

STEMtember – Ready, Set, Join the BETO Webinar on Internship and Fellowship Opportunities!

Presenters:

Ebony Brooks, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy

Tiffany Jones, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy

Ali Josephson, Idaho National Laboratory

Dr. Brad Wahlen, Idaho National Laboratory











Feedstock

Algae

Conversion

Systems

Data

September 29, 2022

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- U.S. Department of Energy (DOE)
- Office of Energy Efficiency and Renewable Energy (EERE)
- Bioenergy Technologies Office (BETO)



BETO & DOE National Laboratory Members:

 Bioenergy communicators, laboratory relationship managers, BETO tech team, and education and workforce development professionals



Purpose:

 Communications strategy for BETO-funded bioenergy research and development

Photo by iStock

Today's Agenda

- I. Ebony Brooks and Tiffany Jones, Internship and Fellowship
 Opportunities at DOE EERE
- II. Ali Josephson, Building the Workforce of the Future at Idaho National Laboratory
- III. Dr. Brad Wahlen, Interning at Idaho National Laboratory

Today's Presenters



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Ebony Brooks

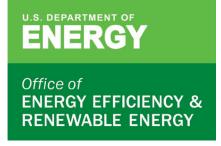
Staffing, Onboarding, and Security Supervisor

DOE EERE



Tiffany Jones

Workforce Management Office
Staffing Liaison
DOE EERE



Internship and Fellowship Opportunities

Ebony Brooks and Tiffany Jones



Who is EERE?

About the Office of Energy Efficiency and Renewable Energy

The Office of Energy Efficiency and Renewable Energy (EERE) is working to build a clean energy economy that benefits all Americans through energy efficiency, renewable energy, and sustainable transportation.

What Does EERE Do?

EERE invests in clean energy technologies that show viable pathways for achieving EERE's programmatic priorities: decarbonizing the electricity, transportation, industrial, and agricultural sectors, and reducing the carbon footprint of buildings.









EERE's Three Pillars



Energy Efficiency

Research and development in advanced manufacturing and building technologies.



Renewable Energy

Applied research, development, and demonstration (RD&D) activities to make renewable energy—geothermal, solar, wind, and water power—cost-competitive with traditional sources of energy.



Sustainable Transportation

RD&D in bioenergy, hydrogen and fuel cells, and vehicles to increase access to domestic, clean transportation fuels and improve the energy efficiency, convenience, and affordability of transporting people and goods.

Internship and Fellowship Opportunities

Federal Opportunities

- Internships (<u>https://www.usajobs.gov/</u>)
- Recent Graduates (https://www.usajobs.gov/)
- Presidential Management Fellows (<u>https://www.pmf.gov/</u>)

Non-Federal Opportunities

- Minority Educational Institution Student Partnership Program (MEISPP)
- DOE Scholars
- EERE Science and Technology and Policy Fellowships
- American Association for the Advancement of Science (AAAS) Science & Technology Policy Fellowship

Bonus

Student Volunteer Internship Program



Internships

Federal Opportunity

Pathways

- Student Trainee/Student Intern
 - Apply on <u>usajobs.gov</u>



Non-Federal Opportunity

- <u>MEISPP</u> is open to students pursuing a variety of academic degrees, such as engineering, science, social sciences, and business.
- The <u>DOE Scholars</u> program is accepting applications now for interns and fellows and may offer several application opportunities throughout the year.



Minority Educational Institution Student Partnership Program

To be eligible, you must:



Be an undergraduate or graduate student enrolled full-time in an accredited Minority Serving Institution (MSI).



Be at least 18 years of age and a U.S. citizen (permanent residents and green card holders are ineligible).



Have earned at least 24 undergraduate semester hours (39 quarter credit hours).



Maintain a minimum overall GPA of 3.0 on a 4.0 scale.

