QUBES: Building a community to promote undergraduate quantitative biology education

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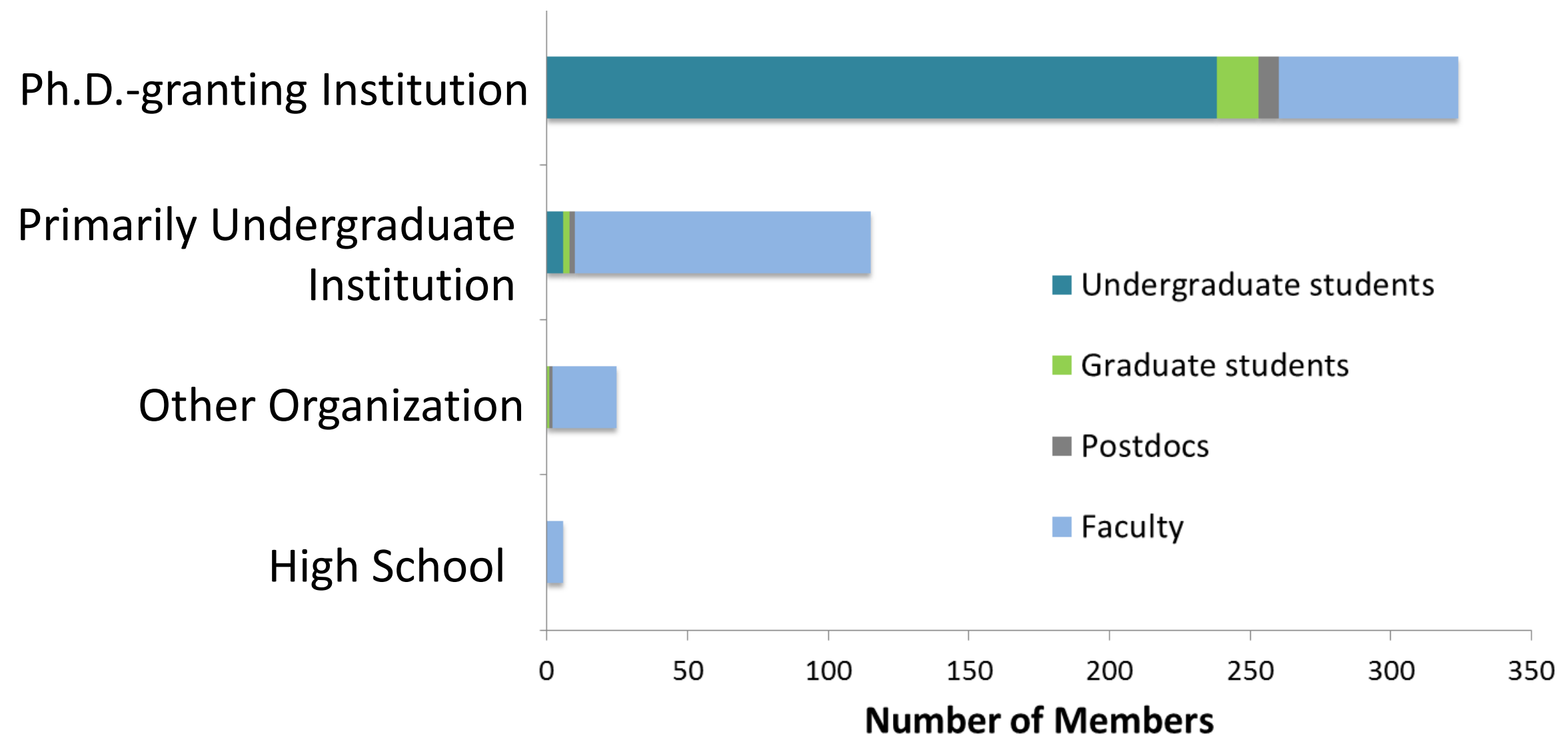
QUBES Goals

Quantitative skills have been recognized as core competencies for career success in biology, and many faculty are interested in teaching more quantitative biology in their courses. The QUBES project is designed to:

- Improve communication among educators
- Assist faculty in understanding and implementing novel content and teaching strategies in their unique classroom settings
- Create an academic reward system that emphasizes teaching as well as research

To meet these goals, QUBES is building a diverse online community of educators interested in quantitative biology.

