# Hanwen Bi

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## EDUCATION

**Heinrich Heine University Düsseldorf**  **Düsseldorf, DE**
Ph.D. in Medical Sciences (Neuroscience)  Jun 2022 – Present

**Columbia University**  **New York, NY**
M.S. in Biomedical Engineering  Aug 2019 – Feb 2021
**Relevant Courses:** Machine Learning, Sparse Models for High-Dimensional Data, Computational Neuroscience, Deep Learning, Biostatistics

**Northeastern University**  **Shenyang, CN**
B.E. in Biomedical Engineering  Sep 2015 – Jun 2019

## RESEARCH EXPERIENCE

**Research Center Jülich**  **Jülich, DE**
  **Association between Sleep, Brain, and Cognitive Performance**  Jan 2021 – Present
*Doctoral Researcher. Advisor: Dr. Masoud Tahmasian & Prof. Simon Eickhoff*

- Proposing a machine learning framework for classification and biomarker selection for insomnia symptoms using structural neuroimaging data.
- Implementing state-of-art machine learning methods to combine sleep, brain structure and genetic data to predict cognitive scores.

**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 modeling 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

- Fully Transformer Network for Skin Lesion Analysis
  Xinzi He, Ee-Leng Tan, **Hanwen Bi**, Xuzhe Zhang, Baiying Lei. *Medical Image Analysis, 102357.* 2022
- 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

## PROFESSIONAL AFFILIATION

OHBM Student Member      2019 - 2021

## CONFERENCES/WORKSHOPS

Neuromatch Academy – Computational Neuroscience (Interactive Track)      Jul 2020

## SKILLS

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|---|---|
| Coding: | Python, MATLAB |
| Frameworks & Tools: | Pytorch, FreeSurfer, CAT, DPABI |

## SCHOLARSHIPS AND AWARDS

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| 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 |