Twenty Fourth National Conference on Communications (NCC 2018),
IIT Hyderabad, February 25-28, 2018

Program Booklet

Organized by the Joint Telematics Group of the IITs and IISc
# NCC-2018 Program At a Glance (Session wise)

## Feb 25 (Sunday)

<table>
<thead>
<tr>
<th>Slot</th>
<th>Auditorium</th>
<th>LH1</th>
<th>LH2</th>
<th>R#220</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30am-12:40pm</td>
<td></td>
<td>Tutorial 1</td>
<td>Tutorial 2</td>
<td>Tutorial 3</td>
</tr>
<tr>
<td>12:40pm-2:00pm</td>
<td></td>
<td>Lunch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2:00pm-5:10pm</td>
<td></td>
<td>Tutorial 4</td>
<td>Tutorial 5</td>
<td>Tutorial 6</td>
</tr>
</tbody>
</table>

## Feb 26 (Monday)

<table>
<thead>
<tr>
<th>Slot</th>
<th>Auditorium</th>
<th>LH1</th>
<th>LH2</th>
<th>R#220</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30am-11:10am</td>
<td></td>
<td>Cognitive Radio I</td>
<td>Sensor Networks</td>
<td>Speech Processing &amp; Understanding</td>
</tr>
<tr>
<td>11:10am-11:40am</td>
<td>Networking Break</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:40am-1:00pm</td>
<td>Inauguration and Plenary Talk by Prof. P. P. Vaidyanathan, CalTech, USA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:00pm-2:00pm</td>
<td>Lunch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2:00pm-3:40pm</td>
<td></td>
<td>Information Theory &amp; Applications</td>
<td>Data Center Networking and Network Security &amp; Invited Talk by Dr. Mohan Dhawan</td>
<td>Speech &amp; Audio Applications &amp; Invited Talk by Dr. Amod Anandkumar</td>
</tr>
<tr>
<td>3:40pm-4:10pm</td>
<td>Networking Break</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4:10pm-5:10pm</td>
<td>Keynote by Dr. Rohit Kapoor, Qualcomm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5:10pm-6:10pm</td>
<td></td>
<td>Cognitive Radio II &amp; Relay Networks</td>
<td>Optical Networks</td>
<td>Speech Processing</td>
</tr>
<tr>
<td>6:30pm-7:30pm</td>
<td>JTG Meeting</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Feb 27 (Tuesday)

<table>
<thead>
<tr>
<th>Slot</th>
<th>Auditorium</th>
<th>LH1</th>
<th>LH2</th>
<th>R#220</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30am-11:10am</td>
<td></td>
<td>Communications Theory I</td>
<td>Cellular Networks</td>
<td>Signal Processing</td>
</tr>
<tr>
<td>11:10am-11:30am</td>
<td>Networking Break</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:30am-12:15pm</td>
<td>DoT &amp; TSDSI Joint Session</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:15pm-1:00pm</td>
<td>Keynote by Mr. Satish Mohanram, National Instruments</td>
<td>Signal Processing &amp; Invited Talk by Mr. Anand Joshi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:00pm-2:00pm</td>
<td>Lunch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2:00pm-3:40pm</td>
<td></td>
<td>Communications Theory II</td>
<td>Wireless Networks &amp; Invited Talk by Prof. Subhash Bhalla</td>
<td>Image Understanding</td>
</tr>
<tr>
<td>3:40pm-4:10pm</td>
<td>Networking Break</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4:10pm-5:10pm</td>
<td>5G Industry Session (NI)</td>
<td></td>
<td>Image Processing</td>
<td></td>
</tr>
<tr>
<td>5:10pm-6:10pm</td>
<td></td>
<td>Communication Systems</td>
<td>Potpourri (Networks)</td>
<td>Machine Learning &amp; Applications</td>
</tr>
<tr>
<td>7:00pm-9:30pm</td>
<td>Banquet</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Feb 28 (Wednesday)

<table>
<thead>
<tr>
<th>Slot</th>
<th>Auditorium</th>
<th>LH1</th>
<th>LH2</th>
<th>R#220</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30am-10:10am</td>
<td></td>
<td>Invited Talk by Mr. Satish Jamadagni, Reliance Jio &amp; TSDSI</td>
<td>Invited Talk by Prof. Ashwin Gumaste, IIT Bombay</td>
<td></td>
</tr>
<tr>
<td>10:10am-11:10am</td>
<td></td>
<td>Keynote by Dr. David Maltz, Microsoft, USA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:10am-11:40am</td>
<td>Networking Break</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:40am-12:40pm</td>
<td>Plenary talk by Prof. Lina Karam, ASU, USA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:40pm-2:00pm</td>
<td>Lunch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2:00pm-3:40pm</td>
<td></td>
<td>Network Coding</td>
<td>SDN/NFV</td>
<td>Biomedical Signal processing</td>
</tr>
<tr>
<td>3:40pm onwards</td>
<td></td>
<td></td>
<td></td>
<td>Closing Session and High Tea</td>
</tr>
</tbody>
</table>
On behalf of the Organizing Committee, we welcome you with great pleasure to the twenty-fourth National Conference on Communications (NCC 2018). The conference will be held at IIT Hyderabad campus during February 25-28, 2018.

The National Conference on Communications (NCC) is a flagship conference in India dedicated to advanced research in the areas of Communications, Signal Processing and Networks. Over the years, it has emerged as a forum for researchers from academia and industry from all areas of communications, signal processing and networks to exchange their ideas, foster collaboration, and cover new grounds, and this year is no exception.

