

Jarrell WAGGONER

Biographical

ADDRESS 540 West Madison Street Suite 2500
c/o DRW, Chicago, IL, 60661
PHONE 847-261-4747
EMAIL jarrell.waggoner@gmail.com

Online

WEBSITE www.malloc47.com
TWITTER [@malloc47](https://twitter.com/malloc47)
GITHUB github.com/malloc47
LINKEDIN linkedin.com/in/malloc47

Research Interests

computer vision, segmentation, contour completion, perceptual grouping, document image analysis, event recognition, image processing, artificial intelligence, pattern recognition & machine learning, data science, functional programming, Clojure

Education

- AUG. 2013 Ph.D. in COMPUTER SCIENCE & ENGINEERING **University of South Carolina**
Advisor: Dr. Song WANG
Dissertation: "Multi-Label Segmentation Propagation for Materials Science Images Incorporating Topology and Interactivity"
- MAY 2009 Master of Engineering in COMPUTER SCIENCE **University of South Carolina**
GPA: 3.8/4.0 | *magna cum laude*

Industry Experience

- 2016—PRESENT | Software Engineer **DRW Holdings, LLC**
Member of the Trading Infrastructure team, developing the internal platform used across trading desks at DRW. Building greenfield high-performance service-oriented systems using **Clojure** and **Java** and maintaining legacy applications in **Ruby** and **C#**.
- 2013—2016 | Senior Software Engineer **Groupon, Inc.**
Tech Lead of the Supply Intelligence team building internal tools and analytics pipelines to optimize Groupon's supply funnel using **Clojure** to develop service-oriented and big data systems.
— Built a **PostgreSQL**-backed high-performance caching and write management system around **Salesforce** that hits 10K req/min
— Managed a critical business automation of the sales lead assignment process that previously required an estimated 80 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**
— Oversaw technical decisions, engaged in mentorship, established best practices, coordinated with stakeholders, and led multiple major technical initiatives on a team of 5 developers
— Built out an ETL management and machine learning platform using **Python**, **Clojure**, **Hive**, and **Spark**
- 2012—2014 | Technical Lead **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 | Project Manager **Palmetto Computer Labs**
Assisted in planning the POSSCON conference. Managed the Open IT Lab and associated projects (Android Development). Provided software support for websites and managed projects.

| | | |
|------|--|----------------------------------|
| 2011 | <p>Contractor</p> <p>Created a parser and generator for XML medical records formats (CCR and CCD) in Java using JDOM, JAXB, SAX, Xerces, and Hibernate (HSQLDB), on an Axis2+Jetty6 driven server.</p> | <i>Elastic Vision Consulting</i> |
|------|--|----------------------------------|

Research Experience

| | |
|-----------|--|
| 2011–2013 | <p>Research Assistant funded by AFOSR</p> <p><i>Materials Volume Segmentation</i></p> <p>Developed segmentation methods for materials image volumes in <i>Python+NumPy/SciPy</i> and <i>MATLAB</i> at the COMPUTER VISION LAB at USC. Managed the lab computer network and organized weekly lab meetings. Created GUI interface using wxWidgets for assisted segmentation, and conducted large-scale evaluations on multiple datasets for metallic and biological materials.</p> |
| 2010–2011 | <p>Research Assistant funded by DARPA</p> <p><i>Video Event Recognition</i></p> <p>Explored segmentation methods for video event recognition. Attended P.I. meetings in San Diego (2010) and Colorado (2011). Developed algorithms in <i>Scheme</i> to process a corpus of thousands of videos extracted into over 3 million frames using a high-performance computing cluster.</p> |
| 2009–2010 | <p>NEH Fellow at the CENTER FOR DIGITAL HUMANITIES</p> <p><i>Digital Collation</i></p> <p>Created a DIGITAL COLLATION application to handle automatic differencing of sub-textual inconsistencies among multiple copies of <i>The Faerie Queene</i> by EDMUND SPENSER in <i>MATLAB</i> to process tens of thousands of book page images.</p> |

