

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. DO NOT EXCEED FIVE PAGES.

NAME: Geethanath, Sairam

eRA COMMONS USER NAME (credential, e.g., agency login): sg3606

POSITION TITLE: Associate Research Scientist

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	END DATE MM/YYYY	FIELD OF STUDY
Visweswaraya Technological University, Instrumentation Technology, Bangalore, Karnataka	BENG	05/2005	Instrumentation Technology
Illinois Institute of Technology, Electrical and Computer Engineering, Chicago, IL	MS	12/2007	Electrical Engineering - Biomedical Imaging and Signals
University of Texas Southwestern Medical Center, Joint Program in Bioengineering with UT Arlington, Dallas, TX	PHD	11/2011	Biomedical Engineering - Magnetic Resonance Imaging
Indian Institute of Science, Bangalore	Other training	05/2005	Instrumentation and Applied Physics
Imperial College London	Postdoctoral Fellow	11/2012	Magnetic Resonance Imaging Physics and Engineering

A. Personal Statement

I am a biomedical engineer with a broad background in MR technology development and clinical translation. My research interests are in developing novel image acquisition and reconstruction methods. These are aimed to deliver accessible MRI solutions to the world's underserved populations that do not have access to MRI. To this end, I was part of a team of five investigators in India to build her first indigenous MRI. Currently, I am developing methods related to Autonomous MRI, new methods of spatial encoding and accelerated quantitative imaging to build hardware cognizant systems and methods. In the past, I have focused on accelerated MRI acquisition and reconstruction methods to overcome challenges related to Spatio-temporal resolutions.

1. Geethanath S, Vaughan JT Jr. Accessible magnetic resonance imaging: A review. J Magn Reson Imaging. 2019 Jun;49(7):e65-e77. PubMed PMID: [30637891](#).
2. Ravi KS, Potdar S, Poojar P, Reddy AK, Kroboth S, Nielsen JF, Zaitsev M, Venkatesan R, Geethanath S. Pulseq-Graphical Programming Interface: Open source visual environment for prototyping pulse sequences and integrated magnetic resonance imaging algorithm development. Magn Reson Imaging. 2018 Oct;52:9-15. PubMed PMID: [29540330](#).
3. Balsiger Fabian, Shridhar Amaresha, Chikop Shivaprasad, Chandran Vimal, Scheidegger Olivier, Geethanath Sairam, Reyes Mauricio. Magnetic Resonance Fingerprinting Reconstruction via Spatiotemporal Convolutional Neural Networks. arXiv preprint arXiv:1807.06356. 2018;
4. Geethanath S, Baek HM, Ganji SK, Ding Y, Maher EA, Sims RD, Choi C, Lewis MA, Kodibagkar VD. Compressive sensing could accelerate 1H MR metabolic imaging in the clinic. Radiology. 2012 Mar;262(3):985-94. PubMed PMID: [22357898](#); PubMed Central PMCID: [PMC3285227](#).

B. Positions and Honors**Positions and Employment**

2005 - 2005 Project trainee, Indian Institute of Science, Instrumentation and Applied Physics, Bangalore,

Karnataka

2006 - 2007 Software engineer co-op, Siemens Medical Solutions, Angiography and Xray, Chicago, Illinois

2008 - 2008 Software Engineer 2, Siemens Medical Solutions, Angiography and Xray, Chicago, Illinois

2008 - 2011 Graduate Research Assistant, University of Texas Southwestern Department of Radiology, Radiology, Dallas, TX

2012 - 2017 Director, Medical Imaging Research Center, Dayananda Sagar Institutions, Medical Electronics, Bangalore, Karnataka

2018 - Associate Research Scientist, Columbia University, Zuckerman Mind Brain Behavior , New York, NY

Other Experience and Professional Memberships

2008 - Member, International Society of Magnetic Resonance in Medicine

2009 - Member, Golden Key Honor Society

2011 - 2015 Member, Biomedical Engineering Society

2013 - Member, National Magnetic Resonance Society

2014 - Reviewer, NMR in Biomedicine

2014 - Reviewer, Biotechnology Ignition Grant scheme, Dept. of Biotechnology, Govt. of India

2014 - 2017 Secretary, International Society of Magnetic Resonance in Medicine - Indian Chapter

2015 - Member, Selection committee, Dept. of Health & Family Welfare, Govt. of Karnataka, India

2015 - Reviewer, Investigative Radiology

2015 - Reviewer, Biomedical signal processing and control

2016 - Member, International Society of Magnetic Resonance in Medicine - Web Editorial Board

