

SARANG SURESH DALAL, PH.D.

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Education

- **Ph.D. in Bioengineering** (April 2007)
concentrations in Biomedical Signal Processing, Cognitive Neuroscience, and Biotech Policy
[University of California, San Francisco](#) and [University of California, Berkeley](#) (USA)
- **B.S. in Biomedical Engineering** (May 2000)
concentration in Electrical/Computer Engineering and minor in Psychology
[Johns Hopkins University](#) (Baltimore, Maryland, USA)
- **diploma** (June 1996)
Torrey Pines High School (San Diego, California, USA)

Employment History

Zukunftskolleg Junior Research Fellow (January 2011 – present)

Department of Psychology

University of Konstanz, Germany

Research Areas:

- The contribution of deep brain oscillations to perception, memory, and cognition
- Simultaneous MEG & depth EEG of the human hippocampus
- Source localization of EEG, MEG, and intracranial EEG

Marie Curie Postdoctoral Fellow (April 2007 – December 2010)

[INSERM Unité 821](#) & [CERMEP MEG Department](#), Lyon, France

PIs: Olivier Bertrand, Ph.D. & Jean-Philippe Lachaux, Ph.D.

Projects:

- Simultaneous MEG & intracranial EEG
- Spatial localization of neural oscillations using MEG
- Tinnitus: investigation of abnormal oscillatory networks

Graduate Student Researcher (January 2003 – March 2007)

[Biomagnetic Imaging Laboratory](#)

[Helen Wills Neuroscience Institute](#)

Co-PI: Srikantan S. Nagarajan, Ph.D.

Co-PI: Robert T. Knight, M.D.

[University of California, San Francisco](#)

[University of California, Berkeley](#)

Dissertation: Reconstructing Cortical Dynamics with Magnetoencephalography

Projects: Comparison of MEG and intracranial EEG in epilepsy and brain tumor patients

Rotations: Simultaneous EEG-fMRI; motor-evoked potentials in the intensive care unit

Graduate Student Researcher (September 2000- May 2001)

[School of Optometry](#)

PI: Stanley A. Klein, Ph.D.

[University of California, Berkeley](#)

Rotation: [Realistic Vision Model](#) & Realistic Mathematical Representation of the Cornea

Firmware Engineer Intern (May 1999 - August 1999)

[St. Jude Medical](#) (Sunnyvale, California, USA)

Project: Modified existing code and implemented original C++ algorithms for a new implantable defibrillator/pacemaker; evaluated algorithms using clinical electrocardiogram data

Research Assistant (January 1999 - November 1999)

*Center for Imaging Science, Departments of Electrical and Biomedical Engineering
Johns Hopkins University* (Baltimore, Maryland, USA)

Project: Semi-automated segmentation of neuroanatomical MRI data

Computer Skills

Unix/Linux/Mac/Windows, programming: Matlab, C++, HTML, shell scripting.

Language Skills

English (native), French (fluent), Spanish (proficient), German (beginner)

Professional Societies

- Organization for Human Brain Mapping
- Cognitive Neuroscience Society
- Society for Neuroscience
- IEEE Engineering in Medicine and Biology Society
- International Society for Brain Electromagnetic Topography

Honors and Recognition

- **Marie Curie Fellowship**, European Commission, 2008-2010
- **Featured Cover Articles (twice)**, NeuroImage, 2008, 2009
- **HBM Travel Award (twice)**, NIH and Organization for Human Brain Mapping, 2008, 2009
- **Chateaubriand Fellowship**, Embassy of France in the United States, 2007-2008
- **Outstanding Poster Presentation**, UCSF/UC Berkeley Bioengineering conference, 2005
- **Young Investigator Award**, International Conference on Biomagnetism, 2004
- **Kirchstein National Research Service Award**, NIH/NIDCD, 2004-2007
- **Lili Fabilli and Eric Hoffer Essay Prize, fourth place**, UC Berkeley, 2004
- **Dean's Health Sciences Fellowship**, UCSF, 2000-2002
- **Travel Grant**, ARVO/National Eye Institute, 2001
- **Outstanding Biomedical Instrumentation Design Project**, Johns Hopkins University, 2000
- **Abraham Pikoos Scholar**, Johns Hopkins University, 1998-1999
- **Multicultural Student Affairs Award**, Johns Hopkins University, 1998-1999
- **Dean's List**, Johns Hopkins University, 1997-1999
- **Inductee**, Alpha Eta Mu Beta (Biomedical Engineering Honor Society), 1998
- **Summer Research Fellowship** (declined), Mayo Clinic, 1998
- **National Merit Scholar**, 1996-2000
- **Competitive Edge Scholar**, Wal-Mart, 1996-2000
- **Technology Scholar**, Tandy, 1996

