Naveed Anwar Bhatti

Assistant Professor

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EDUCATION

November 2014 – Feb 2018

Ph.D. (Computer Science)
Politecnico di Milano, Milan, Italy

Ph.D. Thesis: *System Support for Transiently-Powered Embedded Sensing Systems*
Advisor: Prof. Luca Mottola

The focus of my doctoral research is to enable transiently-powered embedded sensing devices to make progress across periods of energy unavailability by developing software techniques. As energy availability is likely erratic in ambient harvesting or wireless energy transfer settings, applications may be unpredictably interrupted. To behave dependably, applications should resume from where they left as soon as energy is newly available.

August, 2011 – July 2013
(Gold Medal)

MS (Computer Science)
National University of Computer and Emerging Sciences (FAST-NUCES), Islamabad
MS Thesis: *Long range RF-based ID (LRFID) System: Decoupling sensing and energy in sensor networks using energy transference*
Advisor: Dr. Affan Syed   **Co-Advisor:** Dr. Muhammad Hamad Alizai (LUMS)

August, 2007 – July 2011

BS (Telecommunication)
National University of Computer and Emerging Sciences (FAST-NUCES), Islamabad
Final Year Project: *Internet controlled unmanned ground vehicle (iUGV)*
Advisor: Dr. Waseem Ikram

WORK EXPERIENCE
(~10 Years)

July, 2023 - Current

Assistant Professor
Department of Computer Science, Syed Babar Ali School of Science and Engineering (SBASSE), LUMS, Lahore, Pakistan

Sep, 2019 – June 2023
(4 years)

Assistant Professor
Department of Cyber Security, Faculty of Computing and Artificial Intelligence (FCAI) Air University, Islamabad, Pakistan

April, 2019 – Sep, 2019
(6 months)

Senior Researcher
RISE SICS, Stockholm, Sweden

April, 2018 – March, 2019
(1 year)

ERCIM Alain Bensoussan Post-Doctoral Fellowship
RISE SICS, Stockholm, Sweden

Smart Implicit Interactions:

This project is built around developing a new interface paradigm for IoT called "smart implicit interaction". Implicit interactions stay in the background thriving on data analysis of speech, movements and other contextual data, avoiding unnecessarily disturbing us or grabbing our attention. This project is a collaborated work between researchers from RISE SICS, Stockholm University and KTH Royal Institute of Technology.

Internet of Things Security:

IoT is now becoming an integrated part of our society's infrastructure. As we become increasingly reliant on IoT systems to perform critical functions, it becomes apparent that security and safety concerns must be taken seriously. An important step is to enable memory isolation, by means of compiler tools, OS mechanisms, and building on a memory-protection unit (MPU) and/or Trusted Execution Environments (TEE). In this project, we investigated security aspects for intermittent computing systems, which form the foundation for the next generation battery-less Internet of Things by using energy harvesting to power their operation.

Feb, 2012 – Oct, 2014 **(2 years and 8 months)**	**Research Associate**

Research Associate

SysNet Lab, National University of Computer and Emerging Sciences (FAST-NUCES), Islamabad

Wireless Sensor Networks:
▪ Hands on experience of installation and configuration of TinyOS.
▪ Analyse different wireless energy transference techniques that can be used in WSNs.
▪ Hands on experience on TelosB, Waspmote, Arduino and several others

Botnet Detection:
▪ Hands on experience of installation and configuration of Bro- Intrusion Detection System.
▪ Worked on the detection of different kinds bot's and study the life cycle of a botnet.
▪ Analysis of a 2.7TB (4 days) network trace for botnet detection using Bro-IDS & tshark.
▪ Lead a team of researchers to deliver a project on real time ISP based detection of botnets.

August 2013- Dec 2013
August 2012- Dec 2012
August 2011- Dec 2011
(1 year and 4 months)

Teacher Assistant of "Adv Embedded Systems" course for MS (TE)

National University of Computer and Emerging Sciences (FAST-NUCES), Islamabad

▪ Conducted tutorial labs for TelosB, Mbed and MSP430 platforms.
▪ Mark Quizzes, Sessionals and Finals

ACADEMIC SERVICES

2022 and 2024	▪ Reviewer **ACM Computing Survey**
2024	▪ Technical Program Committee (TPC) member of **ACM ENSsys 2024**
2021	▪ Reviewer **Elsevier Computer and Security**
2019	▪ Reviewer **ACM Computing Survey**
2019	▪ Reviewer Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies
2019	▪ Technical Program Committee (TPC) member of **IEEE ICPADS'19** Conference
2019	▪ Technical Program Committee (TPC) member of **IEEE ISIOT'19** Conference
2019 and 2018	▪ Technical Program Committee (TPC) member of **ACM/IEEE IoTDI'19** Poster/Demo
2019	▪ Web and Social Chair of **ACM/IEEE IPSN 19** and **IPSN 18** conferences
2019	▪ Reviewer Springer Swarm Intelligence
2019, 2018 and 2016	▪ Reviewer IET Electronic Letters
2015	▪ Reviewer IEEE Transactions on Sensor Networks (**TOSN**)
2015	▪ Reviewer International Journal of Distributed Sensor Networks (**IJDSN**)
2015	▪ Reviewer ACM Internetware'15 Conference

