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EDUCATION

Ph.D. in Computing & Information Sciences Aug 2018 - Dec 2023
Rochester Institute of Technology

Advisor—Dr. Andrew Meneely
Committee—Dr. Daniel Krutz, Dr. Mehdi Mirakhorli, Dr. Emily Prud'hommeaux

Dissertation Title—Human Error Assessment in Software Engineering
Dissertation Abstract—Software engineers work under strict constraints, balancing a complex, multi-phase development process on top of user support and professional development. Despite their best efforts, software engineers experience **human errors**, which manifest as software defects. While some defects are simple bugs, others can be costly security vulnerabilities. Practices such as defect tracking and vulnerability disclosure help software engineers reflect on the outcomes of their human errors (*i.e.* software failures), and even the faults that led to those failures, but not the underlying human behaviors. While human error theory from psychology research has been studied and applied to medical, industrial, and aviation accidents, researchers are only beginning to systematically reflect on software engineers' human errors. Some software engineering research has used human error theories from psychology to help developers identify and organize their human errors (mistakes) during requirements engineering activities, but developers need an improved and systematic way to reflect on their human errors during other phases of software development. The goal of this dissertation is ***to help software engineers confront and reflect on their human errors by creating a process to document, organize, and analyze human errors***. To that end, our research comprises three phases: (1) systematization (*i.e.* identification and taxonomization) of software engineers' human errors from literature and development artifacts into a Taxonomy of Human Errors in Software Engineering (T.H.E.S.E.), (2) evaluation and refinement of T.H.E.S.E. based on software engineers' perceptions and natural language insights, and (3) creation of a human error informed micro post-mortem process and the Human Error Reflection Engine (H.E.R.E.), a proof-of-concept GitHub workflow facilitating human error reflection. In demonstrating the utility of T.H.E.S.E. and our micro post-mortem process, the software development community will be closer to inculcating the wisdom of historical developer human errors, enabling them to engineer higher quality and more secure software.

Notable Coursework
Regression Analysis • Nonparametric Statistics & Bootstrapping • Fundamentals of Computer Networking
Neural Networks for Data Science • Fundamentals of Instructional Technology • Teaching Skills Workshop
Cyberinfrastructure Foundations • Introduction to Geographic Information Systems

B.S. in Software Engineering Sep 2013 - May 2018
Rochester Institute of Technology
Concentration in Computational Linguistics • Minor in Language Science

Notable Linguistics Coursework
Introduction to Language Science • Language & Linguistics • Evolving English Language • Psycholinguistics
Introduction to Natural Language Processing • Spoken Language Processing • Science & Analytics of Speech
Language & Culture • Language & Sexuality • Language Technology

Notable Software Engineering & Computer Science Coursework
Introduction to Computer Science Theory • Principles of Data Mining • Mathematical Models of Software
Engineering of Concurrent & Distributed Software Systems • Software Process & Project Management
Software Performance Engineering • Engineering of Software Subsystems • Personal Software Engineering
Engineering Secure Software • Discrete Mathematics for Computing • Linear Algebra • Applied Statistics

RESEARCH PUBLICATIONS

[10] *Taxonomy-Based Human Error Assessment for Senior Software Engineering Students* Mar 2024
Benjamin S. Meyers, and Andrew Meneely. Special Interest Group on Computer Science Education *(SIGCSE) Technical Symposium.*

[9] *Human Error Assessment in Software Engineering* Dec 2023
Benjamin S. Meyers. Ph.D. Dissertation at Rochester Institute of Technology.

[8] *What Happens When We Fuzz? Investigating OSS-Fuzz Bug History* May 2023
Brandon N. Keller, **Benjamin S. Meyers**, and Andrew Meneely. International Conference on Mining Software Repositories *(MSR).*

[7] *Examining Penetration Tester Behavior in the Collegiate Penetration Testing Competition* Apr 2022
Benjamin S. Meyers, Sultan Fahad Almassari, Brandon N. Keller, and Andrew Meneely. ACM Transactions on Software Engineering and Methodology *(TOSEM)* 31, no. 3 (2022).

