

# KHOI HUYNH

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## RESEARCH INTERESTS

Lifespan Brain Development, Diffusion MRI, Tractography, Microstructural Modelling, Brain Functional and Structural Connectivity, MR Reconstruction, Noise Removal, Brain Atlas

## EDUCATION

- 2017 – 2022    **The University of North Carolina at Chapel Hill** – Chapel Hill, North Carolina  
PhD in Biomedical Engineering  
PI: Prof. Pew-Thian Yap. *Dissertation: Computational Tools For Studying Microstructural Development Of The Human Brain With Diffusion Magnetic Resonance Imaging.*
- 2012 – 2016    **International University** – Hochiminh City, Vietnam  
Bachelor of Engineer in Biomedical Engineering  
1<sup>st</sup> class honor.

## RESEARCH EXPERIENCE

- From 2022    **Postdoctoral Scholar**  
Prof. Pew-Thian Yap's Lab, Department of Radiology, School of Medicine, UNC Chapel Hill.  
Lifespan Brain Development, Structural, Functional, and Diffusion MRI Modelling
- 2017 – 2022    **Graduate Research Assistant**  
Prof. Pew-Thian Yap's Lab, Department of Biomedical Engineering, School of Medicine, UNC Chapel Hill.  
Diffusion MRI Processing and Analysis

## AWARDS

- 2025    ISMRM Summa Cum Laude awards  
Presentations: *"Precision Cortex Tractography for the Developing Brain"*, and *"Pan-Contrast Learning of MRI Segmentation for Healthy and Anomaly Cases: Faithful to Tissue Properties and MR Physics"*  
ISMRM Education Stipend
- 2023    UNC Radiology Symposium Best Oral Presentation  
Presentation: *"Microstructural Atlases of the Developing Brain"*.
- 2021    ISMRM Education Stipend  
Abstract: *"Quantifying Cell Size and Membrane Permeability with Microstructure Fingerprinting"*.
- 2020    UNC Graduate Student Transportation grant  
Abstract: *"Dense Temporal Mapping of Cortical Microstructure in the Early Developing Brain"*.

- UNC-BME Travel Award  
Abstract: *"Quantifying Intra-Soma Diffusion Properties via Spherical Mean Spectrum Imaging"*.
- 2019 MICCAI Graduate Student Award  
Paper: *"Probing Brain Micro-Architecture by Orientation Distribution Invariant Identification of Diffusion Compartments"*.  
Paper: *"Characterizing Non-Gaussian Diffusion in Heterogeneously Oriented Tissue Microenvironments"*.
- 2019 UNC-BME Travel Award  
Abstract: *"Dense Mapping of Microstructural Development in the Human Brain During the First Two Years of Life"*.
- 2018 ISMRM Education Stipend  
Abstract: *"Spatially Varying Signal-Drift Correction in Diffusion MRI"*.

## ACADEMIC SERVICES

- Reviewer **Journal:** IEEE-TMI, IEEE-TCDS, Scientetific Reports, MRM, NeuroImage, PLoS ONE, Brain Structure and Function  
**Conferece:** MICCAI, ISMRM, OHBM, MLMI, CDMRI
- Organizer 2025 ISMRM Workshop on 40 Years of Diffusion MRI
- Undergraduate Thesis Committee 2023: Yicheng Zou–Investigation of Learning-Based Tractography via TractSeg (UNC Department of Computer Science, Principal Advisor: Pew- Thian Yap)

