

Opportunity Title: Spray Characteristics and Emulsion Stability of
Brine/Kerosene Mixtures

Opportunity Reference Code: NETL-2019-FRP-Oryshchyn-1



Organization National Energy Technology Laboratory (NETL)

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How to Apply Applicants should apply through the Oak Ridge Institute for Science and Education (ORISE) program. The ORISE Program provides opportunities for undergraduate students, recent graduates, graduate students, postdoctoral researchers, and faculty researchers to apply classroom knowledge in a real-world setting to learn about NETL Research and Innovation Center's (R&IC) core mission areas.

In the online application **list Dan Oryshchyn as your requested mentor**. This will associate your application with this posting. Please send a CV to danylo.oryshchyn@netl.doe.gov.

A complete application consists of:

- An application
- Transcripts – [Click here for detailed information about acceptable transcripts](#)
- A current resume, including academic history, employment history, relevant experiences
- Two educational or professional references

All documents must be in English or include an official English translation.

If you have questions, send an email to NETLinfo@ornl.gov. Please include the reference code for this opportunity in your email.

Application Deadline 12/16/2019 11:59:00 PM Eastern Time Zone

Description Through the Oak Ridge Institute for Science and Education (ORISE) this posting seeks a qualified candidate to participate with NETL researchers on a project developing a potassium-seeding method for increasing the conductivity of oxy-kerosene combustion products. The augmented combustion products are used in experiments regarding direct power-extraction from a flowing plasma via interaction with a magnetic field (a magnetohydrodynamic interaction). Emulsions of K₂CO₃ brine and kerosene have proven effective, but an increased concentration of K₂CO₃ in the brine is desired. Stable fuel emulsions with high-concentration brines are difficult to generate.

This project would explore emulsion-generation methods with potassium carbonate (K₂CO₃) brines from 20 mass-percent to fully saturated. Results will include diameter measurements of the dispersed-phase droplets, time the emulsion remains fully mixed, viscosity, predicted droplet size when the emulsion passes through a crossflow atomizer.

The selected applicant will gain hands on experience with and an enhanced knowledge of computational fluid-dynamics (CFD) modeling of gas-driven atomization - non-Newtonian fluids, measurement of liquid characteristics (viscosity, surface tension), and chemical interactions between ionic and anionic surfactants with brine.

Qualifications Ideal candidates preferred skills include:













1. CFD Modeling
2. Liquid characteristic measuring techniques (e.g. viscometry, sessile-drop, pH) with statistically significant results
3. Design Of Experiment

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Any degree .
- **Discipline(s):**

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- **Chemistry and Materials Sciences** (12 )
- **Communications and Graphics Design** (2 )
- **Computer, Information, and Data Sciences** (16 )
- **Earth and Geosciences** (21 )
- **Engineering** (27 )
- **Environmental and Marine Sciences** (14 )
- **Life Health and Medical Sciences** (45 )
- **Mathematics and Statistics** (10 )
- **Other Non-Science & Engineering** (2 )
- **Physics** (16 )
- **Science & Engineering-related** (1 )
- **Social and Behavioral Sciences** (27 )

Affirmation To be eligible, you must:

Be a full-time regular permanent faculty member at an accredited college/university with a research interest in NETL core R&D areas.

Additional requirements:

- Must provide a detailed statement of educational objectives and projected benefits to be realized as a result of the appointment.
- Part-time appointment candidates must submit a Part-Time Approval Form.
- Sabbatical appointment candidates must include a statement describing the financial arrangements with their academic institution , including fringe benefits paid by the institution (state as a percentage of salary and itemize).