The QUBES community is diverse



QUBES primarily targets faculty teaching undergraduate biology courses, but users also come from industry, non-profits, and secondary schools. Undergraduate students are welcome to join the QUBES website to use the on-site software. There are no fees to join!

QUBES supports meetings and workshops

Participants in the 2015 Quantitative Biology Education Summit

The QUBESHub website provides tools to increase visibility, collaborations, and follow-up for in-person meetings and workshops. Planning a meeting? Contact us about providing an online collaborative space: qubeshub.org/groups/supportmeetings

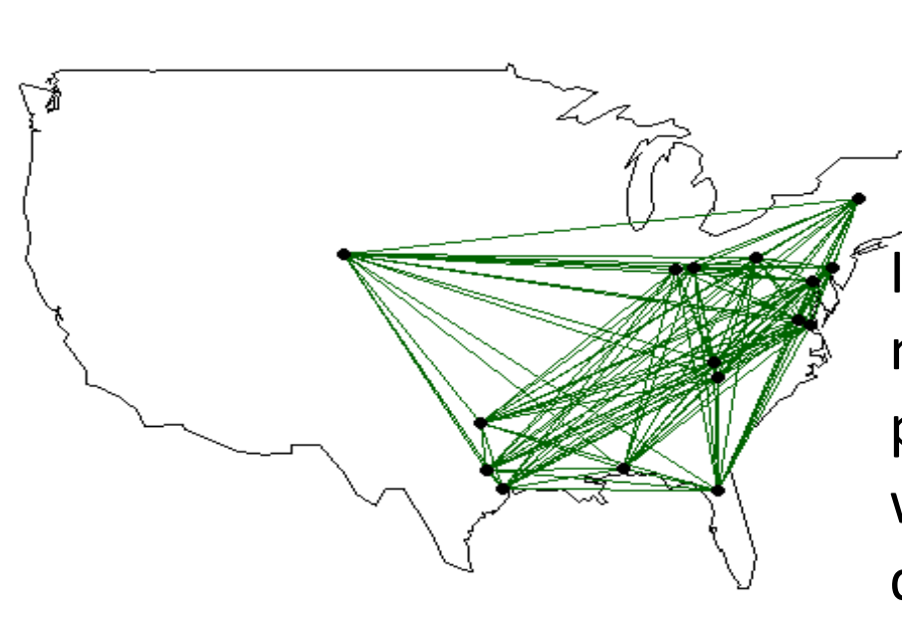
Learn how to get involved at qubeshub.org

QUBES
The Power of Biology × Math × Community

Faculty mentoring networks support faculty adoption of quantitative biology teaching

Faculty mentoring networks are:

- Online groups of 10-15 faculty members
- Focused on specific topics
- Led by teams of experts in biology, math, and pedagogy
- Intensive support over a short time period



In the DryadLab faculty mentoring network, participants connect with other faculty at 14 different institutions.

