

# 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

Lab: Heffner Biomedical Imaging Lab

Advisor: Andrew Laine, PhD, Professor of Biomedical Engineering

Jonathan Posner, MD, Professor of Psychiatry at CUMC

Position: Research Assistant

Responsibilities: -Projecting adults 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

#### Intravascular Lumen-wall Separation through DE-CT and Deep Learning

Apr 2020 - Present

Lab: Heffner Biomedical Imaging Lab

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, train 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

Lab: Heffner Biomedical Imaging Lab

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 analyzing 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

Lab: Medical Imaging and Intelligent Analysis Lab

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)

### Construction, Feature Extraction and Analysis of Brain Function Network

Mar 2017 - Mar 2018

Lab: Medical Imaging and Intelligent Analysis Lab

Advisor: Xuan He, PhD, Lecture, Department of Biomedical Informatics

Position: Core member of a five-person group

Responsibilities: -Read references about brain science and neuroimage  
 -Collected MRI data from ADNI database and used DPABI to preprocess data

## 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**

**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**

OHBM Student Member

2019 - 2020

## **CONFERENCES/WORKSHOPS**

OHBM 2020

Jun 2020

Neuromatch Academy 2020 (Interactive Track)

Jul 2020

## **SKILLS**

Programming: Python, Matlab

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

## **SCHOLARSHIPS AND AWARDS**

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**

*Leader*, 2017 Summer Social Practice for visiting Ansteel and studying Spirit Mengtai (a model worker characterized for his arduous struggle)

2017

*Core Member*, Winter Social Practice for enrollment promotion of Northeastern University

2016, 2017

*Participant*, Spring Sports Meeting of Northeastern University – Men's 1500m

2017

*Player*, Soccer Match of Northeastern University

2016, 2017

*Leader*, 2016 Daily Social Practice, investigating the industry situation and development prospect of BME major and visiting Neusoft Group Inc.

2016

*Member*, 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

*Volunteer Teacher*, Guangming Primary School and Luguan Primary School (twice a week)

2015 - 2016