TEACHING AND LEARNING PORTFOLIO

by

Amy Kamarainen

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Delta Program in Research, Teaching, and Learning
University of Wisconsin-Madison
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.

For more information, please call us at 608-261-1180 or visit http://www.delta.wisc.edu.
# Table of Contents

Introduction 1

Perspective on Teaching 2

Teaching and Learning Themes 4

Teaching and Learning Portfolio

Piece 1 – Learning through Lecture 7

Piece 2 – Using Scenarios as a Teaching Tool 11

Piece 3 – Aquatic Ecology News Blog 13

Curriculum vitae 16
Introduction

Here I will insert a one-page introduction that explains the Delta program and my motivation to be involved in it. I will also explain the purpose of this portfolio.
Perspective on Teaching

“Education is the process by which we discover that learning adds quality to our lives”
~ William Glasser

I strive to bring about this process of discovery by making learning place-based and personally meaningful, by developing problem-based learning activities that allow students to exercise skills and modes of inquiry that are broadly applicable, and by involving myself and my students in a community that extends beyond the walls of the classroom. I believe we will face unprecedented environmental and social challenges in the coming century and we will need capable and creative leaders as well as engaged and informed citizens to participate in solutions. Through teaching, I hope to facilitate the personal and intellectual growth of people to fill these roles.

Place-based and personally meaningful learning
By involving students in activities that are based on local ecosystems, students draw connections with their community and exercise skills that have immediate social and ecological significance. Social-ecological systems are inherently complex, yet I believe this complexity may become approachable and teachable when it is presented in the context of rich real-world examples relevant to students. I use environmental history to communicate the importance of “a sense of place” and to explore human relationships with the natural environment (see Artifact 1). I have also explored the use of scenario building to help students and community members conceptualize the current and potential relationships among natural resources, environmental policies, and public and private institutions (see Artifact 2).

Problem-based learning activities
Authentic learning experiences are those that require students to exercise skills and knowledge that are used by practitioners in the field. I like to use authentic learning experiences and problem-based activities to engage students and encourage them to take ownership in their learning. I plan to use scenario-building activities (see Artifact 2) in future courses whereby students may act as stakeholders to determine the management priorities for an ecosystem. This problem-based learning activity gives students a sense of the complexity inherent in land-use and management decisions and instills appreciation for the diversity of perspectives that must be considered. In such activities, students learn to communicate respectfully with diverse audiences and have a chance to participate in a collaborative problem-solving process. The communication and problem-solving skills they’ve acquired will be useful in many contexts after students leave my classroom.

Community development
The scientific process is inherently creative and I think that insight can come from people who approach science from different backgrounds. In order to capitalize on the diversity in a classroom I try to create learning spaces that are conducive to collaboration, I encourage students to get to know one another, and I integrate small-group discussions and projects into my courses. For example, during my teaching
internship in an Aquatic Ecology course, small groups of biology students worked together to complete blog entries linking scientific literature to current news items. As such, students worked together outside of class and strengthened new relationships through online interaction on our shared blog (see Artifact 3). I hope to promote a spirit of collaborative learning that extends beyond the walls of the classroom or laboratory.

**Teaching and student learning**

I view teaching as an iterative and collaborative process. I continuously challenge myself to improve my teaching practices and the learning experiences of my students, and think that viewing teachers and students as a community of learners can support this. I feel it is critical that I learn from the students as I teach; learn what is working for them and what is not. I have been practicing strategies for self-evaluation and student assessment through participating in a learning community on the UW campus through the Delta program (a branch of the NSF-sponsored Center for the Integration of Research, Teaching and Learning). Through this program I have realized the benefits of participating in a collaborative learning community. Please find attached my Teaching and Learning Portfolio, which contains materials that support the development of my perspective on teaching.
Teaching and Learning Themes

During my graduate-school career I participated in the Delta Program at the University of Wisconsin, Madison (http://www.delta.wisc.edu/index.html) and worked toward a Delta Certificate in Research, Teaching and Learning (Certificate pending). Delta supports and encourages a community of current and future faculty members in science, technology, engineering and math (STEM) disciplines who are committed to improving their teaching practice.