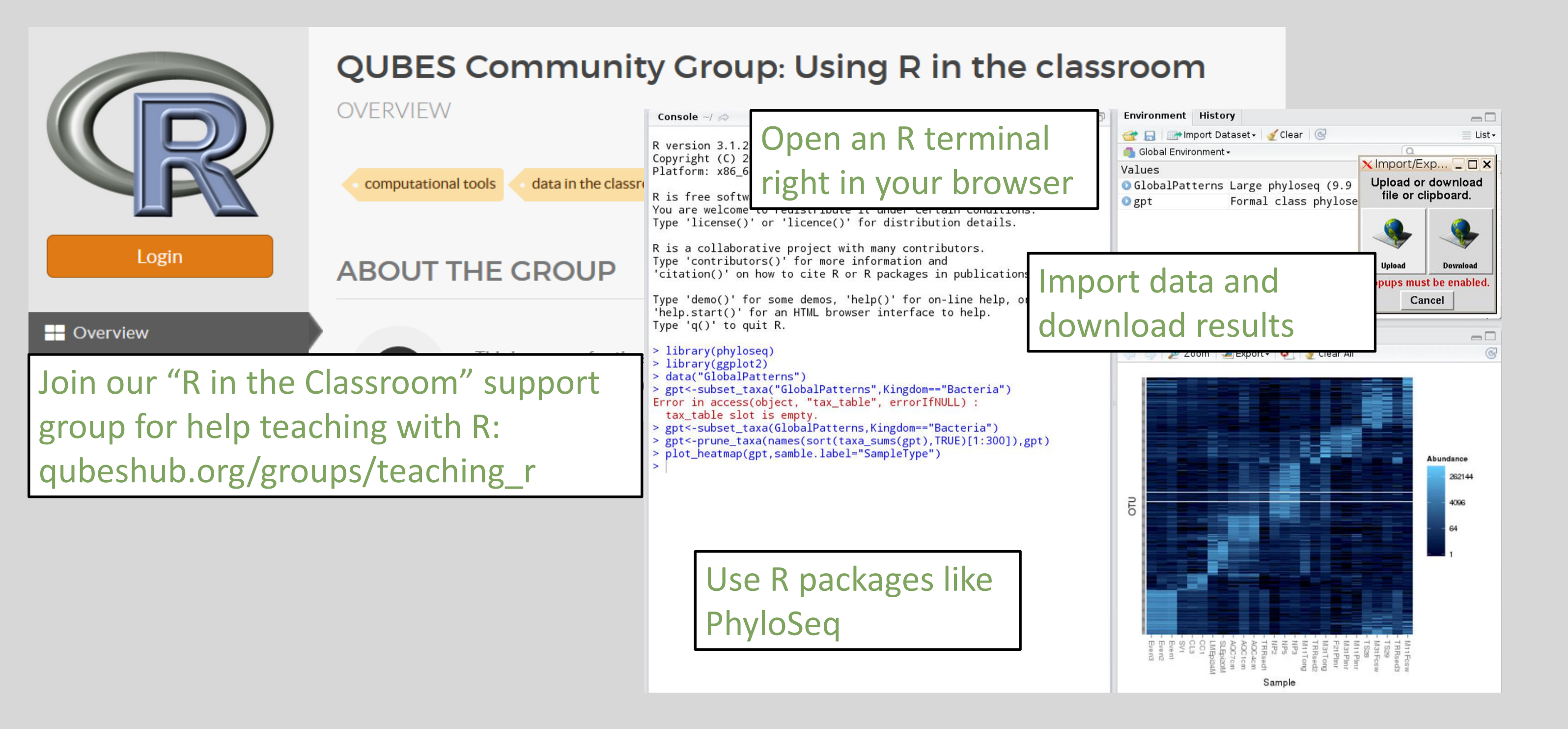
Network	Can I join?	Focus
Populus	Past	Using Populus software to build student understanding of population models
	Past	For faculty at Radford University
DRYAD LAB	Closed	Ecological data-driven DryadLab teaching modules
	Apply today!	Teaching agent-based modeling with Netlogo, a student-friendly software
AIMS	Apply today!	Image analysis as a tool to help students understand math/stats

qubeshub.org/facultymentoringnetworks

Computational tools let students run quantitative software on-site

On-site software:

- Students can use cloud-based software
- Features many popular programs like RStudio, FastQC, Netlogo
- Faculty can upload data files for student use



QUBES Community Group: Using R in the classroom

```
> library(phyloseq)
> library(ggplot2)
> data("GlobalPatterns")
> gpt<-subset_taxa("GlobalPatterns",Kingdom=="Bacteria")
Error in access(object, "tax_table", errorIfNULL) :
  tax_table slot is empty.
> gpt<-subset_taxa(GlobalPatterns,Kingdom=="Bacteria")
> gpt<-prune_taxa(names(sort(taxa_sums(gpt),TRUE)[1:300]),gpt)
> plot_heatmap(gpt,samble.label="SampleType")
>
```

Open an R terminal right in your browser

Import data and download results

Join our “R in the Classroom” support group for help teaching with R: qubeshub.org/groups/teaching_r

