

# KRISHNA S. NAYAK

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## EDUCATION

|                                    |                          |      |
|------------------------------------|--------------------------|------|
| Ph.D. Electrical Engineering       | Stanford University      | 2001 |
| M.S. Electrical Engineering        | Stanford University      | 1996 |
| B.S. Elec Eng, Comp Sci, Appl Math | Florida State University | 1995 |

## PRIMARY POSITIONS

|   |         |
|---|---------|
| Professor, Electrical Engineering, University of Southern California<br>(joint appointments in Biomedical Engineering, Radiology, and Medicine) | 2014-   |
| Associate Professor, Electrical Engineering, University of Southern California  | 2009-14 |
| Assistant Professor, Electrical Engineering, University of Southern California  | 2003-09 |
| Lecturer & Research Associate, Electrical Engineering, Stanford University  | 2001-03 |

## INDUSTRY POSITIONS

|  |         |
|--|---------|
| President, Lively Sensors, LLC             | 2016-   |
| Consultant, Physical Optics Corporation    | 2016    |
| Consultant, Lithera, Inc.                  | 2013    |
| Consultant, California Heart Centers Group | 2009-11 |
| Consultant, Phantoms by Design, Inc.       | 2002-09 |
| Consultant, NetVMG, Inc.                   | 2001-03 |

## VISITING POSITIONS

|   |         |
|---|---------|
| Sabbatical, Lively Sensors, LLC   | 2017-18 |
| Visiting Professor (1 month), Indian Institute of Sciences                  | 2017    |
| Sabbatical, Laboratory of Cardiac Energetics, NIH/NHLBI Intramural Division | 2010-11 |
| Research Professor, Department of Medicine, Loma Linda University           | 2008-13 |

## RESEARCH AND TEACHING FIELDS

|                            |                           |
|----------------------------|---------------------------|
| Magnetic Resonance Imaging | Signals & Systems         |
| Medical Physics            | Digital Signal Processing |

## HONORS and AWARDS

|   |         |
|---|---------|
| Elected "Fellow" of SCMR  | 2018    |
| Elected "Fellow" of AIMBE   | 2017    |
| USC Community Engagement Award  | 2014    |
| USC Center for Excellence in Teaching, Faculty Fellow                       | 2013-16 |
| NAE Frontiers of Engineering Education, Participant                         | 2011    |
| GE Healthcare Magnetic Resonance Thought Leader Award                       | 2009    |
| USC Mellon Mentoring Award, Faculty Mentoring of Graduate Students          | 2008    |
| Elected "Senior Member" of IEEE   | 2008    |
| USC Viterbi School of Engineering Outstanding Junior Faculty Research Award | 2007    |
| Fannie and John Hertz Foundation Doctoral Thesis Prize                      | 2001    |
| ISMRM Student Stipend Recipient   | 1997-99 |
| Fannie and John Hertz Foundation Graduate Fellowship                        | 1995-00 |
| Tau Beta Pi Centennial Fellowship #11                                       | 1995    |
| Phi Kappa Phi Graduate Fellowship   | 1995    |

## MEMBERSHIP

|  |       |
|--|-------|
| American Institute for Medical and Biological Engineering                      | 2017- |
| American Society for Engineering Education                                     | 2011- |
| American Association for the Advancement of Science                            | 2008- |
| American Heart Association   | 2003- |
| Institute of Electrical and Electronics Engineers (Senior Member 2008-present) | 2001- |
| Society for Cardiovascular Magnetic Resonance (Fellow 2018-present)            | 2000- |
| International Society for Magnetic Resonance in Medicine                       | 1996- |

## RESEARCH

### FUNDING

- ▶ **Principal Investigator**, NIH/NCI, “Precise DCE-MRI Assessment of Brain Tumors,” R33-CA225400. Sept 2017 – Aug 2020. Total: \$1.6M. KN’s portion: \$1.3M.
- ▶ **Principal Investigator**, NIH/NHLBI, “Novel Myocardial Perfusion Stress Test using Arterial Spin Labeling,” R01-HL130494. July 2016 – June 2020. Total: \$1.7M. KN’s portion: \$1.2M.
- ▶ **Co-Investigator**, NIH/NIDDK, “Optimizing Tissue Iron Quantification at 3 Tesla,” R01-DK097115. PI: John Wood. Sept 2013 – Aug 2017. Total: \$1.6M. KN’s portion: \$140k.
- ▶ **Co-Investigator**, NIH/NIDCD, “Dynamics of Vocal Tract Shaping,” R01-DC007142, PI: Shrikanth Narayanan. May 2005 – April 2010. Total: \$2.1M. KN’s portion: \$400k. May 2010 – April 2015. Total: \$2.0M. KN’s portion: \$380k. Dec 2015 – Nov 2020. Total: 2.0M. KN’s portion: \$380k.
- ▶ **Co-Principal Investigator**, NSF, “RI: Medium: Collaborative Research: Understanding individual-level speech variability: from novel articulatory data to robust speaker recognition,” #1514544. PI(s): Shrikanth Narayanan, Krishna Nayak. September 2015 – August 2019. Total: \$1.2M.
- ▶ **Co-Investigator**, NIH/NIEHS 5P01ES022845-04 and EPA RD-83544101-0, “Southern California Children’s Environmental Health Center (SC-CEHC),” PI: Rob McConnell. June 2013 – May 2018.
- ▶ **Co-Investigator**, NIH/NHLBI, “Model-based Phenotyping of OSAS in Pediatric Obesity using Dynamic MR Imaging,” R01-HL105210. PI: Michael Khoo. Sept 2010 – Aug 2016. (no cost extension) Total: \$3.4M. KN’s portion: \$1.2M.
- ▶ **Co-Investigator**, NIH/NIDDK, “ $\beta$ -cell Preservation through Fat Mitigation,” U01-DK094430. PI(s): Tom Buchanan, Anny Xiang. September 2011 – June 2016. Total: \$3.8M. KN’s portion: \$20k.
- ▶ **Principal Investigator**, American Heart Association, Grant-in-Aid, “Myocardial ASL Perfusion Imaging with Improved Coverage and Sensitivity,” 13GRNT13850012, January 2013 – December 2015. Total: \$140k.
- ▶ **Principal Investigator**, Wallace H. Coulter Foundation, Coulter Translational Research Award, “Myocardial Perfusion Imaging without Contrast Agents,” Phase-I: September 2010 – August 2012. Total: \$180k. Phase-II: September 2012 – August 2015. Total: \$320k.
- ▶ **Co-Investigator**, NIH/NIDDK, “Risk Factors for Type-II Diabetes in Hispanic Adolescents,” R01-DK059211. PI: Michael Goran. Oct 2009 – Sept 2015. Total: \$3.2M. KN’s portion: \$60k.
- ▶ **Co-Investigator**, NIH/NIBIB, “Novel ICA Based Multi-fiber Streamline Tractography Approach,” R21-EB013456. PI: Meng Law. January 2012 – December 2013. Total: \$440k. KN’s portion: \$16k.
- ▶ **Principal Investigator**, NIH/NIDDK, “Rapid MRI Measures of Absolute Fat Mass in Adipose Tissue and Organs,” R21-DK081173. February 2009 – December 2012. (no cost extension). Total: \$450k.
- ▶ **Co-Principal Investigator**, GE Healthcare, “Cardiovascular Magnetic Resonance at 3 Tesla,” PI(s): Gerald Pohost, Krishna Nayak. July 2008 – December 2011. Total: \$320k. KN’s portion: \$240k.
- ▶ **Principal Investigator**, NIH/NHLBI, “Superior Cardiac MRI using Wideband SSFP at 3 Tesla,” R21-HL079987. February 2006 – November 2008. Total: \$430k.

- ▶ **Principal Investigator**, American Heart Association, Scientist Development Grant, “Coronary Magnetic Resonance Angiography at 3 Tesla,” #0435249N, \$260,000. July 2004 – June 2008. Total: \$320k.
- ▶ **Subcontract PI**, NIH/NHLBI, “Comprehensive Assessment of Valvular Function with MRI,” R01-HL074332. PI: John Pauly (Stanford). January 2004 – January 2008. Total: \$350k.

