

# Daniel E. Krutz

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## RESEARCH INTERESTS

Autonomic Computing, Mobile Security, 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, 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 Research Laboratory, 2018

## PUBLICATIONS

- [1] PERUMA, Anthony ; KRUTZ, Daniel E.: Security: A Critical Quality Attribute in Self-Adaptive Systems. In: *13th International Symposium on Software Engineering for Adaptive and Self-Managing Systems*, 2018 (SEAMS '18)
- [2] PERUMA, Anthony ; PALMERO, 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*, 2018 (MOBILESoft '18)
- [3] 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)
- [4] 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)

- [5] 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
- [6] 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
- [7] 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
- [8] 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
- [9] 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
- [10] 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
- [11] 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
- [12] Conference Organization. In: *2016 International Conference on Cloud and Autonomic Computing (ICCAC)*, 2016, S. ix–xi
- [13] 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
- [14] 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
- [15] 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
- [16] 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
- [17] 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

- [18] 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 IEEE*, 2015, S. 522–525
- [19] 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
- [20] 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
- [21] 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
- [22] 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
- [23] KRUTZ, Daniel E. ; SHIHAB, Emad: CCCD: Concolic code clone detection. In: *Reverse Engineering (WCRE), 2013 20th Working Conference on IEEE*, 2013, S. 489–490
- [24] 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
- [25] 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
- [26] 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
- [27] KRUTZ, Daniel E.: *Code Clone Discovery Based on Concolic Analysis*, Diss., 2013. – 139 S.
- [28] 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

## GRANTS

[≈\$1.7M federal funding]

- ONR, “A Multimodal Dynamic Bayesian Learning Framework for Complex Decision-making”, \$1,586,799 (Co-PI (2 total project personnel), 9/18 - 8/22).
- NSA, “2018 Gencyber Program”, \$130,908 (Co-PI, 5/18 - 9/18).
- RIT, “Making Self-Adaptive Systems More Resilient By Reducing Decision-Making Uncertainty”, \$5,000 (PI, 5/18 - 9/18).
- RIT, “Mobile Accessibility Modules for Computing Courses”, \$11,200 (PI, 1/17 - 12/17).
- SIGSCE, “Inclusive Apps: Supporting Mobile Accessibility Standards Through Educational Exercises”, \$3,800 (PI, 1/17 - 12/17).
- RIT, “PLASMA: A Set of Educational Mobile Security Modules”, \$1,800 (PI, 1/16 - 12/16).
- RIT, “FEED Development”, \$3,150 (PI, 1/16 - 12/16).
- SIGSCE, “Supporting Education Using a Public Oracle of Vulnerable Mobile Apps”, \$2,400 (PI, 1/16 - 12/16).

- RIT, “Investigating Android M Permissions: Adoption, Ratings, and Malware”, \$1,800 (PI, 1/15 - 12/15).
- RIT, “Enhancing Software Engineering Education for Deaf/HoH Students”, \$525 (PI, 1/15 - 12/15).

## INVITED TALKS

- Technische Universität Berlin, Berlin, Germany, 7/17
- SEED Security Workshop, Syracuse, NY, 6/17
- New York Celebration of Women in Computing, Rochester, NY, 4/17

## COURSES TAUGHT

- Web Engineering: Spring 2012 - present (developed new course).
- Research Methods (graduate course) - Fall 2016 - Present
- Engineering of Secure Software - Fall 2014 - Spring 2017
- Foundations of Software Engineering (graduate course) - Fall 2015 - 2017
- Introduction to Software Engineering: Fall, - Present
- Software Testing: Fall 2010 - Fall 2014.
- Freshman Seminar: Fall 2011, 2012 & 2015.
- Senior Project Coaching: 2010-present.
- Engineering of Enterprise Software Systems: Spring 2013 - Present
- Independent Study: Spring 2013-Present

## Theses Supervised

- Saleh Rebaz – MS 11/17 “Mining User Reviews To Extract Features For Initial Release Of Mobile Apps” *RIT*
- Jhaveri Sweta – MS 8/17 “An Empirical Analysis of Privacy Leaks in Android Apps” *RIT*
- Tilekar Rohan – MS 8/17 “Extraction and Quality Analysis of Third Party Libraries in Android” *RIT*

## SERVICE

### Conference Organizing Committees

- Innovation & Technology in Computer Science Education (ITiCSE). Associate PC. 2016 - Present
- IEEE International Conference on Cloud and Autonomic Computing (ICCAC). Poster Chair. 2017
- IEEE International Conference on Cloud and Autonomic Computing (ICCAC). Web Chair. 2016

### Publication Reviewer

- Journal of Visual Language & Computing
- (ASEE) American Society for Engineering Education. 2011-present
- (FIE) Frontiers in Education. 2013-present
- (InCULT) International Conference on University Learning and Teaching 2016 - Present

## 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

- Access Computing <https://www.washington.edu/accesscomputing/>
- Association for Computing Machinery (ACM)
- Institute of Electrical and Electronics Engineers (IEEE)

## UNIVERSITY SERVICE

- College Governance Committee 2016-Present (Chair 2017 - Present)
- Coordinator for concurrent sections of Introduction to Software Engineering course (12-15 sections with 240-300 students) (2010-2016)
- Undergraduate curriculum committee, 2012-2016
- Software Engineering Honors Advocate 2015-Present

## REFERENCES

Available upon request

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