

# Imtiyaz Khan

DOCTORAL STUDENT, ELECTRONICS & COMMUNICATION, NIT ROURKELA

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## EDUCATION

<b>National Institute of Technology Rourkela</b> , Odisha, India <i>PhD</i> , Thesis: Cooperative Communication and Spectrum Sharing, <b>GPA: 9.0/10</b>	<i>Jan' 13 - Jul' 18</i> (Expected)
<b>Tallinn Technical University</b> , Estonia, Europe <i>PhD Exchange</i> , Thesis: Robust Spectrum Sensing, <b>Duration: 14 months</b>	<i>Sep' 14 - Oct' 15</i>
<b>National Institute of Technology Rourkela</b> , Odisha, India <i>Master of Technology (M.Tech.)</i> , Communication and Signal Processing, <b>GPA: 8.65/10</b>	<i>Jul' 10 - Jul' 12</i>
<b>Government Engineering College Raipur</b> , Chattisgarh, India <i>Bachelor of Engineering (B.E.)</i> , Electronics and Telecommunication, <b>GPA: 8.07/10</b>	<i>Jul' 06 - Jul' 10</i>
<b>Gujrati English Higher Secondary School Raipur</b> , Chattisgarh, India <i>Higher Secondary</i> , Science, Passed with <b>85%</b>	<i>Jul' 05 - Jul' 06</i>
<b>Gujrati English Higher Secondary School Raipur</b> , Chattisgarh, India <i>Senior Secondary</i> , Passed with <b>77%</b>	<i>Jul' 03 - Jul' 04</i>

## RESEARCH INTERESTS

Cooperative Communication, Spectrum Sharing and Sensing in Cognitive Radio, Multi-Antenna Systems, Interference Limited System.

## PUBLICATIONS

Tõnu Trump, **Imtiyaz Khan**. "Robust Detectors for Cognitive Radio System", *EURASIP Journal on Wireless Communications and Networking (Springer)*, 2015, vol. 1, pp. 1-16.

**Imtiyaz Khan**, Poonam Singh. "Outage Analysis for Multiuser Underlay Cognitive TWRN with Antenna Selection and User Scheduling", *International Journal of Electronics and Communications (Elsevier)*. [Under Review]

**Imtiyaz Khan**, Poonam Singh. "Performance Evaluation and Optimization of Multi-Antenna Two-Way Interference-Limited Relay Network Over Nakagami-m Fading", *Wireless Personal Communications (Springer)*. [Under Review]

**Imtiyaz Khan**, Poonam Singh. "Double Threshold Feature Detector for Cooperative Spectrum Sensing in Cognitive Radio Networks", *Proc. IEEE INDICON*, Dec. 2014, India.

**Imtiyaz Khan**, Poonam Singh. "Performance Comparison of Modulation Techniques for Underlay Cognitive Radio Transceivers", *International Conference on Communication and Electronics System Design (ICCESD)*, Jan. 2013, India.

**Imtiyaz Khan**, Dhulipudi Krishna Kanth, Poonam Singh. "Performance Analysis of Multi-antenna Two-Way Relay Network With Co-Channel Interference", *Proc. IEEE ANTS*, Dec. 2017, India. [Accepted]

**Imtiyaz Khan**, Dhulipudi Krishna Kanth, Poonam Singh. "Interference Limited Two-Way Relaying With Multiantenna Sources: Beamforming and Antenna Selection" to appear in *Proc. IEEE ICC Workshop*, Jan. 2018, USA.

**Imtiyaz Khan**, Dhulipudi Krishna Kanth, Poonam Singh. "Performance Analysis and Optimization of Interference limited Multi-Antenna BRN", *Proc. IEEE NCC*, Feb. 2018, India. [Accepted]

**Imtiyaz Khan**, Matla Rakesh, Poonam Singh. "Outage analysis of Multi Antenna- Multi Relay Cognitive Spectrum Sharing" to appear in *Proc. IEEE I2CT*, Feb. 2018, India.

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#### AWARDS & ACHIEVEMENTS

Qualified **GATE** 2009, 2010, 2012, 2013.  
**Academic Excellence Award 2006**, Higher Secondary.  
Secured an **All-India-Rank of 1414** in **GATE** 2010 amongst 1,04,291 candidates.  
Secured an **State-Rank of 475** in CGPET 2006 amongst 20,000 candidates.

