

## CURRICULUM VITAE

**Name:** Vince D. Calhoun, Ph.D.

**Born:** October 1, 1967, Toledo, Ohio

**Family:** Married to June; son Jachin (age 4)

### Education:

B.S. Electrical Engineering, University of Kansas, Lawrence, KS, May 1991

M.A. Biomedical Engineering, Johns Hopkins University, Baltimore, MD, May 1993

M.S. Information Systems, Johns Hopkins University, Baltimore, MD, January 1996

Ph.D. Electrical Eng., Univ. of Maryland Baltimore County, Baltimore, MD, May 2002

### Career:

1990-1991 Research Assistant, Remote Sensing Laboratory  
University of Kansas, Lawrence, KS

1993-1993 Research Technician, Laboratory for Studies on  
Johns Hopkins University, Baltimore, MD  
Controlled Release of Bioactive Materials

1993-1996 System Manager/Programmer, Psychiatric Neuroimaging  
Johns Hopkins University, Baltimore, MD

1996-2001 Research Engineer, Psychiatric Neuroimaging  
Johns Hopkins University, Baltimore, MD

2001-2002 Senior Research Engineer, Psychiatric Neuroimaging  
Johns Hopkins University, Baltimore, MD

2002- Director, Medical Image Analysis Laboratory  
Institute of Living, Hartford, CT

2002-2005 Assistant Clinical Professor, Department of Psychiatry  
Yale University, New Haven, CT

2005- Associate Professor, Adjunct, Department of Psychiatry  
Yale University, New Haven, CT

2006- Associate Professor, Department of Electrical and Computer Engineering  
University of New Mexico, Albuquerque, NM

2006- Director Image Analysis and MR Research  
The MIND Institute, Albuquerque, NM

## Professional Honors or Recognition:

2006 Recipient, American College of Neuropsychopharmacology Young Investigator Memorial Travel Award

2005 Recipient, Young Investigator Award, International Congress on Schizophrenia Research

2004 Recipient, Early Career Investigator Award, International Society for Neuroimaging in Psychiatry

1992, 1995 International Society of Magnetic Resonance in Medicine Student Travel Award

Member, Phi Beta Kappa (honor society)

Member, Omicron Delta Kappa (honor society)

Member, Secretary, Mortar Board (honor society)

Member, President, Tau Beta Pi (engineering honor society)

Member, Eta Kappa Nu (engineering honor society)

## List of Funded Research:

### ACTIVE:

- |  |                  |
|--|------------------|
| NSF (Calhoun)  | 8/1/06-7/31/09   |
| Collaborative Research: SEI: Independent Component Analysis of Complex-Valued Brain Imaging Data   | \$200,000/year   |
| To develop multivariate methods for incorporating complex-valued processing strategies in the context of structural MRI, functional MRI, and diffusion tensor imaging data.  |                  |
| Role: Primary Investigator   |                  |
| NIBIB; 1 R01 EB 000840-01 (Calhoun)  | 4/1/03-4/1/07    |
| Multi-group Semi-blind ICA of fMRI   | \$250,000/year   |
| To develop, evaluate the performance of, and optimize semi-blind independent component analysis for the analysis of multi-group functional magnetic resonance imaging data and to use study data previously collected from patients with schizophrenia and healthy controls performing an auditory oddball task. |                  |
| Role: Primary Investigator   |                  |
| NIH; R01EB005846 (Calhoun)   | 8/1/05 – 7/31/08 |
| Collaborative Research: Spatiotemporal Fusion of fMRI, EEG, and Genetic Data Using Independent Component Analysis  | \$220,000/year   |
| To develop data fusion approaches for fMRI, EEG, and gene SNP array data.  |                  |
| Role: Primary Investigator   |                  |
| NSF (Calhoun)  | 4/1/06-3/31/11   |
| Collaborative Research: SEI: Independent Component Analysis of Complex-Valued Brain Imaging Data   | \$200,000/year   |
| To develop methods for analyzing complex-valued fMRI data.   |                  |
| Role: Primary Investigator   |                  |

NIH: 1 R24 RR021992 (Potkin) 4/1/06-3/31/11  
 BIRN: Functional Imaging Research for Schizophrenia Testbed \$157,000/year  
 Federated database project involving 19 performance sites. PI involvement in cognitive, statistics, and calibration workgroups.  
 Role: PI on Subcontract

NARSAD; (Calhoun) 4/1/04-3/31/07  
 Assessment of the State-Trait Specificity of Auditory Cortex fMRI \$60,000  
 Synchrony Maps in Schizophrenia and Bipolar Disorder  
 Study of specificity of auditory cortex maps in acute psychotic bipolar patients and after 6 months of medication. Maps are generated using independent component analysis methods we have developed.  
 Role: Primary Investigator

Hartford Hospital (Calhoun) 1/1/03-12/31/07  
 Functional Mapping of the Neocortical Network in Schizophrenia: \$50,000  
 Executive-Function Impairments and Spontaneous Fluctuations in fMRI  
 Role: Primary Investigator

NIAAA; 1 RO1 AA015615-01 (Pearlson) 3/1/05 – 2/28/09  
 Alcohol and Driving: fMRI Studies \$250,000/year  
 To study specific cognitive impairments caused by alcohol, their underlying functional anatomy and how they relate to performance on a validated simulated driving task.  
 Role: PI on subcontract

NIMH; 2 RO1 MH43775-14 (Pearlson) 3/1/05 – 2/28/10  
 Quantitative Neuroimaging in Psychosis \$250,000/year  
 Investigates circuit-wide abnormalities in schizophrenia using functional and structural brain MRI in schizophrenia and healthy controls.  
 Role: Co-Investigator

NIAAA 1 P50-AA12870-05; (Krystal) 12/1/06-11/30/11  
 Center for Translational Research in Alcoholism: Project 4: fMRI of \$1,325,662  
 reward Anticipation in Family History Positive vs Negative Subjects.  
 The project will examine fMRI activation patterns in reward tasks that may be vulnerability markers for alcoholism risk. The overall PO1 examines neurotransmitter, genetic, imaging and electrophysiologic alcoholism vulnerability markers.  
 Role: Project PI on subcontract within Dr. Krystal's P01 structure.

NIMH; 1 R01 MH0705539-01 (Kiehl) 12/1/04-11/30/08  
 ERP and fMRI of emotion and cognition in psychopathy \$250,000/year  
 To test the paralimbic dysfunction hypothesis of psychopathy in community samples using event-related potentials and functional magnetic resonance imaging.  
 Role: Co-Investigator

NIMH; 1 R01 MH072681-01 (Kiehl) 7/1/05-6/30/09  
 Abnormal functional connectivity in psychosis \$250,000  
 To use functional brain imaging measures to differentially diagnose schizophrenia from psychotic bipolar illness.  
 Role: Co-Investigator

NIDA; 1 R01 DA020870-01 (Kiehl)	9/1/05-8/31/10
Neurocognitive changes associated with behavioral treatment in cocaine abusers	\$388,096
To examine functional and structural changes associated with three cognitive behavioral treatment protocols in cocaine abusers.	
Role: Co-Investigator	
NIDA; Grant number pending (Potenza)	9/1/05-8/30/10
fMRI of CBT and CM for Cocaine Dependence	\$374,476
Will study the mechanisms of behavior treatment of cocaine dependence with fMRI	
Role: Co-Investigator	
NIMH; K23 MH070036-01 Stevens (PI)	8/01/04 - 7/01/09
Neuroimaging Cognition in Adolescent Behavior Disorders	\$142,250
A 5-year Career Development Award to provide the PI skills for an independent clinical neuroscience research career investigating how brain function relates to diagnoses associated with disruptive behavior.	
Role: Co-Mentor	
NIMH; 1 R01 MH074934-01 (Tolin)	6/1/06-5/31/10
Neural Mechanisms of Compulsive Hoarding	\$167,898
Primary Aims: To use functional brain imaging to assess error processing dysfunction in compulsive hoarding syndrome, obsessive-compulsive disorder, and anxious control groups.	
Role: Co-Investigator	
NIMH; K02 MH067967 (Ford)	10/1/03-9/30/08
Neurobiology of response monitoring failure in schizophrenia	\$141,100
This career development award provides salary support for Dr. Ford's effort on projects that involve enhanced design of fMRI studies, improved analysis of event-related potential (ERP) data; and new ways to integrate fMRI and ERP data to advance study of self monitoring in schizophrenia.	
Role: Advisor	

**Service:**

Associate Editor  
International Journal of Computational Intelligence and Neuroscience, 2006-