As a part of Delta, I participated in roundtable discussions, learning expeditions, courses focused on higher education, and a teaching internship. Woven throughout the Delta experience are three themes (teaching as research, learning community, and learning through diversity) that represent the groundwork from which I’ve built an understanding of good teaching practice. These themes and my Delta experiences guide my teaching practice and serve as a foundation from which I will continue to grow as a teacher and researcher. Below I would like to tell you more about how my ideas and teaching practices have been influenced by these central themes.

Teaching as Research
Experiments are fun. As a scientist, I get excited by an opportunity to test a theory and see if the data support my hypothesis. By thinking of teaching as research (TAR), I can harness these inquisitive tendencies to improve my teaching practice. Through the Delta program I began thinking of TAR and am finding that my teaching has become more exciting and productive.

TAR is an analogy that captures the power of the scientific method and applies it to teaching activities. Through TAR I develop questions and hypotheses about what and how my students are learning. I then challenge myself to think of new ways that the same material could be taught, and I design a teaching experiment around my new ideas. Also, as part of the process of designing my teaching experiment, I think about what variables I will need to measure in order to know whether student understanding has improved. Thus, assessment and reflections on student learning are guided by my research questions and are an integral part of the TAR process.

TAR has become a cornerstone in my teaching practice because it is infinitely scalable. Sometimes my teaching experiments take five minutes and sometimes they take the entire semester, yet in the end I have always learned from the experience and have new data with which I can better understand how my students learn.

Learning Community
People who share a common purpose can provide support and resources for one another that may help all achieve their shared goals. As a teacher, I share many goals with the other teachers around me as well as with the students I teach. The role of the
learning community builds on that of teaching as research. As scientists, we need to interact with one another and share our ideas and findings.

My teaching experience has been enriched because I have identified and interacted with a group of current and future faculty members who share goals for improving the way we teach. We help one another to achieve our goals by meeting regularly to share ideas about teaching and learning, by serving as peer-reviewers for one another’s proposals, and by sharing findings from our teaching experiments. Following my participation in the Delta program, I have a better appreciation for the importance of connecting and staying connected with those in my community. I have learned more about teaching from hearing other’s anecdotes and experiences than I could hope to learn from any book.

Just as participation in a learning community has enhanced my learning experience, I find that promoting a sense of community within the classroom can improve students’ learning experience. I instill a sense of community within the classroom by making sure students know each others’ names and something about one another. The students often help me define the goals or rules for the semester, which helps us all to acknowledge our shared role in the learning process. Students learn to work together because I ask students to work in small groups both in and outside of class, and I offer to mediate when they have inter-personal problems that impede group work. Many students enjoy these opportunities for social-interaction, and I often see students learning from one another as they share their own knowledge and experiences.

Participating in a learning community is a cornerstone of my teaching practice because it has given me a forum for exchanging ideas about teaching and learning. Also, a learning community within the classroom can provide students with social and communication skills that will be important in their roles in communities outside of the classroom.

Learning through Diversity
A learning community may be most effective when students feel comfortable and feel that their contributions are valued, yet students come to class with different ways of learning and from different backgrounds. When students’ diverse perspectives and needs are recognized and appreciated, all students may participate more freely in the learning community and, thereby, enrich the learning community.

A young woman who was a student in my Limnology class sat with her head down, her eyes intent on the lines and figures she was doodling in her notebook while the rest of the group worked on the thought exercise I had assigned. I approached the group and asked the young woman if she had any other ideas to add to the brainstormed list. She declined, and continued her doodle as the group discussed. During a break in the class, I asked about her summer break, and her sullen expression softened as she told me about her trip to the Dominican Republic to visit her cousins.

During the next class period I asked the student groups to provide a summary of the water supply and treatment system used in a number of places around the world. I
assigned the young woman to the group that would provide a summary for Santo Domingo, Dominican Republic. She contributed to her group and I could hear her telling her group members about the rivers and streams in the mountains near Santo Domingo. In future weeks, I didn’t need to beg her participation.

I try to draw on student diversity by learning about the students’ backgrounds and learning styles. I like to deliver a survey at the beginning of the semester that includes questions about their academic background and their preferred methods for learning. I also strive to create an inclusive learning environment by making it clear that ideas should be shared and discussed freely and respectfully. Finally, I try to promote learning through diversity by pairing and grouping students in different combinations. I think working with people with new or different perspectives can challenge students’ preconceptions and open up new opportunities for learning.

