TEACHING AND LEARNING PORTFOLIO

by

Brad Bolling

August 2007

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Delta Program in Research, Teaching, and Learning
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Integrating Research, Teaching, and Learning

The Delta Program in Research, Teaching, and Learning is a project of the Center of the Integration of Research, Teaching, and Learning (CIRTL—Grant No. 0227592). CIRTL is a National Science Foundation sponsored initiative committed to developing and supporting a learning community of STEM faculty, post-docs, graduate students, and staff who are dedicated to implementing and advancing effective teaching practices for diverse student audiences. Any opinions, findings and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

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TEACHING PHILOSOPHY

Introduction

As a teacher, I take responsibility for student learning. I am motivated by remembering my past teachers who have had high expectations of me, were enthusiastic about teaching, and cared deeply for students. My teaching experiences and training have led me to use active learning, teaching-as-research, learning community, and learning-through-diversity as classroom approaches.

Active Learning

Learning is an active process, and as a teacher, I strive to make the learning subject engaging. When mentoring student groups through a senior level, semester-long inquiry-based food chemistry lab, I found that students took ownership of their work and learned deeper when pursuing knowledge. Lecture-style classes should also be engaging. As a lecturer for a freshmen level introductory food science class about food and health, I used “clickers,” a computerized instant feedback device, to poll students about their opinions and practice about food and health. Students were excited to share their opinions. This led into an exercise where students evaluated products based on the advertised heath claims and taste. My goal is to incorporate many different types learning activities that will engage students.

Teaching-as-Research

As a teacher I work to improve my teaching philosophy and methods by using teaching-as-research. This requires reflection to identify difficulties or room for improvement in my teaching. Once a problem is identified, I devise an approach; collect data, assess students, and obtain feedback to see if my approach helped. For example, as the University of Wisconsin-Madison Food Science Department was implementing a learning-outcome based approach to curriculum, one problem was identifying a method to assess programmatic learning outcomes in class. To address this problem, I developed a rubric and embedded question to assess quantitative reasoning skills as part of a laboratory exercise. In the future, I would use similar embedded questions to assess student development through my classes.

Learning Community

In the classroom, I take opportunities to foster learning community among the students. I connect students to the larger learning community by introducing current and past researchers who develop knowledge in the topic we are studying. In class, I introduce faculty and grad students conducting research within the department. I also explicitly reference the classroom as a learning community while teaching.

Learning-Through-Diversity

Science is benefited by diversity. I use diversity as a learning tool for both the students and me. I integrate different types of learning activities to benefit a variety of learning styles. The design of my visual elements, group-work, class discussion, homework problems, and notes make the information I am teaching accessible. When I used the “clickers” to poll students in the above example, I asked students to identify their backgrounds that might influence their opinions about food and health. Identifying their backgrounds, helps both the students and me understand characteristics that give them unique perspectives in learning and problem solving.

UNDERGRADUATE MENTORING PHILOSOPHY

Mentoring undergraduates in a research laboratory setting is an excellent opportunity to expose students to a research environment. The experience developing and working on a project exposes a deeper level of scientific thinking than can often be achieved in a classroom setting. My mentoring experiences have led me to approach undergraduate mentoring as a contractual relationship.

- **A mentoring relationship should be a committed relationship.**

Before mentoring begins, the student and I must agree to the terms of commitment. I ask students to lay out their expectations, priorities, and past experience and clearly define mine. For example, students I have encountered have come from different backgrounds. Some are early in their college career, and have not taken chemistry or have other basic lab skills. Others have had more experience and are looking to challenge themselves. Periodically, we will reevaluate these guidelines for the relationship. Monthly, I ask how I am performing as a mentor, and areas where they would like improvement.

- **Mentoring should be an active process between both parties.**

Sadly, I have had mentoring relationships where communication drops off and the mentoring relationship changes to "*yes ,..boss*" one. Over the course of a semester, our work load changed both the student's and my attitude toward the project. Although, we still valued learning in the project, the focus became the work. Therefore, I try to avoid boredom or overload by communicating with the student often. Because this type of mentoring relationship is new to most undergraduates, I strive to maintain regular communication, because even if it is seemingly insignificant at the time, issues and concerns need to be revealed to keep the relationship stable.

- **Focus on meeting learning goals in a mentoring relationship.**

Because the spectrum of students is broad, each student will have a unique set of learning goals we aim to achieve. Yes, mentoring an undergraduate is a process that enhances the development of an individual's ability to perform scientific research, but it may be a tremendous accomplishment to get a particular student to write a detailed entry in a lab notebook. Project progress or results do not always reflect growth of a student. So if both student and I are meeting our learning goals, the relationship is on the right track.

- **Mentoring should have an end in sight.**

The student and I must agree to length of the relationship. It is acceptable for either party to gracefully leave before retirement or graduation. I do not expect students to love lab work, the scientific process, or the type of research they were working with. Instead, I challenge those students to keep learning in any type of environment they may encounter.