2018 - Reviewer, Journal of Magnetic Resonance Imaging

2019 - Reviewer, Physics in Medicine and Biology

Honors

1997 President Scout Award, Bharat Scouts and Guides

2008 New Entrant Stipend, International Society of Magnetic Resonance in Medicine

2008 - 2011 STEM Doctoral Fellowship, University of Texas at Arlington

2010 Honorable mention in Graduate oral presentations at Annual Celebration of Excellence by Students, University of Texas at Arlington

2010 - 2012 Educational Stipend, International Society of Magnetic Resonance in Medicine (ISMRM)

2011 Best Poster Award, Dallas Metroplex Day Committee

2011 Junior Scientist Stipend Award, Gordon Conference on in vivo MR

2017 ISMRM Research Exchange Award for Ashwini Kumnoor's project on "Design of gradient coils for stroke imaging" (home mentor), ISMRM

2018 Summa Cum Laude Merit Award for Pavan Poojar's abstract on "Evaluation of spirals for low field MR imaging of the brain", ISMRM

2019 Winner, ISMRM Junior Fellows Challenge (Africa) for Gehua Tong's abstract on "Virtual Scanner", ISMRM

2019 Co-Chair, 1st ISMRM workshop on "Accessible MRI for the world", ISMRM

C. Contribution to Science

1. Accelerated MRI acquisition and reconstruction - My contributions include developing and demonstrating compressed sensing applications to MR Spectroscopic Imaging and Angiography. In particular, this was developed for Proton and Sodium nuclei in the case of spectroscopy while the work on Angiography exploited limited support for the region of interest. More recently, I have focused on developing Magnetic Resonance Fingerprinting methods tailored to accomplish simultaneous, non-synthetic, multi-contrast images along with parametric maps of tissue properties

- a. Konar AS, Vajuvalli NN, Rao R, Jain D, Ramesh Babu DR, Geethanath S. Accelerated dynamic contrast enhanced MRI based on region of interest compressed sensing. *Magn Reson Imaging*. 2019 Nov 18;67:18-23. PubMed PMID: [31751673](#).
 - b. Balsiger Fabian, Shridhar Amaresha, Chikop Shivaprasad, Chandran Vimal, Scheidegger Olivier, Geethanath Sairam, Reyes Mauricio. Magnetic Resonance Fingerprinting Reconstruction via Spatiotemporal Convolutional Neural Networks. arXiv preprint arXiv:1807.06356. 2018;
 - c. Maguire ML, Geethanath S, Lygate CA, Kodibagkar VD, Schneider JE. Compressed sensing to accelerate magnetic resonance spectroscopic imaging: evaluation and application to ²³Na-imaging of mouse hearts. *J Cardiovasc Magn Reson*. 2015 Jun 15;17:45. PubMed PMID: [26073300](#); PubMed Central PMCID: [PMC4466859](#).
 - d. Geethanath S, Baek HM, Ganji SK, Ding Y, Maher EA, Sims RD, Choi C, Lewis MA, Kodibagkar VD. Compressive sensing could accelerate 1H MR metabolic imaging in the clinic. *Radiology*. 2012 Mar;262(3):985-94. PubMed PMID: [22357898](#); PubMed Central PMCID: [PMC3285227](#).
2. Open Source tools for Accessible MRI - As an independent PI in India, I directly contributed towards the efforts to enable access to MRI. This was through my role as one of the five investigators on the indigenous MRI project in India. This included rapid prototyping of pulse sequences, image reconstruction and parametric mapping methods from scratch. This also provided me with an opportunity to deeply understand and contribute towards tools for hardware-software interplay and peripherals in MRI
 - a. Tong G, Geethanath S, Jimeno M, Qian E, Ravi K, Girish N, Vaughan J. Virtual Scanner: MRI on a Browser. *Journal of Open Source Software*. 2019 November 25; 4(43):1637-.
 - b. Ravi K, Geethanath S, Vaughan J. PyPulseq: A Python Package for MRI Pulse Sequence Design. *Journal of Open Source Software*. 2019 October 12; 4(42):1725-.
 - c. Poojar P, Geethanath S, Reddy AK, Venkatesan R. Rapid Prototyping of Two-Dimensional Non-Cartesian K-Space Trajectories (ROCKET) Using Pulseq and Graphical Programming Interface. *Crit Rev Biomed Eng*. 2019;47(4):349-363. PubMed PMID: [31679263](#).
 - d. Ravi KS, Potdar S, Poojar P, Reddy AK, Kroboth S, Nielsen JF, Zaitsev M, Venkatesan R, Geethanath S. Pulseq-Graphical Programming Interface: Open source visual environment for prototyping pulse sequences and integrated magnetic resonance imaging algorithm development. *Magn Reson Imaging*. 2018 Oct;52:9-15. PubMed PMID: [29540330](#).
 3. Dynamic MRI: My contributions in this area have been focused on developing numerical methods to accelerate parameter estimation in dynamic contrast-enhanced MRI and motion. These primarily include speeding up the Tofts' model and exploring external device measurement methods to detect motion
 - a. Chikop SA, Anchan ABS, Koulagi G, Honnedevasathana AA, Imam S, Geethanath S. Automatic motion correction of Musculoskeletal MRI using DSLR camera. *Magn Reson Imaging*. 2018 May;48:74-79. PubMed PMID: [29307810](#).
 - b. Vajuvalli N, Chikkemenahally D, Nayak K, Bhosale M, Geethanath S. The Tofts model in frequency domain: fast and robust determination of pharmacokinetic maps for dynamic contrast enhancement MRI. *Physics in Medicine and Biology*. 2016 December 21; 61(24):8462-8475.
 - c. Vajuvalli N, Nayak K, Geethanath S. Accelerated pharmacokinetic map determination for dynamic contrast enhanced MRI using frequency-domain based Tofts model. 2014 36th Annual International Conference of the IEEE Engineering in Medicine and Biology Society. 2014 36th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC); ; Chicago, IL. IEEE; c2014.
 - d. Geethanath S, Gulaka PK, Kodibagkar VD. Acceleration of conventional data acquisition in dynamic contrast enhancement: comparing keyhole approaches with compressive sensing. *Crit Rev Biomed Eng*. 2014;42(6):437-50. PubMed PMID: [25955710](#).
 4. Magnetic Resonance characterization of imaging agents and materials - My collaborative work involves high precision relaxometric and related measurements of novel contrast agents developed by colleagues in

