Christian Newman

ASSISTANT PROFESSOR

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Education

PhD.	Computer Science	Kent State University	Summer 2017
M.S.	Computer Science	Kent State University	Fall 2013
B.S.	Computer Science	Kent State University	Fall 2010

Academic Experience

- **Assistant Professor**, Department of Software Engineering, Rochester, NY
  08/17 - Present
- **Graduate Research Assistantship,** Department of Computer Science, Kent State University, Kent, Ohio.
  01/16 – 08/17, Funded by the National Science Foundation, CNS 13-05292/05217.
- **Graduate Research Assistantship,** Department of Computer Science, Kent State University, Kent, Ohio.
  05/15 – 08/15, Funded by the National Science Foundation, CNS 13-05292/05217.
- **Teaching Assistantship**, Department of Computer Science, Kent State University, Kent, Ohio. (08/12-05/15).
- **Graduate Research Assistantship**, Department of Computer Science, Kent State University, Kent, Ohio.
  05/12 – 08/12, Funded by ABB inc.
- **Graduate Research Assistantship**, Department of Computer Science, Kent State University, Kent, Ohio.
  07/10 – 05/12, Funded by the National Science Foundation MRI-R2 CNS 09-59924.

Advisor

Dr. Jonathan I. Maletic (2010 – 2017)

LAB

Source Code Analysis and Natural Language Laboratory (SCANL LAB) – www.scanl.org

Research Interests & Statement

Software engineering, maintenance and evolution; specifically, program transformation, static analysis, program slicing, and program comprehension.

Program Comprehension and Textual Analysis

There is a strong relationship between the natural language (e.g., found in identifiers) and behavior of source code; developers use this relationship to understand the code they read daily. We explore this relationship by studying rename refactorings, grammar patterns, and static source code analysis. Our goal is to support stronger techniques to automate identifier naming as well as support developers in reading and comprehending code more quickly. This is the research topic that underlies all other research we do.

Program Transformation

Program transformations allow us to modify code programmatically. It is important to ensure these techniques are safe, customizable, and easily integrated with today's software development processes such that developers can, for example, migrate APIs or refactor. We support transformations both through our research on identifier naming and through the creation of flexible, easy-to-use techniques for creating and applying program transformations.

Static Source Code Analysis

A lot of our work relies on static analysis techniques, and most frequently we make use of the srcML Framework to normalize, transform, and analyze source code. Our lab supports several tools built on srcML in addition to hosting Dr. Emily Hill's natural language framework, SWUM. We are dedicated to providing high-quality research tools and data sets for software research and development. Check our github page regularly to see what we have to offer and feel free to contact us with questions.

Funding

Proposals Submitted

Title	Investigator(s)	Agency/Source	Amount	Period
CRII:SHF:Towards the Construction of a Model for Natural Language and Source Code ***Submitted August 2018 - Funded***	Newman, C.D. (RIT)	National Science Foundation CCF: Core Programs	174k	2 years
REU Supplement CRII:SHF:Towards the Construction of a Model for Natural Language and Source Code ***Submitted August 2019 - Funded***	Newman, C.D. (RIT)	National Science Foundation REU	10k	1 year
Pending				
Declined				
SHF: SMALL: SHF: Small: Toward a Language for Comprehending Source Code Changes ***Submitted November 2019 - Pending***	Newman, C.D. (RIT) Mkaouer, Mohamed (RIT)	National Science Foundation CCF: Core Programs	483k	3 years
SHF: SMALL: On-Demand Program Comprehension Using a Source Code-Natural Language Model ***Submitted November 2019 - Pending***	Newman, C.D. (RIT) Hill, Emily (Drew)	National Science Foundation CCF: Core Programs	488k	3 years
Sloan Foundation Grant ***Submitted August 2019 - Pending***	Newman, C.D (RIT)	Sloan Foundation	75k	2 years
SHF:MEDIUM:Collaborative Research: Supporting Automated Evolution of Large-Scale Software ***Submitted September 2017 - declined***	Newman, C.D (RIT) Decker, M.J(BGSU) Maletic, J.I. (KSU)	National Science Foundation CCF: Core Programs	1.1M	4 years
SHF:SMALL:RUI:Collaborative Research: Enhancing Name Appraisal and Synthesis Using a Source Code-Natural Language Model ***Submitted November 2017 -declined***	Newman, C.D. (RIT) Hill, Emily (Drew)	National Science Foundation CCF: Core Programs	500k	3 years
Sloan Foundation Grant ***Submitted August 2018 - Declined***	Newman, C.D (RIT)	Sloan Foundation	75k	2 years

