

# Hanwen Bi

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## EDUCATION

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### **Columbia University**

M.S. in Biomedical Engineering

**New York, NY**

Aug 2019 - Dec 2020

### **Northeastern University**

B.E. in Biomedical Engineering

GPA: Overall 3.51/4.00; Major 3.67/4.00

**Shenyang, CN**

Jun 2019

## RESEARCH EXPERIENCE

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### **Columbia University**

**New York, NY**

#### **Unravel developing infant brain network patterns with deep learning**

Sep 2020 - Present

**Advisor:** Andrew Laine, PhD, Professor of Biomedical Engineering

Jonathan Posner, MD, Professor of Psychiatry at CUMC

**Position:** Research Assistant

**Responsibilities:**

- Projecting adult default mode network template to infant brain in different monthly period
- Adding an RNN to VAE to model the temporal dynamics of rs-fMRI
- Tracking and modelling infant brain pattern changes across the first few years of life in latent space

#### **Intrapulmonary Lumen-wall Separation through DE-CT and Deep Learning**

Apr 2020 - Present

**Advisor:** Andrew Laine, PhD, Professor of Biomedical Engineering

R. Graham Barr, MD, PhD, Professor of Medicine at CUMC

**Position:** Research Assistant

**Responsibilities:**

- Developing an automatic pipeline to separate lumen and wall on DECT scans through multi-material decomposition
- Utilizing domain adaptation and transfer learning, training a segmentation model on Non-contrast CT scans (or Virtual Non-contrast CT scans)
- Extracted vessel center line and optimized filter result (removed small vessel and disconnected component)

#### **Whole Mouse Brain Neuron Structure and Connections analysis**

Oct 2019 - Feb 2020

**Advisor:** Andrew Laine, PhD, Professor of Department of Biomedical Engineering

Alex Dranovsky, MD, PhD, Assistant Professor of Psychiatry at CUMC

**Position:** Research Assistant

**Responsibilities:**

- Enhanced the microscopic images of the mouse brain with advanced Vessel Filter, made the axon structure clearer for identification and reduced noises.

-Image registration and analyzed mouse brain connection changes by counting changes in the number of somas in the brain regions.

## **Neuromatch Academy**

### **Predicting Working Memory Performance Based on Resting State fMRI Data**

Jul 2020

Advisor: Jeff Yau, PhD, Assistant Professor of Neuroscience, Baylor College of Medicine

Responsibilities: -Made project proposal, developed research direction and data process pipeline, programed data preprocess  
-Implemented Spectral Co-Clustering method to extract four subnetworks from the whole brain network  
-Utilized a GLM model with L2 regularization to predict participants' performances from subnetworks

## **Northeastern University**

Shenyang, CN

### **Construction and Analysis of Functional Brain Network Based on Network Similarity**

Mar 2018 - Apr 2019

Advisor: Yueyang Teng, PhD, Associate Professor of Biomedical Engineering

Position: Project leader of a three-person group

Responsibilities: -Made project proposal, consulted references to keep up with the cutting-edge development, and coordinated routine work of members  
-Preprocessed brain f-MRI imaging and constructed brain network with DPABI  
-Successfully applied deep learning method of graph convolutional network to non-Euclidean data and obtained more comprehensive information of network for classification (AD/MCI/NC)

## **Course Project**

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### **Functional Brain Network Analysis Using Sparse Representation Methods**

Spring 2020

Course: ELENE6876 Sparse and Low-Dimensional Models for High-Dimensional Data

Lecture: John Wright, PhD, Associate professor of Electrical Engineering

Responsibilities: -Successfully implemented the sparse subspace clustering method to reveal the relationship between different brain areas  
-Utilized the robust principle content analysis method to extract information from the brain network to interpret the latent information

## **INTERNSHIP EXPERIENCE**

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### **Neusoft Group Inc.,**

Shenyang, CN

#### **Medical Image Management System Based on Android**

Jul 2017 - Aug 2017

Responsibility: Programmed app front-end interface and server, and decoded JSON data using Java

Product Function: User/doctor: to register/log in; Doctor: to upload/download images from the server

#### **Modern Traffic Control System**

Jul 2016 - Aug 2016

Responsibility: Programmed image processing & analyzing module

Product Function: To read vehicle pictures and upload them to the server; to recognize license plate numbers and input them to the server

## **PROFESSIONAL AFFILIATION**

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OHBM Student Member	2019 - 2020
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## **CONFERENCES/WORKSHOPS**

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OHBM 2020	Jun 2020
Neuromatch Academy 2020 (Interactive Track)	Jul 2020

## **SKILLS**

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Programming: Python, Matlab  
Frameworks & Tools: Pytorch, Keras, DPABI, Fiji (ImageJ), NeuroScope

## **SCHOLARSHIPS AND AWARDS**

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Northeast University Graduate Scholarship, Northeastern University	2018 - 2019
Scholarship for Outstanding Students, Northeastern University	2017 - 2018
Scholarship for Outstanding Students, Northeastern University	2016 - 2017
Scholarship for Outstanding Students, Northeastern University	2015 - 2016
2017 Outstanding Social Practice Report Award, Northeastern University	2017
2016 Outstanding Social Practice Individual Award, Northeastern University	2016

## **SOCIAL ACTIVITIES AND STUDENT WORK**

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<i>Leader</i> , 2017 Summer Social Practice for visiting Ansteel and studying Spirit Mengtai (a model worker characterized for his arduous struggle)	2017
<i>Core Member</i> , Winter Social Practice for enrollment promotion of Northeastern University	2016, 2017
<i>Participant</i> , Spring Sports Meeting of Northeastern University – Men's 1500m	2017
<i>Player</i> , Soccer Match of Northeastern University	2016, 2017
<i>Leader</i> , 2016 Daily Social Practice, investigating the industry situation and development prospect of BME major and visiting Neusoft Group Inc.	2016
<i>Member</i> , Department of Art of Student Union of BMIE College, Northeastern University	2015 - 2016
• Leader and Participant of Team Event & Jump Rope of Sports Meeting and coordinator of all team members for training	
• Director of New Year's Day Party	
<i>Volunteer Teacher</i> , Guangming Primary School and Luguan Primary School (twice a week)	2015 - 2016