M. Nahin Khan

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EDUCATION

Carnegie Mellon University, Education City, Qatar **Class of 2020**
Bachelor of Science in Biological Sciences, GPA: 3.93
Additional Major in Computer Science, Fifth Year Scholar
Mellon College of Science Dean's List High Honors: Fall 2016 – Fall 2019

RESEARCH & WORK EXPERIENCE

Honors Thesis: Developing a Computational Tool for Exploring RNA-Protein Interactions, iYLab | Jan – May 2020
- Developed an integrated software called *RNPFind*
- Wrote functions that collect and analyze information on RBPs that bind on a template RNA molecule
- Developed mechanisms for correlation studies, overall-binding profiles, cooperation-competition analysis, etc.

Qatar Student Initiated Undergraduate Research Program (QSIURP), Younis Lab, Awardee | May – Aug 2019
- Theorized the reason for selective degradation of the lncRNA Neat1 by AUF1 over Malat1
- Performed RIP experiments to test for equal binding of AUF1 on Neat1 and Malat1 in cancer cells
- Scripted a program to automatically collate experimental and computational RBPs that binds a given RNA

International Genetically Engineered Machine Competition, Boston, Team Bioinformatician | April – Oct 2019
- Built a machine capable of detecting recessive genetic disease in carriers in half an hour
- Gave talks at various high schools to raise awareness and take societal input on the project
- Collaborated with various international teams on molecular modeling of Cpf1, gRNA, and template DNA

Undergraduate Research with Dr. Annette Vincent, Carnegie Mellon University Qatar | Jan – April 2019
- Identified novel active site residues for DHFR that could be targeted by cancer drugs
- Performed an R70E site directed mutagenesis on a plasmid expressing DHFR
- Performed enzymatic assay after induction to investigate effect of mutation on protein activity
- Validated results by molecular dynamics simulations via FoldX to predict changes in Gibb's free energy

Experimental Techniques in Molecular Biology Research Course, CMU Qatar | Jan – May 2019
- Investigated the effect of EDTA on enzymatic activity of calf intestinal alkaline phosphatase
- Compared the effects of calcium propionate and potassium sorbate on MDCK II cells

Machine Learning Lab, Northwestern Polytechnic University of Xi'an, Research Intern | June – Aug 2018
- Took part in an online audio classification competition on Kaggle

Undergraduate Research with Dr. Ihab Younis, Carnegie Mellon University Qatar | Jan – April 2018
- Investigated minor intron splicing of DNA damage repair genes DDB1, Parp1, and XRCC5 upon UV damage
- Performed RT-PCR to measure levels of mRNA with or without the minor intron spliced

Woolford Lab, Mellon College of Science, Pittsburgh USA, Research Intern | June – Aug 2017
- Investigated the role of Drs1 in ribosome assembly pathway in yeast cells
- Created spotting assays of mutagenized strains and isolated preribosomes for protein analysis
- Constructed models for Drs1 function in ribosome assembly

Phage Genomics Research Course, Carnegie Mellon University Qatar | Aug – May 2017
- Analyzed and observed the phage structures isolated from soil using SDS-PAGE and electron microscopy
- Sequenced extracted DNA using ion Torrent machine to obtain DNA strand sequences
- Performed computational assembly and annotated the sequenced DNA to generate a gene map

Ballroom Dancing Instructor, Carnegie Mellon University Qatar | Jan – May 2020
- Co-instructed a Student-led Course (StuCo) designed to be an introduction to ballroom dancing
- Taught cha cha, waltz, foxtrot, rumba, tango, swing, and salsa.

