

Fatima Ahsan

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Summary

Ph.D. researcher with **12+ years of experience** in signal processing, data science, and multi-physics modeling. Authored **7+ first-author papers** and received competitive awards, including the **Fulbright and Rice Graduate Fellowships**. Secured **\$70K for research commercialization**, **\$12.5K in discretionary research funding**, and multiple travel grants. Presented at **70+ academic forums** and **mentored 150+ students** through teaching, research, and outreach. **Developed end-to-end engineering systems** by integrating signal processing, data science, and physics-based modeling with practical hardware-software implementations. Currently transitioning into the research and innovation ecosystem in Switzerland following my Ph.D. and relocation.

Education

- Ph.D., Electrical and Computer Engineering**, Rice University, Houston, USA 2024
- **Thesis:** Minimally invasive deep brain stimulation using temporally interfering electromagnetic waves
 - **Awarded Rice Innovation Fellowship**
- M.S., Electrical and Computer Engineering**, Rice University, Houston, USA 2018
- **Thesis:** Leveraging massive Multiple-Input Multiple-Output spatial diversity in random access
- M.S., Electrical Engineering**, Lahore University of Management Sciences (LUMS), Lahore, Pakistan 2015
- **Thesis:** Stalkers: A physical-layer solution towards co-existence with WiFi
 - **Awarded Gold Medal**
- B.S., Electrical Engineering**, University of Engineering and Technology (UET), Lahore, Pakistan 2013
- **Thesis:** Self-reconfigurable and transformable robot
 - **Awarded Best Senior Thesis Award**

Skills

Programming: Python, MATLAB, C/C++, PyTorch, NumPy, Pandas, scikit-learn, SQL, ROS, GNU Radio, Librosa, Assembly, VerilogHDL

Computing & Simulation: GPU Programming (CUDA, NVIDIA GPUs), COMSOL Multiphysics, Ansys, PSpice, PCB Express, LaTeX

Hardware & Embedded Systems: Microcontroller Programming (Arduino, PIC, Atmel), Universal Software Radio Peripherals (USRPs), Vector Network Analyzer (VNA), Digital Signal Processing Chain Design, Analog Circuit Prototyping, PCB Fabrication

Electrophysiology & Neurotechnology: Stimulating, recording, and analyzing calcium imaging data from the *Hydra vulgaris*; Wide-field imaging of HEK cells, neuronal cell culture, and head-mounted mice cortex.

Experience

Led various projects through the entire scientific lifecycle, from hypothesis, research methodology, experiments, data acquisition, statistical analysis, validation, and documentation, resulting in **7+ first-author publications** and **1 US patent**. Several projects resulted in funding and recognition from the NSF, M-Tech, and McNair Foundation.

Postdoctoral Researcher & Independent Researcher *Houston, TX, USA & Geneva, Switzerland*
Aazhang Lab, Rice University *Apr 2024 – Present*

- **Advanced EMvelop stimulation research** building on my Ph.D. work during a postdoctoral appointment at Rice University.
- **Concluded appointment early**, foregoing multiple U.S.-based offers, to **relocate to Switzerland to reunite with family**.

- Continued **postdoctoral-level research independently** in Switzerland, focusing on neurostimulation, machine learning, and signal processing for biomedical applications.
- **Preparing three manuscripts** on data-driven electric-field estimation for EMvlop stimulation, pseudo supervision of diffusion models, and custom NN convolutions to enable broader loss landscape minima.
- Advanced **French language proficiency to A2 level** and continue training toward full professional fluency.

