

2016 Twenty Second National Conference on Communication (NCC 2016)

**Guwahati, India
4 – 6 March 2016**



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NCC 2016 TECHNICAL PROGRAM DETAILS**March 4, 2015
Pre-Conference Tutorial**

Friday, March 04 **08:30 AM – 10:30 AM****Location:** Hall 2, Conference Center**Tutorial #1: Network Coding: Recent Trends and Challenges****Speaker:** Prof. B. Sundar Rajan, Indian Institute of Science, Bangalore

Friday, March 04 **08:30 AM – 10:00AM****Location:** Hall 3, Conference Center**Tutorial #2: Sub-Nyquist Sampling - Recent Advances and Applications** **Speaker:** Dr. Chandra Sekhar

Seelamantula & Group, Indian Institute of Science, Bangalore

Friday, March 04 **08:30 AM – 10:00 AM****Location:** Hall 4, Conference Center**Tutorial #3: Information Centric Networking - an Insight into Architecture and****Caching** **Speaker:** Dr. Samar Shailendra & Group, CTO Networks Lab, TCS Bangalore

Tea Break **10:30 AM – 11:00 AM**

Friday, March 04 **11:00 AM – 12:00 PM****Location:** Hall 2, Conference Center**Industry Session #1: Tutorial Talk on Software Define Radio** **Industry:** National Instruments India**Resource Persons:** Mr. Raviteja Chivukula, Mr. Avichal Kulshrestha, Mr. Tripuraneni Varun

Friday, March 04 **12:00 PM – 01:00 PM****Location:** Hall 2, Conference Center**Industry Session #2: Developing Next-Generation Wireless Communications Systems Using****MATLAB and Simulink** **Industry:** MathWorks India**Resource Person:** Dr. Amod Anandkumar

Lunch Break **01:00PM – 02:00 PM**

Friday, March 04 **02:00 PM – 05:00 PM****Location:** Hall 2, Conference Center

Industry Session #3: Hands-on Workshop on Software Defined Radio Industry: National Instruments India

Resource Persons: Mr. Raviteja Chivukula, Mr. Avichal Kulshrestha, Mr. Tripuraneni Varun

Friday, March 04

02:00 PM – 04:00 PM

Location: System Simulation Lab, Dept. of EEE

Industry Session #4: Software-Defined Radio Using MATLAB and Simulink

Industry: MathWorks India

Resource Person: Dr. Amod Anandkumar

Friday, March 04

04:00 PM – 05:00 PM

Location: System Simulation Lab, Dept. of EEE

Industry Session #5: "LTE Antenna design and placement using FEKO Software Tool

Industry: Altair Engineering India

Resource Person: Mr. Sumith Pillai

Tea Break 05:00 PM – 05:30 PM

Friday, March 04

05:30 PM – 07.30 PM

Location: Dr. Bhupen Hazarika Auditorium

Plenary Talk-I: Welcome Plenary Speech on Road to Massive MIMO in 5G

Speaker: Prof. A. J. Paulraj, Professor Emeritus (Research), Stanford University, Stanford, USA

Dinner

07:30 PM – 09:00 PM

Location: Conference Center Lobby

JTG MEETING

9:00 PM Onwards

Location: Guest House Conference Room

March 05, 2016 Technical Sessions

Saturday, March 05

08:30 AM -9:30 AM

Location: Dr. Bhupen Hazarika Auditorium

Plenary Talk-II: Network Adaptability to Combat Disaster Disruptions and Cascading Failures

Speaker: Prof. Biswanath Mukherjee, University of California, Davis, USA

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Location: Hall 2, Conference Center

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ShijinRajakrishnan and Sundara Rajan (IIT Madras, India); Vinod M Prabhakaran (Tata Institute of Fundamental Research, India).....1

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Coded Caching in Hybrid Networks

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Location: Hall 2, Conference Center

Invited Talk #1:Non-coherent Reception for Multiple Antenna Systems

Speaker: Prof. R. K. Mallik, Indian Institute of Technology, Delhi

Saturday, March 05

02.00 PM – 02.50 PM

Location: Hall 3, Conference Center

Invited Talk #2:Determining Commonalities in Crowd Sourced Data

Speaker:Prof. S. Chaudhuri, Indian Institute of Technology, Bombay

Saturday, March 05

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Location: Hall 3, Conference Center

