Gaurang BANSAL

Google PhD Fellow | PhD National University of Singapore

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💼 PROFESSIONAL SUMMARY

Experienced Google PhD Fellow and Doctoral Researcher at NUS, Singapore, with expertise in designing authentication protocols, LLM-based security networks, malware protection, and phishing identification. Specialized in cybersecurity, algorithm design, LLMs, DeepNets, and data analytics, with over 8 years of experience.

🎓 EDUCATION

August 2020 – Present

Doctor of Philosophy, (NETWORK SECURITY), National University of Singapore
> **Thesis:** Advanced Security Protocols for UAV Swarm Communications.
> **Advisor:** Prof. Biplab Sikdar, (HoD & Professor, NUS)

Cybersecurity | Networking | Artificial Intelligence | Cryptography | Algorithm Design and Analysis | Machine Learning.

August 2018 – June 2020

M. Tech, (COMPUTER SCIENCE), BITS Pilani
> **Thesis:** On-Chip Security Solutions for Enhanced Lightweight IoT Protocols.
> **Advisor:** Prof. Vinay Chamola (Associate Professor, BITS Pilani)

Hardware Security | Optimisation | Cryptography | Network Security | Internet of Things. Algorithm Design

August 2014 – June 2018

B. Tech, (COMPUTER SCIENCE), BITS Pilani
> **Thesis:** 3D V-Net Segmentation Based Enhanced Lung Cancer Detection.
> **Advisor:** Prof. Sundaresan Raman (Assistant Professor, BITS Pilani)

Image Processing | Computer Vision | Machine Learning | Deep Learning | Data Augmentation | Pattern Recognition.

💼 EXPERIENCE

August 2023 – Present

Security Research Collaborator, GOOGLE & NUS, Singapore
> **Title:** PhishNet: Unsupervised Phishing Site Identification with One-Shot Deep Learning.
> **Collaborators:** Sai Teja Peddinti, (Google) and Dinil Mon Divakaran, (Professor, NUS)
> **Contribution:** Utilizing a one-shot deep learning framework, our research project automates phishing site identification by analyzing domain-specific features and logo comparisons, eliminating manual annotations and enhancing detection accuracy. System is augmented by a technically integrated browser plugin demonstrating high precision in real-time phishing site detection.

Cybersecurity | Machine Learning | Deep Learning | Image Processing | Python | PyTorch

January 2019 – Present

Senior Researcher, BITS PILANI & NUS, ASEAN
> **Title:** Securing Resource-Constrained Networks using Advanced Cryptographic Approach
> **Collaborators:** Biplab Sikdar, (Professor, NUS), Dusit Niyato, (Professor, NTU), F. Richard Yu (Professor, Carleton University), Nirwan Ansari (Professor, NJIT) and Vinay Chamola (Assoc. Professor, BITS Pilani)
> **Contributions:** Designing advanced software-based authentication methods using rapid cryptography. Addressing attack scenarios in resource-limited systems, understanding threats from adversaries and showcasing formal security assessments coupled with mathematical analysis.

Cryptographic protocols | attack mitigation | adversarial threat analysis | security formal methods.

May 2022 – Jan 2023

Tech Lead Researcher, DRIFE, Bangalore
> **Title:** Achala: Pioneering Decentralized Mobility with Blockchain-Integrated Geospatial Systems
> **Collaborators:** Mudit Marda, (CTO, DRIFE) and Vikas Hassija (Associate Professor, KIIT)
> **Contribution:** Architected a specialized distributed ledger system for integrating mobility primitives with blockchain. Engineered a decentralized ride-sharing platform akin to Uber, enabling dApps deployment for advanced mobility solutions, fostering a peer-to-peer transportation network. Innovated a decentralized geospatial system, facilitating real-time indexing, geo-querying of roaming entities, and intricate geo-fence operations in a fully distributed framework.

Distributed ledger systems | Python | Real-time data indexing | Geo-querying and geo-fencing

📖 PUBLICATIONS

[J22] G. Bansal, M. Baser, and V. Chamola, "Epidemic Safeguard: Multi-Tier IoT Contact Tracing for Global Health Defense," IEEE Consumer Electronics Magazine, 2023 (IF: 4.5).

[J21] G. Bansal, V. Chamola, M. Guizani, and D. Niyato, "Transforming Conversations with AI - A Comprehensive Study of ChatGPT," Cognitive Computation, 2023 (IF: 5.4).

