reduction in Self-Adaptive Systems to Increase System Effectiveness, Efficiency and Resiliency", "Extension Grant" (PI: **Daniel Krutz**; 4/19 - 12/19).
G9: ONR, "A Multimodal Dynamic Bayesian Learning Framework for Complex Decision-making", $1,586,800 (PI: Qi Yu; Co-PI: **Daniel Krutz**; 10/18 - 9/22).
G10: NSF, "Developing Experiential Laboratories for Computing Accessibility Education", $299,994 (PI: **Daniel Krutz**; Co-PI: Samuel Malachowsky, Paul Tymann, Yasmine El-Glaly; 9/18 - 8/21).
G11: NSF, "Collaborative Research: Interactive Video-Enhanced Tutorials on Problem Solving in Physics", $290,105 (PI: Robert Teese; Co-PI: Michelle Chabot; Sr. Person **Daniel Krutz**; 9/18 - 8/21).
G12: NSA, "GenCyber @ RIT: Secure Web and Mobile Computing", $130,908 (PI: Rajendra Raj; Co-PI: **Daniel Krutz**; 5/18 - 4/19).
G13: RIT, "Making Self-Adaptive Systems More Resilient By Reducing Decision-Making Uncertainty'", $5,000 (PI: **Daniel Krutz**; Co-PI: None; 5/18 - 9/18).
G14: SIGSCE, "Inclusive Apps: Supporting Mobile Accessibility Standards Through Educational Exercises", $3,800 (PI: **Daniel Krutz**; Co-PI: Yasmine El-Glaly; 1/17 - 12/17).
G15: RIT, "FEED Development ", $3,150 (PI: **Daniel Krutz**; Co-PI: None; 1/17 - 12/17).
G16: RIT, "PLASMA: A Set of Educational Mobile Security Modules", $1,800 (PI: **Daniel Krutz**; Co-PI: None; 1/16 - 12/16).
G17: RIT, "FEED Development ", $3,150 (PI: **Daniel Krutz**; Co-PI: None; 1/16 - 12/16).
G18: SIGSCE, "Supporting Education Using a Public Oracle of Vulnerable Mobile Apps", $2,400 (PI: **Daniel Krutz**; Co-PI: None; 1/16 - 12/16).
G19: RIT, "Investigating Android M Permissions: Adoption, Ratings, and Malware", $1,800 (PI: **Daniel Krutz**; Co-PI: None; 1/15 - 12/15).
G20: RIT, "Enhancing Software Engineering Education for Deaf/HoH Students", $525 (PI: **Daniel Krutz**; Co-PI: None; 1/15 - 12/15).

GIFTS

G21: Visions Global Empowerment, "Women in Computing Hackathon", $2,750 (PI: **Daniel Krutz**; Co-PI: None; 11/20).

PUBLICATIONS

[1] Haq, Aizaz U. ; Deshpande, Niranjana ; ElSaid, AbdElRahman ; Desell, Travis ; Krutz, Daniel E.: Addressing Tactic Volatility in Self-Adaptive Systems Using Evolved Recurrent Neural Networks and Uncertainty Reduction Tactics. In: *Proceedings of the Genetic and Evolutionary Computation Conference*. New York, NY, USA : Association for Computing Machinery, 2022 (GECCO '22). – ISBN 9781450392372, 12991307

[2] Zhu, Yuansheng ; Shi, Weishi ; Pandey, Deep S. ; Liu, Yang ; Que, Xiaofan ; Krutz, Daniel E. ; Yu, Qi: Uncertainty-Aware Multiple Instance Learning from Large-Scale Long Time Series Data. In: *2021 IEEE International Conference on Big Data (Big Data)*, 2021, S. 1772–1778

[3] Deshpande, N. ; Sharma, N. ; Yu, Q. ; Krutz, D. E.: R-CASS: Using Algorithm Selection for Self-Adaptive Service Oriented Systems. In: *2021 IEEE International Conference on Web Services (ICWS)*. Los Alamitos, CA, USA : IEEE Computer Society, sep 2021, 61-72. – Best Paper Award

[4] ElSaid, AbdElRahman ; Karns, Joshua ; Lyu, Zimeng ; Krutz, Daniel ; Ororbia, Alexander ; Desell, Travis: Improving Neuroevolutionary Transfer Learning of Deep Recurrent Neural Networks through Network-Aware Adaptation. In: *Proceedings of the 2020 Genetic and Evolutionary Computation Conference*. New York, NY, USA : Association for Computing Machinery, 2020 (GECCO '20). – ISBN 9781450371285, 315323. – Best paper nominee

