

**IEEE** Gujarat  
Section



**IEEE**  
SCET, SB



# **A Report on New Trends in Signal Processing 2022**

**Event Date: 6<sup>th</sup> & 7<sup>th</sup> September, 2022**

Organized by:

**Sarvajani College of Engineering and Technology**

**In association with**

**IEEE GS, IEEE SPS GS**

**& IEEE SCET Student Branch**

## **Team Behind the Event:**

**Patron:** Dr. Hiren Patel

**Advisors:** Shri Deepak Mathur, Dr. Anil Roy, Dr. Maniklal Das

**General Co-chairs:** Dr. Kiran Amin, Dr. Chirag Paunwala

**Program Chair:** Dr. Mita Paunwala, Dr. Manish Khare

**Organizing Co-chair:** Dr. Nehal Shah, Prof. Ketki Pathak

**Program Committee:** Dr. Arpan Desai, Dr. Srimanta Mandal, Dr. Sarosh Dastoor, Dr. Vandana Shah, Prof. Pritesh Saxena, Prof. Dhatri Pandya

**Finance Chair:** Prof. Neeta Chapatwala

**Web Committee:** Dr. Nirali Nanavati

**Student Co-ordinators:** Khushi Fatnani, Hetav Raval



**IEEE** Gujarat Section



**IEEE** SCET Student Branch



# Netsip<sup>2022</sup>



The theme of 5th edition of NeTSiP is Security. Leading researchers in the domains of Multimedia Signal Processing, biometrics, bioinformatics, block chain technologies, will share knowledge.



DR. JEROME BELLEGARDA ,  
APPLE INC, USA



DR. S. VENKATESAN ,  
IIIT ALLAHABAD



PROF. SANJAY CHAUDHARY ,  
AHMEDABAD UNIVERSITY



PROF. ANISH MATHURIA ,  
DA-IIT, GANDHINAGAR



PROF. PRITEE KHANNA ,  
IIIT JABALPUR



PROF. DHINAKARAN  
VINAYAGAMURTHY ,  
IBM RESEARCHER



DR. MADHU KAMBLE ,  
SAMSUNG RESEARCH ,  
BANGLORE



PROF. DEEPAK SINGH TOMMAR ,  
MANIT, BHOPAL

## For Whom:

Researchers from academia including faculty members, Ph.D. scholars, M.Tech./M.E./B.Tech./B.E./ BCA/B.Sc./MCA/M.Sc. as well as industry participants interested in the field of Security.

### Student Coordinators

Khushi Fatnani : +91 99980 29494  
Hetav Raval : +91 84601 13189

### Faculty Coordinators

Dr. Chirag Paunwala : +91 94290 89799  
Prof. Ketki Pathak : +91 98240 63676  
Dr. Manish Khare : +91 92651 85940

**DATE :** 6th - 7th Sept, 2022

**VENUE :** Sarvajanik College of Engineering and Technology, Surat.

**MODE :** HYBRID

**REGISTER HERE**



<https://bit.ly/NetSiP-2022>

## **Student Volunteers:**

1. Khushi Fatnani
2. Hetav Raval
3. Abanob Bhanu
4. Muskan Jhawar
5. Ritavi Shah
6. Rutvik Sojitra
7. Dixit Boghara
8. Jigar Adhvaryu
8. Sanket Iyer
10. Jeet Bari
11. Aks Patel
12. Saqlain Shaikh
13. Geet bhatt
14. Mahek Godiwala
15. Priyanshi Gadhia
16. Ujas Patel
17. Mohit Dhabuwala
18. Palaksha Raskapoorwala
19. Nimesh
20. Priyanshi Gelani
21. Jill Saliya
22. Jeel Ramani
23. Aarya Shah
24. Ansh Dobariya
25. Sarthak Bosamiya

## **Event Details:**

**Event Type:** Symposium

**Event Mode:** Hybrid

**Event Platform:** Cisco WebEx

(<https://ieeemeetings.webex.com/ieeemeetings/j.php?MTID=m88f68f8471e327808bb962b6d8246509>)

**Event Category:** Technical Event

**Event Date and Time:** 6<sup>th</sup>-7<sup>th</sup> September 2022,  
10:00 IST to 16:00 IST

**Event Accessibility:** For registered participants

**Event Related Links:** <http://ieeespsgs.org/netsip2022/>

**Website:** <https://ieeespsgs.org/mspcup/>

## Event Insight:

### About the event:

The purpose of the event was to uncover contemporary signal processing trends specifically in the security domain. With the ever-increasing number of data sources, we are facing a data deluge. Thus, making the need of security, more important than ever. The event therefore was aimed at gaining insights in the domains of speech, image, audio, video processing, bioinformatics, biometrics, language processing.