Minority Educational Institution Student Partnership Program

Ideal candidates will demonstrate the following:



Leadership potential



Commitment to public service



Interest in energyrelated issues

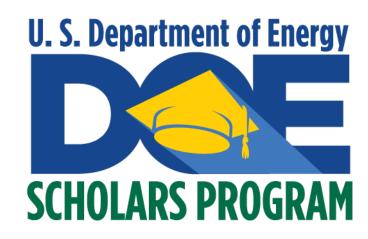


Strong written and verbal communication skills

DOE Scholars

To be eligible you must:

- Be at least 18 years of age AND a U.S. citizen.
- Meet <u>one</u> of the following conditions:
 - Be enrolled as an undergraduate or graduate student at an accredited institution of higher education pursuing or with a degree in science, technology, engineering, or math (STEM) or a field that supports DOE's operations, such as communications, management, business, or law.



- Have completed an undergraduate or graduate degree within 5 years of the intended start date.
- Be a U.S. military veteran who has been honorably discharged and/or medically discharged and who received a college degree in an appropriate discipline within 10 years of the desired start date.
- Have completed a qualifying certificate STEM program, with a minimum of 30 semester credit hours or the equivalent, by an accredited academic institution within one year of the desired start date. The certificate program should be related to or complement a prior degree earned (bachelor's or higher).

Fellowships

Federal Opportunity

Pathways

- Recent Graduate
 - Apply on <u>usajobs.gov</u>



Non-Federal Opportunity

Managed by ORISE

- <u>EERE Science and Technology and Policy</u>
 <u>Fellowships</u>
- AAAS Science & Technology Policy Fellowship
- <u>DOE Scholars</u> (interns and fellows)
 - View <u>open opportunities</u>.





Appointments will be awarded to applicants based on academic level and experience.

Level 1

For recent college graduates who have held a bachelor's degree for less than 5 years at the time of application.

Level 2

For recent master's or Ph.D. graduates who have held a graduate degree for less than 3 years at the time of application.

Level 3

For master's or Ph.D.
graduates who have held
a graduate degree for more
than 3 years at the time
of application and have
post-degree experience
in a technical or
research capacity.

Level 1

Required qualifications:



Bachelor's degree for less than five years in an energy-relevant field of science, engineering or other highly quantitative field such as economics.



U.S. citizenship or permanent resident (Green Card) status.



Matriculated undergraduates may be considered for short-term appointments.

Level 2

Required qualifications:



Ph.D. or master's
degree for no more
than 3 years in an
energy-relevant field of
science, engineering, or
other highly
quantitative field such
as economics.



U.S. citizenship or permanent resident (Green Card) status.

Level 3

Required qualifications:



Doctorate or master's degree for more than 3 years in an energy-relevant field of science, engineering, or other highly quantitative field such as economics. If more than 5 years have passed since receipt of graduate degree, applicant must have at least 3 years of post-degree experience in a technical or research position in a field related to energy innovation.



U.S. citizenship or permanent resident (Green Card) status.



Experience and knowledge in technology commercialization is desirable but not required.

Ideal candidates will have:



A superior academic performance and publication record.



Strong analytical, research, and communication (oral and written) skills and demonstrated capacity for creative thinking.



A strong technical background and expertise in a field related to energy technology.



An interest in being part of a multi-disciplinary, fast-paced environment, focused on energy technology research and development.

AAAS Science & Technology Policy Fellowship

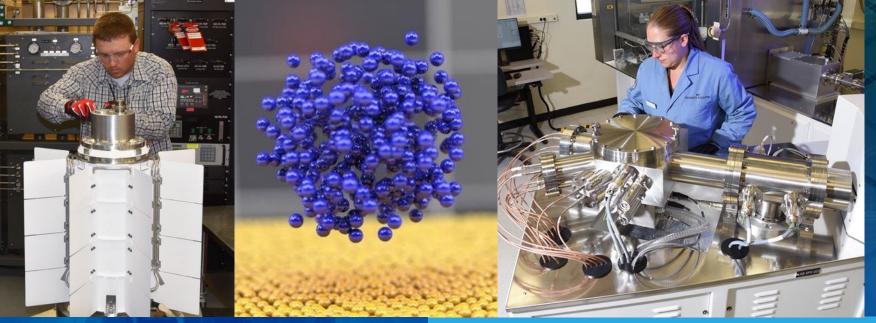
Applicants for Executive, Legislative, or Judicial Branches must:

- Hold a doctoral-level degree in a qualified field or a master's degree in engineering plus 3 years of professional engineering experience.
- Be a U.S. citizen (dual citizenship is acceptable).
- Be eligible to receive federal government funds through the System of Award Management (SAM).
- Comply with U.S. Selective Service System requirements.
- Not be a federal employee, including Title 42 positions and Presidential Management Fellowships.
- Not be an employee of AAAS or be working with AAAS through a paid engagement.



Ali Josephson

University Recruitment Manager Idaho National Laboratory



Ali Josephson

Manager, University Recruiting

ali.josephson@inl.gov



Building the Workforce of the Future at Idaho National Laboratory (INL)

Building the Workforce of the Future

INL is focused on:

- Working with universities nation-wide
- Recruiting the best talent

Increasing inclusive diversity



In FY22, INL hosted 513 interns from:

42 states + DC

25 countries





151

HS, colleges, universities and Institutions represented

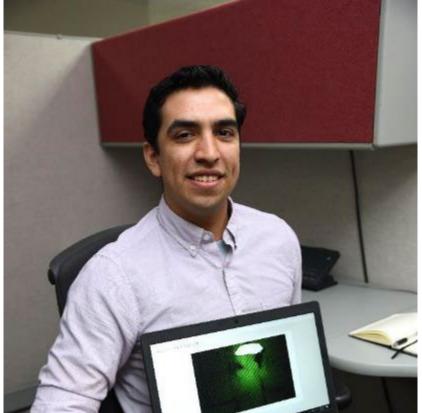
2,176 Intern applicants from 334 colleges and universities in FY22





Graduate fellowships 25







Benefits of interning at a national laboratory

- Designated Mentor
- Meaningful Projects
- Access to State-of-the-Art Research Facilities

- Hands-On Experience
- Long-Term Collaboration Opportunities
- Networking Opportunities
- Career Exploration

What We're Working On

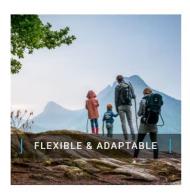






WHY CHOOSE INL?

INL occupies a unique niche at the nexus of energy supply and security. Our scientists, engineers and support staff work each day to change the world's energy future and secure our nation's critical infrastructure. Want a career that can change the world? Come join us!







Find out why our employees love working at INL

Other DOE-Funded Internship **Programs**

Science Undergraduate Laboratory Internships (SULI)/ Community College Internships (CCI)

- Undergraduate and Community College Student Opportunities in STEM degree programs
- 10- and 16-week internships at national laboratories managed by DOE Office of Science
- Summer application period: October 18, 2022, to January 10, 2023
- Apply at https://science.osti.gov/wdts/suli

Minority Servings Institutions Partnerships Program (MSIPP)

- Opportunities for undergraduate and graduate students from minority serving institutions
- Focus on STEM degree programs
- · 10-week internships working at national laboratories managed by DOE Office of Environmental Management (DOE-EM).
- Application deadline: February 28, 2023
- Apply at https://orise.orau.gov/msipp/

Energy Efficiency and Renewable Energy (EERE) and Advanced Manufacturing Office (AMO)

- EERE AMO offers three advanced manufacturing internship programs in robotics, energy storage, and high-performance computing designed
- Application and projects are listed on Zintellect.com



INL SULI Intern Julie Nguyen

Commitment to Inclusion and Diversity

"We have so much to learn from those whose experiences and backgrounds differ from our own. Our work is difficult and complex. Producing the positive outcomes expected of us will only happen if everyone performs at their best."