Thanks to the sincere efforts of the organizing committee and the dedication of the TPC and reviewers, we have a deep, diverse and excellent technical program that, apart from regular papers, includes two plenary lectures, three keynote presentations, six invited talks, 5G industry session, a special joint session from Department of Telecom (DoT), Govt. of India and Telecommunications Standards Development Society, India (TSDSI), industry demos, and 7 tutorial sessions. The conference received a total of 330 submissions this year from various parts of the country, and abroad. In keeping with the quality of the conference over the years, each paper was carefully reviewed by 2-5 reviewers from the TPC, with a final acceptance ratio of 32.7%. We congratulate all authors for the acceptance of their papers in the conference, and take the opportunity to thank all reviewers for their efforts in the success of the conference. A total of 108 papers will be presented across 28 sessions between Feb 26-28th, with a balanced distribution of topics between theory and application, as well as established and emerging areas. The tutorial sessions on Feb 25th will cover cutting-edge topics including blockchain, deep learning, and IoT. We encourage all participants to attend as many sessions as possible to make the most of the conference. We are confident that with the strong presence of academia, industry and standardization bodies at the conference, new synergies will be found, forging greater innovations in the years to come.

We are very grateful to the Joint Telematics Group (JTG), the coordination body of NCC consisting of IITs and IISc, for the opportunity to host NCC 2018 at IIT Hyderabad, especially considering 2018, being the 10th anniversary, holds a special place for the institution. We are thankful to Prof. U. B. Desai, Director of IIT Hyderabad and the chief patron of NCC 2018, for his continuous support and guidance. We are also grateful to the generous sponsorship of our industrial sponsors: Qualcomm (diamond sponsor), National Instruments (diamond sponsor), Tejas Networks (gold sponsor), Redpine Signals (gold sponsor), ADTRAN (gold sponsor), MathWorks (gold sponsor), and NVIDIA (silver sponsor), as well as the technical co-sponsors: IEEE and IEEE Hyderabad section.

We sincerely hope that you will have a rewarding and enjoyable time at NCC 2018 in Hyderabad. The city and its surroundings are pleasant at this time of year and have a lot to offer in terms of sights, heritage, cuisines and attractions.

We welcome each one of you again, and are grateful to each speaker, author, organizer, sponsor, volunteer and attendee for the success of NCC 2018.

General Co-Chairs: Bheemarjuna Reddy Tamma (IITH), Zafar Ali Khan (IITH)
TPC Co-Chairs: Anamitra Makur (NTU Singapore), Antony Franklin (IITH), Kiran Kuchi (IITH), Michael Ng (University of Southampton, UK), Vineeth N. Balasubramanian (IITH), T. Venkatesh (IIT Guwahati)
Organizing Committee

Patron
Uday B. Desai (IITH)

General Co-Chairs
Bheemarjuna Reddy Tamma (IITH)
Zafar Ali Khan (IITH)

TPC Co-Chairs
Anamitra Makur (NTU Singapore)
Antony Franklin (IITH)
Kiran Kuchi (IITH)
Michael Ng (University of Southampton, UK)
Vineeth N. Balasubramanian (IITH)
T. Venkatesh (IIT Guwahati)

Local Organization Co-Chairs
G. V. V. Sharma (IITH),
K. Sri Rama Murty (IITH)

Publicity Co-Chairs
Abhinav Kumar (IITH)
N. Venkatesh (Redpine Signals)

Publications Co-Chairs
Lakshmi Prasad Natarajan (IITH)
Lalitha Vadlamani (IIITH)

Finance Co-Chairs
P. Rajalakshmi (IITH)
P. K. Srijith (IITH)

Tutorial/Workshop Co-Chairs
Kotaro Kataoka (IITH)
Soumya Jana (IITH)

Web Chair
Sumohana S. Channappayya (IITH)
Sunday 25 Feb 2018
9.30 am - 12.40 pm, Sunday

TUTORIAL 1 ROOM: AUDITORIUM
Building IoT Solutions with Edge Intelligence
Mr. Anand Joshi, Dr. N. Govinda Rao, Mr. Karthik Suryadevara, Redpine Signals

TUTORIAL 2 ROOM: LH1
Modeling and Analysis of mmWave Networks
Dr. Abhishek Kumar Gupta, IIT Kanpur

TUTORIAL 3 ROOM: LH2
An Introduction to Bitcoin
Dr. Saravanan Vijayakumaran, IIT Bombay

TUTORIAL 4 ROOM: AUDITORIUM
SDN/NFV within a telecommunications access network
Dr. Marc Kimpe and Mr Chris Thompson, ADTRAN

TUTORIAL 5 ROOM: LH1
Using SDR based testbeds to accelerate real-time prototyping
Mr. Raghunandan N V, National Instruments

TUTORIAL 6 ROOM: LH2
Online Learning with Dynamic Convex Optimization
Dr. Ketan Rajawat, IIT Kanpur

TUTORIAL 7 ROOM: 220
Demystifying Deep Learning - a Hands-On MATLAB Tutorial
Dr. Amod Anandkumar, Dr. Rishu Gupta, MathWorks

