Bharat Lal
Curriculum Vitae

Education

2021–2024	**PhD, Information and Communication Technologies**, *University of Calabria*, Italy. **Research Topic:** Compressive Sensing for Wireless healthcare devices. **Expertise:** Machine Learning | Compressed Sensing | Hardware Implementation of Machine Learning Models | Signal Processing | Healthcare | Data Encryption with Compressed Sensing **Researcher Exchange:** Four months research exchange program at Center for Sensor Systems (ZESS), University of Siegen, Germany (June-September 2023). One Month Erasmus+ Traineeship at the School of Computer Science and Electronic Engineering, University of Essex, UK.
2016–2018	**Master of Engineering, Automation and Control**, *Mehran University of Engineering and Technology*, Pakistan. **Thesis:** Design and functional verification of PSO-based FIR filters in FPGA.
2012–2016	**Bachelor of Engineering, Electronics Engineering**, *Mehran UET*, Pakistan. **Thesis:** Automation and monitoring of smart reverse osmosis water treatment plant.

Research and Industrial Experience

2019 – 2021	**Lecturer**, *Department of Electronic Engineering, Mehran University of Engineering and Technology*, Jamshoro, Pakistan. **Responsibilities:** - Delivered lectures and tutorials on core subjects. - Coordinator, Quality Outcome Based Education System. - Supervised final year projects and dissertations for undergraduate and master's students. - Faculty Advisor for IEEE Instrumentation and Measurement Society Chapter.
2016 – 2018	**Lab Engineer**, *Department of Electrical Engineering, Isra University*, Hyderabad, Pakistan. **Responsibilities:** - Designed, conducted, and assessed lab practicals for undergraduate students. - Operation, maintenance, and inventory management of lab equipment. - Selection and upgrading of lab equipment as required.
2018 – 2019	**Instruments and Control Engineer**, *CHD Power Plant Operation Co. Ltd (CHDOC)*, China & Pakistan. **Responsibilities:** - Participated in 6 months operation and maintenance training at Guizhou, China - Assisted in design and implementation of distributed control systems for power plant operations. - Conducted regular maintenance and calibration of I&C related equipment. - Provided technical support and troubleshooting for control system issues.

Research Interests

Compressive Sensing, Wearable Computing, IoT, Machine Learning and Artificial Intelligence, Embedded Systems Design, Signal Processing, Cybersecurity

Programming Skills

Programming Languages	C++, VHDL, Python, MATLAB, Vivado HLS

Professional Development and Leadership

2023–Present	Chair, IEEE University of Calabria Student Branch
2015–2016	Chair, IEEE Instrumentation and Measurement Society, Mehran University Chapter, Pakistan
2016–2018	Chair, Innovation and Entrepreneurship Society, Mehran University of Engineering and Technology, Pakistan

Professional Trainings

26 Aug. - 13 Sep. 2024	**IoT & AI for Frugal Innovation Bootcamp**, *University of Cambridge, United Kindgom*.
20 Nov. - 01 Dec. 2023	**Joint ICTP-IAEA School on Systems-on-Chip Based on FPGA for Scientific Instrumentation and Reconfigurable Computing**, *ICTP Trieste, Italy*.
8-12 Sept. 2022	**International School on Internet of Things & Edge AI: Computing, Communications and Systems**, *Calabria, Italy*.
3-5 March 2015	**ICTP International Workshop on Embedded Systems and its Applications**, *Mehran University of Engineering and Technology, Pakistan*.

Awards and Funding

2024	Best Team Award: Pitch Competition at the "IoT & AI for Frugal Innovation Bootcamp" at Jesus College, University of Cambridge, United Kingdom.
2022	Gold Medal Best Research Paper Award: Paper title "Smart Concrete Strength Measurement Device" at IEEEP International Multi-topic Symposium, Karachi, Pakistan.
2016	Runner-Up: Final Year Project Competition. Project Title: Automation and Monitoring Smart Reverse Osmosis Water Treatment Plant.
2014	Winner: Scientific Appearance Competition at IMMUET Students Seminar, Mehran UET, Pakistan.
2012	Winner: Merit-based fully funded national ICT scholarship by Prime Minister of Pakistan for undergraduate studies (1.1 million PKR).
2016	Winner: Merit-based fully funded scholarship for master's studies by Higher Education Commission of Pakistan, (0.5 million PKR).
2017	Research and Development grant from Higher Education Commission of Pakistan (0.4 million PKR).