REFLECTION 1

Reflection 1 refers to Artifact 1- Food analysis course goals, prerequisites, and prioritized learning outcomes. These were prepared with other University of Wisconsin-Madison Food Science faculty while I was serving on the Curriculum Committee, and were to be implemented as part of an undergraduate curriculum revision.

I was elected by the graduate students in the University of Wisconsin-Madison Food Science department to serve on as the student representative for the department's Curriculum Committee. I had the opportunity to serve for three years, during which time the committee was revising the undergraduate curriculum from a course-oriented approach to a learning outcome-based one. Essentially, this task was to build a new curriculum by writing departmental and discipline-based learning outcomes. After pooling and prioritizing learning outcomes from Food Chemistry, Food Engineering, Food Processing, Food Microbiology, and Statistics into courses, I helped to prepare the course syllabus and learning outcomes which are included as an artifact here.

During this process, I observed obstacles that needed to be circumvented in order to approve departmental-based learning outcomes in a curriculum. Instructors and professional staff needed to sacrifice a certain amount of freedom to fit into this outcomes-based approach. However, I believe the gains made by having a curriculum that with progressive learning outcomes are worth that sacrifice. Before the revision, courses were dictated by title and topic, rather than by measurable learning outcomes. By interweaving and reinforcing the core competencies of Food Science disciplines in the junior year, and having integrated courses in the senior year makes practical connections more explicit for students. Further, this interdisciplinary approach increases the opportunities to engage students, collaboration between fields, and reinforces diversity within the field.

I am very grateful to have had the opportunity to serve with many outstanding faculty members from the Food Science department. I observed they genuinely cared about students and were passionate about changing to the way they teach for their benefit. I want my career to be filled with that same passion and humbleness. Curriculum change is not easy, even with committed faculty. Assessment is needed to measure this change. If given the opportunity to design a course, I would match course goals, learning objectives, and assessment techniques to complement the departmental objectives. My lesson planning and objectives need to be suitable for a student at a particular point in the curriculum, but also to move them to deeper learning.

My experience has led me to believe that faculty members need to cooperate and be actively involved in setting course learning objectives. Communication of the progress students make toward learning objectives will improve student/teacher and faculty communication. As a teacher, I will continue to build those principles into my course design.

REFLECTION 2

Reflection 2 refers to Artifact 2- Photograph of a student who I mentored through a semester long research project with her poster that was displayed at an undergraduate research fair, and the certificate of completion.

The Biology 152 course at the University of Wisconsin-Madison pairs undergraduate sophomore students with faculty or graduate students to work on a semester-long project. As an undergraduate, I went through the same course, which is how I started work in my advisor's lab. This time around, I had a different perspective. My advisor gave me the opportunity to work with a student interested in food science. She had little to no prior lab experience, but was a diligent worker. Together, we planned and prepared experiments that led data which she could use to write a report and present a poster at a research fair with her colleagues at semester's end.

At the beginning of the project, we were attempting experimental method development. However, we became frustrated when nothing became of the changes. Due to the time constraints, we moved to commercial kit that could test similar activity. I also began by giving her a stack of science papers to "brush-up" on other researchers who had worked in this area. As I checked for understanding, I found it was difficult for her to understand the research with no help from me. I remember feeling the same way when I began reading technical articles, so changed my approach. When I gave a paper, I began to ask her to compare only the methods, and not focus on the results. Since she had an understanding of the reaction mechanism we were working on, she became more comfortable reading the methods sections. Establishing writing deadlines was another important component of this project. Progressively, the introduction, methods, and results sections were needed. Most of the questions and discussion that we had about understanding occurred during the writing phase, emphasizing that it is important for learners to frame a problem in their own context. I also felt that the learning community established in the Biology 152 section was beneficial for the students. The poster presentation encouraged broader learning and accountability to peers. I had a sense of satisfaction browsing the presentations at the end of the semester.

Reflecting on that time, I believe that the ownership of a project or work makes students more proud of the finished project. A different student that I mentored did not have the same type of learning community and the outcome was different. The communication and assessment cycle is crucial, especially in short-term projects. I will begin my mentoring projects with this in mind and encourage writing/understanding goals. In this experience, I found that some students need more attention than others, and as a mentor, I should bear that in mind and be open to learning about student needs. In a sense, I am also a needy learner, and feel compelled to check in regularly with my advisor and colleagues. Lastly, the student poster session compelled me to make learning community an emphasis in the times when I have the chance to mentor students. It may not be on the same scale, but smaller things such as interdepartmental communication, lab meetings, or participation in other undergraduate research fairs can build learning community.

In the future, I want to incorporate undergraduate research into my research program. Mentoring relationships are complex, but I believe constant communication, goal setting, and fostering learning community is important for how I relate to students.

