

David C. Zhu, Ph.D.

Assistant Professor of Psychology and Radiology
Cognitive Imaging Research Center
358 Giltner Hall

Michigan State University
East Lansing, MI 48824

Phone: (517) 353-9432 (main office) or (517) 355-0120 ext. 345, Fax: (517) 353-3745
email: zhuda@msu.edu

EDUCATION

Ph.D., Biomedical Engineering, University of California, Davis, December 1999.
Dissertation: Magnetic Resonance Pulse Sequences and Analytical Techniques for Breast Cancer Detection and Cardiovascular Flow.

M.S., Biomedical Engineering, California State University, Sacramento, August 1996.
Thesis: Odd-Number Hybrid Echo Planar Magnetic Resonance Imaging.

B.S., Electrical and Electronic Engineering, California State University, Sacramento, May 1996.

B.A., Molecular & Cell Biology, emphasis: Biochemistry, University of California, Berkeley, May 1992.

EXPERIENCE

Assistant Professor of Psychology and Radiology, Cognitive Imaging Research Center, Michigan State University, East Lansing, Michigan, 4/2005 – present.

- MRI methodology development.
- Apply fMRI to study human cognition.
- MRI physics and fMRI data analysis consultation to investigators.

Research Associate (Assistant Professor) of Radiology, Brain Research Imaging Center, Department of Radiology, University of Chicago, Chicago, IL, 8/2002 – 4/2005.

- MR methodology development for brain research, including functional MRI.
- Maintained the state-of-the-art 3T MR scanner.
- MRI physics and MR system consultation to investigators.

MR Applications Engineer, GE Medical Systems, Waukesha, WI, 1/2000 – 8/2002.

- Pulse sequence development with an emphasis on Fast Spin Echo sequences.
- Integration of the EXCITE data acquisition system.
- Resolving MR system issues.
- The coordinator for ESE (The pulse sequence development environment) research support.

Postgraduate Researcher, Department of Radiology, University of California, Davis, 6/95 – 11/99.

Developed and implemented the following MR pulse sequences:

- an arterial spin tagging pulse sequence for breast cancer detection,
- a 4D phase contrast pulse sequence for cardiovascular flow studies,
- an "odd-number" interleaved pulse sequence for high-resolution EPI, and
- a multi-echo pulse sequence for renal flow studies.

Developed linear regression, segmentation and pattern recognition algorithms for breast cancer detection.

Performed data analysis and data management for brain functional MRI studies.

Production Assistant Chemist, MDL Information Systems Inc., San Leandro, California, 6/92 - 8/93.

Production and quality control on chemical databases.

CITIZENSHIP: U.S. citizen.

PUBLICATIONS

Huang J, Zhu DC. Simultaneous magnetic resonance imaging of diffusion anisotropy and diffusion gradient magnetic resonance imaging. Manuscript in revision for submitting to Magnetic Resonance Imaging. 2007.

Henderson JM, Larson CL, Zhu DC. What makes real-world scenes special: An fMRI study. Cognition. 2006 (Submitted).

Henderson JM, Larson CL, Zhu DC. Full scenes produce more activation than close-up scenes and scene-diagnostic objects in parahippocampal and retrosplenial cortex: an fMRI study. Brain and Cognition. 2007. (Accepted for publication).

Henderson JM, Larson CL, Zhu DC. Cortical activation to indoor versus outdoor scenes: an fMRI study. Exp Brain Res. 2007;179:75-84.

Linninger AA, Xenos M, Zhu DC, Somayaji MR, Kondapalli S, Penn RD.. Cerebrospinal fluid flow in the normal and hydrocephalic human brain. IEEE Trans Biomed Eng. 2007;54:291-302.

Zhu DC, Xenos M, Linninger AA and Penn RD. Dynamics of lateral ventricle and cerebrospinal fluid in normal and hydrocephalic brains. J Magn Reson Imaging. 2006;24:756-770.

Goldman MB, Heidinger L, Kulkarni K, Zhu DC, Chien A, McLaren DG, Shah J, Coffey CE Jr, Sharif S, Chen E, Uftring SJ, Small SL, Solodkin A, Pilla RS. Changes in the amplitude and timing of the hemodynamic response associated with prepulse inhibition of acoustic startle. Neuroimage. 2006;32:1375-1384.

