

# Daniel E. Krutz

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## RESEARCH INTERESTS

Autonomic Computing, Decision Support, 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

G1: NSA, “GenCyber @ RIT: Secure Computing”, \$106,023 (PI: **Daniel Krutz**; Co-PI: Jayalaxmi Charavarthy, Robert St. Jacques; 4/19 - 4/20).

G2: AFRL, “Uncertainty Reduction in Self-Adaptive Systems to Increase System Effectiveness, Efficiency and Resiliency”, “Extension Grant” (PI: **Daniel Krutz**; 4/19 - 12/19).

G3: 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).

G4: NSF, “Developing Experiential Laboratories for Computing Accessibility Education”, \$299,994 (PI: **Daniel Krutz**; Co-PI: Paul Tymann, Yasmine El-Glaly; 9/18 - 8/21).

G5: 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).

- G6: NSA, “GenCyber @ RIT: Secure Web and Mobile Computing”, \$130,908 (PI: Rajendra Raj; Co-PI: **Daniel Krutz**; 5/18 - 4/19).
- G7: RIT, “Making Self-Adaptive Systems More Resilient By Reducing Decision-Making Uncertainty”, \$5,000 (PI: **Daniel Krutz**; Co-PI: None; 5/18 - 9/18).
- G8: SIGSCE, “Inclusive Apps: Supporting Mobile Accessibility Standards Through Educational Exercises”, \$3,800 (PI: **Daniel Krutz**; Co-PI: Yasmine El-Glaly; 1/17 - 12/17).
- G9: RIT, “FEED Development ”, \$3,150 (PI: **Daniel Krutz**; Co-PI: None; 1/17 - 12/17).
- G10: RIT, “PLASMA: A Set of Educational Mobile Security Modules”, \$1,800 (PI: **Daniel Krutz**; Co-PI: None; 1/16 - 12/16).
- G11: RIT, “FEED Development ”, \$3,150 (PI: **Daniel Krutz**; Co-PI: None; 1/16 - 12/16).
- G12: SIGSCE, “Supporting Education Using a Public Oracle of Vulnerable Mobile Apps”, \$2,400 (PI: **Daniel Krutz**; Co-PI: None; 1/16 - 12/16).
- G13: RIT, “Investigating Android M Permissions: Adoption, Ratings, and Malware”, \$1,800 (PI: **Daniel Krutz**; Co-PI: None; 1/15 - 12/15).
- G14: RIT, “Enhancing Software Engineering Education for Deaf/HoH Students”, \$525 (PI: **Daniel Krutz**; Co-PI: None; 1/15 - 12/15).

## PUBLICATIONS

- [1] SHI, Weishi ; MALACHOWSKY, Samuel ; EL-GLALY, Yasmine ; YU, Qi ; KRUTZ, Daniel: Presenting and Evaluating the Impact of Experiential Learning in Computing Accessibility Education. In: *Proceedings of the 42nd International Conference on Software Engineering*, 2020 (ICSE)
- [2] ELSAID, Abdelrahman ; KARNS, Joshua ; LYU, Zimeng ; KRUTZ, Daniel ; DESELL, Travis: Neuro-Evolutionary Transfer Learning through Structural Adaptation. In: *23rd European Conference on the Applications of Evolutionary and bio-inspired Computation*, 2020 (EvoAPPs 2020)
- [3] 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
- [4] SCOCCIA, G. ; PERUMA, A. ; PUJOLS, V. ; MALAVOLTA, I. ; KRUTZ, D: Permission Issues in Open-source Android Apps: An Exploratory Study. In: *2019 IEEE 19th International Working Conference on Source Code Analysis and Manipulation (SCAM)*, 2019
- [5] 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
- [6] 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)
- [7] 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

- [8] 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
- [9] 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)
- [10] 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)
- [11] 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
- [12] 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
- [13] 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
- [14] 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
- [15] 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
- [16] 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
- [17] 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
- [18] Conference Organization. In: *2016 International Conference on Cloud and Autonomic Computing (ICCAC)*, 2016, S. ix–xi
- [19] 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
- [20] 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