REFLECTION 3

Reflection 3 refers to Artifact 3- Photograph and teaching materials from an interactive learning activity developed by the University of Wisconsin-Madison Food Science Department. Participants selected beverages they believed were good or poor antioxidants, and then tested them using a colorimetric experiment. Presentation was part of a science outreach fair for a lay audience.

I first met my advisor at an event called Future Days.[1] The event highlighted research aimed at improving the future. I also remember I paid $4.00 to get in. For an undergraduate working the summers to pay tuition, that seemed like a lot of money. The reason I went was to see the professor I would be working with on a semester-long project for a class. A year later, I was working a similar event, this time at UW-Day.[2] A diverse audience of grown-ups and children participated in the experiment. We measured antioxidant capacity in a visually-apparent way. The audience could pick a juice of their choice, and we would test its ability to reduce free radicals. Many people were interested in the test, as antioxidants and nutraceuticals were popular at that time.

These events established my advisor's research (and later my own) in the context of community outreach. Hands-on experimental demonstrations are powerful ways to engage students and community members. Having them predict the outcome and hypothesize about the antioxidant mechanism led to deeper questioning about what makes a food beneficial to health. In a sense, this may have presented a simplified view of science, in that one test should not determine what you should eat or drink. We emphasized that just because carrot juice was not as potent of an antioxidant as cranberry juice, doesn't mean the participant needed to change their dietary habits. I believe the benefits on engaging people to think more about the food around them outweighs the simplified view of science, as long as we are careful to present a balanced view.

By participating in this and other demonstrations, I have come to believe that community outreach is important to dissemination of research, especially about food and healthy eating. Whatever direction my research takes, I will seek to present it to the public in meaningful ways. Community outreach can also spur undergraduate or graduate students to think of their research in a new context. At the same time, I realize it is important not to create misconceptions, and will be careful to approach a presentation with that in mind. To relate this to classroom teaching, engaging the audience is important to create deeper thinking and enthusiasm about the topic. This can lead to deeper learning and greater retention of knowledge.

As a teacher, I want to be enthusiastic and engaging about my research and food science or chemistry in general. Community outreach can be a way to spark that creativity and to present the results that a diverse audience can understand.

1. Future Day was an exposition open to the general public held in Madison, WI that highlighted research that would impact the future quality of life.

2. UW-Day was a publicity event held for the public to showcase science research performed at the University of Wisconsin-Madison.

REFLECTION 4

Reflection 4 refers to Artifact 4- Diagram of the learning process. The collage was prepared as a part of the Delta Program discussion Creating a Collaborative Learning Environment (CCLE). Over the course of four weeks, students from different disciplines and I worked to visually represent our perception of the learning process.

The picture in Artifact # 4 may be the most abstract artifact in my portfolio, but is important. For one semester I participated in a weekly discussion group, Creating a Collaborative Learning Environment (CCLE) led by the Delta program. The discussion guided us to explore the process of learning. The group was composed of six students from different disciplines, including biological sciences, engineering, soil science, philosophy, and physics. We met weekly to reflect on assigned pedagogy readings and examined ourselves as learners. As a group, we created a diagram which represented learning as a set of paths, learners, obstacles, and conduits. We drew on our own experience as learners and current theories which we had discussed as group.

At first, I thought creating the diagram would be fruitless. The concept seemed abstract, and I believed we were setting ourselves up for arguments about the learning process. However, I learned that discussion of ideas can encourage learning-through-diversity. We worked through several iterations of sketches in attempt to diagram the learning process. It was those iterations and ideas that helped create a visual picture of what we had identified as essential to the learning process. For example, one colleague thought to represent learners as boats on a sea either on course or blown helplessly by the wind (as forces that can counteract learning). We settled on this idea which was very different from my initial concept of the learning process. My idea was one dimensional, which was represented by a hiker or explorer. Since the student who proposed the idea enjoyed sailing, the benefited from this idea, which came from a background different from ours.

Students that I encounter and I are each at different stages in the learning process. I found that encouraging positive attitudes are essential, as many discriminatory forces can hider or limit a learner's progress. Our group needed encouragement from the instructor to tap into our own pictures of the learning process, as in the sailing example. Keeping abreast with literature in teaching and learning can help me to better use and practice learning through diversity in my own ways.

As I grow as a teacher and learner, I intend to seek out a learning community in my field. I believe that encouraging students from different backgrounds to work together improves learning-through-diversity. I will try to make room for discussion and group work so that ideas can be shared between students.

REFLECTION 5

Reflection 5 refers to Artifact 5- Summary of some data collected during a semester-long Delta internship project. In the project, I designed a lecture and lab component for the current Food Analysis course with the cooperation of the course instructor. Responses are results of a questionnaire administered to students following lecture and lab exercises.

