Sidharth Kumar

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EDUCATION

2019– **The University of Texas at Austin**, *Electrical and Computer Engineering*, Ph.D. CGPA: 4/4
Supervisor - Prof. Jonathan I. Tamir

2017–19 **Indian Institute of Technology, Delhi**, *Electrical Engineering*, M.S.(Research) CGPA: 9.935/10
Supervisor : Prof. Swades De

2013–17 **Indian Institute of Technology, Delhi**, *Electrical Engineering*, B.Tech CGPA: 8.905/10
Supervisor : Prof. Swades De

RESEARCH INTERESTS

Deep Learning, Generative Machine Learning, Computer Vision, Computational Imaging

PUBLICATIONS

- Casey E. Stowers, Chengyue Wu, Zhan Xu, **Sidharth Kumar**, et. al., "Integrating biology-based and data-driven modeling to predict the response of locally advanced triple-negative breast cancer before initiating neoadjuvant chemotherapy", Radiology: Artificial Intelligence (2024), Under review.
- Asad Aali, Giannis Daras, Brett Levac, **Sidharth Kumar**, Alexandros G Dimakis and Jonathan I. Tamir, "Ambient Diffusion Posterior Sampling: Solving Inverse Problems with Diffusion Models trained on Corrupted Data", Feb, 2024, arXiv:2403.08728 (*Link)
- Brett Levac, **Sidharth Kumar**, Ajil Jalal, and Jonathan I. Tamir, "Accelerated motion correction with deep generative diffusion models", Magnetic Resonance in Medicine (2024), (*Link).
- **Sidharth Kumar**, Hamidreza Saber, Odelin Charron, Leorah Freeman, and Jonathan I. Tamir, "Correcting Synthetic MRI Contrast-Weighted Images using Deep Learning", Magnetic Resonance Imaging (2024)., (*Link)
- Asad Aali, Marius Arvinte, **Sidharth Kumar**, and Jonathan I. Tamir, "Solving Inverse Problems with Score-Based Generative Priors learned from Noisy Data," in Proceedings IEEE Asilomar Conference on Signals, Systems & Computers, 2023, (*Link).
- Kalina P. Slavkova, Julie C. DiCarlo, Viraj Wadhwa, **Sidharth Kumar**, Chengyue Wu, John Virostko, Thomas E. Yankeelov and Jonathan I. Tamir, "An untrained deep learning method for reconstructing dynamic magnetic resonance images from accelerated model-based data", Magnetic Resonance in Medicine (2023)., (*Link)
- Ali Lotfi Rezaabad, **Sidharth Kumar**, Sriram Vishwanath and Jonathan I. Tamir, "Few-Max: Few-Shot Domain Adaptation for Unsupervised Contrastive Representation Learning", June, 2022, arXiv:2206.10137 (*Link)
- Brett Levac[†], **Sidharth Kumar**[†], Sofia Kardonik and Jonathan I. Tamir, "FSE Compensated Motion Correction for MRI Using Data Driven Methods", MICCAI'22, Singapore, 18-22 Sept., 2022, (*Link) ([†] Co-primary authors)
- **Sidharth Kumar**, Suraj Suman, and Swades De, "Dynamic Resource Allocation in UAV-enabled mmWave Communication Networks", IEEE Internet of Things Journal, vol. 8, no. 12, pp. 9920-9933, June. 2021, (*Link)
- Suraj Suman, **Sidharth Kumar**, and Swades De, "Impact of Hovering Inaccuracy on UAV-aided RFET", *IEEE Communication Letter*, vol. 23, no. 12, pp. 2362 - 2366, Dec. 2019, (*Link)
- Suraj Suman, **Sidharth Kumar**, and Swades De, "UAV-assisted RFET: A Novel Framework for Sustainable WSN", IEEE Transactions on Green Communications and Networking, vol. 3, no. 4, pp. 1117 - 1131, Dec. 2019, (*Link)
- Chi Zhang[†], **Sidharth Kumar**[†] and Dinesh Bharadia, "Capttery: Scalable Battery-like Room-level Wireless Power", ACM MobiSys'19, Seoul, South Korea, 17-21 June, 2019, (*Link) ([†] Co-primary authors)
- Suraj Suman, **Sidharth Kumar**, and Swades De, "Path Loss Model for UAV-assisted RFET", *IEEE Communication Letter*, vol. 22, no. 10, pp. 2048-2051, Oct. 2018, (*Link),
- **Sidharth Kumar**, Swades De and Deepak Mishra, "RF Energy Transfer Channel Models for Sustainable IoT", IEEE Internet of Things Journal, vol. 5, no. 4, pp. 2817-2828, Aug. 2018, (*Link)
- Suraj Suman, **Sidharth Kumar** and Swades De, "UAV-assisted RF Energy Transfer", IEEE International Conference on Communications (ICC), Kansas City, USA, 20-24 May, 2018, (*Link)

- **Sidharth Kumar**, Suraj Suman, and Swades De, "Backhaul and Delay-aware Placement of UAV-enabled Base Station", *IEEE INFOCOM Workshop on Wireless Sensor, Robot and UAV Networks (WiSARN)*, Honolulu, USA, 15-19 April, 2018, (*Link)

- **Sidharth Kumar**, Deepak Mishra and Swades De, "An Accurate Channel Model for Optimizing Effect of Non-LOS Component in RF Energy Transfer," in Proceedings Twenty Third National Conference on Communication (NCC), pp. 1–6, Chennai, India, Mar. 2017, (*Link).