Monday 26 Feb 2018
9.30 am - 11.10 am, Monday

MON-1-COM1: COGNITIVE RADIO I
CHAIR: RAHUL VAZE ROOM: AUDITORIUM

9.30 Spectrum Sensing and Collision with Primary Users in MIMO Cognitive Radio
Vijay Viswanath (Qualcomm India Pvt Ltd, India); Shahzad Alam (Qualcomm India Private Limited, India); Rakshesh Singh Kshetrimayum (Indian Institute of Technology Guwahati, India)

9.50 Optimization of Majority Rule Threshold in Double Threshold Based Cooperative Cognitive Radio Network
Priyanka Maity (National Institute of Technology, Rourkela)

10.10 Optimal Sequential Channel Sensing for Cognitive Radios for IID and Non-Identical Channels
Aaqib Patel (IIT Hyderabad, India)

10.30 Generalized Statistical Spectrum Occupancy Modeling and Its Learning Based Predictive Validation
Anirudh Agarwal (The LNM Institute of Information Technology, Jaipur, India); Ranjan Gangopadhyay (The LNM Institute of Information Technology, India)

10.50 Cooperative Sensing of OFDM Signals Using Heterogeneous Sensors
Akhil Singh (International Institute of Information Technology, Hyderabad, India); Prakash Gohain (International Institute of Information Technology, Hyderabad, India); Sachin Chaudhari (International Institute of Information Technology, India)

MON-1-COM2: ANTENNAS & PROPAGATION
CHAIR: AMALENDU PATNAIK ROOM: 220

9.30 Graphene Plasmonic Bowtie Antenna for UWB THz Application
Sasmita Dash (IIT Roorkee, India); Amalendu Patnaik (Indian Institute of Technology, Roorkee, India)

9.50 Design of Enhanced Gain Two Element Linear Microstrip Antenna Array
Prahilada Rao (Guilbarga University &amp; Guilbarga University, India); Vani M and Prabhakar Hunugund (Guilbarga University, India)

10.10 An Optically Transparent Microwave Broadband Absorber Using Resistive Sheet
Harsh Sheokand, Gaganpreet Singh, Saptarshi Ghosh and Mondeep Saikia (Indian Institute of Technology Kanpur, India); Kumar Vaibhav Srivastava (Indian Institute of Technology Kanpur, India); J Ramkumar (Indian Institute of Technology Kanpur, India); Anantha Ramakrishna (IIT kanpur, India)

10.30 Broadband Simultaneously Dual Circularly Polarized Planar Monopole for Single Antenna Diversity Reception and Transmission
Bharath Reddy Gudipandi (National Institute Of Technology, Tiruchirappalli, India)

10.50 A Compact Dual-Band Resonator for Negative Permittivity Metamaterial at Microwave Regime
Dushyant Marathe (Visvesvaraya National Institute of Technology, VNT, Nagpur, India); Kishore Kulat (Visvesvaraya National Institute of Technology, VNT, Nagpur)

MON-1-NW: SENSOR NETWORKS
CHAIR: MOHAN DHAWAN ROOM: LH1

9.30 Balanced Use of Battery Power in Ad-hoc Wireless Sensor Networks
Hema Aggarwal (The LNM Institute of Information Technology, India); Santosh Shah (The LNM Institute of Information Technology, Jaipur, India)

9.50 Range Free Localization in Anisotropic Networks Using Unbiased Distance Model
Meera Bharathan, Mirudula. K. M and Ameer P M (National Institute of Technology, Calicut, India)

10.10 A New Combinatorial Design Based Data En-Route Filtering Scheme for Wireless Sensor Networks
Alok Kumar (National Institute of Technology Karnataka, Surathkal, India); Alwyn Roshan Pais (NITK, Suratkal, Mangalore India, India)

10.30 Energy-Efficient Air Pollution Monitoring with Optimum Duty-Cycling on a Sensor Hub
Mayukh Roy Chowdhury (Indian Institute of Technology Delhi, India); Narendra Kumar Shukla (Shiv Nadar Univ
10.50  Improved Energy Efficient Architecture for Wireless Sensor Networks with Mobile Sinks
Prashanth Lingala, P Rajalakshmi and Soumil K Heble
(Indian Institute of Technology Hyderabad, India)

MON-1-SP: SPEECH PROCESSING & UNDERSTANDING
CHAIR: PREETI RAO  ROOM: LH2

9.30  Approaches to Codec Independent Speaker Identification in VoIP Speech
Anil Chilli (Centre for AI and Robotics, India)

9.50  Improved Epoch Extraction Using Variational Mode Decomposition Based Spectral Smoothing of Zero Frequency Filtered Emotive Speech Signals
Govind D and Pravlena D (Amrita Vishwa Vidyanapeetham, India); Ajay Ganesan (Amrita School of Engineering); Amrita Vishwa Vidyanapeetham, India)

10.10  A Novel Feature for Nasalised Vowels and Characteristic Analysis of Nasal Filter
Debasish Jyotishi (IIT, GWUWAHATI, India); Sunam Deb (Indian Institute of Technology, India); Samarendra Dan dapt (IITG, India)

10.30  Manner of Articulation Based Split Lattices for Phoneme Recognition
Pradeep R (Indian Institute of Technology, Kharagpur, India); K. Sreenivasa Rao (IIT KGP, India)

10.50  Exploiting Parts-of-Speech for Improved Textual Modeling of Code-Switching Data
Ganji Seeraram (IIT Guwahati, India); Rohit Sinha (Indian Institute of Technology Guwahati, India)