*Total amounts include F&A and indirect costs, and are rounded to two significant digits. If funding is shared by multiple investigators, my portion is listed separately.*

### Small / Pilot Grants

- ▶ **Co-Investigator**, BRACCO Global Investigator, “Evaluation of Regional Gadolinium Retention in the Brain,” PI: Alex Lerner, August 2016 – July 2018.
- ▶ **Co-Investigator**, Wright Foundation, Pilot Grant, “Noninvasive Coronary Endothelial Function using Arterial Spin Labeling,” PI: Parveen Garg, July 2015 – June 2017. \$48,000.
- ▶ **Co-Investigator**, Whittier Foundation, Pilot Grant, “Myocardial ASL Stress Testing in Heart Transplant Recipients,” PI: Andrew Yoon, September 2014 – December 2016. \$100,000.
- ▶ **Co-Investigator**, Southern California Clinical and Translational Science Institute, Pilot Grant, “Drug-Induced Sleep Endoscopy and Magnetic Resonance Imaging in Obstructive Sleep Apnea,” PI: Eric Kezirian, July 2014 – June 2015. \$49,000.
- ▶ **Principal Investigator**, Southern California Clinical and Translational Science Institute, Pilot Grant, “Improved DCE Neuro-MRI using Constrained Reconstruction,” July 2013 – June 2014. \$38,282.
- ▶ **Principal Investigator**, Clinical and Translational Science Institute, Pilot Grant, “MRI Assessment of 3D Blood Flow Dynamics in Patients with Carotid Atherosclerosis,” July 2008 – June 2009. \$41,556.
- ▶ **Subcontract PI**, Respiroics Foundation, “Development of Non-invasive Airway Compliance Assessment using Real-Time MRI,” PI: Ian Colrain (SRI International), January 2008 – July 2008. \$73,150.
- ▶ **Principal Investigator**, Center for Transdisciplinary Research on Energetics and Cancer, Pilot Grant, “Rapid and Non-invasive Quantitation of Abdominal Fat Distribution using Magnetic Resonance Imaging,” September 2007 – August 2008. \$35,000.
- ▶ **Co-Principal Investigator**, James H. Zumberge Research and Innovation Fund, Interdisciplinary Research Grant, “Assessment of Myocardial Perfusion by Cardiac MRI,” with Co-PI: Gerald Pohost, July 2005 – June 2006. \$50,000.
- ▶ **Subcontract PI**, Respiroics Foundation, “Non-invasive Airway Compliance Assessment using Real-Time MRI,” PI: Ian Colrain (SRI International), October 2004 – March 2006. \$86,673.
- ▶ **Principal Investigator**, James H. Zumberge Research and Innovation Fund, Individual Research Grant, “Cardiac Magnetic Resonance Imaging at 3 Tesla,” July 2004 – June 2005. \$25,000.

### Funding from a previous institution (Stanford):

- ▶ **Investigator**, NIH/NHLBI, “Noninvasive Coronary Artery Imaging using MR,” PI: Dwight Nishimura (Stanford), R01-HL39297. July 1992 – August 2007.
- ▶ **Investigator**, NIH/NHLBI, “Integrated Myocardial Ischemia Assessment with MRI,” PI: John Pauly (Stanford), R01-HL67161. January 2003 – December 2007.

- ▶ **Investigator**, NIH/NIBIB, “MR Guided Vascular Interventions,” PI: John Pauly (Stanford), R01-EB002992. September 2003 – July 2007.
- ▶ **Investigator**, NIH/NCI, “High-Speed MRI for Tumor Interventions,” PI: Al Macovski (Stanford), R01-CA50948. July 2000 – June 2003.
- ▶ **Investigator**, California TRDRP, “Comprehensive Evaluation of the Ischemic Leg,” PI: Dwight Nishimura (Stanford), 9RT-0024. July 2000 – June 2003.
- ▶ **Investigator**, NIH/NICRR, “Center for Advanced Magnetic Resonance Technology at Stanford,” PI: Gary Glover (Stanford), R01-HL39297. January 2001 – December 2006.
- ▶ **Investigator**, NIH/NIBIB, “Development of a Prepolarized MRI Extremity Scanner,” PI: Al Macovski (Stanford), R01-EB000346. September 2001 – August 2005.
- ▶ **Investigator**, NIH, “Development of Improved MRI Techniques for Cartilage Injury and Repair,” PI: Al Macovski (Stanford), R01-AR46904. September 1999 – August 2003.

## PUBLICATIONS

### JOURNAL PAPERS (refereed)

1. X Zhong, T Martin, HH Wu, **KS Nayak**, KH Sung. Prostate DCE-MRI with B1+ Correction using an Approximated Analytical Approach. *Magnetic Resonance in Medicine*. accepted
2. T Jao, **KS Nayak**. Demonstration of Velocity Selective Myocardial Arterial Spin Labeling Perfusion Imaging in Humans. *Magnetic Resonance in Medicine*. 80(1):272-278. July 2018.
3. Y Guo, SG Lingala, Y Bliesener, RM Lebel, Y Zhu, **KS Nayak**. Joint arterial input function and tracker kinetic parameter estimation from under-sampled DCE-MRI using a model consistency constraint. *Magnetic Resonance in Medicine*. 79(5):2804-2815. May 2018.
4. V Landes, **KS Nayak**. Simple Method for RF Pulse Measurement using Gradient Reversal. *Magnetic Resonance in Medicine*. 79(5):2642-2651. May 2018.
5. SG Lingala, Y Zhu, Y Lim, A Toutios, Y Ji, W-C Lo, N Seiberlich, S Narayanan, **KS Nayak**. Feasibility of spiral through-time GRAPPA for low latency accelerated real-time MRI of speech. *Magnetic Resonance in Medicine*. 78(6):2275-2282. December 2017.
6. W Chen, E Gillett, MCK Khoo, SL Davidson Ward, **KS Nayak**. Real-time Multi-slice MRI during Continuous Positive Airway Pressure Reveals Upper Airway Response to Pressure Change. *Journal of Magnetic Resonance Imaging*. 46(5):1400-1408. November 2017.
7. Y Guo, SG Lingala, Y Zhu, RM Lebel, **KS Nayak**. Direct Estimation of Tracer-Kinetic Parameter Maps from Highly Undersampled Brain Dynamic Contrast Enhanced MRI. *Magnetic Resonance in Medicine*. 78(4):1566-1578. October 2017.
8. HP Do, AJ Yoon, MW Fong, F Saremi, ML Barr, **KS Nayak**. Double-gated Myocardial ASL Perfusion Imaging is Robust to Heart Rate Variation. *Magnetic Resonance in Medicine*. 77(5):1975-1980. May 2017.
9. J Töger, T Sorensen, K Somandepalli, A Toutios, SG Lingala, S Narayanan, **KS Nayak**. Test-retest repeatability of human speech biomarkers from static and real-time dynamic magnetic resonance imaging. *Journal of the Acoustical Society of America*. 141(5): 3323. May 2017.
10. SG Lingala, Y Zhu, YC Kim, A Toutios, S Narayanan, **KS Nayak**. A Fast and Flexible MRI System for the Study of Dynamic Vocal Tract Shaping. *Magnetic Resonance in Medicine*. 77:112-125. January 2017.
11. Y Zhu, Y Guo, SG Lingala, RM Lebel, M Law, **KS Nayak**. GOCART: Golden-angle Cartesian Randomized Time-resolved 3D MRI. *Magnetic Resonance Imaging*. 34(7): 940-950. September 2016.
12. Z Wu, W Chen, MCK Khoo, SL Davidson Ward, **KS Nayak**. Evaluation of upper airway collapsibility using real-time MRI. *Journal of Magnetic Resonance Imaging*. 44(1):158-167. July 2016. Recipient of the W.S. Moore Young Investigator Award at ISMRM 2016.
13. Z Wu, F Han, P Hu, **KS Nayak**. Anisotropic Field-of-View Support for Golden Angle Radial Imaging. *Magnetic Resonance in Medicine*. 76(1):229-236. July 2016
14. L Nava-Guerra, WH Tran, P Chalacheva, S Loloyan, B Joshi, TG Keens, **KS Nayak**, SL Davidson Ward, MCK Khoo. Model-based stability assessment of ventilatory control in overweight adolescents with obstructive sleep apnea during NREM sleep. *Journal of Applied Physiology*. 121(1):185-97. July 1 2016.
15. X Miao, SG Lingala, Y Guo, T Jao, M Usman, C Prieto, **KS Nayak**. Accelerated Cardiac Cine MRI Using Locally Low Rank and Finite Difference Constraints. *Magnetic Resonance Imaging*. 34(6):707-714. July 2016.