With the help of leading industry experts and academicians, the drive for this event was also to experience advancements, Advancements that enable mobility, ubiquitous connectivity, and nearly universal access to informational resources, whilst also discussing some of the challenges and concern that lie within these domains.

## **Registration and Event management:**

Registration of the event started on 19<sup>th</sup> August 2022 and over 200 participants registered for the event, from all over the country.

Throughout all the sessions, participants showcased their enthusiasm by asking interesting questions to experts. Speakers gave excellent response to all their queries as well as provided additional insights. All the students, attendees and delegates demonstrated immense satisfaction towards the event.

Day 1 of NetSip, was anchored by Ms. Keshvi Pipwala and Ms. Tanushree Doctor, III Year Computer Engineering Student of SCET, Surat. Day 2 of NetSip, was anchored by Ms. Shivangi Vyas and Ms. Aarya Lokhandwala

The event was very well-managed by Dr. Chirag Paunwala, Chair, IEEE SPS GS, Prof. Ketki Pathak, Advisor, IEEE SPS SCET SBC, Dr. Manish Khare



## Session Experts:

### 1) Dr. Jerome Bellegarda:

**Dr. Jerome R. Bellegarda** is Apple Distinguished Scientist in Intelligent System Experience at Apple Inc., Cupertino, California, which he joined in 1994. Prior to that, he was a Research Staff Member at the IBM T.J. Watson Center, Yorktown Heights, New York. He received the Ph.D. degree in Electrical Engineering from the University of Rochester, Rochester, New York, in 1987. Among his diverse contributions to speech and language advances over the years, he pioneered the use of tied mixtures in acoustic modeling and latent semantics in language modeling. In addition, he was instrumental to the due diligence process leading to Apple's acquisition of Siri personal assistant technology and its integration into the Apple ecosystem. His general interests span machine learning applications, statistical modeling algorithms, natural language processing, man-machine communication, multiple input/output modalities, and multimedia knowledge management. In these areas he has written close to 200 publications, and holds over 100 U.S. and foreign patents. He has served on many international scientific committees, review panels, and advisory boards. In particular, he has worked as Expert Advisor on speech and language technologies for both the U.S. National Science Foundation and the European Commission, served on the IEEE Signal Processing Society (SPS) Speech Technical Committee, was Associate Editor for the IEEE Transactions on Audio, Speech and Language Processing, and is currently an Editorial Board member for Speech Communication. He was recently selected as one of the 2022 IEEE SPS Distinguished Industry Speakers. He is a Fellow of both IEEE and ISCA (International Speech Communication Association).

### 2) Dr. Deepak Singh Tomar

Dr. Deepak Singh Tomar is a Associate Professor in Department of Computer Science and Engineering at Maulana Azad National Institute of Technology, Bhopal, Madhya Pradesh. Prior to which he served as a lecturer in Department of Technical Education, Govt. of Madhya Pradesh. He also worked as visiting faculty at ABV-Indian Institute of Information Technology and Management, Gwalior, Indian Institute of Science Education & Research(IISER), Bhopal, Government Engineering College, Bhopal, and, IITM, Jabalpur. He also served as a Academic Counsellor for I.G.N.O.U. He has pursued his Ph.D in Computer Science and Engineering as well as his M.Tech & B.E in the domain of Computer Technology. His Research interests are Cyber Security& Cyber Forensics, Data Mining, Internet Technology, Network Security, Machine Learning. He has many National and International conference publication including 53 International Journal publication. He is a member of IEEE, IACSIT, CSTA, IAENG, IWA. He has establish 3 new labs at MANIT, Bhopal over the span of 2016-2021.

### **3) Dr. Sankita Patel**

Dr Sankita Patel is a Assistant Professor in Department of Computer Engineering at SVNIT, Surat. Prior to joining SVNIT she was an assistant professor, from 2008-2009, at C.K. Pithalwalla College of Engineering and Technology where she also served a lecturer over the span of 2003-2008. She has pursed her M.Tech and Ph.D from SVNIT, Surat, in the domain of Computer Science. She has over 10 international journal publications and 20 international conference publications as well as 7 national conference publications. Her research interests includes information security and privacy, privacy issues in data mining, security in wireless sensor networks and privacy issues in online social networks.