Learning through diversity has become a cornerstone in my teaching practice because I believe that students learn more when diverse perspectives are shared within the learning community. Yet, in order for students to share their diverse perspectives, it must be made clear to them that their ideas are valued and respected. I strive to encourage learning through diversity by setting the tone for interaction at the beginning of the semester and following through with positive reinforcement when students share ideas and feedback with one another.

Teaching as Research, Learning Community, Learning through Diversity

These Delta themes have significantly influenced my perspective on teaching and learning and the reader will see these themes revisited throughout my teaching and learning portfolio.
Portfolio Piece 1: Learning through Lecturing

Figure 1. A subset of powerpoint slides used during a guest lecture on “Phosphorus and Eutrophication of Lakes” in Analytical Chemistry in 2006. I provided an overview of the concept of eutrophication (A), backed up conceptual understanding with empirical evidence from the literature (B), and provided analogies to help students remember different forms of phosphorus (where total phosphorus is like a whole pig, while dissolved inorganic phosphorus is readily consumed, like fresh-cooked bacon.) (C).
Reflections on Portfolio Piece 1

During the summer of 2006 I was asked to talk about the subject of my graduate research, phosphorus and cultural eutrophication of lakes, during the Analytical Chemistry course at the University of Wisconsin, Madison. Two years later, after I had begun participating in the Delta program and had taken a course focused on teaching environmental history, I was asked to give a guest lecture on “sense of place” in the Lake Wingra watershed in the Public Information Campaigns and Programs course at
the University of Wisconsin, Madison. Reflecting on these two experiences provides insight into how my approach to teaching through lectures has changed and provides an example of the process I go through to continuously improve my teaching.

**Phosphorus and Eutrophication - Analytical Chemistry – 2006**

For the phosphorus lecture in the Analytical Chemistry course, the instructor asked me to provide context for phosphorus samples they would be analyzing in class. This is all the information she provided, and I didn’t ask for any more. During the lecture, I provided students with a definition of eutrophication, explained the historical context for the problem, showed evidence that phosphorus drives eutrophication, talked about point and non-point source pollution, and peppered the lecture with amusing analogies and real field data (Figure 1). All in all, I thought the lecture had gone really well. Then, the students raised their hands to ask questions. They asked how to analyze samples for the different forms of phosphorus, what kinds of digestions I did in order to extract bio-available phosphorus from the total pool and asked what kinds of equipment we used in the lab. I hadn’t even mentioned these topics related to analytical chemistry, even though I was lecturing to upper-level chemistry students in an Analytical Chemistry course! Also, I learned that the students would be analyzing samples from Lake Mendota, a lake right on campus. I had mentioned Lake Mendota in my lecture, but most of my examples were based on conceptual understanding and on data from other systems. I had missed an opportunity to connect what I was talking about to the lake that was right outside their doors. I realized that I had provided context for understanding the role of phosphorus in eutrophication, but I hadn’t connected the information I was presenting to the focal material in a meaningful way.

Another shortcoming of my lecture in the Analytical Chemistry course is that my only feedback was based on my own inferences and reflections. I didn’t engage the students, didn’t ask them any questions, and didn’t assess what they had learned. I had no way of knowing whether they had taken home my central messages from the lecture. As a guest lecturer, I felt powerless in my ability to assess the students because I would not be around for the next exam. Through the Delta program I have learned many strategies for both formal and informal student assessment that could be applied during guest lectures. If I were to do this type of lecture again, I would embed informal assessments within the lecture. First, I may ask a multiple-choice question (and ask them to raise their hands in response to their preferred answer) near the beginning of the lecture to engage the students and to assess their background knowledge on the subject. Then, at the end of the lecture I may administer a three-question quiz or ask the students to recap the clearest point and muddiest point from the lecture. These assessments, altogether, would take less than five minutes and may give me a much better understanding of what the students took away from the lecture.