11.40 am - 1.00 pm, Monday

INAUGURATION AND PLENARY LECTURE
ROOM:AUDITORIUM

Plenary Lecture: Srinivasa Ramanujan and Digital Signal Processing
Prof P. P. Vaidyanathan, CalTech, USA

2.00 pm - 3.40 pm, Monday

MON-3-COM1: INFORMATION THEORY & APPLICATIONS
CHAIR: SIBI RAJ B PILLAI  ROOM: AUDITORIUM

2.00  Communication and State Estimation over a State-Dependent Gaussian Multiple-Access Channel
Viswanathan Ramachandran (Indian Institute of Technology Bombay, India); Sibi Raj B Pillai (IIT Bombay, India); Vinod M Prabhakaran (Tata Institute of Fundamental Research, India)

2.20  Gaussian MAC with Feedback and Strictly Causal State Information
Haseen Rahman (Indian Institute of Technology Bombay, India); Sibi Raj B Pillai (IIT Bombay, India); Kumar Appaiah (Indian Institute of Technology Bombay, India)

2.40  On the Equivalence of Projections in Relative α-Entropy and Rényi Divergence
Periyapatna Narayana Prasad Karthik and Rajesh Sun dasaran (Indian Institute of Science, India)

3.00  Universal Compression of a Piecewise Stationary Source Through Sequential Change Detection
Dheeraj Kumar Chittam (Honeywell Tech. Solutions Lab Pvt. Ltd.); Rafesh K. Baneal (Indian Institute of Technology Kanpur &amp; India, India)

MON-3-COM2: OPTICAL & VISUAL LIGHT COMMUNICATIONS
CHAIR: G V V SHARMA  ROOM: 220

2.00  Optimum Power Allocation for Uniform Illuminance in Visible Light Communication
G V S S Praneeth Varma (IIT Hyderabad, India)

2.20  Comparative Analysis of Different Performance Enhancement Techniques in 2-D Atmospheric OCDMA System
Ajay Yadav and Prateek Yadav (Indian Institute of Technology Delhi, India); Subrat Kar (Indian Institute of Technology Delhi, India); V K Jain (IIT Delhi, India)

2.40  Generation of Perfectly DC Balanced Codes for Visible Light Communications
Uday Thummaluri, Abhinav Kumar and Lakshmi Prasad Natarajan (Indian Institute of Technology Hyderabad, India)

3.00  Bi-Directional Indoor VLC System with Backhaul Solution
Akash Gupta (Netaji Subhas Institute of Technology, India); Parul Garg (Netaji Subhas Institute of Technology, New Delhi, India)

MON-3-NW: DATA CENTER NETWORKING AND NETWORK SECURITY
CHAIR: SWADES DE  ROOM: LH1

2.00  ZEUS: Analyzing Safety of Smart Contracts
Invited Talk by Dr. Mohan Dhawan, IBM Research

2.40  Caching Policies for Transient Data
Santosh Fatale (Indian Institute of Technology Bombay, India); R Sri Prakash (IIT Bombay, India); Sharayu Moharir (Indian Institute of Technology Bombay, India)

3.00  ML-based Admission Control of Cloud Services: Centralized Versus Distributed Approaches
Abul Bashar (Prince Mohammad Bin Fahd University, Saudi Arabia)

3.20  Inferring the Deployment of Source Address Validation Filtering Using Silence of Path-Backscatter
Saman Saurabsh (Shiv Nadar University, India); Ashok Singh Sairam (Indian Institute of Technology Guwahati, India)

MON-3-SP: SPEECH AND AUDIO APPLICATIONS
CHAIR: K. SRI RAMA MURTY  ROOM: LH2

2.00  Energy-Weighted Multi-Band Novelty Functions for Onset Detection in Piano Music
Krishna Subramani, Sivratssrithanh and Rohit Anan thanarayana (Indian Institute of Technology Bombay, India); Preeti Rao (IIT-Bombay, India)

2.20  Mridangam Artist Identification from Taniavartanam Audio
Krishnachaitanya Gogineni and Jom Kuriakose (IIT Madras, India) Hema A Murthy (Indian Institute of Technology Madras, India)

2.40  Improving the Noise Robustness of Prominence Detection for Children’s Oral Reading Assessment
Kamini M Sabu (Indian Institute of Technology, Bombay, India); Kanhaiya Kumar (IIT Bombay, India); Preeti Rao (IIT-Bombay, India)

3.00  Cell-Phone Identification from Recompressed Audio Recordings
Vinay Verma, Preet Khaturia and Nitin Khanna (Indian Institute of Technology Gandhinagar, India)

3.20  What’s New in MATLAB for Audio Signal Processing
Invited Talk by Dr. Amod Anandkumar, MathWorks
4.10 pm - 5.10 pm, Monday

KEYNOTE TALK  ROOM: AUDITORIUM

Making 5G NR a Commercial Reality: A unified, more capable 5G air interface
Dr. Rohit Kapoor, Qualcomm

5.10 pm - 6.10 pm, Monday

MON-5-COM1: COGNITIVE RADIO II AND RELAY NETWORKS
CHAIR: BHARAT BETTAGERE  ROOM: AUDITORIUM

5.10  Low Complexity Two-Stage Sensing Using Energy Detection and Beamforming
Madhuri Latha (International Institute of Information Technology, India); Prakash Gohain (International Institute of Information Technology Hyderabad, India); Sachin Chaudhari (International Institute of Information Technology, Indi a)