#### **4) Dr. S. Venkatesan**

Dr. S. Venkatesan is an expert in the Cyber Security and Blockchain Technology. He is an Associate Professor in the Department of Information Technology at the Indian Institute of Information Technology Allahabad (IIITA). He heads IIITA's C3iHub IoT Security Lab and is a member of the Network Security and Cryptography (NSC) Group. He has authored several research papers published in reputed journals and presented at conferences. His research interests include Network Security, Cloud Security, Mobile Agent Security, and Blockchain. He has received three grants respectively from Department of Science & Technology, Government of India for the project titled Development of Secure IoT Communication using the Blockchain Technology, Department of Science & Technology - Indo-Norway Collaborative Project titled Cyber-Physical Security in Energy Infrastructure of Smart Cities (CPSEC), Department of Science and Technology -C3i Hub, IHUBNF, Indian Institute of Technology Kanpur project on IoT Security.

#### **5) Dr. Madhu Kamble**

Madhu R. Kamble is currently working as Chief Engineer at Samsung Research Institute, Bangalore (SRI-B), India from June 2022. She pursued her Post-Doc in 2022 from EURECOM, France and Ph.D. from DA-IICT, Gandhinagar, India in 2021. She did her M.Tech. degree from Cummins College of Engineering, Pune, Maharashtra, India in 2015 in Signal Processing specialization and the B.Tech degree from P.V.P.I.T, Budhgaon, Sangli, Maharashtra in 2012. She has been awarded with Rajiv Gandhi National Fellowship (RGNF) for her doctoral research studies. Her research interest inclined towards voice biometrics, in particular, analysis of spoofing attacks and development of countermeasures. She offered a tutorial jointly with Prof. Patil on the same topic in IEEE-WIE Conference, at AISSM's Pune in Dec 2016. She was the co-instructor for a tutorial in Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA-ASC), Kuala Lumpur, Malaysia, 2017. She is a student member of ISCA, student member of IEEE, IEEE Signal Processing Society, and APSIPA. She is a reviewer for Computer, Speech and Language, EURASIP-JASM, Neurocomputing Journal, Elsevier, INTERSPEECH, ICASSP, BIOSIG,. She received ISCA and IEEE SPS student travel grant to present her papers during INTERSPEECH 2017, 2018 and ICASSP 2019 and 2022.



## **6) Dr. Anish Mathuria**

Anish Mathuria is a Professor at DA-IICT. His research interests are in information security and cryptography. Anish is currently an Associate Editor for Sadhana, a journal published by Indian Academy of Sciences. He has served on the program committees of ICISS, Indocrypt, and SPACE conferences. Anish was an invited speaker at the CIMPA-UNESCO-INDIA School on Security for Computer Systems and Networks held in 2005. He has served on the committee for “e-Authentication standards” constituted by the Ministry of Communications and Information Technology. Anish has a Bachelor’s degree in Electronics from University of Bombay, and Master’s and PhD degrees in Computer Science from University of Wollongong, Australia. Prior to joining the faculty at DA-IICT, he was at IBM Tokyo Research Laboratory, and University of Massachusetts Dartmouth, USA

## **7) Dr. Sanjay Chaudhary**

Dr. Sanjay Chaudhary is a Dean of Students of Ahmedabad University and a Professor, School of Engineering and Applied Science of Ahmedabad University. He was a Professor and Associate Dean of School of Engineering and Applied Science, Ahmedabad University during 2016 to 2019. During 2001 to 2013, he was a Professor as well as Dean (Academic Programs) at Dhirubhai Ambani Institute of Information and Communication Technology (DA-IICT), Gandhinagar, India. His research areas are Cloud Computing, Blockchain Technology, Big Data Analytics, and ICT Applications in Agriculture and Rural Development. He has authored eight books and nine book chapters. He has published more than one hundred and fifty research papers in international conferences, workshops and journals. He is an active member of program committees of leading International conferences and workshops as well as review committees of leading journals. He has received research grants from leading organizations including IBM, Microsoft and Department of Science and Technology, Govt. of India.

