

# Yuexuan Wu

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## EDUCATION

<b>Ph.D. in Statistics</b> <i>Florida State University</i> <ul style="list-style-type: none"><li>Advisor: Prof. Anuj Srivastava; Dissertation: Computational Anatomy: Elastic Shape Analysis of Subcortical Structure Surfaces</li></ul>	July 2022 <i>Tallahassee, FL</i>
<b>Master of Science in Applied Statistics</b> <i>Florida State University</i>	May 2019 <i>Tallahassee, FL</i>
<b>Bachelor of Engineering in Packaging Engineering</b> <i>Wuhan University</i> <ul style="list-style-type: none"><li>Double degree: Bachelor of Commerce in Economics</li></ul>	June 2017 <i>Wuhan, China</i>

## EXPERIENCE

<b>Assistant Professor</b> <i>Department of Statistics, University of South Carolina</i>	Aug 2024 - Present <i>Columbia, SC</i>
<b>Postdoctoral Scholar</b> <i>University of Washington</i> <ul style="list-style-type: none"><li>Postdoctoral Scholar with the National Alzheimer's Coordinating Center (NACC), under the supervision of Dr. K.C. Gary Chan.</li><li>UW Data Science Postdoctoral Fellow, eScience Institute.</li></ul>	Sept 2022 – Aug 2024 <i>Seattle, WA</i>
<b>Research Assistant</b> <i>Florida State University</i> <ul style="list-style-type: none"><li>Leading and participating in multiple projects of the Statistical Shape Analysis &amp; Modeling Group.</li></ul>	May 2020 – July 2022 <i>Tallahassee, FL</i>

## CURRENT RESEARCH INTERESTS

Medical image analysis (neuroimaging)	Shape and functional data analysis
Computational neuroscience	Alzheimer's disease and related dementias
Causal inference (mediation analysis)	

## AWARDS

<b>Travel Award</b> <i>8th Workshop on Biostatistics and Bioinformatics</i>	2023
<b>Yongyuan and Anna Li Award</b> <i>Department of Statistics, Florida State University</i> <ul style="list-style-type: none"><li>For best graduate student presentations</li></ul>	2022
<b>Best Student Presentation Award</b> <i>2022 Annual Florida ASA Chapter Meeting</i> <ul style="list-style-type: none"><li>Longitudinal Elastic Shape Analysis of Brain Subcortical Structures</li></ul>	2022
<b>Best Student Poster Award (Top 1%)</b> <i>SIAM Conference on Computational Science and Engineering (CSE) 2021</i> <ul style="list-style-type: none"><li>Elastic Shape Analysis of Post-Traumatic Stress Disorder on Subcortical Brain Structures</li></ul>	2021
<b>2<sup>nd</sup> Place in ACM Programming Contest</b> <i>Florida State University</i>	2018
<b>1<sup>st</sup> Class Scholarship (Top 1%)</b> <i>Wuhan University</i>	2016

## PROJECTS

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- Elastic Shape Analysis of Brain Structures for Predictive Modeling of PTSD** Feb 2020 - Aug 2022
- In collaboration with Dr. Suprateek Kundu and Dr. Jennifer Stevens from Emory University.
  - Integrating brain morphological features and clinical covariates to model Post-traumatic stress disorder outcomes.
  - Applying the method to data from the Grady Trauma Project and yielding superior predictive performance.
- LESA: Longitudinal Elastic Shape Analysis of Brain Subcortical Structures** Sept 2020 - Nov 2022
- In collaboration with Drs. Zhengwu Zhang, Di Xiong, Joseph Graham, and Hongtu Zhu from UNC Chapel Hill.
  - Developing an efficient framework and a unique toolbox for systematically quantifying and visualizing the development and changes of longitudinal subcortical surface shapes.
  - Analyzing three longitudinal neuroimaging data sets with estimating continuous shape trajectories, building life-span growth patterns, and comparing shape differences among different groups.
- Solving Optimal Surface Deformation Using Deep Residual Networks** Jan 2021 - Present
- In collaboration with Dr. Boulbaba Ben Amor from Inception Institute of Artificial Intelligence.
  - Utilizing deep residual neural networks to solve the optimal shape deformation of surfaces under the square root normal field (SRNF) representation.
- Analysis and Generation of Bacteria Cellular Shapes** Mar 2021 - Mar 2023
- In collaboration with Tanjin Taher Toma, Dr. Jie Wang, and Dr. Scott Acton from the University of Virginia.
  - Analyzing the shape summaries of segmented 3D bacteria cellular surfaces; generating synthetic bacteria cellular surfaces based on the distribution of true surface shapes.
- Spatial-Temporal Analysis of 3D Human Body Movements Using Video Data** Nov 2021 - Present
- In collaboration with Dr. Hamid Laga from Murdoch University.
  - Developing a framework for reproducing smooth 3D human movement videos based on sparse time samples of movement
  - Analyzing movement differences by conducting spatial-temporal surface registration.
- Topological and Geometrical Analysis of Brain Shape with Multi-modality Data** Sept 2022 - Present
- In collaboration with Drs. Yen-Chi Chen, Kyle Ormsby, and Dean Shibata from the University of Washington.
  - Understanding the interplay between A $\beta$  and tau proteins and their spatial distribution in the brain using PET images.
  - Investigating the topological and geometrical features of brain images in different groups to reveal complex underlying structures and identify potential biomarkers for disease progression.
- Causal Inference on Brain Structures and Cognitive Disorder** Oct 2022 - Present
- Developing a high-dimensional multivariate mediation analysis approach for complex brain structures.
  - Gaining more statistical power, identifying more significant SNPs associated with AD, and capturing the causality between deformations in brain structure shapes with genotypes and disease progression.

