

MINSOL (MICHELLE) KIM

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EDUCATION

Wellesley College (GPA: 3.82)

Wellesley, MA

Candidate for B.A. in Computer Science and B.A. in Data Science

Sept 2020 - May 2024

- **Notable Courses:** *Distributed Computing, Tangible User Interface, Human Computer Interaction, Multivariate Statistics, Regression Analysis and Statistical methods, Applied Data Analysis and Statistical Inference, Theory of Computation, Fundamentals of Algorithms, Differential Equations with Applied Linear Algebra, Classical Dynamics, Product Creation for All*
- **Upcoming Courses:** *Modeling for Computer Systems, Foundations of Computer Systems with Laboratory, Causal Inference*

Massachusetts Institute of Technology

Cambridge, MA

Cross-registered Student

Sept 2021 - Present

- **Notable Courses:** *Intro to Machine Learning (6.036), Process Data Analytics (2.874), Project Engineering (6.914)*
- **Upcoming Courses:** *Computational Sensorimotor learning (6.884), Engineering Leadership Lab (6.9130)*

RESEARCH EXPERIENCE

MIT-IBM Watson AI Lab

Cambridge, MA

Machine Learning Research Intern (MIT UROP, CareerEd Grant)

Feb 2023 - Present

Mentor: Dr. Li-wei Lehman

- Developed Autoregressive Hidden Markov Model (AR-HMM) variants to predict fluid treatment response outcomes.
- Established data pipeline and efficiently processed large scale minute-by-minute data of critical care unit patients.
- Created visualizations for patient monitoring, sourced from the encrypted Physionet MIMIC-II/MIMIC-III databases.

MIT Media Lab Fluid Interfaces Group

Cambridge, MA

Research Assistant (MIT UROP)

Feb 2023 - Present

Mentor: Dr. Nataliya Kosmyna

- Developed real-time facial recognition and imaging software to report blink counts, generating true labels as part of online Blink detection Software using Electro-oculography (EOG) analysis project and resolving edge cases.
- Resolved network and system issues for portable Brain-Computer Interfaces (BCI) and neural signal analysis, contributing to multiple successful interactive displays, such as NeuraFutures exhibition at Boston Cyberarts Gallery.
- Implemented Muse device backend to ensure Bluetooth connectivity on both iOS and Android and enabled the Vercel website to be adaptive to various screen sizes, using React, Node.js, and Gatsby libraries.
- Provided comprehensive code inspection, user-centric design support, and troubleshooting for developing Panda3D gaming software involving joysticks, for seamless spacecraft control simulation. Expected publication in February.
- Collaborated with NASA-National Aeronautics and Space Administration for recording EEG and EOG to record brain activity during parabolic flight and investigate neuroscience of group interactions in ecologically natural settings.

Wellesley Human-Computer Interaction Laboratory

Wellesley, MA

Research Assistant (NSF Grant, Brachman Hoffman Fellowship, Clare Boothe Luce Scholars Program)

May 2022 - Aug 2022

Mentor: Dr. Orit Shaer

The Mobile Office: The Future of Work and Well-being in Automated Cars

- Led 3-month development of two remote controllers for Augmented Reality Windshield Displays on automated cars.
- Optimized driver experience, adapting user mental model after conducting elicitation study with 373 commands.
- Designed and conducted study with 43 participants through Prolific for new multi-interface support devices.

DISCOVRE: Distributed Immersive Scientific Collaboration Over Virtual Reef Environments

- Conducted 50 70-min user studies in Virtual Reality classroom with embodied notes, and analyzed data with Atlas.ti.
- Led the development of a mobile app prototype that offers visual and textual photographic feedback underwater.

MIT IDSS Device Realization Laboratory

Cambridge, MA

Research Assistant (MIT UROP)

Jan 2022 - May 2022

Mentor: Dr. Brian Anthony

- Developed predictive control system for error detection in alignment and folding process of packaging machines.
- Contributed to editing, organizing, and documenting MATLAB computer vision analysis code for reproducibility.
- Designed data pipeline and reduced prediction error by 8%, predicting battery life cycle using 7.7GB data.

MIT Center for Collective Intelligence

Cambridge, MA

Research Assistant (MIT UROP)

Oct 2021 - May 2022

Mentor: Dr. Thomas Malone

- Recruited and contributed to the study design for assessing GPT-3 performance in short story writing.
- Enhanced inter-rater reliability in the pilot study, optimizing the testing process and quality metrics.

HONORS THESIS - COMPUTER SCIENCE

Title: *Towards Translating Brain Activity into Drone Navigation: Brain-Computer Interfaces (BCI) for Communication and Control*

Advisor: Dr. Christine Bassem, Dr. Nataliya Kosmyna

In pursuit of developing lightweight machine control, the thesis delves into the utilization of BCIs to stream EEG and EOG data for interpreting user actions. The focus is on a gamified Bitcraze drone control interface that responds to cognitive load and eye blinks.