SHF:SMALL:RUI:Collaborative Research: On-Demand Program Comprehension Using a Source Code-Natural Language Model ***Submitted November 2018 - declined***	Newman, C.D. (RIT) Hill, Emily (Drew)	National Science Foundation CCF: Core Programs	499k	3 years
SHF:SMALL:Designing a Domain Specifi Language to Support Software Refactoring ***Submitted November 2018 - declined***	Newman, C.D. (RIT) Mohamed Wiem Mkaouer (RIT)	National Science Foundation CCF: Core Programs	453k	3 years

Awards and Other Support

- **ABB Stipend** – Travel support to ICSME 2015 (~1600$)
- **Best Presentation Award** - 30th Annual Graduate Research Symposium 2015
- **NSF Travel Grant** - Travel support to ICSM '11 (750$)
- **NSF REU** - Research Experience for Undergraduates (5000$)
- **NSF S-Stem Scholarship** – Undergrad scholarship for science, technology, engineering and mathematics (5000$) – 2009-2010

Publications and Scholarly Work (Also see: Google Scholar)

Research Publications

1. Christian D. Newman, Reem S. AlSuhaibani, Michael J. Decker, Anthony Peruma, Dishant Kaushik, Mohamed Wiem Mkaouer, Emily Hill, "**On the generation, structure, and semantics of grammar patterns in source code identifiers**", Journal of Systems and Software, Volume 170, 2020, 110740, ISSN 0164-1212, https://doi.org/10.1016/j.jss.2020.110740.
2. Anthony Peruma, Christian D. Newman, Mohamed Wiem Mkaouer, Ali Ouni, and Fabio Palomba. 2020. "**An Exploratory Study on the Refactoring of Unit Test Files in Android Applications.**" In Proceedings of the IEEE/ACM 42nd International Conference on Software Engineering Workshops (ICSEW'20). Association for Computing Machinery, New York, NY, USA, 350–357. DOI:https://doi.org/10.1145/3387940.3392189
3. Eman Abdullah AlOmar, Anthony Peruma, Mohamed Wiem Mkaouer, Christian Newman, Ali Ouni, Marouane Kessentini, "**How we refactor and how we document it? On the use of supervised machine learning algorithms to classify refactoring documentation"**, Expert Systems with Applications, 2020, 114176, ISSN 0957-4174, https://doi.org/10.1016/j.eswa.2020.114176. (http://www.sciencedirect.com/science/article/pii/S095741742030912X)
4. Eman Abdullah AlOmar, Anthony Peruma, Christian D. Newman, Mohamed Wiem Mkaouer, and Ali Ouni. 2020. "**On the Relationship Between Developer Experience and Refactoring: An Exploratory Study and Preliminary Results**". In Proceedings of the IEEE/ACM 42nd International Conference on Software Engineering Workshops (ICSEW'20). Association for Computing Machinery, New York, NY, USA, 342–349. DOI:https://doi.org/10.1145/3387940.3392193
5. Anthony Peruma, Mohamed Wiem Mkaouer, Michael J. Decker, Christian D. Newman, "**Contextualizing rename decisions using refactorings, commit messages, and data types**", Journal of Systems and Software, Volume 169, 2020, 110704, ISSN 0164-1212, https://doi.org/10.1016/j.jss.2020.110704.
6. Anthony Peruma, Christian D. Newman, Mohamed Wiem Mkaouer, Ali Ouni, and Fabio Palomba, "**An Exploratory Study on the Refactoring of Unit Test Files in Android Applications,**" in Proceedings of the 42nd Annual Conference on Software Engineering Workshops (ICSEW'20), July 6-11
7. Anthony Peruma, Khalid Almalki, Christian D. Newman, Mohamed Wiem Mkaouer and Ali Ouni, "**On the Distribution of Test Smells in Open Source Android Applications: An Exploratory Study,**" in Proceedings of the 29th Annual International Conference on Computer Science and Software Engineering, Nov 4-6th
8. C. Newman, M. J. Decker, R. AlSuhaibani, D. Kaushik, A. Peruma, and E. Hill, "**An Open Dataset of Abbreviations and Expansions**," in *35th IEEE International Conference on Software Maintenance and Evolution*, Sept 30th, p. 11.