FUNDED PROJECTS

2024	"***IoT and LLMs as Catalysts for Change:*** A Pilot Case Study in Agriculture with LLMs" Faculty Initiative Fund (FIF), LUMS. **Rs. 2/- Million**. • Role: PI • Awarded: July 2024 – July 2025
2024	"***Cleanify***: *AI-Based Waste management system using Battery-less IoT devices*" NRPU Research Fund. **Rs. 9.5/- Million**. • Role: PI • Awarded: April 2024 – April 2026
2021	"***SCYDES*** - *Self Cyber Defense Evaluation System*" NCCS Research Fund. **Rs. 14.972/- Million**. • Role: PI. • Awarded: Feb 2021 – Sep 2022 (**Successfully Completed**)
2021	"***ReCyP:HER*** - *Rethinking Cybersecurity in Pakistan Human factors' Essential Role*" Erasmus+ Research Fund. • Role: Leader WP3 and WP7. • Awarded: Jan 2021 – Jan 2024

AWARDS & ACHIEVMENTS

2022	▪ Vice Chancellor Commendation Award (Air University)
2021	▪ Best Teacher Award (Cyber Security Department, Air University)
2018	▪ Recipient of a 12-month ERCIM Alain Bensoussan Postdoc fellowship (RISE- Stockholm)

2017	• Best Ph.D. Forum Presentation award in IPSN 2016
2014	• Recipient of a Ph.D. grant from the Italian govt at Politecnico di Milano
2013	• Recipient of the Gold Medal of MS (CS) graduating class of 2011 (at FAST-NUCES)
2012	• Best Cloud Computing course project Issued by: Microsoft Research and FAST-NUCES Islamabad
2011	• Best Final Year Project BS (Telecom) – Issued by: FAST-NUCES Islamabad
2010	• Winner ROBOTHON (line following robot competition) Issued by: IEEE GIKI

TEACHING

9 different courses taught, two of which were newly developed courses

2024 and 2025	• Internet of Things (CS-677)
2024	• Algorithms (CS-310)
2023 and 2024	• Operating Systems (CS-370)
2023, 2021 and 2020	• Object Oriented Programming (CS-210)
2022	• Embedded Systems Security (ESS) (CyS-367)
2022	• Critical Infrastructure Security (CyS-697)
2022 and 2021	• Research Methodology (CS-692)
2021	• Cyber Security Tool Development (CyS-353)
2021 and 2020	• Embedded System (CS-602)
2020 and 2019	• Data Structures (CS-210)
2020 and 2019	• Object Oriented Programming (CS-200)
2020	• Drone and Autonomous Vehicle Security (CS-634)
2019	• Introduction to Computing (CS-156)
2013, 2012 and 2011	• Teacher Assistant for EE522 (Advance Embedded System at FAST-NUCES)

PUBLICATIONS

23 peer-reviewed publications, including:
- **11 journal articles, of which 3 ACM or IEEE Transactions articles**
- **12 papers at conferences with CORE rank A* or A, of which 2 ACM/IEEE IPSN papers, 1 ACM SENSYS papers, 1 ACM AsiaCCS, and 1 ACM EWSN papers.**

–Totalling 830+ citations, H index is 15 with first paper published in 2014 (source: Google Scholar).

