

Hanwen Bi

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EDUCATION

Columbia University

M.S. in Biomedical Engineering

Relevant Courses: Machine Learning, Sparse Models for High-Dimensional Data, Computational Neuroscience, Deep Learning, Biostatistics

New York, NY

Aug 2019 – Feb 2021

Northeastern University

B.E. in Biomedical Engineering

Shenyang, CN

Sep 2015 – Jun 2019

RESEARCH EXPERIENCE

Columbia University

New York, NY

Unravel Developing Infant Brain Network Patterns with Deep Learning

Oct 2020 – Feb 2021

Research Assistant. Advisor: Prof. Andrew Laine & Dr. Yun Wang

- Implemented a python script for structure MRI data preprocessing of 343 subjects from Baby Connectome Project (BCP), and organized BCP data as Brain Imaging Data Structure format.
- Investigated the effect of using different frame displacement calculation parameters at different ages on brain motion detection. Utilized bounding sphere and active contour to calculate the infant brain radius at different ages from brain mesh.
- Proposing a VAE model for 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 – Sep 2020

Research Assistant. Advisor: Prof. Andrew Laine

- Implemented a MATLAB script to extract vessel centerline and optimize filter results (removed small vessels and disconnected components).
- Participated in developing an automatic pipeline to separate lumen and wall on DECT scans through multi-material decomposition.
- Participated in proposing a recursive refinement network (RNN) for 3D registration of expiratory-inspiratory pairs of CT lung scans. The proposed framework extracts multi-scale features, constructs normalized local cost correlation volume and recursively refines volumetric deformation vector fields.

Neuromatch Academy

Predicting Working Memory Performance Based on Resting State fMRI Data

Jul 2020

Mentor: Dr. Jeff Yau

- Developed a pipeline for fMRI timeseries data processing and functional brain network construction. Implemented Spectral Co-Clustering method to extract four subnetworks from the whole brain network.

- Proposed a GLM model with L2 regularization to predict participants' working memory performances based on extracted subnetworks.

Northeastern University

Shenyang, CN

Analysis of Functional Brain Connectivity Based on Network Similarity

Mar 2018 – Apr 2019

Research Assistant. Advisor: Prof. Yueyang Teng

- Led a 3-person student group, made project proposal and coordinated routine work of members.
- Collected and organized fMRI data from ADNI and ABIDE dataset. Preprocessed data and constructed brain network by Data Processing & Analysis for Brain Imaging (DPABI) toolbox.
- Proposed a graph convolutional network for functional brain network classification. Tested the method in ADNI and ABIDE dataset, conducted cross-database experiments and analyzed results.

PUBLICATIONS

- Recursive Refinement Network for Deformable Lung Registration between Exhale and Inhale CT Scans
Xinzi He, Jia Guo, X. Zhang, **Hanwen Bi**, S. Gerard, D. Kaczka, A. Motahari, E. Hoffman, J. Reinhardt, R. G. Barr, E. Angelini, Andrew Laine. *arXiv: 2106.07608*. 2021
- Fully Transformer Network for Skin Lesion Analysis
Xinzi He, Ee-Leng Tan, **Hanwen Bi**, Xuzhe Zhang, Baiying Lei. submitted to *Medical Image Analysis (Special Issue on Skin Lesion)*. 2021

PROFESSIONAL AFFILIATION

OHBM Student Member

2019 - 2021

CONFERENCES/WORKSHOPS

Neuromatch Academy – Deep Learning (Interactive Track)

Aug 2021

Neuromatch Academy – Computational Neuroscience (Interactive Track)

Jul 2020

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

Implemented 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

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

SKILLS

Coding: Python, MATLAB

Frameworks & Tools: Pytorch, Keras, FSL, FreeSurfer, DPABI

SCHOLARSHIPS AND AWARDS

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