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Paper ID –1570231811**A Discrete Addressing Scheme for Wireless Sensor Networks based Internet of Things**

Sarang Deshpande (Samsung R&D Institute (MS - IIT Madras), India); Ravi Shankar (Samsung R&D Institute (MTech - IIT Madras), India).....456

Paper ID – 1570232097**A Crowd-Cloud Architecture for Big Data Analytics**

Varun Mehta (Indian Institute of Technology Bombay, India); Zoheb Shaikh (Manipal Institute of Technology, India); KesavKaza (IIT Bombay, India); HD Mustafa (IIT Bombay & Transocean Inc& RIG Ltd., India); Shabbir N Merchant (IIT Bombay, India).....462

Paper ID –1570232342**Localization in Wireless Sensor Networks with Cognitive Small World Characteristics**

Om Pandey (Indian Institute of Technology Kanpur, India); Ashutosh Kumar (Indian Institute of Technology, Kanpur, India); Rajesh M Hegde (Indian Institute of Technology Kanpur, India).....468

Paper ID –1570232414**Enhancements to OpenADN Platform for End-to-End Automated Service Delivery - A Practical Perspective**

Deval Bhamare (Qatar University & Qatar University, India); Hagar Hussein, Abeer Al Marridi, Hafsa Al Tairi, Mohammed Samaka and Aiman Erbad (Qatar University, Qatar).....N/A

Paper ID –1570232422**Velocity Based Dynamic Flow Mobility in Converged LTE/Wi-Fi Networks**

Prashant Sharma, Thomas Valerrian Pasca S, Naveen Kamath and Bheemarjuna Reddy Tamma (IIT Hyderabad, India).....474

Tea Break**4:30 PM – 4:45 PM****Saturday, March 05****4.45 PM – 6:45 PM****Location:**System Simulation Lab, Dept. of EEE**Industry session #6: Video Processing on Raspberry Pi using Simulink****Industry:**MathWorks India**Resource Persons:** Dr. Amod Anandkumar**Saturday, March 05****7:00 PM – 8:30 PM****Location:**Dr. Bhupen Hazarika Auditorium**CULTURAL PROGRAM**

Saturday, March 05**8.30 PM – Onwards****Location:** Conference Center Lobby**CONFERENCE DINNER**

**March 06, 2016
Technical Sessions**

Friday, March 06**08:30 PM – 09:30 PM****Location:** Dr. Bhupen Hazarika Auditorium**Plenary Talk-I: Codes for Big Data: Error Correction for Distributed Storage****Speaker:***Prof. P. Vijay Kumar, Indian Institute of Science, Bangalore*

Tea Break**09:30 PM – 09:45 PM**

Sunday, March 06**09:45 AM – 12:00 PM****Location:** Conference Center Wing Area**Poster Session: Communications (Phase-I)**

Paper ID – 1570219288**Source and Relay Transmit Antenna Selection in Two Hop Cooperative Communication Systems over κ - μ Fading Channels***Brijesh Kumbhani (IIIT Kota, India); Rakesh Singh Kshetrimayum (Indian Institute of Technology Guwahati, India).....480***Paper ID – 1570221525****Power Control Over Gilbert-Elliot Channel With No Observable States***Rahul Meshram (Indian Institute of Technology Bombay, India).....485***Paper ID – 1570222901****A Capacity-Achieving Coding Scheme for the AWGN Channel with Polynomial Encoding and Decoding Complexity***Shashank Vatedka (Indian Institute of Science, Bangalore, India); Navin Kashyap (Indian Institute of Science, India).....491***Paper ID – 1570222907****Performance Evaluation of Satellite-to-Earth FSO Link in Presence of Turbulence and Weather Conditions for Different IM Schemes***Anjitha Viswanath (Indian Institute of Technology Delhi, India); V K Jain (IIT Delhi, India); Subrat Kar (Indian Institute of Technology, Delhi, India).....497***Paper ID – 1570222984****Small size planar monopole antenna for high speed UWB applications***Nella Anvesh, Kumar (VNIT Nagpur, India); Abhay Gandhi (Viswesaraya National Institute of Technology, India).....502***Paper ID – 1570224414****Indigenous Design and Development of Underwater Wireless Power Transfer System***Manikandan J and Vishwanath A (PES University (PESU), India); Agrawal VK (Director- CORI, PESIT, India); Manu Korulla (Naval Research Board (NRB), India).....507*