Teaching Experience

| | |
|-----------------|--|
| 2008–2009 | <p>GK-12 Fellow at CRAYTON MIDDLE SCHOOL</p> <p><i>8th Grade Science</i></p> <p>Served in Crayton Middle School, coordinating with the classroom instructor to enhance the science curriculum and activities in an 8th grade science classroom. Subsequently coordinated and taught at the GK-12 INSTITUTE FOR TEACHERS, presenting the activities developed and delivered in the classroom.</p> |
| 2007–2008, 2011 | <p>Graduate Teaching Assistant at USC</p> <p><i>Web Development</i></p> <p>Supervised CSCE 145 labs, covering software development with JAVA, and taught CSCE 102, covering JAVASCRIPT, HTML, and CSS. Taught CSCE 211 covering digital logic design.</p> |
| SPRING 2007 | <p>Instructor for CSCE 204 at USCL</p> <p><i>Introductory Programming</i></p> <p>Hired as special faculty. Taught introductory Visual Basic for majors and non-majors. Selected textbooks, developed all course material, graded all assignments. Worked with Dr. Noni M. Bohonak</p> |
| FALL 2006 | <p>Camp Instructor for USCL ARTS AND SCIENCES ADVENTURE CAMP</p> <p><i>5th-8th Grade Students</i></p> <p>Worked in collaboration with Dr. Dwayne Brown. One of two instructors teaching Math and Computer Science to grade school students.</p> |
| 2003–2007 | <p>Professional Tutor at USCL ACADEMIC SUCCESS CENTER</p> <p><i>High School and College Students</i></p> <p>Student and graduate tutor for college-level Mathematics, Computer Science, Physics, and English classes.</p> |

Publications

- [C1] Derrick. C. Spell, Ling-Yong Wang, Richard T. Shomer, Bahador Nooraei, **Jarrell Waggoner**, Xiaio-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](#)].
- [C2] **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](#)].
- [C3] **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](#)].
- [C4] Youjie Zhou, Lili Ju, Yu Cao, **Jarrell Waggoner**, Yuewei Lin, Jeff Simmons, and Song Wang. Edge-weighted centroid voronoi tessellation with propagation of consistency constraint for 3D grain segmentation in microscopic superalloy images. In *CVPR Workshop on Perception Beyond the Visible Spectrum (PBVS)*, 2014. [[PDF](#)].
- [C5] Dhaval Salvi, **Jarrell Waggoner**, Andrew Temlyakov, and Song Wang. A graph-based algorithm for multi-target tracking with occlusion. In *IEEE Workshop on Applications of Computer Vision (WACV)*, 2013. [[PDF](#)].
- [C6] Dhaval Salvi, Jun Zhou, **Jarrell Waggoner**, and Song Wang. Handwritten text segmentation using average longest path algorithm. In *IEEE Workshop on Applications of Computer Vision (WACV)*, 2013. [[PDF](#)].
- [C7] Andrew Temlyakov, Pahal Dalal, **Jarrell Waggoner**, Dhaval Salvi, and Song Wang. Shape and image retrieval by organizing instances using population cues. In *IEEE Workshop on Applications of Computer Vision (WACV)*, 2013. [[PDF](#)].
- [C8] **Jarrell Waggoner**. *Multi-Label Segmentation Propagation for Materials Science Images Incorporating Topology and Interactivity*. Dissertation, University of South Carolina, 2013. [[PDF](#)].
- [C9] **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](#)].
- [C10] **Jarrell Waggoner**, Youjie Zhou, Jeff Simmons, Ayman Salem, Marc De Graef, and Song Wang. Interactive grain image segmentation using graph cut algorithms. In *Proceedings of SPIE (Computational Imaging XI)*, Burlingame, CA, 2013. [[PDF](#)].
- [C11] 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](#)].
- [C12] Andrei Barbu, Alexander Bridge, Dan Coroian, Sven Dickinson, Sam Mussman, Siddharth Narayanaswamy, Dhaval Salvi, Lara Schmidt, Jiangnan Shangguan, Jeffrey Mark Siskind, **Jarrell Waggoner**, Song Wang, Jinlian Wei, Yifan Yin, and Zhiqi Zhang. Large-scale automatic labeling of video events with verbs based on event-participant interaction. Technical report, 2012. [[PDF](#)].
- [C13] **Jarrell Waggoner**, Jeff Simmons, Marc De Graef, and Song Wang. Graph cut approaches for materials segmentation preserving shape, appearance, and topology. In *International Conference on 3D Materials Science*, pages 147–152, Seven Springs, PA, 2012. [[PDF](#)].
- [C14] **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](#)].
- [C15] Zhiqi Zhang, Sanja Fidler, **Jarrell Waggoner**, Yu Cao, Sven Dickinson, Jeffrey Mark Siskind, and Song Wang. Superedge grouping for object localization by combining appearance and shape information. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pages 3266–3273, Providence, RI, 2012. [[PDF](#)].