Refereed Conference Abstracts

- Srivathsa Pasumarthi, **Sidharth Kumar**, and Ryan Chamberlain, "A Contrastive Learning Approach for Unsupervised Anomaly Detection on Contrast-Enhanced Brain MRI Images", ISMRM 2024, Singapore.

- Asad Aali, Marius Arvinte, **Sidharth Kumar**, Yamin Ishraq Arefeen, and Jonathan I. Tamir, "GSURE Denoising enables training of higher quality generative priors for accelerated Multi-Coil MRI Reconstruction", ISMRM 2024, Singapore.

- **Sidharth Kumar**, Asad Aali, and Jonathan I. Tamir, "Multi-Contrast 3D Fast Spin-Echo T2 Shuffling Reconstruction with Score-Based Deep Generative Priors", ISMRM 2023, Toronto, ON, Canada.

- **Sidharth Kumar**, Asad Aali, and Jonathan I. Tamir, "T2 Shuffling Fast 3D Spin-Echo Reconstruction with Score-Based Generative Modeling", ISMRM Sedona Workshop on Data Sampling & Image Reconstruction 2023.

- **Sidharth Kumar**, and Jonathan I. Tamir, "Improving Synthetic MRI from Estimated Quantitative Maps with Deep Learning", ISMRM May, 2022, London, England, UK.

Patent

- Thomas Yankeelov et al., "Pre-treatment prediction of the response of cancer to neoadjuvant therapy", Patent App. PCT/US2024/023107.

Experience

Graduate Researcher - University of Texas at Austin
Supervisor:- Prof. Jonathan I. Tamir *[August 2020 - Ongoing]*

Summer Internship: Unsupervised Anomaly Detection on Brain MRI Images
Manager:- Ryan Chamberlain, Mentor:- Srivathsa Pasumarthi, Subtle Medical, Menlo Park *[May 2023 - Aug 2023]*

Summer Internship: Link Error Prediction for Terrestrial Broadcast
Manager:- Alberto Rico Alvarino, Mentor:- Ayan Sengupta, Qualcomm, San Diego *[June 2020 - Aug 2020]*

Graduate Researcher - University of Texas at Austin
Supervisor:- Prof. Robert W. Heath Jr. *[August 2019 - May 2020]*

Graduate Researcher - Indian Institute of Technology, Delhi
Supervisor:- Prof. Swades De *[July 2017 - July 2019]*

Summer Research Internship: Wireless Power Transfer using Capacitive Coupling Methods
Supervised by Prof. Dinesh Bharadia, UC San Diego *[May 2018 - Aug 2018]*

Undergraduate Researcher - Indian Institute of Technology, Delhi
Supervisor:- Prof. Swades De *[May 2016 - July 2017]*

Scholastic Achievements

- **George J. Heuer, Jr. Ph.D. Endowed Graduate Fellowship** (UT Austin) *[2023]*
- UT **Engineering Fellowship Award** from Cockrell School of Engineering (UT Austin) *[2019]*
- Awarded **SN Bose fellowship** for pursuing research internship at University of California San Diego *[2018]*
- Awarded **Rajiv Bambewale award** for best project work in B.Tech Thesis *[2017]*
- Recipient of **BOSS award, IIT Delhi** for best experimental project in B.Tech Thesis *[2017]*
- Recipient of **IIT Delhi Semester Merit Award** in 6^{th}, 7^{th}, & 8^{th}, semester for making it to **top 7%** *[2016-17]*
- Awarded Alumni Association IIT Delhi Award for **best academic improvement** *[2014-2015]*
- Secured **All India Rank 295** (GE) in JEE Advanced given by 150,000 students *[2013]*
- Awarded merit certificate in NSEP (Physics Olympiad) for ranking among **national top 1%** *[2012]*
- Awarded merit certificate in NSEC (Chemistry Olympiad) for ranking among **state wise top 1%** *[2012]*

MISCELLANEOUS

Teaching Assistantship:

- **UT Austin:-** Linear Systems and Signals (ECE313), Fall 2022,
- **IIT Delhi:-** Microwaves Laboratory (ELP719), Fall 2018, Digital Signal Processing (ELL319), Fall 2017, Signal and Systems (ELL205), Spring 2017, Introduction to Electrical Engineering (ELL100), Fall 2016

Technical Skills:

- **Programming Languages:** Python, MATLAB, C++
- **Packages and Tools:** Pytorch, Siemens idea (basic), Ansys (Maxwell, Simplorer), Wireless InSite

Relevant Coursework:

- Advanced Topics in Computer Vision (Deep Learning), Data Mining, Online Learning, Machine Learning.
- Computational MRI, Biomedical Imaging Modalities, Digital Signal Processing, Signal Theory.
- Wireless Communication, Digital Communication, Antenna Theory & Techniques, MIMO wireless communication, Computer Communication, Optimizations in Communication Networks.