Bowen Chen

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RESEARCH INTERESTS

Machine Learning, Computer Vision, Visual-Language Pretraining, Representation Learning, Natural Language Processing, Reinforcement Learning, Medical Image Analysis, Computational Pathology

EDUCATION

Stanford University Sep 2024 –
Ph.D. in Biomedical Data Science

Harvard University Sep 2018 – May 2022
A.B. in Computer Science and Statistics **Overall GPA: 3.93/4.00**
Magna cum laude (based on overall GPA cutoff, major GPA, and senior thesis reviews)
Harvard College Scholar (top 10% of class based on GPA)

TECHNICAL SKILLS

Computer Skills: Python, PyTorch, R, C++, JavaScript

Relevant Coursework (@Harvard): Machine Learning (CS 181), Probability (Stat 110), Inference (Stat 111), Linear Models (Stat 139), Comp Bio and Bioinformatics (Stat 115), Data Structures & Algorithms (CS 124), Computing hardware (CS 141), Programming Languages (CS 152), Groups & Vector Spaces (Math 122), Evolutionary Dynamics (Math 153)

EXPERIENCE

Computational Pathology Research Associate (PI: Faisal Mahmood) March 2020 - March 2024
Pathology, Brigham and Women's Hospital, Harvard Medical School *Boston, MA*

- Researching low cost deployment of deep learning models for computational pathology and integration with custom-built optics hardware for real-time, point-of-care diagnosis.
- Completed undergraduate thesis titled "A Multi-resolution Hard Attention Model to Select Regions of Interest on Whole Pathology Slide Images". Received honors rating of high plus.
- Developing deep learning methods involving computer vision and vision-language pretraining for classification and survival prediction on gigapixel pathology whole slide images.
- Creating visual-language foundation models for pathology images and text.
- Developing an interactive multimodal assistant for pathology.

Founding Engineer March 2024 –
Modella AI *Boston, MA*

- Part of core founding team.
- Implementing data collection and processing pipeline for scaling up medical image and text data.
- Contributing to the development of the core product of the company.

PUBLICATIONS

1. Ming Y Lu*, **Bowen Chen***, Drew FK Williamson*, Richard J Chen, Kenji Ikamura, Georg Gerber, Ivy Liang, Long Phi Le, Tong Ding, Anil V Parwani, Faisal Mahmood
"A Foundational Multimodal Vision Language AI Assistant for Human Pathology"
***Equal contribution (co-first author)**
***Nature**, 2024*

2. Ming Y Lu*, **Bowen Chen***, Drew FK Williamson*, Richard J Chen, Ivy Liang, Tong Ding, Guillaume Jaume, Igor Odintsov, Andrew Zhang, Long Phi Le, Georg Gerber, Anil V Parwani, Faisal Mahmood
"Towards a Visual-Language Foundation Model for Computational Pathology"
***Equal contribution (co-first author)**
***Nature Medicine**, 2024*

3. Richard J Chen*, Tong Ding*, Ming Y Lu*, Drew FK Williamson*, Guillaume Jaume, Andrew Song, **Bowen Chen**, Andrew Zhang, [10 others], Long Phi Le, Georg Gerber, Faisal Mahmood
"A General-Purpose Self-Supervised Model for Computational Pathology"
***Equal contribution**
***Nature Medicine**, 2024*

4. Andrew H. Song, Mane Williams, Drew F.K. Williamson, Sarah S.L. Chow, Guillaume Jaume, Gan Gao, Andrew Zhang, **Bowen Chen**, Alexander S. Baras, Robert Serafin, Richard Colling, Michelle R. Downes, Xavier Farré, Peter Humphrey, Clare Verrill, Lawrence D. True, Anil V. Parwani, Jonathan T.C. Liu, Faisal Mahmood
"Weakly Supervised AI for Efficient Analysis of 3D Pathology Samples"
***Cell**, 2024*

5. Kendra Sirak, Julian Jansen Van Rensburg, Esther Brielle, **Bowen Chen**, Iosif Lazaridis, Matthew Mah, [12 others], David Reich.
"Medieval DNA from Soqotra points to Eurasian origins of an isolated population at the crossroads of Africa and Arabia"
***Nature Ecology and Evolution**, 2024*

