

Academic Job Hunting Tips and Advice: Summary of DIALOG IV Symposium Working Group Discussion

Participants: Andrew Baker, Janina Benoit, Romi Burks, Maria Castillo, Reide Corbett, Dionne Hoskins, Jennifer Klug, Rebecca Shipe and Frank Wilhelm

We met to share advice on the job hunting process for a PhD in the aquatic sciences. Advice was given by participants who had jobs in baccalaureate and masters granting institutions, a research university and a non-profit organization. Although this is not a comprehensive list, we brainstormed our best advice, discussed the application and interviewing processes and compiled a list of some more complete resources for conducting a job search. Three job application “packages” are provided for use as models by academic job applicants.

The Application

- First, clarify your goals. Then, apply only to jobs that you can fill well. Do not waste your time on jobs for which you are not a good fit.
- Once you clarify the type of job that you want, try to start as high as you can in institutional prestige. It may be harder to move up later.
- Be imaginative and create possibilities for yourself. You may be able to work with an institution to create/customize a job for yourself.
- Tailor your application to the job. Do your research on the institution and its goals and on current projects that are underway.
- Make sure that your letters of recommendation are strong. Do not be afraid to ask your references if the letter will be strong, and give them a packet of information that includes the job description, your current CV, and how you think that you fit the job.description. They will not be upset if you suggest what they might write.
- For academic jobs, take the teaching philosophy statement seriously. You may want to address styles of learning, your approach and assessment techniques. At research institutions, the teaching philosophy can hurt you but may not help you.
- Proofread your application! Mistakes are an easy reason to throw out an application.

The Interview

- Be honest and absolutely BE YOURSELF.
- Have questions for everyone who you might meet. In academia, this includes having questions for each faculty member, deans, chairs, students and staff. If research is involved in the position, know the work of each faculty member, and have some idea of how you might collaborate with them (if possible)
- Have confidence - you are interviewing them as well! Find out if they have the resources that you need to do a good job.
- If you give a talk, tailor it to the audience. This will be their opportunity to evaluate you as a teacher and as a scientist.
- Do not be discouraged. Think of this as a networking opportunity and a learning process.

Resources

- The Chronicle of Higher Education (<http://chronicle.merit.edu/>)
- Tomorrow’s Professor – listserv and book by R. Reis (<http://sll.stanford.edu/projects/tomprof/newtomprof/>)
- Academic Job Search Handbook (Heiberger and Vick)
- (<http://geyer.lcs.mit.edu/~mernst/advice/academic-job.html>)
- (http://ccrma-www.stanford.edu/~unjung/guide/academic_job.html)

SAMPLE JOB APPLICATION PACKAGES

Reide Corbett and Jennifer Klug kindly volunteered to share job application packages they used for their own job searches, with the hope that they will provide useful models for others.

REIDE CORBETT

January 25, 2000

Dr. Richard K. Spruill, Chair
Search Committee
Department of Geology
East Carolina University
Greenville, NC 27858-4353

Dear Selection Committee:

Please consider my application for the Assistant Professor of Biogeochemistry position in the Department of Geology and Coastal Resources Management. My curriculum vitae, statements of teaching and research interests, and the names and addresses of references are enclosed. Additionally, I have enclosed several reprints/preprints from my recent publications. Letters of recommendation will be sent upon request.

My interest in pursuing an academic career began while an undergraduate in the Chemistry Program at Florida State University. Through several undergraduate research projects, I became interested in coastal hydrology and began working in the Department of Oceanography. I decided to continue my education at Florida State University, where I obtained teaching experience in several different capacities, including working closely with many undergraduates on independent study projects and supervising several laboratory technicians.

My main research interests are in biogeochemical and radioisotopic applications to hydrologic and coastal systems. I have applied my research to sedimentary systems, karst geologic formations, coastal oceans, and lakes. Through these research projects, I have employed several different natural and artificial tracers (^{222}Rn , CH_4 , ^{15}N , SF_6 , ^{131}I , ^{32}P). I am continuing this line of research as a Postdoctoral Research Associate at the Institute for Earth and Ecosystem Sciences, Dept. of Geology, Tulane University. At Tulane, I have begun to study the sedimentary biogeochemistry associated with river-ocean interactions, concentrating on nutrient, carbon, and contaminant transport and fate.

