



**IEEE International Conference on Advanced Networks  
and Telecommunications Systems**

14-17 December 2020 // Virtual Conference

ICT for Connecting Humanity // Organized by IEEE ComSoc, IEEE ANTS Committee, and IIT Delhi, India



**Please Note: Important Instructions to our Authors on Page #3**

# **IEEE ANTS Women in Engineering (WIE) Mini Conference**

**Date: 16<sup>th</sup> December 2020**



**“WiN with WiT”**

**(Women in Networking with Women in Telecommunications)**

## **MESSAGE FROM WIE CO-CHAIRS**



A warm welcome to all our dear participants of the 14<sup>th</sup> edition of IEEE International Conference on Advanced Networks and Telecommunications Systems (IEEE ANTS 2020) being held as a virtual conference in IIIT-Delhi, between 14-17 Dec 2020. On 16<sup>th</sup> December, a Women in Engineering mini-conference is being held, aiming to provide a unique opportunity for women engineers to network and showcase their skill and expertise. The program schedule is enclosed. We urge our women participants to utilize this unique opportunity provided to network and further their professional career forward. Let us leverage on this forum opened for only the 5<sup>th</sup> time in IEEE ANTS & celebrate Women In Engg!

**Dr. Mydhili Nair, Prof, Ramaiah Institute of Technology, Bengaluru**



It is my pleasure to welcome all the distinguished scientists and engineers attending the IEEE ANTS Women in Engineering Mini Conference. The objective of WiE is to provide a multi-discipline forum for women researchers and technologists in the fields of networks and telecommunication technologies to present new ideas and contributions in the form of technical papers and panel discussions on applications in the ever-growing areas of wireless communication. I would like to take this opportunity to express my gratitude to all members of the International and National Advisory Committee, whose able guidance and suggestions are invaluable to the success of the conference. Finally, I would like to express my sincere thanks to all speakers, session chairs, authors and attendees for their active participation and contributions which will make the conference successful and rewarding.

**Dr. Sakshi Kaushal, Prof, U.I.E.T, Panjab University, Chandigarh**

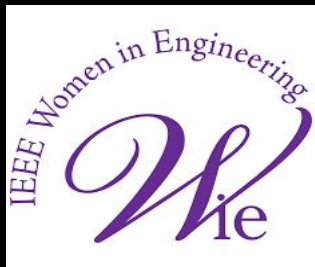


A very hearty welcome to all the participants of IEEE International Conference on Advanced Networks and Telecommunications Systems (IEEE ANTS 2020) being held virtually this time. We have a one day mini conference Women in Engineering on 16<sup>th</sup> December 2020. It provides a unique platform for all the women engineers/researchers to present their work, get feedback from eminent researchers all across the world and create synergy with other fellow women engineers. This time keynote/invited talks are by top researchers both from academia and industry. We urge all women participants to utilize this opportunity to the fullest. Let us nurture the talents and celebrate Women in Engineering!

**Dr. Mukulika Maity, Asst Prof, IIIT-Delhi**

## **Important Instructions to our Technical Paper Authors**

1. Authors need to make a [Video](#) of your Powerpoint Presentation for **max 12 minutes**.
2. Please stick to the max time limit of 12 minutes.
3. This ppt has to **uploaded** to the following [Google Drive](#): [IEEE ANTS 2020-WiE-Video-Upload Link](#)
4. Your presentation video will be played during your scheduled time slot.
5. **You need to be present** while the video of your technical presentation is being played
6. You need to be ready with your PowerPoint presentation also. You may be asked to present Live too.
7. At the end of your video presentation, there will be a **3 minute Q & A** by the Session Chairs.
8. Therefore, you need to be present **LIVE** for your scheduled time slot.
9. There are four sequential Tracks for this WiE Mini Conference, with time slots as
  - [Track 1](#): 9.30am to 11am
  - [Track 2](#): 11.30am to 1.00pm
  - [Track 3](#): 2.00pm to 4.15pm
  - [Track 4](#): 4.45pm to 6.00pm
10. You are advised to be present throughout the Track Timeslot your presentation is scheduled. **There** could be a possibility of the timings to be shuffled.



