



NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

**Faculty of Computing and
Informatics**

Department: Computer
Science

Programme

2023 International Conference on Emerging Trends in Networks and Computer Communications (ETNCC)

Dates: 16-18 August 2023

Venue: High-Tech Transfer Plaza Select (HTTPS),
NUST Lower Campus

Zoom Links

16 - 17 August 2023 - <https://tinyurl.com/2ybusp5p>
Meeting ID: 863 7000 7404 | Passcode: ENTCC@23

18 August 2023- <https://tinyurl.com/2p974f7m>
Meeting ID: 864 7446 9088 | Passcode: @FCI#2023

UNESCO Chair on Secure
High-performance
Computing for Higher
Education and Research



The Opening of International Conference on 2023 Emerging Trends in Networks and Computer Communications (ETNCC)

Date: Wednesday, 16 August 2023
Time: 09:00 - 11:00 (CAT) / 12:30 - 14:30 (IST)
Venue: High-Tech Transfer Plaza Select (HTTPS), NUST Lower Campus
 MS Teams/Zoom

Director of Ceremonies: Prof Fungai Bhunu Shava
General Chair, 2023 ETNCC

Time (CAT)	Activity	Presenter
09:00	National and AU Anthems	
09:05	Welcoming Remarks	Dr Eroid Naomab <i>Vice-Chancellor: NUST</i>
09:15	Overview of the Conference	Prof Dharm Singh Jat <i>UNESCO Chairholder</i>
09:25	Remarks	Mr Waldo Junius <i>Acting Director: Namibia National Commission for UNESCO Secretariat, Ministry of Higher Education, Technology and Innovation</i>
09:35	Remarks	Dr Licky Erastus <i>Managing Director: Mobile Telecommunications Limited</i>
09:45	Remarks	Prof David Oyedokun, <i>Chair:IEEE South Africa Section</i>
09:55	Keynote Speaker	Prof Manoj Choudhary <i>Vice Chancellor: Gati Shakti Vishwavidyalaya (Central University) Lalbaug, Vadodara, India</i>

10:15	Opening Remarks	Dr Itah Kandjii-Murangi <i>Honourable Minister: Ministry of Higher Education, Training and Innovation, Namibia</i>
10:30	Vote of Thanks	Dr Colin Stanley <i>Acting DVC Research, Innovation and Partnerships: NUST</i>
10:35	AU and National Anthems	
10:40	Tea Break	
11:00	Distinguish Speaker Session 1 Chair 1: Dr Azeta Ambrose, NUST Chair 2: Dr Rituraj Soni, Engineering College Bikaner Moderator: Ms Jovita Mateus, NUST	
11:00	Cyber Security of Embedded Networks in Heavy Vehicles	Prof Indrakshi Ray <i>Director: Colorado Center for Cyber Security Colorado State University</i>
11:25	Artificial Learning: From Machine Learning (ML) to X-Learning (XL)	Prof B. Antoine Bagula <i>ISAT Laboratory (Head), Department of Computer Science, University of the Western Cape, South Africa</i>
11:50	Towards Building Secure Cyber-Physical Systems	Dr Indrajit Ray <i>Professor of Computer Science Colorado State University.</i>
12:15	Challenges and Opportunities of Artificial Intelligence	Dr Deepak Garg <i>Vice Chancellor - SR University</i>
13:00 - 14:00	Lunch Break	

14:00 - 15:30	Technical Session – T1 Chair 1: Dr Munyaradzi Maravanyika, NUST Chair 2: Dr Vinesh Kumar Jain, Govt Engineering College, Ajmer Moderator: Ms Teresia Ankome, NUST	
Paper ID	Authors	Title of Paper
E13	Piyush Bagla, Ravi Sharma, Amit Kumar Mishra, Neha Tripathi, Ankur Dumka and Neeraj Kumar Pandey	An Efficient Security Solution for IoT and Cloud Security using Lattice-based Cryptography
E29	Nandkishor Narkhede, Sumit Mathur, Anand Bhaskar, Kamal Kant Hiran, Manish Dadhich and Mukesh Kalla	A New Methodical Perspective for Classification and Recognition of Music Genre Using Machine Learning Classifiers.
	Harmanjot Singh, Harish Kumar and Sakshi Kaushal	Review of Challenges and Application of Unmanned Aerial Vehicle
E53	Geeta Rani, Shrey Khandelwal, Nidhi Kundu and Vijaypal Singh Dhaka.	Automatic Segmentation and Classification of Skin Cancer Cells using Thresholding and Deep Learning based Techniques
C64	Vinay Maurya	Blockchain-Powered Solution to Safeguard IoT Devices against Attacks
C17	Dishant Zaveri, Jasleen Gill, Krishi Jain, Vividha Jagtap, Shivam Sheth, Narendra Shekhar	Revolutionizing Obstetric Care: IoT, AI-Enabled, and Data-Driven Partograph System
14:00 - 15:30	Technical Session - 2 Chair 1: Mr Peter Gallert, NUST Chair 2: Dr Kamal Kant Hiren, Symbiosis University of Applied Sciences Moderator: Mr Nasimane Ekandjo, NUST	