Academic Service

Journal Review Editorial Board

Frontiers in Human Neuroscience

Journal Reviewer

NeuroImage, Human Brain Mapping, IEEE Transactions on Biomedical Engineering, Frontiers in Neuroscience, Journal of Neuroscience Methods, Epilepsy & Behavior, Computer Methods and Programs in Biomedicine, International Journal of Psychophysiology

Graduate Student Instructor (September 2003 - December 2003)

Bioengineering 248: Electromagnetic Neuroimaging
University of California, San Francisco

Volunteer Instructor (November 2004 - June 2006)

UCSF Student Education Program

San Francisco Unified School District

Taught science lessons to children and science education techniques to teachers in San Francisco public schools.

Invited Talks

Insights from Simultaneous Recording of MEG and Intracranial EEG, International Conference on Biomagnetism (Biomag), Dubrovnik, Croatia. 2010.

[MEG sensitivity to sources near and far: evidence from simultaneously recorded intracranial EEG and implications for the inverse problem](#). Workshop on Inverse Problems in Brain Imaging and Multimodal Fusion, Centre de Recherches Mathématiques, Université de Montreal. 2009.

Inferring Mesoscopy from Macroscopy: Reconstruction of Cortical Time-Frequency Dynamics from MEG. Neural Information Processing Systems Conference, Vancouver, Canada. 2007.

Spatiotemporal dynamics of cortical networks preceding finger movement and speech production. ISBET Conference, Bern, Switzerland. 2005.

Overview of Magnetoencephalography. Windsor Research Institute, Windsor, Jamaica. 2004.

Publications

Doctoral Dissertation

Dalal SS (2007). Reconstructing Cortical Dynamics with Magnetoencephalography. University of California, San Francisco and University of California, Berkeley. 171 pp.

Peer-Reviewed Articles

Hamamé CM, Vidal JR, Ossandón T, Jerbi K, **Dalal SS**, Minotti L, Bertrand O, Kahane P, Lachaux J-P.

Reading the mind's eye: Online detection of visuo-spatial working memory and visual imagery in the inferior temporal lobe. *NeuroImage*. (in press)

Guggisberg AG, **Dalal SS**, Schnider, A., Nagarajan SS (2011). The neural basis of event-time introspection. *Consciousness and Cognition*. (in press)

Guggisberg AG, **Dalal SS**, Zumer JM, Wong DD, Dubovik S, Michel CM, Schnider A (2011). Localization of cortico-peripheral coherence with electroencephalography. *NeuroImage*, 57(4):1348-1357.

Dalal SS, Vidal JR, Hamamé CM, Ossandón T, Bertrand O, Lachaux J-P, Jerbi K (2011). Spanning the rich spectrum of the human brain: slow waves to gamma and beyond. *Brain Structure & Function*, 216(2):77-84.

Jerbi K, Vidal JR, Mattout J, Maby E, Lecaiguard F, Ossandón T, Hamamé CM, **Dalal SS**, Bouet R, Lachaux J-P, Leahy RM, Baillet S, Garnero L, Delpuech C, Bertrand O (2011). Inferring hand movement kinematics from MEG, EEG and intracranial EEG: From brain-machine interfaces to motor rehabilitation. *IRBM*, 32:8-18.

Dalal SS, Zumer JM, Guggisberg AG, Trumpis M, Wong DDE, Sekihara K, Nagarajan SS (2011). MEG/EEG source reconstruction, statistical evaluation, and visualization with NUTMEG. *Computational Intelligence and Neuroscience*, 2011:758973, 17 pp.

Hinkley LBN, Nagarajan SS, **Dalal SS**, Guggisberg AG, Disbrow EA (2011). Cortical temporal dynamics of visually-guided behavior. *Cerebral Cortex*, 21(3):519-529.

Chang EF, Edwards E, Nagarajan SS, Fogelson N, **Dalal SS**, Canolty RT, Kirsch HE, Barbaro NM, Knight RT (2011). Cortical spatio-temporal dynamics underlying phonological target detection in humans. *Journal of Cognitive Neuroscience*, 23(6):1437-46.

Zhang J, **Dalal SS**, Nagarajan SS, Yao D (2010). Coherent MEG/EEG source localization in transformed data space. *Biomedical Engineering: Applications, Basis and Communications*, 22:351-365.

Vidal JR, Ossandón T, Jerbi K, **Dalal SS**, Minotti, L., Ryvlin, P., Kahane, P., Lachaux J-P (2010). Comparing the specificity of intracerebral ERP, alpha/beta and gamma-band responses to multiple visual categories. *Frontiers in Human Neuroscience*, 4:195, 14 pp.