9. A. Peruma, M. W. Mkaouer, M. J. Decker, and C. D. Newman, "**Contextualizing rename decisions using refactorings and commit messages**," in Proceedings of the 19th IEEE International Working Conference on Source Code Analysis and Manipulation, IEEE, 2019.
10. C. D. Newman, A. Peruma, and R. AlSuhaibani, "**Modeling the relationship between identifier name and behavior**," in Proceedings of the 35th IEEE International Conference on Software Maintenance, IEEE, 2019.
11. Christian Newman, Michael J. Decker, Reem Alsuhaibani, Dishant Kaushik, Anthony Peruma and Emily Hill. "**An Empirical Study of Abbreviations and Expansions in Software Artifacts",** in the Proceedings of the 35th IEEE International Conference on Software Maintenance and Evolution (ICSME 2019). Cleveland, OH, USA, Sept 30th -Oct 4th, 2019, 12 pages, IEEE.
12. Zyrianov, V., Newman, C, D., Guarnera, D., Collard, M.L., Maletic, J.I. "**srcPtr: A Framework for Implementing Static Pointer Analysis Approaches**", in the Proceedings of *The 27th IEEE/ACM International Conference on Program Comprehension (ICPC 2019)*. Montreal, QC, Canada, May 25th – 26th, 2019, 5 pages, IEEE.
13. Newman, C,D., Dragan, N., Collard, M.L., Maletic, J.I, Decker, M.J., Guarnera, D., Abid, N. "**Automatically Generating Natural Language Documentation for Methods**", in the *Third International Workshop on Dynamic Software Documentation (DySDoc3)*. Madrid, Spain, September 25th, 2018, 2 pages, IEEE.
14. Guarnera, D., Collard, M.L., Dragan, N., Maletic, J.I, Newman, C. D., Decker, M.J. "**Automatically Redocumenting Source Code with Method and Class Stereotypes**", in the *Third International Workshop on Dynamic Software Documentation (DySDoc3)*. Madrid, Spain, September 25th, 2018, 2 pages, IEEE.
15. Decker, M.J., Newman, C,D., Collard, M.L., Guarnera, D., Maletic, J.I, (2018), "**A Timeline Summariation of Code Changes**", in the *Third International Workshop on Dynamic Software Documentation (DySDoc3)*. Madrid, Spain, September 25th, 2018, 2 pages, IEEE.
16. Peruma, A., Mkaouer, M. W., Decker, M. J., and Newman, C. D., (2018), "**An Empirical Investigation of How and Why Developers Rename Identifiers**", in *International Workshop on Refactoring*. Montpellier, France, September 4th, 2018, 8 pages, IEEE.
17. Newman, C.D., Mkaouer, M. W., Collard, M.L., Maletic, J.I., "**A Study on Developer Perception of Transformation Languages for Refactoring**", in *International Workshop on Refactoring*. Montpellier, France, September 4th, 2018, 8 pages, IEEE.
18. Decker, M., Newman, C., Dragan, N., Collard, M.L., Kraft, N.A., Maletic, J.I., "**Which Method-Stereotype Changes are Indicators of Code Smells**", in the Proceedings of the 18th IEEE International Working Conference on Source Code Analysis and Manipulation, Madrid, Spain, Sept 23-24, 2018, 11 pages.
19. Delozier, G., Decker, M.J., Newman, C.D., Maletic, J.I, "**Leveraging the Agile Development Process for Selecting Invoking/Excluding tests to Support Feature Location**", in the *Proceedings of The 26th IEEE International Conference on Program Comprehension (ICPC '18) Industry Track*, Gothenburg, Sweden, May 27th-28th, 2018, 10 pages.
20. Decker, M.J., Newman C.D., Dragan N., Collard, M.L., Maletic, J.I., N.A., Kraft, **"Poster: A taxonomy of how Method Stereotypes Change**", *Poster Proceedings of the 40th International Conference on Software Engineering (ICSE '18)*, Gothenburg, Sweden, May 27th – June 3rd, 2018, 2 pages.
21. Bartman, B., Newman, C. D., Collard, M.L., Maletic, J.I. " **srcQL: A Syntax-Aware Query Language for Source Code**", in the *Proceedings of 24th IEEE International Conference on Software Analysis, Evolution, and Reengineering* (SANER '17) Tool Demonstrations Track, Klagenfurt, Austria, Feb. 20-24, 2017, 5 pages.
22. Newman, C.D., Bartman, B., Collard, M.L., Maletic, J.I., "**Simplifying the Construction of Source Code Transformations via Automatic Syntactic Restructurings**", *Journal of Software Evolution and Process*, Vol. 29, No.4, April 2017, 28 pages, DOI 10.1002/smr.1831.
23. Newman, C. D., Newman, Alsuhaibani, R., Collard, M.L., Maletic, J.I., **"Lexical Categories for Source Code Identifiers**", *in the Proceedings of the 24th IEEE International Conference on Software Analysis, Evolution, and Reengineering* (SANER'17), Klagenfurt, Austria, Feb. 20-24, 2017, 12 pages
24. Newman, C.D., Michael L. Collard, and Jonathan I. Maletic. 2016. "**srcType: A Tool for Efficient Static Type Resolution**", in *Proceedings of the 32nd International Conference on Software Maintenance and Evolution* (ICSME '16). IEEE, Raleigh, NC, USA. 2 pages.
25. Newman, C.D., Tessandra Sage, Michael L. Collard, Hakam W. Alomari, and Jonathan I. Maletic. 2016. "**srcSlice: a tool for efficient static forward slicing**", in *Proceedings of the 38th International Conference on Software Engineering Companion* (ICSE '16). ACM, New York, NY, USA, 621-624.

