

Opportunity Title: Threat-Detection Technologies Research **Opportunity Reference Code:** TSL-NQR-2019

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

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Description The Transportation Security Laboratory (TSL) is offering an exciting opportunity for a candidate to evaluate and develop new threat-detection technologies for critical real-world applications. TSL has successfully exported research-grade infrared and Raman spectra to low-resolution handheld spectrometers for explosives detection in the field, and is interested in extending this process to other modalities. Nuclear quadrupole resonance (NQR) spectroscopy is a potential technology for the detection of explosives due to the presence of nitrogen in many threat materials. This technology continues to be an active research direction in academia, industry, and government, as demonstrated by recent developments in atomic magnetometers for detecting weak NQR signals. To this end, TSL is now acquiring a research-grade NQR spectrometer to interrogate TSL's vast list of explosives for the purposes of determining feasibility of using NQR for fielded detection and for supporting test and evaluation (T&E) of commercially-developed NQR-based explosives detection systems. Under the mentorship of TSL staff, the selected postdoctoral candidate will participate in NQR spectroscopy projects that support TSL goals of establishing NQR measurement capabilities, conducting research and development towards threat detection in real-world environments such as airports and mail facilities, and supporting NQR-related T&E projects.

For questions about TSL and the NQR project, contact Dr. Jeffrey Barber at <u>Jeffrey.Barber@hq.dhs.gov.</u>

Participant Benefits

Selected candidate will receive a competitive stipend for living and other expenses during this appointment. Candidate may also be eligible to receive a health insurance allowance and reimbursement for travel expenses. The initial appointment is for one year and may be extended in increments of up to one year, 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.

Nature of the Appointment

Participants will not enter into an employee/employer relationship with ORISE, ORAU, DOE, DHS, TSL, or any other office or agency. 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:

- Be completing a Master's or have received a Master's degree by the desired starting date in Chemistry, Solid State Physics, or related field.
- Be a US Citizen.

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Desired relevant experience/skills include:

- Operation of NMR/NQR instruments for solid-state samples
- Basic computer programming
- Design, engineering, and construction of basic radiofrequency and digital circuits
- Interpretation and simulation of NMR/NQR spectroscopic data
- Ability to work in a cooperative, collaborative environment
- Proficiency in written and verbal communication
- Independent and highly motivated
- Commitment to performing laboratory work safely and conscientiously

While participants will not enter into an employment relationship with DHS or any other agency, this position will require a suitability investigation. Any offer made is considered tentative pending favorable outcome of the suitability investigation.

Components of the online application are as follows:

- Profile Information
- Educational and Employment History
- Essay Questions (goals, experiences, and skills relevant to the opportunity)
- Resume (PDF)
- Transcripts/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.

If you have questions, send an email to <u>DHSed@orau.org</u>. Please list the reference code of this opportunity in the subject line of the email.

Eligibility • Citizenship: U.S. Citizen Only

- Requirements Degree: Master's Degree.
 - Discipline(s):
 - Chemistry and Materials Sciences (<u>12</u>)
 - Computer, Information, and Data Sciences (16)
 - Engineering (<u>27</u> [●])
 - Mathematics and Statistics (10 (*)
 - Physics (<u>16</u> [●])
 - Age: Must be 18 years of age