Dr. Girish Revadigar

Assistant Professor - Cybersecurity **Email Id:** girishrevadigar@iiitdwd.ac.in
Department of Data Science and Artificial Intelligence
Indian Institute of Information Technology (IIIT) Dharwad

Summary:

- I am an Assistant Professor holding a **PhD** degree in **Computer Science and Engineering** with specialization in **Cybersecurity**.
- **Industry Experience:**
  - I have ~15 years of overall industry experience working at multiple levels/roles from independent contributor to a team leader and project manager.
  - I have ~15 years of hands-on experience in multiple programming languages/platforms like C, Java, Python, Android etc., and demonstrated skills in the complete project life cycle, including the design and implementation of prototypes/proof-of-concepts (POC), and end-to-end solutions/systems with multiple heterogeneous components of different technologies, such as in-vehicle-infotainment (IVI) systems, Real Time Embedded Systems, and short-range wireless networks for IoT and automotive applications.
- **Independent Research Contributions**:
  - I have ~9 years of post-PhD research and development experience and a proven track record of conducting high impact innovative research on multiple topics, viz., the Cybersecurity and Cyber Resilience for Autonomous/Smart Vehicles, Internet of Things (IoT), Wireless Networks, and Cyber Physical Systems. A number of my research work/contributions having commercial value have been patented worldwide (**Total 72 patents**) and/or published in top-tier peer reviewed international conferences and journals.
- **Research Leadership Activities**: I have a total of ~7 years of experience in Research Leadership role, with capabilities like
  - identifying and leading novel research directions,
  - applying to grants - I have secured a total of **USD $ 1.3 million research grant** in the past 6 years, from multiple highly competitive sources,
  - managing R&D projects consisting of multiple entities like internal and external collaborators, contributors, funding bodies, and foreign academic institutions etc,
  - planning strategies for efficient usage of project deliverables - patents, POC, technology transfer, and product integration, etc.
- **Teaching, Supervision and Mentoring**:
  - I have mentored and supervised UG/PG students, interns and trainee engineers in the past 12 years. I have also conducted corporate workshops/training sessions for software engineers.
  - In recent years, I have actively contributed to the development of new university course materials, lab experiments, and testbed setup for research activities.

Areas of Specialization and Research Interests:

- Cybersecurity and Resilience for IoT, Wireless Networks, Autonomous Vehicles, Cyber-physical Systems,
- Physical Layer Security,
- Applications of AI/ML and Blockchain for Cybersecurity,
- Applied Cryptography,
- Intrusion Detection and Prevention Systems.

Work Experience:

	Designation	Organisation	Period
1.	Assistant Professor	Dep. of Data Science and Artificial Intelligence, Indian Institute of Information Technology (IIIT) Dharwad, Karnataka, India	Jul 2025 to Till date
2.	Senior Researcher / Senior Staff Engineer	Huawei Research Centre, Singapore	Dec 2018 to Jun 2025
3.	Postdoctoral Research Fellow	Singapore University of Technology and Design (SUTD), Singapore	Nov 2017 to Dec 2018
4.	Visiting Researcher	Illinois Advanced Research Centre, Singapore	Nov 2017 to Dec 2018

5.	Guest Lecturer, COMP9337 Securing Wireless Networks	School of CSE, UNSW Australia	Apr 2017 to Jun 2017
6.	Research Associate and Project Manager	School of CSE, UNSW Australia	Mar 2017 to Nov 2017
7.	Teaching Assistant, GSOE9400, Engineering Postgraduate Essentials	School of CSE, UNSW Australia	Jul 2015 to Nov 2016
8.	Intern, Data Science Group	Philips Research, Eindhoven, The Netherlands	Aug 2015 to Oct 2015
9.	Teaching Assistant, COMP9337, Securing Wireless Networks	School of CSE, UNSW Australia	Mar 2014 to Jun 2016
10.	Postgraduate Researcher	Data61|CSIRO, ATP, Sydney	Jan 2014 to Mar 2017
11.	PhD Student	School of CSE, UNSW Australia	Aug 2013 to Mar 2017
12.	Senior Software Engineer	AllGo Embedded Systems Pvt. Ltd., India	Apr 2011 to Jul 2013
13.	Software Engineer	AllGo Embedded Systems Pvt. Ltd., India	Jul 2007 to Mar 2011
14.	Trainee Engineer	AllGo Embedded Systems Pvt. Ltd., India	Sep 2006 to Jun 2007

Educational Qualification:

- Doctor of Philosophy (PhD) in Computer Science and Engineering — 30 Aug 2013 to 29 March 2017, The University of New South Wales (UNSW) Sydney, Australia.
- Master of Technology (M.Tech) in Industrial Electronics — Sep 2005 – Jun 2007, First Class with Distinction, 2nd Rank, Sri Jayachamarajendra College of Eng. (SJCE), Mysore, Affiliated to Visvesvaraya Technological University (VTU), Belgaum, Karnataka, India.
- Bachelor of Engineering (B.E.) in Electronics and Communication — Sep 2000 - Jun 2004, First Class, S. T. J. Institute of Technology, Ranebennur (STJIT), Affiliated to Visvesvaraya Technological University (VTU), Belgaum, Karnataka, India.

Post-PhD Research and Development Projects During Industry Employment:

Position: ***Senior Researcher / Senior Staff Engineer / Project Manager @ Huawei Research, Singapore.***

The following were the roles and responsibilities:

1. ***Individual Research and Development Contributions -***
   a. Conducting thorough literature survey on the state-of-the-art in both academia and industry,
   b. Conducting research to identify emerging threats, existing security issues/vulnerabilities, and research gap,
   c. Proposing novel security solutions for attack detection and mitigation,
   d. Patenting the solutions,
   e. Design and implementation of the proof-of-concept (POC)/demonstrations,
   f. Testing/validation of POC,
   g. Preparing the design documents and user guides,
   h. Technology transfer - transferring design documents/source codes etc., to concerned product departments and provide assistance during the integration of our solutions into products,
   i. Providing support for post-integration testing/validation and maintenance/update etc,
   j. Industry Project Supervisor for UG and PG Intern students from top academic universities like NUS, NTU, SMU and SUTD, Singapore.