16. Z Wu, W Chen, **KS Nayak**. Minimum Field Strength Simulator for Proton Density Weighted MRI. *PLoS ONE* 11(5): e0154711. May 2016.
17. Y Guo, RM Lebel, Y Zhu, SG Lingala, MS Shiroishi, M Law, **KS Nayak**. High-resolution whole-brain DCE-MRI using Constrained Reconstruction: Prospective Clinical Evaluation in Brain Tumor Patients. *Medical Physics*. 43(5):2013-2023. May 2016.
18. F Kober, T Jao, T Troalen, **KS Nayak**, Myocardial Arterial Spin Labeling. *Journal of Cardiovascular Magnetic Resonance*. 18:22. April 2016.
19. A Javed, YC Kim, MCK Khoo, SLD Ward, **KS Nayak**. Dynamic 3D MR Visualization and Detection of Upper Airway Obstruction during Sleep using Region Growing Segmentation. *IEEE Transactions on Biomedical Engineering*. 63(2):431-437. February 2016.
20. SG Lingala, BP Sutton, ME Miquel, **KS Nayak**. Recommendations for Real-Time Speech MRI. *Journal of Magnetic Resonance Imaging*. 43(1):28-44. January 2016.
21. VC Rispoli, JF Nielsen, **KS Nayak**, JLA Carvalho. Computational fluid dynamics simulations of blood flow regularized by 3D phase contrast MRI. *Biomedical Engineering Online*. 14:110. November 2015.
22. **KS Nayak**, JF Nielsen, MA Berstein, M Markl, P Gatehouse, R Botnar, D Saloner, C Lorenz, H Wen, BS Hu, F Epstein, J Oshinski, SV Raman. CMR Phase Contrast Imaging. *Journal of Cardiovascular Magnetic Resonance*. 2015 Aug 9;17(1):71
23. **KS Nayak** and RJ Fleck Jr. "Seeing Sleep: Dynamic Imaging of Upper Airway Collapse and Collapsibility in Children." *IEEE Pulse*. 5(5):40-44. September 2014.
24. SS Narayanan, A Toutios, V Ramanarayanan, A Lammert, J Kim, S Lee, **KS Nayak**, YC Kim, Y Zhu, L Goldstein, D Byrd, E Bresch, P Ghosh, A Katsamanis, and M Proctor. "Real-time magnetic resonance imaging and electromagnetic articulography database for speech production research." *Journal of the Acoustical Society of America*. 136(3): 1307-1311. September 2014.
25. YC Kim, RM Lebel, Z Wu, SL Davidson Ward, MCK Khoo, **KS Nayak**. "Real-time 3D MRI of the Pharyngeal Airway in Sleep Apnea." *Magnetic Resonance in Medicine*. 71(4): 1501-1510. April 2014.
26. Z Wu, YC Kim, MCK Khoo, **KS Nayak**. "Evaluation of an Independent Linear Model for Acoustic Noise on a Conventional MRI Scanner and Implications for Acoustic Noise Reduction." *Magnetic Resonance in Medicine*. 71(4):1613-1620. April 2014.
27. RM Lebel, J Jones, JC Ferre, M Law, **KS Nayak**. "Highly accelerated dynamic contrast enhanced imaging." *Magnetic Resonance in Medicine*. 71(2):635-644. February 2014.
28. HP Do, TR Jao, **KS Nayak**. "Myocardial Arterial Spin Labeling Perfusion Imaging with Improved Sensitivity." *Journal of Cardiovascular Magnetic Resonance*. 16:15. January 2014.
29. AZ Lau, AP Chen, Y Gu, M Ladouceur-Wodzak, **KS Nayak**, CH Cunningham. "Noninvasive identification and assessment of functional brown adipose tissue in rodents using hyperpolarized  $^{13}\text{C}$  imaging." *International Journal of Obesity*. 38(1):126-131. January 2014.
30. Y Zu, SS Narayanan, YC Kim, **KS Nayak**, C Bronson-Lowe, B Villegas, M Ouyoung, UK Sinha. "Evaluation of swallow function post tongue cancer treatment using real-time MRI: A pilot study." *Otolaryngology -- Head and Neck Surgery*. 139(12):1312-1319. December 2013.
31. SD Sharma, HH Hu, **KS Nayak**. "Accelerated  $T_2^*$ -Compensated Fat Fraction Quantification Using a Joint Parallel Imaging and Compressed Sensing Framework." *Journal of Magnetic Resonance Imaging*. 38(5):1267-1275. November 2013.

32. SD Sharma, CL Fong, BS Tzung, M Law, **KS Nayak**. "Clinical Image Quality Assessment of Accelerated Magnetic Resonance Neuroimaging using Compressed Sensing." *Investigative Radiology*. 48(9):638-645, September 2013.
33. Y Zhu, MI Proctor, YC Kim, SS Narayanan, **KS Nayak**. "Dynamic 3D Visualization of Vocal Tract Shaping during Speech," *IEEE Transactions on Medical Imaging*. 32(5):838-848. May 2013.
34. CM Toledo-Corral, TL Alderete, HH Hu, **KS Nayak**, S Esplana, T Liu, MI Goran, MJ Weigensberg. "Ectopic Fat Deposition in Pre-diabetic Overweight and Obese Minority Adolescents." *Journal of Clinical Endocrinology & Metabolism*, 98(3):1115-1121, March 2013.
35. T Shin, **KS Nayak**, JM Santos, DG Nishimura, BS Hu, MV McConnell. "Three-dimensional first-pass myocardial perfusion MRI using a stack-of-spirals acquisition." *Magnetic Resonance in Medicine*. 69(3):839-844. March 2013.
36. MI Proctor, E Bresch, D Byrd, **KS Nayak**, SS Narayanan. "Paralinguistic Mechanisms of Production in Human Beatboxing: A Real-Time Magnetic Resonance Imaging Study." *J. Acoust. Soc. Am.* 133(2):1043-1054, February 2013.
37. SD Sharma, HH Hu, **KS Nayak**, "Chemical Shift Encoded Water-Fat Separation Using Parallel Imaging and Compressed Sensing." *Magnetic Resonance in Medicine* 69(2): 456-466, February 2013.
38. AA Joshi, HH Hu, MI Goran, RM Leahy, **KS Nayak**. "Automatic Intra-subject Registration-based Segmentation of Abdominal Fat from 3D Water-Fat MRI." *Journal of Magnetic Resonance Imaging* 37:423-430, February 2013.
39. TB Smith, **KS Nayak**. "Automatic off-resonance correction in spiral imaging with piecewise linear autofocus." *Magnetic Resonance in Medicine*. 69(1):82-90. January 2013.
40. GS Danagoulian, L Qin, **KS Nayak**, RR Colen, S Mukundan Jr., MB Harris, FA Jolesz, A Shankaranarayanan, WA Copen, EJ Schmidt. "Comparison of wideband steady-state free precession and T2-weighted fast spin echo in spine disorder assessment at 1.5 and 3T." *Magnetic Resonance in Medicine* 68(5):1527-1535, November 2012.
41. MK Makhijani, N Balu, K Yamada, C Yuan, **KS Nayak**. "Accelerated 3D MERGE Carotid Imaging using Compressed Sensing with a Hidden Markov Tree Model." *Journal of Magnetic Resonance Imaging* 36(5):1194-1202, November 2012.
42. TB Smith, **KS Nayak**. "Reduced Field of View MRI with Rapid, B<sub>1</sub>-Robust Outer Volume Suppression," *Magnetic Resonance in Medicine* 67(5):1316-1323, May 2012.
43. YC Kim, MI Proctor, SS Narayanan, **KS Nayak**. "Improved imaging of lingual articulation using real-time multislice MRI." *Journal of Magnetic Resonance Imaging* 35(4):943-948. April 2012.
44. SD Sharma, HH Hu, **KS Nayak**. "Accelerated Water-Fat Imaging Using Restricted Subspace Field Map Estimation and Compressed Sensing," *Magnetic Resonance in Medicine* 67(3):650-659, March 2012.
45. Z Zun, P Varadarajan, RG Pai, EC Wong, **KS Nayak**. "Arterial Spin Labeled MRI Detects Clinically Relevant Increases in Myocardial Blood Flow with Vasodilation," *JACC Cardiovascular Imaging* 4(12):1253-1261, December 2011.
46. HH Hu, TR Nagy, MI Goran, **KS Nayak**. Quantification of absolute fat mass by magnetic resonance imaging: a validation study against chemical analysis. *International Journal of Body Composition Research* 9(3):111-122, November 2011.
47. G Hamilton, DL Smith, M Bydder, **KS Nayak**, HH Hu. "Magnetic resonance properties of brown and white adipose tissues," *Journal of Magnetic Resonance Imaging* 34(2):468-473, August 2011.