[J20] G. Bansal, V. Chamola, P. Jain, and M. Guizani, "An Optimal Pricing Based Spectrum Allocation Model in Broadband Market," IEEE Internet of Things Journal, 2023 (IF: 10.3).

[J19] G. Bansal, V. Chamola, A. Jolfaei, and S. Mumtaz, "Cracking the Dark Web: Attacks in Tor Network," IEEE Internet of Things Magazine, 2023.

[J18] G. Bansal, V. Chamola, and B. Sikdar, "Peer2Peer Mutual Authentication-Attestation Protocol in UAV Swarms," IEEE Transactions on Network Science and Engineering, 2023 (IF: 6.6).

[J17] G. Bansal, A. Nawal, V. Chamola, and N. Herencsar, "Prose to Pixels: Generative AI's Impact on Consumer Electronics Imaging," IEEE Transactions on Consumer Electronics, 2023 (IF: 4.3).

[J16] G. Bansal, K. Rajagopal, V. Chamola, Z. Xiong, and D. Niyato, "Healthcare in Metaverse: A Survey on Current Metaverse Applications in Healthcare," IEEE Access, 2023 (IF: 3.6).

[J15] G. Bansal and B. Sikdar, "Achieving Secure and Reliable UAV Authentication: A Shamir's Secret Sharing Based Approach," IEEE Transactions on Network Science and Engineering, 2023 (IF: 6.6).

[J14] G. Bansal, A. Tyagi, and V. Chamola, "PUF Based Fault Tolerant Authentication Protocol for Vehicle to Smart Grid Communications," IEEE Internet of Things Journal, 2023 (IF: 10.3).

[J13] V. Chamola, G. Bansal, T. Kumar, V. Hassija, N. S. S. Reddy, J. Wang, S. Zeadally, A. Hussain, F. R. Yu, M. Guizani, and D. Niyato, "Beyond Reality: The Pivotal Role of Generative AI in the Metaverse," IEEE Internet of Things Magazine, 2023.

[J12] G. Bansal, V. Chamola, B. Sikdar, and N. Ansari, "Scalable Topologies for Time-Optimal Authentication of UAV Swarms," IEEE Network Magazine, 2022 (IF: 10.3).

[J11] G. Bansal, N. Naren, V. Chamola, and B. Sikdar, "SHOTS: Scalable Secure Hardware Based Authentication-Attestation Protocol Using Optimal Trajectory in UAV Swarms," IEEE Transactions on Vehicular Technology, 2022 (IF: 6.8).

[J10] G. Bansal and B. Sikdar, "Beyond Traditional Message Authentication Codes: Future Solutions for Efficient Authentication of Message Streams in IoT Networks," IEEE Internet of Things Magazine, 2022.

[C11] G. Bansal and B. Sikdar, "Fault Resilient Authentication Architecture for Drone Networks," IEEE ICC Workshop, 2022.

[C10] G. Bansal and B. Sikdar, "Secure and Trusted Attestation Protocol for UAV Fleets," IEEE INFOCOM Workshop, 2022.

[J9] T. Alladi, N. Naren, G. Bansal, V. Chamola, and M. Guizani, "SecAuthUAV: A Novel Authentication Scheme for UAV-Ground Station and UAV-UAV Communication," IEEE Transactions on Vehicular Technology, 2021 (IF: 6.8).

[J8] G. Bansal, V. Chamola, G. Kaddoum, M. J. Piran, and M. Alrashoud, "Next Generation Stock Exchange: Recurrent Neural Learning Model for Distributed Ledger Transactions," Computer Networks, 2021 (IF: 5.5).

[J7] G. Bansal, V. Chamola, B. Sikdar, and F. R. Yu, "UAV SECaaS: Game-Theoretic Formulation for Security as a service in UAV Swarms," IEEE Systems Journal, 2021 (IF: 4.8).

[C9] G. Bansal and B. Sikdar, "A Secure and Efficient Mutual Authentication Protocol Framework for Unmanned Aerial Vehicles," Globecom Workshop, 2021.

[J6] G. Bansal and B. Sikdar, "Location Aware Clustering: Scalable Authentication Protocol for UAV Swarms," IEEE Networking Letters, 2021.

[J5] G. Bansal and B. Sikdar, "S-MAPS: Scalable Mutual Authentication Protocol for Dynamic UAV Swarms," IEEE Transactions on Vehicular Technology, 2021 (IF: 6.8).