2. ***Research Project Management Activities –***
   a. Finding an emerging/important research topic and plan for more advanced research (2-3 years),
   b. Finding suitable external collaborators/overseas experts in academics,
   c. Budget estimation for the project,
   d. Preparing the project proposal/funding application documents,
   e. Applying for various internal and external research funds/grants,

f. Presenting the project proposal to funding authorities/stake holders and convince them about the need for novel research and obtain funds,
g. Managing whole life cycle of the project and all collaborators to achieve milestones,
h. Managing fund utilization,
i. Receiving project deliverables from all collaborators, evaluate the deliverables for practical deployment,
j. Preparing the project deliverables document, manage source code repository/archiving,
k. Delivering the source codes etc., to product department(s) and assist in the integration of deliverables into products,
l. Providing post integration support for testing/validation and maintenance/updates etc.

Projects:

1. List of projects that I initiated, secured competitive funding, led and contributed as a Principal Investigator (PI):

1) Intrusion detection and prevention system for securing vehicle to external (V2X) wireless communications.

Grant name:	Asia-Pacific Research Institute Innovation Project Grant
Grant amount:	**USD $ 350,000**
Duration:	1 Year
Month and Year of grant:	Jul 2019.

2) Intrusion resilient sensor perception for autonomous vehicles,
   1.2.1. AI/ML based security mechanisms for the LiDAR sensor of Autonomous Vehicles (AV),
   1.2.2. Multi-sensor (Camera, Lidar, RADAR) based attack detection for Advanced Driver Assistance Module (ADAS).

Grant name:	Asia-Pacific Research Institute Innovation Project Grant
Grant amount:	**USD $ 250,000**
Duration:	1 Year
Month and Year of Grant:	Jul 2020.

3) Attack resilient control systems for cyber-physical systems.

Grant name:	Overseas Research Independent Budget Grant
Grant amount:	**USD $ 350,000**
Duration:	2 Year
Month and Year of Grant:	Nov 2021.

4) Cyber intrusion resilience for control systems of autonomous vehicles.

Grant name:	Intelligent Vehicle Department Research Fund
Grant amount:	**USD $ 350,000**
Duration:	2 Year
Month and Year of Grant:	Nov 2022.

2. List of department-funded projects that I have led and contributed as a Principal Investigator (PI):

1) AI/ML-based prediction methods for the cyber resilience of smart vehicles.
2) State-estimation and prediction-based intrusion detection mechanisms for AVs.
3) Digital Identity framework/Identity and Access Management (IMA) for the service-based architecture of vehicles.
4) Remote Attestation of vehicles' ECU software and whole vehicles' software integrity verification.
5) AI/ML and context-based security methods for vehicle to external communication (V2X).

3. List of department-funded projects that I have contributed as a Co-Principal Investigator (Co-PI):

1) Design and Implementation of whole vehicles' security/Threat Analysis and Resilience Assessment (TARA) Software Tool.
2) Security solutions for the service-based architecture (SOME-IP) of next generation vehicles.

3) Defence-in-depth/multi-layered security for connected/smart vehicles architectures –
   3.3.1. domain-based architecture,
   3.3.2. zone based architecture, and
   3.3.3. service-based architectures.
4) Secure Over-the-air (OTA) software update methods for connected/smart vehicles –
   3.4.1. cloud server-based OTA,
   3.4.2. user mobile phone-based OTA, and
   3.4.3. incremental updates-based OTA.
5) Intrusion Detection and Prevention Systems (IDPS) for secure on-board communication (ex., CAN networks) in vehicles.

International Patents:

Total number of inventions as a Primary Inventor:	**17**	(Invention id 1-17)
Total number of inventions as a Co-Inventor:	**01**	(Invention id 18)
Total number of international patents:	**72**	

*PCT – Patent Cooperation Treaty; Filing a patent as PCT offers protection in 150+ countries with single international patent application.
Note: An invention consists of multiple sub components that could be patented as a whole or split into multiple individual patents.

1. Secure automatic authentication of user's device with the vehicle using Bluetooth Low Energy connection,
   a. USA Granted US11381970B2
   b. China Granted 202080028810.1
   c. Germany Granted EP3861774
   d. Europe Granted EP3861774
   e. France Granted EP3861774
   f. India Granted IN548519
   g. Italy Granted 502023000027195
   h. Japan Granted JP7192122
   i. Republic of Korea Granted KR10-2594996
   j. PCT Published WO 2020/210990
   k. PCT Published WO 2020/211794
   l. Brazil In-progress -
   m. Mexico In-progress -

   Status: POC implementation and evaluation has been completed
   Technology Transfer: The POC, design documents, code etc., have been successfully transferred to intelligent vehicle department.

2. Secure Lightweight Version Control Mechanism for Vehicular Software-Over-The-Air Updates
   a. USA Granted 12079618B2
   b. Germany Granted EP4073629
   c. China Granted 201980059871.1
   d. Europe Granted EP4073629
   e. PCT Published WO 2021/134612

3. Secure Software Patch Stitching Method for Cloud Servers
   a. China Granted 202010077050.5
   b. PCT Published WO 2021/147668

4. Version Tree and Blockchain Based Whole Vehicle's Remote Attestation and Software Integrity Verification Method
   a. China Granted 202080005100.7
   b. Europea Applied EP4211588
   c. Japan Applied JP2023-543476
   d. PCT Published WO2022/067731

5. Entropy Pool Architecture and Electric Network Frequency-Based Random Number Generation
    a. Europe Applied EP4148556
    b. China Granted 202080004611.7
    c. PCT Published WO 2021/237538
    d. USA Published US20230093544

    Status: POC implementation and evaluation has been completed

6. An Architecture Framework for the Service Recording BLE Physical Layer Features,
    a. Europe Applied EP4278856
    b. China Published CN 117014933 A
    c. China Granted 202180000262.6
    d. PCT Published WO 2022/155931

7. An Ultra-Light Weight Intrusion Resilient Smart Authentication for BLE Devices
    a. USA Applied US20230328523
    b. PCT Published WO 2022/116202
    c. Europe Applied EP4245046
    d. China Granted 202080005639.2

    Status: POC implementation and evaluation has been completed
    Technology Transfer: The POC, design documents, code etc., have been successfully transferred to intelligent vehicle department.