As a Delta program intern for one semester, I had the opportunity to participate in a teaching-as-research project in the University of Wisconsin-Madison Food Science Junior level course Food Analysis. The project was in cooperation with Doug Hyslop, the instructor. The project was to design a lecture and lab around the topic of near infrared spectrometry (NIR) while integrating assessment for course and programmatic learning outcomes. The course and Food Science program learning outcomes were developed by the Food Science Curriculum Committee and meant to be implemented in the near future as part of a new undergraduate curriculum. During the project implementation time, I participated in a weekly seminar with other Delta Interns.

This project was implemented following teaching-as-research principles. Don, the instructor, stressed the importance of selecting a meaningful research question. In my case, it took some time to identify a problem. Since I was familiar with the Food Analysis course, it was easier to identify a problem, but narrowly defining a question or hypothesis was more difficult to accomplish. I will try to carry teaching-as-research into future teaching challenges, and think about teaching as research. I think my next challenge will be how to integrate teaching as research in a shorter time period. Surely developing new instructional material in my future positions will have more of a time constraint than I would prefer, so I may need to begin with smaller projects and work toward broader questions.

One obstacle in the teaching-as-research approach was the Instructional Review Board approval by the Education IRB. One person who I spoke on the phone was challenging and accusatory about the way the research was conducted, before obtaining IRB exemption. Next time, I would seek IRB exemption, much further in advance, and make sure to have relative deadlines highlighted in my calendar. I believe the research that I perform in the future will be mostly for personal gain, since IRB approval or exemption is definitely a large hurdle that needs some time to accomplish. However, I appreciate and would like to contribute to the body of literature surrounding food science and chemistry education, and will look for opportunities to share my research with others.

The internship project also gave me additional experience in assessment design. As a result of my research, I believe embedded programmatic assessment questions can be used across the curriculum. Since I used a rubric to assess student learning, I think the rubric should be demonstrably simple, but still have enough increments to measure improvement and levels. For the programmatic rubric, it would be good to have clear goals and standards for the top levels in each area.

In the future, I will make changes to my teaching based on the research I have conducted during the internship. First, I will not make the rubric too specific. I think the rubric I developed for food analysis still needs improvement, but should be tested in other courses as well. For the

Food Analysis course, I would try to expand and improve the lecture component by incorporating a discussion into the planned activities.

In my internship project I had the opportunity to encourage learning community in several ways. First, was to connect student learning to others who use similar research techniques, both in industry and academics. In this way, they could see how learning the principles of NIR connected them to a greater body of knowledge. Further, this gave them more information about employment opportunities. Another way to connect to the learning community was by experiencing a research lab setting. This gave the students a better idea of the research at Babcock Hall, and a chance to meet new graduate students. I believe these types of interactions will help students feel more comfortable with the surrounding building and the people working here.

During the internship seminar, I also had a chance to experience learning community. I found peer evaluation of my work very helpful. It encouraged my to put forward better quality of work, but also provided useful feedback about my project. The student-led seminars also helped implement the Delta core pillars. I felt the environment was safe for sharing my ideas, and there was respect between the students. This was a very good model of building learning community. I feel that I could still contact other members of my group to ask for advice and to share experiences.

During my project implementation, I noticed several areas of diversity. The first was motivation. Some students were eager and highly motivated to complete the activities and were very attentive. Another group was eager to get out of the lab and go home (the class was in the late afternoon and near the end of the semester). I need to realize that everyone is coming into the class with different enthusiasm and motivation each day. Creating connections may be more challenging during certain phases of student life. Also, there was a diversity of experience and comfort in the lab. Some could work quickly and follow instructions closely. On the other hand, some groups struggled to follow directions, and were new to a laboratory environment. For these groups, completing the lab exercises took longer. There also was a diversity of race, gender, and nationality in the lab. Several international students were enrolled, as well as several minority ethnicities. At first I had planned to emphasize learning-through-diversity in the discussion section, but the lecture was shortened for time constraints. In the future I would acknowledge the classroom diversity by surveying the students backgrounds and opinions about the lecture topic during discussion.

In my internship project, I attempted to use learning-through-diversity. To do this I tried to accommodate different learning styles in the lab and lecture. For the lab, there was some hands-on work, as well as calculations. I encouraged peer-peer interactions, by asking groups to share their experiences with the NIR with others in the class. Also, those groups who were not familiar with a lab setting were encouraged to help others. The lecture involved diagrams to cater to visually-oriented learners. I also provided handouts of slides before lecture, so those with limited English skills could follow along easier. This was more difficult in a single lecture/lab, but I tried to about student experiences in the lecture and lab using surveys.

APPENDIX

ARTIFACT 1

Food analysis course goals, prerequisites, and prioritized learning outcomes. These were prepared with other University of Wisconsin-Madison Food Science faculty while I was serving on the Curriculum Committee, and were to be implemented as part of an undergraduate curriculum revision.