Graduate Research Assistant
Aazhang Lab, Rice University

Houston, TX, USA
Jan 2019 – Mar 2024

- **Multi-physics Modeling and Optimization**

- Led a multi-year research project that demonstrated **improvement in the stimulation targeting strength by $\times 700$** over the SOTA methods while **observing IEEE safety limits**, applicable to the goal of developing intense yet safe neuro-rehabilitation protocols.
- Developed **finite-element modeling in COMSOL** and **optimization framework in Matlab** to optimize **electromagnetic field propagation and heat transfer** in brain tissue, applicable to the goal of using advanced signal-processing techniques in designing high-performance biomedical systems.
- **Presented research findings at 50+ lab meetings** and **20+ national/international conferences**, effectively communicating complex data to diverse scientific audiences.
- **Mentored 10+ graduate students** in experimental troubleshooting, data analysis, manuscript writing, and thesis defense preparation, contributing to their academic and professional development.
- Organized **80+ weekly lab meetings** over 2 years, managing speaker rotations, arranging upskilling workshops, and overseeing event logistics.

- **PyTorch-Based Machine Learning Framework for Electromagnetic Field Estimation**

- Developed data-driven models for **high-frequency complex electromagnetic field estimation** using PyTorch with a **correlation coefficient of 0.978** with the ground truth.
- **Increased estimation speed by $\times 1200$** through effective machine learning modeling, contributing to using data-driven approaches for optimizing neuro-stimulation parameters.

- **Biophysical Circuit Modeling of Neurons**

- Modeled **neuronal response to amplitude-modulated GHz EM waves** using the Hodgkin-Huxley framework and cable theory in COMSOL.
- Demonstrated that **only modulated GHz stimulation**, and not continuous GHz, **elicits action potentials**, matching low-frequency stimulation patterns.
- Showed feasibility of a **non-invasive mechanism** for deep brain stimulation by leveraging wave interference to **spare cortical regions**.

Graduate Research Assistant
RENEW (Reconfigurable Eco-system for Next-generation End-to-end Wireless) Lab, Rice University

Houston, TX, USA
Jan 2017 – Dec 2018

- **Leveraging Massive-Input Massive-Output (MIMO) Antenna Array Spatial Diversity in Random Access**

- Devised a novel strategy for reducing access delays in **ultra-dense cellular networks by spatially resolving user collisions** during the LTE random access phase using Massive MIMO array signal processing.
- Modeled realistic 5G environments using **3GPP-standard channel models** and applied **stochastic geometry** to evaluate performance under large user densities.
- Achieved up to **13 \times reduction in access delay**, relevant to the goal of **designing efficient multiplexing algorithms** using Massive MIMO systems.

Graduate Research Assistant and Team Lead
AdCom (Advanced Communication) Lab, LUMS

Lahore, Pakistan
Jan 2014 – Jun 2016

- **Design of Cooperative and Cognitive Communication Networks**

- Led a **research team of 10+ members** as team lead; **coached 3 undergraduate students** in

wireless communication theory and experimental design; performed lab management duties such as keeping lab website up-to-date, organized weekly seminars on cutting-edge wireless communication innovations, and oversaw procurement and maintenance of lab equipment.

- Designed and deployed **full baseband architecture** including time and frequency synchronization, OFDM frame detection, MIMO channel estimation, and interference cancellation encoding/decoding.
- Showed we can **introduce a secondary wifi network in-band with a primary wifi network** without effecting its performance and without the primary network *even being aware* of the presence of a secondary network.
- Developed the **physical layer of Stalkers according to IEEE 802.11a standard**, facilitating cognitive coexistence with existing wireless networks and mitigating self-interference.
- Demonstrated theoretical gains by **over-the-air experiments using software defined radios (SDRs)** emitting wifi signals via **C++ programming** in GNU Radio. This **advanced lab’s capabilities in real-time MIMO prototyping**, laying groundwork for future physical-layer SDR research.

Undergrad Research Assistant

SUPCON (Super Control and Automation) Lab, UET, Lahore

Lahore, Pakistan

Sept 2011 – May 2013

- **Self-reconfigurable and transformable robot**

- Designed Chaser, a self-reconfigurable robot with terrain-aware gait generation and locomotion modes (walk, wheel, swim).
- Achieved 95% success rate across 70+ real-world trials in diverse terrain scenarios.
- Received Best Final Year Project (FYP) Award + 3rd position in IEEE Lahore section FYP evaluations.