8. An Intrusion Detection and Prevention System for Lidar-Based Perception
    a. Europe Applied EP4377716
    b. China Published CN 117730349 A
    c. India Published IN202417015776
    d. PCT Published WO 2023/023982
    e. USA Applied 18587159

    Status: POC implementation and evaluation has been completed

9. Method for Detecting Anomalies of LiDAR Point Cloud Data Using Angle Offset
    a. PCT Published WO 2023/023951
    b. China Published CN 117730265 A
    c. Europe Applied EP4363888
    d. India Published IN202427006835
    e. USA Applied 18584834

    Status: POC implementation and evaluation has been completed

10. Remote Server Assisted Attack Resistant Authentication for Digital Key Solutions
    a. PCT Published WO 2023/097527
    b. China Published CN 118339866 A
    c. Europe Applied EP4427473
    d. USA Applied US20240313981

    Status: POC implementation and evaluation has been completed
    Technology Transfer: The deliverables have been transferred to intelligent vehicle department.

11. Entropy as a Service for Vehicular Service Oriented Architecture
    a. PCT Published WO 2023/000304
    b. China Published CN 117918011 A

12. Authenticated Secure Ranging for Digital Key Solutions
    a. USA Applied US20240312272
    b. PCT Published WO 2023/097492
    c. Europe Applied EP4430838

d. China Published CN 118339851 A

13. LiDAR Data Anomaly Detection Method and System for Autonomous Vehicles
    a. PCT Published WO 2023/220977
    b. China Published CN 119384611A

    Status: POC implementation and evaluation has been completed

14. An Attack Detection Procedure for Vehicle's Adaptive Cruice Control System
    a. PCT Published WO 2024/168541
    b. China In-progress -
    c. USA In-progress -

    Status: POC implementation and evaluation has been completed

15. Unified Digital Identity Architecture for Vehicle Entities
    a. China In-progress -
    b. PCT Published WO 2024/207288

16. A Method for the Detecting GPS Spoofing Attack on Autonomous Vehicles
    a. China Applied 202410070170.0

17. A Method for the Verification of AI agents
    a. PCT Applied PCT/CN2024/114462

18. Auxiliary Secure Start for On-board Controller
    a. USA Published US20220182248
    b. PCT Published WO 2021/022802
    c. UK Granted EP3979113
    d. France Granted EP3979113
    e. Europe Granted EP3979113
    f. Germany Granted EP3979113
    g. China Granted 201910721190.9

Post PhD Research Projects During Postdoctoral Fellowship and Research Associate:

1. **ENF-RBG: Cryptographically Secure Random Bit Generation Using Electric Network Frequency*:* Role: Postdoctoral Researcher @ SUTD and Illinois ARCS, Singapore, Primary Investigator**
   ***Abstract*:** Random bit generator (RBG) is the most crucial part of cryptographic systems, as it is responsible for generating the random bit-strings used as secret nonces, keys, seed, initialisation vector etc. In many applications, due to unavailability of true randomness source(s), deterministic/pseudo-random bit generators (DRBG) are used to generate pseudo-random bitstrings. However, recent research have shown that, if the seed used to initialise DRBGs is obtained from a randomness source that produces low entropy or predictable bits, and/or if there are flaws in DRBG implementation, that can lead to serious security incidents. Hence, the search for a reliable source of (true) randomness that can be easily accessed, and RBGs designed to use such source, is ongoing for many years. In this project, we present a ubiquitous and reliable source of randomness that is accessible to all the devices connected to a power grid's electric network, i.e., Electric Network Frequency (ENF).

   Research Impact:
   - **Research paper publication**:
     - A research paper has been published at IEEE TrustCom Conference, 2019 (A rank).

2. **Fuzzy Extractor and Gait-Based Robust Group Secret Key Generation for Smart Wearables: Role: Postdoctoral Researcher @ SUTD and Illinois ARCS, Singapore, Primary Investigator**
   ***Abstract*:** The recent surge in the usage of smart wearables for health monitoring highlights securing the communication among a group of personal devices using group secret keys (GSK). Simultaneous GSK generation on multiple wearables is very challenging, as finding a common feature among the

devices that has good entropy is difficult. In this work, we present two novel GSK protocols: FEAT-GSK and FEST-GSK, employing the unique gait characteristics of a person and fuzzy extractors. FEST-GSK eliminates the reconciliation and privacy amplification stages as it employs error correcting code and strong extractor. We implement our protocols on android devices and conduct various experiments. Our results demonstrate that the gait features extracted on user's devices show highest correlation (Pearson-correlation-coefficient > 0.9), and guarantees matching group key generation e.g., 256-bit key in less than 4 seconds, whereas the adversaries show as low as 20% key agreement with respect to the user.

Research Impact:

- **Research paper publication**:
  - A research paper has been published at SecureCom Conference, 2018.

3. **Mitigating Jamming Attacks in Communication-Based Train Control Systems:**
   Role: Postdoctoral Researcher @ SUTD and Illinois ARCS, Singapore, Co-Investigator
   Abstract: In this work, we study the impact of signal jamming attacks against communication-based train control (CBTC) and develop countermeasures to limit the attacks' impact. CBTC supports train operation automation and moving-block signalling, which improve transport efficiency. We consider an attacker jamming the wireless communication between the trains or the train to wayside access point, which can disable CBTC and the corresponding benefits. In contrast to prior work studying jamming only at the physical or link layer, we study the real impact of such attacks on end users, namely train journey time and passenger congestion. Our analysis employs a detailed model of leaky medium-based communication (leaky waveguide or leaky feeder/coaxial cable) popularly used in CBTC systems. To counteract the jamming attacks, we develop a mitigation approach based on frequency hopping spread spectrum (FHSS) taking into account the domain-specific structure of leaky-medium CBTC systems. Specifically, compared with existing implementations of FHSS, we apply FHSS not only between the transmitter-receiver pair but also at the track-side repeaters. To demonstrate the feasibility of implementing this technology in CBTC systems, we develop a FHSS repeater prototype using software-defined radios on both leaky-medium and open-air (free-wave) channels. We perform extensive simulations driven by realistic running profiles of trains and real-world passenger data to provide insights into the jamming attack's impact and the effectiveness of the proposed countermeasure.

