

**Opportunity Title:** Research Scientist - Homeland Security Explosives Detection  
Research Opportunity  
**Opportunity Reference Code:** DHS-TSL-NQR-2019-0007

**Organization** U.S. Department of Homeland Security (DHS)

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**Description** *This opportunity is open until filled. Status: Active as of 11/22/2019.*

You will have the opportunity to be part of an exclusive group of scientists to determine the feasibility of using nuclear quadrupole resonance (NQR) for fielded detection and for supporting test and evaluation (T&E) of commercially-developed NQR-based explosives detection systems.

TSL scientists have successfully exported research-grade infrared and Raman spectra to low-resolution handheld spectrometers for explosives detection in the field, and is now interested in extending this process to nuclear quadrupole resonance (NQR) spectroscopy. This technology continues to be an active research direction in academia, industry, and government for the detection of nitrogen containing substances. This opportunity is located in Atlantic City, NJ, on the water and in close proximity to New York City with a competitive stipend for living and other expenses.

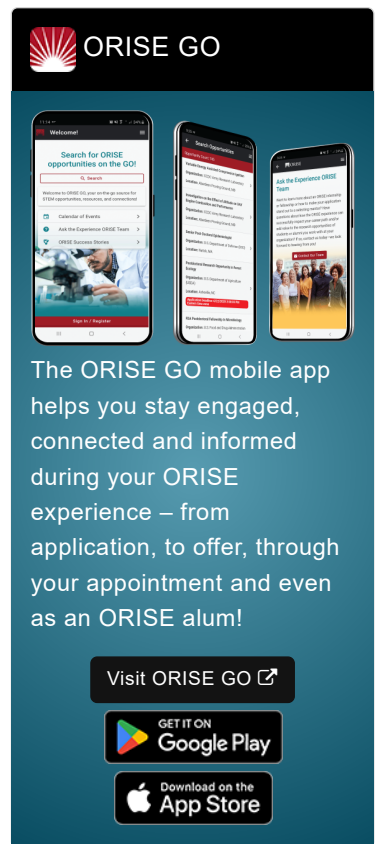
#### **Project – Nuclear Quadrupole Resonance Spectroscopy / Contraband Detection Research**

Under the mentorship of TSL scientists, you will participate in NQR spectroscopy projects that support TSL goals of establishing NQR measurement capabilities, conduct research and development towards threat detection in real-world environments, and support NQR-related T&E projects. You will gain invaluable experience as a researcher and scientist through this appointment, including but not limited to, hands-on training in a federal laboratory, enhanced professional development, familiarity with DHS missions and practice, new knowledge and experience in advanced cutting edge technologies and equipment, and experience working in multi-disciplinary teams with top tier scientists from both private and government industry.

For questions about TSL and the NQR project, contact Dr. Jeffrey Barber at [Jeffrey.Barber@hq.dhs.gov](mailto:Jeffrey.Barber@hq.dhs.gov).

Transportation Security Laboratory (TSL) is a U.S. Department of Homeland Security Federal Laboratory dedicated to protecting our nation's civilian air transportation systems. TSL is looking for masters and doctoral degree level candidates for this exciting new research opportunity in nuclear quadrupole resonance (NQR).

By virtue of its accomplished experts, cutting-edge facilities and partnerships, TSL offers the homeland security community and transportation security partners the ability to advance detection technology from conception to deployment through applied research, test and evaluation, assessment, certification and qualification testing. TSL's core mission is to enhance homeland security by performing research, development and validation of solutions to detect and mitigate the threat of improvised explosive devices, or IEDs.

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TSL addresses four core competencies:

- Explosives Detection Equipment Certification, Qualification, and Assessment Testing
- Industry Partnerships
- Next Generations Explosive Detection or Mitigation Technologies
- Information and Innovation Products

### **Appointment Length**

Opportunity includes full-time one year appointment and may be extended contingent upon project needs and funding availability. The maximum time a participant can remain in the ORISE program is five years from his/her initial start date.

### **Participant Benefits**

Selected candidates will receive a competitive stipend for living and other expenses during this appointment, determined by TSL. Stipends are typically based on the participant's academic standing, discipline, and experience. Candidate may also be eligible to receive a health insurance allowance and reimbursement for travel expenses.

To learn more about TSL, visit <https://www.dhs.gov/science-and-technology/transportation-security-laboratory>. Learn more about Careers in Homeland Security at <https://www.dhs.gov/homeland-security-careers>.

### **Nature of the Appointment**

The participant will not enter into an employee/employer relationship with ORISE, ORAU, DHS, or any other office or agency. Instead, the participant will be affiliated with ORISE for the administration of the appointment through the ORISE appointment letter and Terms of Appointment.

**Qualifications** Applicants must meet the following requirements:

- Have received or expect to complete all requirements for a Master's degree in Chemistry, Solid State Physics, Electrical Engineering, or related field by the desired start date.
- Be a U.S. Citizen.

Preferred candidate will have:

- Received or expect to complete all requirements for a Doctoral degree in Chemistry, Solid State Physics, Electrical Engineering, or related field by the desired start date.
- Basic computer programming
- Knowledge and experience in design, engineering, and construction of basic radiofrequency and digital circuits.
- Ability to work in a cooperative, collaborative environment
- Independent and highly motivated
- Commitment to performing laboratory work safely and conscientiously
- Operation of magnetic resonance instruments for solid-state samples

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- Interpretation and simulation of magnetic resonance spectroscopic data

A complete application consists of:

- Zintellect Profile
- Essay Questions (goals, experiences, and skills relevant to the opportunity)
- Resume (PDF)
- Academic Records - For this opportunity, an unofficial transcript or copy of the student academic records printed by the applicant or by academic advisors from internal institution systems may be submitted.
- Letter of Recommendation - While a letter of recommendation is not required to be considered, applicants are required to provide contact information for one recommendation in order to submit the application. Applicants are encouraged to request a letter of recommendation before submission as this may help reviewers have a better understanding of the applicant's qualifications and interests. Letters of recommendation must be submitted on your behalf before selections are completed and offers are made.

*Submitted documents must have all social security numbers, student identification numbers, and/or dates of birth removed (blacked out, blackened out, made illegible, etc.) prior to uploading into the application system. All documents must be in English or include an official English translation.*

If you have questions, send an email to [DHSed@orau.org](mailto:DHSed@orau.org). Please list the reference code of this opportunity in the subject line of the email.

**Eligibility  
Requirements**

- **Citizenship:** U.S. Citizen Only
- **Degree:** Master's Degree or Doctoral Degree.
- **Academic Level(s):** Graduate Students, Postdoctoral, or Post-Master's.
- **Discipline(s):**
  - **Chemistry and Materials Sciences** ([12](#))
  - **Computer, Information, and Data Sciences** ([16](#))
  - **Engineering** ([27](#))
  - **Mathematics and Statistics** ([10](#))
  - **Physics** ([16](#))
- **Age:** Must be 18 years of age