Paper ID	Authors	Title of Paper
E1	Jyoti Gajrani, Rajat Shri Shrimal, Vinesh Kumar Jain and Meenakshi Tripathi, Dharm Singh Jat	Detection of Ransomware Attacks using Weight of Evidence Technique
E16	Betül Tatar, Teoman Karadağ and Ahmet Harma.	Medical Smart Insoles Provide Controlled Loading
E50	Md Al Amin, Amani Altarawneh, Sumantra Sarkar and Indrajit Ray	Blockchain Smart Contracts for Policy Compliance: A Healthcare Perspective
C7	Geeta Chhikara , Samridh shrivastava , Nidhi Kundu, Vijaypal Singh Dhaka	Leaf Edge Detection using Machine Learning
C10	Kirti Thakur , Harish Kumar, Sneh mani	Advancing Missing Data Imputation in Time-Series: A Review and Proposed Prototype
C20	Pinar Kullu , Sevgi Yigit-Sert , Merve Ozkan-Okay , Yilmaz Ar	An Artificial Bee Colony Based Mapping Method for Three Dimensional Network-on-Chip
C27	Giresse Komba	Water Pipeline Leak Detection and Localisation in Water Distribution Networks
15:30	Tea Break	
15:45 - 17:00	Distinguish Speaker Session 2 Chair 1: Dr Mercy Chitauro, NUST Chair2: Dr Islam Tharwat Abdel Halim, Nile Moderator: Ms Victoria Shakela, NUST	
Time	Distinguish Speaker	Title
15:45	Dr Ashutosh Dutta Chair IEEE ORAN Industry Connection and Chair, IEEE Future Networks	Future Networks

16:05	Prof Sheshadri Mohan <i>Professor: University of Arkansaas</i>	AI/ML-Enabled Connected and Autonomous Vehicles in the Era of 5G, 6G, and Beyond
16:25	Prof Raj Jain <i>Professor of Computer Science and Engineering, Washington University in Saint Louis</i>	Common Issues and Challenges in AI for Cybersecurity
16:45	Dr Heena Rathore <i>Texas State University, San Marcos, Texas, USA, Assistant Professor</i>	Revolutionizing Mental Health Care: The Role of AI in Promoting Well-Being

Research Day (Day 2)

Theme: High-Performance Computing and Artificial Intelligence for Effective Research and Innovation in Namibia

Date: Thursday, 17 August 2023

Time: 08:30 - 18:00 (CAT) / 12:00 - 21:30 (IST)

Venue: MS Teams or Zoom

Inaugural Programme
 Prof Suama Hamunyela
 Associate Dean
 Director of Ceremonies

Time (CAT)	Activity	Presenter/Speaker
08:30	Welcoming Remarks	Prof Fungai Bhunu Shava <i>Acting Executives Dean: Faculty of Computing and Informatics</i>
08:40	Remarks	Dr Manoj Singh Gaur <i>Director: Indian Institute of Technology, Jammu</i>

09:00	Research and Innovation Support	Dr Anna Matros-Goreses <i>Director: Project Services Unit</i>
09:20	Keynote Speaker	Prof Suraj C. Kothari <i>Professor: Electrical and Computer Engineering, IOWA University, USA.</i>
10:00	Opening Remarks	Dr Colin Stanley <i>Acting Deputy Vice-Chancellor: Research, Innovation and Partnerships:</i>
10:10	Closing Remarks	Prof Guy-Alain Zodi <i>Associate Dean</i>
10:15	Tea Break	
10:00 - 12:00	African Research Symposium (ARS) 2023 African Research Symposium: Technical Session – T3 Chair 1 Mr Isaac Nhamu, NUST Chair 2: Prof Chirag S Thaker, L. D. College of Engineering Ahmedabad Moderator: Mr Shoopala Nambahu, NUST	
Time	Topic	Speaker
10:30- 10:50	Documents Forgery Detection Through Source Printer Identification	Prof Hala H. Zayed Professor: Nile University
Paper ID	Authors	Title of Paper
E43	Samuel Nghidengwa Nakale and Lameck Mbangula Amugongo	Predicting student attrition: A case study of the University of Namibia Bachelor of Accounting (Chartered Accountancy) programme
E46	Sakaria Amakali lindombo and Mercy Chitauro	An analysis of the implementation of blockchain technology in smart grid edge IoT devices

E52	Ranganai Turugare, Fungai Bhunu Shava and Mercy Chitauro	Analyzing Security Vulnerabilities in Solo-Developed Mhealth Applications: A Systematic Literature Review
C22	Arpit Jain, Dharm Singh Jat	An Efficient Multihop Edge Enabled Architecture for Time Constraint Application
C32	Jovita Mateus , Guy Alain Lusilao, Bigomokero Antoine Bagula , Landry Mbale	Design of a NFV Traffic Engineering Middlebox for Efficient Link Failure Detection and Recovery in SDN Core Network
C33	Helena Hainana , Guy Alain Lusilao , Jovita Mateus	Design of a NFV Traffic Engineering Middlebox for Efficient Link Failure Detection and Recovery in SDN Core Network
12:00 - 13:00	African Research Symposium: Technical Session – T4 Chair 1: Mr Edward Nepolo, NUST Chair 2: Prof Sanjay M Shah, Government Engineering College, Rajkot Moderator: Mr Steven Tjiraso, NUST	
Paper ID	Authors	Title of Paper
C39	Simon Muchinenyika ,Fungai Bhunu Shava , Joao Bastos	A Secure Cardless Automated Teller Machine
C47	Ndeyanale Taapopi , Colin Stanley, Ambrose Azeta	Strategies for Developing Acoustic Model to Pronounce Names in Low-Resourced Languages