## PUBLICATIONS

- Journal [J8] *The Growing Little Brain: Cerebellar Functional Development from Cradle to School*. Wenjiao Lyu, Kim-Han Thung, **Khoi Huynh**, Li Wang, Weili Lin, Sahar Ahmad, Pew-Thian Yap. *Nature Communications*, in press
- [J7] *Optimal shrinkage denoising breaks the noise floor in high-resolution diffusion MRI*. **Khoi Huynh**, Wei-Tang Chang, Ye Wu, and Pew-Thian Yap. *Patterns*, 2024.
- [J6] *A multimodal submillimeter MRI atlas of the human cerebellum*. Wenjiao Lyu, Ye Wu, **Khoi Huynh**, Sahar Ahmad, and Pew-Thian Yap. *Scientetific Reports*, 2024.
- [J5] *Feasibility of free-breathing 19F MRI image acquisition to characterize ventilation defects in CF and healthy volunteers at wash-in*. Sang Hun Chung, **Khoi Huynh**, Jennifer L Goralski, Yong Chen, Pew-Thian Yap, Agathe S Ceppe, Margret Z Powell, Scott H Donaldson, and Yueh Z Lee. *Magnetic Resonance in Medicine*, 2023.
- [J4] *Deep learning prediction of diffusion MRI data with microstructure- sensitive loss functions*. Geng Chen, Yoonmi Hong, **Khoi Huynh**, and Pew-Thian Yap. *Medical Image Analysis*, 2023.
- [J3] *Rapid Diffusion Magnetic Resonance Imaging Using Slice-Interleaved Encoding*. Tiantian Xu, Ye Wu, Yoonmi Hong, Sahar Ahmad, **Khoi Huynh**, Zhixing Wang, Weili Lin, Wei-Tang Chang, and Pew-Thian Yap. *Medical Image Analysis*, 2022.

- [J2] *Probing Tissue Microarchitecture of the Baby Brain via Spherical Mean Spectrum Imaging.*  
**Khoi Huynh**, Tiantian Xu, Ye Wu, Xifeng Wang, Geng Chen, Haiyong Wu, Kim-Han Thung, Weili Lin, Dinggang Shen, and Pew-Thian Yap. *IEEE Transactions on Medical Imaging*, 2020.
- [J1] *Multi-Site Harmonization of Diffusion MRI Data via Method of Moments.*  
**Khoi Huynh**, Geng Chen, Ye Wu, Dinggang Shen, and Pew-Thian Yap. *IEEE Transactions on Medical Imaging*, 2019.
- Preprint [P5] *Functional Hierarchy of the Human Neocortex from Cradle to Grave.*  
Hoyt Patrick Taylor IV, Kim-Han Thung, **Khoi Huynh**, Weili Lin, Sahar Ahmad, Pew-Thian Yap. *In revision at Nature*
- [P4] *UltimateSynth: MRI Physics for Pan-Contrast AI.*  
Rhea Adams, Walter Zhao, Siyuan Hu, Wenjiao Lyu, **Khoi Huynh**, Sahar Ahmad, Dan Ma, Pew-Thian Yap. *In revision at Nature Biomedical Engineering*
- [P3] *Anatomy-to-Tract Mapping: Inferring White Matter Pathways Without Diffusion Streamline Propagation.*  
Yee-Fan Tan, Siyuan Liu, **Khoi Huynh**, Raphael C-W Phan, Chee-Ming Ting, Pew-Thian Yap. *In revision at Nature Communications*
- [P2] *Cross-layer Balance of Visuo-hippocampal Functional Connectivity Is Associated With Episodic Memory Recognition Accuracy.*  
Wei-Tang Chang, Stephanie Langella, Min Sung Seo, **Khoi Huynh**, Weili Lin, Sahar Ahmad, Pew-Thian Yap.
- [P1] *Navigator-Free Submillimeter Diffusion Imaging using Multishot- encoded Simultaneous Multi-slice (MUSIUM).*  
Wei-Tang Chang, **Khoi Huynh**, Pew-Thian Yap, and Weili Lin.
- Conference [C8] *Microstructure Fingerprinting for Heterogeneously Oriented Tissue Microenvironments.*  
**Khoi Huynh**, Ye Wu, Sahar Ahmad, and Pew-Thian Yap. *MICCAI*, 2023
- [C8] *Relaxation-Diffusion Spectrum Imaging for Probing Tissue Microarchitecture.*  
Ye Wu, Xiaoming Liu, Xinyuan Zhang, **Khoi Huynh**, Sahar Ahmad, and Pew-Thian Yap. *MICCAI*, 2023
- [C7] *Microstructure Fingerprinting for Heterogeneously Oriented Tissue Microenvironments.*  
**Khoi Huynh**, Ye Wu, Sahar Ahmad, and Pew-Thian Yap. *MICCAI*, 2023
- [C6] *Noise Mapping and Removal in Complex-Valued Multi-Channel MRI via Optimal Shrinkage of Singular Values.*  
**Khoi Huynh**, Wei-Tang Chang, Sang Hun Chung, Yong Chen, Yueh Lee, and Pew-Thian Yap. *MICCAI*, 2021
- [C5] *Characterizing Intra-Soma Diffusion with Spherical Mean Spectrum Imaging.*  
**Khoi Huynh**, Ye Wu, Kim-Han Thung, Sahar Ahmad, Hoyt Patrick Taylor IV, Dinggang Shen, and Pew-Thian Yap. *MICCAI*, 2020
- [C4] *Estimating Tissue Microstructure with Undersampled Diffusion Data via Graph Convolutional Neural Networks.*  
Geng Chen, Yoonmi Hong, Yongqin Zhang, Jaeil Kim, **Khoi Huynh**, Jiquan Ma, Weili Lin, Dinggang Shen, and Pew-Thian Yap. *MICCAI*, 2020