- **Autonomous maze-solving and ball-potting robot**

- Built Seeker, an autonomous robot that navigates mazes using infra-red sensors and pots color-matched balls in real time.
- Designed a precision control algorithm (70 cm/s) and sensor linearization algorithm (correlating distance vs light intensity), implementable on an 8-bit microcontroller.
- Achieved 98% success across 40 trials.

Selected Projects

Neurotechnology Projects:

- **Electrical Stimulation of Hydra vulgaris:** Stimulated Hydra vulgaris electrically using invasive and non-invasive methods to determine the cell-membrane time constant, overcoming limitations of traditional patch-clamp techniques.
- **32-Channel Electrophysiology in Mouse Brain:** Evaluated 32-channel recordings to quantify the impact of targeted electrical stimulation on neural activity. Also conducted wide-field imaging experiments.
- **Phantom-Based Electric Field Testing:** Conducted electric-field generation tests in tissue-mimicking liquid phantoms to validate stimulation waveforms and dosimetry.

Image & Audio processing Projects:

- **Acoustic Image Segmentation:** Contributed to U-Net-based boundary estimation system (U-COTANS) for reverberant acoustic environments, improving robustness under low SNRs and enabling accurate 2D scene reconstruction from real-world wave tank data.
- **Wavelet-Based Audio Compression:** Designed and implemented a MATLAB GUI to record, compress, and reconstruct audio using discrete wavelet transforms (DWT). Gained experience in time-frequency signal analysis, wavelet basis selection, and energy-based coefficient compression.
- **Adaptive Filtering and Interference Cancellation:** Implemented LMS, normalized LMS, and RLS algorithms for real-time system identification in time-varying channels. Designed adaptive filters for audio interference cancellation and evaluated convergence behavior.
- **Image Compression and Alignment using PCA:** Applied PCA for global and block-wise image compression, analyzing reconstruction quality and dimensionality trade-offs. Compared eigen-block expressiveness in localized compression. Used PCA for alignment correction by rotating images to principal axes.

Wireless Communication Projects:

- **Digital Transceiver Designs:** First implementation of 802.11a OFDM Transceiver in MATLAB in the Adcom lab. Also, implemented the complete DSP chain of a baseband discrete-time modem in MATLAB.
- **Error Correction Coding:** Implemented BCH Encoder and Decoder for (63,36) 5-error Correcting BCH Code, BJCR Decoder for (2,1,6) WiFi Encoder in MATLAB, Convolutional Decoder for (2,1,6) WiFi Encoder in MATLAB.
- **Software Defined Radio Implementations:** Implemented OFDM-MIMO Beamforming Transceiver in GNU Radio and OFDM-MIMO Zero-Forcing Transceiver in GNU Radio and demonstrated wireless transmission and reception.

Microwave Engineering Projects:

- **Microwave Coupler & Divider Fabrication:** Design and fabrication of rat-race quadrature hybrid coupler on a PCB (FR4 substrate). Fully characterized the S-parameters and insertion loss using a Vector Network Analyzer (VNA). Did the same with Wilkinson Power Divider.
- **Microwave Filter & LNA Design:** Low-pass and band-pass filter design using stubs and stepped-impedance methods in microwave range. Also designed and fabricated a low-noise amplifier on a PCB.
- **Microwave Amplifier & TX/RX Circuit Design:** Microwave amplifier design for specified gain and maximum gain and TX/RX switch design using PIN diodes.

Robotics & Embedded Engineering Projects:

- **Lightening-bolt robot:** Led a 5-member all-women team to build Lightning Bolt, a fighting robot for Pakistan's largest science Olympiad (PsiFi), applying electric machines theory to real-world motor control and embedded design; overall, secured 3rd place in the competition.
- **PID Motor Control & PLC Programming:** Digitized DC Motor control and implemented PID control technique using Arduino micro-controller. Programmed industrial automation logic with Siemens Sematic STEP 7 Basic.
- **Line-Following Robot & H-Bridge Design:** Implemented automatic steering of a line following robot using multiple infra-red sensors. Designed H-Bridge circuitry with discrete components for effective robotic motor steering.