[5] ElSaid, AbdElRahman ; Karns, Joshua ; II, Alexander O. ; Krutz, Daniel ; Lyu, Zimeng ; Desell, Travis: *Neuroevolutionary Transfer Learning of Deep Recurrent Neural Networks through Network-Aware Adaptation*. 2020

[6] Shi, Weishi ; Malachowsky, Samuel ; El-Glaly, Yasmine ; Yu, Qi ; Krutz, Daniel E.: Presenting and Evaluating the Impact of Experiential Learning in Computing Accessibility Education. In: *Proceedings of the ACM/IEEE 42nd International Conference on Software Engineering: Software Engineering Education and Training*. New York, NY, USA : Association for Computing Machinery, 2020 (ICSE-SEET '20). – ISBN 9781450371247, 4960. – Distinguished Paper Award

[7] Shi, Weishi ; Khan, Saad ; El-Glaly, Yasmine ; Malachowsky, Samuel ; Yu, Qi ; Krutz, Daniel E.: Experiential Learning in Computing Accessibility Education. In: *Proceedings of the ACM/IEEE 42nd International Conference on Software Engineering: Companion Proceedings*. New York, NY, USA : Association for Computing Machinery, 2020 (ICSE '20). – ISBN 9781450371223, 250251

[8] ElSaid, AbdElRahman ; Karnas, Joshua ; Lyu, Zimeng ; Krutz, Daniel ; Ororbia, Alexander G. ; Desell, Travis: Neuro-Evolutionary Transfer Learning Through Structural Adaptation. In: *International Conference on the Applications of Evolutionary Computation (Part of EvoStar)* Springer, 2020, S. 610–625

[9] Palmerino, J. ; Yu, Q. ; Desell, T. ; Krutz, D.: Improving the Decision-Making Process of Self-Adaptive Systems by Accounting for Tactic Volatility. In: *2019 34th IEEE/ACM International Conference on Automated Software Engineering (ASE)*, 2019. – ISSN 1938–4300, S. 949–961

[10] Scoccia, Gian L. ; Peruma, Anthony ; Pujols, Virginia ; Malavolta, Ivano ; Krutz, Daniel E.: Permission Issues in Open-Source Android Apps: An Exploratory Study. In: *2019 19th International Working Conference on Source Code Analysis and Manipulation (SCAM)* IEEE, S. 238–249

[11] ElSaid, A. ; Desell, T. ; Krutz, D.: Is Adaptivity a Core Property of Intelligent Systems? It Depends. In: *2019 IEEE/ACM 14th International Symposium on Software Engineering for Adaptive and Self-Managing Systems (SEAMS)*, 2019

[12] Scoccia, Gian L. ; Peruma, Anthony ; Pujols, Virginia ; Christians, Ben ; Krutz, Daniel E.: An Empirical History of Permission Requests and Mistakes in Open Source Android Apps. In: *Proceedings of the 16th International Conference on Mining Software Repositories*, 2019 (MSR '19)

[13] Peruma, Anthony ; Krutz, Daniel: Security: a critical quality attribute in self-adaptive systems. In: *2018 IEEE/ACM 13th International Symposium on Software Engineering for Adaptive and Self-Managing Systems (SEAMS)* IEEE, 2018

[14] Peruma, Anthony ; Palmerino, Jeffrey ; Krutz, Daniel E.: Investigating user perception and comprehension of android permission models. In: *Proceedings of the 5th International Conference on Mobile Software Engineering and Systems* ACM, 2018, S. 56–66

[15] Peruma, Anthony ; Krutz, Daniel E.: Understanding the Relationship Between Quality and Security: A Large-Scale Analysis of Android Applications. In: *International Workshop on Security Awareness from Design to Deployment*. New York, NY, USA : ACM, 2018 (SEAD 2018)

[16] Peruma, Anthony ; Malachowsky, Samuel A. ; Krutz, Daniel E.: Providing an Experiential Cybersecurity Learning Experience Through Mobile Security Labs. In: *International Workshop on Security Awareness from Design to Deployment*. New York, NY, USA : ACM, 2018 (SEAD 2018)

[17] El-Glaly, Yasmine N. ; Peruma, Anthony ; Krutz, Daniel E. ; Hawker, J. S.: Apps for Everyone: Mobile Accessibility Learning Modules. In: *ACM Inroads* 9 (2018), April, Nr. 2, 30–33. http://dx.doi.org/10.1145/3182184. – DOI 10.1145/3182184. – ISSN 2153–2184