**Sense of Place - Public Information Campaigns and Programs – 2008**

The instructor for the Public Information Campaigns and Programs course at the University of Wisconsin, Madison heard that I was doing research on the same lake he was using as a case study for teaching students how to effectively communicate information to the public. As a service-learning project, the class was going to create an
information campaign about using rain gardens to reduce urban runoff. However, students were not familiar with the lake and the community surrounding the lake. I was asked to provide this information within the context of a lecture about “Sense of Place”. In preparation for the lecture, I asked the instructor to provide a copy of the syllabus for the course and asked for more details about what he hoped the students would take away from my lecture (Figure 2A).

Based on the information he provided, I set three main learning goals for the lecture. I wanted students to see Lake Wingra as many residents see it – as a special place with a rich history and local significance. I wanted to inspire students with a vision that positive change could be achieved through community action, with the hope that they would carry this message to the community through their information campaigns. Finally, I wanted to communicate to these non-science students the scientific and historical basis for how the hydrology of the system had changed, thus leading to the need for rain gardens.

“Close your eyes and think of a place that is special to you”, this is the request with which I opened my lecture. I followed by asking what about the place made it special. Students responded with, “Friends and family”, “The way it makes me feel”, “Peace and quiet”, “Anything could happen”, along with poetic descriptions of the way the light shines through the leaves, etc. I was surprised by the diversity of responses and saw a number of students nodding along as other described their special place. Through this exercise, the student connected what they were learning to their own personal experience and this exercise also helped to build community within the classroom by asking students to share with one another. I wanted to help them understand that a sense of place can be very personal, yet is often tied to the shared history of a group of people in a place or community. I continued with my lecture and told them that the residents of the Lake Wingra watershed do think (and, arguably, have always thought) that Lake Wingra is a special place.

I provided evidence for this idea by noting that the shores of Lake Wingra had the highest concentration of Indian earthen works, which are thought to have served a spiritual role in Native American life, of any lake in Wisconsin. I also shared stories about residents in the 1930’s who went to great lengths to remove invasive carp from the system. These stories of human presence and care for the lake exemplify what makes the watershed special and conveys a sense of place in the Wingra watershed (Figure 2B).

After my lecture I asked students to tell me what the take home message was in their own words (Figure 2D). Many of the students in the class were not full time residents of Madison and even fewer were residents of the Wingra watershed, yet student feedback showed that the students left class appreciating the role the lake plays in the local community. On the other hand, some students commented that I could have provided more information about what could be done to improve the current situation (besides rain gardens). If I were to do this type of lecture again, I would plan for a twenty-minute brainstorming session by the students. I would give them time to think of their own ideas for how the Lake Wingra watershed could be improved.
Also, a number of student questions after the lecture probed my comments about the role of wetlands and hydrology in the management of rainwater. Their thoughtful questions demonstrated to me that they had understood my description of how the hydrology had changed and that they wanted more information on this topic. In future lectures of this type I may include even more information about similarities and differences between rain gardens and natural wetlands.

Reflecting on these two guest lecture experiences highlights ways in which I have grown as a teacher. Now, I ask questions, I collect background information about what the students know, I acknowledge the value of students’ personal experience and try to connect these experiences to specific examples from the local community, and I embed formal and informal assessments within a lecture. Nonetheless, the feedback I’ve collected from students highlights ways in which I can continue to improve the way I teach through lectures.
Reflections on Portfolio Piece 2

Twelve students participated in a class called Scenarios Thinking lead by our instructor, Steve Carpenter, during the spring of 2008. The abstract above is derived from a manuscript on which I am a co-author along with my peers and instructor from the course (Figure 3). During the semester we, together with members of the Madison community, developed four feasible scenarios for the social and ecological future of Lake Wingra, a small urban lake in Madison. I found scenario building to be a constructive way to examine and confront uncertainty in a decision-making process. Also, engaging stakeholders in this decision-making process allowed participants to rally around shared goals, acknowledge individual objectives, express their differences in opinion, and still engage in constructive visioning of a shared future. For these reasons, I think scenario-building exercises can serve as an exceptional teaching tool that acknowledges diverse perspectives and builds community beyond the borders of the classroom. I plan to integrate scenario-building exercises into future courses that I teach.

