



Hydro Research Foundation
University Research Awards

Brenna Vaughn

Hydro Research Foundation

brenna@hydrofoundation.org 720-722-0473

February 2017

Hydro Research Foundation University Awards Program

The Challenge: Recognizing the need to stimulate new academic interest in hydropower and a large number of opportunities for employment, how does the industry respond with a meaningful program?

The Response: Targeted student research and a 93% placement rate of students into hydro-related careers.

Partners:

- 19 universities
- 41 organizations
- 27 researchers
- 35 mentors

Next Generation Hydropower (HydroNEXT)

Optimization

- Optimize technical, environmental, and water-use efficiency of existing fleet
- **Collect and disseminate data on new and existing assets**
- Facilitate interagency collaboration to increase regulatory process efficiency
- Identify revenue streams for ancillary services

Growth

- Lower costs of hydropower components and civil works
- Increase power train efficiency for low-head, variable flow applications
- Facilitate mechanisms for testing and advancing new hydropower systems and components
- Reduce costs and deployment timelines of new PCH plants
- **Prepare the incoming hydropower workforce**

Sustainability

- Design new hydropower systems that minimize or avoid environmental impacts
- Support development of new fish passage technologies and approaches
- Develop technologies, tools, and strategies to evaluate and address environmental impacts
- Increase resilience to climate change

Next Generation Hydropower (HydroNEXT)

Growth

- Lower costs of hydropower components and civil works
- Increase power train efficiency for low-head, variable flow applications
- Facilitate mechanisms for testing and advancing new hydropower systems and components
- Reduce costs and deployment timelines of new PSH plants
- **Prepare the incoming hydropower workforce**

The Impact

- Build—Fund 33 researchers to conduct research relevant to hydropower
- Develop—Partnership to support the work. 41 organizations and 35 mentors
- Engage—Find placement for students and linkages for students to continue hydropower work
- Spread the Word—Disseminate findings, publicize, publish
- Results—33 productive research findings, high placement rate of students in workforce/continued research and complete by 2018.

- 14-person Steering Group from a broad array of industry and academic organizations
- Nationwide recruitment of applicants from 1,200 contacts at 125 universities in all 50 states
- Online application process
- Input on research topics coordinated with industry
- Award includes tuition and health insurance allowances, living stipend, advisor discretionary fund, and attendance at Research Roundtable & HydroVision
- Students are provided a Steering Group and industry mentor relevant to research area
- Highly supported with 19 universities providing support, mentors, and high industry engagement

- This nationwide program has funded a diverse group of 27 students at 19 universities in a broad variety of studies
- Three research roundtables have been held where students presented findings and updates and were exposed to industry opportunities
- Seven partnerships were created with Avista Foundation, Knight Piesold, American Hydro, U.S. Army Corps of Engineers (USACE), U.S. Bureau of Reclamation, PennWell Corporation and Sciaky
- Each student is paired with a mentor from industry ensuring a ready-made personal hydropower network
- In-Kind support of universities for each student

- 27 projects funded. Original goal was 8–10.
- 14 completed research products and 13 continued hydropower related work (a 93% placement rate)
- One journal article published, many others being considered
- 22 presentations
- One patent application filed
- 41 organizations engaged in work of program
- Funding is reaching all regions, benefitting most sectors through knowledge and workforce entrants
- Good program management has enabled double of the number students originally envisioned to be funded.

- Project initiation date: February 2014
- Planned completion date December 2018
- Milestones for 2014–2016
- Eight tasks completed on-time and under-budget, including selection of three years of students, completed results, roundtables held all three years, publishing of findings
- Cost time extension made in September 2016 for a 2017 class of students expanding the program by three tasks for a total of 12 tasks
- Six to eight additional students to be funded in 2017
- Eight milestones completed on-time

Budget History

FY2014		FY2015		FY2016	
DOE	Cost-share	DOE	Cost-share	DOE	Cost-share
\$132k	\$135k	\$320k	\$285k	\$348k	\$161k

- The FOA that this award was selected from was opened in June of 2013 (Q4 FY 2013) and the project was awarded in Q2 of FY 2014 with \$999.997k of DOE funds from FY 2013
- The numbers in the above table represent amounts that were costed (spent) in each fiscal year
- Due to successful management of funds over 23 awards were made to students
- Project budget spent to date: 61%
- Other support received from each university, National Hydropower Association, Avista Foundation, PennWell Corporation, American Hydro, Knight Piesold, U.S. Bureau of Reclamation, USACE, and Sciaky Inc.

Partners, Subcontractors, and Collaborators:

Partners - 7

Labs - 2

Universities - 19

Mentors - 35

Supporting Organizations - 41 (includes labs)

Communications and Technology Transfer:

22 Presentations regarding program and research

Three Research Roundtables presenting 27 pieces of research to over 250 industry members

14 completed findings with an average monthly view of 63 which could be extrapolated across the term of the grant to at least 2,200 views. Tracking of citations in progress.

FY17/Current research:

Funding of a 2017 class of researchers is underway
Expect to fund six to eight (6–8) more students
Hold two more research roundtables
Collect 19 research findings

Proposed future research: Identify how to expand/extend program based on DOE programs and consider creating a suite of educational programs for undergraduate students and trades/craft level students to prepare additional workforce entrants.