Paper ID – 1570224723**BER Performance of Communication Systems using SAW Correlators Encoded with Walsh and Gold Codes**

Arijit Roy (Indian Institute of Technology Guwahati, India); Harshal Nemade (Indian Institute of Technology, India); Ratnajit Bhattacharjee (Indian Institute of Technology, Guwahati, India).....513

Paper ID – 1570226462**Duopoly Models for Power Trading in Secure Cooperative Relay Networks**

Khyati Chopra (Indian Institute of Technology Delhi, India); Ranjan Bose (Indian Institute of Technology, India); Anupam Joshi (UMBC, USA).....519

Paper ID – 1570226666**Development and characterization of a high frequency low noise amplifier**

Ashif Reza and Anuraag Misra (Variable Energy Cyclotron Center, India); Indira Chatterjee (IIT Kharagpur, India); Parnika Das (Variable Energy Cyclotron Center, India).....525

Paper ID – 1570227515**Multi Character Frequency based Encoding for Efficient Text Messaging in Indian Languages**

Manu Seth (Loylty Rewardz Management Private Limited, India); Sourya Basu and Shivam Chaturvedi (Indian Institute of Technology, Kanpur, India); Rajesh M Hegde (Indian Institute of Technology Kanpur, India).....529

Paper ID – 1570227689**Performance of 'Modified Switch and Examine' Diversity Combiner over Generalized Gamma Fading Channels**

Manoj B R (IIT Delhi, India); Jibanananda Mishra (Orissa Engineering College, India); Pravas Ranjan Sahu (Indian Institute of Technology Bhubaneswar, India).....535

Sunday, March 06

09:45 AM – 12:00 PM**Location:** Hall 3, Conference Center**Oral Session: Signal Processing-2****Paper ID – 1570219647****09:45 AM – 10:00 AM****Relative Frequency Maps for Face Recognition**

Kannan Karthik (IIT Guwahati, India); Harshit Balaraman (Redmed Health Systems, IIIT Bangalore, India).....541

Paper ID – 1570220338**10:00 AM – 10:15 AM****Multiscale-SSIM Index based Stereoscopic Image Quality Assessment**

Sameeulla Khan MD (Indian Institute Of Technology Hyderabad, India); Sumohana Channappayya (Indian Institute of Technology Hyderabad, India).....547

Paper ID – 1570223061**10:15 AM – 10:30 AM****Compressed Sensing of Respiratory Signals Promoting Joint-Sparsity**

Ramakanth Reddy (IIT Kharagpur, India); Priya Ranjan Muduli (Indian Institute of Technology Kharagpur, India); Anirban Mukherjee (IIT Kharagpur, India).....552

Paper ID – 1570231144**10:30 AM – 10:45 AM****Robust Photoplethysmographic (PPG) Based Biometric Authentication for Wireless Body Area Networks and m-Health Applications**

Tilendra Choudhary (Indian Institute of Technology Guwahati, India); M Sabarimalai Manikandan (Indian Institute of Technology Bhubaneswar, India).....557

Paper ID – 1570231443

10:45 AM – 11:00 AM

Automatic Silhouette Photography

Aalok Gangopadhyay (Indian Institute of Technology Gandhinagar, India); Shubham Pachori (IIT Gandhinagar, India); Shanmuganathan Raman (Indian Institute of Technology, Gandhinagar, India).....563

Paper ID – 1570232318

11:00 AM – 11:15 AM

Salient Keypoint Selection for Object Representation

Prerana Mukherjee (Indian Institute of Technology, Delhi, India); Siddharth Srivastava (Center for Development of Advanced Computing, India); Brijesh Lall (Indian Institute of Technology Delhi, India).....569