## **8) Dr. Dhinakaran Vinayagamurthy**

Dr. Dhinakaran Vinayagamurthy is a Researcher in the Blockchain and Supply chain group at the IBM Research India lab in Bangalore. His research interests are in cryptography and security, focusing on the challenges in computing over private data in untrusted environments. At IBM, he has worked on projects around encrypted databases, IBM Blockchain Transparent Supply and privacy-preserving machine learning. He is also an IBM Quantum Ambassador. He pursued his PhD from the University of Waterloo advised by [Sergey Gorbunov](#) and [David Jao](#), where he was a part of the amazing [CrySP](#) group and [IQC](#). Prior to that he pursued his masters with the [Theory Group](#) at University of Toronto advised by [Vinod Vaikuntanathan](#), and then started his PhD with [Charles Rackoff](#) before "transferring" to Waterloo. Prior to that, he completed his undergraduate degree at College of Engineering, Guindy.

## **9) Mr. Srikanth Chandrasekaran**

Sri has been associated with the IEEE Standards Association (IEEE SA) for the past 9 years as a Sr Director, and practice lead for IEEE SA Foundational Technologies. In this role, Sri is focused on developing key program that address core issues of security, identity, trust and building end-to- end trustworthy devices and systems across emerging areas such as IoT, Smart Cities, Sensors and Blockchain. Sri also heads the standardization activities for IEEE SA for the Asia Pacific region. Sri leads the IEEE Blended Learning Program effort, driving the development of an eLearning platform, focused on bridging skills for students in current and emerging technologies as well as lateral skilling of industry professionals. Prior to joining IEEE, Sri was associated with Freescale Semiconductor Inc. (formerly Motorola Inc.) for 17 years, managing a global Electronic Design Automation R&D team focused on modeling of mixed signal designs and Electro-magnetic compliance for Freescale products. Sri received the Accellera Technical Excellence Award in 2009 for his leadership and contributions to design automation standardisation activities. Sri holds a Bachelor of Science degree in Physics from Madras University, India and a Post Graduation degree in Electrical Communication from Indian Institute of Science, Bangalore, India.

## Inauguration of Event:

The inaugural ceremony of the international symposium on “New Trends in Signal Processing 2022” began with a divine prayer, sang by Ms. Soshmita Paul. The session further moved with the lighting of a lamp by a group of dignitaries of Sarvajanik University and Sarvajanik College of Engineering & Technology - Prof. Hiren Patel (Principal, SCET), Prof. Nehal Shah (Head, Department of Electronics & Communication), Prof. Deepaksingh Tomar, Prof. Chirag Paunwala (Dean R&D, SCET and Chair IEEE SPS GS), Prof. Meeta Paunwala (Vice Chair, IEEE SPS GS), Prof. Ketki Pathak (IEEE SCET SB Councillor), Prof. Ashish Phophalia (Secretary, IEEE Gujarat Section), Ms. Khushi Fatnani.

Session moved further with the felicitation of Prof. Ashish Phophalia by Prof. Nehal Shah, Prof. Ketki Pathak felicitated Prof. Meeta Paunwala and Prof. Chirag Paunwala felicitated Dr. Hiren Patel.

Prof. Hiren Patel formally welcomed all the dignitaries present on the day and participants from various parts of the country & students. He mentioned the significance of taking part in such project competitions and its aims of bringing together a core group of AI, ML, and Computer Vision all over the R10 Region with significant participation from our own state Gujarat.

Ms. Khushi Fatnani briefed all the participants and audience present regarding the event specifics and elaborated on the event flow.

In his address, Prof. Sarosh Dastoor briefed about the importance of the MSP Cup and our esteemed resource persons. He wished for the success of the event and inspired the participants.

Prof. Maniklal Das welcomed the participants and motivated them to learn irrespective of the results. He appreciated the efforts of the IEEE SCET Student Branch and IEEE SPS GS to host such a great event on the premises of SCET.

Mr. Abanob Bhanu enlightened the audience regarding IEEE SCET Student Branch as well as the Promising Student Branch Award

Mr. Hetav Raval delivered the vote thanks to all the participants, speakers and, faculty members involved in making the event a reality.

