Jarrell Waggoner

Biographical

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Online

Website	www.malloc47.com
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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

Education

Expected Aug. 2013	Ph.D. Candidate in Computer Science Advisor: Dr. Song Wang | GPA: 3.91/4.0	**University of South Carolina**
May 2009	Master of Engineering in Computer Science GPA: 3.8/4.0 | *magna cum laude*	**University of South Carolina**
May 2006	Bachelor of Science in Computer Science *summa cum laude*	**Bryan College**
May 2004	Associate of Science in Computer Science GPA: 4.0/4.0 | *summa cum laude*	**University of South Carolina at Lancaster**

Research Experience

2011—Present | Research Assistant funded by AFOSR

Materials Volume Segmentation

Developed segmentation methods for materials image volumes in *Python+NumPy/SciPy* and *MATLAB* 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.

2010—2011 | Research Assistant funded by DARPA

Video Event Recognition

Explored segmentation methods for video event recognition. Attended P.I. meetings in San Diego (2010) and Colorado (2011). Developed algorithms in *Scheme* to process a corpus of thousands of videos extracted into over 3 million frames using a high-performance computing cluster.

2009—2010 | NEH Fellow at the Center for Digital Humanities

Digital Collation

Created a digital collation application to handle automatic differencing of sub-textual inconsistencies among multiple copies of *The Faerie Queene* by Edmund Spenser in *MATLAB* to process tens of thousands of book page images.

Teaching Experience

2008–2009 | GK-12 Fellow at Crayton Middle School
8th Grade Science
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.

2007–2008, 2011 | Graduate Teaching Assistant at USC
Web Development
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.

Spring 2007 | Instructor for CSCE 204 at USCL
Introductory Programming
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

Fall 2006 | Camp Instructor for USCL Arts and Sciences Adventure Camp
5th-8th Grade Students
Worked in collaboration with Dr. Dwayne Brown. One of two instructors teaching Math and Computer Science to grade school students.

2003–2007 | Professional Tutor at USCL Academic Success Center
High School and College Students
Student and graduate tutor for college-level Mathematics, Computer Science, Physics, and English classes.

Industry Experience

2012—Present | Technical Lead — *Huntstand, Inc.*
Developed the www.huntstand.com web application using Python+Django with a PJAX frontend which was deployed to AWS; responsible for curating full technology stack and coordinating with multiple developers.

2011—Present | 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 | Contractor — *Elastic Vision Consulting*
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.

2005 | Intern — Technical Writer — *JAARS, Inc.*
Created documentation and integrated context-sensitive online help system for speech and linguistic software written in C++ and Visual Basic.

2001—2002 | Volunteer Software Developer — *JAARS, Inc.*
Spearheaded the conversion from VB4 to VB6 for the linguistic reference tool IPA Help.

Publications

[C1] Jarrell Waggoner, Jeff Simmons, Marc De Graef, and Song Wang. Multi-structure propagation incorporating homeomorphism for materials image segmentation. *IEEE Transactions on Image Processing*, (under review).

[C2] Jarrell Waggoner, Youjie Zhou, Jeff Simmons, Marc De Graef, and Song Wang. Topology-preserving multi-label segmentation by propagating constrained ring structures and its application to grain image segmentation. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, (under review).

[C3] 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)*, (to appear).

[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.

[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.

[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.

[C7] 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.

[C8] 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.

[C9] 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.

[C10] 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.

[C11] 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.

[C12] 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.

[C13] 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, 2010.

Posters/Presentations

[P1] *Homeomorphic Multi-Structure Propagation for Metallic Image Segmentation.* Gamecock Computing Research Symposium. Columbia, SC. October 5, 2012.

[P2] *Android Application Development Workshop.* Appathon Contest. Columbia, SC. November 17, 2012.

[P3] *Open Source and Education.* SC Municipal Technology Association (SCMTA) Conference. Charleston, SC. September 6, 2012.

[P4] *Open Source and Higher Education.* SC Technical College System (SCTCS) Conference. Columbia, SC. September 25, 2012.

[P5] *Introduction to Android Development.* Digital Humanities High Performance Computing (DHHPC) Workshop. Columbia, SC. August 8, 2012.

[P6] *Combining Global Labeling and Local Relabeling for Metallic Image Segmentation.* SPIE (Computational Image X). Burlingame, CA. January 23, 2012.

[P7] *Open Source and Government.* SC Government Management Information Systems (SCGMIS) Software Developers Workshop. Columbia, SC. January 19, 2012.

[P8] *Superpixel Contour Completion.* DARPA Mind's Eye PI Meeting. Denver, CO. January 20, 2011.

Guest Lectures

[G1] *Building Chrome Extensions.* In CSCE 242. Guest lecture for Dr. José M. Vidal. November 30, 2012.

[G2] *Modeling in Blender.* In CSCE 552. Guest lecture for Dr. Jijun Tang. February 28, 2011.

[G3] *Aspect-Oriented Programming.* In CSCE 531. Guest lecture for Dr. Marco Valtorta. March 19, 2008.

[G4] *Math 241.* Vector Calculus. Guest lecture for Dr. Dwayne Brown. April 23—26, 2007.

[G5] *Math 242.* Differential Equations. Guest lecture for Dr. Dwayne Brown. April 23—26, 2007.

Honors/Awards

2012	Gamecock Computing Research Symposium Poster Session, First Place	
	Graduate Student Day Presentation, First Place	
2011	Graduate Student Day Presentation, Second Place	USC
2010	Graduate Student Day Presentation, Honorable Mention	
2009	Upsilon Pi Epsilon	
2006	Senior Computer Science Award	Bryan College
2004	Clara P. Hammond Award	
	Science and Mathematics Award	USCL
	Highest Academic Average Award	

Teaching

Ongoing	» Open Source 101	Open Source Software	IT-oLogy
Ongoing	» Version Control 101	git, github	
Ongoing	» Command Line 101	Linux, BASH	
Fall 2011	» CSCE 211	Digital Logic Design	USC
Summer II 2008	» CSCE 102	HTML/CSS/Javasript	
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

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
Member	Institute of Electrical and Electronics Engineers (IEEE)
SysAdmin	Computer Vision Lab

Personal and Open Source Projects

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. Available in the Arch Linux AUR.
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

PMLDAP — **Linux** user management tool for Linux clusters. Created as a simplified replacement for LDAP. Capable of bootstrapping new systems, synchronizing users and configuration files, and running distributed commands. Written in **Bash**.
github.com/malloc47/pmldap

MATSCICUT — An energy minimization framework for segmenting 3D materials volumes. Prototype of dissertation work, created in C++ using OpenCV libraries, with assorted MATLAB helper utilities.
github.com/malloc47/matscicut

GIT-HQ — A remote management system for git, created in Python.
github.com/malloc47/git-hq

Skills & Languages

◦ ◦ • Bash	◦ ◦ • GNU/Linux	• • LaTeX	◦ ◦ • Python
• • Blender	• Haskell	• • Maple	• • Django
◦ ◦ • C/C++	◦ ◦ • HTML/CSS	◦ ◦ • MATLAB	◦ ◦ • SciPy
• Emacs Lisp	◦ ◦ • Java	◦ ◦ • NumPy	◦ ◦ • Scheme
◦ ◦ • English	• • Javacript	◦ ◦ • OpenCV	• • SQL
• • git	• • jQuery	• PHP	◦ ◦ • Sys. Admin.

• 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