[6] *An Automated Post-Mortem Analysis of Vulnerability Relationships using Natural Language Word Embeddings* Mar 2021
Benjamin S. Meyers, and Andrew Meneely. Proceedings of the 3rd International Symposium on Machine Learning and Big Data Analytics for Cybersecurity and Privacy at *(ANT/EDI40).* Warsaw, Poland (virtual due to COVID-19).

[5] *Developing a Geographic Information Capacity (GIC) Profile for Disaster Risk Management Under United Nations Framework Commitments* May 2020
Brian M. Tomaszewski, Elizabeth A. Moore, Kyle Parnell, Alexandra M. Leader, William R. Armington, Omar Aponte, Leslie Brooks, Brienna K. Herold, **Benjamin S. Meyers**, Tayler Ruggero, Zachary Sutherby, Madeline Wolters, Sandy Wua, Jörg Szarzynski, Klaus Greve, and Robert Parody. International Journal of Disaster Risk Reduction *(IJDRR)*, 47 (2020): 101638.

[4] *Pragmatic Characteristics of Security Conversations: An Exploratory Linguistic Analysis* May 2019
Benjamin S. Meyers, Nuthan Munaiah, Andrew Meneely, and Emily Prud'hommeaux. Proceedings of the 12th International Workshop on Cooperative and Human Aspects of Software Engineering *(CHASE).* Montréal, QC, Canada.

[3] *A Dataset for Identifying Actionable Feedback in Collaborative Software Development* Jul 2018
Benjamin S. Meyers, Nuthan Munaiah, Emily Prud'hommeaux, Andrew Meneely, Cecilia O. Alm, Josephine Wolff, and Pradeep Murukannaiah. Proceedings of the 2018 Meeting for the Association for Computational Linguistics *(ACL).* Melbourne, Australia.

[2] *An Analysis and Visualization Tool for Case Study Learning of Linguistic Concepts* Sep 2017
Cecilia O. Alm, **Benjamin S. Meyers**, and Emily Prud'hommeaux. Proceedings of the Conference on Empirical Methods in Natural Language Processing *(EMNLP).* Copenhagen, Denmark.

[1] *Natural Language Insights from Code Reviews that Missed a Vulnerability* Aug 2017
Nuthan Munaiah, **Benjamin S. Meyers**, Cecilia O. Alm, Andrew Meneely, Pradeep K. Murukannaiah, Emily Prud'hommeaux, Josephine Wolff, and Yang Yu. Proceedings of the 9th International Symposium for Engineering Secure Software and Systems *(ESSoS).* Bonn, Germany.

RESEARCH PRESENTATIONS

[12] *Using Whisper AI for Transcription to Improve Oral History Workflows* Jul 2024
Tamar Carroll, **Benjamin S. Meyers**, Emmarose Tabin, Caitlin McCabe, Elizabeth Call, Landyn Hatch, Rebekah Walker. Artificial Intelligence in Oral History. Virtual.

[11] *Introduction to Research Computing at RIT* Apr 2024
Benjamin S. Meyers. Upstate New York Statics Conference *(UPSTAT).* Rochester, NY.

[10] *Taxonomy-Based Human Error Assessment for Senior Software Engineering Students* Mar 2024
Benjamin S. Meyers. ACM Special Interest Group on Computer Science Education *(SIGCSE)*. Seattle, WA.

[9] *Introduction to the Research Computing Cluster* Sep 2023
Benjamin S. Meyers. Doctoral Student Association at Rochester Institute of Technology. Rochester, NY.

[8] *Human Error Assessment in Software Engineering* Oct 2023
Benjamin S. Meyers. Ph.D. Dissertation Defense at Rochester Institute of Technology. Rochester, NY.

[7] *An Automated Post-Mortem Analysis of Vulnerability Relationships using Natural Language Word Embeddings* Apr 2023
Benjamin S. Meyers and Andrew Meneely. Upstate New York Statistics Conference *(UPSTAT)*. Rochester, NY.

[6] *Introduction to the Research Computing High-Performance Computing (HPC) Cluster* Sep 2022
Benjamin S. Meyers, Emilio Del Plato, and Sidney Pendelberry. Presentation for RIT Doctoral Student Association. Rochester, NY.

