

Opportunity Title: Microstructure and Mechanical Characterization of Additively Manufactured Superalloys

Opportunity Reference Code: NETL-PIP-2025-Sudbrack

Organization National Energy Technology Laboratory (NETL)

Reference Code NETL-PIP-2025-Sudbrack

How to Apply A complete application consists of:

- An application, including academic history, work history experiences, and honors/awards
- Description of your goals, related experience, and related skills – refer to NETL's Core Competencies and ongoing projects when applicable
- Transcripts – [Click here for detailed information about acceptable transcripts](#)
- A current resume or CV
- Two educational or professional recommendations

You must provide contact information for at least two recommenders in your application. The first two recommendations received will be attached to your application for review by NETL. You may click the "send" (paper airplane) button to send the recommendation request email immediately after entering their information prior to submitting your application; if not, a request will automatically be sent when you submit your application. Your recommenders will receive an email with a subject line of "[Your Name] - ORISE Recommendation Request - [your email]", from Zintellect@orau.org. This email will include information on the opportunity to which you have applied, as well as a secure link to submit a recommendation for you for this application. If you ask the same person to submit a recommendation for you for multiple applications in Zintellect, they must click the unique link in each email request, but will be given the opportunity to copy over what they had previously submitted.

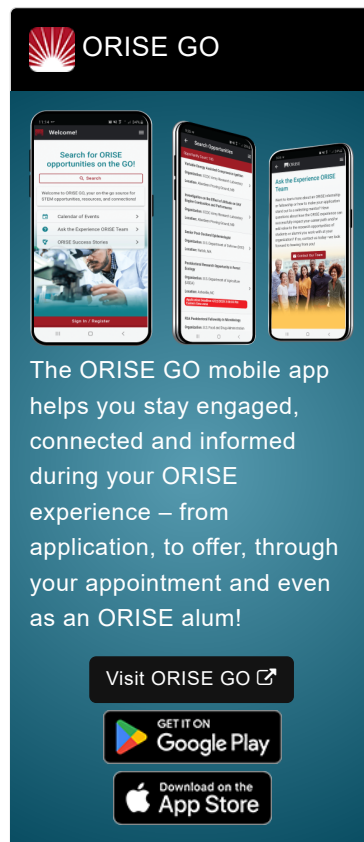
All documents must be in English or include an official English translation.

If you have questions about the application process, contact NETLinfo@orau.org.

After you have submitted an application in Zintellect, you may reach out to internship.program@netl.doe.gov to request to talk with the hosting researcher if you would like additional information on the project or to express particular interest. You must have a completed application in Zintellect to receive a response.


Application Tips


NETL values a combination of academic success, experience, and leadership potential as demonstrated in all aspects of your application. NETL's goal is to create, maintain, and support a [diverse environment](#) that encourages creative ideas and leadership. In the words of former [Lab Director Brian Anderson](#), "our differences make us stronger and we're united in fostering inclusivity in all aspects of our research to drive innovation and deliver solutions for an environmentally sustainable and prosperous energy future." In your application, show us who you are!




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To increase your chances of being selected for an appointment, we recommend:

1. Reading about NETL projects, and tailoring your responses to align with Laboratory focus areas. What parts of the project(s) are most interesting to you?
2. Spending sufficient time on your essay responses and your resume. Give yourself time to review your writing!
3. Ensuring that everything you submit is grammatically correct and clearly expressed.
 - Consider using a word processor to draft your answers and then copy and paste into the application.
 - Review and edit repeatedly until you have a strong response.
 - Ask someone whose judgement you trust to proofread it and make suggestions for improvement.
 - Efficient writing is valued over quantity of writing.
4. Submitting the application -- we can't select you if you don't submit an application!

Application Deadline 5/5/2025 11:59:00 PM Eastern Time Zone

Description The National Energy Technology Laboratory's (NETL's) record of success has been built on understanding the future of energy and the technologies required to make that future possible. We've long touted our success in developing the technologies that took on acid rain in the 1970s and mercury in the early 2000s.

Program Goals

The Professional Internship Program is designed to introduce undergraduate students and recent Bachelor's graduates to the challenges of conducting energy research, and enable graduate students and recent Master's graduates to further build off their studies and experience as they join the scientific community. Participants interact daily with assigned mentors who guide research and project activities during the internship, while they become integral members of project teams.

The program goals include providing the opportunity to participants to:

- Develop skills and knowledge in their field of study
- Engage with new areas of basic and applied research
- Transition classroom theory into hands-on experience
- Network with world-class scientists
- Exchange ideas and skills with the Laboratory community
- Use state-of-the-art equipment
- Contribute to answers for today's pressing scientific questions
- Collaborate with the broader scientific and technical communities

Project Details

Through the Oak Ridge Institute for Science and Education (ORISE), this

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posting seeks a recent Bachelor's graduate or student researcher to engage in projects with the Research Innovation Center (RIC) at the National Energy Technology Laboratory (NETL) in the area of Advanced Energy Materials under the mentorship of Chantal Sudbrack. This project will be hosted at the NETL [Albany, OR](#) campus.