Electronics Projects:

- **Multi-Stage Analog Amplifier Design:** Designed and implemented an analog audio amplifier with gain > 2000 using multi-stage BJTs; also built a single-stage MOSFET amplifier.
- **Digital Dice with Xilinx FPGA:** Developed an electronic game-playing dice using Xilinx platform and programmable logic design.
- **Power Electronics Buck Converter & Inverter:** Designed and implemented a buck DC-DC converter and a single-phase inverter for efficient power conversion.

Research commercialization & clinical translation

Led **100+ customer discovery interviews**, developed a viable business model canvas, and presented findings on our brain stimulation neurotech to **10+ National Science Foundation (NSF) instructors** and **100+ entrepreneurs**.

Entrepreneurial Lead @ NSF I-Corps Program, \$50,000

Rice University

Houston, TX, USA

Jul 2023 – Aug 2023

- Wrote proposal for the NSF I-Corps program to secure funding of \$50,000 to explore research commercialization and translation
- Conducted 100+ customer discovery interviews to develop viable business canvas model for our novel brain stimulation technology.
- Explored the full medtech lifecycle, including FDA approval, coverage, reimbursement, and distribution.
- Presented my findings to a panel of 10 NSF instructors and 100+ entrepreneurs; presentation praised for its clarity, story-telling, and impact.
- Led the team for participation in Napier Rice Launch Challenge pitch competition at Rice University.

Patent

- [1] **Fatima Ahsan**, Taiyun Chi, Raymond Cho, Sameer Anil Sheth, Wayne Goodman, and Behnaam Aazhang, “**Minimally Invasive Deep Brain Stimulation using Electromagnetic Waves**”, US Patent App. 18/051,778, *November 2023*

Publications

- [1] **Fatima Ahsan**, Lorenzo Luzi, Richard G. Barainuk, Sameer A. Sheth, Wayne Goodman, and Behnaam Aazhang, “**EMulator: Rapid Estimation of Complex-valued Electric Fields using a U-Net Architecture**”, <https://arxiv.org/abs/2505.02095>, May 2025.
- [2] Toros Arikan, Luca Chackalackal, **Fatima Ahsan**, Konrad Tittel, Andrew Singer, Gregory Wornell, and Richard G. Barainuk, “**Estimating the number and locations of reflective boundaries in reverberant environments with deep learning**”, IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), April 2025.
- [3] **Fatima Ahsan**, “**EMvelop Stimulation: Minimally Invasive Deep Brain Stimulation using Temporally Interfering Electromagnetic Waves.**”, *Ph.D. Dissertation, Rice University, 2024*
- [4] **Fatima Ahsan**, Aravind M. Govindaraju, Robert M. Raphael, Taiyun Chi, Sameer A. Sheth, Wayne Goodman, and Behnaam Aazhang, “**Biophysics of amplitude-modulated giga-hertz electromagnetic waves stimulation**”, *IEEE Asilomar Conference on Signals, Systems & Computers, Oct. 2023, Monterrey, USA.*
- [5] **Fatima Ahsan**, Taiyun Chi, Raymond Cho, Sameer A. Sheth, Wayne Goodman, and Behnaam Aazhang, “**EMvelop stimulation: minimally invasive deep brain stimulation using temporally interfering electromagnetic waves**”, *Journal of Neural Engineering, June 2022.*
- [6] **Fatima Ahsan**, Taiyun Chi, Raymond Cho, Sameer A. Sheth, Wayne Goodman, and Behnaam Aazhang, “**Non-invasive Deep Brain Stimulation using Electromagnetic Waves**”, *IEEE Asilomar Conference on Signals, Systems & Computers 2020, Monterrey, USA.*
- [7] **Fatima Ahsan**, “**Leveraging Massive MIMO Spatial Diversity in Random Access**”, *MS Thesis, Rice University, 2018*
- [8] **Fatima Ahsan** and M. Uppal, “**Stalkers: Co-existing Nodes within Unlicensed WiFi Band**”, *IEEE Wireless Communications and Networking Conference (WCNC) 2018, Barcelona, Spain.*
- [9] **Fatima Ahsan** and Ashutosh Sabharwal, “**Leveraging Massive MIMO Spatial Degrees of Freedom to Reduce Random Access Delay**”, *IEEE Asilomar Conference on Signals, Systems & Computers, Nov 2017, Monterrey, USA.*
- [10] **Fatima Ahsan** and K. M. Hasan “**Seeker: Autonomous Maze-Navigating and Ball Potting Robot**”, *IEEE International Conference on Open Source Systems and Technologies (ICOSST) 2015, Lahore, Pakistan.*
- [11] **Fatima Ahsan** and K. M. Hasan, “**Gait Generation and Terrain Navigation Algorithm Design for a Self-Reconfigurable Robot**”, *IEEE Conference on Recent Advances in Electrical Engineering (RAEE) 2015, Islamabad, Pakistan.*