- [21] 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
- [22] 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
- [23] 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
- [24] 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
- [25] 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
- [26] 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
- [27] 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
- [28] 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
- [29] KRUTZ, Daniel E. ; SHIHAB, Emad: CCCD: Concolic code clone detection. In: *Reverse Engineering (WCRE), 2013 20th Working Conference on* IEEE, 2013, S. 489–490
- [30] 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
- [31] 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
- [32] 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
- [33] KRUTZ, Daniel E.: *Code Clone Discovery Based on Concolic Analysis*, Diss., 2013. – 139 S.
- [34] 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: *Workshop*, “Experiential Accessibility Learning Labs for Computing Education” (SIGSCE) Portland, Oregon, USA - March, 2020
- P2: *Panel*, “What and How to Teach Accessibility” (SIGSCE) Portland, Oregon, USA - March, 2020

- P3: *Presentation*, “Accessibility Learning Labs” (CCSCNE) New Haven, Connecticut, USA - April, 2019  
 P4: *Invited Talk*, “Mobile Security Education” (n/a) Technische Universität Berlin, Berlin, Germany - July, 2017  
 P5: *Presentation*, “PLASMA: Educational Mobile Security Labs” (SEED Workshop) Syracuse, New York, USA - June, 2017  
 P6: *Presentation*, “Experiential Cybersecurity Educational Labs” (NYCWIC) Rochester, New York, USA - April, 2017

## SERVICE

### Advisory Boards

- S1: Algorithmic Warfare Cross Functional Team (Project Maven) Academic Innovation Council. 2019 - present

### Grant Review Panel

- S2: National Science Foundation (NSF) review panels: 2019

### Program Committees

- S3: International Symposium on Cluster, Cloud and Internet Computing (CCGrid). 2019 - Present  
 S4: Consortium for Computing Sciences in Colleges (CCSCNE). 2019 - Present  
 S5: Special Interest Group on Computer Science Education (SIGCSE). 2019 - Present  
 S6: Innovation & Technology in Computer Science Education (ITiCSE). 2018 - Present

### Conference Organizing Committees

- S7: International Conference on Cloud and Autonomic Computing (ICCAC). Poster Chair. 2017  
 S8: International Conference on Cloud and Autonomic Computing (ICCAC). Web Chair. 2016

## UNIVERSITY SERVICE

- S9: College Academic Senate (Also University Council Representative) 2019 - Present  
 S10: College Governance Committee 2016-Present (Chair 2017 - Present)  
 S11: Coordinator for concurrent sections of Introduction to Software Engineering course (12-15 sections with 240-300 students) (2010-2016)  
 S12: Software Engineering undergraduate curriculum committee, 2012-2016  
 S13: Software Engineering honors advocate 2015-2017

### Publication Reviewer

- S14: Empirical Software Engineering (EMSE)  
 S15: Journal of Systems and Software (JSS)  
 S16: IEEE Software  
 S17: Journal of Visual Language & Computing  
 S18: International Conference on University Learning and Teaching (InCULT)  
 S19: Frontiers in Education (FIE)  
 S20: American Society for Engineering Education (ASEE)

## PhD Students

### *Committee Member*

- AbdElRahman A. ElSaid “*Nature Inspired Topology Optimization Of Recurrent Neural Networks*”

## SUPERVISED MASTERS THESES

- Jan Guillermo – MS 7/19 “Accessibility Lab: Audio Cues” *MIT*
- Jeff Palmerino – MS 5/19 “TVA: A Requirements Driven, Machine-Learning Approach for Addressing Tactic Volatility in Self-Adaptive Systems” *MIT*
- Saleh Rebaz – MS 11/17 “Mining User Reviews To Extract Features For Initial Release Of Mobile Apps” *MIT*
- Jhaveri Sweta – MS 8/17 “An Empirical Analysis of Privacy Leaks in Android Apps” *MIT*
- Tilekar Rohan – MS 8/17 “Extraction and Quality Analysis of Third Party Libraries in Android” *MIT*

## COURSES TAUGHT

C1: Research Methods (graduate course)  
C2: Web Engineering  
C3: Engineering of Secure Software  
C4: Foundations of Software Engineering (graduate course)  
C5: Introduction to Software Engineering  
C6: Software Testing  
C7: Freshman Seminar  
C8: Senior Project Coaching  
C9: Engineering of Enterprise Software Systems  
C10: Independent Study

## 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

Last updated: January 17, 2020