Eugene Rogan Creswick, MS

Compiler Engineer | AWS Elemental | creswick@gmail.com | https://github.com/creswick | 206-569-4294

I am a generalist programmer, with expertise in a variety of languages and application domains (primarily Haskell, Java, Bash, and SQL, with lesser experience in most mainstream languages). My professional experience has focused on program analysis (static and dynamic), compiler development, and natural language processing (typically applied to security policy domains). I am interested in continuing this type of work at a larger scale, and with greater impact.

In addition to my professional experience, I have created, maintained, and transitioned a number of open-source projects, such as Chatter[1] – a natural language processing library that I created to provide assorted tagging and linguistic classification tasks in Haskell – and Cabal-dev[2]. I have also developed a core set of leadership skills as a leader and principle investigator in my positions at Dexcom, Galois, and Stottler Henke.

Experience

Software Engineer (3/2020 – present)

AWS Elemental, Portland, OR

I currently work on the AWS Elemental Live Outputs team, using C++, Ruby, Perl, Python, Bash and Ansible to help maintain the Live video transocoding appliance.

Compiler Engineer (11/2017 – 2/2020)

Groq, Inc., Portland, OR

I designed and implemented the compiler and assembler for a custom ML accelerator (an ASIC for running inference on Tensorflow models). In this role I created the compiler architecture as well as the initial implementation. I mentored junior engineers, on-boarded new hires, and often lectured on the features of the Groq chip and the assorted testing and compilation tools that we developed to spread knowledge within the company.

In addition, I noted deficiencies in company communication and documentation; I linked those issues directly to schedule slips and bug counts and devised a workflow for writing, maintaining, and verifying internal documentation which was adopted immediately.

Developer / Team Lead (8/2016 – 11/2017)

Dexcom, Inc., Portland, OR

I lead the team that maintained backend services sporting the Dexcom Clarity service[3]; a retrospective tool for the analysis of blood sugar readings for type-1 diabetics. I was primarily a Scala developer; however, I was also responsible for the planning, execution, and delivery of backend microservices for the public deployments of Clarity around the world.

In addition, I assisted with the design and implementation of data storage and analysis as Dexcom moved to a big-data platform to conduct population-level analysis, decision support, and insights so that our customers can improve the control of their blood sugar.

[1] Chatter can be found on hackage: https://hackage.haskell.org/package/chatter and GitHub: https://github.com/creswick/chatter

[2] Cabal-dev demonstrated the importance of sandboxed builds in Haskell. It is now deprecated, because those features are available as part of the mainstream Haskell tools. However, the project is still available: https://hackage.haskell.org/package/cabal-dev

[3] Dexcom Clarity; a tool for retrospective analysis of glucose readings http://clarity.dexcom.com.

Developer / Research Lead (1/2010 – 7/2016)

Galois, Inc., Portland, OR (Formaltech)

I held positions of Principle Investigator and Project Lead on various projects related to software development tooling and machine learning at Galois. Most of these projects were the direct result of my efforts writing proposals and establishing relationships to generate additional research funding. I also acted as a substantial technical contributor on all of these projects.

These projects include:

- *Programming by Demonstration: Verified*, A small NASA project to demonstrate that the behavior of certain machine learning agents can be proven correct with respect to stated properties *during training*, thereby guaranteeing a level of success before deployment without compromising the general applicability of the learning agents.
- *Naturally Expressed Policy*, A one-year project to research and demonstrate methods of translating human-readable policy into machine-actionable policy. I designed and developed a mixed system of statistical and grammar-based language processing techniques to map natural language statements into a DSL with sufficient semantics to encode and enforce policy.
- *FUSE: Big-Picture Security Analysis for Android*, A multi-year DAPRA contract to develop tools for statically analyzing Android applications to address security concerns, particularly in the presence of potentially colluding applications.
- *Portable Build Systems*, I designed and developed an abstraction layer to emulate specified development environments (by intercepting and re-writing system calls at runtime). The resulting research can be applied to more efficiently reproduce software builds for debugging and cross-platform development.

Machine Learning Research Lead (3/2006 – 11/2010)

Stottler Henke Associates, Inc., Seattle, WA, USA

I conducted research in machine learning–focusing on natural language processing–and performed as Project Lead on various SBIR projects at Stottler Henke. Of specific note, I lead three Air Force SBIR projects (*InfoAssist, SearchTrainer, and DAIS*) focused on learning to semi-automatically redact sensitive content (text and imagery) based on user demonstrations and supervised learning examples. These projects involved extensive research, design, and implementation, and resulted in an internal deployment at the Air Force Research Lab in Rome, NY. Research on these projects lead to refereed publications in 2008 and 2010.