Under-preparation:

- [12] **Fatima Ahsan**, Lorenzo Luzi, Richard G. Barainuk, Sameer A. Sheth, Wayne Goodman, and Behnaam Aazhang, “**EMulator: Rapid Estimation of Complex-valued Electric Fields using a U-Net Architecture**”, under preparation, to be submitted to Brain Stimulation, Aug 2025
- [13] **Fatima Ahsan***, Ali Siahkoohi*, Lorenzo Luzi*, Richard G. Barainuk, and Behnaam Aazhang, “**Mitigating the effects of over-parametrization by the pseudo-supervision of diffusion models**”, under preparation, to be submitted to TMLR, Aug 2025
- [14] **Fatima Ahsan***, Behnaam Aazhang, and Ali Siahkoohi*. “**Extended Convolutions for Broader Minima in Neural Networks**”, under preparation, to be submitted to ICASSP, Sept 2025

Funded proposals, fellowships, & Awards

I have written proposals that have granted me generous **funding to pursue my academic goals**, including several competitive scholarships such as **Fulbright scholarship** and **Rice ECE graduate fellowship**. Furthermore, I acquired **\$70,000 to explore research commercialization and translation** as a graduate student, discretionary funds of **\$12,500 for demonstrating excellence in research**, and several travel grants.

- **Entrepreneurial lead**, National Science Foundation (NSF) I-Corps, Equity-free funding of \$50,000 **2023**
- **Rice Innovation Fellow**, Liu Idea Lab for Innovation & Entrepreneurship, Equity-free funding of \$20,000 **2023**
- Selected for **Future Leaders Summit by Michigan Institute of Data Science**, the University of Michigan Ann Arbor, USA **2023**
- Ken Kennedy Institute ExxonMobil **Graduate Fellowship**, \$7,500 **2022**
- Cadence Diversity in Technology **Scholarship**, \$5,000 **2022**
- Selected for Rice **Ignite Entrepreneurship Program** in Silicon Valley, CA, sponsored by Rice Alliance **2022**
- Rice ECE **Distinguished Student Service Award**, \$500 **2018**
- **Texas Instruments Scholarship Award**, \$1800/year **Aug 2016-2024**
- Rice **Graduate Research Assistant Fellowship**, \$70,000/year **Aug 2016-2024**
- Awarded **Fulbright Scholarship** for Ph.D., United States Educational Foundation in Pakistan (USEFP), \$50,000/year for 4 years **2016**
- **Awarded Gold Medal** for top of graduating class, LUMS **Class 2015**
- **Masters Merit Scholarship**, LUMS, *Rs.*219,000 **Jan 2014-May 2015**
- **Best Undergraduate Senior Thesis Award**, UET Lahore **Class 2013**
- **3rd position**, IEEE Lahore Section Final Year Project Evaluations **2013**
- ICT R&D Undergraduate **Student Research Grant**, *Rs.*77,000 **2012**
- Award for **top 25 students nationwide and abroad**, Federal Board of Intermediate and Secondary Education Pakistan, *Rs.*20,000 **2009**