Sl#	Time	Event
<b>WiE Technical Paper Presentation Session - Track 1 (9.30am to 11.00am)</b>		
<b>Session Chair: Dr.Sakshi Kaushal Session Co-Chairs: Dr.Mukulika Maity,Dr.Mydhili Nair</b>		
1	09:30 A.M. - 10:00 A.M	<b>Keynote - Morning Session:</b> Dr.Aruna Balasubramanian, State University of New York at Stony Brook,USA <b>Title:</b> Measuring and Modeling User-Centric Web Experience
2	10:00 A.M. - 10:15 A.M.	<i>"On Improving the Fairness of NOMA-Based Indoor Visible Light Communication System(Paper ID:1570659734)"</i> <b>Presenters:</b> Kumud Jindal; Rishu Raj,IIT-Delhi
3	10:15 A.M. - 10:30 A.M	<i>"Study of Performance Enhancement in Underwater Optical Wireless Communication System"(PaperID:1570659777)</i> <b>Presenters:</b> Pooja Singh,IIT-Delhi
4	10:30 A.M. - 10:45 A.M	<i>"Millimeter Wave Wireless System Modeling with Best Channel Selection Policy"</i> (PaperID: 1570661922) <b>Presenters:</b> Tooba Mukarra, BITS Pilani, Rajasthan, India
5	10:45 A.M. - 11:00 A.M.	<i>"A Novel Framework for Misbehavior Detection in SDN-based VANET"(PaperID:1570666496 )</i> <b>Presenters:</b> Rukhsar Sultana, Malaviya National Institute of Technology
11:00am to 11:30am		Tea Break
<b>WiE Technical Paper Presentation Session - Track 2(11.30am to 1:00pm)</b>		
<b>Session Chair: Dr.Mukulika Maity Session Co-Chairs: Dr.Mydhili Nair,Dr.Sakshi Kaushal</b>		
6	11:30 A.M. - 12:00 A.M	<b>Invited Talk:</b> Dr.Sharayu Moharir, Dept. of Electrical Engineering, Indian Institute of Technology Bombay. <b>Topic:</b> Online Partial Service Hosting at the Edge
7	12:00 A.M. - 12:15 P.M	<i>"Security vs.Flexibility: Striking a Balance in the Pandemic Era"(PaperID:1570662138)</i> <b>Presenters:</b> Vaishali Soni,Netaji Subhas University of Technology

8	12:15 P.M. - 12:30 P.M.	<i>"A Simple Approximation of FSO Link Distribution and its Applications"</i> (PaperID: 1570662151) <b>Presenters:</b> Arti Mk,AIACTR
9	12:30 P.M - 12:45 PM	<i>"Two-Tier Architecture for Heterogeneous Public Safety Wireless Networks"</i> (PaperID: 1570675399) <b>Presenters:</b> Pimmy Gandotra, IIT-Delhi
<b>12:45 pm to 02:00 pm Lunch Break</b>		
<b>WiE Technical Paper Presentation Session - Track 3(2.00pm to 4.15pm)</b>		
<b><u>Session Chair:</u> Dr.Mydhili Nair <u>Session Co-Chairs:</u> Dr.Sakshi Kaushal, Dr.Mukulika Maity</b>		
10	02:00 P.M. - 02:30 P.M.	<b>Key Note - Afternoon Session:</b> Dr.Ranjita Bhagwan, Senior Principal Researcher at Microsoft Research India <b>Topic:</b> Using Data to Build Better Systems and Services
11	02:45 P.M. - 03:00 P.M.	<i>"On the fly classification of traffic in Anonymous Communication Networks using a Machine Learning approach"</i> (PaperID: 1570661969) <b>Presenters:</b> Annapurna Patil, Ramaiah Institute of Technology
12	03:00P.M. - 03:15 P.M.	<i>"Detection and Prevention of Black Hole Attack in SUPERMAN"</i> (PaperID:1570666752) <b>Presenters:</b> Kratika Sharma,ABV-IIITM GWALIOR
13	03:15 P.M. - 03:55 P.M.	<b>Plenary Session by Women in Engineering Track Co-Chairs</b> <b>Topic:</b> Using Technology to empower and protect oneself during COVID 19 induced lockdown, online studie, work from home etc. <b>Presenters:</b> Dr.Mydhili K Nair,Professor, Ramaiah Institute of Technology, Bangalore Dr.Mukulika, Asst Prof, Indraprastha Institute of Information Technology,Delhi <b>Moderator:</b> Dr.Sakshi Kaushal, Professor,U.I.E.T, Panjab University,Chandigarh
14	03:55 P.M. - 04:10 P.M.	<i>"Low PAPR Waveform Design for OFDM Systems Based on Convolutional Autoencoder"</i> (PaperID:1570666299 ) <b>Presenters:</b> Yara Huleihel (Ben Gurion University, Israel)
<b>04:15pm to 04:45pm Tea Break</b>		
<b>WiE Technical Paper Presentation Session - Track 4(4.45pm to 6.00pm)</b>		
<b><u>Session Chairs:</u> Dr.Sakshi Kaushal <u>Session Co-Chairs:</u> Dr.Mukulika Maity, Dr.Mydhili Nair</b>		
15	04.45 P.M. - 05.15 P.M.	<b>Invited Talk:</b> Dr.Chetna Singhal , Dept. of Electronics and Electrical Communication Engineering, Indian Institute of Technology (IIT) Kharagpur <b>Topic:</b> Cognitive Radio Systems in next-generation wireless networks
16	05.15 P.M. - 05.30 P.M.	<i>"Robust Maximum Likelihood Algorithm-based Mitigation technique for impulsive noise in MIMO-OFDM systems"</i> (PaperID:1570662231) <b>Presenters:</b> Girija Sakimalla, Kakatiya Institute of Technology & Science, Warangal
17	05.30 P.M. - 05.45 P.M.	<i>"Priority Order-Based Key Distribution in QKD-secured Optical Networks"</i> (PaperID:1570674195 ) <b>Presenters:</b> Purva Sharma (Indian Institute of Technology, Indore, India)
18	05.45 P.M. - 06.00 P.M.	<i>"Virtual Network Function Embedding under Nodal Outage using Reinforcement Learning"</i> (PaperID:1570671538 )

