

Jarrell WAGGONER

Biographical

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INTERESTS computer vision, image processing, artificial intelligence, pattern recognition & machine learning, data science, data engineering, functional programming, web development, GIS, Clojure

Education

AUG. 2013	Ph.D.	COMPUTER SCIENCE & ENGINEERING	University of South Carolina
MAY 2009	M.E.	COMPUTER SCIENCE	University of South Carolina

Experience

- 2017—
PRESENT **Architect** at [RALLY HEALTH, INC.](#)
Seasoned engineering leader responsible for overseeing technical design and engineering decisions across Rally's entire data organization of 50+ engineers, analysts, and data scientists.
- Architected complete rewrite of the data platform for the whole company, moving from a fixed **Cloudera** cluster to a self-service platform using **Databricks** and **Redshift** fed by **Spark** ETLs written in **Scala** and scheduled with **Airflow** atop **Kubernetes**. Built consensus on new architecture and delivered working system within a year while growing the team from only myself to an independent platform team of 10 engineers.
 - Member of the Rally Engineering Technical Staff, responsible for making cross-cutting engineering decisions, evaluating potential acquisitions, signing off on major company-wide architectural changes, and organizing technical interest groups.
 - Heavily involved in defining team structure and hiring, conducting over 100 interviews for IC and management roles to scale the data organization from 4 engineers to over 50 engineers.
 - Fostered good design practices across the data organization by auditing design documents, leading architecture meetings for multiple teams to grow design aptitude, and spearheading the standardization of best-practices on the team including code review, documented on-call workflow, CI/CD, monitoring/alerting, idempotent ETL workflows, and reproducible EDW layout.
 - Coordinated with over 16 internal and external teams across an extensive range of projects including productionalized ML workflows, frontend/mobile event tracking, real time data processing, data anonymization, security/compliance/privacy requirements, data ingestion APIs, data quality validation, and self-service internal product analytics.
- 2016—2017 **Software Engineer** at [DRW HOLDINGS, LLC](#)
Member of the Trading Infrastructure team, developing the internal platform used by every trading desk at DRW. Built greenfield high-performance service-oriented systems using **Clojure** and **Java** while maintaining legacy applications in **Ruby** and **C#** among a catalog of over 50 microservices.
- Contributed to a **Ruby**-based reconciliation tool used to balance cash flows for high-volume trading
 - Extended a research workflow tool used for computing the value and settle price of options, futures, equities, and other financial instruments, written in **Clojure**.
 - Developed and extended multiple UI frontends for internal tools using **React** and **Reagent**.
- 2013—2016 **Senior Software Engineer** at [GROUPON, INC.](#)
Contributed to three engineering teams: The Flux team building Data Science pipelines, the Project Genesis strike team integrating scraped web data into **Salesforce**, and served as Tech Lead of the Supply Intelligence team creating internal sales tools to optimize Groupon's supply funnel.
- Built a **PostgreSQL**-backed high-performance caching and write management system in **Clojure** around the **Salesforce** API that hits 10K req/min.
 - Managed critical business automation of the sales lead assignment process that previously required an estimated 80 sales managers to conduct manually; led the effort to rearchitect this legacy system from an ad-hoc job scheduling platform written in **Ruby** and **Bash** to a multi-staged **Hadoop** pipeline written in **Clojure** to handle over 6M accounts.
 - Coordinated with product and business teams to ETL 250K leads in **Salesforce** from scraped web data.

- Built out an ETL management and machine learning platform using **Python**, **Clojure**, **Hive**, and **Spark** to run mission-critical Decision Tree Learning models to predict customer attrition, lifetime customer value, and merchant value.
 - Mentored interns and junior developers, established best practices, and led multiple major technical initiatives on a team of 5 developers.
- 2012–2014 | **Technical Engineer** at [TERRASTRIDE, INC.](#)
Software developer in an agile startup environment creating the [huntstand.com](#) web application. Written using **Python**, **Django**, and **Backbone.js**; deployed to **AWS**. Responsible for curating full technology stack and coordinating with 5 developers.
- 2011–2013 | **Research Assistant** at USC [COMPUTER VISION LAB](#)
Dissertation research on computer vision models and algorithms for materials science image segmentation in **Python**, **NumPy**, **SciPy**, **OpenCV**, and **MATLAB**. Created a web interface using **Django**, **JavaScript**, and **jQuery**. Conducted large-scale analysis using a 98-core high-performance computing system.
- 2010–2011 | **Research Assistant** for the DARPA [MIND’S EYE PROGRAM](#)
Researched video event recognition for the DARPA Mind’s Eye program. Collaborated with 10 students and faculty members across three institutions. Developed algorithms in **Scheme**, **Bash**, **MATLAB**, and **C** to process a corpus of 3480 videos extracted into over 1.5 million frames. Distributed processing over 7 HPC machines. [0xab.com/research/video-events.html](#) , [github.com/malloc47/video-in-sentences-out](#)
- 2009–2010 | **NEH Fellow** at the [USC CENTER FOR DIGITAL HUMANITIES](#) (SAPHEOS/[PARAGON](#) PROJECT)
Developed the prototype for a *digital collation* application to identify sub-textual inconsistencies among multiple copies of *The Faerie Queene* by EDMUND SPENSER. Created in **MATLAB** using **VLFeat** and **OpenCV** to process tens of thousands of book page images. [github.com/malloc47/digital-collation](#)