- [C3] *Fast Correction of Eddy-Current and Susceptibility-Induced Distortions Using Rotation-Invariant Contrasts.*  
Sahar Ahmad, Ye Wu, **Khoi Huynh**, Kim-Han Thung, Weili Lin, Dinggang Shen, and Pew-Thian Yap. *MICCAI, 2020*
- [C2] *Probing Brain Micro-Architecture by Orientation Distribution Invariant Identification of Diffusion Compartments.*  
**Khoi Huynh**, Tiantian Xu, Ye Wu, Geng Chen, Kim-Han Thung, Haiyong Wu, Weili Lin, Dinggang Shen, and Pew-Thian Yap, for the UNC/UMN Baby Connectome Project Consortium. *MICCAI, 2019*
- [C1] *Characterizing Non-Gaussian Diffusion in Heterogeneously Oriented Tissue Microenvironments.*  
**Khoi Huynh**, Tiantian Xu, Ye Wu, Kim-Han Thung, Geng Chen, Weili Lin, Dinggang Shen, and Pew-Thian Yap. *MICCAI, 2019*
- Workshop [W3] *Image Reconstruction from Accelerated Slice-Interleaved Diffusion Encoding Data.*  
Tiantian Xu, Ye Wu, Yoonmi Hong, **Khoi Huynh**, Weili Lin, Wei-Tang Chang, and Pew-Thian Yap. *Computational Diffusion MRI, 2020*
- [W2] *Longitudinal Parcellation of the Infant Cortex Using Multi-Modal Connectome Harmonics.*  
Hoyt Patrick Taylor IV, Sahar Ahmad, Ye Wu, **Khoi Huynh**, Zhen Zhou, Zhengwang Wu, Weili Lin, Li Wang, Gang Li, Han Zhang, and Pew-Thian Yap. *Computational Diffusion MRI, 2020*
- [W1] *Longitudinal Harmonization for Improving Tractography in Baby Diffusion MRI.*  
**Khoi Huynh**, Geng Chen, Ye Wu, Dinggang Shen, and Pew-Thian Yap. *Computational Diffusion MRI, 2018*
- Abstract [A35] *Precision Cortex Tractography for the Developing Brain.*  
**Khoi Huynh**, Sahar Ahmad, Guoye Lin, and Pew-Thian Yap. *ISMRM, 2025*
- [A34] *Emerging Patterns of Thalamocortical Connectivity in Early Brain Development.*  
Wenjiao Lyu, Kim-Han Thung, **Khoi Huynh**, Sahar Ahmad, and Pew-Thian Yap. *ISMRM, 2025*
- b[A33] *Dynamic Shifts in Controllability of White Matter Networks in Early Brain Development.*  
Son Nguyen, **Khoi Huynh**, Guoye Lin, Sahar Ahmad, and Pew-Thian Yap. *ISMRM, 2025*
- [A32] *Pan-Contrast Learning of MRI Segmentation for Healthy and Anomaly Cases: Faithful to Tissue Properties and MR Physics.*  
Rhea Adams, Walter Zhao, Siyuan Hu, Wenjiao Lyu, **Khoi Huynh**, Sahar Ahmad, Dan Ma, and Pew-Thian Yap. *ISMRM, 2025*
- [A31] *Mapping Cortical Flexibility in Infancy Using Multiscale Functional Connectivity Gradients.*  
Hoyt Patrick Taylor IV, **Khoi Huynh**, Kim-Han Thung, Guoye Lin, Sahar Ahmad, and Pew-Thian Yap. *ISMRM, 2025*
- [A30] *Structural Gradients of the Developing Brain Connectome.*  
Juhyun Lee, **Khoi Huynh**, Hoyt Patrick Taylor IV, Jiarui Mao, Guoye Lin, Sahar Ahmad, and Pew-Thian Yap. *ISMRM, 2025*
- [A29] *Precision Functional Gradients via Optimal Shrinkage Denoising.*  
Jiarui Mao, **Khoi Huynh**, Kim-Han Thung, Hoyt Patrick Taylor IV, Guoye Lin, Sahar Ahmad, and Pew-Thian Yap. *ISMRM, 2025*