Paper ID – 1570232396

11:15 AM – 11:30 AM

An Efficient Face Model for Facial Expression Recognition

Sunil Kumar, Manas Bhuyan and Biplab Chakraborty (IIT Guwahati, India).....575

Paper ID – 1570232427

11:30 AM – 11:45 AM

Improved analysis of Diabetic Maculopathy Using Level set Spatial Fuzzy Clustering

Jyoti Prakash Medhi (Indian Institute of Technology Guwahati, India); Samarendra Dandapat (IITG, India).....581

Paper ID – 1570232490

11:45 AM – 12:00 PM

Segmentation of Carnatic Music Items using KL2, GMM and CFB Energy Feature

Krishnaraj Sekhar PV (Indian Institute of Technology, Madras, India); Sridharan Sankaran (Indian Institute of Technology - Madras & Tata Consultancy Services, India); Hema A Murthy (Indian Institute of Technology Madras, India).....587

Sunday, March 06

12:00 PM – 01:00 PM

Location: Conference Center Wing Area

Poster Session: Communications (Phase-II)

Paper ID – 1570231686

Performance Analysis of DCSK Modulation with Diversity Combining Not Requiring Channel State Information

Atul Kumar (Indian Institute of Technology Guwahati, India); Pravas Ranjan Sahu (Indian Institute of Technology Bhubaneswar, India); Jibanananda Mishra (Orissa Engineering College, India).....592

Paper ID – 1570231745

Performance Analysis of Alamouti Diversity with Sub-optimum Transmit Antenna Selection using Delayed Feedback

Yogesh N Trivedi (Nirma University, India).....598

Paper ID – 1570232135

Opportunistic Interference Alignment in Multi-user MIMO Cognitive Radio Networks for Different Fading Channels

Sukriti Garg (The LNM Institute of Information Technology, Jaipur, INDIA, India); Monika Jain (The LNM Institute of Information Technology, India); Ranjan Gangopadhyay (The L.N.Mittal Institute of Information Technology, India); Divyang Rawal (LNMIIT, India).....604

Paper ID – 1570232283**A CAD Assisted Design Methodology for Wideband Arbitrary Power Division Coupler Implemented in Microstrip Technology**

Mohammad A Maktoomi (iRadio Lab, University of Calgary & CDRL, IIT Delhi, New Delhi, Canada); Mohammad Hashmi (IIITD, India).....610

Paper ID – 1570232314**A High Efficiency 2.4GHz RF to DC Converter using 130nm CMOS Cross-Coupled Rectifier**

Sanjeev K and Manjunath Machnoor (Indian Institute of Science, India); Vinoy K (Prof, India); T Venkata Prabhakar (IISc, India).....614

Paper ID – 1570232338**Channel Estimation in Rotating Polarization Based Wireless Communication Systems**

Theeksha Athoor Perumal (IIT Madras, India); Radha Krishna Ganti, Ravinder D Koilpillai, Devendra Jalihal and Venkatesh Ramaiyan (Indian Institute of Technology Madras, India); Ken Takei (Hitachi, Ltd., Hitachi Research Laboratory, Japan).....618

Paper ID – 1570232354**A Bound-achieving Modified Etzion-Vardy (5,3) Projective Space Code**

Anirban Ghatak (Indian Institute of Science, India).....624

Paper ID – 1570232415**TDoA Based EKF Localization for LTE**

Rohan Sriram (Indian Institute of Technology Madras, India); Devendra Jalihal (Indian Institute of Technology Madras, India).....630

Paper ID – 1570232424**Impact of NoC Interconnect Shorts on Performance Metrics**

Biswajit R Bhowmik and Santosh Biswas (IIT Guwahati, India); Jatindra Kumar Deka (Indian Institute of Technology Guwahati, India).....636