Use R packages like PhyloSeq

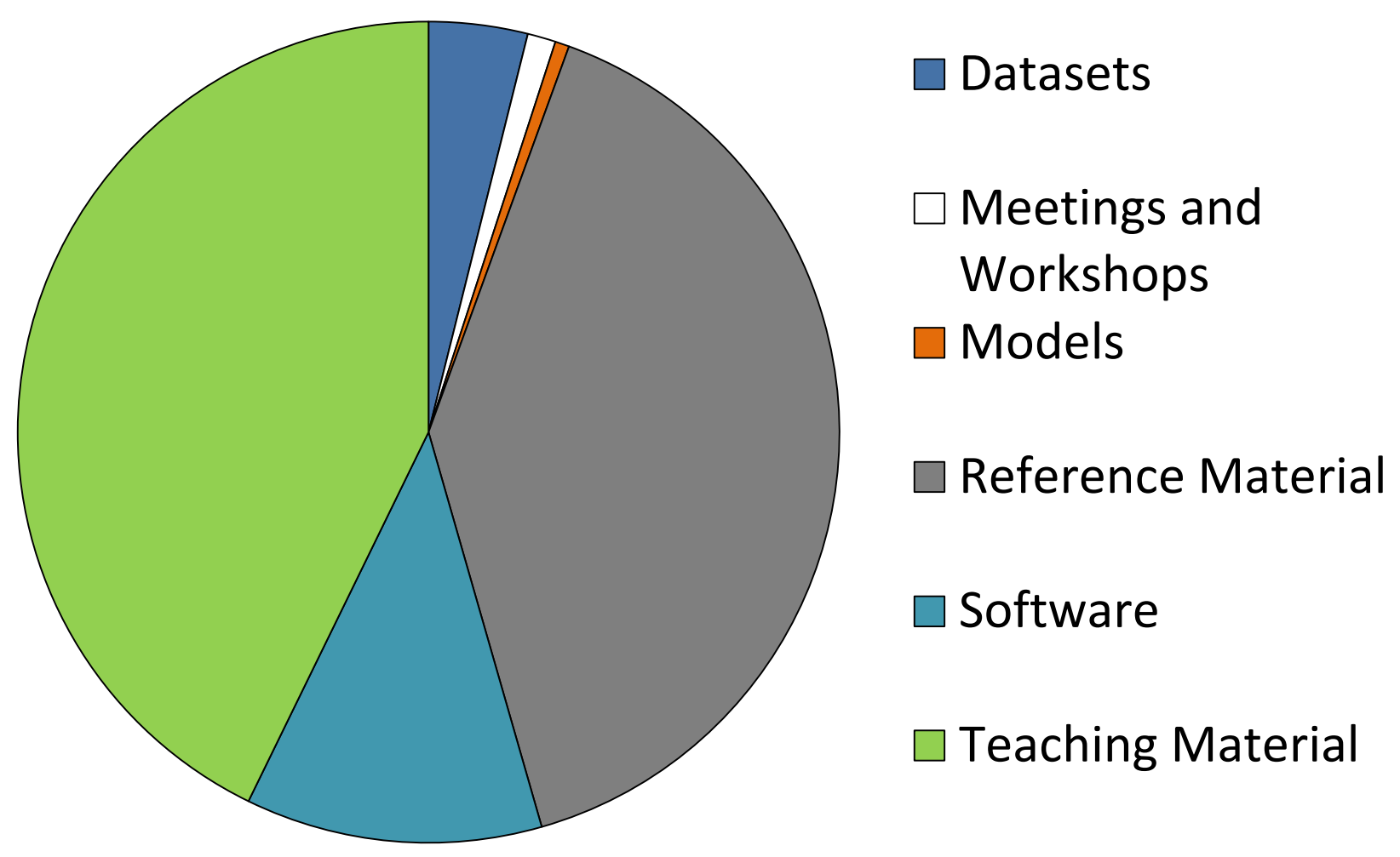
qubeshub.org/resources/software

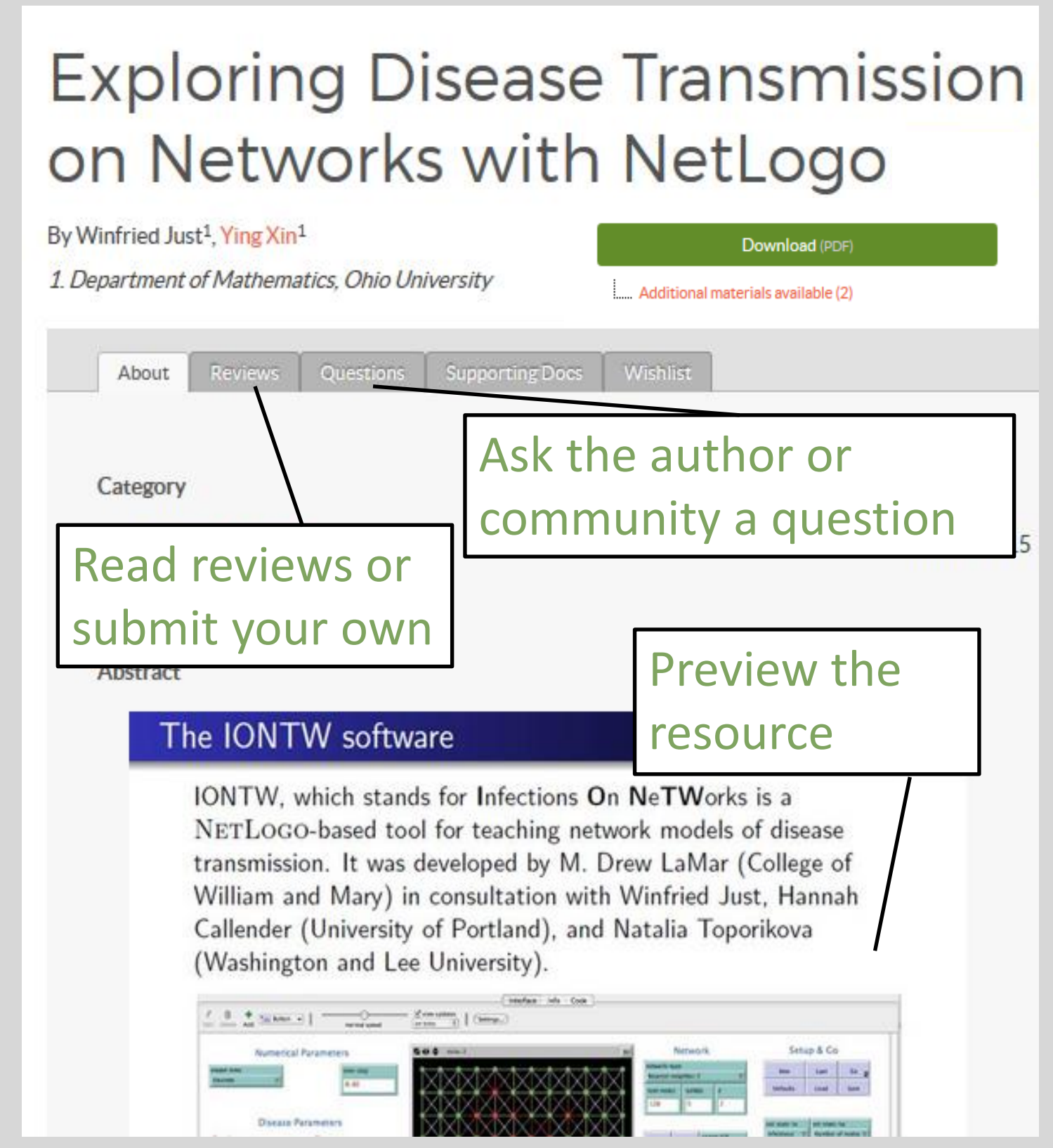
Resources help faculty find quantitative biology teaching materials

Resources are:

- Submitted by community members
- Ranked and reviewed by users
- Interactive – users can ask a question
- Tagged with key search words
- Free!

Distribution of resource types currently on QUBES Hub:





Exploring Disease Transmission on Networks with NetLogo

By Winfried Just[1], Ying Xin[1]

1. Department of Mathematics, Ohio University

The IONTW software

IONTW, which stands for Infections On NeTWorks is a NETLOGO-based tool for teaching network models of disease transmission. It was developed by M. Drew LaMar (College of William and Mary) in consultation with Winfried Just, Hannah Callender (University of Portland), and Natalia Toporikova (Washington and Lee University).

