TAHA AMEEN UR RAHMAN

Electrical Engineering and Mathematics Researcher

taha.ameen1997@gmail.com www.taha-ameen.com/ linkedin.com/in/tahaameen

RESEARCH EXPERIENCE

Linear Systems and Control Theory

A Novel Expression for Computing Time Response of LTI Systems of Arbitrary Order with Applications to Fractional and Stochastic Control

Sept 2019 Sharjah, UAE

- **Citation:** T. Ameen ur Rahman, S. Mukhopadhyay and S. Farhana, "A Novel Expression for Computing Time Response of LTI Systems of Arbitrary Order with Applications to Fractional and Stochastic Control", in *57th Annual Allerton Conference on Communication, Control and Computing*, Monticello, IL, USA, 2019.
- **Description:** The project uses the univariate Fox H-Function to obtain novel closed-form expressions for LTI system response to test inputs in time domain. The expressions are used to characterize the time response of arbitrary order fractional control systems when the input is a stationary stochastic process.

Wireless Communications

A PDE-Based Approach for the Evaluation of Probability of Starvation in Video Streaming

July 2018 – Present Sharjah, UAE

- **Citation:** T. Ameen ur Rahman, Y. Aborahama, M. Hassan and M. Ibrahim, "A PDE-Based Approach for the Evaluation of Probability of Starvation in Video Streaming", *Under Revision for Publication at Physical Communication*, 2019.
- **Description:** The project formulates a system of partial differential equations and solves it to model the total amount of data that can be transmitted over a wireless channel. The channel dynamics are incorporated into a framework to derive a novel expression for the probability of starvation in video streaming. A new rate control algorithm is proposed based on the evaluated starvation probabilities.

Wireless Communications

Distributed Scheduling Algorithms for Ad-Hoc Networks based on Ising Model

Sept 2019 – Present Sharjah, UAE

- **Citation:** T. Ameen ur Rahman, M. Hassan and M. Ibrahim, "A Novel Distributed Scheduling Algorithm for Ad-Hoc Networks based on Ising Model", *In Progress*, 2019.
- **Description:** The project uses a model from statistical mechanics to formulate and solve an optimization problem to propose a distributed scheduling algorithm with excellent performance in terms of throughput optimality and network delay. The approach associates a novel Hamiltonian with the network configuration and implements a modified simulated annealing algorithm to perform the scheduling. The initial results are promising compared to existing schemes such as Q-CSMA and Distributed Greedy Maximal Scheduling.

OBJECTIVE

A passionate, skilled and versatile electrical engineering and mathematics student, seeking graduate education and an opportunity to push the boundaries of research.

EDUCATION

B.S. in Electrical Engineering

American University of Sharjah

Sept 2015 – Dec 2019

CGPA: 4.00/4.00
Accreditation: ABET, MSCHE

B.S. in Mathematics

American University of Sharjah

Sept 2015 – Dec 2019

CGPA: 4.00/4.00
Accreditation: MSCHE

COURSES

Autonomous Robotic Systems
Deep Learning | Stochastic Processes
Communication Networks
Communication Systems Lab
Antennas and Propagation
Signals and Systems | Power Systems
Control Systems | Electronics I, II
Digital Signal Processing | Real Analysis
Electromagnetics | Numerical Methods
Advanced Calculus | Abstract Algebra
Methods of Applied Mathematics
Complex Variables | Number Theory
Mathematical Programming

SOFTWARE

C/C++ | MATLAB | Python | MAPLE
ADS | MultiSIM | LaTeX | LabVIEW
MATHEMATICA | Cadence | PSPICE
SIMULINK | MS Office Suites

Wireless Communications

The Correlated H-Distribution

Sept 2019 – Present Sharjah, UAE

- **Citation:** T. Ameen ur Rahman, M. Ibrahim and M. Hassan, "The Correlated H-Distribution", *In Progress*, 2019.
- **Description:** The project uses the multivariate Fox H-Function to construct correlated distributions from given marginal distributions. The resulting bivariate distribution can be used to model fading in wireless communications.

Algebraic Structures in Quantum Field Theory

Ising Model on Slit-Strip Geometry and Vertex Operator Algebra Product

June 2019 – Present Aalto University, Finland

- **Citation:** T. Ameen ur Rahman, K. Kytölä and D. Radnell, "Ising Model on Slit-Strip Geometry and Vertex Operator Algebra Product", *In Progress*, 2019.
- **Description:** The project studies the scaling limit of Ising model as described by conformally invariant QFTs under a new geometry. It uses elements of conformal field theory, discrete complex analysis and transfer matrix methods to establish a relationship between the algebraic and geometric formulations of Ising Vertex Operator Algebra (VOA) fusion.

AWARDS AND RECOGNITION

The Sheikh Khalifa Presidential Award

American University of Sharjah

Apr 2019

The highest honor that an undergraduate student can receive at the American University of Sharjah. This prestigious award is given to one engineering student annually in recognition of academic excellence, leadership potential, service to the community, demonstrated talent in the field of study, and participation in extracurricular and university activities.

