

Each [QUBES Resource of the Week](#) highlights openly licensed materials shared by QUBES users and partners.

# QUBES-ESA partnership uses online Faculty Mentoring Networks to prepare faculty for teaching quantitative biology to undergraduates

By Nicole Chodkowski, Gabriela Hamerlinck, R Deborah Overath, Teresa Mourad, Kristin Jenkins, Sam S Donovan, Arietta Fleming-Davies, and Jeremy M Wojdak

**QUBES-ESA partnership uses online Faculty Mentoring Networks to prepare faculty for teaching quantitative biology to undergraduates**  
 Nicole Chodkowski<sup>1</sup>, Gabriela Hamerlinck<sup>2</sup>, R. Deborah Overath<sup>3</sup>, Teresa Mourad<sup>4</sup>, Kristin Jenkins<sup>5</sup>, Sam Donovan<sup>6</sup>, Arietta E. Fleming-Davies<sup>7</sup>, and Jeremy Wojdak<sup>8</sup>  
<sup>1</sup>Raffaello University, Raffaio, VA, <sup>2</sup>University of Florida, Gainesville, FL, <sup>3</sup>Texas Southern College, Brownsville, TX, <sup>4</sup>Education & Diversity Programs, Ecological Society of America, Washington, D.C., <sup>5</sup>IBiG/QUEST Curriculum Consortium, Bowie, MD, <sup>6</sup>University of Pittsburgh, Pittsburgh, PA, <sup>7</sup>University of San Diego, San Diego, CA

**INTRODUCTION**

- Quantitative skills such as the ability to analyze and evaluate data sets are important for undergraduate educational and career success (Hixon and Chang, 2015).
- The rapid development of new scientific methods and availability of datasets means that faculty may require additional training to stay up to date for teaching with these tools.

**QUBES**

- Quantitative Undergraduate Biology Education and Synthesis (QUBES) is a multi-institution project that supports a community of faculty and biology educators who share resources and methods for preparing students to use quantitative approaches to tackle real, complex biological problems.
- QUBES uses a central server model to store biology and mathematics faculty and to support collaborations between producers and consumers of educational-related resources.
- Our central platform (QUBESHub) facilitates faculty professional development and sharing open educational resources for teaching quantitative skills.
- We promote student teaching practices by publishing module exemplars, hosting discussions of evidence-based pedagogies, and thoughtful reflections on implementation results, and sharing educational materials with the community.

**FACULTY MENTORING NETWORKS**

- Faculty mentoring networks (FMNs) are online communities of faculty that support the acquisition and implementation of material and/or instructional approaches in their classrooms.
- Typically, participants meet frequently over the course of a semester to discuss module implementation, pedagogical practices, and share educational resources.

**DATA DISCOVERY FMN**

- ESA's Education and Diversity Program (EDP) has partnered with QUBES to collaborate in developing a data-focused Faculty Mentoring Network (DFMN).
- "Data Discovery" programs provide faculty to work with large-scale datasets using data-rich teaching materials from teaching courses and experiments in Ecology (TLE).
- Adaptations of these teaching materials developed during our FMNs are shared with the broader education community.

**RESULTS**

- The "Data Discovery" FMN has gone through four iterations since Spring 2015 and has generated 56 final products (combinations of existing TLE resources).
- The 56 faculty participants spanned 21 colleges throughout the United States and Puerto Rico (Research coordination: 20% (12/56), Post-47% (27/56), 2-year: 18% (10/56) (figures 4 and 5)).
- Open Education Practices (OEP) foster scholarly teaching by providing access to instructors who share faculty on their campuses, and share high-quality teaching resources and strategies.
- Having several options for how to approach a single lesson should multiply the potential value of the original TLE resource. Faculty may now create their own version they can implement given their unique classroom situation.
- Faculty are often not comfortable sharing resources, however, our FMN participants felt more comfortable sharing their resources and teaching materials after the FMN (figures 6A, 6B, and 6C).

**DISCUSSION**

- QUBES FMNs allowed faculty to engage in a professional development opportunity that resulted in authentic, data-focused lessons for their classroom with minimal time and financial investments.
- This successful partnership with ESA has provided students with the opportunity to apply quantitative skills to real-world datasets.

## Module Description:

QUBES Faculty Mentoring Networks (FMNs) are online communities of faculty that support the adaptation and implementation of materials and/or instructional approaches in their classrooms. This resource is a poster that provides a quick orientation to FMNs and specifically highlights Ecological Society of America's Data Discovery FMNs. The poster abstract is below.

