



NARA SURE Summer Undergraduate Research Experience

Shelley Pressley and Michael Wolcott
Washington State University

About the Program

The NARA SURE program is a summer immersion research experience for undergraduates aimed at giving them hands on skills in biofuels and bioproducts research, feeding the pipeline into energy research careers.

SURE participants engage in full time research experiences for a summer (10 week) program that provides laboratory, fieldwork, and research skills in the broad area of biofuels and bioproducts research. Professional development workshops are also provided.

Program Goals

1. To **excite** undergraduate students about cutting edge research in the area of biofuels and bioproducts.
2. To **develop** skills needed for future biofuels and bioproducts research careers
3. To **increase** the number of students participating in biofuels and bioproducts research in the northwest, including those from schools that do not have strong research efforts.
4. To **integrate** mentoring experiences for graduate students and post docs into a formalized training program.

Student Recruitment/Applications

During 2014/2015 we advertised with the NARA website as well as interacting with faculty members to increase visibility of the program on their home campuses. Due to increased efforts in advertising (in particular on the website "Institute for Broadening Participation: Pathways to Science"), this year we received 91 applicants. Approximately 37% of the applicants discovered the program via the Pathways to Science website.

Demographics of 2015 participants were 62% women, and 15% Hispanic, 15% African American, 8% Asian/Pacific, and 62% Caucasian.

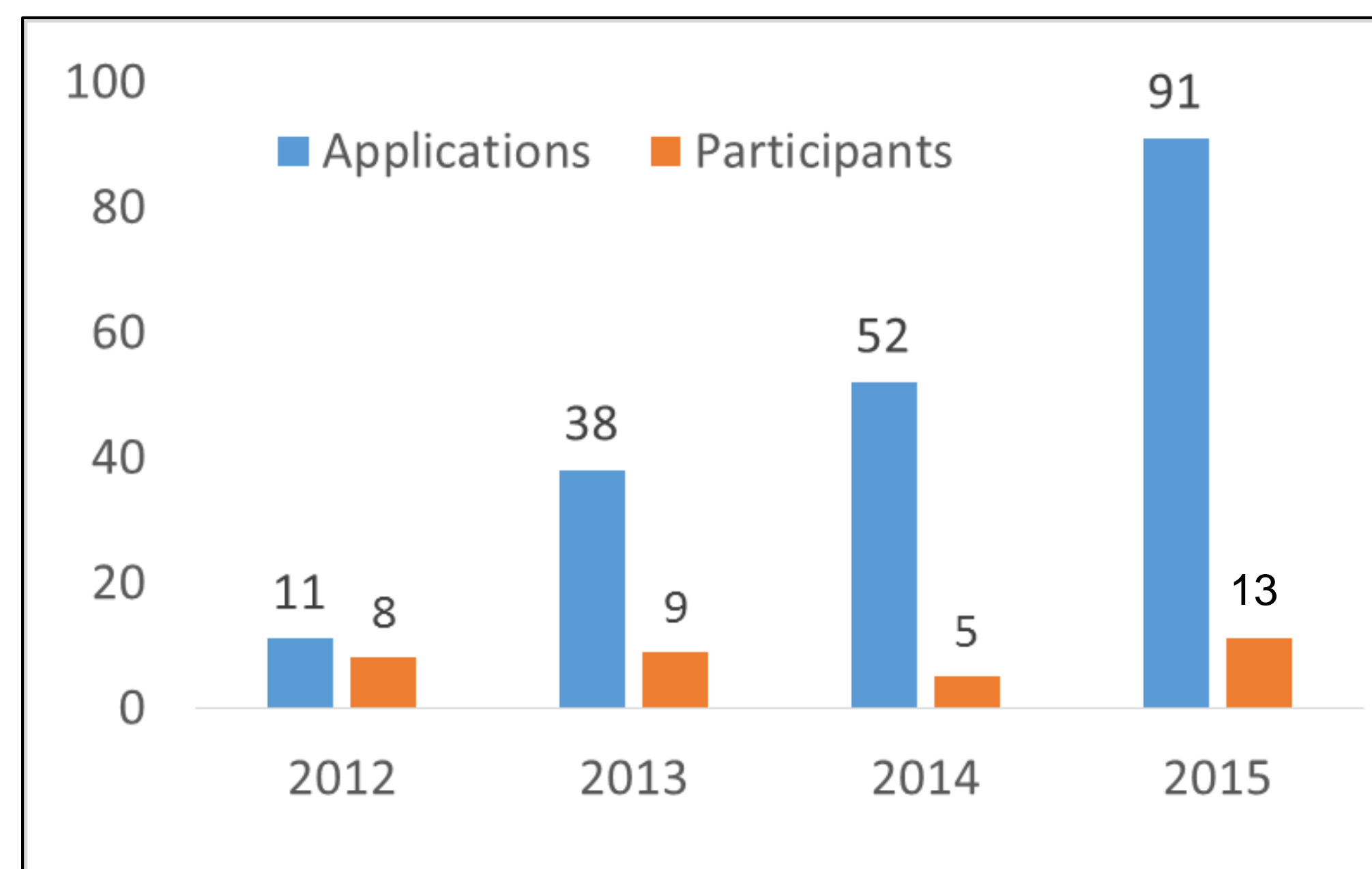


Figure 1: Number of SURE Applications and participants over the past 4 years.