Teaching & Mentorship

Signals, Systems, and Learning

Rice University

Houston, TX, USA

Aug 2018 – Dec 2018

- Conducted bi-weekly 1-hour discussion sessions for a class of 40+ students, reinforcing core course concepts and problem-solving skills.
- Designed weekly problem sets and the final course project to support applied learning objectives.
- Delivered guest lectures in the instructor's absence, ensuring continuity of instruction and maintaining academic rigor.
- Assisted in grading assignments, exams, and final projects, providing timely and constructive feedback.

Principal Lecturer: Dr. Richard G. Barainuk (*Ph.D: UIUC*)

1st Year Grad Students Ph.D. Qualifier Exam

Rice University

Houston, TX, USA

Jan 2018 – May 2018

- Delivered lectures to a class of 30+ students on core technical communication skills, including formulating research questions, abstract writing, designing presentation graphics, and integrating visuals into papers and talks.
- Created and facilitated interactive workshops to help students rehearse their PhD qualifier presentations and receive feedback from senior graduate students.

- Provided coaching on effective oral presentation techniques tailored for academic and professional audiences.

Fundamentals of Electrical Engineering

Rice University

Houston, TX, USA

Aug 2017 – Dec 2017

- Delivered over 30+ hours of instruction to a class of 40+ students through weekly 2-hour sessions, simplifying complex topics such as Linear Systems, Continuous-Time Fourier Analysis, and Discrete-Time Fourier Analysis into intuitive concepts.
- Earned strong student feedback for clarity, engagement, and effectiveness in translating theory into understanding.
- Delivered a guest lecture in the instructor's absence, ensuring continuity of instruction and maintaining academic rigor.

Principal Lecturer: Dr. Don H. Johnson (*Ph.D: MIT*)

ECE Mentor-Mentee Program

Rice University

Houston, TX, USA

Aug 2018 – Aug 2021

- Mentored three first-year PhD students at Rice University, providing support during their transition into graduate school.
- Advised on coursework planning, lab rotations, and university resources; served as a point of contact for questions and challenges throughout their first year.

Undergraduate Summer Internship Program

Rice University

Houston, TX, USA

May 2021 – Aug 2022

- Recruited and mentored two undergraduate students on phantom experiments related to EMvelop stimulation, guiding them through experimental design, setup, and data collection.
- Provided hands-on support with troubleshooting and debugging hardware and software issues, fostering their technical growth and research independence.

Leadership and Collaboration

Demonstrated leadership across **2 multidisciplinary academic organizations** by guiding diverse teams, organizing **20+ professional development and social initiatives**. Experienced in coordinating events, facilitating communication, and supporting peers.

President

Rice Electrical and Computer Engineering, Graduate Student Association

Houston, TX, USA

Sept 2018 – Dec 2019

- Collaborated in weekly leadership meetings with a core team of 6 GSA members to plan initiatives, assess student needs, and foster departmental engagement, resulting in a 10× increase in organized events compared to the previous year.
- Directed mentor-mentee pairing for 30+ incoming graduate students, matching each with a senior peer to support onboarding and academic success within a department of 200+ graduate students.
- Initiated and organized 20+ professional development and community-building events, including industry speaker sessions, social mixers, and wellness activities, some of which attracted 100+ attendees.
- Prioritized student well-being by hosting inclusive events such as coffee breaks, open tabs, hikes, game nights, trivia sessions, and Thanksgiving dinner; earned praise from the Head of the Department for maintaining an active association.

President

Rice Pakistani Students Association

Houston, TX, USA

Aug 2019 – Aug 2020

- Instituted bi-weekly leadership meetings and improved team coordination, resulting in a 3× increase in organized events compared to the previous year.
- Led a student organization of 30+ members to promote Pakistani culture through campus-wide events, including cultural showcases, food festivals, and speaker series.
- Organized and chaired guest talks featuring distinguished Pakistani professionals across the U.S.
- Facilitated incoming international students' welcome and introduction to Pakistani community and resources.