[5] *Introduction to the Research Computing High-Performance Computing (HPC) Cluster* Nov 2019
Benjamin S. Meyers, Emilio Del Plato, and Sidney Pendelberry. Presentation for Teaching Skills Workshop. Rochester, NY.

[4] *A Dataset for Identifying Actionable Feedback in Collaborative Software Development* Jul 2018
Benjamin S. Meyers, Nuthan Munaiah, Emily Prud'hommeaux, Andrew Meneely, Cecilia O. Alm, Josephine Wolff, and Pradeep Murukannaiah. Meeting for the Association for Computational Linguistics *(ACL)*. Melbourne, Australia.

[3] *Natural Language Insights from Code Reviews that Missed a Vulnerability* Apr 2017
Nuthan Munaiah, **Benjamin S. Meyers**, Cecilia O. Alm, Andrew Meneely, Pradeep K. Murukannaiah, Emily Prud'hommeaux, Josephine Wolff, and Yang Yu. Golisano College of Computing & Information Sciences Graduate Research Showcase. Rochester, NY.

[2] *Exploring Discourse of Individuals with Autism Spectrum Disorder* May 2016
Benjamin S. Meyers, Cecilia O. Alm, and Emily Prud'hommeaux. International Meeting for Autism Research *(IMFAR)*. Baltimore, MD.

[1] *Exploring Discourse of Individuals with Autism Spectrum Disorder* Aug 2015
Benjamin S. Meyers, Cecilia O. Alm, and Emily Prud'hommeaux. Undergraduate Research Symposium at the Rochester Institute of Technology. Rochester, NY.

RESEARCH POSITIONS

Graduate Research Assistant, Dr. Andrew Meneely Sep 2018 - Present
Design, implementation, and analysis of experiments involving software developer conversations and penetration testing logs with the goal of improving vulnerability assessment through understanding of developer and attacker behavior when finding, exploiting, and fixing security vulnerabilities. `[Ph.D. Research]`

Research Assistant, Dr. Brian Tomaszewski May 2019 - Jul 2019
Developed the concept of Geographic Information Capacity (GIC), a framework for measuring/analyzing the ability of communities (towns, cities, states, and countries) to understand, access, and utilize geographic information for disaster risk management, and identifying vulnerable communities for prioritizing disaster risk mitigation. `[Full-Time Paid Internship]`

Research Assistant, Dr. Andrew Meneely Jan 2017 - May 2018
Applied natural language processing techniques to a dataset of 788,437 code reviews from the Chromium project to examine the discourse of software developers through analysis of inquisitiveness, sentiment analysis, politeness, formality, propositional density, uncertainty detection, and syntactic complexity. `[Full-Time Co-Op]`

Research Assistant, Dr. Cecilia O. Alm, Dr. Emily Prud'hommeaux Aug 2015 - Dec 2016
Developed a set of distinct case study activities using genuine linguistic datasets to aid student learning and engagement in introductory linguistics classes. Enhanced the visualization capabilities of an existing web application, Linguine, that aided in the analysis of the case study data. `[Part-Time]`

Research Assistant, Dr. Cecilia O. Alm, Dr. Emily Prud'hommeaux Jun 2015 - Aug 2015
Adapted natural language processing techniques to a corpus of speech transcriptions collected from college-aged males with and without autism spectrum disorder. Examined the trajectories of linguistic development in autism through analysis of various syntactic-, semantic-, and discourse-based metrics. `[Full-Time Co-Op]`

ACADEMIC POSITIONS

Adjunct Professor, Software Engineering Senior Project [11 students] Aug 2024 - May 2025
Volunteer Judge, GENIUS Olympiad [23 projects] May 2022 - Jun 2022
Adjunct Professor, Engineering Secure Software [2 semesters; 57 students] Aug 2020 - May 2021
Course Assistant, Software Performance Engineering [1/2 semester] Jan 2019 - Mar 2019
Course Assistant, Engineering Secure Software [1 semester] Sep 2017 - Dec 2017
Course Assistant, Language Technology [1 semester] Jan 2016 - May 2016
Course Assistant, Introduction to Language Science [1 semester] Sep 2015 - Dec 2015