   Research Impact:

   - **Research paper publication**:
     - A research paper has been published at ACM WiSec conference, 2018.
   - **Technology Transfer**:
     - The project deliverables have been successfully transferred to SMRT- Singapore's Mass Rail Transportation Corporation.

4. **LoRa-Based IoT for Smart Buildings:**
   Role: Research Associate and Project Manager @ UNSW Sydney, Australia, Research Leader
   ***Abstract*:** LoRaWAN is a Low Power Wide Area Network (LPWAN) specification intended for wireless battery-operated Things in a regional, national or global network. This project mainly aims at developing "Smart Buildings" by using LoRa as a wireless technology to connect emergency lights, smart security devices, etc., in a home/office/large campus area to web-based management system, called as EMIoT system. Each device communicates with a Gateway device using LoRa technology, and the Gateway is connected to remote management system via internet. The system allows user to remotely view the network configuration of all LoRa enabled devices in his building, send commands to perform maintenance tests, request device status, test results, etc.

   Following are the responsibilities I have handled:

   - Project Manager - managing a team of 3 developers and co-ordinating with external collaborators involved in sub parts of the project, task allocation to team members, tracking the project progress,
   - Designing the whole system architecture, i.e., LoRa network, Gateway, Server, Database and the Website interface,

- Designing the protocols/flow charts, and message formats for communication between LoRa devices-Gateway, Gateway-Server, Server-Database and Website-Database for different application scenarios,
- Implementation, integration and testing of Server functionalities.

Research impact:

- **Technology Transfer:**
  - The deliverables have been successfully transferred to an Australian company manufacturing smart lighting solutions for buildings. The solution has been integrated into their IoT-based smart lighting products, that are being deployed throughout Australia.

Research Projects During PhD:

1. **Symmetric Shared Secret Key Generation in Body Area Networks (BAN):**
   Abstract: The tiny body-worn devices of BAN equipped with sensors/actuators measure the sensitive physiological data and send it to remote server via a hub to enable remote patient monitoring. The wireless medium used for communication in BANs is vulnerable to serious threats like eavesdropping the confidential data, injecting malicious commands to cause damage to person's health, data tampering/modification etc. Thus, the data transmitted between BAN devices must be protected by encrypting the packets using symmetric secret key. Generating the shared secret key on BAN devices is very challenging as the computationally complex cryptographic mechanisms are not feasible due to resource constraints. Our research aims at proposing novel lightweight symmetric shared secret key generation mechanisms for body-worn devices by exploiting the unique features of wireless channel characteristics, e.g., received signal strength (RSS). The advantage of such method is that, no special hardware is required to measure the channel features. The channel characteristics measured by two communicating legitimate devices will have high correlation due to reciprocity property of wireless channel, whereas, the same measured by a nearby eavesdropper will be entirely different due to multipath effects in indoor environments. We exploit these features to generate shared key on legitimate devices during the random body movement of subject wearing devices, as well as in static channel conditions, i.e., when the subject is at rest or sitting/relaxing/sleeping without much body movements. Following are the two proposed solutions:
   - Dual Link Based Radio Frequency Fingerprinting for Wearable Devices (DLINK): A novel secret key generation scheme that exploits the dual antenna architecture of the base station to dynamically identify the suitable multi-path link to improve key generation in fast and slow fading environments,
   - Secret Key Generation for Resource Constrained Devices by Inducing Artificial Randomness in the Channel (iARC): An innovative secret key generation protocol that induces artificial channel randomness by exploiting the dual-antenna architecture of control unit and frequency hopping, for key generation in static environments.

   Research Impact:
   - A short paper has been published at PerCom Workshops conference, 2016 (A* Rank).
   - A research paper has been published at IEEE LCN conference, 2015 (A Rank).
   - A research paper has been published at BodyNets conference, 2015.
   - A Poster has been presented at AsiaCCS Conference, 2015.

2. **Secure Group Key Generation and Distribution for Smart Wearables:**
   Abstract: In many practical scenarios, it is essential to establish a common secret key among multiple wearable devices of a subject, called as group secret key**.** In this project, we design and implement a group secret key generation scheme that allows legitimate devices to establish a common cryptographic key by exploiting user's walking characteristics (gait) and onboard accelerometer sensors. The sensors on different locations of the same body experience similar acceleration when the user is walking. We exploit this feature to generate secret keys and distribute the same securely among multiple body-worn devices.

   Research Impact:
   - A research paper has been published at IEEE TIFS Journal, 2017 (A* Rank).

All the above work were conducted using real programmable wireless nodes and wearable/personal devices like android based smart glass, smart watch, mobile phone, for various use cases. The results demonstrate that the proposed methods achieve highest level of accuracy and are suitable for practical deployments.

Industry Projects Prior to PhD (Duration 6 Yr):

During my employment in industry after Master's degree, I worked on the design and development of Embedded Systems, Automotive Infotainment Solutions, and Wireless Technologies. I successfully contributed and lead the team of software engineers, provided onsite support to multiple projects with major global IT companies like Freescale (India, USA), Honda R&D (USA), Denso (USA), Visteon (India, USA), Broadcom (India), Honeywell (India), Texas Instruments (USA) and Motorola (India, USA). I was also a mentor, trainer and supervisor for new joiners and interns.

