Curriculum Vitae
Joshua V. Stough

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Education

The University of North Carolina, Chapel Hill, NC *2001-2008*
Ph.D., Computer Science 2008 (M.S. 2006)
Advisor: Stephen M. Pizer
Topic: Image analysis: Clustering and shifting of regional appearance for deformable model segmentation, with a target of Radiation Oncology.

Carleton College, Northfield, MN *1997-2001*
B.A., Computer Science and Mathematics, with Distinction
Graduated *Magna Cum Laude*, GPA 3.8

Honors and Awards

- Two Lenfest summer research grants, four RE Lee student research grants (2010, 2011)
  -Institutional funding for summer research (see Research below)
- NSF-TCPP Early Adopter: Curriculum Initiative on Parallel and Dist. Computing (2011)
  -Curriculum grant ($1500), plus expenses/poster at IPDPS 2011
- SuperComputing (SC) Conference - Education Program (2010, 2011)
- Future Faculty Fellowship, Center for Teaching and Learning, UNC-Chapel Hill (*2006*)
- UNC Radiology Research Symposium, honorable mention, best Oral Presentation (*2004*)
- Phi Beta Kappa (*2001-Present*)

Research Interests

- Image appearance models for medical image segmentation
  -ISBI reviewer 2009-Present
- Visual object recognition, machine vision
- Object-oriented data analysis, including clustering and statistical modeling
- Deformable shape model techniques
- Parallel and Distributed Computing education

Research Experience

- **Machine Vision** *2009-Present*
  - Live Coral Segmentation: texture- and color-distribution based classification of live A. cervicornis coral, with a goal of rapid assessment monitoring (Acropora cervicornis coral has been considered a bellwether for coral reef habitat change.)
  - Condor Distributed Computing: worked with Garrett Koller '14 to deploy Condor environment on CS deparmtent lab machines (2011). See condor.cs.wlu.edu.

- Exploiting low-level parallelism in Computer Vision: worked with Paul Nguyen '14 on MEX/CUDA/openmp/pthread implementations of Matlab-based visual object recognition software (2011).
- DistributedPython for easy parallel scripting: developed DistributedPython module for simple SSH-based concurrent execution, using the multiprocessing and subprocess modules. with Lee Davis '13 (2011). See http://code.google.com/p/distributed-python-for-scripting/.
- Visual Object Recognition in natural images: SIFT-based Support Vector Machine and Spatial Pyramid Matching, with a focus on SIFT distance metrics and co-occurance statistics. with Will Richardson '11, Chen Zhong '12 (2010)

- **Research Assistant, UNC-Chapel Hill** *2002-2008*
  Medical Image Display & Analysis Group (MIDAG), led by Stephen M. Pizer
  Completed Ph.D. on object-relative regional appearance models for medical image processing tasks, such as prostate segmentation for adaptive radiotherapy. Also:
  - Authored software for comparing closed surface meshes using accepted metrics such as volume overlap and surface distance.
  - Developed a 3D mesh warping tool using diffusion techniques, towards a symmetric distance metric between surfaces.

- **Research Assistant, UNC-Chapel Hill** *June-December 2001*
  Telecollaboration Research Group, led by Henry Fuchs
  - Designed control software for a pan/tilt unit for use in spectral radiometric testing of a projection screen for calibration.
  - Investigated polygonal mesh repair and simplification software for real world data.

Peer-Reviewed Publications

- **Stough, J.V.**, Greer, L., Benson, M., Sullivan, W.: Texture and Color Distribution-Based Classification for Live Coral Detection. Proc. International Coral Reef Symposium (2012).
- **Stough, J.V.**: Clustering and shifting of regional appearance for deformable model segmentation. PhD Dissertation (Advisor: Stephen M. Pizer). University of North Carolina at Chapel Hill, 2008. See http://midag.cs.unc.edu/.
- Jeong, J.Y., **Stough, J.V.**, Marron, J.S, and Pizer, S.M.: Conditional-Mean initialization using neighboring objects in deformable model segmentation. In: *SPIE: Medical Imaging* 2008.
- **Stough, J.V.**, Broadhurst, R.E., Pizer, S.M., and Chaney, E.L.: Regional appearance in deformable model segmentation. In: *Information Processing in Medical Imaging (IPMI)* 2007, Springer LNCS 4584, 532-543.
- **Stough, J.V.**, Broadhurst, R.E., Pizer, S.M., and Chaney, E.L.: Clustering on local appearance for deformable model segmentation. In: *International Symposium on Biomedical Imaging (ISBI)* 2007, http://ieeexplore.ieee.org/.
- Pizer, S.M., Broadhurst, R.E., Jeong, J., Han, Q., Saboo, R., **Stough, J.**, Tracton, G., and Chaney, E.L.: Intra-Patient Anatomic Statistical Models for Adaptive Radiotherapy. In: *MICCAI Workshop: From Statistical Atlases to Personalized Models*, pp. 43-46, 2006.