C57	Ajai Misra, Dharm Jat, Durgesh Mishra	Startup Success and Failure Prediction Algorithm Using k Means Clustering and Artificial Neural Network
C48	Petrus Shifidi , Colin Stanley, Ambrose Azeta	Machine Learning-Based Analytical Process for Predicting the Occurrence of Gender-Based Violence
12:00 - 13:00	African Research Symposium: Technical Session – T5 Chair 1: Mr Gabriel Nhinda, NUST, NUST Chair 2: Prof Navneet Agrawal, Maharana Pratap University of Agriculture and Technology, Udaipur Moderator: Mr Julius Silaa, NUST	
Paper ID	Authors	Title of Paper
C63	Clement Temaneh-Nyah, Eino JN Shivute	Jamming attacks and Anti-Jamming Strategies on Car Remote Keyless Entry System
C73	Stephan Cilliers , Amit Kumar Mishra	Exploration of Algorithms for the Hardware Acceleration of Multi-scalar Multiplication on FPGA
C24	Muhammad Ali Fauzi, Stephen Wolthusen, Bian Yang , Patrick Bours , Prosper Yeng	Identifying Sexual Predators in Chats using Machine Learning and Feature Ensemble
C23	Prosper Yeng , John-Bosco Diekuu , Mohamed Abomhara, Elhadj Benkhelifa , Mustapha Awinsongya Yakubu , Isaac Nyame , Adejoke Odebade , Muhammad Ali Fauzi , Bian Yang , Rania El-gazzar	HEALER2: A Framework for secure data lake towards healthcare digital transformation efforts in Low and Middle-income Countries

C34	Mounir BAALA, Fatima-zahra TEYANE	Residual CNN-LSTM Enhanced Approach for Atrial Fibrillation Classification.
C79	Nalina Suresh, Aina Kesilohenda Hauwanga	Design & Implementation of Smart Learning Robot Using Recognition Prediction Model to Teach Pre-Schoolers
13:00	Lunch Break	
14:15 - 15:20	Panel Discussion on Rethinking FCI Strategy for Research and Innovation in response to key shifts in global economies Moderator: Prof Attlee M Gamundani, NUST	
14:15	Speakers: Dr Colin Stanley , Prof Heike Winschiers, Prof Dharm Singh Jat, Prof Jose Quenum, Prof Jude Osakwe, Dr Wanja Njuguna	
15:20	Tea Break	
15:35 - 17:35	Workshop on High-Performance Computing in Namibia -- The road we travelled	
15:35	Chair: Prof Jose Quenum, NUST Mr Arpit Jain, NUST	
17:35 - 18:00	Research Day Valedictory Session	
	From Researchers	Feedback
	Prof Fungai Bhunu Shava Acting Executive Dean	Concluding Remarks
25	Prof Suama Hamunyela, NUST Associate Dean	Vote of Thanks
DAY 3		
Date: Wednesday, 18 August 2023		
Time: 08:00 - 17:00 (CAT) / 11:30 - 20:30 (IST)		

08:00 - 09:30	Technical Session T6 Chair 1: Mr Gereon Kapuire, NUST Chair 2: Dr Jyoti Gajrani, GECA Moderator: Ms Loini Iiyambo, NUST Invited Speaker	
	Efficient Privacy-Preserving Authentication using Blockchain for VANET	Prof Meenakshi Tripathi Associate Professor Malaviya National Institute of Technology (MNIT) Jaipur
Paper ID	Authors	Title of Paper
C56	Karthik Srinivasan	Keylogger Malware Detection using Machine Learning Model for Platform-Independent Devices
C18	Dishant Zaveri, Devang Shah, Sharvari Joshi, Tarasha Ahuja, Nilesh Patil, Sridhar Iyer	A Device for Detection and Deterrence of Locust Threats
C9	Md Alimul Haque, Kailash Kumar, Sultan Ahmad, Khushboo Mishra, Shameemul Haque Binay Kumar Mishra	Analyzing University Students' Awareness of Cybersecurity
E44	Minal Hardas, Sumit Mathur, Manish Dadhich, Anand Bhaskar and Kamal Kant Hiran	Multi-class classification of retinal fundus images in Diabetic Retinopathy using Probabilistic Neural Network
09:30 - 11:00	Technical Session T7 Chair 1: Prof Jude Osakwe, NUST Chair 2: Dr. Ajay Nehra, IIIT Kota, India Moderator: Ms Albertina Shilongo, NUST	

C13	Diana D Josephine	Finding the best reference signal pattern for different channel models in 5G
C21	Israel Magodi	A framework for using geographic information system and sensor networks in transformation of water scarce communities into water secure communities: Case of Masvingo City
C6	Manish Dadhich, Heena Siroya , Disha Mathur ,Mamta Jain , Arvind Sharma , Kamal Hiran	Measuring the Enablers of University-based Techno-Entrepreneurship Education to Achieve Sustainable Business: A New-Age Analytical Approach
C12	Eric B Martin , Sudipto Ghosh	GitHub Copilot: A Threat to High School Security? Exploring GitHub Copilot's Proficiency in Generating Malware from Simple User Prompts
C62	Kamal Upreti, Prashant Vats, Gauri Borkhade, Ranjana Dinkar Raut, Sheela Hundekari, Jyoti Parashar	An IoHT System Utilizing Smart Contracts for Machine Learning -Based Authentication
E28	Paras Nath Singh, Deeksha D V, Adithya Anbazhagan and Ambavaram Tharun Kumar Reddy	Hastabhashya”– Interpretation of Indian Sign Language using SqueezeNet and YoloV3