48. YC Kim, CE Hayes, S Narayanan, **KS Nayak**. "A novel 16-channel receive coil array for accelerated upper airway MRI at 3 Tesla," *Magnetic Resonance in Medicine* 65(6):1711–1717, June 2011.
49. HH Hu, **KS Nayak**, MI Goran. "Assessment of abdominal adipose tissue and organ fat content by magnetic resonance imaging," *Obesity Reviews* 12:e504–e515, May 2011.
50. YC Kim, SS Narayanan, **KS Nayak**. "Flexible retrospective selection of temporal resolution in real-time speech MRI using a golden-ratio spiral view order," *Magnetic Resonance in Medicine* 65:1365–1371, May 2011.
51. T Rhee, JP Lewis, U Neumann, **KS Nayak**. Scan-based volume animation driven by locally adaptive articulated registrations. *IEEE Transactions on Visualization and Graphics*, 17(3):368-379, March 2011.
52. K-A Le, EE Ventura, JQ Fisher, JA Davis, MJ Weigensberg, M Punyanita, HH Hu, **KS Nayak**, MI Goran. "Ethnic differences in pancreatic fat accumulation and its relationship with other fat depots and inflammatory markers," *Diabetes Care* 34:485-490, February 2011.
53. HH Hu, SA Chung, **KS Nayak**, HA Jackson, V Gilsanz. "Differential CT attenuation of metabolically active and inactive adipose tissues: preliminary findings," *Journal of Computer Assisted Tomography* 35(1):65-71, January-February 2011.
54. TB Smith, **KS Nayak**, "An overview of MRI artifacts and correction strategies," *Imaging in Medicine*. 2(4):445-457. August 2010.
55. HL Lee, A Shankaranarayanan, GM Pohost, **KS Nayak**, "Improved 3 Tesla cardiac cine imaging using wideband SSFP," *Magn. Reson. Med.* 63(6):1716-1722, June 2010.
56. JLA Carvalho, JF Nielsen, **KS Nayak**. "Feasibility of in vivo measurement of carotid wall shear rate using spiral Fourier velocity encoded MRI," *Magn. Reson. Med.* 63(6): 1537-1547, June 2010.
57. HH Hu, DL Smith, **KS Nayak**, MI Goran, TR Nagy, "Identification of Brown Adipose Tissue in Mice with Fat-Water IDEAL-MRI," *J. Magn. Reson. Imag.* 31(5):1195:1202. April 2010.
58. HL Lee, A Shankaranarayanan, GM Pohost, **KS Nayak**, "Three-dimensional coronary MR angiography with sub-millimeter resolution using wideband SSFP at 3 Tesla," *J. Magn. Reson. Imag.* 31(5):1224-1229. April 2010.
59. KH Sung, HL Lee, HH Hu, **KS Nayak**, "Prediction of Myocardial Signal during CINE Balanced SSFP Imaging," *Magn. Reson. Mater. Phy. (MAGMA)* 23(2):85-91. April 2010.
60. T Shin, GM Pohost, **KS Nayak**, "Systolic 3D first-pass myocardial perfusion MRI: comparison with diastolic imaging in healthy volunteers," *Magn. Reson. Med.* 63(4): 858-864. April 2010.
61. HH Hu, HW Kim, **KS Nayak**, MI Goran, "Comparison of 3D Fat-Water MRI and Single-Voxel MRS in the Assessment of Hepatic and Pancreatic Fat Fraction," *Obesity* 18(4): 841-847. Apr 2010.
62. TB Smith, Z Zun, EC Wong, **KS Nayak**. "Design and use of Variable Flip Angle Schedules in Transient Balanced SSFP Subtractive Imaging," *Magn. Reson. Med.* 63(2):537-542. February 2010.
63. MK Makhijani, HH Hu, GM Pohost, **KS Nayak**, "Improved Blood Suppression in 3D FSE Vessel Wall Imaging using a combination of Double Inversion Recovery and Diffusion Sensitizing Gradient Preparations," *J. Magn. Reson. Imag.* 31(2):398-405. February 2010.
64. HH Hu and **KS Nayak**. "Change in the proton T1 of Fat and Water in Mixture," *Magn. Reson. Med.* 63(2):494-501. February 2010.
65. Z Zun, EC Wong, **KS Nayak**. "Assessment of myocardial blood flow in humans using arterial spin labeling: feasibility and SNR requirements," *Magn. Reson. Med.* 62(4): 975-83. October 2009.

66. YC Kim, S Narayanan, **KS Nayak**. "Accelerated 3D upper airway MRI using compressed sensing," *Magn. Reson. Med.*, 61(6):1434-40. June 2009.
67. JF Nielsen and **KS Nayak**. "Reference-less phase velocity mapping using balanced SSFP," *Magn. Reson. Med.*, 61(5):1096-1102. May 2009.
68. JF Nielsen and **KS Nayak**. "Interleaved balanced SSFP imaging: artifact reduction using gradient waveform grouping," *J. Magn. Reson. Imag.* 29(3):745-750. March 2009.
69. H Jung, KH Sung, **KS Nayak**, EY Kim, JC Ye. "k-t FOCUSS: a general compressed sensing framework for high-resolution dynamic MRI," *Magn. Reson. Med.*, 61(1):103-116. January 2009.
70. T Shin, HH Hu, GM Pohost, **KS Nayak**. "Three dimensional first-pass myocardial perfusion imaging at 3T: feasibility study," *J. Cardio. Magn. Reson.* 10:57. December 2008.
71. HH Hu and **KS Nayak**. "Quantification of Absolute Fat Mass Using an Adipose Tissue Reference Signal Model," *J. Magn. Reson. Imag.*, 28(6):1483-1491. December 2008.
72. HL Lee and **KS Nayak**. "Stabilization of alternating TR steady state free precession sequences," *J. Magn. Reson.* 195:211-218. December 2008.
73. KH Sung and **KS Nayak**. "Design and use of tailored hard-pulse trains for uniform saturation of myocardium at 3 Tesla," *Magn. Reson. Med.*, 60(4):997-1002. October 2008.
74. CY Liu, P Varadarajan, GM Pohost, **KS Nayak**. "Real-time color flow MRI at 3 Tesla using variable density spiral phase contrast." *Magn. Reson. Imaging*, 26(5):661-666. May 2008.
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## PATENTS