6. Ming Y Lu*, **Bowen Chen***, Andrew Zhang, Drew FK Williamson, Yung-Sung Chuang, Richard J. Chen, Tong Ding, Long Phi Le, Faisal Mahmood.
"Visual Language Pretrained Multiple Instance Zero-Shot Transfer for Histopathology Images"
***Equal contribution (co-first author)**
***Conference on Computer Vision and Pattern Recognition (CVPR)**, 2023*

7. Jana Lipkova, Richard J Chen, **Bowen Chen**, Ming Y Lu, Matteo Barbieri, Daniel Shao, Anurag J Vaidya, Chengkuan Chen, Luoting Zhuang, Drew FK Williamson, Muhammad Shaban, Tiffany Y Chen, Faisal Mahmood
"Artificial intelligence for multimodal data integration in oncology"
***Cancer Cell**, 2022*

8. **Bowen Chen**, Ming Y. Lu, Jana Lipkova, Faisal Mahmood.
"Abstract PR-01: Real-time, point-of-care pathology diagnosis via embedded deep learning"
***Clinical Cancer Research**, 2021*

CONFERENCE PRESENTATIONS

CVPR 2023 June 2023
IEEE / CVF *Vancouver, Canada*

· "Visual Language Pretrained Multiple Instance Zero-Shot Transfer for Histopathology Images" (Poster)

Discover Brigham 2022 Nov 2022
Brigham and Women's Hospital *Boston, MA*

· "Localizing Regions of Interest in Whole Slide Images via Reinforcement Learning" (Poster)

Discover Brigham 2021 Nov 2021
Brigham and Women's Hospital *Boston, MA*

· "A 3D-Printed Embedded AI-based Microscope for Pathology Diagnosis" (Poster)

Pathology Visions 2021 Oct 2021
Digital Pathology Association *Las Vegas, NV*

· "A 3D-Printed Embedded AI-based Microscope for Pathology Diagnosis" (Oral talk)

GPU Technology Conference (GTC) 2021 April 2021
NVIDIA *Virtual*

· "Real Time, Point-of-Care Pathology Diagnosis via Embedded Deep Learning on NVIDIA Jetson Nano" (Poster)

AACR Conference on Artificial Intelligence, Diagnosis, and Imaging 2021 Jan 2021
American Association for Cancer Research *Virtual*

· "Real Time, Point-of-Care Pathology Diagnosis via Embedded Deep Learning" (Plenary Talk)

Discover Brigham 2020 Nov 2020
Brigham and Women's Hospital *Virtual*

· "Real Time, Point-of-Care Pathology Diagnosis via Embedded Deep Learning" (Live Demo)

Pathology Visions 2020 Oct 2020
Digital Pathology Association *Virtual*

· "Real Time, Point-of-Care Pathology Diagnosis via Embedded Deep Learning" (Poster)

AWARDS AND HONORS

Discover Brigham Research Excellence Award 2022
Brigham and Women's Hospital
Awarded to posters demonstrating innovative research at the annual institution-wide Discover Brigham conference (20 out of 160+ posters).

Magna cum laude 2022
Harvard College
Awarded based on GPA cutoff and senior thesis reviews.

Pathology Academic Celebration Finalist 2021
Harvard Medical School
Poster competition for students in pathology at Harvard Medical School.

Pathology Visions Best Research Award 2020
Digital Pathology Association
Awarded to poster that demonstrates best research in the Pathology Visions conference (1 out of 50+ posters).

Harvard College Scholar 2019
Harvard College
Top 10% of class based on GPA.

ACADEMIC JOURNAL REVIEWER SERVICE

Nature Medicine
ICLR Workshop on Reasoning and Planning for Large Language Models
Journal of Digital Imaging

TEACHING AND LEADERSHIP EXPERIENCE

Course Assistant for Mathematics Fall 2019 – Spring 2020
Harvard University *Cambridge, MA*

· Undergraduate course assistant for MATH 21A Multivariable Calculus and MATH 21B Linear Algebra and Differential Equations
· Assisted instructor during class-time to aid student learning and answer questions

- Organized weekly review sessions and office hours to review concepts and problems
- Graded homework assignments with other teaching assistants

Mental Health Peer Counselor 2019 – 2022
Harvard University *Cambridge, MA*

- Staffed 12-hour overnight shifts every two weeks. Provided anonymous, non-directive (person-centered) mental health counseling for peers
- Tech director (2021 – 2022). Implemented automations to notify staffers via SMS for COVID testing and postering reminders