-INL lab director, John Wagner













INL Interns at the Intern Poster Session



The East Idaho Lifestyle

- Enjoy unparalleled access to the region's world-class skiing, hiking, camping, climbing, mountain biking, hunting, fishing, and much more.
- Live close to some of the country's greatest natural wonders: Yellowstone National Park, Grand Teton National Park, Craters of the Moon National Monument, Jackson Hole, and more.





Dr. Brad Wahlen

Research Scientist
Idaho National Laboratory





September 29, 2022

Brad Wahlen

Research Scientist

Interning at Idaho National Laboratory (INL)

What to expect

Selection Process – Researcher Perspective

- Several months prior to the internship beginning. Researchers will evaluate internship candidates and identify those that match project needs:
 - Experience level
 - Some projects may require prior experience or a particular experience
 - Often prior experience isn't necessary. Providing experience to students is part of the internship experience
 - Courses taken
 - Project specific. Example, general microbiology may be needed for a project where bacteria cultivation will be a core activity
 - Academic success in core classes
 - Interests
 - Do intern interests match the project, generally.

Selection Process – Intern Perspective

- 2–3 candidates may be selected for a phone interview
 - Conversation between researcher and candidate
 - Discuss project and gauge candidate interest
 - General interview questions
 - Allow candidates to ask questions about the project or about the internship experience
 - Let the candidate know when to expect a decision.

Training

- Research at national laboratories is conducted safely
 - All projects are reviewed for safety concerns.
- Interns will be given trainings to prepare them to execute work safely and confidently in the lab.
- In addition to formal training, interns will work beside their mentor and other lab personnel to learn techniques and to receive additional guidance and support.



Research Execution

- Mentors will discuss project details with the student.
- Projects will support the mission of their respective national lab and the U.S. Department of Energy.
- The environment where the research is conducted could vary:
 - Lab-based, hands-on research using chemical, biological or mechanical processes to further research objectives
 - Software-based, a data-centric project may be executed entirely in the office
 - Hybrid, where research can occur in both environments.

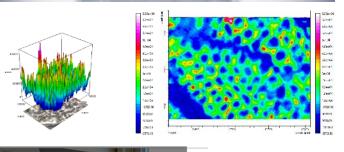




State-of-the-Art Instrumentation

 Student interns will have access to and gain experience using advanced instrumentation.







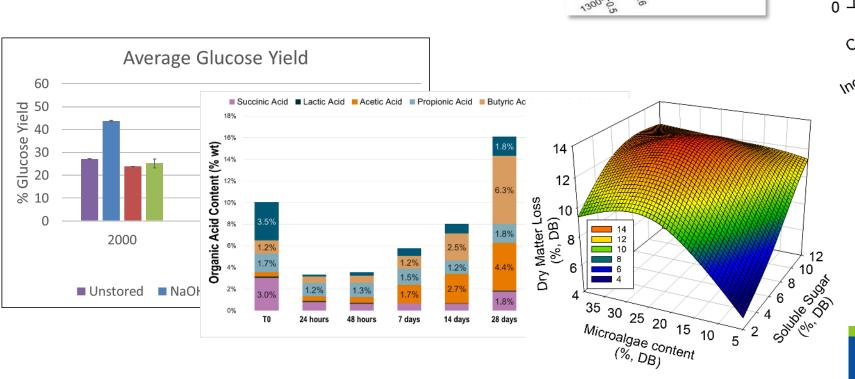






Analysis

 Interns will work with their mentors to analyze the data and develop graphics to communicate their results.