CONFERENCE	• Ahmed Najeeb, Muhammad Rafay, Muhammad Hamad Alizai, and **Naveed Anwar Bhatti**. "Glitch in Time: Exploiting Temporal Misalignment of IMU For Eavesdropping." **ACM AsiaCCS,** 2025.
JOURNAL	• Chaudhry, Hassan Habib, Ramish Majeed Raja, Muhammad Azmeer Zahid, Nauman Zaffar, Muhammad Hamad Alizai, and **Naveed Anwar Bhatti**. "Usage-centered, efficient, and sustainable: an IoT-driven transformation of water heaters." **Data-Centric Engineering (DCE),** 2024. **(Impact Factor = 3)**
CONFERENCE	• Chaudhry, Hassan Habib, Ramish Majeed Raja, Muhammad Hamad Alizai, Nauman Zaffar, and **Naveed Anwar Bhatti**. "From Waste to Watts: A Self-Sustaining Water Heating System Powered by a Thermoelectric Generator." **In Proceedings of the 10th BuildSys, pp. 244-247. 2023.**
JOURNAL	• Sangeen, Muhammad, **Naveed Anwar Bhatti**, Kashif Kifayat, Abeer Abdullah Alsadhan, and Haoda Wang. "Blind-trust: Raising awareness of the dangers of using unsecured public Wi-Fi networks." **Computer Communications, April 2023. (Impact Factor = 6)**
JOURNAL	• Javed, Kashif, **Naveed Anwar Bhatti**, and Mohammad Imran. "MOPTIC-SM: Sleep mode-enabled multi-optimized intermittent computing for transiently powered systems." **Journal of Systems Architecture, April 2023. (Impact Factor = 4.5)**
JOURNAL	• Dileep Kumar Soother, Sanaullah Mehran Ujjan, Kapal Dev, Sunder Ali Khowaja, **Naveed Anwar Bhatti**, Tanweer Hussain" Towards soft real-time fault diagnosis for edge devices in industrial IoT using deep domain adaptation training strategy", **Elsevier Journal of Parallel and Distributed Computing, November 2021. (Impact Factor = 3.734)**
JOURNAL	• Ali Akbar Shah, **Naveed Anwar Bhatti**, Kapal Dev, B.S Chowdhry, "MUHAFIZ: IoT-based Track Recording Vehicle for the Damage Analysis of the Railway Track" **IEEE Internal of Things Journal (IoTJ), March 2021. (Impact Factor = 9.9)**

JOURNAL	▪ Saad Ahmed, **Naveed Anwar Bhatti**, Martina Brachmann, Muhammad Hamad Alizai" A Survey on Program-state Retention for Transiently-powered Systems", **Journal of Systems Architecture, Elsevier, Jan 2021. (Impact Factor = 2.552)**
CONFERENCE	▪ Afanasov, Mikhail, **Naveed Anwar Bhatti,** Dennis Campagna et al. "Battery-less zero-maintenance embedded sensing at the mithræum of circus maximus." **In Proceedings of the 18th Conference on Embedded Networked Sensor Systems (SenSys), November 2020.**.
TRANSACTION	▪ Saad Ahmed, **Naveed Anwar Bhatti**, Muhammad Hamad Alizai, Junaid Haroon Siddiqui, Luca Mottola: Fast and Energy-efficient State Checkpointing for Intermittent Computing, **ACM Transactions on Embedded Computing Systems (TECS), 2020, (Impact Factor = 1.72).**
TRANSACTION	▪ Saad Ahmed, Abu Bakar, **Naveed Anwar Bhatti**, Muhammad Hamad Alizai, Junaid Haroon Siddiqui, Luca Mottola: Demystifying Energy Consumption Dynamics in Transiently-powered Computers, **ACM Transactions on Embedded Computing Systems (TECS), 2020, (Impact Factor = 1.72).**
JOURNAL	▪ Syeda Sundus Zehra, Rehan Qureshi, Kapal Dev, Saleem Shahid, **Naveed Anwar Bhatti.** "Comparative Analysis of Bio-Inspired Algorithms for Underwater Wireless Sensor Networks", **Wireless Personal Communications, Springer, May 2020. (Impact Factor = 1.2)**
CONFERENCE	▪ Saad Ahmed, Abu Bakar, **Naveed Anwar Bhatti**, Muhammad Hamad Alizai, Junaid Haroon Siddiqui and Luca Mottola, "*The Betrayal of Constant Power × Time: Finding the Missing Joules of Transiently-Powered Computer*", Languages, Compilers, and Tools for Embedded Systems 2019 (LCTES '19), **June 2019, Arizona (USA)**.
CONFERENCE	▪ Saad Ahmed, **Naveed Anwar Bhatti**, Muhammad Hamad Alizai, Junaid Haroon Siddiqui and Luca Mottola, "*Efficient Intermittent Computing with Differential Checkpointing*", Languages, Compilers, and Tools for Embedded Systems 2019 (LCTES '19), **June 2019, Arizona (USA)**.
POSTER	▪ Saad Ahmed, MH Alizai, JH Siddiqui, **Naveed Anwar Bhatti**, L Mottola, "Towards smaller checkpoints for better intermittent computing", ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN)**, April 2018**, **Porto (Portugal)**.
CONFERENCE	▪ **Naveed Anwar Bhatti** and Luca Mottola, "*HarvOS: Efficient Code Instrumentation for Transiently-powered Embedded Devices* ", ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN), **April 2017, Pittsburgh (USA)**.
CONFERENCE	▪ **Naveed Anwar Bhatti** and Luca Mottola "*Compiler-assisted Automatic Checkpointing for Transiently powered Embedded Devices* ", EWSN, **Feb 2017, Uppsala (Sweden)**.
POSTER	▪ **Naveed Anwar Bhatti,** "*Back to The Future: Sustainable Transiently Powered Embedded Systems*", **IPSN, April 2016, Vienna (Austria)**. **Best PhD Forum Presentation**
TRANSACTION	▪ **Naveed Anwar Bhatti**, Hamad Alizai, Affan A.Syed and Luca Mottola, "*Energy Harvesting and Wireless Transfer in Sensor Network Applications: Concepts and Experiences* ", **ACM Transactions on Sensor Networks** (TOSN), April **2016. (Impact Factor = 2.7).**
CONFERENCE	▪ **Naveed Anwar Bhatti**, Luca Mottola," *Efficient State Retention for Transiently-powered Embedded Sensing* ", International Conference on Embedded Wireless Systems and Networks (**EWSN 2016**), **Feb 2016, Graz (Austria)**.
JOURNAL	▪ **Naveed Anwar Bhatti**, Affan A.Syed and Hamad Alizai, "*Laser based Energy Distribution Architecture for Decoupling Energy and Sensing Planes in WSN* ", **International Journal of Distributed Sensor Networks (IJDSN), 2015**.
CONFERENCE	▪ Osama Haq, Zainab Abaid, **Naveed Anwar Bhatti**, Zaafar Ahmed and Affan A.Syed, "*SDN-inspired, Real-time Botnet Detection and Flow-blocking at ISP and Enterprise-level* ", IEEE International Conference on Communications (**ICC 2015**), **June 2015, London (UK)**
CONFERENCE	▪ **Naveed Anwar Bhatti**, Affan A.Syed and Hamad Alizai, " *Sensors with Lasers: Building a WSN Power Grid*", The 13th ACM/IEEE Conference on Information Processing in Sensor Networks (IPSN), **April 2014, Berlin (Germany)**.

