

# Jarrell WAGGONER

## Biographical

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## Online

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

## Research Interests

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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

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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

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2013—PRESENT	<div>Software Development Engineer <span style="float: right;"><i>Groupon, Inc.</i></span></div> <div>Tech Lead of the Supply Intelligence team building internal tools and analytics pipelines to optimize Groupon's supply funnel using <b>Clojure</b> to develop service-oriented and big data systems.</div> <div>— Built a <b>PostgreSQL</b>-backed high-performance caching and write management system around <b>Salesforce</b> that hits 10K req/min</div> <div>— 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 <b>Ruby</b> and <b>Bash</b> to a multi-staged <b>Hadoop</b> pipeline written in <b>Clojure</b></div> <div>— Oversaw technical decisions, engaged in mentorship, established best practices, coordinated with stakeholders, and led multiple major technical initiatives on a team of 5 developers</div> <div>— Built out an ETL management and machine learning platform using <b>Python</b>, <b>Clojure</b>, <b>Hive</b>, and <b>Spark</b></div>
2012—2014	<div>Technical Lead <span style="float: right;"><i>TerraStride, Inc.</i></span></div> <div>Software developer in an agile startup environment creating the <a href="http://huntstand.com">huntstand.com</a> web application. Written using <b>Python</b>, <b>Django</b>, and <b>Backbone.js</b>; deployed to <b>AWS</b>. Responsible for curating full technology stack and coordinating with 5 developers.</div>
2011—2013	<div>Project Manager <span style="float: right;"><i>Palmetto Computer Labs</i></span></div> <div>Assisted in planning the POSSCON conference. Managed the Open IT Lab and associated projects (Android Development). Provided software support for websites and managed projects.</div>
2011	<div>Contractor <span style="float: right;"><i>Elastic Vision Consulting</i></span></div> <div>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.</div>

## Research Experience

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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

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2008–2009	<p>GK-12 Fellow at CRAYTON MIDDLE SCHOOL</p> <p><i>8<sup>th</sup> Grade Science</i></p> <p>Served in Crayton Middle School, coordinating with the classroom instructor to enhance the science curriculum and activities in an 8<sup>th</sup> 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>5<sup>th</sup>-8<sup>th</sup> 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

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- [C1] **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. [\[PDF\]](#).
- [C2] **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. [\[PDF\]](#).

- [C3] 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].
- [C4] 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].
- [C5] 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].
- [C6] 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].
- [C7] **Jarrell Waggoner**. *Multi-Label Segmentation Propagation for Materials Science Images Incorporating Topology and Interactivity*. Dissertation, University of South Carolina, 2013. [PDF].
- [C8] **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].
- [C9] **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].
- [C10] 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].
- [C11] 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].
- [C12] **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].
- [C13] **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].
- [C14] 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].
- [C15] 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].
- [C16] 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].
- [C17] 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

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- [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

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

## Classes Taught

2012–2013 » Open Source 101	Open Source Software	IT-ology USC
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

ITERN MENTORING	Groupon internship program, 2014
WEBMASTER	<a href="#">Winter Vision Meetings, 2013</a>
WEBMASTER	<a href="#">Workshop on the Applications of Computer Vision, 2013</a>
JUDGE	Discovery Day — Undergraduate Research Presentations
REVIEWER	Pattern Recognition Letters
REVIEWER	IEEE Transactions on Pattern Analysis and Machine Intelligence
MEMBER	Institute of Electrical and Electronics Engineers (IEEE)
SYSADMIN	Computer Vision Lab

## Personal and Open Source Projects

MATSCISEG	Framework for propagated 3D volume segmentation, used in my dissertation work. Algorithms created in <b>Python</b> and <b>C++</b> and exposed as a web API using <b>Django</b> . Includes a web application that consumes the API created in <b>JavaScript</b> , and <b>jQuery</b> . <a href="https://github.com/malloc47/matsciseq">github.com/malloc47/matsciseq</a>
<a href="#">NONPARTISAN.ME</a>	Google Chrome extension that filters social media websites for political keywords. Available in the <a href="#">Chrome Web Store</a> . Featured in the <a href="#">Charleston City Paper</a> . <a href="https://github.com/malloc47/nonpartisan.me">github.com/malloc47/nonpartisan.me</a>
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 <b>C++</b> . Includes client/server architecture implemented with boost.interprocess and full-featured plugin system. Available in the <a href="#">Arch Linux AUR</a> . <a href="https://github.com/malloc47/term-do">github.com/malloc47/term-do</a>
RATIO CONTOUR	Maintainer and contributor for the Ratio Contour project, a salient object detection and segmentation method used for computer vision applications. Developed in <b>C</b> and <b>MATLAB</b> . <a href="https://github.com/malloc47/ratio-contour">github.com/malloc47/ratio-contour</a>
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 <b>MATLAB</b> . <a href="https://github.com/malloc47/digital-collation">github.com/malloc47/digital-collation</a>
BEFUNGE.PY	Complete <a href="#">Befunge</a> interpreter written in <b>Python</b> . Implements the Befunge 93 specification, and is one of the closest Python equivalents to the C reference implementation. <a href="https://github.com/malloc47/befunge.py">github.com/malloc47/befunge.py</a>

## Skills & Languages

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|----------------|--------------------|-------------------|------------------|
| • • • Bash     | • • • Java         | • • MATLAB        | • • • GNU/Linux  |
| • • • C/C++    | • • JavaScript     | • • Django        | • • • Hadoop     |
| • • • Clojure  | • • <del>TeX</del> | • • • git         | • • Hive         |
| • • Emacs Lisp | • • • Python       | • • • NumPy/SciPy | • • • PostgreSQL |
| • Haskell      | • • • Scheme       | • • • OpenCV      | • • • Spark      |

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

## Activities

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