5.30  A Cognitive Opportunistic Fractional Frequency Reuse Scheme for OFDMA Uplinks
Subbarao Boddu (Indian Institute of Technology Kharagpur, India); Venkata Sudhakar Reddy Bandi (Indian Institute of Technology, India)

5.50  Multihop FD Relaying with Fixed and Random Phase Errors
Prabhaker Sharma (Visvesvaraya National Institute of Technology, India); Kamal Agrawal (Indian Institute of Technology Delhi, India); Parul Garg (Netaji Subhas Institute of Technology, New Delhi, India)

MON-5-NW: OPTICAL NETWORKS
CHAIR: ABHISHEK K GUPTA  ROOM: LH1

5.10  Offline Scheduling Schemes to Transfer Voluminous Deadline Complying Data in Elastic Optical Networks
Sridhar Iyer (Jain College of Engineering, India); Shree Prakash Singh (NSIT, India)

5.30  Performance Analysis of Non-Converged and Converged Medium Access Control Protocols for Radio-Over-Fiber Networks
Kshitiz Singh and Abhishek Dixit (Indian Institute of Technology Delhi, India); V K Jain (IIT Delhi, India)

5.50  Control and Management of Optical Networks Using Optical Network Description Language
Nitin Lothar (Indian Institute of Technology Delhi, India); Subrat Kar (Indian Institute of Technology, Delhi, India)

MON-5-SP: SPEECH PROCESSING
CHAIR: JIJJI CHARANGATT VICTOR  ROOM: LH2

5.10  Robust Offline Trained Neural Network for TDOA Based Source Localization
Srikanth Raj Chetupalli (Indian Institute of Science, India); Ashwin Ram (National Institute of Technology Tiruchi, India); Thippur V. Sreenivas (Indian Institute of Science, India)

5.30  Disambiguation of Source and Trajectory Non-Stationarities of a Moving Acoustic Source
Sai Gunaranjan Pelluri (Indian Institute of Science, Banagalore, India); Thippur V. Sreenivas (Indian Institute of Science, India)

5.50  Grouping Subarray for Robust Estimation of Direction of Arrival
Tejaswini Dudyala, Sivraiyya Munnangi and Senthil Kumar Mani (Meeami Technologies, India)

Tuesday 27 Feb 2018

9.30 am - 11.10 am, Tuesday

TUE-1-COM1: COMMUNICATIONS THEORY I
CHAIR: ABHINAV KUMAR  ROOM: AUDITORIUM

9.30  Performance Analysis of a Gauss-Optimal Receiver for a Receive Diversity PLC System in Nakagami-m Noise Environment
Soumya Prakash Dash (Indian Institute of Technology Delhi, India); Ranjan K. Malik (Indian Institute of Technology Delhi, India); Saif Khan Mohammed (Indian Institute of Technology Delhi, India)

9.50  Multiuser Communication Using Chirp Signals of Equal Chirp Rate
Arijit Roy and Sharmistha Sen (Indian Institute of Technology Guwahati, India); Harshal Nemade (Indian Institute of Technology, India); Ratnajit Bhattacharjee (Indian Institute of Technology Guwahati, India)

10.10  Fading-Averaged Symbol Error Probability Analysis of Full Duplex Amplify-and-Forward Relaying over Rayleigh Fading Channels
Rahul Shrotey (BITS Pilani, Rajasthan, India); B. Sainath (BITS Pilani, India); Gaurav Sharma (BITS Pilani, Rajasthan, India)

10.30  BER Performance of Multi User Scheduling for MIMO-OFDM and MIMO-SCFDMA Broadcast Network with Imperfect CSI
Vinay Kumar Trivedi and Preetam Kumar (Indian Institute of Technology Patna, India)

10.50  Error Rate of MIMO OSTBC Systems over Mixed Nakagami-m/ Rice Fading Channels
Dharmendra Dixit (Indian Institute of Technology Bhurbaneswar & The LNM Institute of Information Technology (LNMIIT), Jaipur, India); Pravas Ranjan Sahu (Indian Institute of Technology Bhurbaneswar, India); George K. Karagiannidis (Aristotle University of Thessaloniki, Greece)

TUE-1-COM2: MICROWAVE COMMUNICATIONS
CHAIR: LAKSHMI NATARAJAN  ROOM: 220

9.30  A Polarization-Independent Tunable Microwave Absorber with Wide Tuning Range
Saptarsi Ghosh and Harsh Sheokand (Indian Institute of Technology Kanpur, India); Kumar Vaibhav Srivastava (Indian Institute of Technology Kanpur, India)

9.50  A Simple Robust Equal-Split T-Junction Power Divider at Three Frequencies
Deepayan Banerjee, Antra Saxena and Mohammad Hashmi (IIITD, India)

10.10  A Polarization-Insensitive Miniaturized Element Frequency Selective Surface Using Meander Lines
Varuna A B, Saptarshi Ghosh and Harsh Sheokand (Indian Institute of Technology Kanpur, India); Kumar Vaibhav Srivastava (Indian Institute of Technology Kanpur, India)

10.30  A Novel Meandered Coupled-Line Tri-Band Impedance Matching Network
Antra Saxena, Deepayan Banerjee and Mohammad Hashmi (IIITD, India)

TUE-1-NW: CELLULAR NETWORKS
CHAIR: SUBHASH BHALLA  ROOM: LH1

9.30  Throughput Optimal Scheduling for Wireless Downlinks with Reconfiguration Delay
Vineeth Bala Sukumaran (Indian Institute of Space Science and Technology, Trivandrum, India)