Following are the major projects undertaken during employment:

1. **NetViz Interactive Network Visualization Tool for Sensor Networks/Zigbee/802.15.4** - design and implementation of whole system viz. the wireless personal area network (PAN) and JAVA swing based GUI application for Windows/Linux PC to configure, control and monitor individual sensor nodes and the whole network.
2. **Home Energy Gateway (HEG) for ZigBee Smart Energy Ecosystem** – Design and implementation of Home energy gateway comprising of a custom built low cost tablet to support Linux and Android OS, design and implementation of GUI application based on Android and GTK (for Linux) for configuration and control of Zigbee Home network. Design and implementation of Zigbee home network to support different smart home components – lights/switches/HVAC/Motor pump/Curtains/doors/smart meter/smart panel etc.
3. **ZiFi ZigBee WiFi Hybrid Network for Home Automation** - design and implementation of whole system comprising a server, Zigbee gateway (Linux based), smart home devices (Zigbee/802.15.4) and a GUI application for user's personal device like mobile phone/tablet to configure and control all network components from inside and even outside the house by using internet connection.
4. **Ytrack Short range wireless network-based device tracking/localization system** – Design and implementation of whole system for tracking sensor nodes, viz. Java based GUI application for PC and 802.15.4 wireless PANs.
5. **YConnect platform evaluation** – implementation and testing of low-level device drivers for custom built wireless nodes – TI's 8 bit microcontroller based devices running a lightweight RTOS.
6. **Android-based IVI -** Design and implementation of Android applications for In Vehicle Infotainment System viz. FM/AM radio, Music player to play from USB, internal memory, home screen, phone screen, AC and fan control etc.
7. **Fable; An android based kids Tablet** - Android framework customization, application development
8. **Android applications for AllGo-Texas Instruments eTab** - A low-cost Tablet for educational use cases
9. **Design and Implementation of Personal Cockpit Concept** – Android based GUI for Advanced Automotive Infotainment System
10. **Android Bring up** - on Sigma Design's 8654 & 8642 Blue Ray Platform
11. **iAP** – iPod/iPhone Accessory Protocol integration and testing into multiple embedded systems/products
12. **Device Driver Development** - for Freescale's MCUs on Linux/RTOS.

Technical Exhibitions:

Following are the solutions/products designed and implemented by myself and the team under my supervision that have been successfully demonstrated at various major events worldwide,

- **Consumer Electronics Show (CES), USA:** CES is the world's biggest technical exhibition event for showcasing innovative embedded system products.
- **Freescale Technology Forum (FTF) USA, India**: FTF is a premier 2-day annual event featuring training sessions, workshops and demonstration of innovative embedded system projects based on latest technologies.
- **Total Facilities Expo (TFX), Australia**: TFX is a 3-day annual event for facilities management industry for manufacturers to showcase smart products.

1. LoRa-based Smart Lighting Systems, TFX, Sydney, March 2017.
2. AllGo-Texas Instruments eTab - CES USA, 2013.

3. Personal Cockpit GUI for Automotive infotainment - CES 2012, USA.
4. iAP - iPod Accessory Protocol - CES USA, 2010.
5. Home Energy Gateway (HEG) for ZigBee Smart Energy Ecosystem, FTF India, August 2010.
6. STAMP/ZigBee Home Automation - FTF Americas, USA 2010.
7. ZiFi – ZigBee WiFi Hybrid Network for Home Automation, FTF India, August 2008.
8. IEEE 802.15.4 Based Wireless Home Automation, FTF India, August 2007.

Invited Talks:

1. Cyber Intrusion Resilience for Autonomous Vehicles, at Huawei Security Workshop, Oct 2022, Singapore.
2. Security Mechanisms for Next Generation Vehicles, at Huawei Asia Pacific Research Institute (APRI) Cross Research Centre Workshop, May 2022. Singapore.
3. Security Threats and Countermeasures for Digital Key Solutions, at AI for Security Seminar Series organised by Huawei Research Centre - Munich, Sep 2021, Germany.
4. Tutorial Session: Secret Key Generation Mechanisms for Resource Constrained Devices, at Int. Conf. on Intelligent Control and Computation for Smart Energy and Mechatronic Systems, by JSS Academy of Technical Education, Noida, India, 2020.
5. AI-Based Cybersecurity for Autonomous Vehicles, at AI for Security Workshop organised by Huawei Research Centre – Munich, Jul 2021, Germany.

Research Publications:

Book Chapters:

1. Secure Device Pairing Protocol Based on Wireless Channel Characteristics for Body Area Networks, Javali C, **Revadigar G**, Libman L, Ding M, Lin Z, and Jha S, Physical Layer Security, 2021, pp 151-179.
2. Cooperative Physical Layer Secret Key Generation by Virtual Link Estimation, Javali C, **Revadigar G**, Ding M, Lin Z, Jha S, Physical Layer Security, 2021, pp 99-128.

Journal papers:

1. Accelerometer and Fuzzy Vault based Secure Group Key Generation and Sharing Protocol for Smart Wearables, **Revadigar G**, Javali C, Xu W, Vasilakos AV, Hu W, and Jha S, IEEE Transactions on Information Forensics and Security (TIFS), 2017, 12, 10, pp 2467-2482. (**A* Rank**, IF = 6.3).
2. Gait-Key: A Gait-based Shared Secret Key Generation Protocol for Wearable Devices, Xu W, Javali C, **Revadigar G**, Luo C, Bergmann N, Hu W, ACM Transactions on Sensor Networks (TOSN), 2017, 13, 1. pp 1-27.
3. Mobility Independent Secret Key Generation for Wearable Health-care Devices, **Revadigar G**, Javali C, Asghar HJ, Rasmussen KB, Jha S, EAI Transactions on Security and Safety, 2015, 3, 8.
4. Secret Key Generation by Virtual Link Estimation, Javali C, **Revadigar G**, Ding M, and Jha S, EAI Transactions on Security and Safety, 2015, 3, 8.
5. Real Time Monitoring And Control of Wireless Networks, **Revadigar G**, and Javali C, International Journal of Embedded Systems and Applications (IJESA) 2012, 2, 1.

Conference papers:

1. Proxicar – Proximity-Based Secure Digital Key Solution for Cars, **Revadigar G**, Javali C, Jha S, International Conference on Communication Systems and Networks (COMSNETS), 2020, Bangalore, India.
2. Network Web Traffic Generator for Cyber Range Exercises, Javali C, **Revadigar G**, IEEE Conference on Local Computer Networks (LCN), 2019, Osnabrueck, Germany. (**A Rank**).
3. On the Effectiveness of Electric Network Frequency (ENF) as a Source of Randomness, **Revadigar G**, Javali C, Li Y, Viswanathan S, IEEE International Conference on Trust and Privacy In Computing and Communications (TrustCom), 2019, Rotorua, New Zealand. (**A Rank**).
4. Signal Jamming Attacks Against Communication-Based Train Control: Attack Impact and Countermeasure, Lakshminarayana S, Karachiwala JS, Chang SY, **Revadigar G**, Sravana Kumar S, Yau DKY, Hu YC, ACM Conference on Security and Privacy in Wireless Mobile Networks (WiSec), 2018, Stockholm, Sweden.
5. LQI-Key: Symmetric Key Generation Scheme for Internet-of-Things (IoT) Devices Using Wireless Channel Link Quality, Kuruwatti N, Nayana YN, Sarole N, **Revadigar G**, Javali C, International Conference on Advances in Electronics, Computers and Communications (ICAECC), 2018, Bangalore, India.