- [C16] Song Wang, **Jarrell Waggoner**, and Jeff Simmons. Graph-cut methods for grain boundary segmentation. *JOM Journal of the Minerals, Metals and Materials Society*, 63:49–51, 2011. [PDF].
- [C17] Andrew Temlyakov, Brent C. Munsell, **Jarrell Waggoner**, and Song Wang. Two perceptually motivated strategies for shape classification. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pages 2289–2296, 2010. [PDF].
- [C18] Zhiqi Zhang, Yu Cao, Dhaval Salvi, Kenton Oliver, **Jarrell Waggoner**, and Song Wang. Free-shape subwindow search for object localization. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pages 1086–1093, San Francisco, CA, 2010. [PDF].

Posters/Presentations

- [P1] Rules Engines: Logic As Data Structure. *Palmetto Open Source Software Conference*. Columbia, SC. April 14, 2015.
- [P2] Python for Computer Vision. *All Things Open*. Raleigh, SC. October 24, 2013.
- [P3] Interactive Grain Image Segmentation Using Graph Cut Algorithms. *USC Graduate Student Day*. Columbia, SC. April 12, 2013.
- [P4] Extending Django. *Palmetto Open Source Software Conference*. Columbia, SC. March 28, 2013.
- [P5] Computer Science: Research, Industry, and Entrepreneurship. *Careers in Science Lecture Series*. Lancaster, SC. March 6, 2013.
- [P6] Interactive Grain Image Segmentation Using Graph Cut Algorithms. *SPIE (Computational Imaging XI)*. Burlingame, CA. February 6, 2013.
- [P7] Homeomorphic Multi-Structure Propagation for Metallic Image Segmentation. *Gamecock Computing Research Symposium*. Columbia, SC. October 5, 2012.
- [P8] Android Application Development Workshop. *Appathon Contest*. Columbia, SC. November 17, 2012.
- [P9] Open Source and Education. *SC Municipal Technology Association (SCMTA) Conference*. Charleston, SC. September 6, 2012.
- [P10] Open Source and Higher Education. *SC Technical College System (SCTCS) Conference*. Columbia, SC. September 25, 2012.
- [P11] Introduction to Android Development. *Digital Humanities High Performance Computing (DHHPC) Workshop*. Columbia, SC. August 8, 2012.
- [P12] Combining Global Labeling and Local Relabeling for Metallic Image Segmentation. *SPIE (Computational Imaging X)*. Burlingame, CA. January 23, 2012.
- [P13] Open Source and Government. *SC Government Management Information Systems (SCGMIS) Software Developers Workshop*. Columbia, SC. January 19, 2012.
- [P14] Superpixel Contour Completion. *DARPA Mind's Eye PI Meeting*. Denver, CO. January 20, 2011.