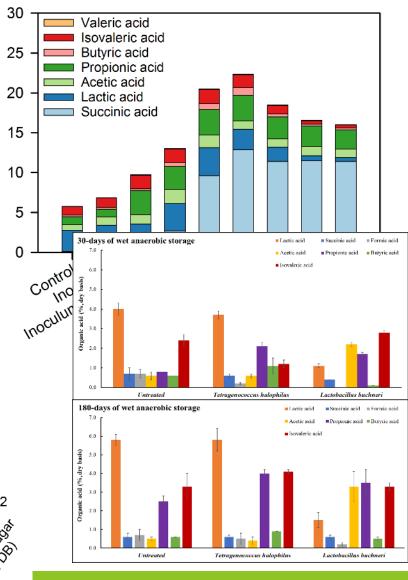


S. acutus inoculated with Tetragenococcus halophilus

Organic acids (%, dry basis)

furfural

hydroxydihydropyranone



Communicate Results – Presentations

- Communication is an essential part of conducting science.
- Students participate in the annual intern poster session at INL.
- This can be intimidating for some early-career scientists.
- Mentors will work with interns to:
 - Develop the poster
 - Practice presenting the poster to mentor, other staff, and fellow interns
 - Receive constructive feedback.



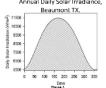


Algae Storage Optimization

Arizona State University, Arizona Center for Algae Technology and Innovation, Mesa, AZ ² Idaho National Laboratory, Biological and Chemical Characterization, Idaho Falls, ID

Motivation

Algae production varies throughout the year as a result of seasonal changes in temperature and solar irradiation. Summer production can be 5 times higher than winter production (Figure 1.) creating challenges in sizing algae conversion facilities. Production variability can be managed by storing a portion of the summer production for conversion in winter, delivering a constant feedstock supply for conversion. However, algae biomass is highly susceptible to degradation. Under aerobic conditions, algae can experience greater than 40% biomass loss over the course of 30 days. Annual Daily Solar Irradiance,



Ensiling is a livestock leed preservation method achieved by encouraging the growth of lactic acid bacteria by creating anaerobic conditions through mechanical compaction. Lactic acid bacteria undergo fermentation. resulting in high levels of organic acids, which inhibit microorganisms responsible for algal biomass degradation.

The goal of this project is to improve preservation of algal biomass by optimizing lactic acid formentation of

Approach

We elected to use a Box-Behnken experimental design /Figure 2 \ to better understand how the inoculum size (lactic acid bacteria), the degree of sugar hydrolysis (via acid prereatment of algal biomass), and the addition of tryptone affect lactic acid fermentation and ultimately biomass preservation (Table 1.). The experimental design varied the combination of different levels of the three factors among thirteen unique individual series. Each series consisted of 225 grams of algae (20% solids) and was conducted in



Experiment.	Inscalant	Suffure Adia	Tryptone
Series 1	-	0	-
Series 2	-	0	
Series 3	0	-	-
Senes 4	0		
Series 5		0	
Senes 5	0	0	0
Senes /	0		
Senes 5		- 0	-
Series 9	-		ō
Senso 10	0		-
Series 11			0
Series 12			0
Series 13	-		0

Predicted Potential Interactions Between Algae Biomass and Experimental Factors

Inoculum: Preservation is expected to improve with increasing inoculum size. A greater inoculum Sulfuric Acid: Acid pre-treatment will increase the soluble sugars available for fermentation and will ultimately increase the concentration of

Prvotone: As a source of protein, toyptone could enhance lactic acid fermentation by providing a nitragen source for bacterial growth.

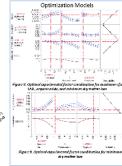


- -60 gradus of each series was postained fin nitropen to create anaerobic conditions, then
- Samples from leach series were dried at 50 °C before and after storage for dry weight an moisture content measurements.



Water extractions were taken from every series

Results



not completely optimize dry matter loss and therefore is not imperative to our goal. The second model (Figure 9.) calculated the optimal concentration of our experimental factors solely for the minimal. amount of dry matter loss. The statistical analysis shows there is an optimal concentration of inoculum and tryptone. Contou graphs (figure 10.) present the relationship between the inoculur

and tryptone and their desirable

quantities to achieve the highes

percentage of biomass

preservation.