Zhu DC, Penn RD. Full-brain T_1 mapping through inversion recovery fast spin echo imaging with time-efficient slice ordering. Magn Reson Med. 2005;54:725-731.

Linninger AA, Tsakiris C, Zhu DC, Xenos M, Roycewicz P, Danziger Z, Penn R. Pulsatile cerebrospinal fluid dynamics in the human brain. IEEE Trans Biomed Eng. 2005;52:557-565.

Norris CJ, Chen E, Zhu DC, Small SL, Cacioppo JT. The interaction of social and emotional processes in the brain. J Cogn Neurosci. 2004;16:1818-1829.

Zhu DC, Buonocore MH. Breast tissue differentiation using arterial spin tagging. Magn Reson Med 2003;50:966-975.

Buonocore MH, Zhu DC. Image-based ghost correction for interleaved EPI. Magn Reson Med 2001;45:96-108.

Buonocore MH, Zhu DC. High spatial resolution EPI using an odd-number of interleaves. Magn Reson Med 1999;41:1199-1205.

ABSTRACTS AND PRESENTATIONS

Zhu DC, Larson CL, Henderson JM. Use a simple "sleep detector" to control fMRI data quality for studies on higher-level visual processing. Poster presented at the Organization for Human Brain Mapping, 13th Annual Meeting, June 10-14, 2007, Chicago, IL.

Larson CL, Aronoff J, Zhu DC. Recognizing threat: neural circuitry for detection of threat responds to simple geometric shapes. Poster presented at the Organization for Human Brain Mapping, 13th Annual Meeting June 10-14, 2007, Chicago, IL.

Zhu DC, DeMarco JK, Ferguson M. An optimized 3D inversion recovery prepared fast spoiled gradient recalled sequence for carotid plaque imaging. E-poster presented at the International Society for Magnetic Resonance in Medicine, 15th Scientific Meeting and Exhibition, May 19-25, 2007, Berlin, Germany.

DeMarco K, Zhu D, Underhill H, Ferguson M, Oikawa M, Yu W, Yuan C. Hemorrhage detection in the carotid atherosclerotic lesion – initial results at 3T. Poster presented at the International Society for Magnetic Resonance in Medicine, 15th Scientific Meeting and Exhibition, May 19-25, 2007, Berlin, Germany.

Larson CL, Aronoff J, Zhu DC. Neural circuitry for detection of threat responds to simple geometric shapes. Poster presented at the Cognitive Neuroscience Society, May 5-8, 2007, New York, New York.

Siebert JE, DeMarco JK, Zhu DC, Latourette MT, Vu AT. Quantitative MRI R2* mapping in atherosclerotic plaque characterization. 18th Annual International Conference on Magnetic Resonance Angiography 2006, #3.7, Basel, Switzerland.

DeMarco JK, Zhu DC, Ferguson M, Underhill H, Yuan C. Initial clinical experience of in vivo 3T carotid MRA and plaque imaging. 18th Annual International Conference on Magnetic Resonance Angiography 2006, #3.4, Basel, Switzerland.

DeMarco K, Zhu D, Hammond C, Henderson G, Kerwin W, Ross W, Yarnykh V, Yuan C. High-resolution carotid MRA and plaque MRI at 3T: Initial clinical experience and validation of semi-automated plaque characterization. Proceeding of the International Society for Magnetic Resonance in Medicine, 14th Scientific Meeting and Exhibition 2006, #2173, Seattle, WA.

Huang J, Zhu DC. Correction of eddy-current induced phase error in diffusion-weighted imaging. Proceeding of the International Society for Magnetic Resonance in Medicine, 14th Scientific Meeting and Exhibition 2006, #2377, Seattle, WA.

Linninger AA, Xenos M, Kondapalli S, Somayaji MBR, Zhu DC and Penn R. Mimics Image Reconstruction for Computer-Assisted Brain Analysis, Proc. Mimics Innovation Award 2005, pp1-12, Chicago, 2005.

Linninger AA, Xenos M, Kondapalli S, Somayaji MBR, Zhu DC and Penn R. Image Reconstruction for Computer-Assisted Brain Analysis, Invited presentation on the Workshop for Computer on 3D Modeling, Chicago, IL, Nov 4-5, 2005.

