

SURAJ SUMAN

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CONTACT INFORMATION

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EDUCATION

- January 2016 - October 2020 **Doctor of Philosophy (PhD)**
Department of Electrical Engineering, IIT Delhi, India
Dissertation: UAV-aided RF Energy Transfer Towards Sustainable IoT Networks
Advisor: Prof. Swades De
**Received best PhD thesis award*
- July 2013 - June 2015 **Master of Technology (MTech)**
Department of Electrical Engineering, IIT Patna, India
Thesis: Improvement in Image Enhancement Using Fractional Derivative Technique
**Received best MTech thesis award*
- July 2009 - June 2013 **Bachelor of Technology (BTech)**
Electronics and Communication Engineering, IIITDM Jabalpur, India
Project: Design of Variable Bandwidth Filter Using Different Polynomials

WORK EXPERIENCE

- December 2022 - present **Assistant Professor**
Department of Electrical Engineering, IIT Patna, India
- July 2022 - November 2022 **Assistant Professor**
Department of Electronics Engineering, IIT(ISM) Dhanbad, India
- January 2021 - June 2022 **Postdoctoral Researcher**
Department of Electronic Systems, Aalborg University, Aalborg, Denmark
Project: *Tactility* (sponsored by European Horizon 2020)
- November 2020 - January 2021 **Project Scientist**
Department of Electrical Engineering, IIT Delhi
Project: *5G Testbed* (sponsored by Department of Telecommunications, GoI)
- July 2015 - October 2015 **Systems Engineer**
Research (CTO) Unit, TCS Innovation Labs, Kolkata, India
Project: *Next Generation Telerehabilitation Technology*

CURRENT RESEARCH INTERESTS

- Tactile Feedback Enriched Virtual Interactions
- Intelligent Wireless Connectivity for Post 5G Era
- Design of UAV Air Traffic Management System
- Testbed Design of UAV-aided and Human-Machine Interaction Systems

PUBLICATIONS

Google Scholar (citations - 288, h-index - 11, i10-index - 13)

Journals:

1. **Suraj Suman**, Čedomir Stefanović, Federico Chiariotti, Strahinja Došen, and Petar Popovski, “[Statistical Characterization of Closed-Loop Latency at the Mobile Edge](#),” *IEEE Transactions on Communications*, vol. 71, no. 7, pp. 4391-4405, July 2023.
2. **Suraj Suman**, Swades De, Ranjan K. Mallik, Maged ElKashlan, and Arumugam Nallanathan, “[Beamforming based Mitigation of Hovering Inaccuracy in UAV-Aided RFET](#),” *IEEE Transactions on Communications*, vol. 70, no. 4, pp. 2691-2706, April 2022.
3. 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.
4. **Suraj Suman** and Swades De, “[Optimal UAV-aided RFET System Design in Presence of Hovering Inaccuracy](#),” *IEEE Transactions on Communications*, vol. 69, no. 1, pp. 558-572, January 2021.
5. **Suraj Suman** and Swades De, “[Low Complexity Dimensioning of Sustainable Solar-enabled Systems: A Case of Base Station](#),” *IEEE Transactions on Sustainable Computing*, vol. 5, no. 3, pp. 438-454, July-September 2020.
6. **Suraj Suman**, Sidharth Kumar, and Swades De, “[Impact of Hovering Inaccuracy on UAV-aided RFET](#),” *IEEE Communications Letters*, vol. 23, no. 12, pp. 2362-2366, December 2019.
7. **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, December 2019.
8. **Suraj Suman**, Sidharth Kumar, and Swades De, “[Path Loss Model for UAV-assisted RFET](#),” *IEEE Communications Letters*, vol. 22, no. 10, pp. 2048-2051, October 2018.
9. **Suraj Suman** and Rajib Kumar Jha, “[A New Technique for Image Enhancement using Digital Fractional-order Savitzky-Golay Differentiator](#),” *Multidimensional Systems and Signal Processing*, vol. 28, no. 2, pp. 709-733, April 2017.
10. **Suraj Suman**, Anil Kumar, and Girish K. Singh, “[A New Method for Higher Order Linear Phase FIR Digital Filter using Shifted Chebyshev Polynomials](#),” *Signal, Video and Image Processing*, vol. 10, no. 6, pp. 1041-1048, September 2016.
11. **Suraj Suman**, Anil Kumar, and Girish K. Singh, “[A New Closed Form Method for Design of Variable Bandwidth Linear Phase FIR Filter using Bernstein Multiwavelets](#),” *International Journal of Electronics*, vol. 102, no. 4, pp. 635-650, April 2015.
12. Rajesh K. Pandey, **Suraj Suman**, Koushendra K. Singh, and Om P. Singh, “[An Approximate Method for Abel Inversion using Chebyshev Polynomials](#),” *Applied Mathematics and Computation*, vol. 237, pp. 120-132, June 2014.
13. Anil Kumar, **Suraj Suman**, and Girish K. Singh, “[A New Closed Form Method for Design of Variable Bandwidth Linear Phase FIR Filter using Different Polynomials](#),” *AEU - International Journal of Electronics and Communications*, vol. 68, no. 4, pp. 351-360, April 2014.