11:10 - 13:00	Technical Session T8 Chair and Speaker: Dr Iyawa Gloria, NUST Chair2 and Speaker: Dr Kamal Upreti, CHRIST (Deemed to be University), Delhi NCR Moderator: Mr Shadreck Chitauru	
Paper ID	Authors	Title of Paper
C51	Rishank Goyal , Meenakshi Tripathi , SHUBHAM TOMAR	GasOptiScan: Unveiling Gas-Inefficient Smart Contracts via Loop Fusible Pattern Detection for Enhanced Cost Efficiency
C68	Vikas kumar jain , Meenakshi Tripathi	Multi Objective Approach for Detecting Vulnerabilities in Ethereum Smart Contracts
C28	Phumelele P Kubheka , Pius Owolawi	Harnessing Advanced Classifiers for Sentiment Analysis on Augmented Tweets
E30	Pratham Goel, Nandini Jhanwar, Punit Jain, Shubh Khatri and Dr. Kamal Kant Hiran.	Efficient Blood Availability for Targeted Individuals through Cloud Computing Web Application
C4	Sonali Bhati , Manish Dadhich, Anand Bhaskar , Kamal Hiran , Roshni Sharma , Anurag Shukla	Quantifying the Contemporary Enablers in Achieving e-Governance for Sustainable Techno-Societal Development: A High Directive SEM Analysis
C67	Navneet Agrawal, Harshprabha Paliwal, Ajay Singh	Vivaldi MIMO Antenna using Oval Shape Structure for 24GHz-34 GHz Millimeter wave Communication Frequency Band

C66	Nishant Kumar, Kamal Upreti, Sheela Hundekar, Ankit Verma, Shikha Mittal, Vishal Khatri	Blockchain integrated pharmaceutical cold chain: An adoption perspective
C69	Mohammad Shahnawaz Nasir, Mohammad Shabbir Alam, Fazal Imam Shahi, Mohammad Shahid Kamal, Kamal Upreti, Prashant Vats	Transformative Insights: Unveiling the Potential of Artificial Intelligence in the Treatment of Sleep Disorders - A Comprehensive Review

Valedictory Session

Date: Friday, 18 August 2023

Time: 13:00 - 13:35 (CAT)

Venue: Zoom (Click here to Join)/HTTPS (In Person)

Director of Ceremonies: Prof Suama L Hamunyela

Associate Dean: School of Informatics, Journalism and Media Technology, FCI, NUST

Time	Activity	Presenter
13:00	Welcoming Remarks	Prof Fungai Bhunu Shava <i>General Co-Chair: Acting Executive Dean, Faculty of Computing and Informatics</i>
13:10	Recommendations of the Conferences	Prof Dharm Singh Jat <i>Professor and UNESCO Chairholder</i>
13:20	Remarks	Dr Andrew Niikondo <i>Deputy Vice-Chancellor</i>
13:30	Vote of Thanks	Prof Attlee M Gamundani <i>NUST Local Chair</i>
13:45	Lunch	

Speakers

Prof Suresh(Suraj) Kothari

*Professor in the Electrical and Computer Engineering Department
Iowa State University, USA*

Title: Managing the Complexity of Cybersecurity with Symbolic Computational Mathematics

Suresh(Suraj) Kothari is a Professor in the Electrical and Computer Engineering Department at the Iowa State University. He has held the Richardson Chair Professorship in the university. He founded EnSoft in 2002. EnSoft's products for analyzing and verifying safety-critical software are used worldwide in more than 450 companies including all major aerospace and automobile manufacturers in North America, Europe, and Asia. He has been a Principal Investigator on Defense Advanced Research Projects Agency (DARPA) APAC and STAC cybersecurity projects with more than \$15 million grants in the last ten years. He has served as a Distinguished ACM Lecturer. He led the effort to establish the software engineering undergraduate degree program at Iowa State University. He was the founding Director of the Software Engineering Program from 2007 to 2011. He has been awarded the Iowa State Board of Regents Professor Award for excellence in research, teaching, and service.

Abstract:

We can build large software, but we lack the ability to reason about software structure and behavior for the purpose of ensuring its safe and secure operation. This is a huge problem as software is everywhere including the essential technologies for commerce, communication, energy, healthcare, and transportation. The soft infinity of execution behaviors is the fundamental problem of cybersecurity. Soft infinity means that the number of behaviors is so large that no matter how fast the computer, the behaviors cannot even be enumerated. For example, the number of execution behaviors, produced by 50 iterations of a loop with 5 non-nested IF statements, is larger than the estimated number of atoms in the universe.

Cybersecurity requires examining all possible execution behaviors to verify

that no unintended behaviors would compromise the safety and security of systems driven by the software. Reasoning about software presents two big challenges: (a) the space complexity challenge to store the behaviors, and (b) the time complexity challenge of computing the properties of the behaviors. This talk will present a new computational method to address these challenges. The method is based on new mathematics that combines algebra and graph theory. The new mathematics is simple; it is built on new insights into familiar algebraic concepts like solving linear systems of equations and factoring polynomials. The computational method is easy to apply to real-world software. We shall illustrate its applicability to the Linux kernel.

