BRYNN WOOLLEY

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Education

University of Michigan — Ann Arbor, MI
Ph.D. in Civil Engineering (Next Generation Transportation Systems) — *August 2024 – May 2029*
- Advised by Dr. F. Atiyya Shaw

Brigham Young University — Provo, UT
Bachelor of Science in Applied and Computational Mathematics (ACME) — *June 2019 – August 2024*
- Concentration in Transportation Systems Engineering

Research Experience

Infrastructure for All (INFRALL) Lab — August 2024 – Present
Graduate Research Assistant — *Ann Arbor, MI*
- Collaborating on a project integrating passive travel data with passenger survey insights, enhancing multimodal transportation systems
- Focusing on advancing equity, accessibility, and efficiency across ground and air transportation networks through innovative data integration methods

BYU Transportation Lab — December 2022 – August 2024
Undergraduate Research Assistant — *Provo, UT*
- Led a project that analyzed e-scooter rider paths and pavement roughness data to assess how road surface conditions influenced riders' route selection
- Developed and executed MATSim microsimulations of Utah's Wasatch Front to optimize traffic incident management, identifying strategies to maximize performance and minimize travel delays

Mathematical Fire & Industry Research Lab — September 2022 – May 2024
Undergraduate Research Assistant — *Provo, UT*
- Forecasted urban structures' vulnerability to wildfire spread using an interdisciplinary predictive model, leveraging both theoretical frameworks and data-driven insights
- Examined the diurnal patterns and interrelationships between soil temperature and water saturation using applied data assimilation techniques (e.g., variational approach, tangent linear method)

Research Interests

Passive Location-Based Data (Big Data), Travel Behavior Modeling, Bias Measurement and Correction, Data Validation, Machine Learning in Mobility, Human Factors

Publications

- Jarvis, D.L., Macfarlane, G.S., **Woolley, B.**, Schultz, G.G. (2024). Simulating incident management team response and performance. *Procedia Computer Science*, 238, 91–96. doi:10.1016/j.procs.2024.06.002
- Macfarlane, G.S., Jarvis, D.L., **Woolley, B.**, & Schultz, G.G. (2024). Simulating Incident Management Team Response and Performance (Report No. UT-23.22). *Utah Dept. of Transportation, Division of Research.* rosap.ntl.bts.gov/view/dot/74034

Teaching Experience

Urban Transportation Planning (CEE 565) — January 2024 – May 2024
Undergraduate Teaching Assistant — *Provo, UT*
- Assisted undergraduate and graduate students with four-step travel modeling using commercial software, advancing their understanding of transportation planning and behavior analysis
- Graded assignments and hosted office hours on transportation demand modeling, sustainable transportation, and land-use interrelationships

Professional Experience

Sundance Mountain Resort May 2024 – August 2024
Parking & Transportation Attendant *Sundance, UT*

- Managed parking logistics, directing guests and employees to designated areas to minimize congestion
- Provided assistance and transportation services, including support for guests with disabilities
- Performed daily vehicle inspections and maintained cleanliness of shuttles and parking facilities

Acute Engineering May 2021 – September 2022
Student Engineer *Orem, UT*

- Completed 600+ hours of engineering to design the structural elements of 125+ homes
- Exceeded performance expectations in speed, accuracy, and quality as a top performer in my intern class, contributing $25,000+ in revenue
- Calculated and specified structural elements in light-frame construction, marked blueprints with structural elements, and created calculation reports using Microsoft Excel and AutoCAD

Leadership Experience

CEE Community, Engagement, & Empowerment Committee (CEE^2) September 2024 – Present
Committee Contributor *Ann Arbor, MI*

- Contribute to departmental initiatives, promoting inclusive practices and supporting diversity-focused programs

Society of Industrial & Applied Mathematics January 2023 – January 2024
Vice President of Recruitment (BYU Chapter) *Provo, UT*

- Organized interdisciplinary research events to promote research opportunities for applied math students

American Society of Civil Engineers December 2021 – December 2022
Service Coordinator(BYU Chapter) *Provo, UT*

- Presented in weekly meetings, organized events, and directed over 1500 hours of service

BYU Student association Presidential Election October 2020 – March 2021
Campaign Manager *Provo, UT*

- Oversaw 40 volunteers, tracked campaign expenditures, and ensured policy and procedural compliance

Community Service

Encircle (LGBTQ+ Youth & Family Resource) September 2023 – July 2024
Programs Support Volunteer *Provo, UT*

- Welcomed and supervised guests during drop-in hours, fostering a welcoming environment while promoting Encircle's mission and services to support the local LGBTQ+ community

Boys & Girls Clubs of Utah County November 2023
Thanksgiving Deliveries Service Project *Provo, UT*

- Developed a customized Python program to optimize route choice and assignment to assist in delivering holiday meals to over 200 homes in need

Scholarships & Awards

Brigham Young Scholarship | *Merit-Based Academic Scholarship* 2019 – 2023
Civil & Environmental Engineering Dept. Scholarship | *Merit-Based Academic Scholarship* 2021 – 2022
Outstanding Performance in Mathematics Award | *Merit-Based Department Award* 2022, 2023
Delta Alpha Pi | *Academic Honor Society* 2023 – 2024

Skills & Competencies

Programming

- Python (NumPy, SciPy, SymPy, pandas, Matplotlib, Scikit-Learn, PySpark)
- Geospatial Analysis (Geopandas, Shapely, Folium)
- C++, Java, HTML, SQL, Unix Shell

Software

- Transportation Modeling: MATSim, CUBE, PTV Vissim
- Geospatial and Design: ArcGIS Pro, QGIS, AutoCAD, Revit

Advanced Modeling & Analysis

- Machine Learning and Neural Networks for predictive modeling
- Statistical Analysis and Time Series (ARIMA, Bayesian methods)
- Mathematical Modeling (differential equations, numerical methods)

References

F. Atiyya Shaw, Ph.D.
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