

Monica Dayao

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EDUCATION

CARNEGIE MELLON UNIVERSITY | PHD IN COMPUTATIONAL BIOLOGY Expected 2024
 Joint Carnegie Mellon–University of Pittsburgh Computational Biology (CPCB) PhD Program
 GPA: 3.98

UNIVERSITY OF CAMBRIDGE | MENG/BA IN ENGINEERING Aug 2015 – June 2019
 Specializations in Information Engineering and Bioengineering
 Result: Honours with Merit, (2.1 with 69% module marks, roughly equivalent to a 3.7+ GPA)

RESEARCH EXPERIENCE

GRADUATE STUDENT RESEARCHER | CARNEGIE MELLON UNIVERSITY Aug 2019 – Present
 Research in Computational Biology and Machine Learning *Advisor: Ziv Bar-Joseph*

- Developed a deep-learning based method (RAMCES) to improve the segmentation of cells in CODEX data, as part of the Human BioMolecular Atlas Program (HuBMAP).
 - M. T. Dayao**, M. Brusko, C. Wasserfall, Z. Bar-Joseph. Membrane marker selection for segmenting single cell spatial proteomics data. *Manuscript in review.*
- Leveraging spatial statistics methods to study the spatial distribution of proteins in the tumor microenvironment of Head and Neck Cancer. In collaboration with Enable Medicine.

UNDERGRADUATE RESEARCHER | UNIVERSITY OF CAMBRIDGE, UK Oct 2018 – June 2019
 Research in Machine Learning, Master's Thesis *Advisors: Timothy O'Leary, Jim Haseloff*

- Investigated deep learning methods for the segmentation and analysis of *Marchantia polymorpha* gemmae confocal microscopy images.

VISUALIZATION INTERN | CANON MEDICAL RESEARCH EUROPE LTD, EDINBURGH, UK June – Sept 2018
 Industry Research in Computer Graphics and Visualization *Mentor: Steven Reynolds*

- Investigated different methods to visualize diffusion tensor imaging (DTI) data with global illumination volume rendering.
- Implemented GPU-efficient algorithms in C++ to create a variety of visual effects.

WORK EXPERIENCE

SOFTWARE ENGINEERING INTERN | SPIRAL SOFTWARE, CAMBRIDGE, UK July – Sept 2017
 Optimization and Maths Team

- Developed production code in C++ that improved optimization across petroleum refinery models.
- Designed a web-based programming aid (HTML, CSS) that allows for efficient debugging of variables in the codebase.
- Analyzed the performance of optimization models and presented results to the team.

ENGINEERING INTERN | THE BOEING COMPANY, HOUSTON, TX June – Sept 2016
 Guidance, Navigation & Control Division for the International Space Station

- Assisted with the testing and verification of NASA flight software and wrote reports detailing testing results.
- Automated the creation of the division's weekly timeline and other administrative tasks.

LEADERSHIP

CPCB GSA | VICE PRESIDENT Aug 2021 - Present

- Manage and take minutes at monthly Graduate Student Association (GSA) meetings to discuss student-related issues in the CPCB program.
- Organize academic, professional and social events for CPCB students.

CPCB ADMISSIONS COMMITTEE

Aug 2021 - Present

- Evaluate and discuss applications to the CPCB PhD program with other faculty and student members on the committee.

CPCB SEMINAR SPEAKER COMMITTEE

2020 - 2021

- Organized invitations and logistics for weekly seminar speakers for the CPCB PhD Program.

SCS PHD DEAN'S ADVISORY COMMITTEE

Summer 2020

Orientation Materials Working Group

- Consolidated a unified set of general information relevant to the School of Computer Science (SCS) PhD programs at Carnegie Mellon.

HACKBRIDGE | VP OF MARKETING AND COMMUNITY ENGAGEMENT

2018 - 2019

- Contacted researchers from both industry and academia for collaboration on projects.
 - Planned and organized internal events such as research reading groups and project exhibitions.
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OUTREACH

TECHNIGHTS

2021 - Present

- Create content for the CMU [TechNights](#) program aimed to expand diversity of interest in computing among middle school students.
 - Fall 2021: Randomness [\[video link\]](#)
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OTHER PROJECTS

Cellular aging latent variables in neural (CALVIN) cells predicts brain aging gene regulation

April 2020

- Implemented unsupervised machine learning methods to identify latent variables predicting age from single cell RNA-seq data of the mouse brain.

gluttonFISH: genes labeling unique (cell)types to order novel FISH probes

Dec 2019

- Developed an ensemble of machine learning methods to classify cell types using a small number (4) of marker genes from single cell RNA-seq data.

WaterScope

June 2018

- Built a water vacuum filtration system prototype for WaterScope, a non-profit company that tests water quality in developing countries.
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AWARDS

NIH T32 TRAINING GRANT | HHMI-NIBIB INTERFACES INITIATIVE

Aug 2020 - Present

- Funding for stipend, tuition, technical supplies, and conference travel.
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MEMBERSHIPS

International Society for Computational Biology