AZRAF ANWAR
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EDUCATION

Columbia University, School of Engineering and Applied Sciences, NY **May 2018**
Bachelor of Science, Biomedical Engineering
CGPA: 3.51, C. Prescott Davis Scholar, Dean's List

New York University, Tandon School of Engineering and Applied Sciences, NY **Expected December 2020**
Bridge Certificate Program in Discrete Mathematics, Data Structures and Computer Science
Currently Enrolled; Qualified for Certificate of Distinction based on present grades

PROFESSIONAL EXPERIENCE

CipherHealth, New York, NY

Senior Product Architect, Data Engineering and Analytics **Feb 2019 – Dec 2019**
• Managed data warehouse requests and implemented data dashboards and reports using Python and SQL, in conjunction with data visualization tools such as Tableau and Periscope, to extract product development and performance insights
• Developed and planned new features with the product decision teams for clinical rounding and data analytics software
• Worked with UI/UX designers and product managers to guide development sprints using Agile methodology in Scrum team
• Managed a team of 5 product architects specializing in CipherHealth's data analytics software and oversaw their production of deliverables for the product and engineering team using Kanban management framework

Product Architect **Aug 2018 – Feb 2019**
• Implemented scripts and reports using Python and SQL for CipherHealth's clinical rounding and data analytics software
• Guided expansion efforts and program configuration for healthcare systems to optimize KPIs in patient outreach programs and clinical rounding programs within various healthcare systems
• Led service recovery at major healthcare systems to safeguard contracts totaling over $1 million from cancellation by revamping technical implementations of clinical rounding programs through collaboration with customer success and product teams

RESEARCH EXPERIENCE

School of Engineering and Applied Science, Columbia University, New York, NY, USA
Laboratory for Nanobiotechnology and Synthetic Biology, Department of Biomedical Engineering
Supervisors: Professor Henry Hess, PhD
Research Topics: Computational Biology, Deep Learning, Image Segmentation, Nanobiotechnology

Post-Baccalaureate Research Associate **May 2020 - Present**
• Labelling fluorescent microscopy images for deep learning analysis to identify fluorescent hotspots in motility assays
• Developing a convolutional neural network to perform instance segmentation to identify fluorescent hotspots and aid in particle tracking in Python

Undergraduate Capstone Project **Sept 2017 – May 2018**
• Implemented a convolutional neural network using Python to detect diabetic retinopathy in patient retinal images through semantic segmentation of retinal damage from images.
• Designed and developed a portable fundoscopic camera attachment to pair with an android smartphone to take retinal images and pass image to CNN
• Presented project and won awards at various meetings and competitions including the Rice University's 360° Global Health Design, Columbia Univeristy's Engineering Fast Pitch, and the VentureWell E-Team Program.
• Raised $6,500 in funding to develop prototype of fundoscopic camera through various academic awards

Undergraduate Research Associate **Jan 2016 – May 2017**
• Developed ODE models for the average velocities, diffusion, and persistence lengths of microtubules in motility assays
• Implemented ODE simulators in Python and MATLAB to simulate and visualize model predictions; developed and applied a protocol for increasing the average length of microtubules polymerized in vitro to be used for the development of microscale transport systems from simulation results.
• Presented research at the Biomolecular Design Competition (BIOMOD), sponsored by the Wyss Institute, 2016, at UCSF.

University of Dhaka, Dhaka, Dhaka, Bangladesh
Laboratory for Genomics and Bioinformatics, Department of Microbiology
Supervisor: Professor Munawar Sultana, PhD
Research Topics: Computational Biology, Mutational Genomics

Post-Baccalaureate Research Associate **May 2020 – Present**
• Collaborated on research investigating the mutational dynamics of SARS-CoV-2 within the Indian Subcontinent and South East Asia in a joint project with the Jessore University of Science and Technology (JUST)
• Performed computational genomic analysis of SARS-CoV-2 sequences from across 6 countries within South East Asia to characterize the spread of the virus; Python used as primary language for coding
• Investigated the micro-biome dynamics of bovine mastitis in a joint project with The George Washington University (GWU)
• Research presented for publication at Transboundary and Emerging Diseases Journal and Genomics Journal; three papers have been published to date

Icahn School of Medicine at Mount Sinai, New York, NY, USA
Laboratory for Computational Systems Biology, Department of Genetics & Genomic Sciences
Supervisor: Professor Jonathan R. Karr, PhD
Research Topics: Computational Biology, Systems Biology, Computer Simulations, Whole-Cell Modelling

Post-Baccalaureate Research Associate **May 2020 – Sept 2020**
• Collaborated on the development of biosimulations.dev, a web-based tool for sharing, re-using, and composing models, simulations, and visualizations in biomedical modelling, using Python and JS.
• Developed common interface to incorporate metabolic simulators for flux balance analysis (FBA) models

Undergraduate Research Associate **May 2017 – Sept 2017**
• Developed an integrated computational model for the metabolism and cell cycle regulation of saccharomyces cerevisiae by combining a flux balance analysis (FBA) model of yeast metabolism with an ODE model of yeast cell cycle regulation.
• Implemented a new hybrid FBA/ODE simulator in Python to simulate and visualize model predictions; used simulations to identify the impact of DNA replication during the S phase on the metabolism of individual cells.
• Attended lectures on data aggregation, constraint-based modeling, dynamic modeling, stochastic simulation, rule-based modeling, multi-algorithmic simulation, parallel simulation, and modeling standards in computational systems biology.
• Presented research at the NY Area Quantitative Biology Meeting, 2017, at Cold Spring Harbor Laboratory.

