

Jack D. Carson

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Research experience

MIT McGovern Institute for Brain Research & MIT BE

August 2023 -

Research Intern

Cambridge, Massachusetts (Hybrid)

- Only HS student in history of Jasanoff lab offered paid research extension in Cambridge
- Working actively with both *in vivo* experimnts involving rodent fMRI and dry lab modelling and development
- Currently working on using deep generative modelling for robust fMRI denoising

CEE/MIT Research Science Institute

June 2023 - September 2023

Research Intern

Cambridge, Massachusetts

- Selected for Research Science Institute at MIT. Most prestigious intl. HS Research Honor. (< 2% Acceptance)
- Worked under Dr. Alan Jasanoff (PI) and Dr. Kevin Chung at MIT Biological Engineering
- Developed mathematical model and software to generalize neurofeedback methods to large neuron groups, using autoencoder latent-space embeddings
- Wrote paper *Optimizing Cognition Modulation with Deep-Brain Neurofeedback*

University of Tulsa Vehicle Autonomy and Intelligence Lab

Aug 2022 - May 2023

Compression Systems Researcher

Tulsa, Oklahoma

- Paid Systems Developer and Researcher under NASA/FAA Grant (7-15 Hrs per Week)
- Core member of OpenGCAS project; Led OpenRQS project
- Worked alongside researchers at Stanford, CERN, NASA
- Only HS student in organization
- Wrote paper *Geospatial Compression Through Entropy-based Quadtree Raster Decomposition*, invited for Digital Avionics System Conference 2024 in Barcelona

University of Tulsa LeBlanc Lab

May 2022 - Sep 2022, April 2023 - June 2023

Research Assistant and Intern

Tulsa, Oklahoma

- Only HS student part of CSURP Research Program
- Only HS student selected for UTulsa Research Showcase
- Presented ML project *Photoanalysis of Electrochemically Deposited Thins for Photovoltaics Applications* at OKPVRI Conference.
- Wrote paper *Underfitting Heuristic Segmentation Models for Superior Neural Results*.
- Awaiting coauthor naming on journal paper

Education

University of Tulsa

Tulsa, Oklahoma

Concurrent Enrollment

March 2022 -

Current GPA: 4.0/4.0

Relevant Coursework: Linear Algebra (2022), Discrete Math (2023), will take Probability Theory, Modern Physics, Data Structures II (2024)

Booker T. Washington High School

Tulsa, Oklahoma

High School Diploma

March 2022 -

Current GPA: 4.74/5.0; 4.0/4.0 (1/300)

Community

Cherokee Nation Tribal Youth Council*December 2022-**Secretary*

Selected as at-large representative for over 80,000 Cherokee youth living off-reservation in the Cherokee Nation. Worked to advance STEM education and cultural involvement among young tribal members.

Tulsa Native Youth Board*September 2022-**President*

President of Tulsa Native Youth Board, empowering Native youth to connect with leadership opportunities, cultural heritage, and opportunities to improve Indigenous communities.

Booker T. Washington Native American Alliance*August 2022-**President*

Founded and served as inaugural president of the Native American student association at Booker T. Washington High School, a large urban high school with a substantial Indigenous population.

City of Tulsa Youth City Council*February 2022-**Councilor*

Selected by Mayor of Tulsa to serve as an inaugural youth city councilor.

Technical skills

Programming Skills

ML/AI, Image Processing, Systems Programming, Algorithm Design, Linux, High Performance Computing, Test Driven Development

Programming Languages/Tech

C, C++, Rust, Python, TypeScript, JavaScript, Java, Julia, Mathematica, SQL, L^AT_EX, PyTorch, Next.js/React

Assorted

Technical Writing, Lab Training (up to Biohazard Level 3),

Publications

The JDVC Multivariable Calculus Cook

Published book on Multivariable Calculus. [Available on Amazon](#). ISBN-13: 979-8218114107

Awards

Native American Academic Excellence Award 2022 & 2023

Oklahoma Indian Honor Society

Research Science Institute

Air Force Engineering Excellence Award

T.D. Williamson Engineering Innovation Award

Presenter: University of Tulsa Research Showcase

Varsity Letter: Football 2020 & 2021