**Presenters:** Swarna Bindu Chetty (University College Dublin, Ireland)

## TECHNICAL PAPER PRESENTATIONS SCHEDULE

### Virtual Conference. Hub at IIIT-Delhi

**NOTE: Each Paper = 12 min (Recorded Video Presentation) + 3 min. (Live Q & A)**

Time Slot#1: 09:30 A.M. - 10:00 A.M	
<b>Keynote Morning Session: Topic:</b>	<i>Measuring and Modeling User-Centric Web Experience</i>
<b>Speaker Name and Affiliation</b>	Dr.Aruna Balasubramanian, State University of New York at Stony Brook,USA
<b>Abstract</b>	<p>There are a number of metrics used to measure Web page load times. However, it is not clear if these metrics measure a user's perceived latency. In this talk, I will describe our work on measuring, modeling, and improving user-centered Page Load time or uPLT.</p> <p>Our work WebGaze shows that user's perceived latency has limited correlation with the various metrics used to measure page load time. I will then describe our system WebGaze, whose goal is to explicitly improve the uPLT metric by leveraging eye gaze. Gaze tracking is commonly employed in the cognitive science literature to measure a user's focused attention. We use eye gaze tracking to build a model of user attention and then prioritize bandwidth to objects that demand higher user attention.</p> <p>I will conclude the talk with a problem we are currently working on---how to define user engagement? As a first step, we use eye gaze to detect when a user is reading versus skimming text, since reading indicates engagement. We are currently working on extending this to Web pages that have both text and images to measure engagement onset time.</p>
Time Slot#2: 10:00 A.M. - 10:15 A.M	
<b>Paper #01 - Title:</b>	<i>"On Improving the Fairness of NOMA-Based Indoor Visible Light Communication System(Paper ID:1570659734)"</i>
<b>Authors Names with Affiliations:</b>	<u>Presenters:</u> Kumud Jindal; Rishu Raj <u>Co-Authors:</u> Abhishek Dixit (Indian Institute of Technology Delhi & IBBT, India)

<b>Abstract:</b>	In this paper, we improve the fairness of non-orthogonal multiple access (NOMA) by proposing a power allocation scheme that ensures all users experience the same bit error rate (BER) irrespective of their channel conditions. We also derive analytical expressions for the BER obtained using this novel power allocation scheme by applying it to a downlink NOMA-based visible light communication (VLC) system. The numerically simulated results for different scenarios match the analytical results, thereby validating the derived power allocation expression. Finally, we demonstrate a significant improvement in the fairness of NOMA for our novel power allocation scheme compared to the existing gain ratio power allocation and normalized gain difference power allocation schemes.
<b>Time Slot#3: 10:15 A.M. - 10:30 A.M</b>	
<b>Paper #02 - Title:</b>	<i>“Study of Performance Enhancement in Underwater Optical Wireless Communication System”</i> (PaperID:1570659777)
<b>Authors Names with Affiliations:</b>	<u>Presenters:</u> Pooja Singh,IIT-Delhi <u>Co-Authors:</u> Ch Krishna Chaitanya,Sonali Sonali, Abhishek Dixit,V K Jain (Indian Institute of Technology, Delhi, India)
<b>Abstract:</b>	Underwater optical wireless communication has many plausible applications, but the biggest challenge for this is the communication medium that is water. Water characteristic changes from place to place. Due to high absorption and scattering, link length is limited to a few meters. In this work, we increase the link length under different channel conditions. For achieving this, we use a semiconductor optical amplifier (SOA) at the receiver and also, error-correcting codes (ECCs) in various water types to mitigate the channel effects. SOA decreases the power required at the receiver, thus, increasing the link length for the same bit error rate (BER). But, SOA fails to perform as water quality degrades too much such as in turbid harbor. In contrast to this, the use of ECCs can significantly reduce the power requirement and increase the link length. We have also employed the combination of both the models in order to achieve desired performance at a lower power and to attain more link length. Simulation is done using MATLAB. Analytical results for SOA assisted systems are also plotted along with the simulation results.
<b>Time Slot#4: 10:30 A.M. - 10:45 A.M</b>	
<b>Paper #03 - Title:</b>	<i>“Millimeter Wave Wireless System Modeling with Best Channel Selection Policy”</i> (PaperID: 1570661922)
<b>Authors Names with Affiliations:</b>	<u>Presenters:</u> Tooba Mukarram <u>Co-Authors:</u> Kartik Shrivastava,B. Sainath ,(BITS Pilani, Rajasthan, India)