Scenario building is a collaborative activity in which interested stakeholders create a shared vision of potential futures for an ecosystem of interest. Scenarios are meant to explore possible future conditions of an ecosystem given planned, likely or even far-fetched changes in the management, institutional, political or social structure related to the ecosystem of interest. Scenario building offers students an applied framework for
exploring what is known and unknown about an ecosystem (the state of the science) and for exploring the social and political context in which the ecosystem is embedded.

Through this scenario building exercise I learned that scenarios provide a good framework for using historical monitoring data in a course. The scenario process required that we learn about the history of the system before we could develop feasible scenarios about the future. Therefore, synthesis and retrospective analysis of local ecosystems were built into the scenario process. The process of seeking historical data about the ecosystem connected students to the local community and helped them appreciate the institutions and people who monitor and manage the local landscape. Also, our exercise demonstrated that the scenario-building process provided an impetus for students, managers, policy makers and citizens to look at past ecological trends together.

Many students in the class mentioned the interaction between students and the greater Madison community as the most rewarding part of the scenario-building exercise. Students appreciated having an opportunity to share the knowledge they were gaining with people in the community who could often put this information to use. Interactions with the community made student knowledge applicable and as students communicated knowledge about the lake to community members, this information was further solidified and retained.

While creating a full set of detailed scenarios for a small urban lake was a challenging assignment for graduate-level students, and may be beyond the scope of an undergraduate course, I think there are many aspects of the scenario building experience that I can incorporate into my future teaching activities. I learned that using real-world examples, based on issues of local importance, can engage and challenge students in a new way. Also, looking to the future forces students to consider the past, thus encouraging students to build a working knowledge of the historical conditions of the ecosystem. Students may gain a greater appreciation for perspectives and goals that are different from their own by acting as stakeholders through a role-playing activity. In so doing, students could achieve a deeper understanding of the importance of considering diverse perspectives during a decision-making process related to ecosystem management. Finally, sharing their knowledge with community members signals to students that they must fill the role as a professional, which can lead to an authentic learning experience in which students feel they can make valuable contributions to the larger community.
Portfolio Piece 3: Aquatic Ecology News Blog

Figure 4. An excerpt from the environmental news blog created by students in the Aquatic Ecology course at Carroll University. The news blog was designed to help students connect scientific literature to information presented in current news articles. We hypothesized that students may learn more from scientific literature that has been connected to real-world topics through the environmental news blog.

Reflections on Portfolio Piece 3

Through the Delta program at the University of Wisconsin, Madison I completed a teaching and research internship. I collaborated with Jason Freund to create an environmental news blog activity that would ask students to highlight the connection between current news articles and the scientific literature. The blog activity was implemented as part of the Aquatic Ecology course lead by Jason Freund at Carroll University in Waukesha, Wisconsin, and an example of a student-created blog entry is posted above. There were 22 students in the upper-level course, which fulfilled a
requirement for the Environmental Science degree offered at Carroll University. The course was designed to be a mixture of lecture and discussion format wherein students would be asked to read scientific articles before each class period and discuss them in class. I worked with Jason to also implement a blog activity that would replace the reading and discussion format during a few weeks of the semester.

During each of five weeks, a small group of students created a blog posting that related a scientific article to a current news event. The rest of the students were asked to read this blog posting and submit their own reply. Based on my observation of class discussion, this activity seemed to add vigor to the in-class discussions related to the primary literature. The internship experience certainly enhanced my understanding of the process of becoming a better teacher and helped me to appreciate the diversity in perspectives in the learning community around me.

I hypothesized that students may score better on content related questions during those weeks in which the blog was used compared to weeks with only regular class discussions. The results of my pre- and post-content quizzes did not reveal a significant difference in learning gains between the content students had blogged about and the content covered in regular class discussions. We did, however, find that students reported greater comfort and confidence in reading, interpreting and communicating about scientific literature after completing the course. We also found that students reported that they were more likely to consult electronic resources such as online news articles and blogs in their quest for more information about new topics. This suggests students are more comfortable using scientific literature as a source of information and that through the course activities they were able to expand the resources they rely upon for making informed decisions. In addition to the empirical findings of my blog project, I learned many personal lessons about teaching from completing this teaching-as-research project.

