DIVYA VARADARAJAN

3740 McClintock Ave, EEB 400, Los Angeles -90089 | E-mail: dvaradar@usc.edu | http://www-scf.usc.edu/~dvaradar/

EDUCATION

University of Southern California, Los Angeles
Ph.D Candidate in Electrical Engineering **2013 - Present**
Thesis Topic : Diffusion MRI - noise modeling, linear theory and experiment design
Advisor: Prof. Justin Haldar
CGPA: 3.77/4

University of Southern California, Los Angeles
Master of Science in Electrical Engineering **2011-2013**
Research: A novel surface based method to improve detection of cortical dysplasia in patients with epilepsy.
Awards: **Masters Honors** in Electrical Engineering

PES Institute of Technology, Bangalore (affiliated to Visvesvaraya Technological University)
Bachelor of Engineering in Telecommunications **2003-2007**
Graduated in **First Class with Distinction**
Student Assistantships: Adaptive Signal Processing, Control Systems and Embedded Systems

RESEARCH EXPERIENCE

Biomedical Imaging Laboratory (BIG), Signal and Image Processing Institute, USC
Research Assistant **2013-Present**

- Diffusion MRI Experiment Design (ongoing work): Developing a new approach to design sampling schemes and estimation methods that improves the accuracy of parameter estimation.
- EAP response function theory: Developed new theory to characterize all Diffusion MRI linear estimation methods.
- MRI noise modeling: Developed a new maximum-likelihood method that models non-central chi (and Rician) distributed noise and estimates clean MRI images or parameters.
- Population based statistical analysis and local feature based thresholding of T1 weighted MR image features to detect cortical dysplasia in Epilepsy patients. Cortical thickness and grey-white matter blurring were used as features.

AWARDS

- **Consolation prize,** Diffusion study group, ISMRM 2016 : One of the 20 abstract selected for presentation at the study group meeting. 2016
- **National Institute of Health travel award** for International Symposium on Biomedical Imaging conference awarded to the top 27 papers in 2015. 2015
- **Educational Stipend**, ISMRM 2015. 2015
- **2015 Best poster – Honorable mention**, ''A theoretical Signal Processing Framework for Linear Diffusion MRI: Implications for Parameter Estimation and Experiment Design", 6th Annual Ming Hsieh Department of Electrical Engineering Research Festival 2015
- **Magna Cum Laude Merit Award (first author)**, ISMRM 2014. For the abstract titled "A Novel Approach for Statistical Estimation of HARDI Diffusion Parameters from Rician and Non-Central Chi Magnitude Images." 2014
- **Masters Honors Award**, Electrical Engineering, University of Southern California. 2013
- **Secured first place** for developing a mobile maze game with haptic control feedback for the visually impaired at the SS12 USA level competition organized in the 27th Annual International Technology and Persons with Disabilities Conference. 2012

JOURNAL PUBLICATIONS

1. **Varadarajan, D**. and Haldar, J. *" A Theoretical Signal Processing Framework for Linear Diffusion MRI: Implications for Parameter Estimation and Experiment Design."* Neuroimage (2017). [In Press] 2017
2. **Varadarajan, D**. and Haldar, J. *"A Majorize-Minimize Framework for Rician and Non-Central Chi MR Images."* IEEE transactions on medical imaging (2015). [PubMed ID : 25935028][link] 2015

CONFERENCE PROCEEDINGS

1. **Varadarajan,D.** and Haldar. J. *"Theoretical characterization of angular resolution for linear ODF estimation"* 23rd Annual Meeting of the Organization for Human Brain Mapping, Vancouver, Canada, June 2017. 2017

2. **Varadarajan,D.** and Haldar. J. *"A Theoretical Framework for Sampling and Reconstructing Ensemble Average Propagators in Diffusion MRI."* International Society for Magnetic Resonance in Medicine 23rd Annual Meeting, Singapore, 2016, p. 2049. (Abstract)[link] 2016

3. **Varadarajan, D.** and Haldar, J. *"A New Linear Transform Approach for Estimating ODFs from Multi-Shell Diffusion Data."* International Society for Magnetic Resonance in Medicine 23rd Annual Meeting, Toronto, 2015, p. 2816.(Abstract) 2015

4. **Varadarajan, D.**, and Haldar, J. *"MS-FRACT: Optimized linear transform methods for ODF estimation in multi-shell diffusion MRI."* Biomedical Imaging (ISBI), 2015 IEEE 12th International Symposium on. IEEE, 2015, pp. 323-326. [link] 2015

5. **Varadarajan, D.,** Wang ZI., Joshi AA., Shattuck DW., Jones SE., Leahy RM. *"Detecting Focal Cortical Dysplasia using Population-Based Models of Cortical Thickness"* 21st Annual Meeting of the Organization for Human Brain Mapping Honolulu, Hawaii, June 2015.(Abstract) 2015

6. **Varadarajan, D.,** and Haldar, J. *"A novel approach for statistical estimation of HARDI diffusion parameters from Rician and non-central chi magnitude images."* Proceedings of the International Society for Magnetic Resonance Medicine, Milan, Italy, 2014, p. 801.(Abstract) 2014

   Featured with a PowerPoster presentation (Hand-selected as one of the 150 most interesting abstracts out of 6,481 submissions to the conference).

   Recipient of a Magna Cum Laude ISMRM Merit Award.

7. **Varadarajan, D.,** and Haldar, J. *"A quadratic majorize-minimize framework for statistical estimation with noisy rician-and noncentral chi-distributed MR images."* Biomedical Imaging (ISBI), 2013 IEEE 10th International Symposium on. IEEE, 2013, pp. 708-711. [link] 2013

OPEN SOURCE CONTRIBUTIONS

BrainSuite Diffusion Pipeline **2016 – Present**

One of two developers of the BrainSuite Diffusion Pipeline. This pipeline contains tools to perform distortion correction, diffusion MRI and anatomical images co-registration and diffusion modeling and parameter estimation on diffusion MR images. [link] (Source requires registration)

PROFESSIONAL EXPERIENCE

Cisco Systems, Chennai, India
Engineer IV **2010 – 2011**

Device driver development for video streaming system

- Developed drivers for multimedia streaming solution and set-top box clients on an in-house ASIC.
- Developed drivers for home networking - streaming video (MPEG4) over an RF network.

Ittiam Systems Pvt Ltd., Bangalore, India
Senior Engineer **2007 – 2010**

Video Communications team, Media Streaming business unit.

Senior Engineer (2009 - 2010)

- Led the development of a video communication system on the Texas Instruments (TI) DM365 platform and the Intel Atom platform.

Engineer (2007 - 2009)

- Led the development for a video surveillance system for homes on TI's DM355 platform. Video, VoIP and multimedia systems
- Integrated speech (G.711, G.729 codecs), telephony (adaptive jitter buffers, echo canceller) and video components (H.264 codec) for a video conferencing solution.

- Tuned Acoustic Echo Cancellation (AEC) component on various platforms
- Designed an optimized implementation for AEC using DM3xx IMX co-processor.
- Implemented a telemedicine solution that allowed integrated ultrasound readings with video communications.
- Developed a Session Initiation Protocol (SIP) user agent on Windows CE and Linux (to establish and control IP sessions between video phones)