The Chancellor's Scholar Award (100% Scholarship)

American University of Sharjah

Aug 2015 - May 2019

The chancellor's scholarship is awarded annually to a single freshman student based on their overall performance in high school. The scholarship covers 100% tuition and residential accommodation for up to 10 consecutive semesters.

Local First, Regional First and Global Third Prize

Accenture Digital Hackathon

Nov 2017

The awards are presented at a global competition in which the themes of opportunity, mobility and sustainability were addressed by feasible, lucrative and innovative ideas. A panel of industry leaders from around the world judged the competition. The local stage was at the UAE country level and the regional stage was across the Middle East and Europe.

COMMUNITY SERVICE

Academic Advising Sessions
for over 100 students over 3 years @ Academic Support Center

Workshop Presentations
Organized and presented over 15 workshops on study and soft skills

Mental Health Awareness Day
Organized a booth and designed brochures to spread awareness

Disability Awareness Day
Manned the university booth in awareness campaign

Red Crescent - UAE
Collaborated and participated in water distribution campaign for workers

March for Visually Impaired
With Emirates Association for Visually Impaired (World Sight Day).

Stress-Relief Activities
Proposed successful stress-relief campaign to officials for exam week

University Orientation
Presented academic tips to batches of freshmen students

Free Course-Help Sessions
Collaborated with IEEE Chapter to organize course-help sessions

Cultural Puzzles Nights
Organized and participated in get-togethers with exchange students for 6 semesters

90 **Annual Community Service Hours**
every year for the last 4 years of undergraduate study

CERTIFICATIONS

Networks Associate
Hewlett-Packard

Connected Devices Associate
Hewlett-Packard

Entrepreneurship Skills Trainee
Massachusetts Institute of Technology

Inclusive Leadership Trainee
Catalyst with edX

RPAS Hobbyist Drone Operator
Exponent Technology Services

8 Deans' Lists and 4 Chancellors' Lists

American University of Sharjah

2015-2019

Students are placed on Dean's List for obtaining a semester GPA of 3.5/4.0 and on the Chancellor's List for obtaining an annual GPA of 3.5/4.0.

Dubai Youth Entrepreneur Award (Runner-Up)

Unilever

Oct 2017

The award is presented annually after a competition where pitches are evaluated for business ideas with a focus on attaining the United Nations' Sustainable Development Goals.

UNDERGRADUATE COURSEWORK

Bachelor's Thesis in Electrical Engineering

American University of Sharjah

Sept 2018 - May 2019

- Developed an energy-efficient and commercially deployable system to detect and classify different species of mosquitoes remotely using infrared lasers.
- The system uses precision instrumentation to measure the body size and wing beat frequency of mosquitoes to generate a time-evolving density map of mosquito hotspots in an area.
- The project won first place in the AUS Senior Design Competition.

Bachelor's Thesis in Mathematics

American University of Sharjah

Dec 2017 - Dec 2018

- Performed an extensive study of the total graph constructed on the ring of integers modulo n, $\mathbb{Z}_n$ and investigated its' properties.
- Used results from number theory, ring theory and graph theory to derive and prove theorems about graph properties such as regularity, dominating number and connectivity.

Deep Networks in Machine Learning

American University of Sharjah

Jan 2019 - May 2019

- Developed a deep neural network to detect presence of lung disease based on patient's breathing sound.
- Approach involved generating spectrograms and experimentation with new convolutional neural network architectures to classify breathing sounds into classes of over ten common lung diseases.

Autonomous Robotic Systems

American University of Sharjah

Jan 2019 - May 2019

- Built a wheeled robot for GPS-driven waypoint navigation with obstacle detection and avoidance.
- The robot used ultrasound and motion sensors to detect obstacles and plan its path using a Kalman filter driven Ackermann steering approach.

MEMBERSHIPS

IEEE Student Member
Active Student Member for the UAE Chapter since 2016

IEEE Solid-State Circuits Society
International Member since 2017

IEEE Eta Kappa Nu (HKN) Honors Society
International Member since 2018

IEEE SIGHT Society
International Member since 2018

Engineering Honor Society at AUS
Member since 2017

OFFICES HELD

Research Assistant (Jun-Aug 2019)
Aalto University, Finland

Research Intern (Jul-Aug 2018)
Exponent Technology Services

Academic Advisor (2016-2019)
Academic Support Center at AUS

Student Representative (2017-2019)
MSCHE Re-accreditation Workgroup

President (2018-Present)
IEEE Student Branch at AUS

Executive Secretary (2017-2018)
IEEE Student Branch at AUS

Recording Secretary (2018-2019)
IEEE - HKN Honors Society at AUS

Vice President (2019-Present)
IEEE - HKN Honors Society at AUS

Founding Member (2018-Present)
IEEE SIGHT Community Services Society at AUS

LANGUAGES

English ●●●●●

Urdu ●●●●●

Hindi ●●●●○

REFERENCES

Available upon request.