Raed Diab

raeddiab.com | contact| LinkedIn

PROFESSIONAL SUMMARY

Experimental physicist with a strong foundation in optical design, simulation, and high-precision laser systems. Experienced in developing, automating, and validating complex optical setups using tools like ZEMAX, COMSOL, and LabVIEW. Skilled in translating experimental concepts into robust, testable systems and bridging research and engineering in cross-functional environments.

SKILLS

Optics & Modeling: ZEMAX, COMSOL Multiphysics, FINESSE (a python-based frequency domain simulator)
Programming & Automation: Python, MATLAB, LabVIEW, C++; automated data acquisition, instrument control, signal processing, workflow optimization; strong emphasis on data-driven optical system validation.
Experimental Systems: Laser interferometry, optical cavity design, fiber optics, beam diagnostic
Other Tools: Git, signal processing, RF systems

Projects

Personal Website Project

- Built and launched personal website using HTML.
- Self-taught through online resources.

Workshop Leader for Python Simulation Training

- Designed and led workshop session to teach FINESSE, Python-based simulations, to colleagues. The workshop can be found on my website
- Facilitated collaborative learning environments.

Animation Project

- Developing skills in creating visualization to present ideas easily using Blender. This can be extended to data visualization.

WORK AND PROFESSIONAL RESEARCH EXPERIENCE

Doctoral Research Assistant, *University of Florida,* Gainesville, Florida Aug 2020 – Present

- Designed and tested high-precision optical setups for laser interferometry; improved cavity alignment noise by 10× using a novel beam alignment method.
- Built and aligned multi-stage optical setups, performed tolerance analysis, and developed simulation models in ZEMAX and COMSOL
- Automated experimental data collection using LabVIEW and Python, increasing efficiency by 70%
- Maintained version-controlled code and documentation for reproducibility and cross-team collaboration

Simulation Fellow, *LIGO Collaboration,* Pasco, Washington Apr 2025 – Jun 2025

- Modeled opto-mechanical effects on interferometer stability and control loops using Python-based DSP tools
- Collaborated with senior researchers on experimental test planning and troubleshooting, enhancing system performance through strong teamwork and problem-solving

Exchange Researcher, *University of Padova,* Padova, Italy May 2024 – Aug 2024

- Modeled optical mode matching for Virgo using Python simulations and alignment diagnostics.
- Designed a proof-of-concept for integrating an electro-optic lens into tabletop optical systems, showcasing innovative experimental design.

Research Assistant, *Miami University,* Oxford, Ohio Aug 2018 – Jul 2020

- Conducted simulations of galactic rotation curves using MOND, achieving results consistent with observed dynamics without dark matter.
- Developed and optimized numerical models in Fortran, focusing on high-performance computing and physical accuracy.

EDUCATION

Doctor of Philosophy in Physics, *University of Florida*, Gainesville, Florida Dec 2025 (expected)

- **Dissertation topic:** Investigating a New Alignment and Mode Matching Sensing Schemes for Advanced Gravitational Waves Detectors such as LIGO.
- **Selected awards:** Research Assistant Fellowship (stipend & tuition); College of Liberal Arts & Sciences (CLAS) Travel Support; LIGO Scientific Collaboration Fellowship.

Master of Science in Physics, *Miami University*, Oxford, Ohio Jul 2020

- **Thesis topic:** The Dynamics of Starts in Dwarf Spheroidal Galaxies Around the Milky Way in the MOND Regime.

LANGUAGE SKILLS

Languages: Arabic (native); English (fluent); German (B2)