Seungyeon (Julia) Han

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EDUCATION

University of Michigan **Ann Arbor, MI**
Doctor of Philosophy, Biomedical Engineering, Biomechanics Track Aug. 2023 - Present

Stony Brook University **Stony Brook, NY**
Master of Science, Applied Mathematics and Statistics, Statistics Track Aug. 2020 - May 2021
3.63 / 4.00

Stony Brook University **Stony Brook, NY**
Bachelor of Science, Applied Mathematics and Statistics Mar. 2016 - May 2020
Bachelor of Science, Mathematics *Magna Cum Laude*, 3.68 / 4.00

RESEARCH EXPERIENCE

Machine Learning in Cardiac Strain Curve, Columbia University **New York, NY**
Research Assistant Dec. 2021 – Apr. 2023
- Assist in developing automated algorithms of zero-crossing (ZC) location on incremental strain curves in the myocardium segmentation for each echocardiographic view and patient
- Optimize ZC selection algorithm using logistic regression, support vector machine (SVM), and Random Forest

Automated Segmentation Using U-Net in Cardiovascular Images **New York, NY**
Research Assistant Dec. 2021 – Apr. 2023
- Implement U-Net convolutional neural networks to automate and improve cardiac B-mode ultrasound image segmentation performance

Cardiac Strain Imaging Artifact Detection Project, Columbia University **New York, NY**
Research Assistant Dec. 2021 - Oct. 2022
- Wrote codes to calculate the Intersection of Union (IoU) values to compare displacement estimation on strain images of healthy human subjects and coronary artery disease patients
- Assisted in applying Minimum Variance beamforming and Singular Value Decomposition (SVD) filtering to myocardial elastography data acquisitions

Cross-Species SARS-CoV-2 Genome Analysis Project **Stony Brook, NY**
- Utilized Clustal Omega, PAL2NAL, MATLAB, and R to conduct multiple sequence and codon alignments of Spike proteins and Envelope proteins Feb. 2021 - May 2021
- Collected nucleotide/protein sequences of coronaviruses from 30 different species through NCBI RefSeq genomes
- Demonstrated lower disparity and mutability of Envelope protein compared to Spike protein by comparing the nonsynonymous substitution and synonymous substitution ratios (dN/dS ratio)

Center for Creative Economy & Innovation **Incheon, Korea**
Big Data Research Assistant Nov. 2018 - Jan. 2019
- Orchestrated personalized AI refrigerator project through the accumulated healthcare information
- Incorporated independent experiments and developed 3D-Modeling by using Python
- Prepared and investigated statistical figures and diagrams for group presentation

Mahdavi Laboratory, Stony Brook University **Stony Brook, NY**
Undergraduate Research Assistant Dec. 2016 - May 2017
- Presented applications of stochastic algorithms in Biostatistics (survival analysis and Gaussian)
- Ran experimental analysis in R and Python to investigate hypothesis with public health data

PUBLICATIONS & CONFERENCE PRESENTATIONS

Electromechanical Wave Imaging for Pediatric Mitral Valve Disease Characterization

Melina Tourni, **Seungyeon Julia Han,** et al, (2023) **New York, NY**
Computers in Biology and Medicine

Cardiac Strain Imaging Artifact Detection and Suppression with MV Beamforming and SVD Filtering

Jad El Harake, […], **Seungyeon Julia Han**, et al (2022) **New York, NY**
IEEE International Ultrasonics Symposium (IUS) Proceedings

Non-Invasive 3D Electromechanical Cycle Length Mapping for Atrial Flutter Characterization

Melina Tourni, […], **Seungyeon Julia Han**, et al, (2022) **New York, NY**
American Heart Association (AHA) Conference

Electromechanical Cycle Length Mapping for Atrial Arrhythmia Detection and Treatment

Melina Tourni, […], **Seungyeon Julia Han**, et al, (2022) **New York, NY**
IEEE International Ultrasonics Symposium (IUS)

HONORS / AWARDS

- Stony Brook University Dean's List, *Stony Brook University* 2016 – 2020
- Academic Excellence Scholarship, *Stony Brook University* Jun. 2019
- Academic Excellence Scholarship, *State University of New York, Korea* Dec. 2018
- Prime Minister Award, *Korea Ministry of SMEs (Small and Medium Enterprise)* May 2018
- Academic Excellence Scholarship, *State University of New York, Korea* Dec. 2017
- Best Project Award, *AI Personalized Cosmetic Corporate, EMei, Beijing* Jun. 2017

TEACHING EXPERIENCE

Calculus with Applications **Stony Brook, NY**
Recitation Lecturer, Department of Mathematics at Stony Brook University Feb. 2019 - May 2019

- Led recitations every week, presented mathematical concepts and problems by using examples
- Provided feedback on coursework and homework during recitations and office hours

Probability and Statistics /Applied Linear Algebra (2 courses) **Stony Brook, NY**
Teaching Assistant, Department of Statistics at Stony Brook University Aug. 2018 - Dec. 2018

- Answered students' questions about Statistical Inference material in weekly office hours
- Graded all individual assignments, quizzes, group projects related to the statistical applications

WORK EXPERIENCE

Number Analytics LLC **New York, NY**
Data Analyst May 2021 - Dec. 2021

- Collected and analyzed health data from clients by using SQL, Python, SPSS, Excel, and R
- Took the role of developing statistical analysis charts, cleaning, transforming, sampling, and analyzing complex datasets to derive statistically significant scientific results with Tableau
- Initiated a self-led individual project to invent a chatbot algorithm to analyze customer complaints
- Proposed suggestions and collect reports from surveys to build more improved functions on web development such as adding diagrams using the ggplot2 package in R and implementing codebooks for variable description

World Federal United Nations Association (WFUNA) **New York, NY**
Intern, College Leaders Jun. 2018 - Aug. 2018

- Transformed large clinical and healthcare datasets using R and Python to identify patterns and important variables for further analysis related to sustainable development goals
- Presented a group project to social entrepreneurs about the importance of statistical infographics

LEADERSHIP EXPERIENCE

SUNY Education Volunteer Club **Incheon, Korea**

Club President, The State University of New York, Korea Jun. 2018 - Aug. 2019

- Organized weekly tutoring sessions for children raised in single-parent families
- Initiated and organized general body meetings to facilitate interaction between club members

Global Campus Ministry International Christian Club (ICC) **Incheon, Korea**

Club President, The State University of New York, Korea Dec. 2017 - Jan. 2019

- Chaired important group meetings for better communication among members
- Structured club activities and events such as fundraising and prayer meetings

Residential College Program **Incheon, Korea**

Resident Assistant, The State University of New York, Korea Jan. 2018 - Dec. 2018

- Coordinated and planned floor events as a student representative
- Promoted a sense of community by encouraging residents to get along together

COMMUNITY SERVICE / ACTIVITIES

Mathematics Teacher **New York, NY**

- Initiate free Mathematics tutoring to K-12 students through Zoom Aug. 2019 – Jan. 2021
- Taught Mathematics to elementary school students at General Social Welfare Center, Korea

Volunteer Abroad **Yanbian, China**

- Provided computing knowledge to Yanbian University of Science Jun. 2018 – Jul. 2018
- Connected the organization to the community by establishing rapport, coaching, and compliance