Associate Editor  
IEEE Signal Processing Letters, 2005-

General Chair  
Machine Learning for Signal Processing 2005, Mystic Connecticut

Chapter Organizer, 2006  
IEEE EMBS, Albuquerque

Member: Editorial Board  
Human Brain Mapping 2004-

Member: Editorial Board 2007-  
The Open Biomedical Engineering Journal

Member, Technical Program Committee  
Machine Learning for Signal Processing (MLSP), 2004-

Member, Technical Program Committee  
Neural Networks for Signal Processing (NNSP 2003)

Member, Technical Committee  
First International Workshop on Biosignal Processing and Classification (BPC), 2005-

Member: Tau Beta Pi Mentoring Program, 2003-

Member: International Review Panel, 2003-  
Medical Science Monitor

Member, Advisory Board  
International Conference on Informatics (ICI-2004)

Member, Program Committee  
International Conference on Intelligent Knowledge Systems (IKS-2005)

NIH Study Section, Ad hoc member, Human Brain Project (HBP)/Neuroinformatics

NIH Study Section, Ad hoc member, Human Brain Project (HBP)/BIST (Biomedical  
Information Science and Technology), Feb 2004

NIH Study Section, Biomedical Imaging Technology (BMIT), June 2005, Feb 2006

Natural Sciences and Engineering Research Council of Canada (NSERC), Ad hoc grant  
reviewer, Jan 2006

The Scottish Executive Healthy Department, Ad hoc grant reviewer, Feb 2006

NIH Study Section, RFA New way of imaging neural activity, April 2006

The Wellcome Trust, Ad hoc grant reviewer, March 2005, May 2006

NSF Grant Review Panel (CRCNS), March 2006

NSF Grant Review (BCS), November 2006

Netherlands Organization for Scientific Research (NWO), Social Sciences, grant reviewer,  
Nov 2006

**UNM Service (Oct 2006-Nov 2006):**

Area Chair: CompE Group

Member: CompE Faculty Search Committee, Fall 2006

Chair: Bioengineering Committee, Fall 2006

Chapter organizer: UNM IEEE Engineering in Medicine and Biology Chapter

## Research and related scholarly activities:

### *Five Publications Illustrating Major Achievements*

- [1] V. D. Calhoun, T. Adali, G. D. Pearlson, and J. J. Pekar, "A Method for Making Group Inferences From Functional MRI Data Using Independent Component Analysis," *Hum. Brain Map.*, vol. 14, pp. 140-151, 2001.

This is the first published method for performing independent component analysis (ICA) on group functional magnetic resonance imaging (fMRI) data. Two other group approaches were subsequently proposed. A published comparison of these three approaches concluded that the above method "provided the best overall performance in terms of accurate estimation of the sources and associated time courses". I have released a software package, implementing this method, which has been downloaded by over 500 individuals (<http://icatb.sourceforge.net>).

- [2] V. D. Calhoun, J. J. Pekar, V. B. McGinty, T. Adali, T. D. Watson, and G. D. Pearlson, "Different Activation Dynamics in Multiple Neural Systems During Simulated Driving," *Hum. Brain Map.*, vol. 16, pp. 158-167, 2002.
- [3] V. D. Calhoun, J. J. Pekar, and G. D. Pearlson, "Alcohol Intoxication Effects on Simulated Driving: Exploring Alcohol-Dose Effects on Brain Activation Using Functional MRI," *Neuropsychopharmacology*, vol. 29, pp. 2097-2107, 2004.

This is the second (and third) published article(s) which examined fMRI activation during the performance of a simulated driving task. The first article, from another group, used a simple subtractive approach and was thus unable to report on the temporal dynamics of simulated driving. Our methodology enabled the analysis and interpretation of a paradigm which was previously thought to be too complex to analyze (e.g. because it involved simultaneously performed cognitive sub-tasks such as divided visual attention & visuo-motor integration). In the first paper, we also developed a cognitive model for simulated driving which did not previously exist. Results from our ICA analysis corresponded remarkably well with hypotheses previously published by John Groeger, a senior neuropsychologist in the area of vehicle driving.

In the second paper, the first published study of its type, we extend our methodology to investigate the impact of different levels of alcohol intoxication upon brain activation during the performance of a simulated driving paradigm. A global disruptive effect of alcohol was observed. In addition, dose-dependent fMRI changes were revealed in orbitofrontal and motor (but not cerebellar) regions; visual and medial frontal regions were unaffected. Cerebellar regions were significantly associated with driving behavior in a dose-dependent manner. Alcohol thus demonstrated unique, disruptive, dose-dependent effects on fMRI signal within several brain circuits.

- [4] V. D. Calhoun, K. A. Kiehl, P. F. Liddle, and G. D. Pearlson, "Aberrant Localization of Synchronous Hemodynamic Activity in Auditory Cortex Reliably Characterizes Schizophrenia," *Biol. Psychiatry*, vol. 55, pp. 842-849, 2004.

This is, we believe, an exceptionally important paper on a reproducible abnormality in auditory cortex processing in schizophrenia, delineated by applying ICA to synchronous fMRI signals in this disorder. The newly defined abnormality in the localization of the synchronous activity very effectively separates patients from controls and may ultimately prove to be an important diagnostic tool. In the paper we show the original finding, and replicate it on a new group of patients and controls, both of which show reliability in the mid to upper 90<sup>th</sup> percentile.

- [5] V. D. Calhoun, T. Adali, G. D. Pearlson, P. C. van Zijl, and J. J. Pekar, "Independent Component Analysis of FMRI Data in the Complex Domain," *Magn Reson. Med.*, vol. 48, pp. 180-192, 2002.

This is a paper which extends the ICA algorithm to enable the analysis of complex-valued fMRI data and applies it to subjects performing a visual stimulation task. This is important because the fMRI data are naturally acquired as a complex-valued data set, however virtually all fMRI analyses discard the phase part of the complex-valued data. In this paper we show that using the phase information improve the estimation of fMRI sources and also provides the investigator with fMRI phase maps and time courses of phase changes, which can be useful for the interpretation of the fMRI data. Because the collection of phase data comes at no extra cost, the ability to add phase information to fMRI data has extremely wide applicability to whole brain fMRI data. We have several grant applications pending on this and related analytic approaches for processing complex-valued fMRI data.

*Selected Collaborators:*

Tulay Adali, Electrical Engineering, University of Maryland Baltimore County  
Andrew Barron, Statistics, Yale University  
Anna Rose Childress, Psychology, University of Pennsylvania  
Wil Cunningham, Psychology, University of Toronto  
Judy Ford, Psychiatry, Yale University  
Charles Guttman, Radiology, Harvard University  
John Hart, Neurology, University of Arkansas  
Jimmy Jensen, Psychiatry, University of Toronto  
Shitij Kapur, Psychiatry, University of Toronto  
Kent Kiehl, Psychiatry, Yale University  
Paul Maciejewski, Psychiatry, Yale University  
Danny Mathalon, Psychiatry, Yale University  
Godfrey Pearlson, Psychiatry, Yale University  
Jim Pekar, Radiology, Johns Hopkins University  
Marc Potenza, Psychiatry, Yale University  
David Schretlen, Psychiatry, Johns Hopkins University  
Reisa Sperling, Neurology, Harvard University  
Michael Stevens, Psychiatry, Yale University  
Hemant Tagere, Diagnostic Radiology & Electrical Engineering, Yale University  
David Yousem, Radiology, Johns Hopkins University