Conferences and Talks

2024	Research Paper Presentation: 6th International Workshop on the Theory of Computational Sensing and its applications to Radar, Multimodal Sensing, and Imaging (CoSeRa 2024).
2023	Program Committee Member: DIStributed COLlective Intelligence (DISCOLI) Workshop, Cyprus.
2023	Organizing Committee Member: International Conference on Embedded Wireless Systems and Networks (EWSN), Rende (CS).
2022	Organizing Committee Member: IEEE CyberSciTech/PICom/DASC/CBDCom, Calabria, Italy.
2023	Talk Delivered: "Exploring the Potential of Compressive Sensing in Healthcare" Organized by IEEE I&M Society and Mehran UET, Pakistan.
2023	Poster Presentation: Compressed Sensing and Learning Approaches for Secure and Low-Power Health Care Devices, UNICAL PhD Day.
2022	Poster Presentation: International School on Internet of Things & Edge AI: Computing, Communications and Systems, Calabria, Italy.

2022	Organizing Committee Member: International Conf. on Emerging Tech. in Electronics, Computing and Communication, Pakistan.
2015	Organizing Committee Member: 4th International Multi-Topic Conference.
2014	Organizing Committee Member: 29th IEEEP International Symposium.
2014	Organizing Committee Member: 29th IEEEP All Pakistan Students' Seminar.
2013	Organizing Committee Member: 3rd International Multi-Topic Conference, Pakistan.
2013	Organizing Committee Member: IEEE Pakistan Students' Gold WIE Conference.

Professional Memberships

2016–Present	Registered Engineer, Pakistan Engineering Council (ELECTRO/23230)
2013–Present	Graduate Student Member, Institute of Electrical and Electronics Engineers (93308329)
2013–Present	Graduate Student Member, IEEE Instrumentation and Measurement Society (93308329)

Research Publications

2024	F. Spagnolo, **Bharat Lal**, P. Corsonello, and R. Gravina, "A Novel Compressive Sensing Method for Secure and Energy Efficient ECG Signal Transmission Applications" in IEEE Journal of Biomedical and Health Informatics. (In Review Stage)
2024	**Bharat Lal**, Khushal Das, Miguel Heredia Conde, Pasquale Corsonello, Raffaele Gravina, "Comparative Analysis of Compressive Sensing Reconstruction Algorithms for ECG Signals" in 6th International Workshop on the Theory of Computational Sensing and its applications to Radar, Multimodal Sensing, and Imaging (CoSeRa 2024).
2024	Qimeng Li, **Bharat Lal**, and Raffaele Gravina, "Multi-user Activity Monitoring based on Contactless Sensing" in Activity Recognition and Prediction for Smart IoT Environments. Cham: Springer Nature Switzerland, 2024. 97-110.
2023	**Bharat Lal**, R. Gravina, F. Spagnolo, and P. Corsonello, "Compressed Sensing Approach for Physiological Signals: A Review" in IEEE Sensors Journal, doi: 10.1109/JSEN.2023.3243390.
2023	**Bharat Lal**, Qimeng Li, Raffaele Gravina, and Pasquale Corsonello, "Compressed Sensing-based IoMT Applications" in Device-Edge-Cloud Continuum Internet of Things, Springer Nature Switzerland, November 2023.
2023	**Bharat Lal**, Q. Li, R. Gravina, and P. Corsonello, "Abnormal ECG Detection in Wearable Devices Using Compressed Learning" in 20th IEEE International Conference on Networking, Sensing and Control, 25-27 October 2023, Marseille, France.
2023	**Bharat Lal**, Miguel Heredia Conde, Pasquale Corsonello, and Raffaele Gravina, "Secure and Energy-Efficient ECG Signal Monitoring in the IoT Healthcare using Compressive Sensing" in 21st IEEE International Conference on Dependable, Autonomic & Secure Computing, 24-27 November 2023, Dubai, UAE.
2023	**Bharat Lal**, Q. Li, R. Gravina, and P. Corsonello, "ECG Signals Analysis based on Compressed Sensing and Learning Techniques for Heart Disease Recognition" in 2023 7th International Multi-Topic ICT Conference (IMTIC), Jamshoro, Pakistan, 2023, pp. 1-7, doi: 10.1109/IMTIC58887.2023.10178468.
2022	B. Abro, **Bharat Lal**, M. Aamir, S. L. Meghwar, F. A. Memon, and Z. Hussain, "Smart Concrete Strength Measurement Device" in 2022 International Conference on Emerging Technologies in Electronics, Computing, and Communication (ICETECC), Jamshoro, Sindh, Pakistan, 2022, pp. 1-5, doi: 10.1109/ICETECC56662.2022.10069766.
2021	J. Abbasi, L. Alina, A. M. Abro, and **Bharat Lal**, "SEHAT: Smart E-Health App for Telediagnosis and First Opinion" in 2021 6th International Multi-Topic ICT Conference (IMTIC), 2021, pp. 1-6, doi: 10.1109/IMTIC53841.2021.9719812.