## PUBLICATIONS

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- Y. Wu**, S. Kundu, J. S. Stevens, N. Fani, A. Srivastava. Elastic Shape Analysis of Brain Structures for Predictive Modeling of PTSD. *Frontiers in Neuroscience*, 2022
- T. T. Toma, **Y. Wu**, J. Wang, A. Srivastava, A. Gahlmann, S. T. Acton. Realistic-Shape Bacterial Biofilm Simulator for Deep Learning-Based 3D Single-Cell Segmentation. *2022 IEEE 19th International Symposium on Biomedical Imaging (ISBI)*, 2022
- Z. Zhang, **Y. Wu**, D. Xiong, A. Srivastava, H. Zhu. LESA: Longitudinal Elastic Shape Analysis of Brain Subcortical Structures. *Journal of the American Statistical Association*, 2023
- Z. Zhang, **Y. Wu**, D. Xiong, A. Srivastava, H. Zhu. Rejoinder: LESA: Longitudinal Elastic Shape Analysis of Brain Subcortical Structures. *Journal of the American Statistical Association*, 2023
- Y. Wu**, C. Huang, A. Srivastava. Shape-Based Functional Data Analysis. *TEST*, 2023
- Y. Wu**, C. Huang, A. Srivastava. Rejoinder on: Shape-based functional data analysis. *TEST*, 2024

**Y. Wu**, K. Ormsby, D. Shibata, Y.C. Chen, S. Biber, W. Kukull, and K.C.G. Chan. Topological Network Analysis of Beta-Amyloid and Tau in Alzheimer's Disease Using PET Imaging Data. *Neuroinformatics*, Submitted in the special volume, 2024+

**Y. Wu**, H. Laga, A. Srivastava. Spatial-Temporal Analysis of 3D Human Body Movements Using Video Data. In preparation, 2024+

**Y. Wu**, K.C.G. Chan. High-Dimensional Multivariate Mediation Analysis with Application to Brain Structural Data. In preparation, 2024+

## PRESENTATIONS

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(03/2021) *Elastic Shape Analysis of Post-Traumatic Stress Disorder on Subcortical Brain Structures*, SIAM Conference on Computational Science and Engineering (poster), online

(05/2021) *Elastic Shape Analysis of Brain Structures for Predictive Modeling of PTSD*, The Statistical Methods in Imaging Conference (poster), online

(04/2022) *Longitudinal Elastic Shape Analysis of Brain Subcortical Structures*, 2022 Annual Florida ASA Chapter Meeting, online

(06/2022) *Longitudinal Elastic Shape Analysis of Brain Subcortical Structures*, 2022 Treatment and Analysis of the Information Methods and Applications (TAIMA), online

(10/2022) *Statistical Shape Analysis and Transdisciplinary Applications*, UW eScience Institute Postdoc Seminar, online

(05/2023) *LESA: Longitudinal Elastic Shape Analysis of Brain Subcortical Structures*, The Statistical Methods in Imaging Conference 2023, Minneapolis, MN

(07/2023) *Topological Network Analysis of Beta-Amyloid and Tau in Alzheimer's Disease Using PET Imaging Data*, The Alzheimer's Association International Conference (AAIC) 2023 (poster), online

(08/2023) *Longitudinal Elastic Shape Analysis of Brain Subcortical Structures*, The 6th International Conference on Econometrics and Statistics (EcoSta 2023), Tokyo (online)

(11/2023) *Statistical Shape Analysis of Brain Structure Surfaces*, Colloquia, Department of Mathematics and Statistics, Texas Tech University (online)

(02/2024) *Data Science Approaches on Neuroimaging Analysis*, Guest lecture (EPI 571 Neuroepidemiology & Environmental Risk Factors), Department of Epidemiology, University of Washington, Seattle, WA

(05/2024) *Topological Network Analysis of Protein Aggregates in Alzheimer's Disease Using PET Imaging Data*, The Statistical Methods in Imaging Conference 2024, Indianapolis, IN

(08/2024) *Topological Network Analysis of Protein Aggregates in Alzheimer's Disease Using PET Imaging Data*, NeuroConnect 2024: Advancing Brain Network Research Workshop (poster), Blowing Rock, NC

## PROFESSIONAL MEMBERSHIPS AND SERVICES

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### Reviewing Activities

Journal of Computational and Graphical Statistics (JCGS)  
Statistics in Medicine  
Data Science in Science

### Memberships

The American Statistical Association (ASA)  
The Institute of Electrical and Electronics Engineers (IEEE)  
Institute of Mathematical Statistics (IMS)  
International Chinese Statistical Association (ICSA)  
Society for Industrial and Applied Mathematics (SIAM)  
The Alzheimer's Association International Society to Advance Alzheimer's Research and Treatment (ISTAART)

## TEACHING EXPERIENCES

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### **University of South Carolina**

- STAT 206 - Elementary Statistics for Business, *Spring 2024*

### **Florida State University**

- STA 2122 - Introduction to Applied Statistics, *Spring 2022*