26. R. S. Alsuhaibani, C. D. Newman, M. L. Collard and J. I. Maletic, "**Heuristic-based part-of-speech tagging of source code identifiers and comments**", *Mining Unstructured Data (MUD), 2015 IEEE 5th Workshop on*, Bremen, 2015, pp. 1-6.
27. Alali, A., Bartman, B., Newman, C.D., Maletic, J.I., "**A Preliminary Investigation of Using Age and Distance Measures in the Detection of Evolutionary Couplings**" in the Proceedings of the ACM International Working Conference on Mining Software Repositories (MSR'13), San Francisco, California, May 18-19, 2013, pp. 169-172.
28. Maletic, J.I., Mosora, D.J., Newman, C.D., Collard, M.L., Sutton, A., Robinson, B.P., (2011), "**MosaiCode: Visualizing Large Scale Software: A Tool Demonstration**", in the Proceedings of the IEEE International Workshop on Visualizing Software for Understanding and Analysis (VISSOFT'11), Williamsburg, VA, USA, Sept 31 – Oct 1, pp.

Online Publications

1. C.D Newman., M.J.Decker. Feb. 12th, 2013. srcML (Wikipedia Page) [Online]. http://en.wikipedia.org/wiki/SrcML

Software Systems Developed / Datasets supported

- SWUM – A software-word usage model https://github.com/SCANL/swum_project
- srcSlice – A program slicer https://github.com/srcML/srcSlice
- srctype – A tool for static type resolution https://github.com/srcML/srcType
- srcTL – A domain-specific language for program transformation (currently under development)
- Static analysis tool which tags identifiers with lexical category as described in *Lexical Categories for Source Code Identifiers* (not yet open-sourced)
- Event-Driven dispatcher framework to assist in the construction of srcML tools -- https://github.com/srcML/srcSAXEventDispatch
- Open corpus of abbreviations and expansions for five open source software systems - https://github.com/SCANL/AbbreviationArtifact-ICSME2019