Dalal SS, Hamamé C. M., Eichenlaub, J. B., Jerbi K (2010). Intrinsic coupling between gamma oscillations, neuronal discharges, and slow cortical oscillations during human slow wave sleep. *Journal of Neuroscience*, 30(43):14285-14287.

Jerbi K, Vidal JR, Ossandón T, **Dalal SS**, Jung, J., Hoffmann, D., Minotti, L., Bertrand O, Kahane, P., Lachaux J-P (2010). Exploring the electrophysiological correlates of the default-mode network with intracerebral EEG. *Frontiers in Systems Neuroscience*, 4:27. 9 pp.

Edwards E, Nagarajan SS, **Dalal SS**, Canolty RT, Kirsch HE, Barbaro NM, Knight RT (2010). Spatiotemporal imaging of cortical activation during verb generation and picture naming. *NeuroImage*, 50(1):291-301.

Baillet S, Tadel F, Leahy RM, Mosher JC, Delorme A, Makeig S, Oostenveld R, Hämäläinen M, **Dalal SS**, Zumer J, Clerc M, Wolters CH, Kiebel S, Jensen O. Academic software toolboxes for the analysis of MEG data. *IFMBE Proceedings*, 28:101-104.

Edwards E, Soltani, M., Kim, W., **Dalal SS**, Nagarajan SS, Berger MS, Knight RT (2009). Comparison of time-frequency responses and the event-related potential to auditory speech stimuli in human cortex. *Journal of Neurophysiology*, 102(1):377-86.

Dalal SS, Baillet S, Adam C, Ducorps A, Schwartz D, Jerbi K, Bertrand O, Garnero L, Martinerie J, Lachaux J-P (2009). Simultaneous MEG and intracranial EEG recordings during attentive reading. *NeuroImage*, 45(4):1289-304.

Jerbi K, Ossandón T, Hamamé CM, Senova, S., **Dalal SS**, Jung, J., Minotti, L., Bertrand O, Berthoz, A., Kahane, P., Lachaux J-P (2009b). Task-related gamma-band dynamics from an intracerebral perspective: review and implications for surface EEG and MEG. *Human Brain Mapping*, 30(6):1758-71.

Jerbi K, Freyermuth S, **Dalal S**, Kahane P, Bertrand O, Berthoz A, Lachaux J-P (2009a). Saccade related gamma-band activity in intracerebral EEG: dissociating neural from ocular muscle activity. *Brain Topography*, 22(1):18-23.

Jerbi K, Hamamé CM, Ossandón T, **Dalal SS** (2008). Role of posterior parietal gamma activity in planning prosaccades and antisaccades. *Journal of Neuroscience*, 28(51):13713–5.

Dalal SS, Edwards E, Kirsch HE, Barbaro NM, Knight RT, Nagarajan SS (2008a). Localization of neurosurgically implanted electrodes via photograph-MRI-radiograph coregistration. *Journal of Neuroscience Methods*, 174(1):106–15.

Dalal SS, Guggisberg AG, Edwards E, Sekihara K, Findlay AM, Canolty RT, Berger MS, Knight RT, Barbaro NM, Kirsch HE, Nagarajan SS (2008b). Five-dimensional neuroimaging: Localization of the time-frequency dynamics of cortical activity. *NeuroImage*, 40:1686–1700.

Guggisberg AG, Honma SM, Findlay AM, **Dalal SS**, Kirsch HE, Berger MS, Nagarajan SS (2008). Mapping functional connectivity in patients with brain lesions. *Annals of Neurology*, 63(2):193–203.

Sekihara K., Hild KE, **Dalal SS**, Nagarajan SS (2008). Performance of prewhitening beamforming in MEG dual experimental conditions. *IEEE Transactions on Biomedical Engineering*. 55(3):1112–21.

Guggisberg AG, **Dalal SS**, Findlay AM, Nagarajan SS (2007). High-frequency oscillations in distributed neural networks reveal the dynamics of human decision making. *Frontiers in Human Neuroscience*, 1:14. 11 pp.

Sekihara K, Hild KE, **Dalal SS**, Zumer JM, Wipf D, Attias HT, Nagarajan SS (2007). Adaptive spatial filter and adaptive inverse modeling for electromagnetic source imaging. *Proc. of the Intl Conf on Functional Biomedical Imaging and Noninvasive Functional Source Imaging of the Brain and Heart*, 190–191.

Dalal SS, Guggisberg AG, Edwards E, Sekihara K, Findlay AM, Canolty RT, Knight RT, Barbaro NM, Kirsch HE, Nagarajan SS (2007). Spatial localization of cortical time-frequency dynamics. *Proceedings of the 2007 IEEE Engineering in Medicine and Biology Society Conference*, 4941–4944.