Food Analysis (Discipline-based)

Goals for this course

Upon completion of this course students will:

- Understand fundamental laboratory techniques used to analyze food
- Have laboratory reasoning and experimental skills (including experimental design, statistical analysis and sampling)
- Relate basic chemical principles to analytical techniques
- Identify the reasons for performing analysis of foods
- Decide which analytical techniques are appropriate for the analysis of a food

Prerequisites (or concurrent registration)

- Organic Chemistry 341 or Biochemistry 501 or Biochemistry 502
- Food Chemistry (discipline-based)

#	**Top Priority Learning Outcomes. Students can:**
1	Describe and use principal analytical methods used for quantifying the composition and reactions of foods components (Comprehension and Application)
2	Interpret and report data derived from chemical experiments/analysis in a meaningful way (Application)
3	Apply basic statistical methods to sampling/testing and the analysis of experimental data (Application)

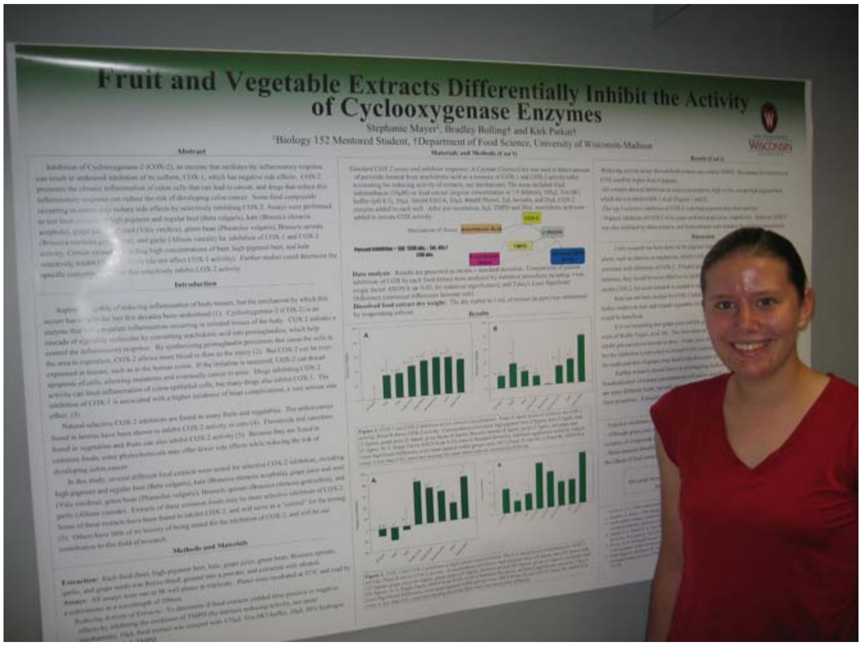
#	**Lower Priority Learning Outcomes. Students can:**
1	Describe basic methods of instrumental and subjective sensory evaluation, including when certain methods might be used, the type of data derived, and how that data might be used in decision-making (Comprehension, application, analysis)
2	Choose appropriate analytical techniques for foods and when/how to use them in a food processing environment/situation such as QA&QC.(Evaluation)

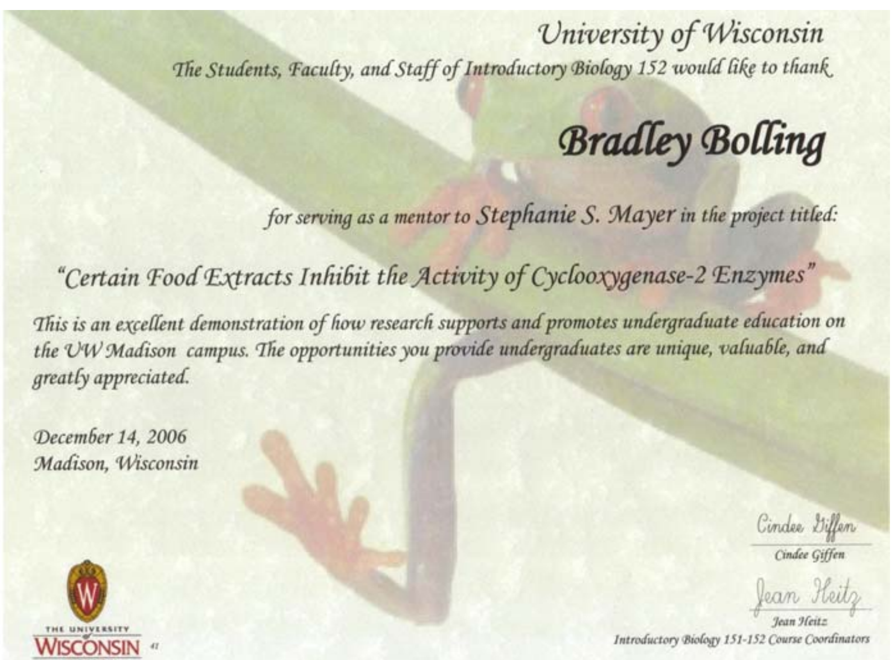
#	**Performance Outcomes. Students can:**
a	Use quantitative reasoning skills
b	Write clear and concise technical reports
c	Work independently, as well as in a group

Assessment Strategies: Exams, graded reports, lab projects, case studies, TA observations, group work, and analysis of unknowns (require decision-making).