[18] Krutz, Daniel E. ; Richards, Thomas: Cyber Security Education: Why Don't We Do Anything About It? In: *ACM Inroads* 8 (2017), Oktober, Nr. 4, 5–5. http://dx.doi.org/10.1145/3132217. – DOI 10.1145/3132217. – ISSN 2153–2184

[19] Krutz, Daniel E. ; Munaiah, Nuthan ; Peruma, Anthony ; Mkaouer, Mohamed W.: Who Added That Permission to My App?: An Analysis of Developer Permission Changes in Open Source Android Apps. In: *Proceedings of the 4th International Conference on Mobile Software Engineering and Systems*. Piscataway, NJ, USA : IEEE Press, 2017 (MOBILESoft '17). – ISBN 978–1–5386–2669–6, 165–169

[20] McAfee, Patrick ; Mkaouer, Mohamed W. ; Krutz, Daniel E.: CATE: Concolic Android Testing Using Java Pathfinder for Android Applications. In: *Proceedings of the 4th International Conference on Mobile Software Engineering and Systems*. Piscataway, NJ, USA : IEEE Press, 2017 (MOBILESoft '17). – ISBN 978–1–5386–2669–6, 213–214

[21] Chester, Piper ; Jones, Chris ; Mkaouer, Mohamed W. ; Krutz, Daniel E.: M-perm: A Lightweight Detector for Android Permission Gaps. In: *Proceedings of the 4th International Conference on Mobile Software Engineering and Systems*. Piscataway, NJ, USA : IEEE Press, 2017 (MOBILESoft '17). – ISBN 978–1–5386–2669–6, 217–218

[22] Dennis, Colton ; Krutz, Daniel E. ; Mkaouer, Mohamed W.: P-lint: A Permission Smell Detector for Android Applications. In: *Proceedings of the 4th International Conference on Mobile Software Engineering and Systems*. Piscataway, NJ, USA : IEEE Press, 2017 (MOBILESoft '17). – ISBN 978–1–5386–2669–6, 219–220

[23] Krutz, Daniel E. ; Malachowsky, Samuel A.: Teaching android security through examples: a publicly available database of vulnerable apps. In: *ACM Inroads* 7 (2016), Nr. 4, S. 96–98

[24] Conference Organization. In: *2016 International Conference on Cloud and Autonomic Computing (ICCAC)*, 2016, S. ix–xi

[25] Krutz, Daniel E. ; Munaiah, Nuthan ; Meneely, Andrew ; Malachowsky, Samuel A.: Examining the Relationship Between Security Metrics and User Ratings of Mobile Apps: A Case Study. In: *Proceedings of the International Workshop on App Market Analytics*. New York, NY, USA : ACM, 2016 (WAMA 2016). – ISBN 978–1–4503–4398–5, 8–14

[26] Krutz, Daniel E. ; Mirakhorl, Mehdi: Architectural Clones: Toward Tactical Code Reuse. In: *Proceedings of the 31st Annual ACM Symposium on Applied Computing*. New York, NY, USA : ACM, 2016 (SAC '16). – ISBN 978–1–4503–3739–7, 1480–1485

[27] Munaiah, Nuthan ; Klimkowsky, Casey ; McRae, Shannon ; Blaine, Adam ; Malachowsky, Samuel A. ; Perez, Cesar ; Krutz, Daniel E.: Darwin: a static analysis dataset of malicious and benign Android apps. In: *Proceedings of the International Workshop on App Market Analytics* ACM, 2016, S. 26–29

[28] Malachowsky, S. A. ; Krutz, D. E.: A project component in a web engineering course. In: *2015 IEEE Frontiers in Education Conference (FIE)*, 2015, S. 1–6

[29] Krutz, D. E. ; Meneely, A. ; Malachowsky, S. A.: An insider threat activity in a software security course. In: *2015 IEEE Frontiers in Education Conference (FIE)*, 2015, S. 1–6

[30] Krutz, Daniel E. ; Mirakhorli, Mehdi ; Malachowsky, Samuel A. ; Ruiz, Andres ; Peterson, Jacob ; Filipski, Andrew ; Smith, Jared: A dataset of open-source Android applications. In: *Mining Software Repositories (MSR), 2015 IEEE/ACM 12th Working Conference on Mining Software Repositories* IEEE, 2015, S. 522–525