6. Birds of a Feather Flock Together: Fuzzy Extractor and Gait-Based Robust Group Secret Key Generation for Smart Wearables, Javali C, **Revadigar G**, Security and Privacy in Communication Networks (SecureComm), 2018, Singapore.
7. I Am Alice, I Was in Wonderland: Secure Location Proof Generation and Verification Protocol, Javali C, **Revadigar G**, Rasmussen KB, Hu W, Jha S, IEEE Conference on Local Computer Networks (LCN), 2016, Dubai, UAE (**A Rank**).
8. Walkie-Talkie: Motion assisted Automatic Key Generation for Secure On-Body Device Communication, Xu W, **Revadigar G**, Luo C, Bergmann N, and Hu W, IEEE/ACM International Conference on Information Processing in Sensor Networks (IPSN), 2016, Vienna, Austria (**A* rank**).
9. Secure key generation and distribution protocol for wearable devices, **Revadigar G**, Javali C, Xu W, Hu W, Jha S, IEEE International Conference on Pervasive Computing and Communication (Percom) Workshops, 2016, Sydney, Australia **(A* Rank**).
10. DLINK: Dual link based radio frequency fingerprinting for wearable devices, **Revadigar G**, Javali C, Hu W, Jha S, IEEE Conference on Local Computer Networks (LCN), 2015, Florida, USA (**A Rank**).
11. Secret key generation by virtual link estimation, Javali C, **Revadigar G**, Ding M, Jha S, EAI International Conference on Body Area Networks (BodyNets), 2015, Sydney, Australia.
12. Mobility independent secret key generation for wearable health-care devices, **Revadigar G**, Javali C, Asghar HJ, Rasmussen KB, Jha S, EAI International Conference on Body Area Networks (BodyNets), 2015, Sydney, Australia.
13. SeAK: Secure Authentication and Key Generation Protocol Based on Dual Antennas for Wireless Body Area Networks, Javali C, **Revadigar G**, Libman L, Jha S, Radio Frequency Identification: Security and Privacy Issues (RFIDSec), 2014, Oxford, UK.
14. Wireless Smart Badge based on IEEE 802.15.4 LRWPAN, Javali C, and **Revadigar G**, World Congress on Information and Communication Technologies (WICT), 2012, Trivandrum, India.
15. Generic Network Visualization Tool for Monitoring Adhoc Wireless Networks, **Revadigar G**, Javali C, Advances in Computer Science and Information Technology. Networks and Communications, 2012.

Posters/Project Demonstrations:

1. Demo abstract: Location fingerprint evidence and authorisation using WiFi channel characteristics, Javali C, **Revadigar G**, Pletea D, Jha S, IEEE International Conference on Pervasive Computing and Communication Workshops, 2016, Sydney, Australia (**A* Rank**), (**Best Demo Award**)
2. Poster: Were You in the Cafe Yesterday?: Location Proof Generation & Verification for Mobile Users, Javali C, **Revadigar G**, Hu W, Jha S, ACM Conference on Embedded Network Sensor Systems (SenSys) (**A* Rank**)
3. iARC: Secret Key Generation for Resource Constrained Devices by Inducing Artificial Randomness in the Channel, **Revadigar G**, Javali C, Jha S, ACM Symposium on Computer and Communications Security (AsiaCCS), 2015, Singapore.
4. Go Green Via IoT, **Revadigar G**, Javali C, IEEE Technologies of the Future (IToF), 2014, Sydney (**Best Demo Award**).
5. Wireless Smart Badge for Social Networking, Javali C, **Revadigar G**, IEEE Technologies of the Future (IToF), 2013, Sydney, (**Best Poster Award**).
6. Real Time Monitoring and Control of Wireless Networks, **Revadigar G**, Javali C, IEEE Technologies of the Future (IToF), 2013, Sydney.

External Examiner for PhD Thesis (Duration 8 Yr):

I have been serving as an external examiner for the PhD thesis from the following Indian Universities:

1. Visveswaraya Technological University (VTU), Karnataka, India
2. JSS Science and Technology University, Mysore, Karnataka, India,
3. Sri Siddhartha Academy of Higher Education, Tumkur, Karnataka, India.

UG and PG Student Supervision, and Mentoring activities:

I have been involved in mentorship and supervision of engineering UG/PG students from 2007,

1. **Mentor and Supervisor for UG and PG engineering students** from top universities like **NUS, NTU, SMU** and **SUTD**, pursuing their internship (major thesis work) at Huawei Research Centre, Singapore.
2. **Industry Supervisor/Mentor** for the final year project and thesis work of **B.E./B.Tech/M.Tech** intern students/trainee engineers from **IITs, IISC, NITs, and IIITs** at AllGo systems, Bangalore, 2007-2013, India.

3. **Industry Supervisor** for the final year project of **BE students** from **various colleges in Karnataka**, India, 2007-2013. Following are the projects under my guidance that have been selected for the competitive sponsorship by Karnataka State Council for Science and Technology (KSCST) in 2009 and 2010:
    a. Wireless home automation system
    b. Parking lot monitoring system
    c. Wireless voting/audience polling system
    d. Remote temperature monitoring system
    e. Smart energy metering solution.