Before beginning my internship experience I felt I had a good understanding of the theory behind teaching-as-research (TAR), and I thought implementing TAR would be straightforward given my background in science and ample practice with designing and analyzing experiments. Implementing TAR was a greater challenge than I had expected. I began from an inductive framework, beginning with my specific experiences in which I’d identified learning challenges, and then tried to develop general principles that I could test using TAR. I soon found that the general learning principles I thought were important included many topics that had already been addressed in the primary teaching literature. This experience made me acutely aware and more respectful of the wealth of research that has been completed on the principles of learning and teaching. My greatest challenge was becoming familiar with this literature during a very short period of time so that I could develop a relevant and interesting research question. As such, I was reminded of the important role literature serves as a mode of communication among the community of researchers and teachers. I now rely on a broad base of literature to inform my TAR practices and view keeping up with the literature as an integral part of maintaining and improving my teaching practice.

Becoming familiar with existing literature and growing more respectful of the difficulty in implementing a wide-reaching research project lead me to realize that TAR could be
used at different scales, and didn’t always have to be so “big”. I began to better appreciate the power in implementing TAR on a daily-basis. Rather than developing a research program that may encompass an entire semester, I can use TAR to gather feedback and data on my students during a single lecture. Thus, due to my internship experience, I further appreciate the challenges in carrying out high-quality TAR projects and recognize the value of using TAR principles at different scales.

My recognition of the full scope of the teaching literature was greatly facilitated by my interactions with students and instructors during a semester-long internship seminar that accompanied my internship experience. During the internship seminar I met with other students who were working on internships and we discussed our proposals, designing teaching experiments, and approaches for analyzing our data. It was fantastic to interact with a community that shared my interest in improving teaching practices, yet who were all approaching the subject from different perspectives and different disciplines. This experience further solidified my view on the importance of peer interaction in learning a new topic.

I also found that development of a learning community within the classroom at Carroll University inspired more varied conversation related to scientific literature and its broader impacts. Students developed an online community by discussing their views on the relationship between current news events and primary literature and I found that when students discussed these particular topics, more and/or different students participated in the in-class discussions compared to weeks in which we discussed research articles in class alone. Perhaps development of an online community made students feel more comfortable sharing their ideas in person. Regardless, in-class discussions certainly benefitted from the input of a greater proportion of the students.

Including a greater proportion of the students in class discussions brought to light many of the diverse perspectives that were present in the classroom. In this course focused on aquatic science, students brought to discussions their perspectives from other courses related to policy, management and sociology. Also, students shared personal experiences, additional information from the internet, and things they found surprising.

For example, one student posted a reply to a blog about the clean water act by saying

“A..friend… and I were just discussing these issues this weekend. She has been studying the CWA in her Environmental Law course and was telling me about how the legitimacy of the CWA is under attack due to the 10th Amendment (all powers not expressly given to the federal government are in each of the states’ individual power). That is, the Constitution does not expressly say the federal government can regulate the environment so some folks think these decisions should be left up to each state.”

Another student offered their classmates a resource for limiting their own impact on fisheries that have been identified as declining:

“As individuals, there are a lot of things we can do to lessen our part on the overfishing of the world’s oceans. For example, the "Guide to Good fish", available at http://overfishing.org and many other websites, is a simple pocket-sized pamphlet that can be taken with individuals when shopping for food or eating out at restaurants. It lists SO MANY different kinds of fish, and rates them on the negative effects of their consumption, so that people can make smart decisions and
choose to eat fish that will have the least impact on the environment and dwindling fish populations.”

Finally, here is an example where one student provided feedback that let me know they had learned a great deal from the blog postings related to the “Dead Zone” in the Gulf of Mexico.

“So... I thought I knew everything worth knowing about the Dead Zone, but this proved me wrong -- several times. Coastal zones and estuaries stratify. Who knew? I guess I was under the impression that only small, freshwater lakes did this without realizing that the same process would be possible in an ocean ecosystem.”