Ask the author or community a question

Read reviews or submit your own

Preview the resource

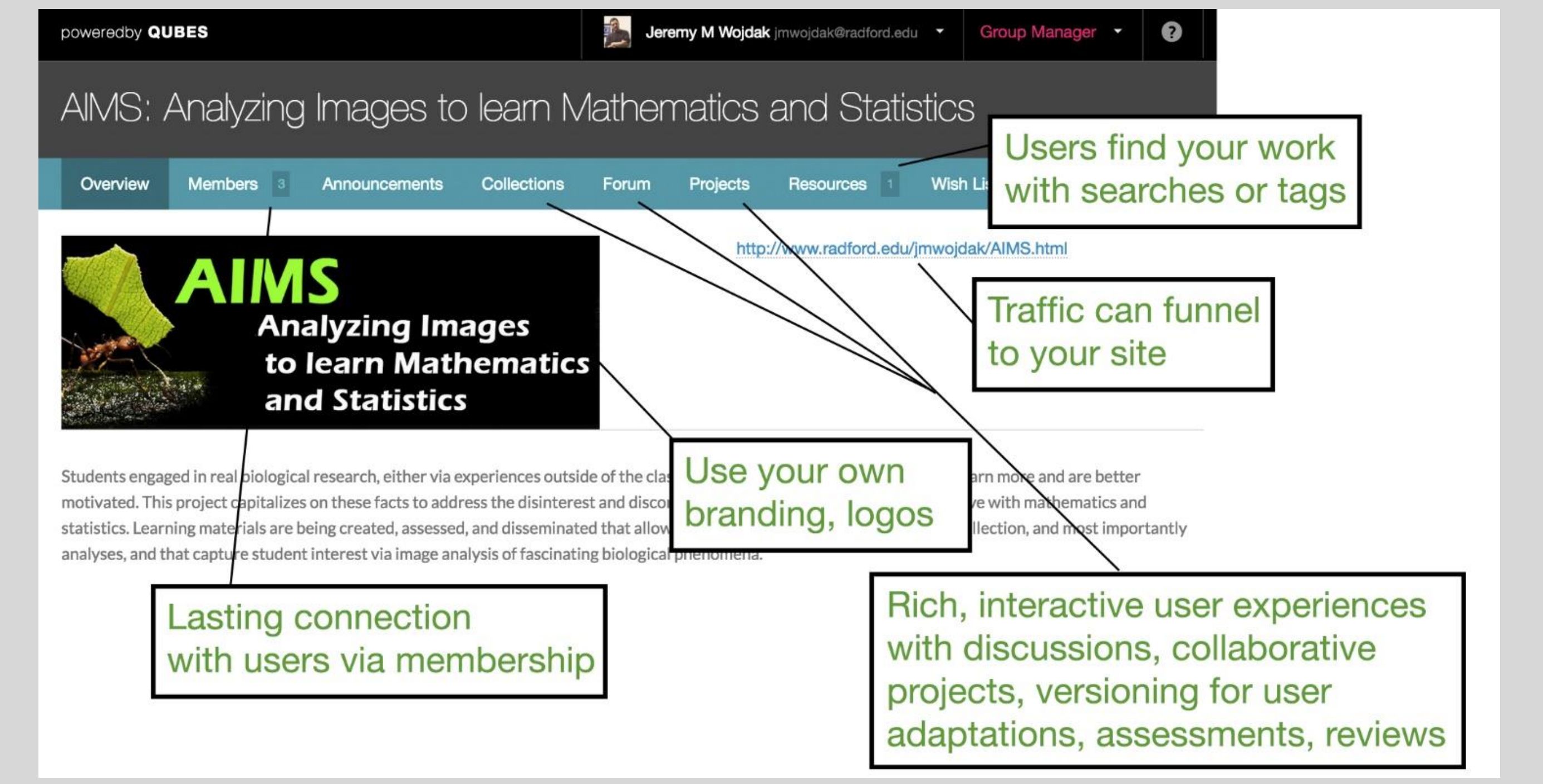
Example of a Reference Material resource on QUBES Hub

qubeshub.org/resources

Partner pages help promote faculty projects and materials

Partner pages:

- Bring faculty projects directly to the target audience
- Encourage community interaction with materials
- Use the project’s own look and branding
- Can support a customized site for a textbook, short course, or outreach component of a grant



AIMS: Analyzing Images to learn Mathematics and Statistics

Users find your work with searches or tags

Traffic can funnel to your site

Use your own branding, logos

Lasting connection with users via membership

Rich, interactive user experiences with discussions, collaborative projects, versioning for user adaptations, assessments, reviews

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Jeremy M Wojdak jmwojdak@radford.edu
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http://www.radford.edu/jmwojdak/AIMS.html
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qubeshub.org/projectpartnership

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