Faculty Recruitment

Recruitment of faculty mentors still continues to be an issue. Finding enough mentors can be a limitation, and correctly matching students with the appropriate skills to a project can also be difficult. Several projects were identified for the summer of 2015, but students were not well suited to work on those projects. Consequently, there were two mentors that did not work with students.

PLEASE contact Shelley Pressley if you are interested in mentoring a student in 2016.

2015 Participants

Students were selected based on their applications and skills (relative to the proposed projects). In Pullman students were co-located in housing with other summer researchers. The other NARA SURE students were located in varied places, as shown in Table 1. All students traveled to Pullman and spent 1.5 days participating in professional development activities, and then they participated in a poster session on July 31. The 13 students enjoyed meeting each other, sharing lunch together and hearing about each other's research.

Student	Home Institution	Faculty Mentor	SURE Location	Research Title
Maika Bui	University of Washington	Jinwen Zhang	WSU Pullman - CMEC	Synthesis of Lignosulfonate Hydrogels cross-linked with PEGDGE
Kyle Thompson	San Jose State University	Jinwen Zhang	WSU Pullman - CMEC	Characterization and Modification of Asphalt With Epoxy Resins Synthesized From Pyrolysis Oil, a Derivative of Lignocellulosic Biomass
Bailey Tebou	North Carolina State University	Brian Lamb	WSU Pullman	Air Quality Impact of the NARA Biorefinery
Shakema Haynes	University of Arkansas at Pine Bluff	Ian Dallmeyer	WSU Pullman	Activated Carbon by Chemical Activation of Lignin with Potassium Hydroxide
John Barth	Washington State University	Jinwu Wang	WSU Pullman - CMEC	Comminution of Unmerchantable Forest Residuals to Determine Power and Energy Consumption as a Function of Moisture Content and Size Reduction Range
Adriana Guzman	Washington State University	Karla Eitel	MOSS - McCall ID	Making The Chemistry of the NARA Project Visible: CO2 Consumption and Biofuel Transportation Adventure Race
Sarah Wilkins	Yale University	Karla Eitel	MOSS - McCall ID	Middle and High School Energy Education
Emi Schwartz	University of Washington	Karla Eitel	MOSS - McCall ID	Forest Ecology and Biofuel Production Potential for Tribally-Managed Forests in the Northern Rockies
Jennifer Murphy	University of Idaho	Karla Eitel	MOSS - McCall ID	Educating Youth on Air Pollution Caused by Transportation
Mark Wohlpart	The Pennsylvania State University	Paul Smith	Penn State	Screening Value-Added Market Opportunities for Lignin
Oshauna Morgan	Johnson C. Smith University	Xiao Zhang	WSU TC - Richland, WA	Catalytic Oxidation of Lignin for Value Added Chemicals
Kasey Markland	Washington State University - TC	Xiao Zhang	WSU TC - Richland, WA	Demethylation of Lignin and Lignin Model Compounds to Value Added Compounds
Aleksandr Kirpach	Tufts University	Rob Harrison	U Washington/OR	Preventing Nitrogen Depletion in Forests Undergoing Forest Residual Removal

Table 1: 2015 NARA SURE participants along with their home institution, faculty mentor, SURE summer location, and research title.



Figure 2: 2015 NARA SURE participants and Director. (l to r, row 1): Shakema Haynes, Maika Bui, Sarah Wilkins, Adriana Guzman (row 2): John Barth, Jennifer Murphy, Emi Schwartz, Alex Kirpach (row 3): Bailey Tebou, Shelley Pressley, Mark Wohlpart, Kyle Thompson, Oshauna Morgan, and Kasey Markland.

NARA SURE Program Summary and Next Steps

- ❖ A total of 35 students have been educated and trained for future biofuels and bioproducts research over the past 4 years.
- ❖ Next steps for the summer of 2016 is to increase the number of faculty mentors and research projects available for undergraduates.
- ❖ Spring 2016, plan to submit a proposal to USDA for Undergraduate Research Fellowships, *looking for collaborators.*

Possible Benefits of Doing Research (Ranked based on their 2015 Experience)	'Extremely valuable' or 'valuable' benefit
Learned what it's like to be a researcher	80%
Determined that I want to continue studying science or engineering	60%
Travel to an interesting/different/new place	70%
I found a particular field of research offered through this program very interesting	60%
Learned what it's like to do research for grad school	50%
Obtained hands-on experience to go with my class experience	80%
Get experience/publications that I'm proud of and can put on my resume	80%
Financially benefit	90%
I want to improve my analytical abilities.	70%
Something different than I've done before.	90%
This was my only option/job possibility for this time during the summer.	70%

Table 2: 2015 NARA SURE perceived benefits after completing the summer experience. Response rate of 77%.