John Lenz

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Work and Academic History

Research Assistant Professor, Department of Mathematics, Statistics, and Computer Science, University of Illinois at Chicago, 2011-2016.

Part-time software developer and consultant for CMS Research, Inc., 1996-present.

Ph.D. Mathematics, University of Illinois at Urbana-Champaign, 2006-2011.

M.S. Mathematics, University of Illinois at Urbana-Champaign, 2006-2009.

Teaching Assistant, University of Illinois at Urbana-Champaign, 2007-2011.

B.S. Mathematics and Computer Science, *Summa Cum Laude*, University of Wisconsin-Madison, 2001-2005.

Job Interests

My postdoc at the University of Illinois has ended and I am excited to explore opportunities outside academics. Currently, I am interested in jobs in machine learning and deep learning which combine both data analysis with significant programming. I love research, discovering new things, and working on new hard problems.

Skills Summary

Machine Learning and Deep Learning Theoretical and practical experience in a range of machine learning topics: supervised learning, regression, scikit-learn, unsupervised learning, deep learning, deep neural nets, convnets, recurrent neural networks, TensorFlow, reinforcement learning, Markov decision processes, game theory. I know the mathematical background of a wide range of machine learning topics. I also have applied machine learning as part of my work with CMS Research, using machine learning to schedule orders for factory machining.

Programming A lifelong interest in programming languages and program architecture, developed and enhanced by involvement with many open source projects. I have written or contributed to large programs in Haskell, C#, VB.Net, Python, JavaScript, C, and C++. In addition, I am familiar with Java, SQL, Linux, ReactJS, AngularJS, Git, Mercurial, MapReduce, MongoDB, Fortran, Lisp, Scheme, Perl, ML, CSS, Bootstrap, Bash Scripting, Debian, Arch Linux, Kepware, OCaml, Rust, Purescript, Elm, Go, COBAL, Lua, Scala, Embedded Programming, Network and Client/Server Programming, GUI Programming, Web Programming, Test-Driven Development, Unit Testing, and End2End Testing.

Mathematics Extensive knowledge of mathematics and its applications to theoretical computer science. My research focuses primarily on graphs and graph algorithms, studying what problems are solvable using graphs, hypergraphs, and algorithms. In addition, I have taught many of the courses in the computer science curriculum, including Data Structures, Algorithms, and Introduction to Programming in Python. I have a deep knowledge of data structures, algorithms, and developing code to solve difficult problems.

Writing Experience in technical writing. I have written math papers, documentation for my open source projects, course material, my Ph.D. thesis, and blog posts. I have dozens of research papers written and published in mid and top-tier mathematics journals (one paper published in *Forum of Mathematics*, one of the best journals in mathematics). Skills include extensive coordination with co-authors, clear technical writing, self-directed time management and deadlines, maintaining motivation on complex projects, enjoyment of challenges, learning new things, and creativity and problem solving.

Project and Team Management I have experience teaching a range of classes, from first year undergraduates to graduate students. Skills include facilitating group discussion, providing oral and written feedback, planning weekly presentations, explaining complex topics clearly, and setting and supporting weekly, monthly, and semester goals for others. I also have given dozens of presentations at large and small conferences. Skills include speaking about a technical topic in front of a large audience, planning and practicing a presentation, condensing a large amount of material into a 50-minute talk, and keeping the audience engaged and attentive. Finally, I proposed, was awarded, and managed a NSA Young Investigators Grant. Skills include financial planning and budgeting, developing a detailed proposal, and periodic progress reports.

Programming and Work Experience

Open Source Projects

I have a long history of contributing to a range of open source projects starting from my undergraduate days and continuing today. My Bitbucket page (`https://bitbucket.org/wuzzeb`) and Github page (`https://github.com/wuzzeb`) contain the projects I have worked on. A selection of recent projects is:

GHCJS is a Haskell-to-javascript compiler that is in development. I have contributed patches to the compiler and its runtime system, but my main contribution is to develop a library *react-flux* (`http://hackage.haskell.org/package/react-flux`) which consists of bindings to Facebook's ReactJS library based on the Flux Application Architecture.

Yesod (`http://www.yesodweb.com`) - a web server framework written in Haskell. I wrote the embedded static subsite component of Yesod as well as other small contributions throughout the project, for example an authentication plugin (`http://hackage.haskell.org/package/yesod-auth-account`) and AngularJS integration.

Haskell Webdriver - `http://bitbucket.org/wuzzeb/webdriver-utils`. I wrote and maintain these libraries, which support writing browser automation tests of web applications in Haskell using the Haskell behavioral driven development testing tool hspec.

Older contributions (for which I am no longer active) include the Linux kernel (see for example my name in `http://git.kernel.org/cgit/linux/kernel/git/torvalds/linux.git/tree/drivers/leds/led-class.c`) and SWIG (`http://www.swig.org`), for which I was a Google Summer of Code Mentor.

Professional Experience

Since 1996, I have been the lead programmer and a manufacturing designer at CMS Research, Inc., in a part-time fashion. CMS Research is a small consulting and software company focused on industrial manufacturing optimization; we use our software and experience to design and/or optimize the machining and production process of our customers. We have worked on projects at Caterpillar, John Deere, and many other smaller companies.

I am the lead (and now only) developer on our software, which is a client/server program. We support SQLite, Oracle, or SQL Server for the database, have an application server written in C#, and a variety of client applications written in VB.NET and C#. This software is used daily to track orders, schedule machining operations based on orders, control various robots on the factory floor, signal part inspections, track parts via barcodes, and many other factory management tasks.

I also assist in the design of machining systems. For example, in 2011 I designed a $15 million system for John Deere to build the parts for their new series of tractor (which debuted in 2014). The final design uses eight machines and two robots, with conveyors for the incoming and outgoing material. During daily operation (continuing today), my software automatically imports orders with due dates from SAP, optimizes the orders to determine what should be run, and then controls the system by giving moment-by-moment instructions to the robots based on the computed schedule. Also, software clients I wrote allow the managers and operators to view and control the operation of the system.