Zhu DC, Heidinger L, Kulkarni K, McLaren DG, Goldman MB. Brain activation temporal characteristic mapping in event-related fMRI studies. The Organization for Human Brain Mapping, 11th Annual Meeting 2005, Toronto, #596.

Zhu DC, Xenos M, Linninger AA, Penn RD. Magnitude and temporal characteristics of lateral ventricle contraction and expansion. Proceeding of the International Society for Magnetic Resonance in Medicine, 13th Scientific Meeting and Exhibition 2005, #67, Miami, FL.

Zhu DC, Penn RD. A color-coding technique for quantitative cinematic visualization of the cerebrospinal fluid flow dynamics. Proceeding of the International Society for Magnetic Resonance in Medicine, 13th Scientific Meeting and Exhibition 2005, #64, Miami, FL.

Zhu DC, Linninger AA, Penn RD. Brain water content measurement and visualization with applications to hydrocephalus. Proceeding of the International Society for Magnetic Resonance in Medicine, 13th Scientific Meeting and Exhibition 2005, #1099, Miami, FL.

Heidinger L, Kulkarni K, Solodkin A, Zhu DC, McLaren DG, Small SL, Gibbons R, Goldman MB. Neural correlates of prepulse inhibition of acoustic startle. International Congress on Schizophrenia research, biannual meeting 2005, Schizophrenia Bulletin, 31:421, Savannah, GA.

Goldman MB, Heidinger L, Kulkarni K, Zhu D. Neural Responses to Acoustic Startle Modification. Poster presented at the 34th Annual Meeting of the Society for Neuroscience, 2004, #202.23, San Diego, CA.

Heidinger L, Kulkarni K, Solodkin A, Zhu D, Small S, Goldman MB. Neural responses to acoustic startle modification. Poster presented at the conference of the International Society of Neuroimaging in Psychiatry, 2004, Irvine, CA.

Zhu DC, Penn RD. Full-brain T_1 mapping through inversion recovery fast spin echo imaging with time-efficient slice ordering. Proceeding of the International Society for Magnetic Resonance in Medicine, 12th Scientific Meeting and Exhibition 2004, on CD-ROM, #2103.

Zhu DC. T_2 and T_2^* triple spiral acquisition for fMRI on 3T systems. Proceeding of the International Society for Magnetic Resonance in Medicine, 12th Scientific Meeting and Exhibition 2004, on CD-ROM, #1007.

Norris CJ, Zhu DC, Chen E, Small SL, Cacioppo JT. Imaging the Orbitofrontal Cortex. Poster presented at the annual meeting of the Society for Psychophysiological Research 2003, Chicago, IL.

Priatna A, Zhu DC. Double/Triple IR dual contrast FSE of the heart with ASSET. Proceeding of the International Society for Magnetic Resonance in Medicine, 11th Scientific Meeting and Exhibition 2003, on CD-ROM, # 1562.

Zhu DC, Norris CJ, Chen E, Cacioppo JT, Uftring SJ, Hlustik P, Noll DC, Small SL. Systematic evaluation of fMRI acquisition methods for orbitofrontal cortex on a 3T system. The Organization for Human Brain Mapping, 9th Annual Meeting 2003, New York, on CD-ROM, #723.

Norris C, Chen E, Zhu D, Nusbaum H, Solodkin A, Small S, Cacioppo J. Neural Mechanisms Activated by Emotional Pictures. The Organization for Human Brain Mapping, 9th Annual Meeting 2003, New York, on CD-ROM, #58.

Zhu DC. Systematic diagnosis of phase problems using a FSE sequence. Proceeding of the International Society for Magnetic Resonance in Medicine, 10th Scientific Meeting and Exhibition 2002, on CD-ROM, # 2321.

Zhu DC, Vu AT. Routine ultra high-resolution 3D time of flight imaging using 8-channel head array coil with EXCITE data acquisition technology. Proceeding of the International Society for Magnetic Resonance in Medicine, 10th Scientific Meeting and Exhibition 2002, on CD-ROM, # 1056.