Patents:

1. Kingshuk Chakravarty, Brojeshwar Bhowmick, Aniruddha Sinha, **Suraj Suman**, and Abhijit Das, “[Kinect Based Balance Analysis Using Single Leg Stance \(SLS\) Exercise](#),” International patent application number: PCT/IB2017/051567.
(Remark: Project at TCS Innovation Labs)

Conferences:

1. **Suraj Suman**, Čedomir Stefanović, Strahinja Došen, and Petar Popovski, “[Analysis and Optimization of the Latency Budget in Wireless Systems with Mobile Edge Computing](#),” in *Proc. IEEE International Conference on Communications (ICC)*, Seoul, South Korea, pp. 1-6, 16–20 May 2022.
2. **Suraj Suman** and Swades De, “[Performance Analysis of UAV-aided RF Energy Transfer](#),” in *Proc. IEEE International Conference on Communication Systems & Networks (COMSNETS)*, Bengaluru, India, pp. 1-3, January 2020.

3. **Suraj Suman**, Sidharth Kumar, and Swades De, “UAV-assisted RF Energy Transfer,” in *Proc. IEEE International Conference on Communications (ICC)*, Kansas City, USA, pp. 1-6, May 2018.
4. Sidharth Kumar, **Suraj Suman**, and Swades De, “Backhaul and Delay-aware Placement of UAV-enabled Base Station,” in *Proc. IEEE INFOCOM Workshop on Wireless Sensor, Robot and UAV Networks (WiSARN)*, Honolulu, USA, pp. 1-6, April 2018.
5. **Suraj Suman** and Swades De, “Solar-enabled Green Base Stations: Cost versus Utility,” in *Proc. IEEE International Symposium on a World of Wireless Mobile and Multimedia Networks (WoWMoM)*, Macau, China, pp. 1-8, June 2017.
6. Kingshuk Chakravarty, **Suraj Suman**, Brojeshwar Bhowmick, Aniruddha Sinha, and Abhijit Das, “Quantification of Balance in Single Limb Stance using Kinect,” in *Proc. IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Shanghai, China, pp. 854-858, May 2016.

Articles under review/preparation:

1. Federico Chiariotti, **Suraj Suman**, Pranav Mamidanna, Čedomir Stefanović, Dario Farina, Petar Popovski, and Strahinja Došen, “Next-Generation Bionic Limbs: The Untapped Synergy of Signal Processing, Control, and Wireless Connectivity,” under review in *IEEE Signal Processing Magazine*.
2. **Suraj Suman**, Pranav Mamidanna, Strahinja Došen, Federico Chiariotti, Čedomir Stefanović, Petar Popovski, and Jimmy Jessen Nielsen, “Experimental Evaluation of Impact of Wireless Impairments on Tactile Feedback Enriched Interactions,” to be submitted in *IEEE Transactions on Haptics*.
3. Nithin Babu, **Suraj Suman**, Petar Popovski, and Constantinos B. Papadias, “Cost-Efficient Deployment of a Reliable Multi-UAV Unmanned Aerial System,” *IEEE Transactions on Vehicular Technology* (under preparation).
4. Sadvik Work
5. Sadvik Work
6. Goje Work
7. SDe Work