ARTIFACT 2

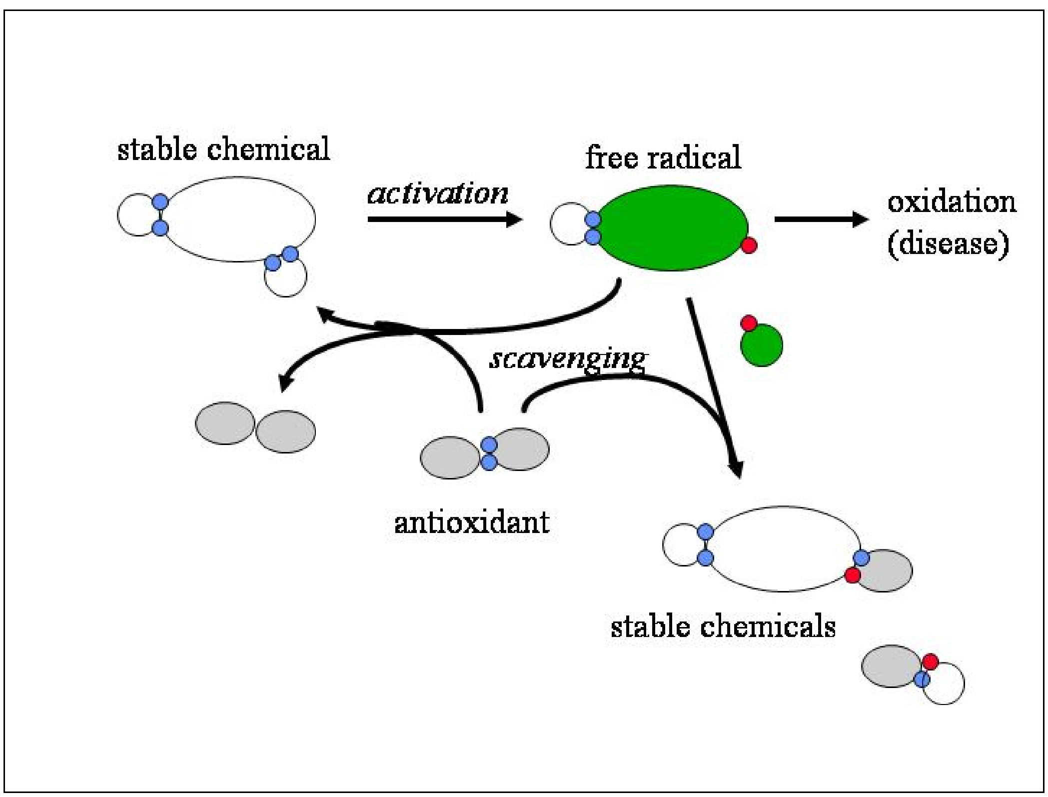
Photograph of a student who I mentored through a semester long research project with her poster that was displayed at an undergraduate research fair, and the certificate of completion.





ARTIFACT 3

Photograph and teaching materials from an interactive learning activity developed by the University of Wisconsin-Madison Food Science Department. Participants selected beverages they believed were good or poor antioxidants, and then tested them using a colorimetric experiment. Presentation was part of a science outreach fair for a lay audience.



ARTIFACT 4

Diagram of the learning process. The collage was prepared as a part of the Delta Program discussion Creating a Collaborative Learning Environment (CCLE). Over the course of four weeks, students from different disciplines and I worked to visually represent our perception of the learning process.

ARTIFACT 5

Summary of some data collected during a semester-long Delta internship project. In the project, I designed a lecture and lab component for the current Food Analysis course with the cooperation of the course instructor. Responses are results of a questionnaire administered to students following lecture and lab exercises.

Table 7. Lecture questionnaire responses

Level of Difficulty	0% Too difficult 15% Difficult, but manageable 70% Just right 10% Easy 0% Too Easy
Degree of Interest	10% Exciting 50% Somewhat interesting 30% Not interesting/not boring 0% Somewhat boring 5% Very boring
Clarity of Information	55% Very clear, easy to understand and follow 45% Generally clear, a few places need clarification 0% Hard to follow