# Agenda:

**SARVAJANIK EDUCATION SOCIETY**  
**Sarvajanik College of Engineering & Technology, Surat**  
**New Trends in Signal Processing (NeTSiP) 2022**

**Programme** : NeTSiP 2022  
**Date** : 6th-7th September 2022  
**Time** : 10:00 AM onwards  
**Venue** : SCET EC AV Room

## AGENDA

Sr. No.	Item	Hosted By	By	Minute
1.	Prayer and lighting of the lamp	Host	Dignitaries	<u>5</u>
2.	Felicitation of Dignitaries and the Jury with flowers and e-memento	Host	Prof. Chirag Paunwala to Prof. Anil Roy, Advisor, IEEE Gujarat Section Prof. Ketki Pathak, SCET SB Councillor to Prof. Ashish Phophalia, Secretary, IEEE Gujarat Section Prof. Neeta Chapatwala to Prof. Hiren Patel, Principal, SCET.	<u>3</u>
3.	Welcome speech	Host	Prof. (Dr.) Hiren Patel, Principal, Faculty of Engg.	<u>5</u>
4.	About NeTSiP event	Host	Ms. Khushi Fatnani, Coordinator	<u>5</u>
5.	Words of Motivation	Host	Prof. Anil Roy, Advisor, IEEE GS	<u>5</u>
6.	About SCET SB and Promising SB Award	Host	Mr. Abanob Bhanu, Chair, IEEE SCET SB (Brief intro about SB and the most promising SB award 2021) (A trophy will be given by Prof. Anil Roy to Prof. Hiren Patel, Principal, Faculty of Engineering).	<u>5</u>
7.	Vote of Thanks	Host	Mr Hetav Raval, IEEE SPS SCET SB Chair	<u>2</u>
Master of Ceremony: Tanushree and Keshvi				

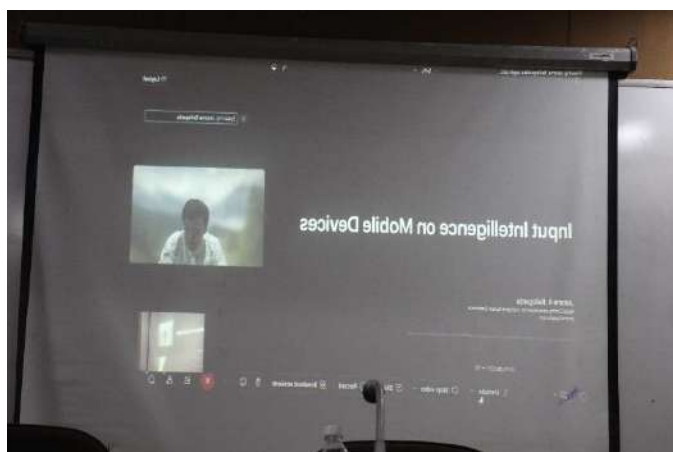
# Day 1

## Session 1

**Dr. Jerome Bellegarda**

### **Input Intelligence on Mobile Devices**

Over the past decade, the confluence of sophisticated algorithms and tools, computational infrastructure, and data science has fueled a machine learning revolution across multiple fields, including speech and handwriting recognition, natural language processing, computer vision, social network filtering, and machine translation. Ensuing advances are changing the way we interact with technology in our daily lives. This is particularly salient when it comes to user input on mobile devices, be it speech, handwriting, touch, keyboard, or camera input. Increased input intelligence boosts device responsiveness across languages, improving not only basic abilities like tokenization, named entity recognition and part-of-speech tagging, but also more advanced capabilities like statistical language modeling and question answering. In this talk, I will give selected examples of what we are doing at Apple to impart input intelligence to mobile devices, with two overarching themes as sub-text: (i) enhancing interaction experience through machine learning, and (ii) transforming users' digital lives without sacrificing their privacy.









## **Session 2**

### **Dr. Deepak Singh Tommar**

# **Forensics Investigation of Application Attacks**

The growth of web applications on Internet has led to an ever-present increase in cyber-crime. The attacker may inject malicious code into text boxes of vulnerable web application such as guestbook, feedback form, search box, etc. which may be further executed by web server. Code injection attack is a type of multi-step attack which can be carried out by potentially malicious invaders through inserting script code. The execution of system calls and API on web server by attacker through code injection may damage the file system or leak configuration information of web server.

