

Sidharth Kumar

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EDUCATION

2019–	The University of Texas at Austin , <i>Electrical and Computer Engineering</i> , Ph.D. Supervisor - Prof. Jonathan I. Tamir (Expected Graduation: Spring 2024)	CGPA: 4/4
2017–19	Indian Institute of Technology, Delhi , <i>Electrical Engineering</i> , M.S.(Research) Supervisor : Prof. Swades De	CGPA: 9.935/10
2013–17	Indian Institute of Technology, Delhi , <i>Electrical Engineering</i> , B.Tech Supervisor : Prof. Swades De	CGPA: 8.905/10

RESEARCH INTERESTS

Machine Learning, Computational Imaging, Signal processing

PUBLICATIONS

- **Sidharth Kumar**, and Jonathan I. Tamir, “Correcting Synthetic MRI Contrast-Weighted Images using Deep Learning”, Nov, 2022, Journal in preparation.
- 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”, May, 2022, Journal paper under revision, ([*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, Under submission for conference, ([*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](#)).

RESEARCH PROJECTS

Improving Synthetic MRI Using Deep Learning

Supervised by Prof. Jonathan I. Tamir, UT Austin

[Sep 2020 -]

- Implemented a GAN based model for translating synthetic contrasts to clinically relevant contrasts.
- Working on newer algorithms to make synthetic MRI more robust to unmodeled physical artifacts.

Summer Internship: Link Error Prediction for Terrestrial Broadcast

Manager:- Alberto Rico Alvarino, Mentor:- Ayan Sengupta, Qualcomm, San Diego

[June 2020 - Aug 2020]

Millimeter-Wave Multicasting with Low-resolution transceivers

Supervised by Prof. Robert W. Heath Jr., UT Austin

[Sep 2019 - May 2020]

- Designed frequency domain precoding for multicasting with low resolution digital to analog convertors (DACs).
- Numerically evaluated proposed beamforming algorithm for different mmWave channel realizations.

System Design for wireless power transfer using capacitive coupling methods

Supervised by Prof. Dinesh Bharadia, UC San Diego

[May 2018 - Dec 2018]

- Investigated the feasibility of capacitive power transfer for IoT devices by conducting extensive simulations in Ansys Maxwell and Simplorer for different geometrical configurations.
- Proposed compensation network topologies for both the transmitter and receiver to maximize power transfer. Built an experimental setup to corroborate simulation results.

Wireless communication and networking system design for UAV-enabled base station

Supervised by Prof. Swades De, IIT Delhi

[Dec. 2017 - July 2019]

- Proposed framework for evaluating the optimal UAV deployment altitude satisfying the coverage, load traffic constraints and backhaul limitations.
- Solved the mixed-integer non-convex power and subcarrier allocation problem using Lagrangian dual decomposition method.

UAV based wireless energy transfer to make sensor networks sustainable

Supervised by Prof. Swades De, IIT Delhi

[July 2017 - July 2019]

Wireless Channel Propagation Model for RF Energy Transfer

Supervised by Prof. Swades De, IIT Delhi

[August 2016 - July 2017]

SCHOLASTIC ACHIEVEMENTS

- **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 6th, 7th, & 8th, 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:

- Linear Systems and Signals (ECE313), Fall 2022
- 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, Seimens idea (basic), Ansys (Maxwell, Simplorer), Wireless InSite

Relevant Coursework:

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