1. **KS Nayak**, "Magnetic Measurement of Fat Fraction," US Provisional Application 62/440,294, December 2016.
2. HP Do, TR Jao, **KS Nayak**, "Multi-Pulsed Arterial Spin Labeled Magnetic Resonance Imaging," USC Disclosure #D2014-0072. April 2014.
3. Y Zhu, Y Guo, RM Lebel, **KS Nayak**, "Method for Dynamic 3D MRI Data Sampling," USC File #2014-227. US Provisional Application 61/980,462. April 2014.
4. **KS Nayak** and Y Chai, "Alignment Indicator for Dental Radiography," USC File #2014-187. February 2014.
5. T Smith and **KS Nayak**, "Method for Reduced Field-of-View MRI in an inhomogeneous field with rapid Outer Volume Suppression," U.S. Patent #9,739,861. Issued August 2017.
6. T Jao, Z Zun, and **KS Nayak**, "Efficient Mapping of Tissue Properties for Unregistered Data with Low Signal-to-Noise Ratio," (under review) U.S. Patent Application #13/231,741. March 2012.
7. K Sung and **KS Nayak**, "Tailored radiofrequency pulses for uniform saturation in magnetic resonance imaging," U.S. Patent #8,324,898. issued Dec. 2012.
8. JF Nielsen and **KS Nayak**, "Eddy-current artifact reduction in balanced steady-state free precession magnetic resonance imaging," U.S. Patent #8,283,924. issued Oct. 2012.
9. HL Lee and **KS Nayak**, "Preparing the magnetization state of a sample for alternating repetition time steady state free precession magnetic resonance imaging," U.S. Patent #8,269,494, issued September 2012.
10. JF Nielsen and **KS Nayak**, "Fast velocity measurements using balanced SSFP magnetic resonance imaging," U.S. Patent #8,212,561. issued July 2012.
11. CH Cunningham, **KS Nayak**, JM Pauly, "RF field mapping for magnetic resonance imaging," U.S. Patent #7,446,526. issued Nov. 2008. Licensed to GE, Siemens, and Philips.
12. K Sung and **KS Nayak**, "Compensating for non-uniformity of excitation field in MRI," U.S. Patent #7,372,270. issued May 2008.
13. **KS Nayak** and BA Hargreaves, "Steady-State Free-Precession MRI with Increased Signal Bandwidth," U.S. Patent #7,332,908. issued Feb. 2008. Licensed to GE, Siemens, and Philips.
14. **KS Nayak** "Ultra-short T2 Imaging Pulse Sequence," 2003, software licensed to GE.
15. KI Iourcha, **KS Nayak**, Z Hong, "System and Method for Fixed-rate Block-based Image Compression with Inferred Pixel Values," U.S. Patent #5,956,431, issued Sept. 1999. Continuation: "Fixed-rate Block-based Image Compression with Inferred Pixel Values," U.S. Patent #6,658,146, issued Dec. 2003. Continuation: "Fixed-rate Block-based Image Compression with Inferred Pixel Values," U.S. Patent #6,683,978, issued Jan. 2004. Continuation: "Fixed-rate Block-based Image Compression with Inferred Pixel Values," U.S. Patent #6,775,417, issued Aug. 2004. Continuation: "Fixed-rate Block-based Image Compression," U.S. Patent #7,039,244, issued May 2006. Continuation: "Image Processing System," U.S. Patent #7,043,087, issued May 2006. Continuation: "Imaging CODEC Engine," U.S. Patent #7,801,363, issued Sept. 2010.

## INVITED TALKS

### INVITED CONFERENCE TALKS

1. Arterial Spin Labeling, Session: Non-contrast Methods, SCMR/ISMRM Co-Provided Workshop on CMR in Ischemic Heart Disease, Barcelona, February 2018.
2. Diagnostic Real-Time MRI, Plenary Session “Dynamic Real-Time MRI”, ISMRM 2017 Scientific Sessions, Honolulu, HI, April 2017.
3. MR Phase Imaging, ISMRM Workshop on Quantitative MR Flow: Innovation & Implementation for Clinical & Physiological Insights, San Francisco, CA, October 2016.
4. MRI at Multiple Spatial Scales, daVinci Convergence Symposium - Imaging Across Scales, Santa Monica, CA, February 2016.
5. Myocardial ASL Perfusion, ISMRM Workshop on Non-Contrast Cardiovascular MRI, Long Beach, CA, March 2015.
6. Real-Time Imaging and Compressed Sensing, Gordon Research Conference on In-Vivo NMR, Proctor Academy, Andover, NH, July 2014.
7. Imaging Challenges at 3T and Above, ISMRM 2014, Course: Cardiovascular MRI at 3T and Beyond, Milano, Italy, May 2014.
8. Real-Time MRI of Speech Production, Speech MRI Summit, Los Angeles, CA, February 2014.
9. How to Quantify Blood Flow, SCMR 16th Scientific Sessions, Physician Pre-conference Course, January 2014.
10. What is Compressed Sensing and How Can We Use It? ASFNR-ISMRM Session on Ultrafast MR Imaging, ASNR 51st Annual Meeting, San Diego, CA, May 2013.
11. New CMR Sequences and Techniques. ISMRM 2013 Weekend Course, Recent Innovations in Cardiovascular MR, Recent Developments in Hardware and Software Relevant to CMR. Salt Lake City, April 2013.
12. Towards myocardial perfusion imaging using arterial spin labeling at high fields. SCMR-ISMRM Joint Workshop: New Horizons in High-Field Cardiovascular MR: Promise and Progress. San Francisco, CA, January 2013.
13. New CMR Sequences and Techniques. ISMRM 2012 Weekend Course, Recent Advances in Cardiovascular MR, Recent Developments in Hardware and Software. Melbourne, Australia, May 2012.
14. Non-contrast perfusion methods: Ready for prime time? SCMR 14th Scientific Sessions, Orlando, FL, February 2012.
15. CMR Perfusion using Arterial Spin Labeling. GE Lunchtime Symposium at the SCMR 14th Scientific Sessions, Nice, France, February 2011.
16. Novel Myocardial Perfusion Techniques: Arterial Spin Labeling. SCMR 14th Scientific Sessions, Basic Science Pre-conference Course. Nice, France, February 2011.
17. Advanced Pulse Sequences for 3 Tesla CMR. ISMRM 18th Scientific Sessions, Sunrise Course: Cardiovascular MR Imaging, Stockholm, May 2010.
18. Tools for Mapping and Quantitative Imaging. ISMRM 18th Scientific Sessions, Educational Course: Imaging Strategies, Stockholm, May 2010.
19. Update on Myocardial Perfusion using Arterial Spin Labeling. SCMR 13th Scientific Sessions, Phoenix, AZ, January 2010.
20. Technical Challenges and Solutions for CMR at 3 Tesla. SCMR High-Field and Basic Science Pre-conference workshop. Phoenix, AZ, January 2010.
21. Real-Time Measurement of Cardiac Function and Flow. ISMRM Workshop on Cardiovascular Function, Flow, and Tissue Mechanics. Sintra, Portugal, September 2009.