Academic Teaching/ Conducting Technical Workshops/Training Sessions:

1. **Guest Lecturer**, COMP9337 Securing Wireless Networks, School of CSE, The University of New South Wales (UNSW) Sydney, Australia, Apr 2017-Jun 2017.
2. **Teaching Assistant**, GSOE9400, Engineering Postgraduate Essentials, School of CSE, The University of New South Wales (UNSW) Sydney, Australia, Jul 2015 – Nov 2016.
3. **Teaching Assistant**, COMP9337 Securing Wireless Networks, School of CSE, The University of New South Wales (UNSW) Sydney, Australia, Mar 2014 to Jun2016.
4. **1 Day Workshop on Android Programming,** I have conducted this workshop for every new batch of trainee engineers and new joiners at AllGo Embedded Systems, Bangalore, India – 2008 to 2012.
5. **Corporate training: A Workshop on Android Application Development,** conducted for the software engineers at Delphi, Bangalore, India, 2012.

New Course and Lab Setup Contributions:

I have contributed substantially for setting up of the following new course and lab(s):

1. **New university course material** for the revised course - COMP4337/9337 Securing Wireless Networks, The University of New South Wales (UNSW) Sydney, Australia, 2017.
2. **New university lab experiments** for the revised course - COMP4337/9337 Securing Wireless Networks, The University of New South Wales (UNSW) Sydney, Australia, 2017.
3. **Software defined radio-based test bed setup** at Illinois Advanced Research Centre at Singapore (Illinois ARCS) for testing various attacks and mitigation solutions on wireless networks, 2018.
4. **Autonomous Vehicle test bed/Lab setup** based on Baidu's Apollo AV Platform, at Huawei research centre Singapore, for conducting various AV security research work for whole team, 2020.

Academic Citizenship:

- Member of IEEE, ACM and EAI.
- Executive Committee Member, IEEE Technical Committee on Computer Communications (TCCC) 2019 and 2020.
- Session Chair for the following conferences and workshops:
    - Annual Cyber Security Workshop, Huawei Singapore Research Centre, 2019, 2020.
    - The 14th EAI International Conference on Security and Privacy in Communication Networks (SecureComm) 2018.
    - National Conf. on Emerging Trends in Engineering, Research and Management (NCETERM) 2017.
- Industry/Research Advisory Committee Member for the following conferences:
    - Int. Conf. on Mobile Ubiquitous Computing, Systems, Services and Technologies (Ubicomm) 2017.
- I have served as a Technical Program Committee (TPC) Member for the following conferences:
    - International Conference on Communication Systems and Networks (COMSNETS),
    - The IEEE Global Communications Conference: Selected Areas in Communications: Internet of Things (Globecom SAC IoT).
    - The 43rd IEEE Conference on Local Computer Networks (LCN).
    - IEEE Int. Symp. On Personal, Indoor, and Mobile Radio Communications (PIMRC).
    - The Int. Conference on Advanced Technologies for Communications (ATC).
    - The Int. Conference on Communication Systems and Network Technologies (CSNT).
    - Int. Conf. on Mobile Ubiquitous Computing, Systems, Services and Technologies (Ubicomm).
    - Int. Conf. on Systems and Networks Communications (ICSNC).
- I have been a reviewer for the following conferences and journals:
    - IEEE Transactions on Information Forensics and Security (TIFS) (ERA 'A*' Rank).
    - IEEE Transactions on Mobile Communications (TMC) (ERA 'A' Rank).
    - ACM Transactions on Sensor Networks (TOSN).

- ACM Conf. on Computer and Communications Security (CCS) (ERA 'A*' rank).
- ACM/IEEE Int. Conf. on Information Processing in Sensor Networks (IPSN) (ERA 'A*' rank).
- ACM Conf. on Embedded Networked Sensor Systems (SenSys) (ERA 'A*' rank).
- IEEE Conf. on Local Computer Networks (LCN 2015) (ERA 'A' rank).
- Int. Conf. on Embedded Wireless Systems and Networks (EWSN) (ERA 'A' rank).
- Int. Conf. on Mobile and Ubiquitous Systems: Computing, Networking and Services (Mobiquitous) (ERA 'A' rank).
- ACM Int. Conf. on Modelling, Analysis and Simulation of Wireless and Mobile Systems (MSWiM) (ERA 'A' rank).
- ACM Conf. on Security and Privacy in Wireless and Mobile Networks (WiSec).
- International Conference on Communication Systems and Networks (COMSNETS),
- EAI International Conference on Body Area Networks (BODYNETS),
- IEEE/ACM International Symposium on Quality of Service (IWQoS),
- IEEE Int. Symp. On Personal, Indoor, and Mobile Radio Communications (PIMRC),
- IEEE International Conference on Internet-of-Things Design and Implementation (IoTDI),
- Security and Communication Networks.
- IEEE Int. Conf. on Communications (ICC) (ERA 'B' rank).

- Representative, School of CSE, 2014, IEEE Student branch, UNSW Australia.
- Student volunteer, 38th IEEE Conference on Local Computer Networks (LCN) 2013.

Awards:

1. **Best Innovative Project Technology Transfer award** – awarded by Huawei for the technology transfer of software solution having high commercial value, to a product department, 2025.
2. ***Best Project Delivery Award*** – awarded by Huawei, for being one of the group member that delivered a number of high value patents and other project deliverables to product department, 2022.
3. ***Best Innovative Project Delivery Award*** – awarded to project managers/researchers by Huawei to recognise the best innovative project that has commercial value, 2020.
4. ***Future Star Award*** – awarded to selected researchers by Huawei Research to recognise their novel contributions, 2019.
5. ***SUTD Strategic Research Awards: Best Poster in Cybersecurity Category 2018*** - "A Novel Location Proof Generation and Verification System for Mobile Devices", **Revadigar G** and Javali C, at the Fostering Industrial Research Success Together (FIRST) Workshop Competition held at SUTD Singapore, July 2018.
6. ***Selected as "One of The Top 200 Most Qualified Young Researchers" to participate in the prestigious 4th Heidelberg Laureate Forum (HLF) 2016.*** HLF is a week-long interactive mentoring program with the recipients of most prestigious awards in Computer Science and Mathematics, like the Abel Prize, ACM Turing Award, ACM Prize in Computing, Fields Medal, IMU Abacus Medal, and Nevanlinna Prize.
    a. Only 200 researchers were selected from more than 20,000 applicants word-wide,
    b. Only one fellowship was awarded throughout Australia in 2016.
7. ***Best Paper Runner-up Award,*** *"Walkie-Talkie: Motion Assisted Automatic Key Generation for Secure On-Body Device Communication",* Xu W, **Revadigar G**, Luo C, Bergmann N, and Hu W, in the 15th IEEE/ACM Conference on Information Processing in Sensor Networks (IPSN), Vienna, Austria, April 2016 (CORE and ERA 'A*' rank conference).
8. ***People's Choice Best Project Demonstration Award***, "Location Fingerprint Evidence and Authorisation using WiFi Channel Characteristics", Javali C, **Revadigar G**, Pletea D and Jha S, 14th IEEE International Conference on Pervasive Computing and Communications (PerCom), Sydney, Australia, March 2016 (CORE and ERA 'A*' rank conference).
9. ***NASSCOM Highly Commended IT Technical Innovation Award 2015****,* "Ultra-lightweight Security Mechanisms for Wearable Devices", **Revadigar G** and Javali C. The NASSCOM Student Innovation competition was open for students studying PhD, Masters, Bachelors/Undergraduate degrees from ICT/Engineering faculties in all Universities across Australia, 2015.
10. ***Best Project Demonstration Award****,* "Go Green via IoT", **Revadigar G** and Javali C, in the 6th IEEE Technologies of the Future (iToF) competition was open for PhD, Postgraduate and Undergraduate students from all universities across New South Wales, Australia, 2014.
11. ***Best Poster Award****,* "Wireless Smart Badge for Social Networking", Javali C and **Revadigar G,** in the 5th IEEE Technologies of the Future (iToF) competition was open for PhD, Postgraduate and Undergraduate students from all universities across New South Wales, Australia, 2013.
12. ***Second Rank, Postgraduate degree (M. Tech) University Examinations***, awarded by Visveswaraya Technological University (VTU), Karnataka, India, 2007.

Scholarships/Grants:

- Science and Industry Endowment Fund (SIEF) - Australian Academy of Science (AAS) Fellowships to the Lindau Nobel Laureates Meetings, awarded to support attendance at the 4th Heidelberg Laureates Forum (HLF), held in Germany in Sep 2016.
- UNSW CSE Conference Travel Fund, Nov 2016, Feb 2016, Mar 2015: granted to selected PhD students to cover travel expenses to attend international conferences for presenting their research work,
- NICTA Research Student Grant, Oct 2015: granted to selected PhD students to cover travel expenses to attend international conferences for presenting their research work,
- Fully funded internship at Philips Research, Eindhoven, The Netherlands, Sep-Oct 2015.
    - Invited to contribute to the AU2EU project, an EU funded R&D Project.
- Australian Research Council (ARC) Discovery grant 2015, Aug 2015: Fund by ARC to support long term research in Australian University,
- Postgraduate Research Student Support (PRSS) Fund, Jun 2015 by UNSW: granted to selected PhD students to cover travel expenses to attend international conferences for presenting their research work,
- NICTA Research Postgraduate Award (NRPA), Jan 2014 - Dec 2016: Funded by Data61|CSIRO of Australia, to cover partial scholarship during PhD at top Australian Universities.
- Australian Postgraduate Award (APA), Aug 2013 - Dec 2016: Competitive scholarship funded by Australian Government to cover expenses during PhD at the top Australian Universities.
- S. J. Jindal Scholarship, India, Sep 2000 - Jun 2004: granted to suitable meritorious students studying engineering course in India.

Technical Skills:

• Programming languages	C, Embedded C, Java - Data Structures & Algorithms, Python
• Platforms/Operating systems	Linux, Embedded Linux, Android, Windows, WinCE 6.0, TinyOS, Contiki, SafeRTOS, Seggor EmbOS
• Debuggers	JTAG, GDB, ADB
• Android	Porting, Framework customization and Application development
• Development environments	Matlab, Freescale's Code Warrior, Freescale's Beekit, Kiel IDE, IAR EWARM - Embedded Workbench for ARM, Eclipse IDE for Java & C/C++, Microsoft Visual studio 2005, Android SDK, Android NDK
• GUI development	Java , Android, GTK (C, Linux), QT, Kivy (Python)
• Configuration management tools	CVS, SVN, Tortoise SVN, Git, Gitlab, Clearcase, BitBucket
• Bug tracking	BugZilla, JIRA, WIndRiver's Trace, Assembla
• Protocol stacks	TCP/IP, UDP, FreeRadius, iAP - iPod/iPhone Accessory Protocol (Apple Accessory Protocol), Bluego stack for Bluetooth, MOST stack for FM/AM Radio, Bluetooth - A2DP, Hands Free, and AVRCP profiles
• Wireless network standards	IEEE 802.15.4 MAC, ZigBee/ZigBee Pro (Home Automation, Smart Energy Meter), IPV4/IPV6, 6LoWPAN, LoRaWAN/LPWAN, MQTT, Bluetooth Low Energy (BLE)
• Sensor platforms	Tmote Sky, TelosB, MICAz, CSIRO's Opal platform
• Microcontrollers/processors	CC2420, Freescale's MC1321X (HCS08 - 8bit), MC1322X (32 Bit, ARM7), MPC5121e (PPC, AXE), Raspberry Pi 3/3B/4
• Cloud Platforms	AWS
• Digital Identity and SSI	W3C DID, W3C VC, W3C-WEB
• Automotive Standards	AUTOSAR (Classic, Adaptive) ISO/SAE 21434 (Road Vehicles – Cybersecurity Engineering) UNECE WP.29 (Regulation on Cybersecurity)
• ECU Network Architectures	Domain based, Zone based and Software Defined Vehicles
• Automotive Security	IPSec, MACSec, Data Distribution Service (DDS), EVITA, SecOC
• In-Vehicle Communications	Controller Area Network (CAN), CAN Flexible Data rate (CAN-FD), Automotive SOA, SOME/IP
• Threat and Risk Analysis	TARA- Threat Analysis and Risk Assessment Methods HARA – Hazard Analysis and Risk Assessment ISO 26262,
• Autonomous Vehicle Simulation Platforms with AI/ML support	CARLA, Robotic Software (ROS), Baidu's Apollo Platform
• Automotive hardware	Infineon AURIX based ECUs, Trusted platform Modules (TPM), Hardware Security Modules (HSM)

You are welcome to contact me for any research collaboration/discussion. Thank you.