# Ribhu


**Contact Information**

Institute Research Associate
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**Research Interests**

Signal Processing for wireless communications, MIMO Communications, Adaptive Signal Processing, Cognitive Radio, Detection and Estimation.

**Education**

**Indian Institute of Technology Roorkee**, Roorkee, India

Ph.D., Electronics and Communication Engineering, December 2011 - May 2016

- Thesis Topic: *Adaptive Techniques for Cyclostationary Spectrum Sensing in Cognitive Radios*
- Supervisors: Prof. D. K. Mehra and Prof. Debashis Ghosh

M.Tech., Communication Systems, July 2009 - June 2011

- Dissertation Topic: *Sparse Representations of Signals and their Application to Pattern Matching and Information Hiding*
- Supervisor: Prof. Debashis Ghosh
- CGPA 8.77 on scale of 10

**Panjab University**, Chandigarh, India

B.E., Electronics and Communication Engineering, July 2005-May 2009

- *First division with honors*
- Score : 82.74%

**Post Ph.D. Research Experience**

**Institute Research Associate** May 2016 to present
Department of Electrical Communication Engineering,
Indian Institute of Science
Supervisor: Dr. Chandra R. Murthy

**Project Associate** Aug 2015 to May 2016
Department of Electrical Communication Engineering,
Indian Institute of Science
Supervisor: Dr. Chandra R. Murthy

**Refereed Journal Publications**

## Published

1. **Ribhu Chopra**, Chandra R. Murthy, and Ramesh Annavajjala, "Multi-Stream distributed Co-Phasing" in *IEEE Transactions on Signal Processing*, vol. 65, no. 4, pp. 1042-1057, Feb.15, 2017.

2. **Ribhu Chopra**, Chandra R. Murthy, and Himal A. Suraweera, On the Throughput of Large MIMO Beamforming Systems with Channel Aging in *IEEE Signal Processing Letters*, vol. 23, no. 11, pp. 1523-1527, Nov. 2016.

3. **Ribhu Chopra**, Debashis Ghosh, and D.K. Mehra, " Performance evaluation of FRESH filter based spectrum sensing for cyclostationary signals", *Physical Communication(Elsevier)*, Volume 20, September 2016, Pages 17-32, ISSN 1874-4907.

4. **Ribhu Chopra**, Debashis Ghosh and D. K. Mehra, "FRESH Filter-Based Spectrum Sensing in the Presence of Cyclic Frequency Offset" in *IEEE Wireless Communications Letters*, vol. 5, no. 2, pp. 124-127, April 2016.

5. **Ribhu Chopra**, Debashis Ghosh, and D. K. Mehra, "Spectrum Sensing for Cognitive Radios Based on Space-Time FRESH Filtering" *IEEE Transactions on Wireless Communications*, vol.13, no.7, pp.3903-3913, July 2014.

6. Khunteta, A., Ghosh D and **Ribhu**, "A Fuzzy Approach to Image Exposure Level Estimation and Contrast Enhancement in Dark Images via Exposure Level Optimization" *International Journal of Latest Trends in Engineering, Science and Technology*, Volume 1, Issue 5, April 2014.

### Submitted

1. **Ribhu Chopra**, Debashis Ghosh, and D. K. Mehra, "Spectrum sensing for OFDM Signals Using Pilot Induced Cyclostationarity in the Presence of Cyclic Frequency Offset" to *Physical Communication (Elsevier)*, submitted in April 2016, revision submitted in September 2016.

2. **Ribhu Chopra**, Debashis Ghosh, and D. K. Mehra, " Collaborative Spectrum Sensing using Jointly Adaptive FRESH filters" to *Physical Communication (Elsevier)* Submitted in May 2016.

3. **Ribhu Chopra**, Ramesh Annavajjala, Chandra R. Murthy "Distributed Co-Phasing with Autonomous Constellation Selection" to *IEEE Transactions on Signal Processing*, Submitted in January 2017.

