

## NANCY BOURY

Assistant Professor

Plant Pathology and Microbiology

Microbiology Interdepartmental Program

Iowa State University, Ames, IA 50011-4009

E-mail: [nan1@iastate.edu](mailto:nan1@iastate.edu)

ORCID iD: <https://orcid.org/0000-0003-1438-8299>

### Teaching Philosophy Summary

As a teacher, my first concern is creating conditions that encourage students to reach their full potential, both in and out of the classroom. The courses I teach are in the biological sciences, which are notorious for the amount of new terminology presented each semester. I challenge students to go beyond memorizing facts and vocabulary to asking how biologists study the living world. In each of these classes, I want my students to become enthusiastic scholars with an active interest in the biological sciences.

I believe the role of the teacher in a classroom is to serve as an example of a professional scholar. This means staying current in microbiology, immunology and general biology. Part of this scholarship is adding to the tools available to other students and instructors by writing instructor's manuals for textbooks, student study guides and textbooks. The second part of being a teaching scholar is implementing proven teaching techniques and testing new methods to determine if they increase engagement, learning and higher order thinking skills. This requires a willingness to try new things as well as planning and organizational skills needed to assess student learning so valid comparisons can be made. The ideal teacher is knowledgeable, current in his or her field of study, enthusiastic, respectful and cares about students as both fellow human beings and fellow scholars. Most of all, the ideal teacher takes the long view and asks the basic question: "How can their experiences in this course and at this university foster the professional development of students?" In a perfect world, graduates are critically thinking, responsible, scholarly members of society.

### Courses Taught

**General Biology I** (Organismal Biology, Evolution, Intro Genetics, Ecology), **General Microbiology** (Majors – Cell Biology, Genetics, Ecology, Metabolism, Host-Pathogen Interactions), **General Genetics** (Transmission, Molecular, Population Genetics), **One Health: Predicting the next Pandemic** (One Health Principles and Science Literacy), **SEA-PHAGES** – (Phage discovery and annotation CURE courses)

### Experience with Evidence-Based Teaching.

I am a graduate of the Biology Scholars program with over 20 years' experience in the classroom. This includes being the assessment coordinator for the microbiology undergraduate program and publishing both curriculum and research papers in a variety of DBER journals, presenting at both SABER and ASMCUE national meetings, and winning multiple teaching awards for evidence-based teaching.

- A. DBER Presentations and Publications (2015-present)
  - **Nancy Boury**, Kanwal Alvarez, Amaya Garcia Costas, Gwendolyn Knapp, Rebecca Seipelt-Thiemann. (2021) Teaching in the time of COVID-19: Creation of a Digital Internship to Develop Scientific Thinking Skills and Create Science Literacy Exercises for use in Remote Classrooms. *Journal of microbiology & biology education* – Accepted
  - **Nancy Boury** Interactive Journal Club for the Masses: Teaching Students to Read Primary Literature. Presented virtually at ASMCUE, 2020.
  - Massimelli, Julia, Kameryn Denaro, Brian Sato, Pavan Kadandale, and **Nancy Boury**. "Just figures: A method to introduce students to data analysis one figure at a time." *Journal of microbiology & biology education* 20, no. 2 (2019). DOI 10.1128/jmbe.v20i2.1690
  - **Nancy Boury** Using Game-Design Strategies to Develop Higher Order Skills with Vocabulary: Microbiology Code Names (2018) Presented at ASMCUE, 2018

- Aune J, Evans L, **Boury N.** (2018). Using nonfiction narratives in an English course to teach the nature of science and its importance to communicating about science. *Journal of microbiology & biology education* 19(1): doi:10.1128/jmbe.v19i1.1435
- **Nancy Boury** and Samantha Parks (2017) Finding Funds: Identifying Local Opportunities and Networking to Secure Support for Educational Activities and SOTL Research. Presented at ASMCUE ~50 participants
- Paustian, T. D., Briggs, A. G., Brennan, R. E., **Boury, N.**, Buchner, J., Harris, S., ... & McDonald, A. H. (2017). Development, validation and application of the Microbiology Concept Inventory. *Journal of microbiology & biology education* doi.org/10.1128/jmbe.v18i3.1320
- **N. Maroushek Boury** "Primary Literature in Large Lecture General Microbiology: Using Personal Response Systems to increase Science Literacy." Presented at the ASM conference for undergraduate educators, 2016.
- **N. Boury.** Enabling Student Choice to Foster Metacognition and Self-Regulated Learning in an Online Microbiology Course. Presented at the ASM conference for undergraduate educators, 2015.

#### B. Grants & Awards received (2015-present)

- ASM Concept Inventory Conference - NSF-DUE #1625772 (awarded Spring 2016)
- "Tools for Assessment in Genetics (TAG)" NSF-DUE #1710262 \$182,812 (awarded July 2017)
- "Evaluating the success of RCR training: development, validation, and application of an assessment tool" NSF-CCE STEM \$523,413 NSF-SES# 1736990 (Awarded August 2017)
- Miller Faculty Fellowship, "Save Us: Online general microbiology students as post-apocalyptic plague survivors" (Awarded 2017)
- College of Agriculture and Life Sciences Online Teaching award (Spring 2020)
- Iowa State University Innovative Teaching Award (Spring 2020)

#### Educational Innovations Employed

I have adopted both Universal Design for learning and Backwards design practices in all of my courses. This means the learning objectives are determined prior to the assessment plan. Once both learning objectives and the assessment plan are established, I design the learning activities for any course. Innovative classroom activities include: 1) Game based Learning : Microbiology "Code Names", Narrative-based General Microbiology 2) Flipped classroom : Interactive lecture videos assigned prior to in-class discussion of case studies and/or vocabulary practice 3) Developing a digital internship for Summer 2020 where students annotated a scientific podcast (TWiM), 4) Wikipedia Training for first year Honors students updating ~3 articles per term (Fall 2020 = radiotrophic fungus, respiratory pigments, Chinese rice fish)

#### Discipline-Based Education Research Focus

My research program at Iowa State University is split between developing teaching innovations (e.g. Digital internships, Game Based Learning, use of primary literature) and biology education research (e.g. Concept Inventory development). I serve as a reviewer for several microbiology and education research journals (e.g. JMBE, JCST, Frontiers in Microbiology) to keep current in both disciplines and the expectations of journals when submitting articles and to serve the professional community.

#### Experience in Mentoring Others in Teaching

- Biology Scholar Mentor: Disciplinary Based Education Research (DBER) Design and Implementation (2017). Mentored 6 new Biology scholars in this introductory session, teaching them the fundamentals of discipline-based education research.
- Steering Committee Member, The Ethics Network for Course-based Opportunities in Undergraduate Research (ENCOUR) (2019-present) Mentor a group of 20 fellows in general, and a small-group of 2 fellows specifically.
- Co-Chair American Society for Microbiology Conference of Undergraduate Educators (ASMCUE). 2019 (Chair, 2020)
- Preparing future faculty mentor (2017-present). Worked with graduate students to prepare lessons, teaching philosophy statements, and an entire course as part of a graduate certificate.