

CHARLIE BURTON

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EDUCATION

PhD Student, Physics Present
Northwestern University, Evanston, IL, USA

BA Physics, BA Neuroscience May 2022
Earlham College, Richmond, IN, USA
3.81 Cumulative GPA with College Honors

RESEARCH INTERESTS

Broadly interested in complex fluids, including how drop impact experimentation on shear-thickening fluids allows for probing behaviors of fluids beyond the capabilities of traditional rheometers as well as how altering the geometry, polydispersity and density of particles in suspension affects shear-induced dynamics.

RESEARCH EXPERIENCE

Research Assistant March 2025 –
Driscoll Lab, Department of Physics and Astronomy, Northwestern University, Evanston, IL
- Use high-speed cameras, chemical synthesis and fabrication methods to investigate how material properties affect the dynamics of shear-thickening drops in drop-impact experimentation.
- Write programs to assist with data processing and analysis of large high-speed video files.
Skills acquired: *electron microscopy, high-speed imaging,, Python and FIJI image analysis*

Research Analyst Jun 2023 – Jun 2024
Territo Lab, Stark Neuroscience Research Institute, Indiana University School of Medicine, Indianapolis, IN
- Built novel tools for the analysis of PET images in a network neuroscience context such as region enrichment analysis, an analysis parallel to gene set enrichment analysis used to determine functional properties in covariance networks of PET images
- Assisted in the data collection, analysis, and publication novel preclinical research into the metabolic and perfusion network dynamics of transgenic/genetically modified models of Alzheimer's Disease
- Mentored two undergraduate students and one master's student on image and data analysis projects (connectomic analysis and multidimensional uncoupling analysis, respectively)
- Continued responsibilities of role below
Skills acquired: *expertise in SPSS, MATLAB, Python, network neuroscience, applied graph theory, statistical inference, mentorship*

Laboratory Research Assistant Jun 2022 – Jun 2023
Territo Lab, Stark Neuroscience Research Institute, Indiana University School of Medicine, Indianapolis, IN
- Co-ran tracer modeling, image validation components of Territo Lab research under Dr. Paul Territo
- Assisted in mapping imaging data into brain atlas space, dimensionality reduction and analysis of imaging data
- Developed novel multi-plex image quantification methods to maximize efficiency and output data towards translational modeling of Alzheimer's Disease
- Developed workflows to maintain consistent experimental and statistical methods, reduce error
Skills acquired: *proficiency in SPSS, MATLAB, autoradiography, immunohistochemistry, immunofluorescence, animal research, pharmacokinetics/dynamics, connectomics, biological modeling*

TEACHING EXPERIENCE

Teaching Assistant

Northwestern University Department of Physics and Astronomy, Evanston, IL

Sep 2025 –

Teaching Assistant

Earlham College Department of Physics and Astronomy, Richmond, IN

Sep 2020 – Dec 2021

PUBLICATIONS

Mobaseri A, Burton CP, Gordillo L, et al. Impact dynamics of shear-thickening drops. *Awaiting Publication*

Kotredes KP, Pandey RS, Persohn S, et al. Characterizing molecular and synaptic signatures in mouse models of late-onset Alzheimer's disease independent of amyloid and tau pathology. *Alzheimer's Dement.* 2024; 20: 4126–4146. <https://doi.org/10.1002/alz.13828>

Chumin EJ, Burton CP, Silvola R, et al. Brain metabolic network covariance and aging in a mouse model of Alzheimer's disease. *Alzheimer's Dement.* 2024; 20: 1538–1549. <https://doi.org/10.1002/alz.13538>

Onos KD, Lin PB, Pandey RS, et al. Assessment of neurovascular uncoupling: *APOE* status is a key driver of early metabolic and vascular dysfunction. *Alzheimer's Dement.* 2024; 20: 4951–4969. <https://doi.org/10.1002/alz.13842>

Burton CP, Chumin EJ, Collins AY, Persohn SA, Onos KD, Pandey RS, Quinney SK and Territo PR (2024) Levetiracetam modulates brain metabolic networks and transcriptomic signatures in the 5XFAD mouse model of Alzheimer's disease. *Front. Neurosci.* 17:1336026. doi: 10.3389/fnins.2023.1336026

J. A. K. Chong Chie, S. C. Persohn, E. W. Miner, C. P. Burton, P. Salama and P. R. Territo, "Total Variation Based 2D Image Registration of Post-Mortem Mouse Brain Images," 2024 IEEE International Symposium on Biomedical Imaging (ISBI), Athens, Greece, 2024, pp. 1-4, doi: 10.1109/ISBI56570.2024.10635196.

For the most updated list, please use [Google Scholar](https://scholar.google.com/citations?user=CP_Burton) or search "CP Burton" in Google Scholar.

PRESENTATIONS

World Molecular Imaging Congress, "Application of Neurovascular Uncoupling and Whole Brain Network Connectomics to Assess the Role of Genetic and Dietary Risk Factors in the LOAD2 Mouse Model.", 2023.

Preclinical Imaging Consortium, "Assessing the risk potential of ABCA7*A1527G in a novel mouse model of late-onset Alzheimer's Disease.", 2023.

Commencement of the Class of 2022 Speaker, Earlham College, 2022.

HONORS AND AWARDS

George Van Dyke Distinguished Student in Physics Award

2022

- Presented to a graduating senior who showed excellence in physics throughout their undergraduate study

Charles A. Frueuaff Award

2021

- Presented to a student in the natural sciences who displayed exceptional creativity in their work