Aiden Koch

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EDUCATION

University of Oklahoma, Norman, OK August 2026 - Present

Ph.D. Student in Engineering Physics

Valparaiso University, Valparaiso, IN May 2026

B.S. in Electrical Engineering; complementary major in Physics

Summa Cum Laude; Christ College Honors; GPA: 3.84/4.00

RESEARCH INTERESTS

Semiconductor nanomaterials; colloidal quantum dots; midwave infrared optoelectronics; precision optical and magnetic measurements; sensing instrumentation.

RESEARCH EXPERIENCE

Light Matter Interaction Laboratory, University of Oklahoma, Norman OK September 2026 - Present

Graduate Researcher

- Characterized optical properties of infrared-emitting nanocrystals by measuring photoluminescence quantum yield.

Los Alamos National Laboratory, Los Alamos NM June - August 2026

Undergraduate Physics Research Assistant

- Characterized magnetic contamination in nEDM components using optically pumped magnetometry; achieved background fields as low as approximately ±5 pT and analyzed measurements in CERN ROOT.
- Performed magnetic decontamination and valve-cell reassembly.
- Cataloged measurements and updated CAD documentation for future reference by the collaboration, creating a consulting guide for remanufacturing experimental components.

Los Alamos National Laboratory, Los Alamos NM June 2024 - March 2025

Undergraduate Physics Research Assistant

On-site summer appointment followed by remote analysis and project development.

- Conducted a systematic study investigating the effectiveness of the magnetic shielding of the nEDM experimental housing at frequencies near the Earth's magnetic field.
    - Designed and built an external pancake-coil apparatus, modeled experimental fields, and compared measured shielding with previous measurements of different methods.
- Designed, built, and tested a PCB and microcontroller-based continuity tester for 64-pin ribbon cables for the UCNA+ experiment, including controller scripting and operating documentation.

PRESENTATIONS

- **Koch, A.** (2025). "Measurement of the shielding factor of the Magnetically Shielded Room for the nEDM experiment at Los Alamos National Laboratory." Oral presentation at the Valparaiso University Symposium for Undergraduate Research and Creative Expression, Valparaiso IN, April 2025.

- **Koch, A.** (2025). "Measurement of the shielding factor of the Magnetically Shielded Room for the nEDM experiment at Los Alamos National Laboratory." Oral presentation at the APS March Meeting, Anaheim CA, March 2025.
- **Koch, A; Nelson, E** (2024). "Current Status of the nEDM Experiment at Los Alamos National Laboratory." Oral presentation at the Valparaiso University Physics and Astronomy Colloquium, Valparaiso IN, Fall 2024.
- **Koch, A.** (2024). "Shielding Factor Measurement Update" Oral presentation to the nEDM Collaboration, Virtual, August 2024.

TEACHING EXPERIENCE

University of Oklahoma, Norman OK August 2026 - Present

Physics 2414 Discussion Section Leader

- Facilitated four in-person discussion sections that met weekly; solved group problems and encouraged discourse among the students regarding the material presented in lecture.
- Held weekly office hours; delivered individualized instruction to students requiring additional academic assistance.

Valparaiso University Department of Physics and Astronomy, Valparaiso IN January - May 2026

Physics 141 Grader

- Evaluated weekly homework from kinematics students; provided written feedback to the students and communicating problem areas with the Professor.

Christ College - The Honors College at Valparaiso University, Valparaiso IN August 2025 - January 2026

First-Year Teaching Assistant and Writing Tutor

- Met with students weekly; offered critical draft revision, ideation help, and text-specific alternative interpretations of passages.

TECHNICAL SKILLS

Programming and computing: Python, MATLAB, VHDL, Arduino development, Linux

Electronics design: PCB design, OrCAD, SPICE, microcontrollers, soldering

Instrumentation: Optically pumped magnetometry, oscilloscopes, waveform generators

Data analysis: CERN ROOT, signal analysis, magnetic-field modeling and measurement analysis

SELECTED ENGINEERING PROJECT

Molding Recycled Plastics; Senior Design August 2025 - May 2026

Customer Communications Officer

- Communicated customer needs with team; outlined design requirements; relayed engineering decisions to customer Vidette Makes of Valparaiso IN.
- Led the controls portion of the project; optimized Arduino scripts and monitored feedback from motor drivers, thermocouples, PID controllers.

LEADERSHIP AND SERVICE

Graduate Physics Student Initiative Sept 2026 - Present

Event/Accommodations Coordinator

- Oversaw graduate-student event planning; partnered with academic leadership to design and execute collaborative events.
- Communicated with faculty-led Community and Belonging Committee; voicing student concerns.

Valparaiso University Student Senate May 2025 - May 2026

Executive Treasurer

- Advised the Operations Committee and oversaw allocation of a $500,000 student-organization budget.

HONORS AND AWARDS

Sigma Pi Sigma, physics honor society	2026
Phi Beta Kappa, liberal arts and sciences honor society	2025
Tau Beta Pi, engineering honor society	2025
IEEE Eta Kappa Nu, electrical engineering honor society	2023
College of Engineering Dean's List	All eight undergraduate semesters