Honors/Awards

| | | |
|------|---|------|
| 2012 | Gamecock Computing Research Symposium Poster Session, First Place Graduate Student Day Presentation, First Place | USC |
| 2011 | Graduate Student Day Presentation, Second Place | |
| 2010 | Graduate Student Day Presentation, Honorable Mention | |
| 2009 | Upsilon Pi Epsilon | |
| 2004 | Clara P. Hammond Award Science and Mathematics Award Highest Academic Average Award | USCL |

Classes Taught

| | | | |
|----------------|-----------------------|----------------------|----------|
| 2012–2013 | » Open Source 101 | Open Source Software | IT-ology |
| 2012–2013 | » Version Control 101 | git, github | |
| 2012–2013 | » Command Line 101 | Linux, BASH | |
| Fall 2011 | » CSCE 211 | Digital Logic Design | USC |
| Summer II 2008 | » CSCE 102 | HTML/CSS/JavaScript | |
| Spring 2008 | » CSCE 145 Lab | Java | |
| Fall 2007 | » CSCE 145 Lab | Java | |
| Spring 2007 | » CSCE 204 | Visual Basic | USCL |
| Spring 2007 | » Math 241 & Math 242 | Maple | |

Service

| | |
|---------------|--|
| BOOK REVIEWER | Practical Data Analysis , Packt Publishing, 2013 |
| MENTORING | Groupon internship program, 2014 |
| WEBMASTER | Winter Vision Meetings , 2013 |
| WEBMASTER | Workshop on the Applications of Computer Vision , 2013 |
| JUDGE | Discovery Day – Undergraduate Research Presentations |
| REVIEWER | Pattern Recognition Letters |
| REVIEWER | IEEE Transactions on Pattern Analysis and Machine Intelligence |
| SYSADMIN | Computer Vision Lab |

Personal and Open Source Projects

MATSCISEG

Framework for propagated 3D volume segmentation, used in my dissertation work. Algorithms created in **Python** and **C++** and exposed as a web API using **Django**. Includes a web application that consumes the API created in **JavaScript**, and **jQuery**.
github.com/malloc47/matsciseg

| | |
|-------------------|---|
| NONPARTISAN.ME | Google Chrome extension that filters social media websites for political keywords. Available in the Chrome Web Store . Featured in the Charleston City Paper . github.com/malloc47/nonpartisan.me |
| TERM-DO | An interactive terminal prompt that displays potential command completions as you type. A hybrid of gnome-do and Emacs's ido-mode. Works on many tested VT100 terminal types; built in C++. Includes client/server architecture implemented with boost.interprocess and full-featured plugin system. github.com/malloc47/term-do |
| RATIO CONTOUR | Maintainer and contributor for the Ratio Contour project, a salient object detection and segmentation method used for computer vision applications. Developed in C and MATLAB. github.com/malloc47/ratio-contour |
| DIGITAL COLLATION | Research project to “collate” high-resolution documents by using image registration, accomplished using the SIFT feature detector and a thin plate spline warping technique, written in MATLAB. github.com/malloc47/digital-collation |
| BEFUNGE.PY | Complete Befunge interpreter written in Python . Implements the Befunge 93 specification, and is one of the closest Python equivalents to the C reference implementation. github.com/malloc47/befunge.py |

Skills & Languages

- Bash
- C/C++
- Clojure
- Emacs Lisp
- Haskell
- Java
- JavaScript
- \LaTeX
- Python
- Scheme
- MATLAB
- Django
- git
- NumPy/SciPy
- OpenCV
- GNU/Linux
- Hadoop
- Hive
- PostgreSQL
- Spark

• Small-scale projects and/or assignments •• Multiple projects and/or experience teaching ••• Large-scale and/or multi-group projects

Activities

teaching, programming, open source software, system administration, data visualization, Linux, [music composition](#)