# Christian Newman

Assistant Professor

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# Education

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

# Non-Academic Experience

* ABB Engineering and Research intern; wrote a wrapper around the [srcML](http://www.srcml.org) 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

# Advisor

Dr. Jonathan I. Maletic (2010 – 2017)

# Research Interests & Statement

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

## Program Transformation

My interest in program transformation seeks to ease the burden of applying transformation and refactorings techniques automatically. Recently, there is an increased interest and reliance on systems that can support their own evolution. It is important to ensure these techniques are safe, customizable, and easily integrated with today's software development processes.

## Program Comprehension and Textual Analysis

I am interested in what direct analysis of source code can tell us about the mental model created by developers during development tasks. Specifically, I want to study how natural language used in source code is related to the behavior of source code itself. My work in this area attempts to model this this relationship with a goal of supporting stronger, developer-centric tools and techniques to improve comprehension and development.

## Static Source Code Analysis

Static analysis techniques are the basis of a lot of my research, and most frequently I make use of the srcML Framework to normalize, transform, and analyze source code. On the whole, one of my favorite things to do is explore code; searching for patterns that can be used to improve and support software development using automated tools, visualization, and high-quality, code-centric models.

# Funding

**Proposals Submitted & Pending**

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| --- | --- | --- | --- | --- |
| Title | Investigator(s) | Agency/Source | Amount | Period |
| 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 |
| CRII:SHF:Towards the Construction of a Model for Natural Language and Source Code  ***Submitted August 2018 - Recommended*** | Newman, C.D. (RIT) | National Science Foundation CCF: Core Programs | 174k | 2 years |
| Sloan Foundation Grant  ***Submitted August 2018 - Pending*** | 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 - Pending*** | 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 - Pending*** | 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](https://scholar.google.com/citations?user=hb_08rUAAAAJ&hl=en))

## Research Publications

1. 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.
2. 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.
3. 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.
4. 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.
5. 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.
6. 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.
7. 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.
8. 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.
9. 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.
10. 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.
11. 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.
12. 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
13. 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.
14. 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.
15. 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.
16. 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.
17. 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

* 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>

# Teaching & Mentoring

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| |  |  |  | | --- | --- | --- | | **Course Title/Duties** | **Terms/Dates** | **Institution** | | **Personal Software Engineering** | Spring 2019 | Rochester Institute of Technology | | **Foundations of Software Engineering** | Fall 2018 | Rochester Institute of Technology | | **Personal Software Engineering** | Spring 2018 | Rochester Institute of Technology | | **Software Quality Engineering** | Fall 2017 | Rochester Institute of Technology | | **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

* Dishant Kaushik – Aug 2017 – Present
* Anthony Peruma – April 2018 – Present
* Satyajit Mohapatra – August 2018 – December 2018 (graduated, Microsoft)
* Shimon Johnson – August 2018 – Present
* Tejal Vishoi – January 2019 - Present

## Undergraduate Mentoring

* 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

## 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

# 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 25th International Conference on Software Analysis, Evolution, and Reengineering (SANER’18) – ERA 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

## Organizing Committee

* IEEE 34th International Conference on Software Maintenance and Evolution (ICSME’19) – Student Volunteer Chair

## Journal Reviewer

* Journal of Systems and Software – Spring 2019

## Workshop Attendance

* SEI Software Engineering Educators Workshop 2017

# 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)

## 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)

# Programming Languages

Primary languages include C++, C, C#, and Python. I have some previous experience with Javascript, Haskell, and Java.