Prof Manoj Singh Gaur

Director, Indian Institute of Technology, Jammu

Professor Manoj Singh Gaur assumed the charge of Director, Indian Institute of Technology, Jammu on June 29, 2017. Before joining IIT Jammu, he was a Professor and Head of the Department of Computer Science and Engineering at Malaviya National Institute of Technology (MNIT) Jaipur, India. Additionally, he was Professor-In-Charge (Coordinator) of IIIT Kota, which is currently being mentored by MNIT Jaipur. He has been Dean, Students Affairs, and Head, Central Computer Centre at MNIT Jaipur as well. He also served as Chairman, Senate UG Board at MNIT Jaipur. He completed his Master's degree in Computer Science and Engineering from the Indian Institute of Science Bangalore and Ph.D. from the University of Southampton, UK.

Prof Indrakshi Ray

Director: Colorado Center for Cyber Security, Colorado State University

Title: Cyber Security of Embedded Networks in Heavy Vehicles

Dr Indrakshi Ray is a Professor in the Computer Science Department at Colorado State University. She is the Director of Colorado Center for Cyber Security at Colorado State University. She is also the Site Director of NSF IUCRC Center for Cyber Security Analytics and Automation. Dr Ray has been a visiting faculty at Air Force Research Laboratory, Naval Research Laboratory,

and at INRIA, Rocquencourt, France. She obtained her Ph.D. in Information Technology from George Mason University. Dr Ray's research interests include software assurance, data analytics and security. She has published almost two hundred technical papers in refereed journals and conference proceedings with the support from agencies including Air Force Research Laboratory, Air Force Office of Scientific Research, National Institute of Health, National Institute of Standards and Technology, National Science Foundation, the United States Department of Agriculture, and industries from the US, Norway, and Japan. Dr. Ray is on the editorial board of IEEE Transactions on Services Computing, International Journal of Information Security, Computer Standards and Interfaces, and Associate Editor of IEEE Security & Privacy. She was a member of the editorial board of IEEE Transactions on Dependable and Secure Computing. She serves on the program committees of various prestigious conferences and has chaired many of them. Dr. Ray is a senior member of the IEEE and a senior member of the ACM. Dr. Ray is also active in endeavors trying to increase minority participation in Computer Science.

Abstract:

Trucks play a very important role in driving the nation's economy, moving more than 70% of all the freights transported in the US by weight. Any event that grounds all trucks even for a few days, have severe consequences, including food shortages, hospitals exhausting their oxygen supplies, and gas stations running out of fuel. While we have not yet faced such a situation, the way modern heavy vehicles are designed, this increasingly looks like a distinct possibility. Modern day trucks are equipped with numerous sensors, embedded controllers, communication networks, and electro-mechanical systems that work in tandem to improve their performance, efficiency, safety, connectivity, and user-experience. However, they also bring up serious cyber threats to the truck's operation. This talk discusses cyber security vulnerabilities our group has identified that span across all modern day heavy vehicles and allow a hacker to access the embedded controller network of a truck to cause different types of attacks. We present some approaches for detecting attacks in real-time and show how we can distinguish them from safety-critical events. We have developed reporting tools and techniques that can aid the heavy vehicle drivers in near real-time to make informed decisions in the event of a cyber attack. We conclude by discussing some of our future research directions in

heavy vehicle security.

Dr. Indrajit Ray

Professor of Computer Science Colorado State University.

Title: Towards Building Secure Cyber-Physical Systems

Dr Indrajit Ray is a Professor of Computer Science at Colorado State University. He joined CSU in 2001 moving from the University of Michigan-Dearborn where he worked as an Assistant Professor from August 1997 – July 2001. Dr. Ray obtained his Ph.D. in Information Technology from George Mason University in August 1997. Indrajit’s primary research is in computer security and privacy. His major contributions have been in security risk modeling and security protocol design using applied cryptographic techniques. Other areas in which he has made valuable contributions are trust models for security and micro-data disclosure control. He has published more than 150 technical papers. His research has been well funded through various federal agencies. He has advised several Ph.D. students many of whom hold tenured positions in academia. He has also played leadership roles in the academic community by serving as program chairs in various conferences. In 2015 he served as General Chair of the 2015 ACM CCS conference which is the flagship conference of ACM SIGSAC, and in 2017 as the General Chair of the 2017 IEEE CNS conference. He was the founder of the IFIP TC 11, WG 11.9 on Digital Forensics and its first Chair. Recently, Indrajit has helped establish the CSU site of the NSF funded I/UCRC Center for Configuration Analytics and Automation, where he is Co-Director. This multi-university research center that includes fee-paying members from the industry and FFRDCs works with enterprises and government entities to improve service assurability, security and resiliency of enterprise IT systems, cloud/SDN data centers, and cyber-physical systems by applying innovative analytics and automation. More recently, he served as a Program Director at the National Science Foundation in the Secure and Trustworthy Cyberspace program.

Abstract:

Increasing use of digital technology in Industrial Control Systems (ICS) brings in cyber-security as a crucial threat to the operational continuity of cyber-physical systems (CPS) as well as to public safety. Many security measures, such as intrusion detection and prevention systems, virtual private networks, data diodes or identity management systems that are well-tested in an information technology (IT) setting often cannot be applied directly to the CPS networks since ICSs use different protocols and logic than used in IT systems. Moreover, there is very little understanding or research geared towards the human operators' response under cyber-security threats, and operation procedures to cope with such threats. Human operators are one of the weakest links in cyber and operational security and can often become unwitting accomplices in an attack. APTRON is an ongoing project that takes a mission centric view of security in Cyber Physical Systems integrating ICS and SCADA systems, IT systems and human users, and develops a formal methodology for quantitative security risk assessment and mitigation. In APTRON, a mission is abstracted as a complex network of networks defined by dependencies between various system activities, user activities, and resources. The continuity of the mission is more important than protecting the computing infrastructure on which it executes from cyber-attacks.