Teaching & Mentoring

Course Title/Duties	Terms/Dates	Institution
Web Engineering	Fall 2020	RIT
Personal Software Engineering	Spring 2020	RIT
Personal Software Engineering	Fall 2019	RIT
Personal Software Engineering	Spring 2019	RIT
Foundations of Software Engineering	Fall 2018	RIT
Personal Software Engineering	Spring 2018	RIT
Software Quality Engineering	Fall 2017	RIT
Computer Science 2 (data structures) Laboratory instructor	Fall 2012 – Spring 2015	Kent State University
Intro to Databases Grader	Spring 2014	Kent State University

Graduate Students

PhD

- Anthony Peruma – April 2018 – Present

Masters

- Vaibhavi Raut – August 2020 - Present
- Srujan Ganesh Shetty – Jan 2020 - Present

- Shimon Johnson – August 2018 – Spring 2020 (graduated)
- Dishant Kaushik – Aug 2017 – Jan 2020 (graduated, IBM)
- Satyajit Mohapatra – August 2018 – December 2018 (graduated, Microsoft)
- Tejal Vishoi – January 2019 – May 2019 (graduated)

Undergraduate Mentoring

- Samuel Velasquez, Rochester Institute of Technology REU, Summer 2020
- Gideon Wikina, Rochester Institute of Technology REU, Summer 2020
- Aditya Bhargava, Rochester Institute of Technology REU, summer 2020
- Sophie Lelei, Rochester Institute of Technology REU, Summer 2020
- Brian Popoek, Rochester Institute of Technology REU, Summer 2020
- Tessandra Sage, Kent State University, Fall 2014.
- David Carlyn, Kent State University, Fall 2016
- Patricia Jordan, Kent State University, Spring 2017
- Vlas Zyrianov, Kent State University, Fall 2016 and Spring 2017
- Aryan Jha, Rochester Institute of Technology, Summer 2019

Masters Thesis Committee Member

- Rebaz Saleh, Rochester Institute of Technology, Graduated 12/2017
- Anthony Peruma, Rochester Institute of Technology, Graduated 5/2018
- Mazen Alotaibi, Rochester Institute of Technology, Graduated 5/2018
- Eman Abdullah Alomar, Rochester Institute of Technology, Graduated 5/2018
- Adriana Sejfia, Rochester Institute of Technology, Graduated 5/2018
- Kevin Hannigan, Rochester Institute of Technology, Graduated 8/2018
- Khalid Almalki, Rochester Institute of Technology, Graduated 12/2018
- Ahmed Aljohani, Rochester Institute of Technology, Graduated 5/2019
- Andrew Di Stassi, Rochester Institute of Technology, Graduated 5/2019
- Sultan Mira, Rochester Institute of Technology, Graduated 8/2019
- Ben Christians, Rochester Institute of Technology, Graduated 5/2020
- Steve Simmons, Rochester Institute of Technology, Graduated 5/2020

Dissertation Defense Committee Member

- Waleed Zogaan, Rochester Institute of Technology, Graduated 12/2019
- Deema AlShoaibi, Rochester Institute of Technology, TBD
- Eman Abdullah Alomar, Rochester Institute of Technology, TBD

Professional Service (internal)

- Undergraduate Curriculum Committee – Fall 2020
- Outstanding Educator Award Committee – 2019 - 2020
- Tenure-track Search Committee – Fall 2019, Spring 2020
- Software Engineering Guest Speaker Series Committee – 2018-2019, 2019-2020
- Outstanding Educator Award Committee – 2018-2019
- SEI Software Engineering Educators Workshop 2017

Professional Service (external)

Workshop Co-Chair

- Exploring the Shifting Sands: Accounting for Evolution in Analyzing Data from Social Media Platforms 2018, co-located with AOIR 2018.