22. Quantitative MRI of Abdominal Fat: Recent Developments. NCI Transdisciplinary Research on Energetics and Cancer (TREC) Scientific Meeting. Cleveland, OH, May 2009.
23. Myocardial Perfusion using Arterial Spin Labeling. SCMR 12th Scientific Sessions, Orlando, FL, January 2009.
24. Real-Time Imaging at 3T. SCMR 11th Scientific Sessions, Los Angeles, CA, February 2008.
25. Handling RF Variation at 3T. Workshop on High-Field Cardiovascular MR: An Update, Los Angeles, CA, January 2008.
26. Real-Time Imaging at 3T. ISMRM 15th Scientific Sessions, Clinical Categorical Course: Cardiovascular Imaging at High Field, Berlin, May 2007.
27. Strategies for collecting temporally-resolved physiological data. ISMRM 15th Scientific Sessions, Educational Course: MR Physics for Physicists, Berlin, May 2007.
28. Spiral and Real-Time Imaging. SCMR 10th Scientific Sessions, Rome, February 2007.
29. The Current Cutting-Edge in Rapid CMR Imaging, SCMR 10th Scientific Sessions, Rome, February 2007.
30. Spiral and Real-Time Imaging. NIH/NIBIB Workshop on High-Field Cardiovascular Magnetic Resonance, Washington, DC, September 2006.
31. EPI Artifact Correction using Parallel Imaging. IEEE-EMBS, Special Session on Cardiac Imaging, September 2006.
32. Real-Time Flow Imaging. ISMRM Workshop on Flow and Motion: Imaging Assessment of Cardiovascular and Tissue Mechanics, New York, July 2006.
33. Recent Advances in the Diagnosis of Coronary Artery Disease. North American Konkani Association Medical Symposium, Hamilton, Ontario, July 2006.
34. Real-Time Color Flow MRI. ISMRM 14th Scientific Sessions, Flow and Motion Study Group Meeting, Seattle, May 2006.
35. Spirals at High Field. SCMR 9th Scientific Sessions, Basic Science Plenary Session: Parallel and Other Novel Imaging Techniques, Miami, January 2006.
36. Identification, Modeling and Correction of Image Artifacts. ISMRM 13th Scientific Sessions, Educational Course: MR Physics for Physicists, Miami, May 2005.
37. Real-Time Cardiac Imaging. GE-Asia Seminar Series (five locations): Sydney, New Delhi, Mumbai, Beijing, and Shanghai, March 2005.
38. How to Transition to the Real World. SCMR 8th Scientific Sessions, Trainee and Students Hour, San Francisco, January 2005.
39. Non-cooperative Patients and Arrhythmia: Real-Time and Single Shot Imaging. SCMR 8th Scientific Sessions, Pre-Conference Workshop, San Francisco, January 2005.
40. Cardiovascular 3T Imaging. NASCI 32nd Annual Meeting, Next Generation Cardiac MR Session, Amelia Island, October 2004.
41. Hemodynamic Visualization with Real-Time MRI. University of Toronto Real-Time MRI Workshop, Toronto, July 2003.

## COLLOQUIA

Axilor Ventures, December 2017

GE John F. Welch Technology Center, December 2017

Dayananda Sagar College of Engineering, November 2017

ISMRM India Chapter, November 2017

Indian Institute of Sciences, Computational and Data Sciences, November 2017

University of Wisconsin-Madison, Medical Physics, October 2017

Arizona State University, Biomedical Engineering, September 2017  
University of California, San Diego, Physiology & Medicine, June 2017  
Case Western Reserve University, Case Center for Imaging Research, October 2016  
University of California, Davis, Radiology Grand Rounds, October 2016  
Cincinnati Children's Hospital, Radiology Grand Rounds, October 2014  
University of California, Los Angeles, Department of Radiology, June 2014  
University of Calgary, Alberta, Canada, June 2013  
University of California, San Diego, Center for Functional MRI, May 2013  
University of Southern California, Center for Excellence in Teaching, May 2013  
Cedars-Sinai Medical Center, Biomedical Imaging Research Institute, January 2013  
Seoul National University Hospital, Seoul, South Korea, August 2012  
Neuroscience Research Institute, Gachon University, Incheon, South Korea, August 2012  
NIH / NHLBI Laboratory for Cardiac Energetics, Bethesda, June 2010.  
Linköping University Hospital, Linköping, Sweden, February 2010.  
University of Louisville, Electrical Engineering, Louisville, November 2009  
University of California, San Diego, Penner Biomechanics Seminar, October 2009  
Brigham and Women's Hospital, Department of Radiology, October 2009  
FAMU/FSU College of Engineering, May 2009  
Loma Linda University Medical Center, May 2008  
Yale University, Bioimaging Science Lecture Series, November 2006.  
University of California, San Diego, Center for Functional MRI, August 2006.  
GE Global Research Center, Niskayuna, July 2006.  
University of Virginia, Biomedical Engineering, Charlottesville, April 2006.  
Johns Hopkins University, Radiology, Baltimore, April 2006.  
Florida State University, Computer Science, Tallahassee, November 2004.  
NIH / NHLBI Laboratory for Cardiac Energetics, Bethesda, February 2004.  
Medtronic AVE Inc., Santa Rosa, June 2003.  
Linköping University Hospital, Linköping, Sweden, October 2002.  
Guidant Inc., Santa Clara, September 2001.  
Agilent Labs, Palo Alto, April 2001.  
Kawasaki Medical College, Okayama, Japan, July 2000.

## TEACHING & MENTORING

### TEACHING and MENTORING GRANTS

- **Principal Investigator**, National Science Foundation, “New GK-12: Body Engineering Los Angeles,” Grant #1045595. August 2011-July 2016. \$1,400,000. (with ~\$1M matching funds from the USC Viterbi School of Engineering)
- **Principal Investigator**, SAMPE Foundation, “GK-12: Body Engineering Los Angeles,” August 2014. \$10,000.
- **Principal Investigator**, Stevens Institute for Innovation, Innovation Inside Curriculum Grant, “Commercialization of Magnetic Resonance Imaging Technology,” December 2007. \$2,000.

### DIRECT TRAINEES

| Name                | Degrees, Years                   | Current Position  |
|---------------------|----------------------------------|---|
| Joao Luiz Carvalho  | PhD, 2004-08                     | Associate Professor,<br>Universidade de Brasilia (Brazil)               |
| Kyunghyun Sung      | PhD, 2004-08                     | Assistant Professor,<br>University of California, Los Angeles           |
| Hsu-Lei Lee         | PhD, 2004-08                     | Research Fellow,<br>Queensland Brain Institute (Australia)              |
| Taehoon Shin        | PhD, 2004-09<br>Postdoc, 2009-10 | Assistant Professor,<br>University of Maryland & Ewha Womans University |
| Chia-Ying Liu       | Postdoc, 2004-06                 | Assistant Professor,<br>Johns Hopkins University                        |
| Jon-Fredrik Nielsen | Postdoc, 2005-08                 | Research Assistant Professor,<br>University of Michigan, Ann Arbor      |
| Yoonchul Kim        | PhD, 2005-10<br>Postdoc, 2010-14 | Scientist,<br>Samsung Medical Center (Korea)                            |
| Zungho Zun          | PhD, 2005-10                     | Assistant Professor,<br>Children’s National Medical Center              |
| Mahender Makhijani  | PhD, 2005-12                     | Senior Engineer,<br>Continuum Analytics                                 |
| Houchun Hu          | Postdoc, 2006-09                 | Director of Radiology Research,<br>Nationwide Children’s Hospital       |
| Samir Sharma        | PhD, 2007-12                     | Engineer,<br>Toshiba America Medical Systems,                           |
| Travis Smith        | PhD, 2007-12                     | Research Assistant Professor,<br>Oregon Health Sciences University      |
| Marc Lebel          | Postdoc, 2010-12                 | Scientist,<br>GE Applied Sciences Laboratory (Canada)                   |
| Yinghua Zhu         | PhD, 2010-15                     | Engineer,<br>Google   |
| Ziyue Wu            | PhD, 2011-15                     | Scientist,<br>All-Tech Medical Systems USA                              |
| Johannes Töger      | Postdoc, 2015-16                 | Researcher,<br>Lund University (Sweden)                                 |

| Name              | Degrees, Years                  | Current Position  |
|-------------------|---------------------------------|---|
| Sajan Lingala     | Postdoc, 2014-17                | Assistant Professor,<br>University of Iowa                            |
| Hung Phi Do       | PhD, 2010-2017<br>Postdoc, 2017 | MR Clinical Collaborations Manager<br>Toshiba America Medical Systems |
| Yi Guo            | PhD, 2012-2017                  | Engineer,<br>SnapChat   |
| Terrence Jao      | PhD, 2011-2017                  | Medical Student,<br>USC   |
| Vanessa Landes    | PhD, 2012-                      |   |
| Ahsan Javed       | PhD, 2012-                      |   |
| Weiyi Chen        | PhD, 2013-                      |   |
| Xin Miao          | PhD, 2013-                      |   |
| Yannick Bliesener | PhD, 2015-                      |   |
| Yongwan Lim       | PhD, 2015-                      |   |