Additive manufacturing shows great promise in fabricating high-temperature load-bearing parts with complex geometries for advanced energy systems. As an emerging technique, wire arc additive manufacturing (WAAM) can build large near-net-shaped parts using fast deposition rates and is attracting attention due to potential cost and schedule savings. Haynes 282 is a Ni-based superalloy with wide application in turbine engines due to high strength, corrosion resistance, weldability and good creep performance up to 900C. To achieve an optimal processing for high-quality WAAM parts, requires a systematic understanding of the process parameters, including travel speed, wire feed, and shielding gas. The research aims to understand the effect of processing on microstructure and mechanical properties of WAAM Haynes 282.

The research aims to characterize the microstructure and strength of a set of Ni-base superalloys fabricated by WAAM additive manufacturing to understand the effect of varying processing parameters (wire feed, travel speed, shielding gas). The candidate will: (a) Meet with a mentor to establish a plan, identify tasks, and establish responsibilities; (b) Participate in team meeting discussions and present research results; (c) Use/learn establish research techniques, like optical microscopy, electron microscopy (TEM, SEM-EDS, EBSD), microhardness, surface profilometry. (d) Produce a final report. The results may be included in a conference presentation or journal article with the candidate listed as a co-author.

Stipend: Participants receive a biweekly stipend based on their educational level. Stipend payments are taxable as an educational benefit. Stipends for full-time participation are:

- \$750.50-\$805 per week for undergraduate students
- \$1167.50-\$1252.50 per week for recent Bachelor's graduates
- \$1428-\$1532 per week for graduate students and recent Master's graduates

Deliverables: To document the effectiveness of the program, participants are required to submit a pre-appointment and post-appointment survey, as well as a reflection on their appointment experience when they renew or end their appointment. The reflection should summarize their project(s), additional activities, and overall experience. Details are provided as the appointment end date approaches.

Participants may also have the opportunity to contribute to manuscripts, journal articles, book chapters, conference presentations, posters, patents, and other publications as a part of their appointment. Such achievements should also be reported to ORISE; additional details are provided after an offer has been accepted.

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The National Energy Technology Laboratory (NETL), part of the U.S. Department of Energy (DOE) national laboratory system, is owned and operated by the DOE. NETL supports the DOE mission to advance the energy security of the United States. This is an educational opportunity offered by NETL and administered by the Oak Ridge Institute for Science and Education. Participants in the program are not considered employees of NETL, DOE, the program administrator, or any other office or agency.

Qualifications The ideal candidate would have some, but not necessarily all, of the following skills:

- Experience with microstructural characterization of high temperature alloy using SEM, EDS and EBSD
- Experience in high temperature alloy research for structural applications
- Good communication skills


To be eligible for this opportunity, you must:

- Have one of the following academic statuses
 - An undergraduate student*¹ in good standing at a regionally accredited college/university*²
 - A recent Bachelor's degree graduate*¹ who has received their Bachelor's degree from a regionally accredited college/university*² within the last 24 months at time of application
 - A graduate student in good standing at a regionally accredited college/university
 - A recent Master's degree graduate who has received their Master's degree from a regionally accredited college/university within the last 36 months at time of application
- Have an overall GPA of 2.5/4.0 or higher
- Be at least 18 years of age at the time of application
- Provide confirmation of coverage under a health insurance plan prior to the beginning of the internship

*¹ Soon-to-be Associate's degree graduates are eligible to apply if enrolled as a student at time of application.

*² Students and recent Bachelor's degree graduates from accredited Community Colleges and Technical Schools are encouraged to apply.











Point of Contact [Ryan](#)

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|---------------------|---|
| Eligibility | <ul style="list-style-type: none">• Citizenship: LPR or U.S. Citizen |
| Requirements | <ul style="list-style-type: none">• Degree: Associate's Degree, Bachelor's Degree, Master's Degree, or Doctoral Degree.• Minimum Overall GPA: 2.50• Discipline(s):<ul style="list-style-type: none">◦ Chemistry and Materials Sciences (12 ) |

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- **Communications and Graphics Design** ([2](#) )
- **Computer, Information, and Data Sciences** ([17](#) )
- **Earth and Geosciences** ([21](#) )
- **Engineering** ([27](#) )
- **Environmental and Marine Sciences** ([14](#) )
- **Life Health and Medical Sciences** ([51](#) )
- **Mathematics and Statistics** ([11](#) )
- **Physics** ([16](#) )
- **Science & Engineering-related** ([2](#) )
- **Social and Behavioral Sciences** ([29](#) )
- **Age:** Must be 18 years of age

Affirmation I certify at the time of application that I meet at least one of the following academic status eligibility criteria, at a regionally accredited academic institution:

- I am currently pursuing an undergraduate degree.
- I received a Bachelor's degree no more than 24 months before the date of application.
- I am currently pursuing a Master's degree.
- I received a Master's degree no more than 36 months before the date of application.
- I am currently pursuing a doctoral degree.