Table 8. Lab questionnaire results

Level of Difficulty	0% Too difficult 5 % Difficult, but manageable 60% Just right 25% Easy 10% Too Easy
Integration with the lecture component	55% Clear connections to lecture material 40% Some connections to lecture material, but may be opportunities for more 5% Few connections if any to lecture material
Clarity of Information	70% Very clear, easy to understand and follow 35% Generally clear, a few places need clarification 0% Hard to follow
Clarity of the instruction from the teaching assistant	80% Very clear, easy to understand and follow 20% Generally clear, a few places need clarification 0% Hard to follow
Were any problems encountered during the laboratory exercise?	0% Yes (please describe) 100% No

CURRICULUM VITAE

Bradley W. Bolling
1605 Linden Drive, Madison, WI 53706
Phone: (608) 438-5357 e-mail: bwbolling@gmail.com

Education:

University of Wisconsin-Madison	**1998-2007**
PhD Candidate, Food Chemistry	GPA: 3.8/4.0
Distributed Minor	
Thesis: Phase II enzyme inducing agents from soybean (*Glycine max*)	
B.S. Honors in Research, Food Science	GPA: 3.5/4.0

Summary of relevant work experience; including teaching activities

- Research assistant, Department of Food Science. 2002-present.
  Developed and performed chemical and biological assays including antioxidant quantification, chromatography (HPLC, FLASH, TLC, GC, LC-MS), cell culture, ELISA, COX-2 and PGE2 quantification. Isolated and identified sub-milligram quantities of secondary plant metabolites (MS/MS, NMR, UV/VIS analysis). Performed animal feeding trial including analysis of tissues (liver, lung, kidney, brain, colon, and intestine) for antioxidant enzymes (QR, GST, GSSG, TRR, EROD) and distribution of metabolites (current work). Mentored undergraduate students in the research laboratory.
- Teaching Assistant, Food Chemistry 512 Lab. 2004.
  Mentored undergraduate and graduate student lab groups through project selection, implementation, and completion phases.
- Teaching Assistant, Food Analysis 310 Lab. 2005.
  Prepared laboratory experiments and teaching materials on food analysis topics such as ashing, chlorine determination, water hardness, protein analysis and TLC. Graded and evaluated students, prepared exam questions, presented food color lecture.
- Undergraduate Student Hourly, University of Wisconsin-Madison Department of Food Science. 2000-2002.
  Laboratory research included food sampling, microbiological assays, chemical assays, cell culture, antioxidant assays, and data interpretation.

Publications, contributor

- Ingham, S.C.; Bolling, B.; Schmidt, D.J. Development of a Simple Method for Detecting Presumptive Esherichia coli on Fresh Retail Beef. Journal of Food Science, V. 67(1) 258-261.
- Wettasinghe, Mahinda; Bolling, Bradley; Plhak, Leslie; Xiao, Hang; Parkin, Kirk. Phase II Enzyme- Inducing and Antioxidant Activities of Beetroot (Beta vulgaris L.) Extracts from Phenotypes of Different Pigmentation. Journal of Agricultural and Food Chemistry (2002), 50(23), 6704-6709.
- Wettasinghe, M.; Bolling, B.; Plhak, L.; Parkin, K. Screening for phase II enzyme-inducing and antioxidant activities of common vegetables. Journal of Food Science (2002), 67(7), 2583-2588.
- Lee, Chen-Hsien; Wettasinghe, Mahinda; Bolling, Bradley, Ji, Li-Li, Parkin, Kirk.
  Betalains, Phase II Enzyme-Inducing Components From Red Beetroot (Beta vulgaris L.) Extracts. Nutrition and Cancer (2005) 53(1), 91-103.
- Bolling, Bradley, Chen, E., Parkin, K. (2006) Quinone reductase inducing and antioxidant activities of aqueous isolates of green bean (*Phaseolus vulgaris* L.) Food Reseach International. (2007). 40(1), 182-190.

Presentations, contributor

- Parkin, Kirk; Wettasinghe, Mahinda; Xiao, Hang; Lee, Chen-Hsien; Bolling, Bradley; Plhak, Leslie. Isolation and identification of potentially cancer chemopreventive agents in table beet (Beta vulgaris L.) roots. Abstracts of Papers, 224th ACS National Meeting, Boston, MA, United States, August 18-22, 2002.
- Parkin, Kirk; Wettasinghe, Mahinda; Bolling, Bradley; Xiao, Hang; Peterson, David. Methodological considerations for the Murine hepatoma cell bioassay-directed isolation of cancer chemopreventive agents. Abstracts of Papers, 223rd ACS National Meeting, Orlando, FL, United States, April 7-11, 2002.
- Bolling, Bradley, Parkin, Kirk; Chen, Erqin. Characterization of green bean isolates exhibiting antioxidant and phase II enzyme-inducing activities. Book of Abstracts IFT Annual Meeting, Chicago, IL, United States, June 12-16, 2003.
- Bolling, Bradley, Parkin, Kirk; Chen, Erqin. Characterization of green bean isolates exhibiting antioxidant and phase II enzyme-inducing activities. Sci-Mix Poster Presentation, 226th ACS National Meeting, New York, NY, United States, September 7-11, 2003.
- Parkin, Kirk; Bolling, Bradley; Chen, Erqin. Screening for cancer chemopreventive agents from soybean. Volunteered oral technical paper, IFT Annual Meeting, Las Vegas, NV, United States, July 13-16, 2004.
- Bolling, Bradley; Parkin, Kirk. Isolation and identification of in vitro quinone reductase-inducing components from soybean (Glycine max ssp.). Volunteered oral technical paper. AOCS 96th Annual Meeting, Salt Lake City, UT, United States, May 1-4, 2005
- Bolling, Bradley; Parkin, Kirk. Active components in an in vitro quinone reductase-inducing ethanolic fraction from soybean (Glycine max ssp.). Volunteered oral technical paper, IFT Annual Meeting, New Orleans, LA, United States, July 15-20, 2005.
- Bolling, Bradley; Parkin, Kirk. Bioactivity-guided isolation of in vitro quinone reductase (QR) inducing agents from soybean (Glycine max ssp.). Volunteered oral technical paper, 233rd ACS National Meeting, Chicago, IL, United States, March 25-28, 2007.