- [A28] *Holistic brain functional parcellation in young children.*  
Kim-Han Thung, Wenjiao Lyu, **Khoi Huynh**, Sahar Ahmad, and Pew-Thian Yap. *ISMRM, 2025*
- [A27] *Lifespan Mapping of the Human Cerebellum: Tissue Segmentation and Surface Reconstruction.*  
Quoye Lin, Junjie Zhao, **Khoi Huynh**, Wenjiao Lyu, Sahar Ahmad, Pew-Thian Yap. *ISMRM, 2025*
- [A26] *Cell radius and membrane permeability in the developing brain.*  
**Khoi Huynh**, Sahar Ahmad, Kim-Han Thung, and Pew-Thian Yap. *ISMRM, 2024*
- [A25] *Temporal profile block-matching denoising enables free-breathing dynamic 19F lung MRI with sub 0.5 second acquisition time.*  
Truc Nguyen, **Khoi Huynh**, Sang Hun Chung, Pew-Thian Yap, and Yueh Z Lee. *ISMRM, 2024*
- [A24] *Lung Multi-Breath Wash in/out MRI with 19F with Sub 0.5 Second Scan Time.*  
Sang Hun Chung, **Khoi Huynh**, Yong Chen, Pew-Thian Yap, Jennifer Goralski, Scott Donaldson, and Yueh Z Lee. *ISMRM, 2023*
- [A23] *A Multimodal Atlas of the Human Cerebellum at 760  $\mu$ m Resolution.*  
Wenjiao Lyu, Ye Wu, **Khoi Huynh**, Sahar Ahmad, and Pew-Thian Yap. *ISMRM, 2023*
- [A22] *Longitudinal atlases of cortical and subcortical tissue microstructure in the early developing brain.*  
**Khoi Huynh**, Sahar Ahmad, Kim-Han Thung, Weili Lin, and Pew-Thian Yap. *OHB, 2023*
- [A21] *Multidimensional optimal denoising with block matching is robust to misalignment and contrast changes.*  
**Khoi Huynh**, Sang Hun Chung, Yueh Z Lee, and Pew-Thian Yap. *ISMRM, 2023*
- [A20] *Ventilation defect percentage comparison between spiral with post-acquisition denoising and cartesian acquisition for 19F lung magnetic resonance imaging.*  
Sang Hun Chung, **Khoi Huynh**, Yong Chen, Pew-Thian Yap, Jennifer L Goralski, Scott H Donaldson, and Yueh Z Lee. *Journal of Cystic Fibrosis, 2022*
- [A19] *Evolution of Cortical Microstructure Across the Human Lifespan.*  
**Khoi Huynh**, Sahar Ahmad, Kim-Han Thung, Zhengwang Wu, Weili Lin, Li Wang, Gang Li, and Pew-Thian Yap. *ISMRM, 2022*
- [A18] *Feasibility of VDP Calculation using 19F Free Breathing Spiral Acquisition with Post-Acquisition Denoising.*  
Sang Hun Chung, **Khoi Huynh**, Yong Chen, Pew-Thian Yap, Jennifer L. Goralski, Scott H. Donaldson, and Yueh Lee. *ISMRM, 2022*
- [A17] *COMEDI: A Toolkit for Lifespan Computational Diffusion MRI.*  
Ye Wu, Sahar Ahmad, **Khoi Huynh**, Tiantian Xu, and Pew-Thian Yap. *ISMRM, 2022*
- [A16] *Brainwide functional networks associated with hippocampal subfields during memory task using fMRI with 1-mm isotropic resolution.*  
Wei-Tang Chang, Stephanie Langella, **Khoi Huynh**, Min Sung Seo, Pew-Thian Yap, Weili Lin, and Kelly S. Giovanello. *ISMRM, 2022*