material science, nanoscience and chemistry departments. These studies have allowed the exploration of synthetic methods for imaging agents as well as theranostic benefits from such developments.

- a. Meenambal R, Poojar P, Geethanath S, Kannan S. Substitutional limit of gadolinium in β -tricalcium phosphate and its magnetic resonance imaging characteristics. *Journal of Biomedical Materials Research Part B: Applied Biomaterials*. 2017 November; 105(8):2545-2552.
- b. Ponnillavan V, Poojar P, Geethanath S, Kannan S. Gadolinium Doping in Zirconia-Toughened Alumina Systems and Their Structural, Mechanical, and Aging Behavior Repercussions. *Inorg Chem*. 2017 Sep 18;56(18):10998-11007. PubMed PMID: [28846397](#).
- c. Venkatesha N, Poojar P, Qurishi Y, Geethanath S, Srivastava C. Graphene oxide-Fe₃O₄ nanoparticle composite with high transverse proton relaxivity value for magnetic resonance imaging. *Journal of Applied Physics*. 2015 April 21; 117(15):154702.
- d. Menon JU, Gulaka PK, McKay MA, Geethanath S, Liu L, Kodibagkar VD. Dual-modality, dual-functional nanoprobe for cellular and molecular imaging. *Theranostics*. 2012;2(12):1199-207. PubMed PMID: [23382776](#); PubMed Central PMCID: [PMC3563152](#).

D. Additional Information: Research Support and/or Scholastic Performance

Ongoing Research Support

GE Healthcare-Columbia Radiology MR Research Partnership Program 06/01/18-05/01/20

Sairam Geethanath (PI)

Tailored Magnetic Resonance Fingerprinting for Pediatric Neuroimaging: An intelligent, flexible, comprehensive framework for rapid prototyping

Role: PI

Completed Research Support

R01-EB023618-02S1, NIH Sairam Geethanath (PI) 09/01/18-09/01/19

Fast Functional MRI R01 - Administrative Supplement Subcontract to Columbia University

Role: PI

1(15)/2014-ME&HI, Sairam Geethanath (PI) 01/01/15-12/01/17

Department of Electronics and Information Technology, Ministry of Communications and Information Technology

Indigenous Magnetic Resonance Imaging System – A national mission

Role: PI

GRD 333 Sairam Geethanath (PI) 08/01/15-08/01/17

Department of Science and Technology, Ministry of Science and Technology

Infrastructure to set-up for laboratory of magnetic resonance imaging and signal processing

Role: PI

DST/TSG/NTS/2013/100-G; DST/TSG/NTS/2013/100-C Sairam Geethanath (PI) 03/01/15-02/01/18

Department of Science and Technology, Ministry of Science and Technology

Novel acquisition and reconstruction methods in magnetic resonance imaging using compressed sensing

Role: PI