TECHNICAL POSITIONS

Research Computing Facilitator III, Rochester Institute of Technology Nov 2024 - Present
Responsible for providing advanced computing support for RIT researchers. Assisting researchers with accessing Research Computing services, like batch processing with Slurm, data storage on a Ceph cluster, software package management with Spack, and implementing high performance computational workflows. Responsible for the development of documentation and training for researchers on the use of Research Computing services. Responsible for planning and organizing professional and social events for researchers. `[Full-Time]`

Research Computing Facilitator II, Rochester Institute of Technology Jul 2022 - Nov 2024
Responsible for providing advanced computing support for RIT researchers. Assisting researchers with accessing Research Computing services, like batch processing with Slurm, data storage on a Ceph cluster, software package management with Spack, and implementing high performance computational workflows. Responsible for the development of documentation and training for researchers on the use of Research Computing services. Responsible for planning and organizing professional and social events for researchers. `[Full-Time]`

Applications Developer, Collegiate Penetration Testing Competition Aug 2019 - Aug 2020
Implementation of web browser history logging for Linux/Windows competition machines. Implementation of virtual machine backup scripts. Integration with Laforge, an in-house competition infrastructure management tool. Technologies involved: Splunk, Veeam. Languages involved: Bash, PowerShell, Python. `[Volunteer]`

Applications Developer, Kate Gleason College of Engineering Aug 2017 - May 2018
Implementation of new features and improvements to existing features in PICS, the purchasing and inventory control system for KGCOE's multidisciplinary senior design projects. Technologies involved: Active Directory, AngularJS, CLAWS, GitLab, MySQL, oVirt. Languages involved: HTML/CSS, JavaScript, PHP. `[Software Engineering Senior Project]`

Applications Developer, Computational Linguistics & Speech Processing Lab May 2016 - May 2018
Implementation of improvements to Linguine, a pre-existing linguistics learning tool. Implementation of new linguistic analyses and visualizations. Technologies involved: MongoDB, NodeJS. Languages involved: HTML/CSS, JavaScript, Python. `[Part-Time]`

Website Administrator, Computational Linguistics & Speech Processing Lab May 2015 - May 2018
Management of multiple linguistics websites. Design and implementation of Language Science Department website. Technologies involved: CLAWS, GitLab. Languages involved: HTML/CSS, JavaScript. `[Part-Time]`

Applications Developer, Kate Gleason College of Engineering May 2016 - Sep 2016
Implementation of ATLAS, a web application to facilitate management of IT service tickets within the Kate Gleason College of Engineering and self-service group management. Technologies involved: Active Directory, CLAWS, GitLab, MySQL. Languages involved: HTML/CSS, JavaScript, PHP. `[Full-Time Co-Op]`

Assistant Systems Administrator, Kate Gleason College of Engineering Dec 2015 - May 2016
Assisting with day-to-day maintenance of servers, user-support activities, as well as other duties as assigned. Technologies involved: CLAWS, oVirt. `[Part-Time]`

Programming Team Leader, Greater Rochester Robotics F.I.R.S.T. Team 340 Sep 2009 - May 2013
Management of a team of 5-10 student programmers. Design and implementation of autonomous and user-controlled robot code using a variety of hardware sensors, including potentiometers, speed controllers and ultrasonics. Languages involved: Java, LabVIEW. `[Student Volunteer]`

JOURNAL CO-REVIEWER EXPERIENCE

`[MSR]`	Mining Software Repositories (2)	2022
`[TSE]`	IEEE Transactions on Software Engineering (2)	2018 • 2021
`[TOSEM]`	ACM Transactions on Software Engineering and Methodology (2)	2021 • 2024
`[ICTD]`	International Conference on Technical Debt (4)	2019 • 2021
`[SQJ]`	Software Quality Journal (1)	2019
`[ESSoS]`	International Symposium on Engineering Secure Software and Systems (1)	2017

MENTORSHIP EXPERIENCE

Research Computing Student Employees Jul 2022 - Present

Tyler Allen, Mallory Bridge, Bailey Brown, Jeffrey Condell, Vikas Karch, Cecilia Lau, Alexander Luete, Ashim Mahara, Sangu Mbekelu, Aaliyan Qadri, Aubdrey Tarmu, Noelle Voelkel