Sunday, March 06**09:45 AM – 01:00 PM****Location:** Hall 2, Conference Center**Industry Session #7: Round Table on 5G Communication Networks****Industry:** National Instruments India**Lunch Break****01:00 PM – 02:00 PM****Sunday, March 06****02:00 PM – 03:15 PM****Location:** Hall 2, Conference Center**Oral Session: Communications-4****Paper ID – 1570227450****02:00 PM – 02:15 PM****On Energy Cooperation in Energy Harvesting Underlay Cognitive Radio Network**

Kalpant Pathak (Indian Institute of Technology Kanpur, India); Adrish Banerjee (Indian Institute of Technology, Kanpur, India).....642

Paper ID – 1570220780 **02:15 PM – 02:30 PM**
On Robust k-hop clustering in Ad-hoc Cognitive Radio Networks

Rajiv Misra (Indian Institute of Technology, India); Ram Narayan Yadav (Indian Institute of Technology Patna, India); Vinod Dosapati (IIT PATNA, India).....648

Paper ID – 1570226560 **02:30 PM – 02:45 PM**
Performance Analysis of MIMO-OSTBC based Selective DF Cooperative Wireless System with Node Mobility and Channel Estimation Errors

Neeraj Varshney and Aditya K Jagannatham (Indian Institute of Technology Kanpur, India).....654

Paper ID – 1570227468 **02:45 PM – 03:00 PM**
Coded Cooperation over Wireless Optical Links in Weak Turbulence with Misalignment Fading

Prabhat Kumar Sharma (Visvesvaraya National Institute of Technology, India); Parul Garg and Ankita Gupta (Netaji Subhas Institute of Technology, New Delhi, India).....660

Paper ID – 1570227559 **03:00 PM – 03:15 PM**
K-mean Clustering based Cooperative Spectrum Sensing in Generalized $\kappa - \mu$ Fading Channels

Vaibhav Kumar (The LNMIIT Jaipur, India); Deep Kandpal and Monika Jain (The LNM Institute of Information Technology, India); Ranjan Gangopadhyay (The L.N.Mittal Institute of Information Technology, India); Soumitra Debnath (The LNM Institute of Information Technology, India).....665

Sunday, March 06

02:00 PM – 03:15 PM

Location: Conference Center Wing Area

Poster Session: Signal Processing-2 (Phase-I)

Paper ID – 1570220414

Learned dictionaries for sparse representation based unit selection speech synthesis

Pulkit Sharma (IIT Mandi, India); Vinayak Abrol (IIT Mandi, India); Anil Kumar Sao (IIT Mandi, India).....670

Paper ID – 1570222838

Effectiveness of Polarity Detection for Improved Epoch Extraction from Speech

Govind D, Hisham PM and Pravena D (Amrita Vishwa Vidyapeetham, India).....675

Paper ID – 1570232485

Blind Forensics Method for GOP Period Detection in Motion Compensated Video

Aniruddha Mazumdar, Perla Ramakrishna and Prabin Kumar Bora (Indian Institute of Technology Guwahati, India).....681

Paper ID – 1570226581

Warping Path and Gross Spectrum Information for Speaker Verification under Degraded Condition

Deepshikha Mahanta, Anupama Paul, Ramesh Kumar Bhukya, Rohan Kumar Das, Rohit Sinha and S. R. Mahadeva Prasanna (Indian Institute of Technology Guwahati, India).....687

Paper ID – 1570227678

Analysis of glottal stops using pitch synchronous integrated linear prediction residual

Sishir Kalita (IIT Guwahati, India); S. R. Mahadeva Prasanna (Indian Institute of Technology Guwahati, India); Samarendra Dandapat (IITG, India).....693

Paper ID – 1570227707

Efficient Resampling of Speech/Audio Signals in Shift-Invariant Spaces

Gutta Sreedevi and Praneeth Kurpad Narayanamurthy (Indian Institute of Science Bangalore, India); Chandra Sekhar Seelamantula (Indian Institute of Science, India).....699

Paper ID – 1570230838

Spoken Term Detection from Continuous Speech Using ANN Posteriors and Image Processing Techniques

Speaker Ravi Shankar, Arpit Jain and Deepak KT (Indian Institute of Technology Guwahati, India); Vikram Cm (Indian Institute of Technology Guwahati, India); S. R. Mahadeva Prasanna (Indian Institute of Technology Guwahati, India).....704