9.50  Optimal Association of Wireless Devices to Cellular and Wi-Fi Base Stations
10.10 Modeling MME Residence Time in LTE Based Cellular Networks
Ushashi Ghosh (NIT Durgapur, India); Pranay Agarwal (Indian Institute of Technology, Hyderabad, India); Abhinav Kumar (Indian Institute of Technology Hyderabad, India)

10.30 Channel Allocation for Multiple D2D-Multicasts in Undeployed Cellular Networks Using Outage Probability Minimization
Ajay Bhardwaj and Samir Agnihotri (Indian Institute of Technology Mandi, India)

10.50 Spectrum Sharing for LTE-A Network in TV White Space
Meghna Khaturia (IIT Bombay, India); Sweety Suman (IIT Bombay); Abhay Karandikar and Prasanna Chaporkar (IIT Bombay, India)

TUE-1-SP: SIGNAL PROCESSING
CHAIR: MRITYUNJOY CHAKRABORTY ROOM: LH2

9.30 Power System Frequency and Amplitude Estimation Using Variational Mode Decomposition and Chebfun Approximation System
Neethu Mohan and Soman K P (Amrita Vishwa Vidyapeetham, India)

9.50 Co-Prime Sampling and Cross-Correlation Estimation
Usham Dias and Seshan Srirangaran (Indian Institute of Technology Delhi, India)

10.10 State-Space Digital Filters with Minimum Weighted Round-off Noise and Pole Sensitivity Subject to l_2-Scaling Constraints
Yoichi Hinamoto (National Institute of Technology, Kagawa College, Japan); Akimitsu Doi (Hiroshima Institute of Technology, Japan)

10.30 Batch Look Ahead Orthogonal Matching Pursuit
Muralikrishnna G. s. (National Institute of Technology, Tiruchirappalli, India); Sooraj K. Ambat and K. v. s. Hari (Indian Institute of Science, India)

10.50 Functional Signal Representation: Foundations and Redundancy
Saili Samant and Shiv Dutt Joshi (Indian Institute of Technology, Delhi, India)

11.30 am - 12.15 pm, Tuesday

SPECIAL SESSION ON 5G ROOM: AUDITORIUM

5G Initiatives in India and Telecom Standardization: Role of TSDSI
Mr. N Sivasailam and Mr. R. K. Pathak, DoT, GoI; Mr. Satish Jamadagni, SG1 Chair, TSDSI

12.15 pm - 1.00 pm, Tuesday

KEYNOTE TALK ROOM: AUDITORIUM

A Platform Approach to 5G: Design, Prototyping and Test
Mr. Satish Mohanram, National Instruments

TUE-2-SP: SIGNAL PROCESSING AND INVITED TALK
CHAIR: G V V SHARMA ROOM: LH2

12.15 Enhanced Convergence Distributed Arithmetic Based LMS Adaptive Filter Using Convex Combination
Tasleem Khan and Shaik Rafi Ahmed (Indian Institute of Technology, Guwahati, India)

12.35 Invited Talk on Signal Processing (Accelerating AI Applications in Hardware)
Anand Joshi (Redpine Signals, Hyderabad, India)

2.00 pm - 3.40 pm, Tuesday

TUE-3-COM1: COMMUNICATIONS THEORY II
CHAIR: RANJAN K MALLIK ROOM: AUDITORIUM

2.00 Training-Based Joint Antenna and Relay Selection in Multiuser Downlink Cellular Network with RF Impairments
Anoop Kumar Mishra (National Institute of Technology Rourkela, India); Poonam Singh (National Institute Of Technology, Rourkela, India)

2.20 Modeling and Outage Analysis of DF Relay Assisted Mixed PLC-VLC System
Manan Jani and Parul Garg (Netaji Subhas Institute of Technology, New Delhi, India); Akash Gupta (Netaji Subhas Institute of Technology, India)

2.40 Performance Evaluation and Optimization of Multi-antenna Two-Way Relaying System with CCI
Imtiyaz Khan (NIT Rourkela, India); Dhulipudi Kanth (NIT Rourkela, India); Poonam Singh (National Institute Of Technology, Rourkela, India)

3.00 Impact of Underlaid Multi-antenna D2D on Cellular Downlink in Massive MIMO Systems
Amit Agarwal and Sudarshan Mukherjee (Indian Institute of Technology Delhi (IITD), India); Saif Khan Mohammed (Indian Institute of Technology Delhi, India)

3.20 Closed-form Approximations for Coverage and Rate in a Multi-tier Heterogeneous Network in Nakagami-m Fading
G V S S Praneeth Varma (IIT Hyderabad, India); Gvv Sharma and Abhinav Kumar (Indian Institute of Technology Hyderabad, India)

TUE-3-COM2: CODING THEORY & APPLICATIONS
CHAIR: PRASAD KRISHNAN ROOM: 220

2.00 A Rate-Optimal Construction of Codes with Sequential Recovery with Low Block Length
Balaji Srinivasan Babu (IISc, India); Ganesh Kini (Indian Institute of Science, India); P Vijay Kumar (Indian Institute of Science & University of Southern California, India)

2.20 On Maximally Recoverable Codes for Product Topologies
D. Shivakrishna (IIT Hyderabad, India); V. Arvind Rameshwar (BITS Pilani, Hyderabad Campus, India); V. Lalitha (International Institute of Information Technology, India); Birenjith Padmakumari Sasidharan (Indian Institute of Science, India)

