

# 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

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

Apr 2020 - Present

Lab: Heffner Biomedical Imaging Lab

Advisor: Andrew Laine, Ph.D., Professor of Biomedical Engineering

R. Graham Barr, MD, Ph.D., 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, Ph.D., Professor of Department of Biomedical Engineering

Alex Dranovsky, MD, Ph.D., 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, Ph.D., 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, Ph.D., Associate Professor of Biomedical Imaging
- 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
  - Wrote code in Python to extract network characteristics to classify image data (AD/MCI/NC) base on Tensorflow
  - Successfully applied deep learning method of graph convolutional network to non-Euclidean data and obtained more comprehensive information of network

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

Mar 2017 - Mar 2018

- Lab: Medical Imaging and Intelligent Analysis Lab
- Advisor: Xuan He, Ph.D., 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

### **Design and Implementation of Obstetric Referral System Based on B/S Architecture**

Oct 2016 - Dec 2016

- Tutor: Jingshu Zhang, Ph.D., Lecture, Department of Biomedical Informatics
- Responsibilities: Designed and implemented back-end database in MySQL and front-end web page based on PHP

### **PET Reconstruction Based on MLEM Algorithm**

Apr 2016 - Jun 2016

- Tutor: Dayu Xiao, Lecture, Department of Biomedical Imaging
- Responsibilities: Programmed the functional interface and debugged the application using C++

## **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, Ph.D., 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 2018 - Aug 2018

- 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	
	<b>Modern Traffic Control System</b>	Jul 2017 - Aug 2017
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
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## **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**

<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
<ul style="list-style-type: none"> <li>• Leader and Participant of Team Event &amp; Jump Rope of Sports Meeting and coordinator of all team members for training</li> <li>• Director of New Year's Day Party</li> </ul>	
<i>Volunteer Teacher</i> , Guangming Primary School and Luguan Primary School (twice a week)	2015 - 2016