Parallel and Sequential Data Structures and Algorithms Teaching Assistant, CMU Pittsburgh | Aug – Dec 2019
- Led weekly 50-minute recitation sessions to teach key concepts to students
- Led review sessions to help prepare students for midterms and exams

Fundamentals of Programming, Course Assistant | Aug – Dec 2017

Great Theoretical Ideas in Computer Science, Course Assistant **| Jan – May 2020**
Concepts of Mathematics, **Course Assistant** **| Jan – May 2020**

TALKS AND PRESENTATIONS

Meeting of the Minds Symposium:
"Truncations of Drs1 Arms Provide Insight into Their Possible Functions" |M. Khan, D. Ferdinando, J. Woolford (2018)
"Effect of EDTA on enzymatic activity of alkaline phosphatase" | M. Khan, D. Ferdinando, A. Vincent (2019)
"Expression and Purification of Dihydrofolate Reductase" | D. Ferdinando, M. Khan, A. Vincent (2019)

TECHNICAL SKILLS

Microbiology: Organic synthesis and analysis, spectrophotometric analysis, picking and streaking of cells/viruses, cellular component isolation (DNA, RNA, protein), enzyme digestions, transformation of cells, gel electrophoresis, SDS-PAGE, ribosomal purification, centrifugation, site directed mutagenesis, amplification of plasmids, primer design, fractionation of cells, PCR and sequencing, mammalian cell culture maintenance, UV-induced damage, RT-PCR

Computer: Python, C, MATLAB, SML, Unix Shell, BLAST, HTML, CSS, Excel, PowerPoint

Language: Fluent in English, Urdu-Hindi (intermediate), and Arabic (basic).
Experience with East Asian and Middle Eastern culture.

AWARDS & HONORS

Andrew Carnegie Scholar and Qatar Campus Scholar, Awardee **| Oct 2019 – Present**
- For seniors who show high standards of academic excellence, leadership, and involvement in the community
- Selected by deans and department heads to represent the class

Fifth Year Scholar, Awardee **| May 2019 – May 2021**
- CMU program that sponsors a student to study for an extra year after graduating
- Allows student to explore and give back to the community.
- I will organize high school outreach programs to raise interest in computational biology in Qatar

Qatar University Math Championship, Second Place **| Nov 2018**
- National competition with over 400 university participants

Qatar Foundation Scholarship, Recipient **| Aug 2017 – Present**
- Competitive merit-based full scholarship given to students in Education City

Python Chess A.I. Final Project, Creator **| Nov 2016**
- Developed a Chess program with Artificial Intelligence and shared online for a course
- Has been referenced by several repositories on GitHub and has attracted community attention

Carnegie Mellon University Qatar Programming Competition, First Place **| March 2018**

LEADERSHIP & EXTRACURRICULAR

Academic Review Board, Member **| Aug 2018 – Present**

Service Trip to Bali, Indonesia **| March 2020**
- Ran workshops for local children on environmental issues and raised awareness in Qatar

Sustainability Trip to Singapore and Greece **| March 2018, 2019**
- Learnt principles from top sustainable cities around the world to bring back and implement in Qatar

Thought Club, Vice President and Co-Founder, (**Best New Club Award)** **| Aug 2018 – Present**
- Organized meetings where students could discuss answers to thought-provoking philosophical questions

Student Orientation, Orientation Counselor **| Aug 2018, 2017**
- Facilitated the assimilation of incoming students into the Carnegie Mellon community

Language Bridges Program, CMUQ, Teacher **| Aug – Dec 2016**
- Taught foreign workers to improve their English fluency utilizing reading, writing, and speaking exercises

Basketball Team, Member **| Aug 2016 – Present**

Andrew Knight Club (Chess Club), President **| Aug 2017 – 2018**

RELEVANT COURSEWORK

Undergrad Complexity Theory | Graph Theory | Experimental Techniques in Molecular Biology | Experimental Techniques in Microbiology | Biochemistry | Genetics | Cellular Biology | Molecular Biology | Molecular and Cellular Immunology | Principles of Imperative Computation | Principles of Functional Programming | Parallel and Sequential Data Structures and Algorithms | Great Theoretical Ideas in Computer Science | Machine Learning (Coursera)