David Beckwitt, Ph.D.

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Professional Summary

Physicist specializing in quantitative modeling, **machine learning**, and structural defect analysis of van der Waals (vdW) thin films. Experienced in **X-ray/neutron scattering**, **thin film fabrication**, and **computational physics**.

Education

Ph.D. Physics, University of Missouri — 2026 (expected)
Dissertation: *Investigating Disorder in van der Waals Thin Films*

M.S. Physics, University of Missouri — 2022
B.S. Physics, Missouri State University — 2020

Research Experience

Graduate Research Assistant, University of Missouri — 2021–Present

- Developed **GIWAXS** simulations using Python and Monte Carlo methods.
- Extended and validated simulations with theory of **structural disorder**.
- Grew **CVD**-based PbI_2 films; experimentally validated with models (ACS Appl. Mater. Interfaces).
- Implemented **CNNs** in PyTorch for automated structural analysis.

Intern, NASA Space Consortium — 2019–2020

- Synthesized graphene heterostructures using PLD and PVD.

Research Assistant, Missouri State University — 2017–2020

- Designed and built a PLD system; characterized films via XRD, SEM, Raman.

R&D Intern, Dynatek Labs — 2019

- Developed software for biomedical testing automation.

Selected Technical Projects

Xray Diffraction Simulator Github: Quantitative X-ray diffraction area detector simulation.
2D Mosaic Sim, GitHub: Interactive X-ray diffraction animator.
OSC Reader, GitHub: Detector file converter tool.

Technical Skills

Languages: **Python**, C++, Fortran, R, SQL, Bash, LaTeX **Analysis**: Monte Carlo, ML (**PyTorch**), **NumPy**, pandas **Tools**: Git, MPI, **Matplotlib**, Plotly, Jupyter, **SEM**, Raman spectroscopy

Selected Publications

- Arendse et al., ACS Appl. Mater. Interfaces 15, 56692 (2023). *Study of orientation and phase stability in halide perovskite films.*
- Beckwitt, APS March Meeting (2024). *X-ray diffraction analysis of disorder in vdW films.*

Selected Leadership & Awards

Vice-President/President, Physics Graduate Association — 2022–2024
Outstanding Research Presentation, NSSA — 2023
Green Chalk Teaching Award, University of Missouri — 2023