<b>Abstract:</b>	Millimeter-wave (mmWave) technology is one of the most popular enabling technologies in the fifth-generation and beyond wireless systems. MmWave technology provides substantial extra bandwidth to address high data rate requirements for various terrestrial mobile systems. The main challenges in technology include high propagation attenuation and channel fading. In this paper, we consider mmWave non-cooperative and cooperative system models and propose the best mmWave channel selection policy (BMSCP). For these systems, we study the performance of the proposed BMSCP. Specifically, we present useful mathematical analysis for the average spectral efficiency (SE) of both non-cooperative and cooperative mmWave systems. To quantify the gains delivered by BMSCP, we compare the average SE performance with that of the randomly selected channel. We find that the proposed policy provides superior performance in terms of average spectral efficiency.
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**Time Slot#5: 10:45 A.M. - 11:00 A.M**

<b>Paper #04 - Title:</b>	<i>"A Novel Framework for Misbehavior Detection in SDN-based VANET"(PaperID:1570666496 )</i>
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<b>Authors Names with Affiliations:</b>	<u>Presenters:</u> Rukhsar Sultana, Malaviya National Institute of Technology <u>Co-Authors:</u> Jyoti Grover(Malaviya National Institute of Technology), Meenakshi Tripathi (MNIT Jaipur, India)
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<b>Abstract:</b>	In Vehicular Ad Hoc Networks (VANET), internal attacks are performed by insider nodes. Effective Misbehavior Detection System (MDS) can detect such misbehaving insider nodes. MDS monitors the transmitting messages constantly to detect incorrect data packets through plausibility and consistency checks and thus detects the misbehaving vehicle. Existing detection systems are not adaptive to network statistics. Therefore, we propose a framework for misbehavior detection in Software-Defined Networking (SDN)-based VANET. SDN-based VANET is provided with programmability and flexibility so that proposed framework can be adjusted according to the present network scenario on order to provide effective and accurate detection performance.
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**Time Slot#6: 11:30 A.M. - 12:00 Noon**

<b>Invited Talk - Title:</b>	<i>"Online Partial Service Hosting at the Edge"</i>
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<b>Authors Names with Affiliations:</b>	Dr.Sharayu Moharir, Dept. of Electrical Engineering, Indian Institute of Technology Bombay.
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<b>Abstract:</b>	The focus of this work is on the benefits of using storage/computation resources at the edge to host Software as a Service (SaaS) instances like social networks, online shopping, navigation services etc. A key characteristic of current edge computing platforms is the pay-as-you-go flexibility via short term contracts. The
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	<p>client can thus optimize the cost incurred to edge resources by dynamically adjusting hosting decisions depending on request patterns. Unlike most of the existing literature on this topic, where the SaaS is either completely hosted at the edge or not hosted at all, we allow the service to be partially hosted at the edge. This is motivated by the growing popularity of the paradigm of designing services as a collection of independent microservices instead of a monolith.</p> <p>In the setting where edge resources can be rented and the SaaS can be partially hosted at the edge, we first characterize the fundamental limit on the performance of any policy. We propose an online hosting policy which dynamically determines what fraction of the SaaS is hosted at the edge based on the request arrival process and the various costs involved in an online manner. We corroborate our analytical results by comparing the performance of the proposed policy and some natural alternatives like TTL via trace-driven simulations using real data.</p>
<b>Time Slot#7: 12:00 Noon - 12:15 P.M</b>	
<b>Paper #05 - Title:</b>	<i>"Security vs.Flexibility: Striking a Balance in the Pandemic Era"(PaperID:1570662138)</i>
<b>Authors Names with Affiliations:</b>	<u>Presenters:</u> Vaishali Soni Deepika Kukreja,Deepak Kumar Sharma(Netaji Subhas University of Technology)
<b>Abstract:</b>	<p>An organization's reputation is largely dependent on the work culture it provides to its employees. This is the reason, "flexibility" is becoming an inherent part of an employer's support to its employees. Due to the unprecedented outbreak of novel corona virus (COVID-19), most companies have adapted flexibility of working from anywhere, for their employees. This digital transformation took place almost instantaneously. Hence, neither the employees, nor the companies were fully prepared for this situation. This definitely makes our lives convenient. But there exists another side of the coin which is concerned with the security issues pertaining to use of personal networks and devices. The home network devices have not been configured to be secure in line with the company's requirements. That is the reason, attackers have a larger surface to get their hands dirty on. This paper emphasizes on the cybersecurity threats which have emerged in this pandemic era. The work presents the challenges faced by the employees as well as their companies in these tough times. Then this paper discusses the sudden rise in volumes of cyber-attacks between January 2020 to March 2020. Next, it describes the risks which might occur in the near future of the COVID-19 world. The paper proposes some of the ways in which companies can strike an efficient balance between flexibility for employees and security of their assets.</p>
<b>Time Slot#8: 12:15 P.M - 12:30 P.M</b>	