2.40 Rewrite Cost Optimal Rank Modulation Codes in S4 and S5
Arijit Dutta and Saravana Rajiyakumar (IIT Bombay, India)

3.00 Permutation Polynomial Representations and Their Matrices
Megha Kolhekar (Electrical Engineering Department IIT Bombay); Harish Pillai (Indian Institute of Technology Bombay, India)

3.20 Determining the Generalized Hamming Weight Hierarchy of the Binary Projective Reed-Muller Code
Vinayak Ramkumar and Myna Vajha (Indian Institute of Science, India); P Vijay Kumar (Indian Institute of Science & University of Southern California, India)
TUE-3-NW: WIRELESS NETWORKS
CHAIR: VINEETH BALA SUKUMARAN ROOM: LH1

2.00 Independent Dependency Tracking in Mobile Ad hoc Networks
Invited Talk by Prof. Subhash Bhalla

2.40 A Frequency Assignment Technique for Effective SINR and Throughput Management in a Battlefield
Athinandan Ramesh Kumar (Center for Excellence in Wireless Technology & Indian Institute of Technology Madras, India); Navin Nath Palanisamy and Kulito Milleth (Centre of Excellence in Wireless Technology, India)

3.00 Optimal Rate Control in a Quasi-Static Wireless Fading Channel with Throughput and Power Constraints
Rahul R and Utpal Mukherji (Indian Institute of Science, India)

3.20 Dynamic Beam Assignment in Narrow Beamforming and mmWave Systems
Arzad Kherani (Indian Institute of Technology, Bhilai, India); R M Karthik (Samsung India Software Operations, India)

TUE-3-SP: IMAGE UNDERSTANDING
CHAIR: PRITIHWIJIT GUHA ROOM: LH2

2.00 A Deep Learning Based Technique for Anomaly Detection in Surveillance Videos
Vinod Pankajakshen (Indian Institute of Technology Roorkee, India); Prakshar Singh (IIT Roorkee, India)

2.20 Weighted Nuclear Norm and TV Regularization Based Image Deraining
Bajju P S and Deepak P (National Institute of Technology Calicut, India); Sudhish N George (National Institute of Technology, Calicut, India)

2.40 Multiview 3D Reconstruction of Underwater Scenes Acquired with a Single Refractive Layer Using Structure from Motion
Parvathi VS (College of Engineering Trivandrum, India); Jiji Charangatt Victor (College of Engineering, Trivandrum, India)

3.00 Forgery Detection in Digital Images Through Lighting Environment Inconsistencies
Aniruddha Mazumdar, Jefin Jacob and Prabin Kumar Bora (Indian Institute of Technology Guwahati, India)

3.20 Spatio-Spectral Compression and Analysis of Hyperspectral Images Using Tensor Decomposition
Renu K (Amrita University, India); V Sowmya (Amrita Vishwavidyapeetham, India); Soman K P (Amrita Vishwavidyapeetham, India)

4.10 pm - 5.10 pm, Tuesday

5G INDUSTRY SESSION ROOM: AUDITORIUM

Paving the Way to 5G: Where we are & What we need to do?
Mr. Farris Alhorr, National Instruments

TUE-4-SP: IMAGE PROCESSING
CHAIR: VINOD PANKAJAKSHAN ROOM: LH2

4.10 Full Reference Quality Assessment of Full HD Images Using Combined Saliency Priors in Multi-Scale
Sameeuila Khan MD (Indian Institute Of Technology Hyderabad, India)

4.30 Symmetric Chaos-Based Image Encryption Technique on Image Bit-Planes Using SHA-256
Abhijit Bhadke (Visvesvaraya National Institute of Technology, India); Surender Kannaiyan (Visvesvaraya National Institute of Technology); Vinod Pankajakshen (Indian Institute of Technology Roorkee, India)

5.50 An Irrotationality Preserving Total Variation Algorithm for Phase Unwrapping
Bhargav Ghanekar and Dipak Narayan (Indian Institute of Technology Madras, India); Uday Khankhoje (Indian Institute of Technology Madras)

5.10 pm - 6.10 pm, Tuesday

TUE-5-COM1: COMMUNICATION SYSTEMS
CHAIR: PARUL GARG ROOM: AUDITORIUM

5.10 Hybrid Satellite-Terrestrial Cooperative Communication with Mobile Terrestrial Nodes
Neeraj Varshney and Aditya K Jagannathan (Indian Institute of Technology Kanpur, India)

5.30 System Design Aspects of Ka-Band High Throughput Satellite (HTS) for Indian Region
Neha Mehra (Space Applications Centre, ISRO, India); Abhishek Kakkar and Subhash Bera (Space Applications Centre; ISRO, India)

5.50 A Study on Pathloss Model for UAV Based Urban Disaster and Emergency Communication Systems
Alok Ranjan (National Institute Of Technology, Rourkela, India); Bighnaraj Panigrahi and Hemant Kumar Rath (Tata Consultancy Services, India); Prasant Misra (TATA Con sultancy Services, India); Anantha Simha (Tata Consultancy Services, India); H Sahu (NIT Rourkela, India)

TUE-5-COM2: COMMUNICATION NETWORKS & IOT
CHAIR: SWADES DE ROOM: 220

5.10 The Effect of Introducing Redundancy in a Probabilistic Forwarding Protocol
Vinay Kumar B. R. (Indian Institute of Science, India); Roshan Antony (Qualcomm India, India); Navin Kashyap (Indian Institute of Science, India)