### Under Preparation

1. **Ribhu Chopra**, Chandra R. Murthy, Himal A. Suraweera, and Erik G. Larsson "On the Performance of FDD Massive MIMO Systems Under Channel Aging"

## Conference Publications

### Published

1. **Ribhu**, Debashis Ghosh, "Dictionary design for sparse signal representations using K-SVD with sparse Bayesian learning" *2012 IEEE 11th International Conference on Signal Processing (ICSP)*, vol.1, no., pp.21,25, 21-25 Oct. 2012

2. **Ribhu**, Debashis Ghosh, "A sparse representation based approach for steganography," 2012 IEEE 11th International Conference on Signal Processing (ICSP), vol.3, no., pp.1678,1681, 21-25 Oct. 2012

3. Ajay Khunteta, Debashis Ghosh, **Ribhu**, "Fuzzy rule-based image exposure level estimation and adaptive gamma correction for contrast enhancement in dark images" *2012 IEEE 11th International Conference on Signal Processing (ICSP)* vol.1, no., pp.667,672, 21-25 Oct. 2012

4. Debashis Ghosh, **Ribhu**, A. P. Shivaprasad, "Parameter tuning for multi-prototype possibilistic classifier with reject options," *2013 IEEE International Conference on Fuzzy Systems (FUZZ)* , vol., no., pp.1,6, 7-10 July 2013

5. **Ribhu**, Debashis Ghosh, D. K. Mehra, "Cyclostationary spectrum sensing for OFDM signals in the presence of cyclic frequency offset" *2014 International Conference on Signal Processing and Communications (SPCOM)*, vol., no., pp.1,6, 22-25, Bangalore, India, July 2014

6. **Ribhu**, Debashis Ghosh, Mehra, D.K., "Cooperative Spectrum Sensing for Cognitive Radios Using Jointly Adaptive FRESH Filters" *National Conference on Communications 2015 (NCC-2015)*, pp.1,6, Mumbai, India, Feb 2015

7. **Ribhu Chopra**, Chandra R. Murthy, and R. Annavajjala, "Multi-Stream distributed Co-Phasing: design and analysis, in *2016 IEEE 17th International Workshop on Signal Processing Advances in Wireless Communications (IEEE SPAWC 2016)*, (Edinburgh, United Kingdom), July 2016.

## Honors and Awards

- Awarded one of the two IISc Institute Research Associate positions in the electrical sciences division for the period May 2016 - April 2017.
- Awarded the MHRD Senior Research Fellowship from January 2014 to July 2015.
- Awarded the MHRD Junior Research Fellowship from December 2011 to December 2013.
- Had the highest CGPA in the 2011 graduating class of M.Tech. Communication Systems at IIT Roorkee.
- Qualified GATE 2009 with a rank 385 and a 99.08 percentile.
- Stood second in Panjab University in the order of merit in the undergraduate course.

## Teaching Experience

Teaching Assistant — Autumn 2010- Autumn 2014

EC-311 - Principles of Digital Communication — Autumn 2010
Instructor: Dr. A. Pattnaik
Department of Electronics and Communication Engineering,
Indian Institute of Technology Roorkee

EC-202 - Signals and Systems — Spring 2011
Instructor: Dr. Debashsis Ghosh
Department of Electronics and Communication Engineering,
Indian Institute of Technology Roorkee

EC-310 - Communication Systems Lab — Spring 2013, Spring 2014
Instructors: Dr. D. K. Mehra and Dr. Debashsis Ghosh
Department of Electronics and Communication Engineering,
Indian Institute of Technology Roorkee

EC-510 - Communication Systems Lab — Autumn 2014
Instructor: Mr. S. Chakravorty
Department of Electronics and Communication Engineering,
Indian Institute of Technology Roorkee

Guest Lecturer — Autumn 2011

IT-322 - Analog and Digital Communication
University Institute of Engineering and Technology
Panjab University, Chandigarh

## Professional Service

Served as a reviewer for the following journals

- IEEE Transactions on Wireless Communication
- IEEE Transactions on Communication
- IEEE Transactions on Vehicular Technology
- IEEE Wireless Communication Letters
- IEEE Communication Letters
- IEEE Wireless Communication Magazine
- IEEE Signal Processing Letters.

References Available on request