These perspectives shared online before class lead to richer and broader discussions of the importance and implications of the scientific literature compared to in-class discussions that did not involve on-line interaction. Thus, I found developing an online learning community was an integral part of tapping into the diversity in the classroom.
Amy M. Kamarainen  www.amakama.com

Center for Limnology  (608) 852-6896 (phone)
University of Wisconsin  (608) 265-2340 (fax)
680 North Park Street  kamarainen@wisc.edu
Madison, WI 53706

EDUCATION

UNIVERSITY OF WISCONSIN, Madison, Wisconsin  2004 – present
Ph.D. in Zoology with a focus on aquatic ecology and ecosystem analysis
Dissertation title: “Long-term trends in aquatic pollutants: Chloride and phosphorus
dynamics in lakes embedded in urban and agricultural watersheds”
Anticipated completion: May 2009

Certificate in Research, Teaching and Learning  2007 – present
A program that aims to enhance the learning experience of teachers and students
Sponsored by: The Center for the Integration of Teaching and Learning
Anticipated completion: July 2009

Bachelor of Science in Zoology and Environmental Biology with Honors
Bachelor of Science in Fisheries and Wildlife Management with Honors

TEACHING EXPERIENCE

2009  Delta Teaching Intern: Does blogging enhance student understanding of
       scientific literature? Advisor: Jason Freund, Carroll University, Waukesha, WI
2007  Teaching Assistant: Animal Biology Laboratory, University of Wisconsin
2006  Teaching Assistant: Limnology Laboratory, University of Wisconsin
2002 – 2003  Tutor: Learning Resources Center, Michigan State University

Guest Lecturer
2008  Public Information Campaigns and Programs, University of Wisconsin
2006  Analytical Chemistry, University of Wisconsin

Advisor for Undergraduate Research
2008  1 undergraduate student, University of Wisconsin
2007  2 undergraduate students, University of Wisconsin
2006  1 undergraduate student, University of Wisconsin

RESEARCH EXPERIENCE

2004 – 2009  Doctoral Student: Center for Limnology, University of Wisconsin, Advisor: Dr.
             Stephen Carpenter.
             Combined ecological models and empirical data to explore issues related to
             phosphorus cycling and ecosystem management. Conducted field and laboratory
             analysis associated with biogeochemistry and aquatic invertebrates in lakes.
Gained skills in statistical data analysis, computer modeling and use of geographic information systems.

2003 – 2004  Research Technician: Water Microbiology Laboratory, Michigan State University, Advisor: Dr. Joan Rose
Assisted with projects on the survival and infectivity of waterborne human pathogens (Cryptosporidium parvum and Giardia lamblia). Conducted laboratory analysis related to toxicity of Microcystis aeruginosa blooms in Michigan lakes following invasion by exotic zebra mussels.

2000 - 2003  Research Student: Howard Hughes Undergraduate Research Program: Molecular Ecology Lab, Michigan State University, Advisor: Dr. Kim Scribner
Used molecular biology techniques (DNA extraction, PCR, PAGE) to study genetic relationships within populations of waterfowl and reptiles.

2002  Research Student: National Science Foundation Research Experience for Undergraduates Program: University of Alaska, Juneau, Alaska, Advisor: Dr. Brendan Kelly
Studied the behavior of ringed seals (Phoca hispida) using radio telemetry and visual surveys while living at a remote field station on the Arctic Ocean.

RECENT AWARDS AND FELLOWSHIPS

2005-2009  National Science Foundation Graduate Research Fellowship
2008  Advancing the Science of Limnology and Oceanography Student Travel Award
2008  John Jefferson Davis Travel Award
2005  John Jefferson Davis Research Award
2004-2005  Wisconsin Alumni Research Foundation Fellowship

SERVICE AND AFFILIATIONS

Member of the Ecological Society of America, the Advancing the Science of Limnology and Oceanography
Graduate Student Representative, North Temperate Lakes LTER (2006-2008)
Coordinating Committee, Zoology Graduate Student Informal Seminar (2007-2008)
Instructor, Winter Limnology, University of Wisconsin Enrichment Program for middle school students (2006)
President, University of Wisconsin, Limnology and Fisheries Society (2005-2006)
Reviewer, Limnology and Oceanography, Environmental Science and Technology, Hydrobiologia

PUBLICATIONS (* indicates undergraduate advisee author)


MANUSCRIPTS IN REVIEW (* indicates undergraduate advisee author)


PRESENTATIONS