[31] Krutz, Daniel E. ; Malachowsky, Samuel A. ; Shihab, Emad: Examining the effectiveness of using concolic analysis to detect code clones. In: *Proceedings of the 30th Annual ACM Symposium on Applied Computing* ACM, 2015, S. 1610–1615

[32] Krutz, D. E. ; Malachowsky, S. A. ; Jones, S. D. ; Kaplan, J. A.: Enhancing the educational experience for deaf and hard of hearing students in software engineering. In: *2015 IEEE Frontiers in Education Conference (FIE)*, 2015, S. 1–9

[33] Krutz, Daniel E. ; Le, Wei: A code clone oracle. In: *Proceedings of the 11th Working Conference on Mining Software Repositories* ACM, 2014, S. 388–391

[34] Krutz, Daniel E. ; Malachowsky, Samuel A. ; Reichlmayr, Thomas: Using a Real World Project in a Software Testing Course. In: *Proceedings of the 45th ACM Technical Symposium on Computer Science Education*. New York, NY, USA : ACM, 2014 (SIGCSE '14). – ISBN 978–1–4503–2605–6, 49–54

[35] Krutz, Daniel E. ; Shihab, Emad: CCCD: Concolic code clone detection. In: *Reverse Engineering (WCRE), 2013 20th Working Conference on* IEEE, 2013, S. 489–490

[36] Krutz, D. E. ; Meneely, A.: Teaching Web Engineering using a project component. In: *2013 IEEE Frontiers in Education Conference (FIE)*, 2013. – ISSN 0190–5848, S. 1366–1368

[37] Krutz, D. E. ; Vallino, J. R.: Experiencing disruptive behavior in a team using moles. In: *2013 IEEE Frontiers in Education Conference (FIE)*, 2013. – ISSN 0190–5848, S. 1492–1495

[38] Krutz, D. E. ; Lutz, M.: Bug of the Day: Reinforcing the importance of testing. In: *2013 IEEE Frontiers in Education Conference (FIE)*, 2013. – ISSN 0190–5848, S. 1795–1799

[39] Krutz, Daniel E.: *Code Clone Discovery Based on Concolic Analysis*, Diss., 2013. – 139 S.

[40] Lutz, M. J. ; Vallino, J. R. ; Martnez, K. ; Krutz, D. E.: Instilling a software engineering mindset through freshman Seminar. In: *2012 Frontiers in Education Conference Proceedings*, 2012. – ISSN 0190–5848, S. 1–6

WORKSHOPS, TUTORIALS AND OTHER PRESENTATIONS

P1: *Tutorial*, "The Accessible Learning Labs: Supporting Accessibility Education" (ASE) Ann Arbor, Michigan, United States - October, 2022
P2: *Tutorial*, "ALL: Accessibility Learning Labs for Computing Accessibility Education" (ITISCE) Remote, (COVID), - July, 2021
P3: *Tutorial*, "Supporting Computing Accessibility Education Using Experiential Learning Labs" (CCSCNE) Remote, (COVID), - April, 2021
P4: *Tutorial*, "Using Experiential Learning to Support Accessibility in Computing Education" (CSEE&T) Remote, (COVID), - October, 2020
P5: *Tutorial*, "Creating Accessible Software Using Experiential Learning Labs" (ASE) Remote, (COVID), - September, 2020
P6: *Panel*, "What and How to Teach Accessibility" (SIGSCE) Remote, (COVID), - June, 2020
P7: *Presentation*, "Accessibility Learning Labs" (CCSCNE) New Haven, Connecticut, USA - April, 2019
P8: *Invited Talk*, "Mobile Security Education" (n/a) Technische Universität Berlin, Berlin, Germany - July, 2017
P9: *Presentation*, "PLASMA: Educational Mobile Security Labs" (SEED Workshop) Syracuse, New York, USA - June, 2017
P10: *Presentation*, "Experiential Cybersecurity Educational Labs" (NYCWiC) Rochester, New York, USA - April, 2017

EXTERNAL SERVICE

Advisory Boards

S1: U.S. Department of Defense: Algorithmic Warfare Cross Functional Team (AWCFT) Academic Innovation Council (Project Maven). 2019 - present

Grant Reviewer

S2: National Science Foundation (NSF) panelist: 2019, 2020, 2021, 2022
S3: Maryland Industrial Partnerships Program (MIPS): 2020

