

## Christian Newman

Department of Computer Science  
Kent State University  
Kent, Ohio 44242

Office: MSB 152  
Email: [cnewman@kent.edu](mailto:cnewman@kent.edu)  
URL: <https://github.com/cnewman>

## Education

B.S. Computer Science	Kent State University	2010
M.S. Computer Science	Kent State University	2013
PhD. Computer Science	Kent State University	2017-18 (expected)

## Academic Experience

**Graduate Research Assistantship**, Department of Computer Science, Kent State University, Kent, Ohio. 07/10, Funded by the National Science Foundation MRI-R2 CNS 09-59924

**Teaching Assistantship**, Department of Computer Science, Kent State University, Kent, Ohio. (2012-2015)

## Non Academic Experience

Kent State University IS as a Student Technician from Aug. 2008 - Jun 2010  
ABB Engineering and Research intern from Aug 17<sup>th</sup> 2015 – Feb 17<sup>th</sup> 2016

## Advisor:

Dr. Jonathan I. Maletic (2010 – Present)

## Research Interests, work, & Statement

Software engineering, program transformation, program comprehension, slicing, software traceability, software visualization, static analysis, software evolution

### Program Transformation

Program transformation is concerned with methods for specifying sections of code to apply some change to, how to apply the change, then automatically changing specified code to the desired form safely (in many cases, behavior must be preserved. Not in all cases, however). I have developed Normalizing-Refactorings as a technique for easing the creation of program transformation scripts and am currently developing a small programming language to support transformation tasks in [srcML](#).

### Program Comprehension

My work in this area has focused on the use of natural language processing combined with the use of method stereotypes in order to re-document [srcML](#) archives with parts of speech. The result of this work will be a framework (currently in development) for identifying and marking parts of speech in code, and tools to support the use of parts of speech for program comprehension and documentation generation tasks.

### Program Slicing

I have been heavily involved in re-writing the srcSlice tool for the [srcML](#) framework in order to make it easier for general use and to increase its performance. Currently, its speed from the original incarnation has nearly doubled.

### Software Visualization

Software visualization is concerned with visualizing different aspects of software packages whether they be metrics related to those packages or other sorts of metadata. I was part of the team that developed Mosaicode; a program used for identifying characteristics of a large code base. Example include identifying areas of high code churn.

### **Static Analysis**

As a [srcML](#) developer, I've worked on and supported a number of tools to support static analysis. As a result, I've become familiar with the development and support of tools using the [srcML](#) framework as well as research and techniques related to static analysis and its applications both inside and outside of my own research.

### **Awards, Funding, and Other Support**

**Stem Scholarship** – Undergrad scholarship for science, technology, engineering and mathematics (5000\$)

**NSF REU** - Research Experience for Undergraduates(5000\$)

**NSF Grant** - Travel support to ICSM '11 (750\$)

**ABB Stipend** – Travel support to ICSME 2015 (~1600\$)

### **Publications And Scholarly Work**

#### **Research Publications:**

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. (6 pages to appear)

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.

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.

Christian D. Newman, 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.

Christian D. Newman, 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.

Christian 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 (to appear)

Newman, C., 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. ?, No. ?, Accepted Sept. 6, 2016, 28 pages, (to appear)

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.

#### Other Publications

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

## Institutional and Professional Activities

### Teaching

Course Title/Duties	Terms/Dates	Institution
Computer Science 2 (data structures) Laboratory instructor	Fall 2012 – Spring 2015	Kent State University
Intro to Databases Grader	Spring 2014	Kent State University

### Conferences Attended

ICSM 2011, VISSOFT 2011, ICSME 2015, MUD 2015, ICSME 2016, SANER 2017

### Programming Experience:

- Primary languages include C++, C, C#, and Python. I have some experience with Javascript, Haskell, ASP, and Java. I find I generally learn new languages fairly quickly.
- I've written a number of research tools including a slicer (<https://github.com/srcML/srcSlice>), a domain-specific language, two static analysis tools; one for type resolution (<https://github.com/srcML/srcType>) and another for parts of speech tagging in source. This was all written using the [srcML](https://github.com/srcML/srcML) framework, for which I'm one of the developers.
- For ABB, I wrote a wrapper around the [srcML](https://github.com/srcML/srcML) framework in C# as well as a web-based query builder for communicating between arbitrary database REST APIs and a UI. I also wrote a wrapper around srcML's c++ library to adapt srcML for us in C# for use at ABB. The project can be found here: <https://github.com/abb-iss/SrcML.NET>