5.30 Energy-Delay-Distortion Problem
Rahul Vaze (TIFR Mumbai, India); Akshat Choube (IIT-Palakkad, India); Shreyas Chaudhari (IIT-Madras, India); Nitin Aggarwal (IIT-Roorkee, India)

5.50 Minimizing Energy Theft by Statistical Distance Based Theft Detector in AMI
Sandeep Kumar Singh (Indian Institute of Technology Delhi, India); Ranjan Bose (Indian Institute of Technology, India); Anupam Joshi (UMBC, USA)

TUE-5-NW: POTPOURRI - NETWORKS
CHAIR: ARZAD KHERANI ROOM: LH1

5.10 Deterministic Evolution Through Indexed Leaf Node Based Attachment in Complex Networks
Gautham Suresh and Abhishek Chakraborty (Indian Institute of Science and Technology, India); Manoj B S (Indian Institute of Space Science and Technology, India); Carlos Unzal (Universitat de les Illes Balears, Spain)

5.30 PPsS: A Novel Sub-flow Scheduler and Socket APIs for Multipath TCP (MPTCP)
Abhijit Mondal (Indian Institute of Technology Madras); Aniruddha Rao Kab (Uniiversity of Cambridge, United Kingdom (Great Britain)); Shamal Shailendra, Hemant Kumar Rath and Arpan Pal (Tata Consultancy Services, India)

5.50 Fraction of Connections Among Friends of Friends as a New Metric for Network Analysis
Kumar Gaurav (Indian Institute of Technology Kanpur, India); Sateeshkrishna Dhuli and Yatinendra Nath Singh (Indian Institute of Technology Kanpur, India)
**Wednesday 28 Feb 2018**

**9.30 am - 10.10 am, Wednesday**

**INVITED TALK**

**5G: What is missing and What it should be**  
Mr. Satish Jamadagni, Reliance Jio & TSDSI

**10.10 am - 11.10 am, Wednesday**

**KEYNOTE TALK**

**Beyond Software Defined Networking: When Software Isn’t Fast Enough**  
Dr. David A. Maltz, Microsoft USA

**11.40 am - 12.40 pm, Wednesday**

**PLENARY LECTURE**

**Generative Sensing: Transforming Unreliable Sensor Data for Reliable Recognition**  
Prof Lina Karam, ASU, USA

**2.00 pm to 3.40 pm, Wednesday**

**WED-3-NW: SDN/NFV**

**CHAIR: KOTARO KATAOKA**

**ROOM: LH1**

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.00</td>
<td>Analysis of Computational Complexity and Power Consumption in Cloud Based Heterogeneous RAN</td>
<td>Ramakrishnan S and Subrat Kar (Indian Institute of Technology, Delhi, India); Dharmaraja Selvamuthu (IIT Delhi, India)</td>
</tr>
<tr>
<td>2.20</td>
<td>Providing Resiliency for Service Function Chaining in NFV Systems Using a SDN-based Approach</td>
<td>Karthik Karra (Indian Institute of Technology, Madras, India); Krishna M. Sivalingam (Indian Institute of Technology Madras, India)</td>
</tr>
</tbody>
</table>

**WED-3-SP: BIOMEDICAL SIGNAL PROCESSING**

**CHAIR: P. RAJALAKSHMI**

**ROOM: LH2**

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.00</td>
<td>Identification of Coronary Artery Diseased Subjects Using Spectral Features</td>
<td>Pranab Samanta (IIT Kharagpur); Akanksha Pathak (IIT Kharagpur, India); Kayapanda Mandana (Fortis Healthcare Limited, India); Goutam Saha (IIT Kharagpur, India)</td>
</tr>
<tr>
<td>2.20</td>
<td>Subspace Based CS-MUSIC for Diffuse Optical Tomography</td>
<td>B p v Dileep (IIT Kharagpur, India)</td>
</tr>
<tr>
<td>2.40</td>
<td>Region Selective Information Augmentation for Retinal Images</td>
<td>Vineeta Das (Indian Institute of Technology Guwahati, India); Samarendra Dandapat (IIITG, India); Prabin Kumar Bora (Indian Institute of Technology Guwahati, India)</td>
</tr>
</tbody>
</table>

**WED-3-COM1: NETWORK CODING**

**CHAIR: V. LALITHA**

**ROOM: AUDITORIUM**

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.00</td>
<td>Optimal Index Codes via a Duality Between Index Coding and Network Coding</td>
<td>Ashok Choudhary (IIT Hyderabad, India); Vamsi Krishna Gummadi (IIT Hyderabad, India); Prasad Krishnan (IIT Hyderabad, India)</td>
</tr>
<tr>
<td>2.20</td>
<td>On Linear Codes for Broadcasting with Noisy Side Information</td>
<td>Suman Ghosh (IIT Hyderabad, India); Lakshmi Prasad Natarajan (Indian Institute of Technology Hyderabad, India)</td>
</tr>
<tr>
<td>2.40</td>
<td>Index Coding: Rank-Invariant Extensions</td>
<td>Vamsi Krishna Gummadi (IIT Hyderabad, India); Ashok Choudhary and Prasad Krishnan (IIT Hyderabad, India)</td>
</tr>
</tbody>
</table>
Sponsors

Technical Co-Sponsors

Diamond Sponsors

Gold Sponsors

Silver Sponsor

NVIDIA