#### FELLOWSHIPS

**Shiksha Deep Scholarship**: Full waiver from tuition fee during 4 year of B.E. (₹72000)  
**Erasmus Mundus Fellowship**: Full funding for 14 months for research and residency in Estonia. (₹17,70,000 approx)  
**Academic Excellence Award 2006**, Higher Secondary.

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#### RESEARCH WORK

##### **Robust Spectrum Sensing for Cognitive Radio**

*Supervisor : Prof. Tõnu Truup*

*Sep '14 - Oct '15*

- Modelling the noise as consisting of two components, one of them being Gaussian, which has proven itself as a good model for thermal noise, and the other being uniform, which appears with certain probability and models the impulsive noise.
- Several detectors arising from this model are proposed and analysed.
- *Journal accepted in EURASIP, one of the premier SCI Open-Access Journal*

##### **Cooperative Spectrum Sensing for Cognitive**

*Supervisor : Prof. Poonam Singh*

*Jan '13 - Aug '14*

- Devised a new double threshold method to improve the quality spectrum sensing, in terms of detection probability, for a given set of passing and failing test-cases
- Implemented this method for autocorrelation based feature detection of OFDM signal.
- Upto 30% improvement in detection quality as compared to the state-of-the-art energy detection.
- *Paper accepted in INDICON, one of the premier peer-reviewed Conference in India.*

##### **Underlay Cooperative Spectrum Sharing System**

*Supervisors : Prof. Poonam Singh*

*Nov '15 - Present*

- Studied cooperative spectrum sharing in underlay environment.
- Two way relaying system is considered for cognitive radio system which is allowed to operate in power constrained due to primary user.
- Developed a relay position optimization technique to alleviate the effect of interference from primary user.
- *In the process of writing a paper and submitting to a peer-reviewed Conferences and Journals.*

##### **Interference Limited Multi-antenna Two-Way Relaying Network**

*Prof. Poonam Singh*

*May '16 - Present*

- All the terminals of relaying system is assumed to experience Co-channel interference.
- Performance analysis and optimization of considered system is being evaluated.
- *In the process of writing a paper and submitting to a peer-reviewed Conferences and Journals.*

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#### FOREIGN COURSE ATTENDED

##### **Special Course of Stochastic Signals and Systems**

*Supervisor : Prof. Tõnu Truup*

*Jan '15 - Jul '15*

- Studied the estimation and detection techniques for random variable.
- Specifically: Minimum variance unbiased estimation, best linear unbiased estimation, Cramer-Rao lower bound (CRLB), Maximum Likelihood estimation (MLE), Least Squares Estimation.
- Further, Likelihood Ratio testing, Bayes detectors, Neyman-Pearson detectors (matched filter, energy detector etc), Generalized likelihood ratio tests (GLRTs),
- **Passed with Excellent grade**

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**LABS ASSISTED****Basic Electronics Lab.***Supervisor : Prof. Nurul Islam**Jan '13 - Apr '13*

- Time Response & Frequency Response of RC and RLC Circuits, Diode Characteristics and DC Power Supply, BJT Circuits, OPAM.
- Instruments used: *Digital Oscilloscope, Breadboard, Signal Generator, Ammeter, Voltmeter etc.*

**Communication Lab.***Supervisor : Prof. Poonam Singh**Aug '13 - Nov '13*

- AM, FM & PM, sampling and reconstruction, PAM, PPM, PWM, PCM encoding and decoding.
- Instruments used such as *Digital Oscilloscope, Emona Telecom Trainer Kit, Signal Generator etc.*

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**COMPUTER SKILLS****Languages:** C, C++, L<sup>A</sup>T<sub>E</sub>X  
**Simulator:** Matlab**EXTRA INTERESTS****Hobbies:** Yoga, Heath & Hygiene, Religious Studies.  
**Languages:** English (Reading & Writing), Urdu (Reading & Writing), Arabic (Reading & Writing).

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**REFEREE****Prof. Poonam Singh**Associate Professor, Department of Electronics and Communications Engineering.  
NIT Rourkela, Email: psingh@nitrkl.ac.in, Phone: +91 94382 46593**Prof. Tõnu Trump**Professor, Department of Radio and Communications Engineering.  
TTU, Email: tonu.trump@gmail.com, ttrump@lr.ttu.ee, Phone: +372 620 2358**Prof. Sarat Kumar Patra**Director, Indian Institute of Information Technology, Vadodara.  
IITV, Email: skpatra@iiitvadodara.ac.in, Phone: +91 94372 21578

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