Raed Diab – Curriculum Vitae

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PROFESSIONAL SUMMARY

I am a motivated experimental physicist with hands-on expertise in precision optical alignment, interferometry, and laser systems. My skills in designing and automating complex optical setups, combined with strong data analysis abilities using Python and MATLAB, will help me contribute effectively to designing and characterizing TESAT's optical communication terminals. Additionally, my experiences with noise reduction and electronic communication equip me to ensure payload systems meet rigorous technical specifications.

SKILLS

Optics & Photonics: Laser systems, interferometry, precision alignment, fiber optics, beam diagnostics, optical design software including ZEMAX and FINESSE (Python-based frequency domain simulator)
Programming & Automation: Python, MATLAB, LabVIEW, C++; data acquisition, data analysis and interpretation, instrument control, workflow automation
Modeling & Simulation: COMSOL Multiphysics, ZEMAX, FINESSE; optical and electromechanical system modeling

WORK AND PROFESSIONAL RESEARCH EXPERIENCE

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

- Developed and tested advanced optical setups for interferometry, improving cavity stability and reducing the noise by a factor of 10x.
- Designed, built, and characterized an RF-driven electro-optic system for angular modulation, integrating components and validating performance against COMSOL simulations, relevant for atom manipulation
- Automated experimental data collection using LabVIEW and Python, increasing efficiency by 70%

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
- Simulated quantum squeezing and opto-mechanical coupling, demonstrating foundational understanding of quantum optics and light-matter interaction.
- Collaborated with senior researchers on experimental test planning and troubleshooting, enhancing system performance through strong teamwork and problem-solving
- Authored technical documentation and presented results to commissioning teams

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)