Two optimization models wen generated to show the relationship

and selected metrics. The first

model (Figure 8.) calculated the optimal concentration of our

experimental factors in order to

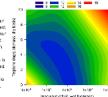
and organic acids while minimizing

dry matter loss. This model doe

between our experimental factors

Conclusion

The most significant finding from our model is the absence of pretreatment in both optimizations. Contrary to our assumption that sulfuric acid would improve algae biomass preservation by increasing soluble sugar availability, minimal dry matter loss i accomplished when no pretreatment is used. During future preservation procedures it would be most feasible to exclude pretreatment altogether.

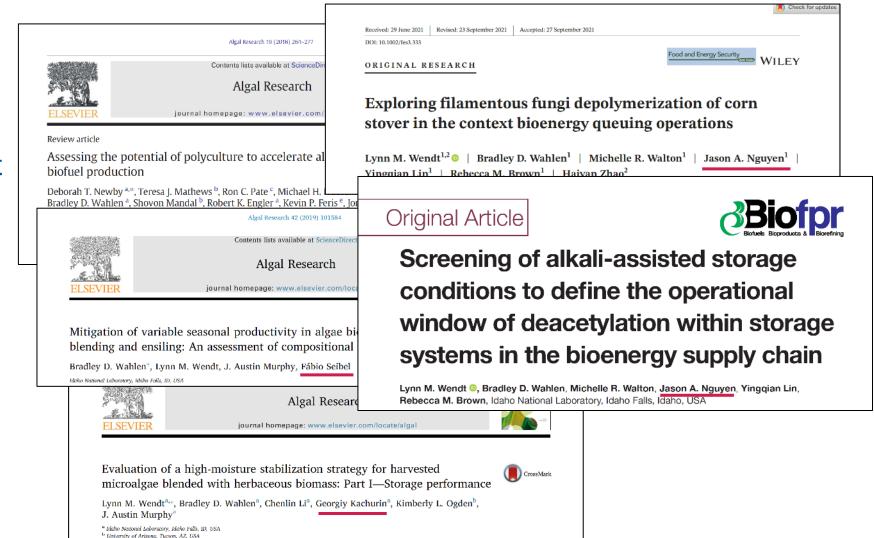


Several new avenues of research can be explored with the findings of our

- Validate the results of the experiment by repeating it using the optimal concentrations produced by the optimization model
- Replacing Tryptone with an amino acid (e.g. glutamate) in order to confirm its purpose of providing a nitrogen source to lactic acid hacteria and ontimize their feamentation to achieve lavorable due

Communicate Results – Publication

- Scientific authorship can be essential for career progression at all career stages.
- Interns can receive co-authorship recognition for their work in peerreviewed journals.
- Multiple examples during career as intern mentor.



Intern and Mentor Impacts

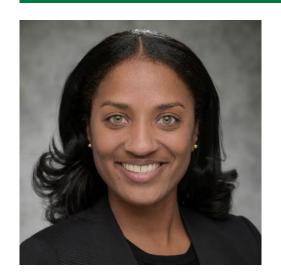
- An internship at a national laboratory is a point of distinction that could you set you apart as an applicant to a job, graduate or professional school.
 - Skills and confidence gained will prepare you for future opportunities.
- Why do I choose to mentor?
 - Interns make meaningful contributions to projects and the lab mission.
 - Give aspiring scientists a research experience
 - Science is a great profession. The research experience can help interns see themselves working as a research professional.
 - Science is an apprenticeship vocation. You learn from other practitioners.
 - Personal fulfillment to help others.

Thank you!

Today's Presentation:

STEMtember – Ready, Set, Join the BETO Webinar on Internships and Fellowships Opportunities!

Didn't get your question answered? Email: eere_bioenergy@ee.doe.gov



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