## Full Bibliography:

### Peer Reviewed Journal Articles:

- [1] B. Reissfeld, S. Blackband, V. D. **Calhoun**, S. Grossman, S. Eller, and K. Leong, "The Use of Magnetic Resonance Imaging to Track Controlled Drug Release and Transport in the Brain," *Mag.Res.Imag.*, vol. 11, pp. 247-252, 1993.
- [2] S. Kalyanasundaram, V. D. **Calhoun**, and K. W. Leong, "A Finite Element Model for Predicting the Distribution of Drugs Delivered Intracranially to the Brain," *Am.J.Physiol.*, vol. 273, pp. R1810-R1821, 1997.
- [3] V. D. **Calhoun**, T. Adali, M. Kraut, and G. D. Pearlson, "A Weighted-Least Squares Algorithm for Estimation and Visualization of Relative Latencies in Event-Related Functional Mri," *Magn.Res.Med.*, vol. 44, pp. 947-954, 2000.
- [4] V. D. **Calhoun**, T. Adali, V. McGinty, J. J. Pekar, T. Watson, and G. D. Pearlson, "Fmri Activation in a Visual-Perception Task: Network of Areas Detected Using the General Linear Model and Independent Components Analysis," *NeuroImage*, vol. 14, pp. 1080-1088, 2001.
- [5] V. D. **Calhoun**, T. Adali, G. D. Pearlson, and J. J. Pekar, "A Method for Making Group Inferences from Functional Mri Data Using Independent Component Analysis," *Hum.Brain Map.*, vol. 14, pp. 140-151, 2001.
- [6] V. D. **Calhoun**, T. Adali, G. D. Pearlson, and J. J. Pekar, "Spatial and Temporal Independent Component Analysis of Functional Mri Data Containing a Pair of Task-Related Waveforms," *Hum.Brain Map.*, vol. 13, pp. 43-53, 2001.
- [7] V. D. **Calhoun**, T. Adali, G. D. Pearlson, P. C. van Zijl, and J. J. Pekar, "Independent Component Analysis of Fmri Data in the Complex Domain," *Magn Reson.Med.*, vol. 48, pp. 180-192, 2002.
- [8] V. D. **Calhoun**, J. J. Pekar, V. B. McGinty, T. Adali, T. D. Watson, and G. D. Pearlson, "Different Activation Dynamics in Multiple Neural Systems During Simulated Driving," *Hum.Brain Map.*, vol. 16, pp. 158-167, 2002.
- [9] A. Horska, V. D. **Calhoun**, D. H. Bradshaw, and P. B. Barker, "A Rapid Method for Correction of Partial Csf Volume in Quantitative Proton Mr Spectroscopic Imaging," *Magn.Res.Med.*, vol. 48, pp. 555-558, 2002.
- [10] M. A. Kraut, S. Kremen, L. R. Moo, J. B. Segal, V. D. **Calhoun**, and J. Hart, Jr., "Object Activation in Semantic Memory from Visual Multimodal Feature Input," *J.Cogn Neurosci.*, vol. 14, pp. 37-47, 2002.
- [11] M. A. Kraut, S. Kremen, J. B. Segal, V. D. **Calhoun**, L. R. Moo, and J. Hart, Jr., "Object Activation from Features in the Semantic System," *J.Cogn Neurosci.*, vol. 14, pp. 24-36, 2002.
- [12] N. Mikhelashvili-Browner, D. M. Yousem, A. S. Mandir, V. D. **Calhoun**, C. Wu, K. K. Oguz, and C. L. Vaughan, "Correlation of Reaction Time in and out of the Functional Mr Unit," *Acad.Radiol.*, vol. 9, pp. 513-519, 2002.
- [13] V. D. **Calhoun**, T. Adali, J. J. Pekar, and G. D. Pearlson, "Latency (in)Sensitive Ica: Group Independent Component Analysis of Fmri Data in the Temporal Frequency Domain," *NeuroImage*, vol. 20, pp. 1661-1669, 2003.
- [14] M. Kraut, V. D. **Calhoun**, J. Pitcock, C. Cusik, and J. Hart, "Neural Hybrid Model of Semantic Object Memory: Implications from Event-Related Timing Using Fmri," *J.Int.Neuropsychol.Soc.*, vol. 9, pp. 1031-1040, 2003.

- [15] N. Mikhelashvili-Browner, D. M. Yousem, C. Wu, M. A. Kraut, C. L. Vaughan, K. K. Oguz, and V. D. **Calhoun**, "Lack of Sex Effect on Brain Activity During a Visuomotor Response Task: Functional Mr Imaging Study," *AJNR Am.J.Neuroradiol.*, vol. 24, pp. 488-494, 2003.
- [16] M. A. Mohamed, D. M. Yousem, A. Tekes, N. M. Browner, and V. D. **Calhoun**, "Timing of Cortical Activation: A Latency-Resolved Event-Related Functional Mr Imaging Study," *AJNR Am.J.Neuroradiol.*, vol. 24, pp. 1967-1974, 2003.
- [17] S. H. Mostofsky, J. G. Schafer, M. T. Abrams, M. C. Goldberg, A. A. Flower, A. Boyce, S. M. Courtney, V. D. **Calhoun**, M. A. Kraut, M. B. Denckla, and J. J. Pekar, "Fmri Evidence That the Neural Basis of Response Inhibition Is Task-Dependent," *Brain Res.Cogn Brain Res.*, vol. 17, pp. 419-430, 2003.
- [18] K. K. Oguz, N. M. Browner, V. D. **Calhoun**, C. Wu, M. A. Kraut, and D. M. Yousem, "Correlation of Functional Mr Imaging Activation Data with Simple Reaction Times," *Radiology*, vol. 226, pp. 188-194, 2003.
- [19] V. D. **Calhoun**, T. Adali, and G. D. Pearlson, "Independent Component Analysis Applied to Fmri Data: A Generative Model for Validating Results," *Journal of VLSI Signal Proc.Systems*, vol. 37, pp. 281-291, 2004.
- [20] V. D. **Calhoun**, T. Adali, and J. J. Pekar, "A Method for Testing Conjunctive and Subtractive Hypotheses on Group Fmri Data Using Independent Component Analysis," *Mag.Res.Imag.*, vol. 22, pp. 1181-1191, 2004.
- [21] V. D. **Calhoun**, D. Altschul, V. McGinty, R. A. Shih, D. Scott, and G. D. Pearlson, "Alcohol Intoxication Effects on Visual Perception: An Fmri Study," *NeuroImage*, vol. 21, pp. 15-26, 2004.
- [22] V. D. **Calhoun**, K. A. Kiehl, P. F. Liddle, and G. D. Pearlson, "Aberrant Localization of Synchronous Hemodynamic Activity in Auditory Cortex Reliably Characterizes Schizophrenia," *Biological Psychiatry*, vol. 55, pp. 842-849, 2004.
- [23] V. D. **Calhoun**, J. J. Pekar, and G. D. Pearlson, "Alcohol Intoxication Effects on Simulated Driving: Exploring Alcohol-Dose Effects on Brain Activation Using Functional Mri," *Neuropsychopharmacology*, vol. 29, pp. 2097-2107, 2004.
- [24] V. D. **Calhoun**, M. Stevens, G. D. Pearlson, and K. A. Kiehl, "Fmri Analysis with the General Linear Model: Removal of Latency-Induced Amplitude Bias by Incorporation of Hemodynamic Derivative Terms," *NeuroImage*, vol. 22, pp. 252-257, 2004.
- [25] M. R. Johnson, N. Morris, R. S. Astur, V. D. **Calhoun**, D. H. Mathalon, K. A. Kiehl, and G. D. Pearlson, "Investigation of Working Memory Abnormalities in Schizophrenia: An Fmri Study," *Biological Psychiatry*, 2004.
- [26] J. S. Kim, S. A. Reading, T. Brashers-Krug, V. D. **Calhoun**, C. A. Ross, and G. D. Pearlson, "Functional Mri Study of a Serial Reaction Time Task in Huntington's Disease," *Psychiatry Res.*, vol. 131, pp. 23-30, 2004.
- [27] M. A. Mohamed, D. M. Yousem, A. Tekes, N. Browner, and V. D. **Calhoun**, "Correlation between the Amplitude of Cortical Activation and Reaction Time: A Functional Mri Study," *AJR Am.J.Roentgenol.*, vol. 183, pp. 759-765, 2004.
- [28] M. Assaf, P. Rivkin, C. Kuzu, V. D. **Calhoun**, M. A. Kraut, K. Groth, M. Yassa, J. Hart, Jr., and G. D. Pearlson, "Abnormal Semantic Object-Recall and Anterior Cingulate Overactivation Correlate with Formal Thought Disorder in Schizophrenia," *Biological Psychiatry*, vol. 59, pp. 452-459, 2005.
- [29] R. S. Astur, S. Germain, E. Baker, V. D. **Calhoun**, G. D. Pearlson, and R. T. Constable, "Fmri Hippocampal Activity During a Virtual Radial Arm Maze," *Applied Psychophysiology and Biofeedback*, vol. 30, pp. 307-317, 2005.

