Zunnoor Fayyaz Awan

Undergraduate international student
School of Electrical Engineering, Korea Advanced Institute of Science and Technology (KAIST)
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Personal

Born Nov 12, 1998 in Islamabad, Pakistan.

Education

1. **Secondary School Certificate, Federal Board of Intermediate and Secondary Education, Pakistan** – *Science Group*
   Passed with the highest grade (A1) in all courses.

2. **Higher Secondary School Certificate, Federal Board of Intermediate and Secondary Education, Pakistan** – *Pre-Engineering Group*
   Passed with distinction and countrywide position, securing highest grade (A1) in all courses.

3. **Korea Advanced Institute of Science and Technology, Korea (KAIST)** – *Bachelor of Science Degree* FALL 2019 – PRESENT: Graduation expected late 2023
   - Majoring in electrical engineering, with a minor in mathematics
   - GPA higher than average, and actively involved in research and extra-curricular activities

4. **Swiss Federal Institute of Technology (ETH), Zürich, Switzerland** – *Undergraduate Mobility Program* FEB. – SEPT. 2022: Department of Information Technology and Electrical Engineering (D-ITET)
   - Coursework involved two graduate-level (MSc) courses, and also wrote a semester thesis

Research

- **KAIST MetaPhotonics Research Laboratory**
  (January 2021 - present)
  - Studying and researching *photonic inverse design*, a field at the intersection of my interests in science, engineering, and computation. In my work, aimed at engineering superior optical devices, physical knowledge and intuition (for problem interpretation and parameterization), computation and optimization theory (to establish the objective function and optimization technique), coding (implementing the optimization and maintaining the data), and engineering (finding the right applications and building complex devices using simpler components) all come together.
  - Selected for and completed the highly selective *Undergraduate Research Participation* project by KAIST in June - December 2021 to investigate miniature inversely-designed light filtering and localization structures. Through this program I was provided funding and research credits, and I presented my final work, titled "*Inverse Design of On-Chip Optical Waveguides: Irregular Corrugations for Light Filtering and Localization*", to a panel of professors for evaluation.
  - I contributed to a conference publication, another submission has been accepted for Jan 2023, and a journal manuscript is under preparation.

- **ETH Zürich Institute for Signal and Information Processing (ISI)**
  (Feb. 2022 - June 2022)
  - Thesis titled "*Outlier Detection in State Estimation via Hypothesis Testing*".
  - Supervised by Prof. Dr. Hans-Andrea Loeliger and Guy Revach (doctoral candidate).
  - I studied the problems associated with simultaneously carrying out a large number of hypothesis tests and methods available for their resolution. Subsequently, I researched on improving state estimation by concentrating on high-quality feedback.
  - My work involved extensive statistical simulation and methodical comparisons.
  - Received grade 5.5/6.

Course projects

- Systems programming: IA-32, x86-64, and RISC-V assemblies; writing a UNIX shell in C.
- Networks programming: implementation of a TCP/IP infrastructure, simulating a router, etc.
- Physics: Acoustic simulation in COMSOL Multiphysics, photonic and optical simulations in Lumerical FDTD and Mode solvers.
- Mathematics: course project on a comparative study of set theory and category theory.
- In humanities, several of my term papers in courses related to anthropology and history of civilization received the highest grades and praise from the professors.

Publications

- Rabiul Islam Sikder, Muhammad Fasih, **Zunnoor Fayyaz Awan**, Hyeonho Yoon, Hyo-Hoon Park, and Hamza Kurt, "Different multi-layer photonic configurations for light filtering in optical communications," 24th International Conference on Advanced Communication Technology (ICACT), 2022. (https://ieeexplore.ieee.org/document/9728774)
- **Zunnoor Fayyaz Awan**, Muhammad Fasih, Rabiul Islam Sikder, and Hamza Kurt, "Inversely Designed Miniaturized Optical Filters." (Accepted in SPIE Photonics West for Jan 2023.)
- **Zunnoor Fayyaz Awan**, Muhammad Fasih, Rabiul Islam Sikder, and Hamza Kurt, "Experimental Demonstration of Optimized Miniature Photonic Filters." (Manuscript under preparation.)

Computational skills

- Experienced with coding in C and Python.
- Experienced with SQL and Spark; basic familiarity with MapReduce, MongoDB, JSONiq.
- Basic familiarity with Numpy and other similar libraries and frameworks.
- Some experience with deep learning and optimization frameworks like PyTorch and TensorFlow.
- Some experience with Verilog HDL and IA-32, x86-64, and RISC-V.
- Experienced with electromagnetic simulations using Lumerical FDTD and Mode solvers.
- Basic experience with acoustic simulations using COMSOL Multiphysics.
- Experienced with MATLAB.
- Skilled in combinatorics, probability, set theory, and group theory topics pertaining to computation and algorithms.

Language skills

- Near-native proficiency in English, TOEFL score of 118/120.
- Native fluency in Urdu.
- Elementary understanding of Turkish, Persian, Punjabi, Arabic, and Korean.

Campus involvement

- Staff reporter for our official English newspaper, the KAIST Herald, writing on issues of global interest. My articles are published monthly in print as well as online at herald.kaist.ac.kr.
- Mentoring incoming international students and providing guidance and advice about account and course registration, traveling to campus, participating in clubs, and so on.
- Student assistantship at the university international office to help international students with their queries and documentation.
- Actively participated in campus community events.