[C8] G. Bansal and B. Sikdar, "Security Service Pricing Model for UAV Swarms: A Stackelberg Game Approach," DroneCom, INFOCOM Workshop, 2021.

[C7] G. Bansal, A. Tyagi, V. Narayanan, and V. Chamola, "Hardware Testbed based Analytical Performance Modelling for Mobile Task Offloading in UAV Edge Cloudlets," VTC Workshop, 2021.

[C6] G. Bansal and A. Bhatia, "A Fast, Secure and Distributed Consensus Mechanism for Energy Trading Among Vehicles Using Hashgraph," Proceedings of IEEE International Conference on Information Networking (ICOIN), Barcelona, Spain, 2020.

[C5] G. Bansal and V. Chamola, "Lightweight Authentication Protocol for Inter Base Station Communication in Heterogeneous Networks," BlockSecSDN, INFOCOM Workshop, 2020.

[J4] G. Bansal, V. Chamola, P. Narang, S. Kumar, and S. Raman, "Deep3DSCan: Deep Residual Network And Morphological Descriptor Based Framework for Lung Cancer Classification And 3D Segmentation," IET Image Processing Journal, 2020 (IF: 2.7).

[C4] G. Bansal, N. Naren, and V. Chamola, "RAMA: Real-Time Automobile Mutual Authentication Protocol Using PUF," Proceedings of IEEE International Conference on Information Networking (ICOIN), Barcelona, Spain, 2020.

[J3] G. Bansal, N. Naren, V. Chamola, B. Sikdar, N. Kumar, and M. Guizani, "Lightweight Mutual Authentication Protocol for V2G Using PUF," IEEE Transactions on Vehicular Technology, 2020 (IF: 6.8).

[J2] V. Hassija, G. Bansal, V. Chamola, N. Kumar, and M. Guizani, "Secure Lending: Blockchain and Prospect Theory-Based Decentralized Credit Scoring Model," IEEE Transactions on Network Science and Engineering, 2020 (IF: 6.6).

[C3] S. Kumar, G. Bansal, and V. Shekhawat, "A Machine Learning Approach for Traffic Flow Provisioning in Software Defined Networks," Proceedings of IEEE International Conference on Information Networking (ICOIN), Barcelona, Spain, 2020.

[C2] G. Bansal, A. Dua, G. S. Ajula, M. Singh, and N. Kumar, "SmartChain: A Smart and Scalable Blockchain Consortium for Smart Grid Systems," IEEE International Conference on Communications, Shanghai, China, 2019.

[J1] G. Bansal, V. Hassija, V. Chamola, N. Kumar, and M. Guizani, "Smart Stock Exchange Market: A Secure Predictive Decentralised Model," Proceedings of the 2019 IEEE Globecom, Big Island, HI, USA, 2019.

[C1] V. Hassija, G. Bansal, V. Chamola, V. Saxena, and B. Sikdar, "Blockcom: A blockchain based commerce model for smart communities using auction mechanism," IEEE International Conference on Communications, Shanghai, China, 2019.

🖥 COORDINATOR

Co-Chair	> IEEE PERCOM 2022 Workshop > IEEE INFOCOM 2022 Workshop > IEEE GLOBECOM 2021 Workshop
TPC	> IEEE ICC > IEEE WiMob > IEEE INFOCOM

🎓 TEACHING

Courses	> Computer Networks > Computer Programming > Internet of Things > Cryptography > Machine Learning > Software for Embedded Systems

🎓 AWARDS, GRANTS AND FELLOWSHIPS

2022	Google PhD Fellowship (USD $ 20,000)
2022	Co-Principal Investigator, ASEAN-India Grant, DST, India (USD $ 43,000)
2021	Student Grant, Internet Engineering Task Force (IETF) (USD $ 1800)
2021	Keynote Speaker, University of Cape Town
2020	NUS President Graduate Fellowship (USD $ 95,000)
2020	Keynote Speaker, BITS Pilani
2018	Prototype Development, APOGEE, BITS Pilani (WINNERS)
2014	Kishore Vaigyanik Protsahan Yojana (KVPY) Fellowship
2013	National Mathematical Olympiad (Rank: 1)

💬 REFEREES

Prof. Vinay Chamola	Prof. Biplab Sikdar	Sai Teja Peddinti
Associate Professor	*Professor & Head of Department*	*Staff Research Scientist*
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