In other words, the system needs to continue to provide mission related services in the face of an attack even though it may have to suffer some collateral damage from security attacks. In the worst case, there needs to be provisions for the graceful degradation of mission services by avoiding cascading catastrophic failures, when all defensive measures have failed. Interestingly, such a change in paradigm from the traditional asymmetric attacker-defender warfare, where the defender is trying to plug all possible security holes and the attacker is trying to exploit just one, enables a defender to proactively define and deploy defensive strategies in a more efficient and cost-effective manner. In this talk, we discuss the underlying formal framework for APTRON. It is based on the paradigm of attack graphs. The attack graph model allows the defender to articulate and reason about the dependencies between a mission's cyber assets, the mission's activities and objectives, the effect of various types of end-users on the mission, and the effects of a cyber-attack on the continuity of the mission. We discuss some of our work in how to

automate the generation of attack graphs from vulnerability descriptions and system configuration, how to perform network defense cost-benefit analysis and some strategies for risk mitigation that allow one to adapt the defense response to emerging threats.

Prof. B. Antoine Bagula

ISAT Laboratory [Head], Department of Computer Science University of the Western Cape, South Africa

Title: Artificial Learning: From Machine Learning (ML) to X-Learning (XL)

Bigomokero Antoine Bagula received a Ph.D. degree [Tech. Dr.] in Communication Systems from the Royal Institute of Technology (KTH), Stockholm, Sweden, and 2 MSc degrees [Computer Engineering – Université Catholique de Louvain (UCL), Belgium and Computer Science - University of Stellenbosch (SUN), South Africa]. He is currently a full professor in the Department of Computer Science at the University of the Western Cape (UWC) where he also leads the Intelligent Systems and Advanced Telecommunication (ISAT) laboratory. He also holds a professor position at ESIS-Salama in DRC where he is in charge of spearheading the institution's research agenda. Prof. Bagula is a well-published scientist in his research field. His current research interests are in Data Engineering, including Big Data Technologies, Cloud/Fog Computing and Network Softwarization (e.g., NFV and SDN); The Internet of Things (IoT), including the Internet-of-Things and Tactile Internet-of-Things; Data Science, including Artificial Intelligence, Machine Learning, and their applications in Big Data Analytics; and Next Generation Networks (NGN) including 5G/6G.

Abstract:

Starting in the early 50s, Artificial Intelligence has been recently dominated by Deep Learning (DL), which emerged as a disrupting technology that brought forth many breakthroughs in the neuro computing (NC) ecosystem. These breakthroughs are a result of its ability to analyse images, videos, and unstructured data , in ways that traditional ML techniques have not been able to easily do. NC has experienced tremendous growth from its onset, with milestones going from the three-layered Neural Network (NN), to DL, and thereafter expanding to Transfer Learning (TL), Federated Learning (FL) and

more recently, Split Learning (SL). It is therefore likely that at this pace, a new X Learning technique will emerge each decade, from the ashes of its predecessor, with novel designs and improvements. Each of the above milestones have brought forth new technical contributions, with advantages and challenges in terms of security, complexity, deployment, and potential application domains. In this talk, we will start by covering these different milestones in terms of technologies, applications and challenges, and thereafter expand on the details of FedFaSt; a novel ML technique that builds on the “Fittest Aggregation” and “Slotted Training” paradigm to improve the performance of Federated Learning.

Prof Hala H. Zayed

Nile University, Professor

Title: Documents Forgery Detection Through Source Printer Identification

Hala H. Zayed received her B.Sc. in electrical engineering (with honor degree) in 1985, her M.Sc. in 1989 and her Ph.D. in electronics engineering in 1995 from Benha University. She is the ex-dean of faculty of Computers and Artificial Intelligence, at Benha university. She is now a professor at the School of Information Technology and Computer Science, Nile University. She is a member of the committee of experts in the national committee of UNESCO (committee of communications and informatics). Her areas of research are computer vision, biometrics, image forensics, image processing and machine learning. Prof Hala H. Zayed received her B.Sc. in electrical engineering (with an honour degree) in 1985, her M.Sc. in 1989 and her PhD in 1995 from Benha University in electronics engineering. She is now a professor at the School of Information Technology and Computer Science (ITCS), at Nile University. Her research areas are computer vision, image forgery, biometrics, machine learning and image processing. Her teaching interests include programming languages, digital logic design, computer vision, artificial intelligence, machine learning and analysis and design of algorithms. She is a member of the committee of experts in the national committee of UNESCO (committee of Communications and Informatics).