Sekihara K, Hild KE, **Dalal SS**, Nagarajan SS (2007). Performance of prewhitening beamforming in MEG dual experimental conditions. *Proceedings of the IEEE/EMBS Conference on Neural Engineering*, 244–247.

Canolty RT, Soltani M, **Dalal SS**, Edwards E, Dronkers NF, Nagarajan SS, Kirsch HE, Barbaro NM, Knight RT (2007). Spatiotemporal dynamics of word processing in the human brain. *Frontiers in Neuroscience*, 1(1):185–196.

Canolty RT, Edwards E, **Dalal SS**, Soltani M, Nagarajan SS, Kirsch HE, Berger MS, Barbaro NM, Knight RT (2006). High gamma power is phase-locked to theta oscillations in human neocortex. *Science*, 313:1626–1628.

Dalal SS, Sekihara K, Nagarajan SS (2006). Modified beamformers for coherent source region suppression. *IEEE Transactions on Biomedical Engineering*, 53:1357–1363.

Dalal SS, Zumer JM, Agrawal, V., Hild KE, Sekihara K, Nagarajan SS (2004). NUTMEG: A neuromagnetic source reconstruction toolbox. *Neurology and Clinical Neurophysiology*, 2004:52, 4 pp.

Summers RM, Agcaoili CM, McAuliffe MJ, **Dalal SS**, Yim, PJ, Choyke PL, Walther MM, Linehan WM (2001). Helical CT of von Hippel-Lindau: semi-automated segmentation of renal lesions. *Proceedings of the International Conference on Image Processing*, 2:293–296.

Manuscripts Submitted for Publication

Edwards E, **Dalal SS**, Canolty RT, Kirsch HE, Barbaro NM, Knight RT, Nagarajan SS, Rao RPN. An efficient coding approach to optimal time-frequency analysis of electrocortical data.

Software and Website

NUTMEG: Neurodynamic Utility Toolbox for MEG and EEG. <http://nutmeg.berkeley.edu>

International Conference Presentations

Dalal SS, Vidal JR, Kahane P, Minotti L, Jerbi K, Lachaux J-P (2010). Beamformer source reconstruction applied to intracranial recordings of visual responses. *Human Brain Mapping Conference*.

Dalal SS, Jerbi K, Bertrand O, Adam C, Ducorps A., Schwartz D, Garnero L, Baillet S, Martinerie J, Lachaux J-P (2010). Insights from simultaneous recording of MEG and intracranial EEG. *International Conference on Biomagnetism*. (talk)

Dalal SS, Zumer JM, Guggisberg AG, Nagarajan SS (2010). NUTMEG: An MEG/EEG source analysis toolbox. *International Conference on Biomagnetism*. (talk)

Dalal SS, Baillet S, Adam C, Ducorps A, Schwartz D, Jerbi K, Bertrand O, Garnero L, Martinerie J, Lachaux J-P (2009). MEG reconstructions of gamma band modulations during attentive reading validated by simultaneous intracranial EEG. *Human Brain Mapping Conference*.

Dalal SS, Jerbi K, Bertrand O, Garnero L, Baillet S, Martinerie J, Lachaux J-P (2009). MEG sensitivity to sources near and far: evidence from simultaneously recorded intracranial EEG and implications for the inverse

problem. *Problèmes inverses et fusion multimodale en imagerie cérébrale*, Centre de Recherches Mathématiques, Université de Montréal. (talk)

Dalal SS, Bidet-Caulet A, Lecaigard F, Weisz N, Bertrand O (2009). Insights from simultaneous recording of MEG and intracranial EEG. *Alpine Brain Imaging Meeting*. (talk)

Dalal SS, Jerbi K, Baillet S, Adam C, Ducorps A, Bertrand O, Garnero L, Martinerie J, Lachaux, J-P (2008). Oscillatory modulations during attentive reading reconstructed with MEG and confirmed by simultaneous intracranial EEG. *International Conference on Cognitive Neuroscience*. (talk)

Dalal SS, Jerbi K, Baillet S, Adam C, Ducorps A, Bertrand O, Garnero L, Martinerie J, Lachaux J-P (2007). Inferring mesoscopy from macroscopy: Reconstruction of cortical time-frequency dynamics from MEG. *Neural Information Processing Systems Conference*. (talk)

Dalal SS, Edwards E, Kirsch HE, Soltani, M., Canolty RT, Barbaro NM, Knight RT (2005). Spatiotemporal dynamics of cortical networks preceding finger movement and speech production. *Meeting of the International Society for Brain Electromagnetic Topography (ISBET)*. (talk)