Research Intern (Summers of 2004, 2005)

IBM TJ Watson, Hawthorne, NY, USA

I designed, implemented, and measured the effectiveness of the Macro Illustrator, a prototype that steps users through legacy documentation as each step is performed. The algorithms developed were subsequently patented by IBM (*Method for Aligning Demonstrated User Actions with Existing Documentation*).

I also designed and implemented SMARTcode, an intelligent tool for automating repetitive editing tasks in the Eclipse workbench. SMARTcode uses Version Space Algebra, an efficient machine learning framework, to learn semantically valid program transformations from user demonstrations.

Graduate Research Assistant (2002 – 2005)

Oregon State University, Corvallis, OR

Resumé

Eugene Rogan Creswick, MS

I worked with Dr. Margaret Burnett in the field of visual programming languages, end-user and professional visual debugging. Our research group applied traditional software engineering techniques, such as testing and assertions to end-user programming languages, to improve the correctness of end-users programs, such as spreadsheets.

Education

- Oregon State University
  MS in Computer Science, June 2004
  Thesis Title: *Dynamic, Incremental Assertion Propagation in End User Programming*.
  Advisor: Dr. Margaret Burnett

- Oregon State University
  BS in Computer Science, June 2002

Honors / Invitations

- Program Committee Member for the Fourth Workshop on Controlled Natural Language (CNL 2014)

- Invited Speaker: 2013 Grammatical Framework Summer School

- Program Committee Member for the Third Workshop on Controlled Natural Language (CNL 2012)

- First Patent Application Invention Achievement Award
  Method for Aligning Demonstrated User Actions with Existing Documentation.

Selected Publications

- Ravitch, T., **Creswick, E. R.**, Tomb, A., Foltzer, A., Elliott, T., and Casburn, L. “Multi-App security analysis with FUSE: Statically detecting Android app collusion”. In Proceedings of the 4th Program Protection and Reverse Engineering Workshop, PPREW-4.
- **Creswick, E. R.** and Novstrup, A. M. “Error-tolerant version space algebra”. In Proceeding of the 14th international Conference on intelligent User interfaces (Hong Kong, China, February 07 - 10, 2010). IUI 2010. ACM, New York, NY, 305-308.
- **Creswick, E. R.**, Fujioka, E., and Goan, T. (2008). “Pedigree Tracking in the Face of Ancillary Content”. In B. Stein, E. Stamatatos, and M. Koppel (Eds.) Proceedings of the Second workshop on Uncovering Plagiarism, Authorship, and Software Misuse (PAN), 2008.
- Greene, K. A., Goan, T., and **Creswick, E. R.** “A collaborative eye to the future”, Proc. SPIE 6968, Signal Processing, Sensor Fusion, and Target Recognition XVII, 2008.
- J. Ruthruff, S. Prabhakararao, J. Reichwein, C. Cook, **E. Creswick**, and M. Burnett, “Interactive, Visual Fault Localization Support for End-User Programmers”, *Journal of Visual Languages and Computing*, 16(1-2):3-40, 2005.
- **Creswick, E. R.**, Bergman, L., Lau, T. A., Castelli, V., and Oblinger, D. A. “Illustrating Macros with Existing Documentation” Tech Report: RC23696, IBM TJ Watson, Hawthorne, NY, August 2005.

- **Creswick, E. R.** “Dynamic, Incremental Assertion Propagation in End User Programming”, Masters of Science Thesis, School of Electrical Engineering and Computer Science, Oregon State University, Corvallis, OR, October 2004. TR#: CS04-60-13.
- Prabhakararao, S., Cook, C., Ruthruff, J., **Creswick, E. R.**, Main, M., Durham, M., and Burnett, M. “Strategies and Behaviors of End-User Programmers with Interactive Fault Localization”, *IEEE Symposium on Human-Centric Computing, Languages and Environments: Symposium on End-User and Domain-Specific Programming*, Auckland, New Zealand, October 2003.
- Ruthruff, J., **Creswick, E. R.**, Burnett, M., Cook, C., Prabhakararao, S., Fisher, M. II, and Main, M. “End-User Software Visualizations for Fault Localization”, *ACM Symposium on Software Visualization*, San Diego, CA, June 2003.