

# Laser Science Lab

at the University of Alberta

## **Postdoctoral Fellow/Research Associate Position**

We invite applications for a Postdoctoral Fellow or Research Associate position in the field of optical instrumentation and laser physics, specifically focused on airborne standoff quantum sensing. The position is on-site only, at the University of Alberta main campus in Edmonton, Alberta, Canada. **The starting date is flexible** and could be as soon as March 15, 2026.

**To apply, email Prof. Gil Porat at [gporat@ualberta.ca](mailto:gporat@ualberta.ca) with your CV or resume and cover letter or research statement**

The position will be held in the group of Prof. Gil Porat, the Laser Science Lab, at the University of Alberta Department of Electrical and Computer Engineering and Department of Physics. This group is pursuing experimental research in developing novel laser systems that enable new quantum sensing schemes and metrological capabilities. Current projects include development and application of lasers for magnetic quantum sensing and portable optical atomic clocks. These and other projects involve collaborations with other academic and government researchers across Canada and internationally. Prof. Porat's group is also part of the Advanced QUANTUM applications via complex states in integrated and meta optics (AQUA) consortium, which includes industry, academic and non-profit partners. Overall, the research environment for the open position provides ample opportunities for collaboration, networking, and facilitating further professional opportunities.

The open position is regarding another, ongoing research project funded by the NSERC Alliance Quantum program. This exciting project combines nonlinear optics, laser spectroscopy, remote sensing, and photon number resolving detection. The project is carried out in collaboration with industry partner Synergy Aviation Ltd. and researchers from the National Research Council Canada. In this project, we combine advanced spectroscopic techniques with upconversion detection of mid-infrared light and threshold quantum photon number resolving detection. Such detection has been shown to provide a quantum advantage in signal-to-noise ratio when detecting few-photon laser light in the presence of thermal background (e.g., solar radiation), due to the difference in the quantum properties of laser and thermal light. The sensing system will be integrated into an airborne payload and tested in flight.

Under Prof. Porat's supervision, the successful applicant will mentor graduate and undergraduate researchers and directly contribute to designing (using theory, in-house code, commercial software) and experimentally characterizing optical systems for launching and collecting laser light, nonlinear frequency conversion, laser spectroscopy, photon number resolving detection, signal processing, integration into airborne packaging, and in-flight testing. In addition, they will be responsible for synthesizing modeling and experimental data analysis and drafting high-quality manuscripts for publication.

For more information on the research group, please visit <https://www.ece.ualberta.ca/~gporat/>

For more information on the industry partner, please visit <https://synergyaviation.ca/>

## **Responsibilities**

- Design, analyze and work with new optical, laser and spectroscopy systems.
- Operate and maintain optical systems, lasers, and other experimental apparatuses.
- Mentor and provide guidance to internal team members working on the same project, including graduate and undergraduate researchers.
- Communicate and work directly with external team members working on the same project.
- Work alongside internal team members working in the group on other projects.
- Manage project operations and administrative tasks, including safety and procurement.
- Disseminate research findings at conferences and symposia through posters, papers and presentations.

## **Key Responsibilities:**

- Design, implement and carry out fabrication and test plans for new optical, laser, and spectroscopy systems.
- Develop, apply and refine advanced models for optical, laser, and spectroscopy system performance.
- Collect and analyze experimental data, draw conclusions and publish findings in high-quality peer-reviewed academic journals.

## **Required Qualifications**

- Graduate degree in Physics, Engineering Physics, Electrical Engineering, or a related field.
- Strong background in optical science, laser science, experimental methods, and data analysis.
- Ability to design and undertake experimental research, analyze results and prepare manuscripts for publication in high-quality academic journals.
- Ability to mentor and provide guidance to junior researchers.
- Ability to work independently and as part of a team.

## **Desired Qualifications**

- Significant and demonstrated experience with laser and optical systems.
- Experience with optical design and analysis (theory, coding, commercial ray tracing software) and data acquisition systems.
- Experience with laser spectroscopy.

## **Contact Information**

- For further inquiries about the position, please contact Professor Gil Porat at [gporat@ualberta.ca](mailto:gporat@ualberta.ca)