Program Committees

S4: Association for Computing Machinery's Special Interest Group on Computer Science Education (SIGSCE). 2023 - Present
S5: International Conference on Model Driven Engineering Languages and Systems -SRC (MODELS). 2021 - Present
S6: International Symposium on Cluster, Cloud and Internet Computing (CCGrid). 2019 - Present
S7: Consortium for Computing Sciences in Colleges (CCSCNE). 2019 - Present
S8: Innovation & Technology in Computer Science Education (ITiCSE). 2018 - Present

Conference Organizing Committees

S9: International Conference on Cloud and Autonomic Computing (ICCAC). Poster Chair. 2017
S10: International Conference on Cloud and Autonomic Computing (ICCAC). Web Chair. 2016

Publication Reviewer

S11: ACM Inroads
S12: Empirical Software Engineering (EMSE)
S13: IEEE Access
S14: Journal of Systems and Software (JSS)
S15: IEEE Software
S16: Journal of Network and Computer Applications (JNCA)
S17: Special Interest Group on Computer Science Education (SIGCSE)
S18: Computers & Security
S19: Journal of Visual Language & Computing
S20: International Conference on University Learning and Teaching (InCULT)
S21: Frontiers in Education (FIE)
S22: American Society for Engineering Education (ASEE)

UNIVERSITY SERVICE

S23: Software Engineering Graduate Curriculum Committee: 2021-present
S24: ESL GCI Seed Proposal Reviewer: 2020-Present
S25: College Academic Senate: 2019-2022
S26: University Council: 2019-2021
S27: GCCIS College Governance Committee (Chair 2017-2022): 2016-2022
S28: University Nominations Committee: 2020-2022
S29: Coordinator for concurrent sections of Introduction to Software Engineering course (12-15 sections with 240-300 students): 2010-2016
S30: Software Engineering Undergraduate Curriculum Committee: 2012-2016
S31: Software Engineering honors advocate: 2015-2017

PhD Students

St1: Advisor: Sheeraja Rajakrishnan: *TBD* - Graduation: TBD
St2: Advisor: Yang Lui: *TBD* - Graduation: TBD
St3: Committee Member: Benjamin Meyers: *Helping Software Developers Confront and Organize Their Mistakes with Human Error Informed Micro Post-Mortems* - Graduation: TBD
St4: Committee Member: AbdElRahman A. ElSaid: *Nature Inspired Topology Optimization Of Recurrent Neural Networks* - Graduation: 2021

SUPERVISED MASTERS THESES

St5: Aizaz UL Haq – MS 12/21 "Evaluation of Neuro-Evolution Algorithms for Tactic Volatility Aware Processes" *RIT*
St6: Saad Khan – MS 7/21 "Pedagogical Evaluation of Cognitive Accessibility Learning Lab in the Classroom" *RIT*
St7: Jan Guillermo – MS 7/19 "Accessibility Lab: Audio Cues" *RIT*
St8: Jeff Palmerino – MS 5/19 "TVA: A Requirements Driven, Machine-Learning Approach for Addressing Tactic Volatility in Self-Adaptive Systems" *RIT*
St9: Saleh Rebaz – MS 11/17 "Mining User Reviews To Extract Features For Initial Release Of Mobile Apps" *RIT*
St10: Jhaveri Sweta – MS 8/17 "An Empirical Analysis of Privacy Leaks in Android Apps" *RIT*
St11: Tilekar Rohan – MS 8/17 "Extraction and Quality Analysis of Third Party Libraries in Android" *RIT*

COURSES TAUGHT

C1: Research Methods (Graduate)
C2: Web Engineering (Undergraduate) - *Developed new course*
C3: Engineering of Secure Software (Undergraduate)
C4: Foundations of Software Engineering (Graduate)
C5: Introduction to Software Engineering (Undergraduate)
C6: Software Testing (Undergraduate)
C7: Freshman Seminar (Undergraduate)
C8: Senior Project Coaching (Undergraduate)
C9: Engineering of Enterprise Software Systems (Undergraduate)

INDUSTRY EXPERIENCE

- Technology Consultant, Mindex Technologies 8/2009 – 8/2010.
- Sr. Software Engineer, 5Linx Enterprises, 2/2009–8/2009.
- R&D Software Developer, Xerox Corporation 5/2004–1/2009.

PROFESSIONAL ASSOCIATIONS

- Association for Computing Machinery (ACM)
- Institute of Electrical and Electronics Engineers (IEEE)
- Access Computing

REFERENCES

Available upon request

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