PUBLICATIONS & PRESENTATIONS

1. Nataliya Kosmyna, Daniel Hails, Eugene Hauptmann, Christopher Markus, Zoe Lee, Gun Bolukbasi and **Minsol Kim**. "Using Wearable Brain Sensing Glasses during Zero-G Flight for Hyperscanning: Preliminary Study," AIAA 2023-4656. ASCEND 2023. October 2023.
2. **Minsol Kim**, Li-wei Lehman. "Characterizing Dynamics of Vital-Sign Signals Using Switching State Space Modeling to Assess Fluid Responsiveness in ICU Patients," American Medical Informatics Association (AMIA) [Preprint]. September 2023.
3. "Wellesley in Product: Design and Human-Computer Interaction" [Presented]. Tanner Conference. September 2023.
4. Karim El Adl, **Minsol Kim**, Nataliya Kosmyna, "Multi-Modal Brain-Computer Interface (BCI) Glasses: Integrating Few-Channel fNIRS, EEG, and EOG to Robustly and Practically Monitor Cognitive Load," [Preprint]. July 2023.
5. Monsurat Olaosebikan, Claudia Aranda Barrios, Katie Gdula, Josephine Ramirez, Jennifer Enriquez, **Michelle Kim**, Angelora Cooper, Lenore Cowen, Orit Shaer. "Embodied Notes: Re-imagining note-taking for academic discovery and learning in VR," International Journal of Human-Computer Studies [Preprint]. August 2022.
6. **Michelle Kim**, Josephine Ramirez, Jennifer Enriquez, Katie Gdula, Angelora Cooper, Lenore Cowen, Andrew Kun, Alberta Ansah, Nabil Al Nahin Ch, Orit Shaer. "Envisioning Tangible Controllers for Augmented Reality Windshield Display," ACM International Conference on Tangible, Embedded and Embodied Interaction [Preprint]. August 2022.
7. "Mobile Office: Designing for the Future of Works in Automated Vehicles" [Co-Presented]. Wellesley Summer Research. July 2022.
8. "DISCOVRE: Mixed Reality Environments for Coral Reef Research"[Co-Presented]. Wellesley Summer Research. July 2022.
9. "Collaborative Immersive Analytics for Coral Reef Data" [Co-Demonstration]. CHIWORKS. June 2022.

TEACHING & LEADERSHIP EXPERIENCE

Massachusetts Institute of Technology

Cambridge, MA

Engineering Leader II (Team Coach), Gordon-MIT Engineering Leadership Program

Sept 2021 - Present

- Cultivated leadership and management skills for driving successful engineering teams in a selective 2-year program.
- Led a 2-hr Inquiring & Dialoguing lab for 50 students, developing class materials, and managed 8 industry guests.
- Coached a team of five students in the program weekly, leading debrief sessions and providing progress reports.

Wellesley College

Wellesley, MA

Teaching Assistant

Jan 2022 - Present

CS 235 Theory of Computation, CS 320 Tangible Interfaces, CS 230 Data Structures

- Led weekly support hours, troubleshooted softwares, and graded assignments for 30 students on average.
- Guided MVP developments, assisting A-Frame AR & VR, Flora, Arduino, Circuits, and DALL-E labs for 20 students.

WUD' V (Second-hand fashion market Startup)

Chicago, IL

Co-founder, Brand Manager

Jul 2022 - Feb 2023

- Headed development of business strategy and organizational relationships, managing projects using project backlog and Qualtrics company dashboard, across cross-functional teams of design, web programming, and marketing.
- Improved UX/UI of websites based on Gen-Z customer journeys, user feedback, and website A/B testing.

RECOGNITIONS

Award: *Best Use of Framer and TypeDream*, MLH Frey Hacks (1st/700 participants, 75+ projects)

Jun 2022

- Led 48-hour web-app development, visualizing AI-based illness prediction and vacation recommendation.
- Developed a mobile app sharing least-resource-requiring recipes, tackling college food insecurities.

Award: *Silver Medal*, International Young Physicists' Tournament (35 national teams)

Aug 2018 - Jul 2019

- Led team of 5 for 11 months, modeling and testing 17 real-world open-ended engineering problems.
- Received the highest score (10/10) in presentation and debate, focusing on data and model visualization.

SKILLS

Programming: *Proficient in Python, Java, HTML/CSS, JavaScript, Familiar with C++, GoLang*

Data Analysis: *R, MATLAB, PyTorch, TensorFlow, Atlas.ti, MySQL*

Libraries: *Scikit, Numpy, Pandas, Seaborn, Panda3D, OpenCV, CVZone, OpenAI, Bleak, tqdm, click, Gatsby, Nodejs, React, Tkinter*

Prototyping and Modeling: *Figma, InVision, OnShape, Solidworks, Vercel, Flora, Arduino, A-Frame, Oculus SDK, Unity3D*

Language: *Fluent in Korean and English, Elementary Spanish and French*