Christian Newman

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Education

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

Academic Experience

- **Teaching Assistantship**, Department of Computer Science, Kent State University, Kent, Ohio. (2012-2015)
- **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
- **Graduate Research Assistantship,** Department of Computer Science, Kent State University, Kent, Ohio. 01/2016 – present, Funded by the National Science Foundation, CNS 13-05292/05217

Non Academic Experience

- ABB Engineering and Research intern; wrote a wrapper around the srcML framework in C# as well as a web-based query builder for communicating between arbitrary database REST APIs and a UI. Additionally, I 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. 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 – Present)

Research Interests & Statement

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

Program Transformation

My work on Normalizing-Restructurings simplifies the task of writing transformation scripts by significantly reducing the number of syntax isomorphisms (via pre-processing transformation step). Additionally, I am currently developing a small programming language to support transformation tasks in srcML with the goal of exploration the automated generation of transformation scripts and undertaking a sizeable empirical study on usage of transformation technologies in industry.

Program Comprehension

I have researched techniques for understanding the use and meaning of identifiers. My work is focused on discovering, statically, the role of an identifier in the context of the body of code it appears in. Mechanically, this involves re-documentation of srcML archives with parts-of-speech-like markers. I am developing a framework to extend this framework to work with English parts-of-speech as well, to

assist other researchers in their activities.

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
I was part of the team that developed Mosaicode; a program used for identifying characteristics of a large code base. Examples include identifying areas of high code churn. Primarily, my interests center around what sorts of visualizations are helpful to the development and maintenance cycles.

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

ABB Stipend – Travel support to ICSME 2015 (~1600$)
30th annual Graduate Research Symposium – award for presenting work on restructurings
NSF Grant - Travel support to ICSM '11 (750$)
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

Research Publications
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, Evoluation, and Reengineering* (SANER '17), (Tool Demonstrations Track) Klagenfurt, Austria, Feb. 20-24, 2017, 5 pages.

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

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

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.

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.

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.

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.

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

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

Software Systems Developed

- Program slicer called srcSlice -- https://github.com/srcML/srcSlice
- Tool for static type resolution called srctype - https://github.com/srcML/srcType
- Domain-specific language for program transformation called srcTL (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)
- Even-Driven dispatcher framework to assist in the construction of srcML tools -- https://github.com/srcML/srcSAXEventDispatch

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

Professional Activities

Conferences Attended

- International Conference on Software Maintenance (ICSM 2011)
- Working Conference on Software Visualization (VISSOFT 2011)
- International Conference on Software Maintenance and Evolution (ICSME 2015)
- Mining Unstructured Documents (MUD 2015)
- International Conference on Software Maintenance and Evolution (ICSME 2016)
- International Conference on Software Analysis, Evolution, and Reengineering (SANER 2017)

Programming Languages

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 quickly.