- [30] V. D. **Calhoun**, T. Adali, M. Stevens, K. A. Kiehl, and J. J. Pekar, "Semi-Blind Ica of Fmri: A Method for Utilizing Hypothesis-Derived Time Courses in a Spatial Ica Analysis," *NeuroImage*, vol. 25, pp. 527-538, 2005.
- [31] V. D. **Calhoun**, K. Carvalho, R. S. Astur, and G. D. Pearlson, "Using Virtual Reality to Study Alcohol Intoxication Effects on the Neural Correlates of Simulated Driving," *Applied Psychophysiology and Biofeedback*, vol. 30, pp. 285-306, 2005.
- [32] N. Giuliani, V. D. **Calhoun**, G. D. Pearlson, A. Francis, and R. W. Buchanan, "Voxel-Based Morphometry Versus Regions of Interest: A Comparison of Two Methods for Analyzing Gray Matter Disturbances in Schizophrenia," *Schizophr.Res.*, vol. 74, pp. 135-147, 2005.
- [33] B. Hong, G. D. Pearlson, and V. D. **Calhoun**, "Source-Density Driven Independent Component Analysis Approach for Fmri Data," *Hum.Brain Map.*, vol. 25, pp. 297-307, 2005.
- [34] K. A. Kiehl, M. Stevens, K. R. Laurens, G. D. Pearlson, V. D. **Calhoun**, and P. F. Liddle, "An Adaptive Reflexive Processing Model of Neurocognitive Function: Supporting Evidence from a Large Scale (N=100) Fmri Study of an Auditory Oddball Task," *NeuroImage*, vol. 25, pp. 899-915, 2005.
- [35] H. Snoussi and V. D. **Calhoun**, "Regularized Spectral Matching for Blind Source Separation. Application to Fmri Imaging," *IEEE Trans.Signal Proc.*, vol. 53, pp. 3373-3383, 2005.
- [36] M. Stevens, V. D. **Calhoun**, and K. A. Kiehl, "Hemispheric Differences in Hemodynamics Elicited by Auditory Oddball Stimuli," *NeuroImage*, vol. 26, pp. 782-792, 2005.
- [37] M. Stevens, V. D. **Calhoun**, and K. A. Kiehl, "Fmri in an Oddball Task: Effects of Target-to-Target Interval," *Psychophysiology*, vol. 42, pp. 636-642, 2005.
- [38] A. Tekes, M. Noureldin, M. Kraut, V. D. **Calhoun**, N. Browner, and D. M. Yousem, "Effect of Age on Visuomotor Functional Mr Imaging " *Acad.Radiol.*, vol. 12, pp. 739-745, 2005.
- [39] Z. Wang, J. Wang, V. D. **Calhoun**, H. Rao, J. A. Detre, and A. R. Childress, "Strategies for Reducing Large Fmri Data Sets for Ica," *Mag.Res.Imag.*, vol. 24, pp. 591-596, 2005.
- [40] T. Adali and V. D. **Calhoun**, "Wide Open Window: Theme Issue on Fmri Data Analysis," *IEEE Eng.in Medicine and Biology*, vol. 25, pp. 22-23, 2006.
- [41] M. Assaf, V. D. **Calhoun**, C. Kuzu, M. A. Kraut, P. Rivkin, J. Hart, Jr., and G. D. Pearlson, "Neural Correlates of Object Recall Process in Semantic Memory," *Psych.Res.Neuroimaging*, vol. 147, pp. 115-126, 2006.
- [42] V. D. **Calhoun** and T. Adali, "Complex Infomax: Convergence and Approximation of Infomax with Complex Nonlinearities," *Journal of VLSI Signal Proc.Systems*, vol. 44, pp. 173-190, 2006.
- [43] V. D. **Calhoun** and T. Adali, "'Unmixing' Functional Magnetic Resonance Imaging with Independent Component Analysis," *IEEE Eng.in Medicine and Biology*, vol. 25, pp. 79-90, 2006.
- [44] V. D. **Calhoun**, T. Adali, N. Giuliani, J. J. Pekar, G. D. Pearlson, and K. A. Kiehl, "A Method for Multimodal Analysis of Independent Source Differences in Schizophrenia: Combining Gray Matter Structural and Auditory Oddball Functional Data," *Hum.Brain Map.*, vol. 27, pp. 47-62, 2006.
- [45] V. D. **Calhoun**, T. Adali, K. A. Kiehl, R. S. Astur, J. J. Pekar, and G. D. Pearlson, "A Method for Multi-Task Fmri Data Fusion Applied to Schizophrenia," *Hum.Brain Map.*, vol. 27, pp. 598-610, 2006.

- [46] V. D. **Calhoun**, G. D. Pearlson, and K. A. Kiehl, "Neuronal Chronometry of Target Detection: Fusion of Hemodynamic and Event-Related Potential Data," *NeuroImage*, vol. 30, pp. 544-553, 2006.
- [47] K. Carvalho, G. D. Pearlson, R. S. Astur, and V. D. **Calhoun**, "Simulated Driving and Brain Imaging: Combining Behavior, Brain Activity, and Virtual Reality," *CNS Spectrum*, vol. 11, pp. 52-62, 2006.
- [48] K. A. Celone, V. D. **Calhoun**, B. C. Dickerson, A. Atri, E. F. Chua, S. Miller, K. DePeau, D. M. Rentz, D. Selkoe, M. S. Albert, and R. A. Sperling, "Alterations in Memory Networks in Mild Cognitive Impairment and Alzheimer's Disease: An Independent Component Analysis," *Journal of Neuroscience*, vol. 26, pp. 10222-10231, 2006.
- [49] M. A. Kraut, J. Pitcock, V. D. **Calhoun**, J. Li, T. Freeman, and J. Hart, Jr., "Neuroanatomic Organization of Sound Memory in Humans," *J Cogn Neurosci.*, vol. 18, pp. 1877-1888, 2006.
- [50] A. Garrity, G. D. Pearlson, K. McKiernan, D. Lloyd, K. A. Kiehl, and V. D. **Calhoun**, "Aberrant 'Default Mode' Functional Connectivity in Schizophrenia," *Am.J.Psychiatry*, vol. 164, pp. 450-457, 2007.

Accepted Journal Articles:

- [1] R. S. Astur, S. Germain, E. Baker, V. D. **Calhoun**, G. D. Pearlson, and R. T. Constable, "Ica of Fmri Radial Arm Maze," *CNS Spectrum*, In Press.
- [2] V. D. **Calhoun** and G. D. Pearlson, "Recent Developments in Brain Imaging of Schizophrenia: A Selective Review," *Neuroscience Imaging*, In Press.
- [3] N. Correa, T. Adali, and V. D. **Calhoun**, "Performance of Blind Source Separation Algorithms for Fmri Analysis," *Mag.Res.Imag.*, In Press.
- [4] M. P. Hejnar, K. A. Kiehl, and V. D. **Calhoun**, "Interparticipant Correlations: A Model Free Fmri Analysis Technique," *Hum.Brain Map.*, In Press.
- [5] Y. Li, T. Adali, and V. D. **Calhoun**, "Estimating the Number of Independent Components for Fmri Data," *Hum.Brain Map.*, In Press.
- [6] Q. Lin, Y. Zheng, F. Yin, H. Liang, and V. D. **Calhoun**, "A Fast Algorithm for One-Unit Ica-R," *Information Sciences*, In Press.
- [7] G. D. Pearlson and V. D. **Calhoun**, "In Review: Structural and Functional Mri in Psychiatric Disorders," *Neuroimaging in Neuropsychiatry*, In Press.
- [8] M. Stevens, K. A. Kiehl, G. D. Pearlson, and V. D. **Calhoun**, "Functional Neural Circuits for Mental Timekeeping," *Hum.Brain Map.*, In Press.

*Technical Notes:*

- [1] T. Adali, T. Kim, and V. D. **Calhoun**, "Independent Component Analysis by Complex Nonlinearities," in *Proc.ICASSP*, pp. 525-528.
- [2] N. Correa, T. Adali, Y. Li, and V. D. **Calhoun**, "Comparison of Blind Source Separation Algorithms for Fmri Using a New Matlab Toolbox: Gift," in *Proc.IEEE Int.Conf.Acoustics, Speech, Signal Processing (ICASSP)*.
- [3] A. Garrity, G. D. Pearlson, K. McKiernan, D. Lloyd, K. A. Kiehl, and V. D. **Calhoun**, "Aberrant Functional Connectivity of the 'Default Mode' in Schizophrenia," in *Trinity Papers*.