Software Engineering Senior Project Students Aug 2024 - May 2025

Lucille Blain, Trevor Borden, Hayden Cabral, Aaron Chan, Sam Coniglio, Erin Henderson, Dalton Fitzsimmons, Jack Vander Linden, Xander Palmer, Jarred Reepmeyer, Will Trimble

Brandon N. Keller, Graduate (Ph.D.) Research Assistant Apr 2022 - Present
Sultan Fahad Almassari, Graduate (M.S.) Research Assistant Aug 2020 - May 2021
Middle School Students on F.I.R.S.T. Lego League Teams Sep 2009 - May 2013

ACADEMIC ORGANIZATIONS

Doctoral Student Association *(DSA)*, Rochester Institute of Technology Sep 2021 - Present
Association for Computing Machinery *(ACM)* Apr 2018 - Present
Computational Linguistics & Speech Processing *(CLaSP)* Lab Jul 2015 - May 2019
Linguistics Society of America *(LSA)* 2017

HONORS & AWARDS

College of Liberal Arts: Language Science and Computational Linguistics Student Excellence Award Apr 2017
College of Computing & Information Science: Dean's List May 2014 • May 2016 • Dec 2016 • May 2017
Presidential Volunteer Service Award, Silver Level 2012 • 2013
Rochester Institute of Technology: Computing Medal Award [$7,000/year scholarship for RIT] Jun 2012

PERSONAL PROJECTS

LUCI: Linguistic Uncertainty Classifier Interface `[Python]` Apr 2017 - Jun 2017
An implementation of a classifier for linguistic uncertainty, based on the theoretical work described in Veronika Vincze's doctoral dissertation: *Uncertainty Detection in Natural Language Texts.* Package: PyPi.

Phonetta: (phonet)ic (t)ranscription (a)ssistant `[JavaScript]` Nov 2016 - Aug 2019
A web application to help users type International Phonetic Alphabet (IPA) symbols and learn phonetic concepts through on-screen buttons, intuitive keyboard shortcuts, audio recordings, and relevant metadata for each symbol.

SPLAT: Speech Processing & Linguistic Analysis Tool `[Python]` Jun 2015 - Nov 2017
A command-line application designed to simplify analysis of natural language texts by interfacing with NLTK, Stanford CoreNLP, and the Berkeley Parser. Package: PyPi.

T-BAG: Text-Based Adventure Game Framework `[Ruby]` Jul 2014 - Aug 2015
A domain-specific language to facilitate writing text-based adventure games.
Package: RubyGems.

OPEN SOURCE SOFTWARE CONTRIBUTIONS

Spack `[Python]`
Package recipes for various open-source software libraries.

Vulnerability History Project `[Ruby, Yaml]`
A museum of mistakes to help us engineer secure software.

MELD `[Python, C++]`
A tool for inferring the structure of biomolecules from sparse, ambiguous, or noisy data.

REFERENCES

Andrew Meneely, Ph.D. • axmvse@rit.edu • 585-475-7829
Associate Professor, Undergraduate Program Director
Department of Software Engineering, Rochester Institute of Technology
Ph.D. Advisor, Aug 2018 - Dec 2023

Matangi Buch • mcbits@rit.edu • 585-475-6174
Executive Director, Research Computing
Information & Technology Services, Rochester Institute of Technology
Current Manager, Oct 2024 - Present

Geremy Gersh • gegits@rit.edu • 585-353-6126
Interim Director, Research Computing
Information & Technology Services, Rochester Institute of Technology
Previous Manager, Mar 2024 - Oct 2024

Kirk Anne • 585-690-1107
Retired
Previous Manager, Jul 2022 - Mar 2024

Naveen Sharma, Ph.D. • nxsvse@rit.edu • 585-475-2472
Department Chair
Department of Software Engineering, Rochester Institute of Technology
Previous Manager, Aug 2020 - May 2021

Emily Prud'hommeax, Ph.D. • prudhome@bc.edu • 617-552-3928
Assistant Professor
Department of Computer Science, Boston College
Previous Manager, Jun 2015 - May 2018

Emilio Del Plato • ehdeec@rit.edu • 585-475-5843
Platform Engineer III
ITS Research Computing, Rochester Institute of Technology
Previous Manager, Dec 2015 - Sep 2016