<b>Paper #06 - Title:</b>	<i>"A Simple Approximation of FSO Link Distribution and its Applications"(PaperID: 1570662151)</i>
<b>Authors Names with Affiliations:</b>	<u>Presenters:</u> Arti Mk <u>Co-Authors:</u> Aarti Jain(AIACTR)
<b>Abstract:</b>	<p>We consider a wireless free space optical (FSO)communication system. The FSO link is assumed to follow the gamma-gamma distribution. It is shown in literature that the probability density function (PDF) of the gain of FSO link has complicated form, it is in the form of modified Bessel function. Due to its complicated nature, the analytical expressions of FSO communication system has very high computational complexity.</p> <p>In this paper, we derive an approximate expression of PDF of gain for FSO link in terms of series expansion. It is shown in the paper that the derived approximate expression is very accurate and easy to deal. The performance of the FSO communication system is analyzed in terms of bit error rate by using the derived PDF expression.</p>
<b>Time Slot#9: 12:30 P.M - 12:45 P.M</b>	
<b>Paper #07 - Title:</b>	<i>"Two-Tier Architecture for Heterogeneous Public Safety Wireless Networks"(PaperID: 1570675399)</i>
<b>Authors Names with Affiliations:</b>	<u>Presenters:</u> Pimmy Gandotra, IIT-Delhi <u>Co-Authors:</u> Vimal Bhatia (Indian Institute of Technology Indore, India)
<b>Abstract:</b>	<p>Device-to-device (D2D) communication and Heterogenous networks (HetNet) in wireless communication networks (WCNs) are known to enhance system capacity, coverage and energy efficiency. A key area where these can improve the overall performance during partial and complete infrastructure unavailability, and ensure coverage, along with essential information broadcasting is the public safety communication systems. Looking for an appropriate architectural solution for the 5G WCNs and beyond, during an emergency, this paper proposes a two-tier architecture for achieving guaranteed Quality of Service (QoS). Under appropriate availability from the macro base station (BS), public-safety users are serviced by it directly, which forms Tier 1. However, under the situation of loss of infrastructure and/or for offloading public-safety traffic from the macro BS, the public-safety users are serviced by the Tier 2 elements, i.e small cell BSs and D2D links. As far as possible, use of D2D or cooperative communication is braced, as it provides higher system throughput. Also, D2D supports much lower power consumption, thereby making it more suitable during emergency situations where users may not be able to recharge handsets frequently</p>