Abstract

Digital forgery involves the illegal alteration of digital content, such as photos, documents, and music, often for financial gain. It is prevalent due to the easy availability of image processing software, making digital image manipulation common. Personal computers, scanners, and color printers being widely accessible and affordable have increased the risk of document forgery, enabling the creation of fraudulent documents like certificates and identity cards. Detecting document forgery has become increasingly important as forgery techniques are accessible even to inexperienced users and impact various aspects of daily life, including financial transactions. Document forensics plays a vital role in identifying the source and authenticity of questioned documents by examining handwriting, ink, and paper and comparing them with known material. This research presents a Source Printer Identification (SPI) technique to determine the source printer of printed documents by classifying them into specific printer classes. Unlike previous studies that segmented documents into characters, words, or patches, this research employs various methods to identify the source printer type, including traditional techniques and Deep Learning (DL) techniques. Traditional methods extract global feature descriptor vectors using Histogram of Oriented Gradients (HOG) features and Local Binary Pattern (LBP) features for each image, and these vectors are concatenated for training. The extracted features are classified using several classifiers, such as Decision Tree, k-Nearest Neighbors (k-NN), Support Vector Machine (SVM), Bagging, Boosting, and random forest.

Additionally, Deep Learning techniques involve training Convolution Neural Network (CNN) models on separate datasets and evaluating their accuracy. The three techniques explored are CNN feature extraction with SVM classification, transfer learning with pre-trained neural networks for feature extraction and classification and training a CNN from scratch for feature extraction followed by SVM classification. Also introduces an Ink Mismatch Detection (IMD) technique to improve the accuracy of black ink detection, which was lacking in earlier studies. The approach employs a supervised deep-learning method that captures spectral features from hyperspectral document images to detect ink mismatches. By using a hyperspectral image dataset containing UWA writing ink in blue and black, the performance of the CNN model is evaluated. Additionally, various artificially identical color inks [2-5] are mixed in different

ratios to identify ink mismatches in the documents.

Dr Heena Rathore

Texas State University, San Marcos, Texas, USA Title: Revolutionizing Mental Health Care: The Role of AI in Promoting Well-Being

Dr Heena Rathore is presently Assistant Professor in Department of Computer Science at Texas State University, San Marcos, Texas, USA. She formerly held positions as Assistant Professor of Practice at University of Texas at San Antonio and Visiting Assistant Professor at Texas A&M University at Texarkana. She has also worked as Data Scientist and Program Manager at Hiller Measurements, Austin. She received her Ph.D. from Indian Institute of Technology Jodhpur India while she was a Tata Consultancy Services Research Scholar. For her postdoctoral research, she worked on the US Qatar joint project on Medical Device Security, which included collaborators from Qatar University, the University of Idaho, and Temple University. Her research interests include cognitive AI, cybersecurity of cyber-physical systems, and biologically inspired systems. Dr. Rathore is IEEE Senior member, and chair for IEEE EMBS Lone Star Section. In the past, she has served as ACM Distinguished Speaker, Vice Chair for IEEE Central Texas Section. Her professional and research experience has led to several prestigious awards, including NI Global Engineering Impact Award, Educationist Empowering India, IEEE Region 5 Outstanding Individual Achievement Award, and many others.

Abstract:

In recent years, the integration of advanced artificial intelligence (AI) technologies, powered by large language models, has led to remarkable progress in the field of mental health care. One of the most notable developments has been the incorporation of AI in digital interventions, such as smartphone apps, to optimize user experience and enhance the effectiveness of mental health treatment. With the emergence of data-driven AI approaches, which focus on leveraging the vast amount of available data, language - a critical aspect of human cognition - can now be quantitatively analyzed using natural language processing to create conversational agents for therapeutic intervention. This talk will provide an overview of the current techniques and tools employed in large language models and mental health support, as well as exploring the

future potential of this rapidly evolving field.

Prof Meenakshi Tripathi

Associate Professor Malaviya National Institute of Technology (MNIT) Jaipur
Title: Efficient Privacy-Preserving Authentication using Blockchain for VANET

Prof Meenakshi Tripathi is an Associate Professor in the Computer Science and Engineering Department at MNIT Jaipur. She received her PhD in Computer Science and Engineering from the MNIT in 2015. She has over 14 years of teaching experience in computer science and information security. She has published more than 100 research articles in leading journals, conference proceedings and books, including IEEE Transactions, IJCS, Computer Networks, journal of Supercomputing etc.. Under her guidance, four students have already been awarded their Ph.D. degrees, and five more are working with her. She has supervised around 30 PG students and more than 60 UG students for their project work. She holds several professional designations, including Dean at Rajasthan Skilled University Jaipur, BoS member of the University of Kota, Ex-chairman of CSI Jaipur chapter, BoS member of the Central University of Rajasthan etc. She is a senior member of IEEE, ACM and a lifelong member of CSI. Her research interests include information security, wireless sensor networks, IoT, Software Defined Networks, blockchain etc.

Abstract:

A vehicular Ad-hoc Network is a wireless network that provides comfort while driving and enhances safety. A tremendous amount of information is exchanged between vehicles and roadside units. While exchanging information, we should prevent others from identifying the subject of communication or learning one's location. The current privacy-preserving approaches for Vehicular Ad-hoc Networks (VANETs) generally maintain many pseudonyms for a single vehicle, neglecting to consider the need for a secret identity. These authentication approaches make managing pseudonyms challenging and revocation inefficient. To handle this issue one of the methods is use of blockchain. As it has various properties such as immutability, transparency, distributed consensus etc.