Skills & Languages

• • • Bash	• • • GNU/Linux	• • • Java	• Nix/NixOS	• • Scala
• • • Clojure	• • • Hadoop ecosystem	• • JavaScript	• • • PostgreSQL	• • • Scheme
• • • git	• Haskell	• • \LaTeX	• • • Python	• • • Spark
• Small-scale or personal projects		• • Used in production		• • • Used in large-scale production systems

Selected Publications

- [1] Derrick. C. Spell, Ling-Yong Wang, Richard T. Shomer, Bahador Nooraei, **Jarrell Waggoner**, Xaio-Han T. Zeng, Jae Y. Chung, Kai-Chen Cheng, and Daniel Kirsche. QED: Groupon’s ETL management and curated feature catalog system for machine learning. In *IEEE International Conference on Big Data*, pages 1639–1646, Dec 2016. [\[Link\]](#).
- [2] **Jarrell Waggoner**, Youjie Zhou, Jeff Simmons, Marc De Graef, and Song Wang. Topology-preserving multi-label image segmentation. In *IEEE Workshop on Applications of Computer Vision (WACV)*, pages 1084–1091, Waikoloa Beach, HI, 2015. [\[PDF\]](#).
- [3] **Jarrell Waggoner**, Youjie Zhou, Jeff Simmons, Marc De Graef, and Song Wang. Graph-cut based interactive segmentation of 3D materials-science images. *Machine Vision and Applications*, 25:1615–1629, 2014. [\[PDF\]](#).
- [4] **Jarrell Waggoner**. *Multi-Label Segmentation Propagation for Materials Science Images Incorporating Topology and Interactivity*. Dissertation, University of South Carolina, 2013. [\[PDF\]](#).
- [5] **Jarrell Waggoner**, Jeff Simmons, Marc De Graef, and Song Wang. 3D materials image segmentation by 2D propagation: A graph-cut approach considering homomorphism. *IEEE Transactions on Image Processing*, 22, 2013. [\[PDF\]](#).
- [6] Andrei Barbu, Alexander Bridge, Zachary Burchill, Dan Coroian, Sven Dickinson, Sanja Fidler, Aaron Michaux, Sam Mussman, Siddharth Narayanaswamy, Dhaval Salvi, Lara Schmidt, Jiangnan Shangguan, Jeffrey Mark Siskind, **Jarrell Waggoner**, Song Wang, Jinlian Wei, Yifan Yin, and Zhiqi Zhang. Video in sentences out. In *Conference on Uncertainty in Artificial Intelligence*, pages 102–112, 2012. [\[PDF\]](#).
- [7] **Jarrell Waggoner**, Jeff Simmons, and Song Wang. Combining global labeling and local relabeling for metallic image segmentation. In *Proceedings of SPIE (Computational Imaging X)*, volume 8296, Burlingame, CA, 2012. [\[PDF\]](#).

Recent Talks

- [1] Project athena: Rally’s next-generation data platform. *Optum/UHG/UHC Analytics Conference*. Eden Prairie, MN. September 2019.
- [2] Rules engines: Logic as data structure. *Palmetto Open Source Software Conference*. Columbia, SC. April 2015. [\[Slides\]](#).
- [3] Python for computer vision. *All Things Open*. Raleigh, NC. October 2013. [\[Slides\]](#).
- [4] Extending django. *Palmetto Open Source Software Conference*. Columbia, SC. March 2013. [\[Slides\]](#).

Activities

open source software, GIS visualization, Linux, [music composition](#)