Time Slot#11: 2:00 P.M. - 2:30 P.M	
<b>Key Note</b> <b>-Afternoon Session</b> <b>Title:</b>	<i>"Using Data to Build Better Systems and Services"</i>
<b>Authors Names</b> <b>with Affiliations:</b>	Dr.Ranjita Bhagwan, Senior Principal Researcher at Microsoft Research India
<b>Abstract:</b>	<p>Today's systems and services are large and complex, often supporting millions or even billions of users. Such systems are extremely dynamic as developers continuously commit code and introduce new features, fixes and, consequently, new bugs. Multiple problems crop up in such a dynamic environment, from misconfiguration of essential services, very slow testing and deployment procedures, and extended service disruptions when catastrophic bugs hit deployment. Nevertheless, with the advent of Cloud-based services, new opportunities to use machine-learning to alleviate such problems have emerged. Large-scale services generate petabytes of code, test, and usage-related data within just a few days. This data can be potentially harnessed to provide valuable insights to engineers on how to improve service performance, security and reliability. However, cherry-picking important information from such vast amounts of systems-related data proves to be a formidable challenge. Over the last three years, we have been working on Project Sankie which uses code, test logs and telemetry as data to build several tools that help develop and deploy systems faster while maintaining and even improving system reliability. My talk will first describe the challenges that arise from using machine-learning on such systems-related data and metadata. Next I will do a deep-dive on two specific tools that we built that are being used by several of Microsoft's services.</p>
Time Slot#12: 2:45 P.M. - 03:00 P.M	
<b>Paper #08 - Title:</b>	<i>"On the fly classification of traffic in Anonymous Communication Networks using a Machine Learning approach"(PaperID: 1570661969)</i>
<b>Authors Names</b> <b>with Affiliations:</b>	<u>Presenters:</u> Annapurna P Patil (M S Ramaiah Institute of Technology, India) <u>Co-Authors:</u> Lalitha Chinmayee MaheshKumar Hurali (Ramaiah Institute of Technology, India)
<b>Abstract:</b>	<p>Anonymous Communication Networks (ACNs) provide privacy and anonymity to the users of the Internet. Traffic classification in ACNs is an emerging area of research due to its benefits in network management tasks like network security, Quality of Service provisioning, and in Research and Development of ACNs. Out of the well-known</p>

	<p>traffic classification approaches available, Machine Learning (ML) based approach has proven to be advantageous over the port-based and payload based approach. Using a publicly released Anon17 dataset, this work presents an ML-based traffic classification technique in</p> <p>ACNs. The proposed technique performs on the fly classification, which involves the classification of traffic as early as possible using the first few packets of traffic flow. The proposed on the fly classification technique outperforms the state of the art technique</p> <p>in ACNs with increased classification accuracy, F measure and requires less number of packets in traffic flow to achieve highest possible performance metrics.</p>
<b>Time Slot#13: 03:00 P.M. - 03:15 P.M</b>	
<b>Paper #09 - Title:</b>	<i>"Detection and Prevention of Black Hole Attack in SUPERMAN"(PaperID:1570666752)</i>
<b>Authors Names with Affiliations:</b>	<p><u>Presenters:</u> Kratika Sharma,ABV-IIITM GWALIOR</p> <p><u>Co-Authors:</u> Saumya Bhadauria (ABV-IIITM Gwalior, India)</p>
<b>Abstract:</b>	<p>MANETs are wireless networks, providing properties such as self-configuration, mobility, and flexibility to the network, which make them a popular and widely used technique. As the usage and popularity of the networks increases, security becomes the most important factor to be concerned. For the sake of security, several protocols and methodologies have been developed for the networks. Along with the increase in security mechanisms, the number of attacks and attackers also increases and hence the threat to the network and secure communication within it increases as well. Some of the attacks have been resolved by the proposed methodologies but some are still a severe threat to the framework, one such attack is Black Hole Attack. The proposed work integrates the SUPERMAN (Security Using Pre-Existing Routing for Mobile Ad-hoc Networks) framework with appropriate methodology to detect and prevent the network from the Black Hole Attack. The mechanism is based on the AODV (Ad-hoc On-demand Distance Vector) routing protocol. In the methodology, the source node uses two network routes, from the source to the destination, one for sending the data packet and another for observing the intermediate nodes of the initial route. If any node is found to be a Black Hole node, then the route is dropped and the node is added to the Black Hole list and a new route to send the data packet to the destination is discovered.</p>
<b>Time Slot#14: 03:15 P.M. - 03:55 P.M</b>	
<b>Plenary Discussion - Title:</b>	<p><b><i>Plenary Session by Women in Engineering Track Co-Chairs</i></b></p> <p><b><u>Topic:</u></b> Using Technology to protect oneself during COVID 19 induced lockdown, online studies and work from home.</p>