Forensic investigation is a technique which is carried out to establish legitimate evidences and facts are to be deduced. In a Web environment the major challenge faced by the law enforcing agency is to collect accurate and effective evidences from the growing volumes of crime data. Investigation of code injection attack is a tedious job for law enforcement agencies due to the insufficient support from existing logging system and dynamic nature of evidence gathering





## **Session 3**

### **Dr. Sankita Patel**

# **Biometric Authentication: Security Issues and Potential Fixes**

Biological characteristics are unique and nearly impossible to replicate, making biometrics a secure access solution. Passwords on the other hand can be shared and easily stolen by hackers because “people” manage their passwords.

Biometrics poses the challenge of privacy since the key features of recognition is exposed to the world. For example, others can record your voice, use your image without consent in facial recognition or copy your fingerprints from an object surface you have held.

If the identity management systems get compromised, hackers can leak or steal your biometric data. Since your biometric information is irreplaceable, malicious people can perpetuate criminal activities as long as they possess your data.







## **Session 4**

### **Dr. S. Venkatesan**

# **Recent Developments in Cyber Security**

The physical world is rapidly changing towards the Cyber World and users are highly accepted the change because of various factors such as immediate availability, fast communication and reduced overhead. The change provides efficient service to the users however this increases the surface for the malicious users. The cyber security techniques mitigates the malicious users however the increase of surface needs advancement. This talk will introduce recent advancements in the cyber security along with the security requirements, impact and the research requirements.









## End of Day 1



## Day 2

### Session 1

## Dr. Madhu Kambale **Voice Biometrics**

A biometric system aims to verify the identity of an individual from their behavioral and/or biological characteristics. Voice biometrics can be considered either as an anatomical or as a behavioral characteristics. Robustness and security are two important factors as far as system deployment is concerned. In recent years, automatic speaker verification (ASV) is used extensively for voice biometrics. This leads to an increased interest to secure these voice biometric systems for real-world applications. The ASV systems are vulnerable to various kinds of spoofing attacks, namely, synthetic speech (SS), voice conversion (VC), replay, twins, and impersonation. The study of spoofing countermeasures has become increasingly important and is currently a critical area of research, which is the principal objective of this thesis. With the development of Neural Network-based techniques, in particular, for machine generated spoof speech signals, the performance of Spoof Speech Detection (SSD) system will be further challenging. To encourage the development of countermeasures that are based on signal processing techniques or neural network-based features for SSD task, a standardized dataset was provided by the organizers of ASVspoof challenge campaigns during 2015, 2017, 2019 and 2021.







## **Session 2**

### **Dr. Anish Mathuria**

# **Privacy-preserving recommendations using homomorphic encryption**

Currently, it may be challenging for organizations to outsource data for storage, processing or analytics to a third-party cloud environment securely. However, with homomorphic encryption, data processing or analytics can be outsourced to a third party without needing to trust that party's data security. Without the correct decryption key, the original data can't be accessed, which means sensitive data can be sent and analyzed while still remaining encrypted. This can be used to preserve customer privacy in industries such as healthcare, financial services and IT.







# **Session 3**

## **Dr. Sanjay Chaudhary**

### **Research Challenges in Blockchain Technologies**

Blockchain is fast emerging as a disruptive technology solution in the areas involving multiple stakeholders, each having complex business processes implemented in unique systems and infrastructure, operating in different administrative, geopolitical boundaries. With cross-organizational workflows and complex compliance requirements, industry sectors like Healthcare, Finance, Manufacturing, International Trade, Insurance, Retail, Supply Chain, Recruitment, Media, Real-estate, and Education etc. can benefit significantly by improved operational efficiency, enhanced security, and transparency offered by blockchain implementation. Though rapid adaptation, blockchain technology practices, standardization and research activities are in its nascent stages and evolving continuously with new tools, technologies, approaches, and application strategies. The talk will highlight challenges related to Blockchain Databases, Blockchain Technology, Integration with Emerging Technologies, and Blockchain Tools.