Prof Sheshadri Mohan

Professor: University of Arkansas

Title: AI/ML-Enabled Connected and Autonomous Vehicles in the Era of 5G, 6G, and Beyond

Dr Seshadri Mohan is a Professor of Systems Engineering at the University of Arkansas at Little Rock. Prof Mohan received his PhD in Electrical and Computer Engineering from McMaster University, Canada; M.Tech., Electrical Engineering from the Indian Institute of Technology, Kanpur, India and B.E. (Honours), Electronics and Telecommunications Engineering, University of Madras, India. His Teaching and Research Interests is in the field of Mobile Multimedia Internet, IP Multimedia Subsystems, Voice and Multimedia over IP, Next Generation Wireless Networking and Control, Including 3G and Beyond, Performance and Analysis of Protocols for Wireless and IP, Control, Restoration, and Recovery in Optical Networks and Source and Channel Coding.

Abstract

With the advent of 5G and the next generation wireless technologies of 6G and beyond, artificial intelligence (AI) and machine learning (ML) will play a significant role in the evolution of connected and autonomous vehicles (CAV). Moreover, applications of IoT devices and sensors have rapidly expanded to integrate intelligent sensing and processing along with smart applications of the technology into various fields such as smart homes, smart appliances, enterprises, smart transportation, smart cities, agriculture, energy, security, healthcare, shopping, location-based services including tracking and other similar fields. Besides the two developments noted above, fueling the growth in the evolution of vehicles towards total automation is the development of novel sensors, 3D cameras, lidars and radars and their ability to connect to the Internet and upload data to cloud. The confluence of the above three developments - advances in wireless, proliferation of IoT devices, and growth of sensors, cameras, radars, and lidars - has contributed to the rapid evolution towards automation of connected vehicles. This talk will explore various aspects of CAVs, use cases, and novel applications.

Prof Raj Jain

Barbara J. and Jerome R. Cox, Jr. Professor of Computer Science and Engineering, Washington University in Saint Louis

Title: Common Issues and Challenges in AI for Cybersecurity

Raj Jain is currently the Barbara J. and Jerome R. Cox, Jr., Professor of Computer Science and Engineering at Washington University in St. Louis. Dr. Jain is a Life Fellow of IEEE, a Fellow of ACM, a Fellow of AAAS, and a recipient of the 2017 ACM SIGCOMM Life-Time Achievement Award. Previously, he was one of the Co-founders of Nayna Networks, Inc., a Senior Consulting Engineer at Digital Equipment Corporation in Littleton, Mass, and then a professor of Computer and Information Sciences at Ohio State University in Columbus, Ohio. With 38,000+ citations, according to Google Scholar, he is one of the highly cited authors in computer science.

Abstract:

AI is everywhere. It is being applied to security as well. In our research on the security of medical and industrial IoT over the last 5 years, we have noticed several common mistakes, challenges, and issues in applying AI and securing IoT. In this talk, we will discuss nine such common issues and mistakes.

Dr Kamal Upreti

Associate Professor, CHRIST [Deemed to be University], Delhi NCR, Ghaziabad, India

Title : Analyzing recognition of EEG based human attention and emotion using Machine Learning

Dr. Kamal Upreti is currently working as an Associate Professor in Department of Computer Science, CHRIST [Deemed to be University], Delhi NCR, Ghaziabad, India. He completed is B. Tech (Hons) Degree from UPTU, M. Tech [Gold Medalist] from Galgotias University, PGDM[Executive] from IMT Ghaziabad and PhD from OPJ University in Department of Computer Science & Engineering. Now, he is doing Postdoc from National Taipei University of Business, TAIWAN funded by MHRD. He has published 50+ Patents, 35+ Books, 32+Magazine issues and 70+

Research papers in various international Conferences and reputed Journals. His areas of Interest are Cyber Security, Machine Learning, Health Care , Wireless Networking, Embedded System and Cloud Computing. He is having enriched years' experience in corporate and teaching experience in Engineering Colleges. He worked with HCL , NECHCL , Hindustan Times , Dehradun Institute of Technology and Delhi Institute of Advanced Studies , with more than 15+ years of enrich experience in research, Academics and Corporate . He also worked in NECHCL in Japan having project – “Hydrastore “ funded by joint collaboration between HCL and NECHCL Company. Dr. Upreti worked on Government project – “Integrated Power Development Scheme (IPDS)” was launched by Ministry of Power, Government of India with the objectives of Strengthening of subtransmission and distribution network in the urban areas. Currently, he has completed work with Joint collaboration with GB PANT & AIIMS Delhi ,under funded project of ICMR Scheme on Cardiovascular diseases prediction strokes using Machine Learning Techniques from year 2020-2023 of having fund of 60 Lakhs .He has attended as a Session Chair Person in National, International conference and key note speaker in various platforms such as Skill based training, Corporate Trainer, Guest faculty and faculty development Programme. He awarded as best teacher, best researcher, extra academic performer and Gold Medalist in M. Tech programme.

Abstract:

An emotionally recognised area of research has already been quite prominent. EEG brain signals have recently been used to recognise an individual's mental condition. Attention often plays a key role in human development but needs more study. This article offers a noble method of acknowledgment of human attention by sophisticated machine learning algorithms. Scalp-EEG signalling is a cost-effective, single-swunged mechanism dependent on time. Many trials have shown possible support for emotional identification through brain EEG waves. This presentation presents a modern technology for identifying emotions by applying new computer learning principles. Ablations experiments also demonstrate the clear and important benefit to the efficiency of our RGNN model from the adjacent matrix and two regularises. Finally, neuronal researches reveal key brain regions and inter-channel relationships for EEG related emotional awareness.