<b>Authors Names with Affiliations:</b>	<u><b>Presenters:</b></u> <ul style="list-style-type: none"> <li>• Dr.Mydhili K Nair,Professor, Ramaiah Institute of Technology, Bangalore</li> <li>• Dr.Mukulika, Asst Prof, Indraprastha Institute of Information Technology,Delhi</li> </ul> <u><b>Moderator:</b></u> Dr.Sakshi Kaushal, Professor, U.I.E.T, Panjab University,Chandigarh
<b>Abstract:</b>	<p>COVID 19 has literally turned our lives topsy-turvy. It's been 13 months to date, since the first case was reported in Wuhan China. Till now, we do not have a fail-proof, fully reliable vaccine developed that will immunize the entire human population against all strands and variants of the Corona virus. Many countries across the world are announcing further strict lockdowns to bring down the surging number of sick people affected with COVID 19. The only tried and tested proven method is social distancing.</p> <p>In this context, with all family members together in their homes 24 x 7, there have been many cases of domestic violence, the victims being women and children. There is also work related harassment reported.</p> <p>In this plenary discussion, use of technology to empower and protect one-self and members of one's family subjected to such victimization will be discussed. Success stories as case-studies of how women in Asian countries, including India have empowered and protected themselves will be show-cased. Proven case-studies of how women professionals (Engineers, Doctors, Educationists, Social Workers etc.) have risen above their call of duty and used technology to find solutions will be discussed.</p>
<b>Time Slot#15: 03:55 P.M. - 04:10 P.M</b>	
<b>Paper #10 - Title:</b>	<i>"Low PAPR Waveform Design for OFDM Systems Based on Convolutional Autoencoder"(PaperID:1570666299 )</i>
<b>Authors Names with Affiliations:</b>	<u><b>Presenters:</b></u> Yara Huleihel (Ben Gurion University, Israel) <u><b>Co-Authors:</b></u> Haim H Permuter(Ben Gurion University, Israel) and Eilam Ben-Dror (Huawei Technologies Ltd., Israel)
<b>Abstract:</b>	<p>This paper introduces the architecture of a convolutional autoencoder (CAE) for the task of peak-to-average power ratio (PAPR) reduction and waveform design, for orthogonal frequency division multiplexing (OFDM) systems. The proposed architecture integrates a PAPR reduction block and a non-linear high power amplifier (HPA) model. We apply gradual loss learning for multi-objective optimization. We analyse the model's performance by examining the bit error rate (BER), the PAPR and the spectral response, and comparing them with common PAPR reduction algorithms.</p>
<b>Time Slot#16: 04:45 P.M. - 05:15 P.M</b>	

<b>Invited Talk - Title:</b>	<i>“Cognitive Radio Systems in next-generation wireless networks”</i>
<b>Authors Names with Affiliations:</b>	Dr.Chetna Singhal , Dept. of Electronics and Electrical Communication Engineering, Indian Institute of Technology (IIT) Kharagpur
<b>Abstract:</b>	In 5G and upcoming 6G wireless networks, Citizens Broadband Radio Service (CBRS) Spectrum Access System (SAS) offer an alternative to unilateral licensed spectrum access. Multi Input Multi Output (MIMO) based Hybrid Cognitive Radio (CR) system utilizes both underlay and interweave CR techniques and provides higher spectral efficiency and ensures efficient utilization of the scarce electromagnetic spectrum. The next-generation wireless networks consisting of CR nodes can achieve high throughput performance by combinedly using Narrowband and Wideband (Multiple Carrier Direct Sequence Code Division Multiple Access, i.e., MC-DS-CDMA) technology adhering to the Interference Threshold limit. The CR network scenario consists of the primary users (PU) and CR secondary users (SU). CR nodes in such a framework access the spectrum channels in the absence of PU. Hybrid CR system ensures efficient spectral utilization under circumstances resulting in near zero throughput for SU. In the presence of PU, CR-SU transmits in either Narrowband or MC-DSCDMA based on the proposed transmission selection algorithm. In the absence of PU, SU uses Interweave technique thereby allowing other competing SUs to transmit in Interference Alignment underlay mode in a multi-user scenario. The achievable throughput is enhanced using the Hybrid-CR technique in a multi-user hybrid MIMO cognitive radio wireless network as compared to the existing system.
<b>Time Slot#17: 05:15 P.M. - 05:30 P.M</b>	
<b>Paper #11 - Title:</b>	<i>“Robust Maximum Likelihood Algorithm-based Mitigation technique for impulsive noise in MIMO-OFDM systems”(PaperID:1570662231)</i>
<b>Authors Names with Affiliations:</b>	<u>Presenters:</u> Girija Prabhakar Sakimalla (Kakatiya Institute of Technology & Science, Warangal) <u>Co-Authors:</u> Rameshwar rao R (Osmania, India)
<b>Abstract:</b>	Non-Gaussian impulsive noise impacts the equalizers and signal detectors directly in the wireless system. The major problem in the MIMO-related applications is the blind source equalization and separation, where the users transmit multiple digital signals in a linear channel that is received using the array of antennas. The noise in the received signals are impulsive in nature, which is mitigated in the research by implementing Robust Maximum Likelihood Algorithm (RMLA) for handling the degradation of the performance in the wireless system. The constant modulus cost function formulated using RMLA is used for modelling the equalizer to adaptively suppress the influence of the impulsive noise. The effectiveness of the proposed RMLA based impulse noise mitigation is evaluated based on the evaluation metrics, such as Bit Error Rate (BER), Mean Square Error (MSE) and Symbol Error Rate (SER) corresponding to the Signal-to-Noise Ratio (SNR) and dissimilar antenna array size. The proposed RMLA based BE method provided a