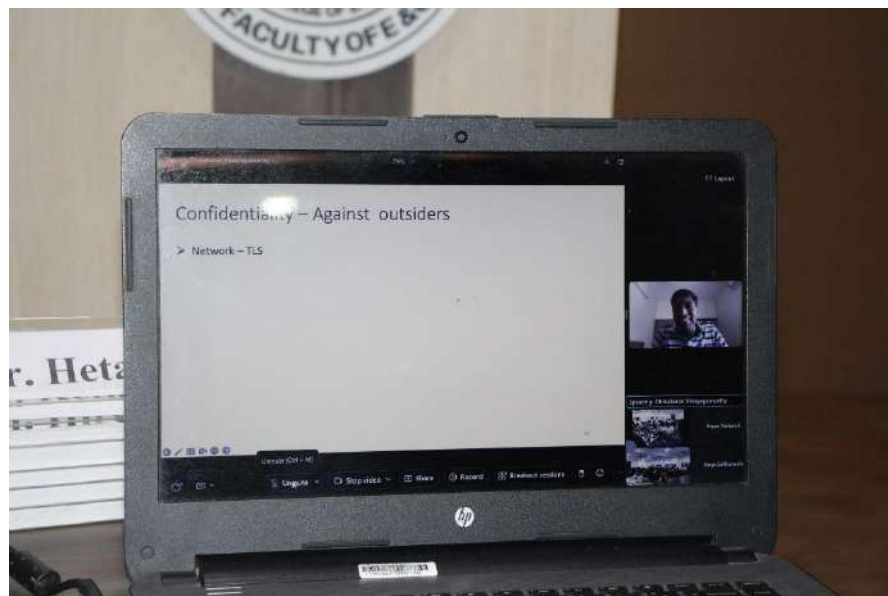
## Session 4

### Dr. Dhinakaran Vinayagamurthy

### Security of Blockchains

The dream of decentralization has gained a lot of traction across different aspects, for eg. infrastructure, governance. The blockchain technology, often synonymously referred to as web3, has formed the basis of this decentralization dream. In this talk, we will discuss some of its popular instantiations and use-cases and look at different security aspects to be considered when implementing and using this technology.







# Session 5

## Srikanth Chandrasekaran

### Building Trust in Systems through IEEE Standards







# Valedictory

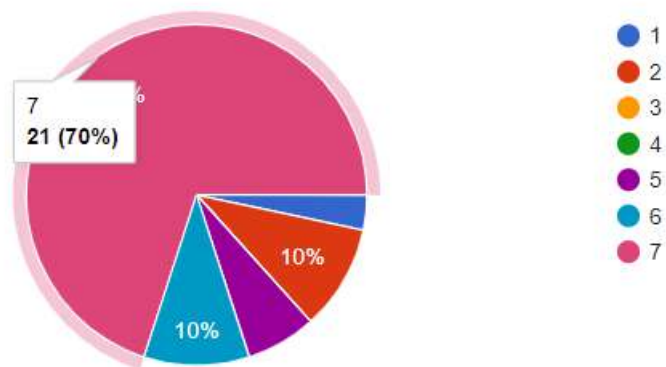




## Feedback:

How many sessions you were able to attend in the event?

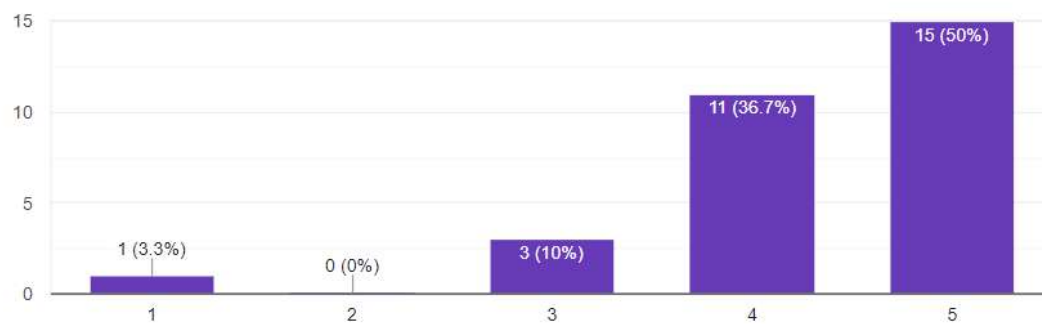
30 responses



Please give overall rating to this event.

 Copy

30 responses



## Quiz Rounds

For both days, quiz rounds were conducted in online mode before and after lunch time. Quizzes were in context to the ongoing sessions, intended to enhance engagement of participants.

Top Performing participants got rewarded with certificates as well as trophies.







## **Volunteer's Team:**







**Report Compiled by:** Hetav Raval, Chair, IEEE SPS SCET SB and Khushi Fatnani, IEEE SCET SB member