Biology graduates are expected to analyze and evaluate data, but many biology courses are developed to deliver content and concepts. Focusing on using data in undergraduate biology classrooms provides a unique opportunity for students to develop and apply quantitative skills to current environmental issues. As datasets become more complex, faculty may require additional training to effectively use data in their classroom. The Quantitative Undergraduate Biology Education and Synthesis (QUBES; [www.qubeshub.org](http://www.qubeshub.org)) project offers an online platform to facilitate faculty professional development and sharing open educational resources for teaching quantitative skills. ESA's Education and Diversity Program Office has partnered with QUBES to collaboratively develop a data-focused Faculty Mentoring Network (FMN). FMNs are online communities of faculty that support the adaptation and implementation of materials and/or instructional approaches in their classrooms. The "Data Discovery" FMN prepares faculty to work with large-scale datasets. FMN participants use data-rich teaching materials from [Teaching Issues and Experiments in Ecology \(TIEE\)](#). Adaptations of these teaching materials developed during our FMNs are shared with the broader education community. Here, we present success metrics of the QUBES-ESA partnership by reporting the number of products (i.e. TIEE module adaptations) generated and faculty involvement over four FMNs.

## Results/Conclusions

The "Data Discovery" FMN has gone through four iterations since Spring 2016. Our past FMNs have a nearly 100% completion rate, meaning, almost all 38 participants earned the ESA education scholar title after completing the FMN. Participants in the first three "Data Discovery" FMNs generated [63 final products](#), mostly comprised of adaptations or modifications of existing TIEE resources. Having several options for how to approach a single lesson should multiply the potential value of the original TIEE resource – faculty may more easily find a version they can implement given their local constraints. The 38 faculty participants spanned 35 colleges throughout the United States and Puerto Rico (Research universities= 23% (8/35), PUI= 74% (26/35), 2-year= 11%

(4/35)). Final results will include the currently running 2018 “Data Discovery” FMN. We expect an additional 14 products will be produced. Overall, the QUBES online platform has reduced time and financial investment barriers to professional development of its faculty participants. This successful partnership with ESA has provided various students with the opportunity to apply quantitative skills to real-world datasets and will continue to help faculty implement authentic, data-focused lessons in the classroom.

## Teaching Setting:

FMNs are professional development opportunities for faculty in any teaching setting. There are a variety of FMNs running every semester, each with a unique theme, making it easy to find FMNs that align with your teaching goals.

## QUBES Citation:

Chodkowski, N., Hamerlinck, G., Overath, R. D., Mourad, T., Jenkins, K., Donovan, S. S., Fleming-Davies, A., Wojdak, J. M. (2018). [QUBES-ESA partnership uses online Faculty Mentoring Networks to prepare faculty for teaching quantitative biology to undergraduates. QUBES Leadership Team](#), QUBES Educational Resources. [doi:10.25334/Q4G71G](#)

Visit Resource



Share



Tweet

## Related Materials and Opportunities:

If you missed their poster presentation at the [Ecological Society of America 2018 Conference](#), you can still meet the authors and ask questions in person when they present

this poster at the [2018 National Association of Biology Teachers \(NABT\) Conference](#), which is being held in San Diego on Nov. 8-11, 2018.

The following FMNs are currently running during the Fall 2018 semester:

- [DIG into Data for the Biology Classroom FMN](#)
- [HHMI BioInteractive FMN](#)
- [Reducing Barriers to Teaching with R in Undergraduate Biology FMN](#)
- [Amplifying data analytic opportunities in your CURE FMN](#)
- [Building mathematical intuition with online MathBench Biology Modules FMN](#)
- [NEON Data Education Fellows FMN](#)
- [Plants by the Numbers 2: Growing Quantitative Literacy Using Botany FMN](#)

Applications are now open for the Spring 2019 [Ecological Society of America \(ESA\)-sponsored Data Explorers: Using ecological data in undergraduate biology classrooms FMN](#). The application deadline is Nov. 30, 2018.

Several additional FMNs are currently being planned for Spring 2019. Just a few of the potential FMN topics include reducing students' math anxiety, building students' data acumen, teaching with quantitative case studies, and using R in discipline-based education research.

If you are interested in staying up to date on the latest FMN information, be sure to [subscribe to the QUBES newsletter](#).

To learn more about FMNs, please [visit our FMNs page](#) and feel free to contact Deborah Rook at deb.rook "at" bioquest.org with questions.

*If you adopt and adapt this module, you are highly encouraged to share your adaptation back with the QUBES community using the QUBES Resources System for sharing Open Education Resources.*

QUBES on Social Media



QUBES is a community of math and biology educators who share resources and methods for preparing students to use quantitative approaches to tackle real, complex, biological problems.

---

*Copyright © 2019 QUBES, All rights reserved.*

P.O. Box 126, Boyds, MD 20841

You are receiving this email because you have shown interest in receiving updates from QUBES.

[Subscribe / Unsubscribe](#) from mailing list

[View ROW on QUBESHub](#)

QUBES Resource of the Week: Issue 10