### INDIRECT TRAINEES (not the primary advisor)

| Name         | Degrees, Years | Current Position  |
|--------------|----------------|---|
| Erik Bresch  | PhD, 2005-2010 | Scientist,<br>Philips Research Laboratories (Netherlands)           |
| Taehyun Rhee | PhD, 2005-2010 | Senior Lecturer,<br>Victoria University of Wellington (New Zealand) |
| Eamon Doyle  | PhD, 2011-2017 | Medical Student,<br>Vanderbilt University                           |
| Adam Bush    | PhD, 2011-2017 | Postdoc,<br>Stanford-Lucile Packard Children's Hospital             |

### TRAINEE AWARDS

|   |         |
|---|---------|
| Ziyue Wu, W.S. Moore Young Investigator Award, ISMRM                    | 2016    |
| Sajan Lingala, USC Provost's Postdoctoral Scholar Research Grant        | 2015    |
| Ziyue Wu, Grodins Graduate Award (#1 PhD student in the BME department) | 2015    |
| Ziyue Wu, Coulter Award, BME Department                                 | 2015    |
| Yoon-chul Kim, American Heart Association Postdoctoral Fellowship       | 2013-15 |
| Christopher Sandino, USC McNair Scholar                                 | 2013    |
| Travis Smith, Ming Hsieh Institute Best PhD Dissertation Award          | 2013    |
| Samir Sharma, Best Research "Fast Pitch", USC EE Research Festival      | 2012    |
| Travis Smith, American Heart Association Predoctoral Fellowship         | 2011-12 |
| Samir Sharma, Ming Hsieh Institute Ph.D. Scholar (one of five)          | 2011-12 |
| Taehoon Shin, American Heart Association Postdoctoral Fellowship        | 2009-11 |
| Hsu-Lei Lee, USC Women in Science and Engineering, Merit Award          | 2008    |
| Taehoon Shin, Best Student Paper Honorable Mention, USC EE Department   | 2008    |
| Joao Carvalho, Best Student Paper Award, USC EE Dept.                   | 2007    |
| Joao Carvalho, USC Dissertation Completion Fellowship                   | 2007-08 |
| Jon-Fredrik Nielsen, American Heart Association Postdoctoral Fellowship | 2006-08 |
| Numerous conference travel grants (not practical to list individually)  | 2005-   |
| Numerous conference paper awards (listed above under Publications)      | 2005-   |

## DISSERTATION COMMITTEES

- **Ph.D. Thesis Defense and Qualifying Exam:** Dimitrios Pantazis (EE), Manjiang Zhang (Physics), Hsiao-Fen Chou (Civil), Ismail Sebe (EE), Fariba Ariei (EE), Bei Wang (EE), Yuriy Brun (CS), Nilesh Ghugre (BME), Taehyun Rhee (CS), Anand Joshi (EE), Ramakrishnan Iyer (BME), Matthew Behrend (EE), Alec Wong (BME), Kenneth Hayworth (Neuroscience), Jonghye Woo (EE), Sangeetha Somayajula (EE), Hua Hui (EE), Erik Bresch (EE), Jay Mung (BME), Vikram Ramanarayanan (EE), Samantha Cunningham (BME), Wentao Zhu (EE), Seth Nfonoyim-Hara (BME), Chitresh Bhushan (EE), Brian Hsu (Linguistics), Yi Lao (BME), Eamon Doyle (BME), Adam Bush (BME).
- **Ph.D. Qualifying Exam Only:** Changsung Kim (EE), Jingliang Peng (EE), Dahua Xie (EE), Esen Kucukaltun-Yildirim (EE), Belma Dogdas (EE), Abhijit Chaudhari (EE), Yousef Al-Rjoub (Civil), Pankaj Mishra (EE), Chiao Wang (EE), Jong Dae Oh (EE), Sanghee Cho (EE), Sundeep Pattem (EE), Joyita Dutta (EE), Juan Soto (EE), Dongwoo Kang (EE), Matthew Borzage (BME), Wentao Zhu (EE), Yanguang Lin (EE), Adam Bush (BME), Joseph Crew (BME), Eamon Doyle (BME), Yi Lao (BME), Yang Li (BME), Chi Tat Chiu (BME), Yu Ryan Chen (BME), Zhaojun Yang (EE), Niharika Gajawelli (BME), Azarang Golmohammadi (EE), Divya Varadarajan (EE), Daeun Kim (EE), Minqi Chong (EE).
- **M.S. Thesis Committees:** Abhijit Kher (BME), Amrita Rajagopalan (BME), Naren Nallapareddy (EE), Grant Haskins (BME).

## DIRECTED RESEARCH

- **Medical Students:** Terrence Jao (USC MD/PhD), Gabriel Rudd-Barnard (Drexel MD)
- **Ph.D. Students:** Barry Vanek (EE), Zihong Fan (EE), Firooz Aflatouni (EE), Stephen Tobin (Linguistics), Ximing Wang (BME), Eric Sohn (BME), Adam Bush (BME), Yunhua Ji (BME).
- **M.S. Students:** Kyunghyun Sung (EE), Antonio Ordonez (EE), Aditya Sane (EE), Taek-yoon Nam (EE), Vishwanath Kottignahal (EE), Ashish Medewar (EE), Peter Shin (EE), Vikram Ramanarayanan (EE), Niharika Gajawelli (EE), Jack Chang (EE), Ziyue Wu (BME), Yinghua Zhu (EE), Divya Varadarajan (EE), Cecilie Anker (Informatics, TU-Denmark), Josephine Jensen (Informatics, TU-Denmark), Naren Nallapareddy (EE), Siyuan Meng (EE), Shayan Farzad (EE), Jieshen Chen (EE).
- **Undergraduates:** Eamon Doyle (Olin College), Sameer Chopra (UC-Riverside), David Chartash (U Western Ontario), Tim Brochier (USC), Melanie Houselog (USC), Samantha Kaplan (USC), Sheldon Cheng (USC), Christopher Sandino (USC), Sam Thornton (USC), Andriana Ayiotis (USC), Natasha Goran (University of Leeds, UK), Octavio Marin Pardo (UNAM, Mexico), Jieshen Chen (USC).
- **High School Students:** Arjun Viswanathan (Minnetonka High School, Minnesota), Nikhil Rajulapati (Trinity Preparatory School, Florida).

## CLASSROOM TEACHING @ USC (student evals: 1.00 is poor, 5.00 is excellent)

Magnetic Resonance Imaging and Reconstruction (EE 591)

Spring 2004 (4.65), Fall 2004 (4.71), Fall 2005 (5.00), Fall 2007 (4.78),  
Fall 2009 (4.79), Spring 2012 (4.79), Spring 2015.

Advanced Topics in Magnetic Resonance Imaging (EE 691)

Fall 2008 (4.44), Fall 2012 (4.70).

Electrical Engineering Research Seminar (EE 598)

Fall 2012 (4.75), Fall 2013 (4.75)



Engineering Freshman Academy (ENGR 102)  
 Fall 2011 (4.86 & 4.42), Fall 2012 (4.57 & 4.62), Fall 2013 (4.44 & 4.69),  
 Fall 2014 (4.42 & 4.25).  
 Digital Signal Processing (EE 483)  
 Spring 2005 (4.32).  
 Introduction to Linear Systems (EE 301)  
 Spring 2007 (4.12), Spring 2009 (4.45), Spring 2014 (3.58), Spring 2016.  
 Real-Time DSP Laboratory (EE 434L)  
 Spring 2008 (3.86).  
 Advanced Real-Time DSP Laboratory (EE 586L)  
 Spring 2008 (4.44).  
 Introduction to Electrical Engineering Systems (EE 200L)  
 Spring 2010 (4.17).  
 EPIC Programming (programming language for GE MRI scanners, informal course)  
 Oct-Dec 2004, June-Aug 2005, Feb-April 2006, May-June 2008, July-Aug 2010.