- [4] A. Garrity, G. D. Pearlson, K. McKiernan, D. Lloyd, K. A. Kiehl, and V. D. **Calhoun**, "Aberrant Functional Connectivity of the 'Default Mode' in Schizophrenia," in *Neuron*.
- [5] B. Hong and V. D. **Calhoun**, "On an Adaptive Ica Method with Application to Biomedical Image Analysis," in *Seventh International Conference on Signal Processing*.
- [6] B. Hong and V. D. **Calhoun**, "Source Density Driven Adaptive Independent Component Analysis Approach for Fmri Signal Analysis" in *Proc.MLSP*, San Paulo, Brazil.
- [7] M. Jafri and V. D. **Calhoun**, "Functional Classification of Schizophrenia Using Feed Forward Neural Networks," in *Proc.EMBS*.
- [8] Y. Li, T. Adali, and V. D. **Calhoun**, "Independent Component Analysis with Feature Selective Filtering," in *Proc.MLSP*.
- [9] Y. Li, T. Adali, and V. D. **Calhoun**, "Feature-Selective Ica and Its Convergence Properties," in *Proc.IEEE Int.Conf.Acoustics, Speech, Signal Processing (ICASSP)*.
- [10] Y. Li, T. Adali, and V. D. **Calhoun**, "Sample Dependence Correction for Order Selection in Fmri Analysis," in *Proc.ISBI*.
- [11] J. Liu and V. D. **Calhoun**, "A Novel Approach to Analyzing Fmri and Snp Data Via Parallel Independent Component Analysis," in *Proc.SPIE*.
- [12] V. B. McGinty, R. A. Shih, E. S. Garrett, V. D. **Calhoun**, and G. D. Pearlson, "Assessment of Intoxicated Driving with a Simulator: A Validation Study with on Road Driving," in *Proc.Human Centered Trans.Sim.Conf.*
- [13] H. Snoussi and V. D. **Calhoun**, "Bayesian Blind Source Separation for Brain Imaging," in *Proc.ICIP*.
- [14] H. Snoussi and V. D. **Calhoun**, "Bayesian Blind Source Separation for Brain Imaging," in *Proc.SETIT*.
- [15] V. D. **Calhoun**, T. Adali, M. Kraut, P. Rivkin, and G. D. Pearlson, "Visualizing Spatially Distributed Hemodynamic Lag Times in Event-Related Functional Mri: Estimation of a Characteristic Visual "Impulse Response"," in *Proc.EMBS*, 1998.
- [16] V. D. **Calhoun**, T. Adali, and G. D. Pearlson, "A Frequency-Space Approach for Motion Correction in Fmri," in *Proc.IMDSP*, 1998, p. 229.
- [17] V. D. **Calhoun** and G. D. Pearlson, "Spatially-Distributed Lag Time Estimation in Event-Related Fmri Via Adaptive Filtering," in *Proc.BMES*, 1998.
- [18] V. D. **Calhoun**, T. Adali, and G. D. Pearlson, "(Non)Stationarity of Temporal Dynamics in Fmri," in *Proc.EMBS/BMES Joint Meeting*, 1999.
- [19] V. D. **Calhoun**, T. Adali, and G. D. Pearlson, "Adaptive Filtering of Visual Evoked Responses in Fmri: Variability of Response," in *Proc.IASTED-SIP*, 1999.
- [20] V. D. **Calhoun**, T. Adali, and G. D. Pearlson, "Independent Components Analysis Applied to Fmri Data: A Natural Model and Order Selection," in *Proc.NSIP*, 2001.
- [21] V. D. **Calhoun**, T. Adali, and G. D. Pearlson, "Independent Components Analysis Applied to Fmri Data: A Generative Model for Validating Results," in *Proc.NNSP*, 2001.
- [22] V. D. **Calhoun**, T. Adali, G. D. Pearlson, and J. J. Pekar, "Group Ica of Functional Mri Data: Separability, Stationarity, and Inference," in *Proc.Int.Conf.on ICA and BSS*, 2001, pp. 155-160.
- [23] V. D. **Calhoun**, V. McGinty, and G. D. Pearlson, "Driving and the Brain: An Imaging Study," in *Proc.Human Centered Trans.Sim.Conf.*, 2001.
- [24] V. B. McGinty, R. A. Shih, E. S. Garrett, V. D. **Calhoun**, and G. D. Pearlson, "Assessment of Intoxicated Driving with a Simulator: A Validation Study with on Road Driving," in *Proc.Human Centered Trans.Sim.Conf.*, 2001, pp. 11-19.
- [25] V. D. **Calhoun** and T. Adali, "Complex Infomax: Convergence and Approximation of Infomax with Complex Nonlinearities," in *Proc.NNSP*, 2002.

- [26] V. D. **Calhoun**, T. Adali, G. D. Pearlson, and J. J. Pekar, "On Complex Infomax Applied to Complex Fmri Data," in *Proc.ICASSP*, 2002.
- [27] V. D. **Calhoun** and T. Adali, "Complex Ica for Fmri Analysis: Performance of Several Approaches," in *Proc.ICASSP*, 2003.
- [28] V. D. **Calhoun**, T. Adali, J. C. Hansen, J. Larsen, and J. J. Pekar, "Ica of Fmri: An Overview," in *Proc.Int.Conf.on ICA and BSS*, 2003.
- [29] V. D. **Calhoun**, T. Adali, and Y. Li, "Independent Component Anlalysis of Complex-Valued Functional Magnetic Resonance Imaging Data by Complex Nonlinearities," in *Proc.ISBI*, 2004, pp. 984-987.
- [30] V. D. **Calhoun**, T. Adali, K. A. Kiehl, and G. D. Pearlson, "Neuronal Chronometry of Target Detection: Fusion of Hemodynamic and Event-Related Potential Data," in *Proc.MLSP*, 2005.
- [31] V. D. **Calhoun** and T. Adali, "Fusion of Multisubject Functional Mri and Event-Related Potential Data Using Independent Component Analysis," in *Proc.ICASSP*, 2006.
- [32] V. D. **Calhoun**, T. Adali, and J. Liu, "A Feature-Based Approach to Combine Functional Mri, Structural Mri, and Eeg Brain Imaging Data," in *Proc.EMBS*, 2006.
- [33] M. Jafri, G. D. Pearlson, and V. D. **Calhoun**, "A Maximal-Correlation Approach Using Ica for Testing Functional Network Connectivity Applied to Schizophrenia," in *Proc.ISBI*, 2007.
- [34] J. Liu and V. D. **Calhoun**, "Parallel Independent Component Analysis for Multimodal Analysis: Application to Fmri and Eeg Data," in *Proc.ISBI*, 2007.

*Book Chapters/Reviews:*

- [1] V. D. **Calhoun**, T. Adali, J. C. Hansen, J. Larsen, and J. J. Pekar, "ICA of FMRI: An Overview," in *Proc. Int. Conf. on ICA and BSS*, Nara, Japan, 2003.
- [2] V. D. **Calhoun** and G. D. Pearlson, Alcohol Intoxication Effects on fMRI Activation. In: *Functional Neuroimaging in Clinical Populations*, eds. F.Hillary and J.DeLuca. Guilford Press, 2005.
- [3] V. D. **Calhoun**, Investigation of Brain Networks Involved in Simulated Driving Using Functional Magnetic Resonance Imaging. In: *NeuroErgonomics: The Brain at Work*, eds. M.Rizzo and R.Parasuraman. Oxford University Press, 2005.
- [4] V. D. **Calhoun** and B. Hong, Independent component analysis of functional magnetic resonance imaging data. In: *Handbook of Pattern Recognition and Computer Vision*, World Scientific Publishing, 2005.
- [5] V.D.**Calhoun** and T.Adali, guest editors, "Special Issue on fMRI Data Analysis," to appear *IEEE Eng. in Medicine and Biology*, 2006.