Research talks & Posters presentations

Delivered **20+** research talks at international or national conferences and forums, and nearly **50+** research talks within my research groups. My presentations were regularly praised for clarity, story telling, and visuals.

- **Fatima Ahsan, “Minimally invasive deep brain stimulation using temporally interfering electromagnetic waves”,** *Invited Talk, University of Southern California, Los Angeles, CA, USA.* **May 2024**
- **Fatima Ahsan, “Minimally invasive deep brain stimulation using temporally interfering electromagnetic waves”,** *Invited Talk, Duke University, Durham, NC, USA.* **May 2024**
- **Fatima Ahsan, “EMvelop Stimulation: minimally invasive deep brain stimulation using temporally interfering electromagnetic waves”,** *PhD Defense Talk, Rice University, Houston, TX, USA.* **March 2024**
- **Fatima Ahsan, “EMulator: Rapid estimation of electric fields induced during electromagnetic stimulation using data-driven models”,** Poster presented at the *Society for Neuroscience (SFN) Conference, Washington, DC, USA.* **Nov 2023**
- **Fatima Ahsan, “Biophysics of amplitude-modulated giga-hertz electromagnetic waves stimulation”,** Poster presented on *IEEE Asilomar Conference, October 2023, Monterrey, CA, USA.* **Oct 2023**
- **Fatima Ahsan, “EMvelop Stimulation: Treatment for medication resistant Parkinson’s disease”,** Talk for the *NSF I-Corps program.* **Jul 2023**
- **Fatima Ahsan, “On developing responsible neurostimulation technologies”,** Talk for *Future Leaders Summit at Michigan Institute of Data Science, Ann Arbor, MI, USA.* **April 2023**
- **Fatima Ahsan, “EMvelop Stimulation: minimally invasive deep brain stimulation using temporally interfering electromagnetic waves”,** *Three posters presented for Neurocon Conference (Rice University, USA), Annual Neuroscience Poster Session (UT Health, USA), and Energy High Performance Computing Conference (Rice University, USA.)* **April 2022 - April 2023**
- **Fatima Ahsan, “Non-invasive Deep Brain Stimulation using Electromagnetic Waves”,** Remote delivery of recorded talk during covid-19 for *IEEE Asilomar Conference 2020, Monterrey, CA, USA* **Oct 2020**
- **Fatima Ahsan, “Defense against the dark arts of neurological disorders: Non-invasive Deep Brain Stimulation using Electromagnetic Waves”,** *Presented on ECE Affiliates Day and DSP50, Rice University, USA.* **April 2019**
- **Fatima Ahsan, “ Leveraging massive Multiple-Input Multiple-Output (MIMO) spatial diversity in random access”,** *MS Thesis Defense, Rice University, 2018* **Dec 2018**
- **Fatima Ahsan, “Reducing Network Latency”,** Three posters presented in *Presented on ECE Affiliates Day, Rice University, and North American School of Information Theory, Texas A&M, TX, USA.* **April 2018**
- **Fatima Ahsan, “Reducing latency in LTE network access channels, by the size of Texas”,** *Presented on ECE Affiliates Day, Rice University, USA.* **April 2017**
- **Fatima Ahsan, “Leveraging Massive MIMO Spatial Degrees of Freedom to Reduce Random Access Delay”,** Conference talk for *IEEE Asilomar Conference, Monterrey, CA, USA.* **Oct 2017**
- **Fatima Ahsan “Seeker: Autonomous Maze-Navigating and Ball Potting Robot”,** Conference talk for *IEEE ICOSST, Lahore, Pakistan.* **Jun 2015**
- **Fatima Ahsan, “Gait Generation and Terrain Navigation Algorithm Design for a Self-Reconfigurable Robot”,** Conference talk for *IEEE Conference on RAEE, Islamabad, Pakistan.* **Jun 2015**