NARA

Energy Education at the Speed of Science

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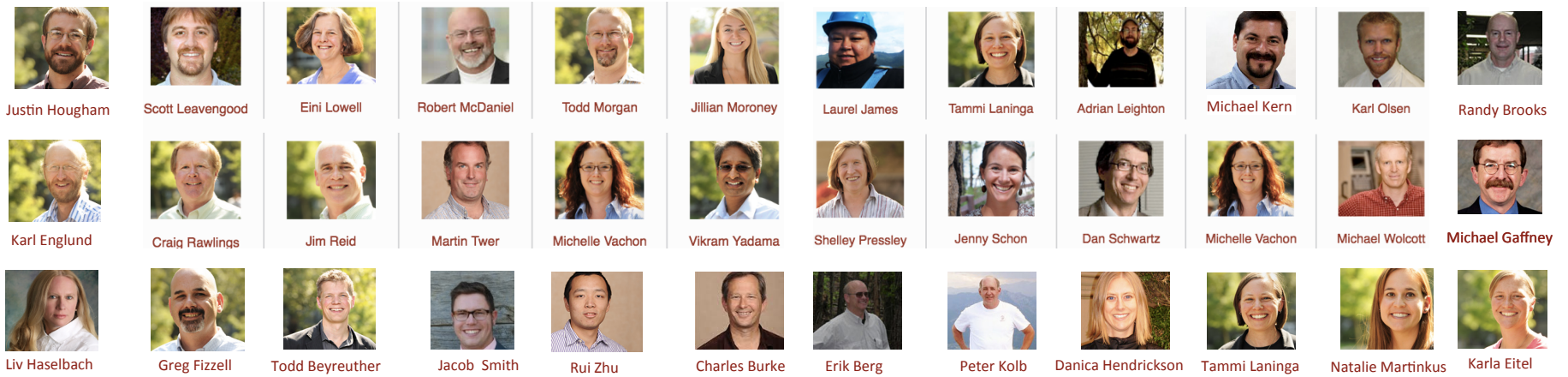

Northwest Advanced Renewables Alliance

USDA NIFA


Sustainable BioJet
Valuable Lignin Co-Products
Rural Economic Development
Supply Chain Coalitions
Energy Literacy
NATIONAL MODEL

Education and Outreach Goals

- Broad, integrated view of science & engineering
- Biofuel literacy of industry, policymakers, the public
- Communication skills of scientists/engineers
- Workforce development for the bioeconomy
- Next generation of energy leaders
- Biofuels literacy of teachers
- Science literacy of K-20 students

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Programs and Outputs

38,724
K12 students

Western Washington University Facing the Future™ Facing the Future is an Independent

MOSS McCall Outdoor Science School

Upham Woods Outdoor Learning Center UW Extension University of Wisconsin-Extension

Alaska Imagine Tomorrow

845
Teachers

Western Washington University Facing the Future™ Facing the Future is an Independent

MOSS McCall Outdoor Science School

Upham Woods Outdoor Learning Center UW Extension University of Wisconsin-Extension

Alaska Imagine Tomorrow

213
Undergrads

Salish Kootenai College Education • Leadership • Wisdom

IDX Integrated Design Experience

Western Washington University Institute for Energy Studies

199
Graduate

IDX Integrated Design Experience

MOSS McCall Outdoor Science School

380
Stakeholder Groups

Washington State University Extension

University of Idaho

Oregon State University Extension Service

PNW

The University of Montana

Montana State University

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NARA Investments in Education

Imagine Tomorrow

Pacific Northwest high school students provide creative solutions to the world's energy needs at this annual event. NARA's support expanded the event to Oregon, Idaho and Montana students and instigated a biofuel challenge category.

Resusts: Ninty-one teams involving 316 high school students have developed projects that explore the development of biofuels.
Learn more at https://nararenewables.org/documents/2016/09/newsletter-29-july-2015.pdf

Facing the Future

FTF creates interdisciplinary K–12 curriculum that equip and motivate students to develop critical thinking skills, build global awareness, and engage in positive solutions for a sustainable future. NARA supported the development of elementary, middle, and high school energy curriculum and accompanying teacher trainings.

Result: Over 425 copies of Fueling Our Future (25 elementary, 222 middle, and 178 high school) have been distributed to teachers and 272 free individual lessons (92 middle school and 153 high school) have been downloaded from FTF's website, reaching over 20,910 students.

Learn more at https://www.facingthefuture.org/

Energy Literacy Principles Matrix

The "Matrix" is an online resource that provides educational materials to teachers and students related to biofuel solutions. All resources are aligned with STEM standards.