**Educational Activities: Teaching/Lecturing**

*At UNM:*

ECE Seminar	4/2006
"Data Driven Brain Image Analysis: Algorithms & Applications"	
ECE Seminar	6/2006
"Data Driven Brain Image Analysis: Algorithms & Applications: Part II"	

2-day ICA and GIFT Software Workshop 4/2006  
The MIND Institute

ECE 595: Analysis Methods in fMRI Spring 2007

*Outside UNM:*

Instructor, Course on MEASURE, volumetric analysis of structural MRI 10/1995  
Johns Hopkins Division of Psychiatric Neuro-Imaging  
Development of Software Manuals, Training Material, and Course Syllabi

Instructor, Course on MEASURE, volumetric analysis of structural MRI 8/1996  
Johns Hopkins Division of Psychiatric Neuro-Imaging  
Development of Software Manuals, Training Material, and Course Syllabi

Organizer of Functional Imaging Journal Club 1996-2002  
Johns Hopkins Division of Psychiatric Neuro-Imaging  
FM Kirby Center for Functional Brain Imaging

Lecturer at Graduate Seminar, University of Maryland, Baltimore County 4/1998  
“Motion Correction in functional MRI (fMRI)”

Lecturer at Psychiatry Research Potpourri, Johns Hopkins University 5/1998  
“Movies of the brain: Simultaneous display of spatial and temporal functional MRI data”

Lecturer at Psychiatry Research Seminar, Johns Hopkins University 11/1998  
“Visual Evoked Responses in fMRI”

Guest Instructor: Computer Visualization 11/1998  
University of Maryland, Baltimore County

Statistics Grand Rounds Presentation at Johns Hopkins Public Health School 5/1999  
“Methods for Exploring Temporal Dynamics of fMRI of the Visual System”

Speaker at Opening Symposium for FM Kirby Center for Functional Brain Imaging 5/1999  
“Temporal Dynamics of Functional MRI in the Visual System”

Organizer and Instructor: Course on fMRI Analysis Methods 9/1999  
Johns Hopkins Division of Psychiatric Neuro-Imaging

Presenter at Psychiatry Research Potpourri, Johns Hopkins University 5/2000  
“Brain Networks activated during a Motor-Free Visual Perception Task: An fMRI Analysis of Functional Connectivity”

Presenter at Graduate Seminar, University of Maryland, Baltimore County 5/2000  
“A Weighted-Least Squares Method for Estimating Latencies in functional MRI”

Invited Panelist and Speaker, NINDS Workshop "Opportunities in Cognitive Neuroscience Research: Neuroimaging and Beyond"	11/2000
Presenter at Graduate Seminar, University of Maryland, Baltimore County "An ICA Model for Application to fMRI: Application to a Simulated Driving Paradigm"	4/2001
Presenter at Psychiatry Research Seminar, Johns Hopkins University "An Introduction to fMRI and its Use in the Study of Complex Behaviors"	5/2001
Organizer and Instructor: Course on SPM Analysis of PET and fMRI Data Johns Hopkins Division of Psychiatric Neuro-Imaging	8/2001
Guest Instructor: Neural Networks University of Maryland, Baltimore County	10/2001
Presenter at Psychiatry Research Seminar, Johns Hopkins University "Simulated Driving and the Effects of Marinol: An fMRI Study"	11/2001
Organizer and Instructor: Course on SPM Analysis of PET and fMRI Data Johns Hopkins Division of Psychiatric Neuro-Imaging	1/2002
Invited Course: Statistical Parametric Mapping analysis of fMRI Data National Institute of Health Gerontology Research Center	2/2002
Chairman's Grand Rounds Presentation at Wayne State University "Simulated Driving: Quantification, Validation and fMRI Studies of Driving While Intoxicated"	3/2002
Co-chair and organizer, workshop on "Novel Methods for processing fMRI Data" Annual meeting of the Society of Biological Psychiatry	5/2002
Invited Speaker, Human Brain Mapping "An Infomax Method for Performing ICA of fMRI Data in the Complex Domain"	6/2002
Presenter at Neuropsychopharmacology Grand Rounds, Institute of Living "Intoxication Effects on Simulated Driving"	10/2002
Invited co-organizer, workshop on "Independent Component Analysis of fMRI Data" Annual meeting on Independent Component Analysis (ICA 2003)	5/2003
Guest Instructor: Biomedical Engineering Seminar (BENG480a) Yale University School of Biomedical Engineering	10/2003
Lecturer at fMRI Seminar Series: "Independent Component Analysis for fMRI" Yale University School of Medicine	10/2003

Guest Instructor: Neuroscience Seminar Trinity College School of Engineering	10/2003
Lecturer at Bioimaging Seminar Series: “Complex-valued fMRI data analysis” Yale University School of Medicine	11/2003
Lecturer for Statistics Series: “The use of higher order statistics for the analysis of functional brain imaging data” Yale University School of Medicine	11/2003
Invited Panelist and Speaker, workshop on virtual reality Society of Biological Psychiatry	12/2003
Lecturer: Neuroimaging in Neuropsychiatry Yale University School of Medicine	4/2004
Invited Speaker, University of Toronto “Independent Component Analysis of fMRI: What?, When?, and How?”	7/2004
Training and initial release of GIFT Software Software available at: <a href="http://icatb.sourceforge.net">http://icatb.sourceforge.net</a>	7/2004
Lecturer: Neuroimaging in Neuropsychiatry Yale University School of Medicine	11/2004
Psychiatry Grand Rounds: “Update on the Olin Center: Medical Image Analysis Lab” Yale University School of Medicine	11/2004
Instructor: Independent Component Analysis for fMRI Olin Neuropsychiatry Research Center Attended by 20 individuals from multiple labs	11/2004
Lecturer at fMRI Seminar Series: “Fusion of multi-task and multi-modal imaging data: joint-ICA modeling approaches” Yale University School of Medicine	12/2004
Organizer/Lecturer: Neuroimaging in Neuropsychiatry I: Methods This is a course on neuroimaging methods and techniques targeted at residents, clinical interns, and neuroscience graduate students	7/2005-12/2005
Guest Instructor: Neuroscience Seminar Trinity College School of Engineering	11/2005
Invited Speaker, BIRN All Hands Meeting “Applications of Independent Component Analysis to fMRI”	11/2005
Organizer and Lecturer, 3-day course on fMRI Data Acquisition and Analysis	6/2005

Olin Neuropsychiatry Research Center, Hartford, CT 30 attendees from around the world	
Organizer, workshop on “Mining the Complexity of Functional MRI Data” Organization for Human Brain Mapping	5/2005
Organizer and Lecturer, 3-day course on fMRI Data Acquisition and Analysis Olin Neuropsychiatry Research Center, Hartford, CT 50 attendees from around the world	11/2005
Organizer/Lecturer: Neuroimaging in Neuropsychiatry II: Applications This is a course on neuroimaging applications targeted at residents, clinical interns, and neuroscience graduate students	1/2006-5/2006
Organizer and Lecturer, 3-day course on fMRI Data Acquisition and Analysis Olin Neuropsychiatry Research Center, Hartford, CT 50 attendees from around the world	3/2006
Organizer and Lecturer: Workshop on GIFT Software MIND Institute, University of New Mexico, Albuquerque, New Mexico 15 attendees	4/2006
Instructor: International Society for Magnetic Resonance in Medicine “Multi-Modal fMRI: Physiology, Acquisition, and Analysis”	5/2006
Instructor: Mining Brain Dynamics A Tutorial Workshop on Independent Component Analysis in Neuroimaging Bergen, Norway	9/2006
ICA and GIFT Software Workshop MGH and MIT 40 attendees	3/2007
Instructor: International Society for Magnetic Resonance in Medicine “Multi-Modal fMRI: Physiology, Acquisition, and Analysis”	6/2007

### **Educational Activities: Training/Mentoring**

#### *Faculty*

Dr. Alireza Atri, M.D., Ph.D., Harvard  
Mentor for NIH K32: Modeling cholinergic modulation of fMRI memory networks

Dr. Judy Ford: Professor, Yale University  
Mentor for NIH K02: FMRI Analysis

Dr. Michael Stevens, Assistant Professor, Yale University  
Mentor for NIH K02 award: FMRI Analysis

Dr. Julie Staley: Assistant Professor, Yale University

## Training in SPM and Voxel-based Morphometry

Dr. Robert Schultz: Associate Professor, Yale University  
Training in Voxel-based Morphometry, Pulse Sequence Development for 3T Siemens Trio

Dr. Wil Cunningham: Assistant Professor, University of Toronto  
Training in Group ICA of fMRI

Dr. David Schretlen, Associate Professor, Johns Hopkins University  
Training in SPM and Voxel-based Morphometry

Dr. Reisa Sperling, Assistant Professor, Harvard University  
Training on Independent Component Analysis of fMRI data and the GIFT software

## *Post Doctoral Fellows*

Dr. Jean Liu: Postdoctoral Fellow in the Medical Image Analysis Lab, on fusion of functional MRI, genetics, and EEG data

Dr. Madiha Jafri: Postdoctoral Fellow in the Medical Image Analysis Lab, on multivariate functional connectivity in schizophrenia

Dr. Baoming Hong: Postdoctoral Fellow in the Medical Image Analysis Lab, on the signal properties of fMRI, ICA, and the development of realistic constraints for ICA analysis.

Dr. Jinsuh Kim: Postdoctoral Fellow in the Medical Image Analysis Lab.

Dr. Mona Noureldin: JHU Radiology fellow, on using SPM99 to analyze fMRI to study normal motor paradigms and Parkinson disease, 2002-present.

Dr. Nina Mikhelashvili: JHU Radiology fellow, on using SPM99 to analyze fMRI to study normal motor paradigms and Parkinson disease, 2001-2002.