[A15] *A data-driven variability assessment of brain diffusion MRI preprocessing pipelines.*

Jelle Veraart, Daan Christiaens, Erpeng Dai, Luke J. Edwards, Vladimir Golkov, Siawoosh Mohammadi, Kurt G. Schilling, Mohammad Hadi Aarabi, Benjamin Ades-Aron, Nagesh Adluru, Sahar Ahmad, Santiago Aja-Fernandez, Andrew L. Alexander, Mariam Andersson, Elixabete Ansorena, Fakhreh Movahedian Attar, Arnaud Attie, Dogu Baran Aydogan, Steven H. Baete, Gianpaolo Antonio Basile, Giulia Berto, Ahmad Beyh, Alberto Cacciola, Maxime Chamberland, Fernando Calamante, Jenny Chen, Jian Chen, Shin Tai Chong, Santiago Coelho, Luis Concha, Ricardo Coronado-Leija, Michiel Cottaar, Daniel Cremers, Szabolcs David, Alberto De Luca, Flavio Dell'Acqua, Thijs Dhollander, Jason Druzgal, Tim B. Dyrby, Hernandez-Torres Enedino, Oscar Esteban, Els Fieremans, Leon Fonville, Bjorn Fricke, Martijn Froeling, Ian Galea, Gabriel Girard, Francesco Grussu, Chin-Chin Heather Hsu, Yung-Chin Hsu, **Khoi Huynh**, Matilde Inglese, Heide Johansen-berg, Derek K Jones, Kouhei Kamiya, Claire Kelly, Ahmad Raza Khan, Ali Khan, Yi-Chia Kung, Alberto Lazari, Alexander Leemans, Laura Mancini, Ivan I. Maximov, Harri Merisaari, Malwina Molendowska, Benjamin T. Newman, Michael D. Noseworthy, Dmitry S. Novikov, Raquel Perez-Lopez, Franco Pestili, Tomasz Pieciak, Marco Pizzolato, Alvaro Planchuelo-Gomez, Paul Polak, Erika P. Raven, Ricardo Rios-Carrillo, Viljami Sairanen, Simona Schiavi, Pohchoo Seow, Dmitri Shastin, Yao-Chia Shih, Lucas Soustelle, Yue Sun, Karsten Tabelow, Chantal MW Tax, Guillaume Theaud, Sjoerd B. Vos, Ryckie G. Wade, Li Wang, Limei Wang, Thomas Welton, Lars T. Westlye, Stefan Winzeck, Joseph Yuan-Mou Yang, Pew-Thian Yap, Yukai Zou, Jennifer A. McNab, Bennett A. Landman, Nikolaus Weiskopf, and Maxime Descoteaux. *ISMRM, 2022*

[A14] *An Automated Processing Pipeline for Diffusion MRI in the Baby Connectome Project.*