Results: Over 700 resources have been catalogued.

Learn more at http://energyliteracyprinciples.org/

McCall Outdoor Science School

MOSS is a K-12 outdoor school teaching kids about science, place and community. NARA's support helped Pacific Northwest teachers and graduate students include biofuel lessons into the classroom.

Result: Over 260 teachers and 20 graduate students participated in bioenergy workshops and 20 lesson plans developed. More than 3,000 students participated in energy literacy lessons through MOSS.

Learn more at https://nararenewables.org/documents/2016/09/newsletter-1-august-2012.pdf

Summer Undergraduate Research Experience

College undergraduate students conduct research during the summer.

Result: NARA included 48 undergraduate students in project research ranging from conversion technologies to supply chain analysis.
Learn more at https://nararenewables.org/documents/2016/09/newsletter-30-augustseptember-2015.pdf

Tribal Partnership Program

TPP provides research opportunities in the area of biofuel development to Native American college students.

Results: Of the 16 Native American scholars who have participated in the NARA TPP program, one Associate in Applied Science (AAS) degree, five Bachelor of Science degrees, and one doctorate degree has been awarded. In addition, four Native scholars are on tap to achieve their degrees this academic year.

Learn more at https://nararenewables.org/documents/2016/09/newsletter-22-november-2014.pdf

Integrated Design Experience

IDX is a course at Washington State University (WSU) for undergraduate and graduate students that uses real world projects to train students to participate in a sustainable future. NARA's support mentored students to develop a facility site selection process and designs that contribute to envisioning a supply chain that uses post-harvest forest residuals to produce biojet fuel and other co-products.

Result: Over 195 students (110 undergraduate, 82 graduate, and 3 Ph.D) from Washington State University and University of Idaho have participated in IDX NARA and Mass Timbers projects, and some are entering the bioenergy workforce.

Learn more at https://nararenewables.org/documents/2016/09/newsletter-31-october-2015.pdf
Review their work at: https://nararenewables.org/supply-chain-analyses/

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Products and Outputs

67 Webinars

2 Learning Assessment Tools

2 Knowledge Bases

44 Refereed & Extension Pubs

66 Videos

250+ Conferences Presentation

3 Teacher Guides

135 News Stories

2 International Conferences

35 Infographics & Factsheets

35 Newsletters

135 Stakeholder Presentations

300+ Social Media Posts

70 Lesson Plans

4 Supply Chain Analyses

15 Quarterly Briefings to **900+** Policymakers

1 E-textbook

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Assessment Results

Outcome Metric	K-12 Students	Teachers	Under-grads	Grads	Stake-holders	Public
Increased biofuel ***knowledge & awareness***	✓	✓	✓	✓	✓	✓
More Informed ***opinions & attitudes***	✓	✓	✓	✓	✓	✓
Increased involvement in ***biofuel research***			✓	✓	✓	
Biofuel integration into ***curriculum***	✓	✓	✓	✓		
Increased use of ***problem-based learning***	✓	✓	✓	✓		
Increased interest in ***STEM careers***	✓		✓			
Increased interest in ***biofuels career***			✓	✓		
Increased bioenergy ***technical/research skill***	✓	✓	✓	✓	✓	
Increased interest in ***biofuel research careers***			✓	✓		
Increased use of ***technical/educational resources***		✓	✓	✓	✓	✓

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Education and Outreach Outcomes

- Broad regional stakeholder community investigating aviation biofuel and co-product development.
- Broadened public understanding and awareness of biofuel and co-product potential.
- Biofuel science and policy integration into K-20 curriculum.
- Increased biofuel and co-product capacity of scientists, engineers, teachers, policymakers, and energy leaders.

NARA

Thanks!


Justin Hougham


Scott Leavengood


Eini Lowell


Robert McDaniel


Todd Morgan


Jillian Moroney


Laurel James


Tammi Laninga


Adrian Leighton


Michael Kern


Karl Olsen


Randy Brooks


Karl Englund


Craig Rawlings


Jim Reid


Martin Twer


Michelle Vachon


Vikram Yadama


Shelley Pressley


Jenny Schon


Dan Schwartz


Michelle Vachon


Michael Wolcott


Michael Gaffney


Liv Haselbach


Greg Fizzell


Todd Beyreuther


Jacob Smith


Rui Zhu


Charles Burke


Erik Berg


Peter Kolb


Danica Hendrickson


Tammi Laninga


Natalie Martinkus


Karla Eitel

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