	minimum BER values of 0.0021, 0.0044, 0.0142 and minimum MSE value of 0.0006, 0.0012, & 0.0037 with the Rayleigh channel, minimum BER values of 0.0006,0.0012&0.0013&given minimum MSE value of 0.0003 with Rician channel.
<b>Time Slot#18: 05:30 P.M. - 05:45 P.M</b>	
<b>Paper #12 - Title:</b>	<i>"Priority Order-Based Key Distribution in QKD-secured Optical Networks"(PaperID:1570674195 )</i>
<b>Authors Names with Affiliations:</b>	<u>Presenters:</u> Purva Sharma (Indian Institute of Technology, Indore, India) <u>Co-Authors:</u> Vimal Bhatia (Indian Institute of Technology Indore, India), Shashi Prakash (Devi Ahilya University, India)
<b>Abstract:</b>	In quantum key distribution (QKD)-secured optical networks, blocking increases with the number of QKD lightpath requests as well as with the number of times modification required to improve the security level of QKD lightpath requests. The blocking is severe problem in such networks because of the limited number of resources (wavelengths and time-slots) in each fiber link. In this paper, we propose a priority order-based routing wavelength and time-slot allocation (POB-RWTA) scheme to reduce the blocking of QKD lightpath requests. In the proposed POB-RWTA scheme, the QKD lightpath requests are served according to their priority order. The priority order of each QKD lightpath request is based on the security level. The blocking of high priority lightpath requests (HPLRs) and total incoming QKD lightpath requests due to limited resources can be reduced using the above criterion of priority order. The performance analysis of the proposed POB-RWTA scheme is made in terms of the success probability of QKD lightpath requests considering different wavelengths for QSch and the probability of secret key update failure. We compared the proposed POB-RWTA scheme with a non-priority order-based routing wavelength and time-slot allocation (NPOB-RWTA) scheme. Simulations performed on NSFNET topology show that by using the POB-RWTA scheme, the success probability of HPLRs and total incoming QKD lightpath requests are significantly improved as compared to NPOB-RWTA.
<b>Time Slot#19: 05:45 P.M. - 06:00 P.M</b>	
<b>Paper #13 - Title:</b>	<i>"Virtual Network Function Embedding under Nodal Outage using Reinforcement Learning" (PaperID:1570671538 )</i>
<b>Authors Names with Affiliations:</b>	<u>Presenters:</u> Swarna Bindu Chetty (University College Dublin, Ireland) <u>Co-Authors:</u> Hamed Ahmadi (University of York, United Kingdom (Great Britain)) Avishek Nag (University College Dublin, Ireland)
<b>Abstract:</b>	With the emergence of various types of applications such as delay-sensitive applications, future communication networks are expected to be increasingly complex and dynamic. Network Function Virtualization (NFV) provides the necessary support towards efficient management of such complex networks, by



disintegrating the dependency on the hardware devices via virtualizing the network functions and placing them on shared data centres. However, one of the main challenges of the NFV paradigm is the resource allocation problem which is known as NFV-Resource Allocation (NFV-RA). NFV-RA is a method of deploying software-based network functions on the substrate nodes, subject to the constraints imposed by the underlying infrastructure and the agreed Service Level Agreement (SLA). This work investigates the potential of Reinforcement Learning (RL) as a fast yet accurate means (as compared to integer linear programming) for deploying the softwarized network functions onto substrate networks under several Quality of Service (QoS) constraints. In addition to the regular resource constraints and latency constraints, we introduced the concept of a complete outage of certain nodes in the network. This outage can be either due to a disaster or unavailability of network topology information due to proprietary and ownership issues. We have analyzed the network performance on different network topologies, different capacities of the nodes and the links, and different degrees of the nodal outage. The computational time escalated with the increase in the network density to achieve the optimal solutions; this is because Q-Learning is an iterative process which results in a slow exploration. Our results also show that for certain topologies and a certain combination of resources, we can achieve between 70-90% service acceptance rate even with a 40% nodal outage.