Program Committee

- IEEE 29th International Conference on Program Comprehension (ICPC 2021) – ERA Track
- IEEE 27th International Conference on Software Analysis, Evolution and Reengineering (SANER 2021) – Tool Track
- The 12th ACM Symposium on Eye Tracking Research and Applications (ETRA2020) – Technical Track
- The 35th IEEE/ACM International Conference on Automated Software Engineering (ASE 2020) – Tool Track
- IEEE 28th International Conference on Program Comprehension (ICPC 2020) – Technical Track
- IEEE 34th International Conference on Software Maintenance and Evolution (ICSME'19) – Industry Track
- IEEE 34th International Conference on Software Maintenance and Evolution (ICSME'19) – Technical Track
- IEEE 27th International Conference on Program Comprehension (ICPC '19) – Technical Track
- IEEE 25th International Conference on Software Analysis, Evolution, and Reengineering (SANER'18) – ERA Track

Organizing Committee

- IEEE 20th International Working Conference on Source Code Analysis and Manipulation – NIER PC co-chair
- IEEE 34th International Conference on Software Maintenance and Evolution (ICSME'19) – Student Volunteer Chair

Journal Reviewer

- IEEE Transactions on Software Engineering (TSE) – Spring 2020, Summer 2020, Fall 2020
- ACM Transactions on Computing Education (TOCE) – Summer 2020
- Software: Practice and Experience (SPE) – Summer 2020
- Empirical Software Engineering (EMSE) Summer 2020
- Journal of Systems and Software (JSS) – Spring 2019
- IEEE Transactions on Software Engineering (TSE) – Summer 2019
- Journal of Software: Evolution and Process (JSEP) – Fall 2020

Professional Activities

Conferences Attended

- International Conference on Software Maintenance (ICSM '11)
- Working Conference on Software Visualization (VISSOFT '11)
- International Conference on Software Maintenance and Evolution (ICSME '15)
- Mining Unstructured Documents (MUD '15)
- International Conference on Software Maintenance and Evolution (ICSME '16)
- International Conference on Software Analysis, Evolution, and Reengineering (SANER '17)
- SEI Software Engineering Workshop for Educators 2017
- International Conference on Software Maintenance and Evolution (ICSME '18)
- International Conference on Software Engineering (ICSE'18)
- International Workshop on Refactoring (IWOR'18)
- Association of Internet Researchers (AOIR'19)
- International Conference on Software Engineering (ICSE'19)

- International Conference on Program Comprehension (ICPC‘19)
- International Conference on Software Maintenance and Evolution (ICSME ’19)
- International Working Conference on Source Code Analysis and Manipulation (SCAM ’19)

Additional Reviewer

- IEEE 22nd International Conference on Software Analysis, Evolution, and Reengineering (SANER’16)
- IEEE 31st International Conference on Software Maintenance & Evolution (ICSME’15) – *ERA Track*
- ACM/IEEE 37th International Conference on Software Engineering (ICSE’15)
- IEEE 23rd International Conference on Program Comprehension (ICPC’15)
- ACM 8th International Symposium on Software and Systems Traceability (SST’15)
- IEEE International Working Conference on Software Visualization (VISSOFT’15)
- ACM/IEEE 36th International Conference on Software Engineering (ICSE’14)
- IEEE International Working Conference on Software Visualization (VISSOFT’14)
- IEEE 30th International Conference on Software Maintenance & Evolution (ICSME’14) – *ERA Track*
- IEEE CSMR-WCRE 2014, the European Conference on Software Maintenance (CSMR’14)
- IEEE 21st International Working Conference on Reverse Engineering (WCRE’14)
- IEEE 29th International Conference on Software Maintenance (ICSM’13)
- IEEE 21st International Conference on Program Comprehension (ICPC’13)
- ACM International Workshop on Traceability in Emerging Forms of Software Engineering (TEFSE’13)
- IEEE International Working Conference on Software Visualization (VISSOFT’13)
- IEEE 20th Working Conference on Reverse Engineering (WCRE’13)
- IEEE Transactions on Software Engineering (TSE)
- Journal of Software: Evolution and Process (Formerly Journal of Software: Maintenance and Evolution) (JSEP)

Non-Academic Experience

- ABB Engineering and Research intern; wrote a wrapper around the srcML framework in C#. The project can be found here: https://github.com/abb-iss/SrcML.NET. Additionally, I wrote a web-based query builder for communicating between arbitrary database REST APIs and a UI. Employment dates: Aug 17th 2015 – Feb 17th 2016
- Kent State University IS as a Student Technician. Computer hardware and software end-user support, group policy management, software distribution. Employment dates: Aug. 2008 - Jun 2010