Buonocore MH, Zhu DC. Image-based ghost correction for general interleaved EPI. Proceeding of the International Society for Magnetic Resonance in Medicine, 9th Scientific Meeting and Exhibition 2001, on CD-ROM, # 292.

Buonocore MH, Zhu DC. Magnetic resonance arterial spin tagging for non-invasive pharmacokinetic analysis of breast cancer. Proceedings of the Era of Hope, Dept. of Defense Breast Cancer Research Program Meeting, Vol. 1, Page 177, June 8-11, 2000, Atlanta, GA.

Buonocore MH, Zhu DC, Bronstein JM. Ghost artifact suppression for interleaved echo planar imaging using image-based phase correction. Proceedings of the International Society for Magnetic Resonance in Medicine, 7th Scientific Meeting and Exhibition 1999;3:1998.

Buonocore MH, Zhu DC, Zulim RA. Analysis software for breast imaging studies. Proceedings of the International Society for Magnetic Resonance in Medicine, 7th Scientific Meeting and Exhibition 1999;3:2172.

Buonocore MH, Zhu DC, Bronstein JA. Ghost artifact suppression for interleaved echo-planar imaging. Scientific paper abstract. Radiological Society of North America, Nov 29 - Dec 5, 1998, Chicago IL.

Buonocore MH, Zhu DC. Odd-number hybrid EPI. Proceeding of the International Society for Magnetic Resonance in Medicine, 6th Scientific Meeting and Exhibition 1998, on CD-ROM, Page 1967.

Buonocore MH, Zhu DC, Pellot-Barakat C, Zulim RA. Non-invasive measurement of breast tissue perfusion using arterial spin tagging. Radiology, November 1997, 205 (P): 162.

Buonocore MH, Zhu DC, Barakat-Pellot C, Zulim RA. Noninvasive measurement of blood flow through breast tumors. Poster presentation, 1997 Breast Cancer Research Symposium, September 16, 1997, Sacramento CA.

Buonocore MH, Zhu DC, Barakat-Pellot C. Measurement of breast tissue perfusion using arterial spin tagging. Proceedings of the International Society for Magnetic Resonance in Medicine, 5th Scientific Meeting and Exhibition 1997;1:311.

Zhu DC, Buonocore MH, Barakat-Pellot C. Breast tissue differentiation using arterial spin tagging. Proceedings of the UC Davis Biomedical Engineering Symposium, Page 35-36, April 25, 1997, Davis CA.

Maddock RJ, Buonocore MH, Zhu D. Cortical responses to threat-related words in normal subjects and patients with panic disorder: an fMRI study. *Biological Psychiatry* 1996;39:637.

PROFESSIONAL MEMBERSHIPS

International Society for Magnetic Resonance in Medicine.
American Association of Physicists in Medicine.
The Organization for Human Brain Mapping.

HONORS and AWARDS

Sigma Xi Scientific Research Society in 2006
Mimics Innovation Award 2006: Mimics - an indispensable tool for patient-specific image analysis. By: Mauli Modi, Rajitha Mullapudi, MahadevaBharath R. Somayaji, Michalis Xenos, Andreas A. Linninger, David C. Zhu and Richard Penn
Mimics Innovation Award 2005: Mimics image reconstruction for computer-assisted brain analysis. By: Andreas A. Linninger, Michalis Xenos, Srinivasa. Kondapalli, MahadevaBharath. R. Somayaji, David C. Zhu and Richard Penn
Paul C. Hodges Alumni Society Research Award in 2003.
GE Medical Systems Management Award in 2002.
Tau Beta Pi Engineering Honor Society in 1995.
U.C. Berkeley Honor Students' Society in 1990-1991.
Undergraduate Scholarship in 1990 at U.C. Berkeley.
Chemistry Annual Award of 1989 at Laney College.

RESEARCH SUPPORT

Completed

Paul C. Hodges Alumni Society Research Award in 2003 Role: PI 1/1/04 - 6/30/05
Triple Spiral Pulse Sequence and Analytical Technique for Functional MRI Study on 3T Systems

The goal of this research is to develop a novel triple spiral sequence and a multivariate analysis technique that can further reduce the image signal loss due to susceptibility artifacts, enhance the sensitivity of fMRI, and provide a high-level localization of neural activity for fMRI studies on 3T systems.