RESEARCH PUBLICATIONS

Academic Publications at Transboundary and Emerging Diseases Journal, Wiley
OK Islam, HM Al-Emran, MS Hasan, **A. Anwar**, M.I.K. Jahid, M.A. Hossain. "Emergence of European and North American mutant variants of SARS-CoV-2 in South-East Asia." *Transbound Emerg Dis*. Wiley. 2020; doi: https://doi.org/10.1111/tbed.13748

M.S. Rahman, M.R. Islam, M.N. Hoque, A.S.M. Rubayet-Ul-Alam, M Akther, J.A. Puspo, S. Akter, **A. Anwar**, M. Sultana, MA Hossain. "Comprehensive Annotations of the Mutational Spectra of SARS-CoV-2 Spike Protein: A Fast and Accurate Pipeline." *Transbound Emerg Dis*. Wiley. 2020; doi: https://doi.org/10.1111/tbed.13834

Academic Publications at Genomics Journal, Elsevier
N.M. Hoque, A. Istiaq, M. S. Rahman, M. R. Islam, **A. Anwar,** Z. Siddiki, M. Sultana, K. A. Crandall, MA Hossain. "Microbiome Dynamics of Bovine Mastitis Progression and Genomic Determinants." *Genomics*. Elsevier. 2020; Vol. 112, Issue 6, 5188-5203. doi: https://doi.org/10.1016/j.ygeno.2020.09.039

ACADEMIC PRESENTATIONS

A. Anwar*, M. Noonavath*, J. Patterson*, D. Theagene*, M. Sup*, A. Kyle. "Diabetic Retinopathy Diagnosis in Low-Resource Settings" Poster, Presentation, Rice 360° Global Health Design, Rice University (2018)

A. Anwar*, R. Roy*, J. R. Karr. "An Integrative, Genome-Scale Model of the Cell Cycle Regulation and Metabolism of Saccharomyces Cerevisiae" Poster, Presentation, NY Quantitative Biology Summit, Cold Spring Harbor Laboratory (2017)

A. Anwar*, D. Theagene*, S. Tsitkov, N. B. Kazeruni, H. Hess. "A Protocol for Increasing the Average Length of Microtubules Polymerized in vitro for the Construction of Microscale Transport Systems" Lecture, BIOMOD, UCSF (2016)

HONORS AND AWARDS

Rice 360° Undergraduate Global Health Technologies Design Competition **2018**
• Awarded 1st place of 19 invited teams, Best Poster Award & Audience Choice Award

VentureWell E-Team Program Stage 1 Recipient **2018**
• Competitive grant of $5000 and startup development workshops to aid development of diabetes-related medical device

Cisco Global Problem Solver Challenge Semifinalist **2018**
• Awarded to 33 out of 300 presenting teams, with innovative ventures for social impact, for senior design project

Columbia Engineering Fast Pitch Competition **2017**
• 1st Place of 33 presenting teams in Undergraduate Division & Audience Choice Award, along with an award of $1300

Columbia Engineering CEIF Research Grant **2016, 2017**
• Awarded $8000 in funding for summer research projects in biomedical engineering and computational biology.

Columba University Scholars Program (CUSP) SEF Research Grant **2015, 2016, 2017**
• Awarded $7500 in funding for summer research projects in biomedical engineering and computational biology.

EXTRACURRICULARS/VOLUNTEERING

Columbia Residence Hall Leadership Organization, Columbia University, New York, NY
Council Treasurer **May 2017 – Dec 2017**
• Maintained financial goals for Residence Hall Leadership at Wien Hall to aid in promoting community among the residential population and advocate for the needs of residents.

Journal of Global Health, Columbia University, New York, NY
Associate Editor **Sept 2016 – Dec 2017**
• Reviewed articles for publication at the student-run chapter of the Journal of Global Health at Columbia University.

Project Rousseau, New York, NY
Instructor **Nov 2014 – May 2016**
• Tutored high school students from underrepresented communities in English and Mathematics; provided mentorship and support to prepare students for college applications.

Bangladesh Debating Council, Dhaka, Bangladesh
National Team Member/Adjudicator **May 2012 – May 2016**
• Member of the national debating team at the World School's Debating Championships at Cape Town, South Africa and Antalya, Turkey during 2012 and 2013. Debate adjudicator at various national tournaments during 2014 to 2016.

SKILLS

Programming: C++, C#, JS, Python, R, MATLAB
DBMS: Oracle, SQL Server, MySQL, AWS Athena
Game Development: Unity, Godot
Data Visualization: Tableau, Periscope, Looker, Pentaho
Product Management: Agile Software Development, User Segmentation, Cohort Analysis, Funnel Analysis
Fabrication: SolidWorks, DipTrace
Language: English, Bengali