Awards, honors and scholarships/fellowships received

- Wisconsin Academic Achievement Scholarship, Hilldale Undergraduate Research Fellowship, Honors Undergraduate Degree
- IFT Graduate Fellowship, September 2003
- American Chemical Society (ACS)- Food Chemistry Division Donald A. Withycombe Fellowship, September 2003
- IFT Annual Conference, 2nd Place in Food Chemistry Division Paper Competition, June 2003
- American Oil Chemists Society Natural Health Research Institute Scholarship for Nutrition and Cancer Prevention or Treatment, September 2004- May 2005
- American Oil Chemists Society Honored Student Award, May 2005
- American Oil Chemists Society Health and Nutrition Division Student Excellence Award, May 2005.

Relevant Leadership Experience

- Curriculum Committee- Food Science Department, elected representative 2004-2007. *Participated in curriculum revision including programmatic outcomes, learning outcomes, course design and assessment activities. Participant in faculty assessment workshop, Aug 11, 2006*.
- Food Science Product Development Team. *Winner, 1st Place in 2005 IFTSA product development competition, Grand Prize Winner, 2005 Almond Innovations Contest, Nasa Product Development Competition 2005, IFTSA Team Captain 2005-2006.*
- English instruction. *Volunteer at the International Friendship Center 2000-2007. Led international student conversation groups.*

Professional Affiliations

American Oil Chemists Society (AOCS), Institute of Food Technologists (IFT), American Chemical Society (ACS)

Pedagogy Training UW-Madison

Delta Program (www.delta.wisc.edu): Participant in certificate program emphasizing three pillars- teaching-as-research, learning community, and learning-through-diversity. Certificate defense scheduled for August 2007.

PP801 Inquiry-Based Biology Teaching (1 cr.): Introduction to professional practice in teaching. Lecturing, classroom planning, discussion, and inquiry-based laboratories were led by Professor Jo Handelsman. Active learning, assessment, diversity, and scientific teaching were used as themes.

PP800 Mentoring undergraduates in the laboratory (1 cr.): Part of the Howard Hughes Medical Institute New Generation Program for Scientific Teaching. Mentored an undergraduate student over the summer semester and participated in weekly discussions.

IA 875 Teaching with technology (2 cr.): DELTA course emphasizing assessing the use of technology in the classroom. Prepared and implemented a technology-based project.

ELPA 502 Delta Internship (1 cr.): Seminar and internship project implementing Teaching-as-Research in the classroom.

Creating a Collaborative Learning Environment (1 semester): Weekly discussion with a peer group, reading and learning activities related to establishing a learning environment, emphasizing the pillars of the Delta program

Food Science Curriculum Committee Elected Representative (2 years): Monthly meetings with Food Science faculty to create a learning-outcome based curriculum for the undergraduate program. Included creating learning outcomes, goals, and assessment for new and existing courses.

Classroom Experience

Teaching assistant- Food Science 512 (Food Chemistry Lab) — Fall 2004

Teaching assistant for a senior level project based lab. Students selected topics and were mentored through experiment planning, data interpretation, and presentations.

Teaching assistant- Food Science 310 (Food Analysis Lecture/Lab) — Fall 2005

Teaching assistant for a junior level lecture/lab.

Project- Food Science 514 (Food Chemistry Lecture) — Spring 2006

Senior level lecture course. Designed and implemented a Maillard browning reaction tutorial as part of the course, “Effective Teaching with Technology”

Internship- Food Science 310 (Food Analysis Lecture/Lab) — Fall 2006

Used teaching-as-research principles to design and present a lecture/lab module as part of the Delta program internship project. Submitted project for IRB approval.

Undergraduate Mentoring

Mentored three undergraduate students through semester-long projects, from project conception to completion phases.