Dr. Kader Karli Oguz: JHU Radiology, on using SPM99 to analyze fMRI of normal motor paradigms, 2001.

## *Students*

Lai Xu: PhD Student, UNM ECE, 2006

Lei Wu: PhD Student, UNM ECE, 2006

Doris Nguyen: Undergraduate Student (via the TBP mentor program), 2003-2005.

Samara Reynolds: Undergraduate Student, Trinity College: Matlab toolbox for 1) timing correction, 2) laterality analysis, and 3) latency estimation for fMRI

Abbie Garrity: Undergraduate Student, Trinity College: differences in the default mode network in schizophrenia, Fall/Spring 2004

Nicole Giuliani: Accepted to Stanford Graduate School PhD Program, Fall 2005.

David Schneider: Graduate Student, University of Connecticut: Accepted to PhD program in Biomedical Engineering at Columbia University, Spring 2006

Kim Celone: Accepted to PhD Program, Boston College

Li Yiou: PhD Student, University of Maryland, Dept. of CSEE

Nicolle Correa: PhD Student, University of Maryland, Dept. of CSEE

Alvin Chon: Undergraduate Student, Trinity College, senior project in informatics: multimodality database and data mining techniques applied to functional MRI, structural MRI, diffusion tensor MRI, and EEG, Fall 2003.

Deanna McDevitt: Undergraduate Student, Yale University, Directed Reading in Psychology on a Depression and the Christian Psychologist, Spring 2003.

Eric Egolf: Undergraduate Computer Science Student: Trinity College, senior project: development of functional connectivity toolbox for SPM99, 2002-2003.

Adam Dziorny: Undergraduate Biomedical Engineering Student, Johns Hopkins University, fMRI processing strategies and research skills, 2001-2002.

Mayur Pandya: Third Year Medical Student, Ohio University College of Osteopathic Medicine, doing neuro-imaging research elective, 2001.

Joseph Hong, High School Student, learning research skills in the Psychiatric Neuro-Imaging Lab, 2000.

Daniel Hong, High School Student, learning research skills in the Psychiatric Neuro-Imaging Lab, 1999.

## **Annotated list of Trainees:**

Peer-reviewed publications with students are listed. Student's names are highlighted in bold font.

### Current/Recent:

#### ***Nicolle Correa***

PhD Student, University of Maryland, Dept. of CSEE

Role: Co-advisor for Masters thesis (received 2006), Co-advisor for PhD thesis

Ms. Correa is currently a masters student co-mentored by myself and Tulay Adali and is funded from my NIH R01 grant. This training occurs via e-mail, phone conference, and monthly travel between Baltimore and Hartford and now Albuquerque.

#### *Publications:*

- [1] **N. Correa**, T. Adali, Y. Li, and V. D. Calhoun, "Comparison of Blind Source Separation Algorithms for FMRI Using a New Matlab Toolbox: GIFT," in Proc. IEEE Int. Conf. Acoustics, Speech, Signal Processing (ICASSP), Philadelphia, PA, 2005.
- [2] **N. Correa**, T. Adali, V. D. Calhoun, "A Quantitative Evaluation of Blind Source Separation Algorithms for FMRI Data", Human Brain Mapping, 2005 (in preparation).

#### ***Yiou Li***

PhD Student, University of Maryland, Dept. of CSEE

Role: Co-advisor for PhD thesis (successful preliminary proposal 15 Nov 2006)

Mr Li is currently co-mentored by myself and Tulay Adali and is funded from my NIH R01 grant. This training occurs via e-mail, phone conferences, and monthly travel between Baltimore and Hartford and now Albuquerque.

#### *Publications:*

- [1] N. Correa, T. Adali, **Y. Li**, and V. D. Calhoun, "Comparison of Blind Source Separation Algorithms for FMRI Using a New Matlab Toolbox: GIFT," in Proc. IEEE Int. Conf. Acoustics, Speech, Signal Processing (ICASSP), Philadelphia, PA, 2005.
- [2] **Y. Li**, T. Adali, and V. D. Calhoun, "Feature-Selective ICA and Its Convergence Properties," in Proc. IEEE Int. Conf. Acoustics, Speech, Signal Processing (ICASSP), Philadelphia, PA, 2005. **BEST PAPER AWARD**
- [3] V. D. Calhoun, T. Adali, and **Y. Li**, "Independent Component Analysis of Complex-Valued Functional Magnetic Resonance Imaging Data by Complex Nonlinearities," in Proc. ISBI, Washington, D.C., 2004.
- [4] **Y. Li**, T. Adali, and V. D. Calhoun, "Independent Component Analysis With Feature Selective Filtering," in Proc. MLSP, Sao Luiz, Brazil, 2004.
- [5] **Y. Li**, T. Adali and V. D. Calhoun, "Feature-Selective ICA for FMRI Data Analysis," IEEE Signal Processing Letters 2005 (under review)
- [6] **Y. Li**, T. Adali and V. D. Calhoun, "Incorporation of spatial smoothness into data reduction algorithms", NeuroImage 2005 (in preparation).

### ***Tom Eichele***

PhD Student, University of Bergen, Norway

Role: Member of PhD committee

Mr Eichele is preparing his PhD dissertation. He visited me for three weeks in 2005 and since then we have been in close contact via e-mail and also I visited Norway to give an educational course.

#### ***Publications:***

- [1] **T. Eichele**, M. Moosmann, V. D. Calhoun, K. Specht, H. Nordby, and K. Hugdahl, Joint ICA of Simultaneous Single Trial ERP-fMRI Proc. HBM, 2006.
- [2] **Tom Eichele**, Vince D. Calhoun, Matthias Moosmann, Karsten Specht, Marijtje L.A. Jongsma, Rodrigo Quian Quiroga, Helge Nordby, Kenneth Hugdahl, Stimulus Predictability affects ERP and fMRI correlates of early auditory change detection, Int. Journal Psychology (submitted) 2006.

### ***Nicole Giuliani***

Role: Primary supervisor of post-graduate training period, 2003-2005

Accepted to Stanford Graduate School PhD Program, Fall 2005.

#### ***Publications:***

- [1] V. D. Calhoun, T. Adali, **N. Giuliani**, J. J. Pekar, G. D. Pearlson, and K. A. Kiehl "A Method for Multimodal Analysis of Independent Source Differences in Schizophrenia: Combining Gray Matter Structural and Auditory Oddball Functional Data," Hum.Brain Map., 2005 (in press).
- [2] **N. Giuliani**, G. D. Pearlson, and V. D. Calhoun, "Alcohol Versus Marinol Intoxication Effects on Visual Perception: An FMRI Study," in Proc. ICANA, New Haven, CT, 2004.
- [3] **N. Giuliani**, V. D. Calhoun, G. D. Pearlson, A. Francis, and R. W. Buchanan, "Voxel-Based Morphometry Versus Regions of Interest: A Comparison of Two Methods for Analyzing Gray Matter Disturbances in Schizophrenia," Schizophr. Res., vol. 74, pp. 135-147, 2005.
- [4] K. Groth, T. Benios, **N. Giuliani**, V. D. Calhoun, and G. D. Pearlson, "General Intelligence Correlates to Brain Structure Differently in Men and Women," in Proc. SAGE IV, Winston-Salem, NC, 2005.

### ***Matthais Moosman***

PhD Student, University of Bergen, Norway

Role: Member of PhD committee

Mr Eichele is preparing his PhD dissertation in medical physics. He visited me for three weeks in 2005 and since then we have been in close contact via e-mail and also I visited Norway to give an educational course.

#### ***Publications:***

- [1] T. Eichele, **M. Moosmann**, V. D. Calhoun, K. Specht, H. Nordby, and K. Hugdahl, Joint ICA of Simultaneous Single Trial ERP-fMRI Proc. HBM, 2006.
- [2] Tom Eichele, Vince D. Calhoun, **Matthais Moosmann**, Karsten Specht, Marijtje L.A. Jongsma, Rodrigo Quian Quiroga, Helge Nordby, Kenneth Hugdahl, Stimulus Predictability affects ERP and fMRI correlates of early auditory change detection, Int. Journal Psychology (submitted) 2006.