2021   Z. Ali, **Bharat Lal**, T. D. Memon, N. Nafi, U. R. Memon, "Digital FIR Filter Design by PSO and its Variants Attractive and Repulsive PSO (ARPSO) & Craziness-based PSO (CRPSO)" in International Journal of Recent Technology and Engineering, Vol. 9, No. 6, Mar. 2021.

2021   M. A. Faheem, D. K. Soother, **Bharat Lal**, J. Kumari, and A. Qureshi, "A Deep Learning based Non-invasive and Real-Time Fault Detection System for 3-Phase Induction Motor" in Sukkur IBA Journal of Emerging Technologies, Vol. 3, No. 1, 2021.

2021   Aisha Baloch, Tayab D Memon, Farida Memon, **Bharat Lal**, Ved Viyas Tony, and Jan, "Hardware Synthesize and Performance Analysis of Intelligent Transportation Using Canny Edge Detection Algorithm" in International Journal of Engineering and Manufacturing (IJEM), Vol. 11, No. 4, pp. 22-32, 2021.

2018   **Bharat Lal**, Shaikh F. B., A. Arain, T. D. Memon, and I. H. Kalwar, "FPGA based Synthesize of PSO Algorithm and its Area-Performance Analysis" in International Journal of Advanced Computer Science and Applications, Vol. 9, No. 6, June 2018.

2018   **Bharat Lal**, S. Sagar, M. Arain, B. A. Arain, F. Shaikh, "Automation and Monitoring of Reverse Osmosis Water Treatment Plant" in International Journal of Engineering and Advanced Technology (IJEAT), Vol. 8, No. 2, December 2018.

2018   B. A. Arian, F. Shaikh, **Bharat Lal**, T. D. Memon, Imtiaz Hussain Kalwar, "Design of PID Controller Based on PSO Algorithm and Its FPGA Synthesization" in International Journal of Engineering and Advanced Technology (IJEAT), Vol. 8, No. 2, December 2018.

2018   R. Akbar, S. R. Mehdi, A. Akhtar, **Bharat Lal**, N. Khaskheli, and K. Shahani, "Design and Control of Unmanned Underwater Vehicle" in Sukkur IBA Journal of Emerging Technologies, Vol. 1, No. 2, December 2018.

2017   M. Farrukh, I. A. Halepoto, B. S. Chowdhry, H. Kazi, and **Bharat Lal**, "Design and Implementation of PLC based Automatic Liquid Distillation System" in Indian Journal of Science and Technology, Vol 10 (29), August 2017.