SPONSORED PROJECTS

1. “Design of Intelligent Tactile Internet System for Post 5G Era”, Start-up Research Grant (SRG), Science and Engineering Research Board (SERB), Department of Science & Technology (DST), Government of India (Approved)
2. “Indian Institute of Technology Patna has been shortlisted by the Institute Selection Committee for the setup up of 5G use case lab”, Department of Telecommunications (DoT), Government of India (approved).
3. “6G Open Radio Access Network Security and Standardisation”, submitted to Australia-India Cyber and Critical Technology Partnership (AICCTP), Department of Foreign Affairs and Trade (DFAT), Australian Government (under review)
4. “AI-powered IoT for Sustainable Smart Environment Scheme”, submitted to United States–India Science & Technology Endowment Fund (USISTEF) (under review)

AWARDS AND HONORS

- **COMSNETS Best PhD Thesis Award** by IEEE International Conference on Communication Systems & Networks (COMSNETS) Bengaluru, 2021
- PhD fellowship under **Visvesvaraya PhD Scheme** for Electronics and IT sponsored by the Ministry of Electronics and Information Technology, Government of India from January 2016 - October 2020
- **National Award for Best MTech Thesis in Electrical & Electronics Engineering** by Indian Society for Technical Education (ISTE) Delhi, 2015
- **Institute Proficiency Prize** by IIT Patna for best MTech project, 2015
- **Assistantship** by Ministry of Human Resource and Development, Government of India during MTech from July 2013 - May 2015

- **Merit-Cum-Means Scholarship** for academic sessions 2010-11, 2011-12, and 2012-13 during BTech at IITDM Jabalpur

PROFESSIONAL ACTIVITY

TPC Member

- IEEE Vehicular Technology Conference (Fall) 2023, Hong Kong, 10-13 October, 2023. (*Signal Transmission and Reception*)
- IEEE International Conference on Advanced Networks and Telecommunications Systems 2023, Jaipur, India; December 17-20, 2023
- IEEE Vehicular Technology Conference 2022 (Spring), Helsinki, Finland; 19 - 22 June, 2022
- Workshop on *Green Solutions for Smart Environment (SAGE)*, IEEE International Conference on Communications 2021, Montreal, Canada; June 14–18, 2021
- IEEE International Conference on Advanced Networks and Telecommunications Systems 2020, Delhi, India; December 14–17, 2020

Peer Reviewer

- Journals: IEEE Transactions on Network Science and Engineering, IEEE Transactions on Wireless Communications, IEEE Transactions on Communications, IEEE Transactions on Vehicular Technology, IEEE Network Magazine, IEEE Internet of Things Magazine, IEEE Internet of Things Journal, IEEE Sensors Journal, IEEE Communications Letters, IEEE Wireless Communications Letters, IEEE Networking Letters, IET Image Processing, Computer Communications, Computer Communications, Ad Hoc Networks, EURASIP Journal on Wireless Communications and Networking, Journal of Communications and Information Networks, IETE Technical Review, Wireless Communications and Mobile Computing
- Conferences: IEEE International Conference on Communications, IEEE Global Communications Conference, IEEE Vehicular Technology Conference, IEEE Wireless Communications and Networking Conference, IEEE National Conference on Communications, IEEE International Symposium on a World of Wireless Mobile and Multimedia Networks, IEEE International Conference on Signal Processing and Communications, IEEE International Conference on Advanced Networks and Telecommunications Systems, Machine Vision and Augmented Intelligence

TEACHING

IIT Delhi:

IIT(ISM) Dhanbad:

IIT Delhi:

Introduction to Electrical Engineering (Fall 2017), Computer Communication (Spring 2017),
Basic Electrical Laboratory (Spring 2017, 2018, Fall 2016), Wireless Communications Lab (Fall 2019, 2020), Microwave Laboratory (Spring 2019)

IIT Patna:

Analog Electronics Laboratory (Spring 2015), Communication System Laboratory (Fall 2014)

REFERENCES

Prof. Petar Popovski, *Fellow, IEEE*

* Professor, Department of Electronic Systems, Aalborg University, Denmark

* Head, Connectivity Section, Department of Electronic Systems, Aalborg University, Denmark

★ Editor-in-Chief, IEEE JSAC

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◇ *Prof. Petar Popovski was my postdoctoral advisor*

Prof. Cedomir Stefanovic

* Professor, Department of Electronic Systems, Aalborg University, Denmark

† Contact: cs@es.aau.dk

◇ *Prof. Cedomir Stefanovic was my postdoctoral advisor*

Prof. Swades De

* Professor, Department of Electrical Engineering, IIT Delhi, India

* Head, Bharti School of Telecommunications Technology and Management, IIT Delhi, India

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◇ *Prof. Swades De was my PhD advisor*