Ye Wu, Sahar Ahmad, Khoi Huynh, Siyuan Liu, Kim-Han Thung, Weili Lin, and Pew-Thian Yap, for the UNC/UMN Baby Connectome Project Consortium. Summa Cum Laude award.. *ISMRM, 2021*

[A13] *Navigator-Free Submillimeter Diffusion MRI using Multishot-encoded Simultaneous Multi-slice (MUSIUM) Imaging.*

Wei-Tang Chang, **Khoi Huynh**, Pew-Thian Yap, and Weili Lin. *ISMRM, 2021*

[A12] *Quantifying Cell Size and Membrane Permeability with Microstructure Fingerprinting.*

**Khoi Huynh**, Ye Wu, and Pew-Thian Yap. *ISMRM, 2021*

[A11] *Reducing Noise in Complex-Valued Multi-Channel Diffusion-Weighted Data via Optimal Shrinkage of Singular Values.*

**Khoi Huynh**, Wei-Tang Chang, and Pew-Thian Yap. *ISMRM, 2021*

[A10] *Dense Temporal Mapping of Cortical Microstructure in the Early Developing Brain.*

**Khoi Huynh**, Ye Wu, Kim-Han Thung, Sahar Ahmad, Zhengwang Wu, Weili Lin, Han Zhang, Li Wang, Gang Li, and Pew-Thian Yap. *OHBM, 2020*

[A9] *Correlation of Myelin Content and Neurite Density in the Early Developing Human Cortex.*

**Khoi Huynh**, Sahar Ahmad, Ye Wu, Kim-Han Thung, Zhengwang Wu, Weili Lin, Han Zhang, Li Wang, Gang Li, and Pew-Thian Yap. *OHBM, 2020*

[A8] *Multivariate Quantification of Brain Development During the First Two Years of Life.*

**Khoi Huynh**, Ye Wu, Kim-Han Thung, Sahar Ahmad, Hoyt Patrick Taylor IV, Weili Lin, and Pew-Thian Yap. *OHBM*, 2020

[A7] *Tackling Degeneracy in Linear Tensor Encoding Diffusion MRI.*

**Khoi Huynh**, Ye Wu, Hoyt Patrick Taylor IV, Weili Lin, and Pew-Thian Yap. *ISMRM*, 2020

[A6] *Quantifying Intra-Soma Diffusion Properties via Spherical Mean Spectrum Imaging.*

**Khoi Huynh**, Ye Wu, Kim-Han Thung, Sahar Ahmad, Hoyt Patrick Taylor IV, Weili Lin, and Pew-Thian Yap. *ISMRM*, 2020

[A5] *Quantifying Tissue Microstructure Non-Gaussianity in the Presence of Fiber Dispersion.*

**Khoi Huynh**, Ye Wu, Geng Chen, Kim-Han Thung, Weili Lin, Dinggang Shen, and Pew-Thian Yap. *RSNA*, 2019

[A4] *Dense Mapping of Microstructural Development in the Human Brain During the First Two Years of Life.*

**Khoi Huynh**, Ye Wu, Kim-Han Thung, Geng Chen, Weili Lin, Dinggang Shen, and Pew-Thian Yap, for the UNC/UMN Baby Connectome Project Consortium *OHBM*, 2019

[A3] *Biases of Microstructure Models in Baby Diffusion MRI.*

**Khoi Huynh**, Ye Wu, Kim-Han Thung, Geng Chen, Weili Lin, Dinggang Shen, and Pew-Thian Yap, for the UNC/UMN Baby Connectome Project Consortium. *ISMRM*, 2019

[A2] *Longitudinal Harmonization of Baby Diffusion MRI Data.*

**Khoi Huynh**, Jaeil Kim, Geng Chen, Dinggang Shen, and Pew-Thian Yap. *OHBM*, 2018

[A1] *Spatially Varying Signal-Drift Correction in Diffusion MRI.*

**Khoi Huynh**, Geng Chen, Wei-Tang Chang, Weili Lin, Dinggang Shen, and Pew-Thian Yap. *ISMRM*, 2018