TALKS AND WORKSHOPS

18th April, 2018	▪ **Transiently-powered Computing Tutorials (11th Cyberphysical Systems week (CPSWEEK) held in Porto, Portugal)** Tutorial on transiently-powered computing has been presented.

15th April, 2017	▪ **Transiently-powered Embedded Systems (RISE-SICS, Stockholm, Sweden)** *Gave talk on Transiently-powered Embedded Systems: challenges and application*
25th July, 2016	▪ **Internet of things workshop (ComSys lab, RWTH Aachen, Germany)** *Gave talk on Internet of Things Workshop with a focus on transiently-powered sensing systems*
28th May , 2015	▪ **Aerial drone showcase at Polifactory (Politecnico di Milano - Campus Bovisa)** *Conducted a workshop to show the potential of drones as tools to enable advanced mobile sensing.*
8th June, 2015	▪ **Interactive lecture on embedded sensing (Politecnico di Milano - Campus Bovisa)** *Gave talk on Embedded sensing, which is the technology behind the internet of things, cyberphysical systems, and wireless sensor networks.*

STUDENT MENTORSHIP

Currently advising 1 PhD student

2023	▪ **Asra Masood** FireFlow: Firewall State Sychronization using BGP Flowspe (Master Student, Air University) - **Completed**
2022	▪ **Kashif Javed.** Towards a Sleep Mode-Enabled Interleaved Multi-Approximate Intermittent Computing (Master Student, Air University) – **Completed**
2019	▪ **Dragoș Perju,** Applying Memoizatition as an Approximation Technique for Transiently-powered Embedded Systems (Master Student, KTH) - **Completed**
2019	▪ **Erik Henricus Wouters,** Securing Intermittent Computing (Master Student, KTH) - **Completed**

TECHNICAL SKILLS

Hardware

Atmel SAM L11 (with ARM TrustZone)	WASP Motes	ST Nucleo L152RE	ST Nucleo F091RC
TelosB mote	NXP Mbed LPC1786	HackRF	AVR ATMEGA-1
MSP430 Launchpad	Arduino (multiple varients)	Raspberry Pi	ESP32 (Node MCU)

Software

TinyOS 2.1.1	Keil uVision v5	Visual Studio	Bro 2.1 (NIDS)
Verilogger Pro	Django Web Framework	Atmel Studio 7	PyCharm
Arduino IDE 2.0	Eclipse		

Languages

Python	C++	C#	Java
nesC	Matlab	HTML/CSS	SQL

REFERENCES

▪ **Dr. Luca Mottola**
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Professor
Dipartimento di Elettronica, Informazione e Bioingegneria
Politecnico di Milano, Italy

▪ **Dr. Martina Brachmann**
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Senior Researcher
Ericsson Research AB
Stockholm, Sweden