### ***David Schneider:***

Masters Graduate Student in Biomedical Engineering, University of Connecticut

Role: co-advisor, 2004-2005

Accepted to Columbia PhD Graduate Program, Fall 2006

***Abbie Garrity:***

Undergraduate Student, Trinity College

Role: Advisor for volunteer project, 2005-

Differences in the default mode network in schizophrenia, Fall/Spring 2004

***2006 Brain Dance Research Award***

***Publications:***

- [1] **A. Garrity**, G. D. Pearlson, K. McKiernan, V. Calhoun "The Default Mode Network and Schizophrenia" American Journal of Psychiatry, 2005 (in press).
- [2] **A. Garrity**, G. D. Pearlson, K. McKiernan, D. Lloyd, K. A. Kiehl, and V. D. Calhoun, "Aberrant Functional Connectivity of the 'Default Mode' in Schizophrenia," in Trinity Papers, 2006.
- [3] K. Groth, **A. Garrity**, G. D. Pearlson, and V. D. Calhoun "Independent Component Analysis of Gray Matter in Schizophrenia Detects Novel Structural Variations in Heteromodal Association Cortex," Am.J.Psychiatry, 2006 (submitted).

***Samara Reynolds:***

Undergraduate Student, Trinity College

Role: Advisor for senior project, 2004-2005

***Publications:***

- [1] **M. Assaf**, S. Reynolds, V. Calhoun "Laterality changes in verbal binding associated with schizophrenia" Biol. Psych., 2006 (in preparation).

***Hichem Snoussi***

Post-doctoral fellow

Role: Primary mentor

***Publications:***

- [1] **H. Snoussi** and V. D. Calhoun, "Bayesian Blind Source Separation for Brain Imaging," in Proc. SETIT, Susa, Tunisia, 2005.
- [2] **H.Snoussi** and V. D. Calhoun, "Regularized Spectral Matching for Blind Source Separation. Application to fMRI Imaging," IEEE Trans. Signal Proc., 2005.
- [3] **H. Snoussi** and V. D. Calhoun, "Bayesian Blind Source Separation for Brain Imaging," in Proc. ICIP, Genova, Italy, 2005.

Past (sample):

***Michael Stevens, Ph.D.***

Appointed junior faculty in the Olin Neuropsychiatry Research Center, 2002-2004

Role: co-advisor 2002-2004; co-mentor on K-Award (2005-2009).

Currently K-awardee (2004-2009)

***Publications:***

- [1] Calhoun, V. D., **Stevens, M. C.**, Pearlson, G. D., & Kiehl, K.A. (2004). fMRI analysis with the General Linear Model: Removal of latency-bias by incorporation of hemodynamic derivative terms. Neuroimage, 22, 252-257.
- [2] Calhoun, V.D., Adali, T., **Stevens, M.C.**, Kiehl, K.A. & Pekar, J.J. (2005). Semi-blind ICA of fMRI: A method for utilizing hypothesis-derived time courses in a spatial ICA analysis. Neuroimage, 25, 527-538.
- [3] Kiehl, K.A., **Stevens, M.C.**, Laurens, K.R., Pearlson, G. P., & Liddle, P F. (2005). An adaptive reflexive processing model of neurocognitive function: Supporting evidence from a large scale (n=100) fMRI study of an auditory oddball task. Neuroimage, 25, 899-915.
- [4] **Stevens, M.C.**, Calhoun, V.D., & Kiehl, K.A. (in press). Hemispheric differences in hemodynamics elicited by auditory oddball stimuli. Neuroimage

***Mona Noureldin Mohamed, M.D.***

Postdoc, Johns Hopkins University

Role: co-advisor for post graduate training period, primary mentor for fMRI training.

***Publications:***

- [1] **M. A. Mohamed**, D. M. Yousem, A. Tekes, N. M. Browner, and V. D. Calhoun, "Timing of Cortical Activation: a Latency-Resolved Event-Related Functional MR Imaging Study," *AJNR Am. J. Neuroradiol.*, vol. 24, pp. 1967-1974, 2003.
- [2] **M. Noureldin**, D. M. Yousem, A. Tekes, N. Browner, and V. D. Calhoun, "Correlation Between the Amplitude of Cortical Activation and Reaction Time: An FMRI Study," in *Proc. ASNR*, Washington, D.C., 2003.
- [3] A. Tekes, **M. Noureldin**, M. Kraut, V. D. Calhoun, N. Browner, and D. M. Yousem, "Effect of Age on Visuomotor Functional MR Imaging," in *Proc. ASNR*, Washington, D.C., 2003.
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- [5] **M. A. Mohamed**, D. M. Yousem, I. Kusevic, V. D. Calhoun, C. Cristinzio, N. A. Honeycutt, A. El-Deib, M. Yassa, B. Caffo, and S. Basset, "Lack of Education Effect on Brain Activity in a Memory Based Functional MRI Experiment," in *Proc. ASNR*, 2004.
- [6] A. Tekes, V. D. Calhoun, **M. A. Mohamed**, B. Yagmurlu, N. Mikhelashvili-Browner, and D. M. Yousem, "Effect of Age in Volume of Activation in Block Design and Single-Event Paradigms Using Visuomotor Functional MR Imaging," in *Proc. ASNR*, 2004.
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***Kim Celone***

Role: tutor for post-graduate training period, 2003-2005

Accepted to PhD Program, Boston College

***Publications:***

- [1] **K. Celone**, V. D. Calhoun, A. Driscoll, E. Rand-Giovannetti, E. Chua, B. Dickerson, M. Albert, D. Blacker, and R. Sperling "ICA of fMRI Associative Memory Networks in Normal Aging, MCI and Mild AD," 2005. (in preparation).
- [2] R. Sperling, E. Chua, B. Dickerson, D. Blacker, M. Albert, V. D. Calhoun, and **K. Celone**, "Compensatory Recruitment of Memory and Attentional Networks in Mild Cognitive Impairment," in *Proc. Amer. Acad. of Neur.*, San Diego, CA, 2005.
- [3] **K. Celone**, V. D. Calhoun, A. Driscoll, E. Rand-Giovannetti, E. Chua, B. Dickerson, M. Albert, D. Blacker, and R. Sperling, "ICA of FMRI Associative Memory Networks in Normal Aging, MCI and Mild AD," in *Proc. Soc. for Neuroscience*, San Diego, CA, 2004.

***Martin Hejnar***

Role: Primary supervisor of post-graduate training period, 2003-2004

***Publications:***

- [1] **M. P. Hejnar**, M. M. Kurtz, K. A. Keihl, G. D. Pearlson, and V. D. Calhoun, "Performance on the Penn Conditional Exclusion Task (PCET) in Patients With Schizophrenia (SZ) and Healthy Controls: An FMRI Analysis," in *Proc. SBP*, 2004.
- [2] **M. P. Hejnar**, K. A. Kiehl, and V. D. Calhoun "Interparticipant Correlations: A Model Free FMRI Analysis Technique," *Hum. Brain Map.*, 2005 (under review).

***Eric Ego***

Role: co-advisor senior project

***Publications:***

- [1] **E. Ego** and V. D. Calhoun, "Group ICA of FMRI Toolbox," in *Proc. Biomedical Engineering Alliance and Consortium*, 2003.
- [2] **E. Ego**, K. A. Kiehl, and V. D. Calhoun, "Group ICA of FMRI Toolbox (GIFT)," in *Proc. HBM*, Budapest, Hungary, 2004.
- [3] B. Hong, G. D. Pearlson, **E. Ego**, and V. D. Calhoun, "Identification of Brain Activity in a Visual Stimulation Task - An Adaptive ICA Approach for FMRI Data," in *Proc. HBM*, 2004.

***Jinsuh Kim, M.D.:***

Post doctoral fellow

Role: primary supervisor 2002-2004

Joined faculty at University of Wisconsin

***Publications:***

- [1] **J. Kim**, R. Kanaan, V. D. Calhoun, S. Mori, and G. D. Pearlson, "More Averages Vs. More Gradients: Which Is Right for Reliable Diffusion Tensor MRI?," in *Proc. RSNA*, Chicago, IL, 2002.
- [2] V. D. Calhoun, **J. Kim**, and G. D. Pearlson, "FMRI Connectivity Measured by Mutual Information and Correlation: Linear Dependence Vs. General Dependence," in *Proc. ISMRM*, Toronto, Canada, 2003.
- [3] **J. Kim**, V. D. Calhoun, and G. D. Pearlson, "DTI of Huntington Disease," in *Proc. ISMRM*, Toronto, Canada, 2003.
- [4] **J. Kim**, V. D. Calhoun, and G. D. Pearlson, "3D Visualization of White Matter Tracts Using LIC," in *Proc. ASNR*, Washington, D.C., 2003.
- [5] **J. Kim** and V. D. Calhoun, "Evaluation of Quantization Error in DICOM Images for FMRI Application," in *Proc. RSNA*, Chicago, IL, 2003.