- Broadhurst, R.E., **Stough, J.**, Pizer, S.M., and Chaney, E.L.: A Statistical Appearance Model Based on Intensity Quantiles. In: *ISBI* 2006, http://ieeexplore.ieee.org/.
- Broadhurst, R.E., **Stough, J.**, Pizer, S.M., and Chaney, E.L.: Histogram statistics of local model-relative image regions. In: *International Workshop on Deep Structure, Singularities and Computer Vision (DSSCV)*, Springer LNCS 3753 (2005), 72-83.
- Pizer, S.M., Jeong, J., Broadhurst, R.E., Ho, S. and **Stough, J.**: Deep Structure of Images in Populations via Geometric Models in Populations. In: *DSSCV*, Springer LNCS 3753 (2005), 49-59.
- Pizer, S.M., Fletcher, P.T., Joshi, S., Gash, A.G., **Stough, J.**, Thall, A., Tracton, G., and Chaney, E.L.: A Method & Software for Segmentation of Anatomic Object Ensembles by Deformable M-Reps. *Medical Physics* **32**(5)(2005), 1335-1345.
- Rao, M., **Stough, J.**, Chi, Y., Muller, K., Tracton, G.S., Pizer, S.M., Chaney, E.L.: Comparison of human and automatic segmentations of kidneys from CT images. *International Journal of Radiation Oncology, Biology, Physics* **61**(3)(2005), 954-960.
- **Stough, J.**, Pizer, S.M., Chaney, E.L., and Rao, M.: Clustering on image boundary regions for deformable model segmentation. In: ISBI 2004, http://ieeexplore.ieee.org/.

Teaching and Related Experience

- **Assistant Professor, Washington and Lee University** *2009-Present*
  In addition to CS 0/1/2 in Python, specializing in courses on image processing, computer graphics, computer vision, and artificial intelligence/machine learning.
  - CS0 Survey of Computer Science (W2012)
  - CS1 Intro. Python (F2011)
  - CS2/DS in Python (4x, most recent W2011)
  - Computer Graphics, C++/OpenGL (W2011)
  - Image Analysis, Matlab (W2010)
  - Computer Networks, Java (W2012)
- **Visiting Assistant Professor, Claremont McKenna College** *2008-2009*
  Fall 2008: taught introductory and advanced programming (CS 1 and 2, respectively) in Java. Spring 2009: taught CS 1 and an image analysis course of my design that is influenced by my experience in the field.
- **Instructor, UNC-Chapel Hill** *Spring 2005, Fall 2007*
  Developed and taught an introductory programming course in Java. Bore full responsibility for lectures, assignments, examinations and grading for the classes of ∼35 students each.
- **Teaching Assistant, UNC-Chapel Hill** *Spring 2002*
  Assisted in a computer organization course, grading assignments and exams, preparing study sessions, and tutoring individually on digital logic design and assembly languages for a class of 30.
- **Guest Instructor, UNC-Chapel Hill** *2004-2007*
  Designed and conducted occasional lectures in graduate courses on image analysis and computer vision.
- **Tutor, Math Skills Center, Carleton College** *1998-2001*
  Tutored fellow undergraduates in Calculus, Statistics and Computer Science.
- **Teaching Assistant, Carleton College** *Winter 2000*

Graded assignments and held office hours in Calculus I

- **Tutor, Chapel Hill-Carrboro City Schools, NC** *2005-2007*
  - Tutored high school students in all subjects, though predominantly algebra and geometry, for the 21st Century Community Learning Center Program.
  - Tutored middle school students in all subjects under the Blue Ribbon Mentor - Advocate Program.

Other Experience

- **Technical Assistant, Carleton College, Northfield, MN** *1998-2001*
  Programmed Perl modules for network device communication via SNMP in a Unix environment. Maintained network by activating ports, troubleshooting, user support.
- **Software Engineer, WestGroup, Eagan, MN** *June-August 2000*
  Authored automation software for quality testing, programming in WindowsNT environment (Visual Basic, Compuware QARun).
- Languages/environments: C++, Java, MATLAB, Python, Perl, Scheme (LISP).
- Packages: OpenGL, Fast Light GUI Toolkit (FLTK), Insight Toolkit (ITK)
- Extensive experience in Unix and Windows Environments.