**CLASSROOM TEACHING @ Stanford** (student evals: *5.00 is poor, 1.00 is excellent*)

Introductory Digital Signal Processing (EE 103)  
 Summer 2001 (1.43), Summer 2002 (1.25).  
 Statistical Signal Processing (EE 278)  
 Summer 2003.

**OTHER MENTORING**

- Stanford Alumni Mentoring 2009-
- Society for Cardiovascular Magnetic Resonance Mentoring Program 2011-

**OTHER OUTREACH**

- Prepared a teaching unit on Medical Imaging appropriate for a high-school physics course, for the USC Physics Instant Update, a workshop for LA-area high-school physics teachers run by Prof. Stephan Haas (Physics).

## SERVICE

### WORKSHOP ORGANIZATION

|   |      |
|---|------|
| Program Committee, SCMR Scientific Sessions. Barcelona, Spain   | 2018 |
| Co-Chair, SCMR/ISMRM Co-Provided Workshop Probing Mechanisms of Heart Disease: Micro to Macro to Model. Washington DC                                 | 2017 |
| Program Committee, SCMR Scientific Sessions. Washington DC  | 2017 |
| Member of Organizing Committee, ISMRM Workshop on Flow and Motion Quantification. San Francisco, CA   | 2016 |
| Program Committee, SCMR Scientific Sessions. Nice, France   | 2015 |
| Member of Organizing Committee, ISMRM Workshop on Non-Contrast Cardiovascular MRI. Long Beach, CA   | 2015 |
| Chair, USC Speech MRI Summit. Los Angeles, CA   | 2014 |
| Member of Organizing Committee, SCMR/ISMRM Joint Workshop on High-Field Cardiovascular Magnetic Resonance. San Francisco, CA                          | 2013 |
| Program Committee, SCMR Scientific Sessions. Orlando, FL  | 2012 |
| Co-Organizer, SCMR Pre-conference Session on High-Field Cardiovascular Imaging and Basic Science. Phoenix, AZ   | 2010 |
| Member of Organizing Committee, ISMRM Workshop on Data Sampling and Image Reconstruction. Sedona, AZ  | 2009 |
| Co-Chair, Workshop on High-Field Cardiovascular MR: An Update. Beverly Hills, CA  | 2008 |
| Member of Organizing Committee, ISMRM Workshop on Non-Cartesian MRI. Sedona, AZ   | 2007 |
| Member of Organizing Committee, NIH/NIBIB Workshop on High-Field Cardiovascular MR: the promise, the problems, the potential solutions. Washington DC | 2006 |
| Chair, ISMRM Workshop on Real-Time MRI: Dynamic Interactive Imaging and its Applications. Santa Monica, CA  | 2006 |

### GRANT REVIEW

- National Institutes of Health:
  - ZRG1 DTCS-A (81) S, Mail Reviewer, Feb 2015.
  - ZHL1 CCT-Q C1 Wireless Physiologic Telemetry for Interventional MRI, Sept 2013.
  - ZHL1 CCT-H C4 NHLBI SBIR Phase I/II Contract Review, Feb 2013.
  - ZHL1 CCT-N C2 B Wireless Physiologic Telemetry for Interventional MRI, Feb 2012.
  - ZRG SBIBU55 Academic-Industry Partnerships Panel, Jun 2010.
  - ZHL1 K99/R00 Panel, Feb 2010.
  - SBIB L30 Special Emphasis Panel, High End Shared Instruments Panel, Nov 2009.
- American Heart Association:
  - Western States Bioengineering Panel, Spring 2010.
  - Radiology, Imaging, and Surgery Panel, Fall 2007, Spring 2008, Fall 2008.
- USC Internal Grants:
  - SC-CTSI, Pilot and Translational Research Grants, 2013.

- o “Cardiovascular, Metabolism, and Neuroscience”, “Systems Biology and Bioengineering”
  - o SC-CTSI, Pilot and Translational Research Grants, 2012.
    - o “Biology, Bioengineering, Molecular Medicine”, “Diabetes, Obesity, Metabolic Diseases”
  - o Clinical Translational Science Initiative, Pilot and Feasibility Grants, 2008.
  - o James H. Zumberge Research and Innovation Fund, 2007.
  - o Saban Research Institute, Career Development Fellowships, 2006.
- Other:
  - o Technology Foundation STW (Netherlands), Innovation Research Incentive Grants, May 2010.
  - o Instituto de Telecomunicações (Portugal), Information Technology Grants, April 2014.

## JOURNAL REVIEW

- Reviewer:
 

|  |       |
|--|-------|
| Magnetic Resonance in Medicine   | 2000- |
| Journal of Magnetic Resonance Imaging                                  | 2001- |
| Journal of Cardiovascular Magnetic Resonance                           | 2002- |
| IEEE Transactions on Medical Imaging                                   | 2007- |
| MAGMA – Magnetic Resonance Materials in Physics, Biology, and Medicine | 2008- |
| Journal of the American College of Cardiology – Cardiovascular Imaging | 2008- |
| Circulation – Cardiovascular Imaging                                   | 2009- |
| Concepts in Magnetic Resonance Part A                                  | 2009- |
| Radiology  | 2010- |
| Investigative Radiology  | 2010- |
| PLOS ONE   | 2013- |
- Editorial Board Member:
 

|  |         |
|--|---------|
| Journal of Cardiovascular Magnetic Resonance | 2002-10 |
| Current Cardiology Reviews                   | 2004-11 |
- Conference Paper/Abstract Reviewer:
 

|                                 |         |
|---------------------------------|---------|
| ISMRM Scientific Sessions       | 2005-   |
| SCMR Scientific Sessions        | 2012    |
| ISMRM Workshops (several years) | 2006-   |
| ISBI                            | 2005-09 |

## OTHER PROFESSIONAL SERVICE

- International Society for Magnetic Resonance in Medicine
 

|   |         |
|---|---------|
| Young Investigator Awards Committee, Member | 2012-14 |
| Nominating Committee, Member                | 2016    |
- Society for Cardiovascular Magnetic Resonance,
 

|  |          |
|--|----------|
| Science Committee, Member                | 2006-12  |
| Science Committee, Chair                 | 2010-12  |
| Election Committee, Member               | 2011     |
| Annual Meeting Program Committee, Member | 11,16,17 |

- External Review Board, National Institutes of Health, “Training in Cardiac Magnetic Resonance Imaging,” T32 Training Grant (T32HL007846) to Stanford University.

## UNIVERSITY SERVICE

### University of Southern California

|   |         |
|---|---------|
| Center for Excellence in Teaching, Faculty Fellow                       | 2013-16 |
| Center for Excellence in Teaching, Academic Careers Week, Session Staff | 2009-13 |
| 3TMRI for Cardiovascular and Neuroimaging, Technical Advisory Board     | 2006-   |
| University Hospital MRI Unit, Technical Advisory Board                  | 2004-   |
| Dornsife Neuroimaging Center, Technical Advisory Board                  | 2004-12 |

### Viterbi School of Engineering

|   |         |
|---|---------|
| Appointment, Promotion, and Tenure (APT) Committee Member       | 2011-13 |
| Viterbi Research Awards Committee                               | 2012    |
| Electrical Engineering Department Unification, Committee Member | 2009    |
| Interviewer, Presidential and Trustee Scholars                  | 2006-07 |

### Ming Hsieh Department of Electrical Engineering

|   |                        |
|---|------------------------|
| Faculty Recruitment Committee                             | 2014-                  |
| Ming Hsieh Institute                                      |                        |
| Advisory Council  | 2013-16                |
| Educational Talks on NSF & NIH Funding                    | 2013                   |
| MHI Scholars Selection Committee                          | 2011                   |
| Signal and Image Processing Group                         |                        |
| Screening Exam Coordinator                                | 2003-12                |
| Admissions and Fellowship Nomination Committee            | 2008-12                |
| Annual Faculty Merit Review, Committee Member             | 2010,<br>2012,<br>2017 |
| Faculty Candidate Evaluation (several short appointments) | 2006-                  |