Sunday, March 06

03:15 PM – 04:30 PM

Location: Hall 2, Conference Center

Oral Session: Communications-5

Paper ID – 1570227584

03:15 PM – 03:30 PM

Sum Rate of K-User MIMO Interference Channel For Finite Constellation Inputs With Interference Alignment

Navneet Garg and Govind Sharma (Indian Institute of Technology Kanpur, India).....710

Paper ID – 1570232100

03:30 PM – 03:45 PM

Arbitrary Beamforming Based FSO MIMO System in Atmospheric Turbulence and Misalignment Errors

Prabhat Kumar Sharma (Visvesvaraya National Institute of Technology, India); Ankur Bansal (Netaji Subhas Institute of Technology, University of Delhi, New Delhi, India); Manav Bhatnagar (Indian Institute of Technology Delhi, India).....714

Paper ID – 1570232418

03:45 PM – 04:00 PM

On the Throughput Maximization of Cognitive Radio using Cooperative Spectrum Sensing over Erroneous Control Channel

Narasimha Rao Banavathu and Mohammed Zafar Ali Khan (Indian Institute of Technology, Hyderabad, India).....719

Paper ID – 1570232440

04:00 PM – 04:15 PM

SBL-Based Data-Aided Channel Estimation for Spatially Evolving STTC MIMO Systems

Amrita Mishra (IIT Kanpur, India); Aditya K Jagannatham (Indian Institute of Technology Kanpur, India).....725

Paper ID – 1570232521

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Hardware Implementation of MIMO OFDMA Test Bed and its Application Towards Channel Characterization on Indoor Lab Test Environment

Sandip Das (IIT Kharagpur, India); Suvra Sekhar Das (Indian Institute of Technology Kharagpur, India); Indrajit Chakrabarti (IIT Kharagpur, India).....731

Sunday, March 06

03:15 PM – 04:30 PM

Location: Conference Center Wing Area

Poster Session: Signal Processing-2 (Phase-II)

Paper ID – 1570232380

Class Specificity and Commonality based Discriminative Dictionary for Speaker Verification

Nagendra Kumar and Rohit Sinha (Indian Institute of Technology Guwahati, India).....737

Paper ID – 1570232401

Zero Time Windowing Analysis of Hypernasality in Speech of Cleft Lip and Palate Children

Akhilesh Dubey (Indian Institute of Technology, Guwahati, India); S. R. Mahadeva Prasanna (Indian Institute of Technology Guwahati, India); Samarendra Dandapat (IITG, India).....743

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IIT-S CSSD: A Cough Speech Sounds Database

Vishwanath Pratap Singh and J Rohith (Indian Institute of Technology Guwahati, India); Yash Mittal (Jaypee University of Information Technology, Solan, India); Vinay Kumar Mittal (Indian Institute of Technology Chittoor, Sri City, India).....749

Paper ID – 1570232416

Enhancements in Assamese Spoken Query System: Enabling Background Noise Suppression and Flexible Queries

Abhishek Dey, Syed Shahnawazuddin and Deepak KT (Indian Institute of Technology Guwahati, India); Siddika Imani (Indian Institute of Technology Guwahati, India); S. R. Mahadeva Prasanna and Rohit Sinha (Indian Institute of Technology Guwahati, India).....755

Paper ID – 1570232442

Mask Region Grow Segmentation Algorithm for Low-Computing Devices

Shitala Prasad (Indian Institute of Technology, Roorkee, India); Sateesh Kumar Peddoju (Indian Institute of Technology Roorkee, India); Debashis Ghosh (Indian Institute of Technology (IIT) Roorkee, India).....761

Paper ID – 1570231733

Multiresolution Inter-sample and Inter-lead Eigen Error Features for Classification of Cardiac Diseases

Rajesh Tripathy, RKT (IIT Guwahati, India); Samarendra Dandapat (IITG, India).....767

Sunday, March 06

04.30 PM – Onwards

Location:Conference Center

Valedictory Session followed by High Tea