My research would focus on studies that parallel coastal and wetland hydrology as well as anthropogenic impacts of our water resources and would benefit students at the East Carolina University. I believe that my experience coastal nutrient dynamics as well as my background in geochemical applications to coastal hydrologic systems will benefit the Department of Geology and would be a useful addition to the Program in Coastal Resources Management. I find the prospect of conducting research and teaching at East Carolina University very exciting. Thank you for considering my application.

Sincerely Yours,

D. Reide Corbett

David Reide Corbett

Department of Oceanography
Florida State University
Tallahassee, Florida 32306-4320
Tel: (850) 644-9914; Fax: (850) 644-2581
Email: rcorbett@ocean.fsu.edu

PERSONAL HISTORY

Date of Birth: 04 May 1971 in Cherry Point, North Carolina
Marital Status: Married to Lisa M. Corbett, 1 son, Ian Combs Corbett

EDUCATION

May, 1996 to present: Ph.D. candidate in Chemical Oceanography (Geochemistry) under the direction of William C. Burnett; Florida State University; Graduation date: 12/99

1996: M.S. in Chemical Oceanography (Geochemistry); Florida State University

1994: B.S. in Chemistry; Florida State University

PROFESSIONAL EXPERIENCE

Beginning Dec. 1999: Postdoctoral Research Associate, Institute for Earth and Ecosystem Sciences, Dept. of Geology, Tulane University, New Orleans, La 70118

- Uranium cycling and sediment transport in the Mississippi

1994 to present: Graduate Research Associate, Department of Oceanography, Florida State University, Tallahassee, Florida 32306-4320

- Radiochemical studies of groundwater, including ^{222}Rn and CH_4 as chemical tracers, employing ^{131}I , ^{32}P , ^{15}N , and SF_6 as tracers for groundwater and contaminate flow into coastal waters; in addition, research experience includes sedimentological studies employing ^{210}Pb , ^{226}Ra , and ^{137}Cs , extraction of ^{239}Pu from seawater, and hydrological studies of coastal regions; supervise and advise undergraduate students and research technicians

1992 to 1994: Laboratory and Field Assistant, Department of Oceanography, Florida State University

- Maintained radon extraction line and collected and analyzed sediment and water samples for radioisotope studies

TEACHING EXPERIENCE

Fall, 1999: Instructor, Marine Isotopic Chemistry; Florida State University

- Invited instructor addressing decay-series radioisotopes as water mass tracers.

Summer, 1999: Instructor, Elementary Oceanography; Florida State University

- Invited instructor addressing marine chemistry, sedimentation, and plate tectonics.

Spring, 1996: Instructor, Elementary Oceanography; Keiser College, Florida

- Lectures covered formation of Earth, plate tectonics, sediment transport and distribution, seawater chemistry, ocean circulation, and food web dynamics.
- Students participated in discussion sessions where exercises, experimental demonstrations, and videos were used to reinforce concepts introduced in lectures.

Fall, 1996: Instructor, Elementary Oceanography; Florida State University

- Invited instructor covering marine chemistry and sediment transport and distribution.

Fall, 1996: Teaching Assistant, Department of Oceanography, Florida State University

- Responsible for review sessions, daily preparations of lectures, and laboratory style demonstrations for introductory oceanography course.

Summer, 1992-1994: Instructor, Field and Laboratory Research Techniques; Florida State University

- Students developed skills in the collection and analyses of experimental data in both the field and laboratory. Focus of course was groundwater flow and groundwater tracers.

CRUISE EXPERIENCE

August 19 to August 27, 1998: R/V *Atlantis*, Gulf of Santa Catalina. Collection of cores from controlled and caged areas via *Alvin* to observe disturbances of macro- and meifauna by pelagic and benthic predators. Collection of sediment for analysis of Th-234 to determine possible effects of caged areas on sedimentation.

July, 1992 to December, 1994: R/V *Seminole*, Gulf of Mexico. Numerous offshore cruises to measure groundwater seepage, take CTD profiles, collect sediment and seawater samples for tracer analysis and study benthic fluxes on the Florida Platform

July 28 to July 31, 1993: R/V *Bellows*, Apalachee Bay, Florida. Sample collection and analysis for natural tracers, ^{222}Rn and CH_4 , and collection of sub-bottom seismic data

May 2 to May 6, 1992: R/V *Bellows*, Apalachee Bay, Florida. Collection of sub-bottom seismic data, installation of “Lee-type” seepage meters, and collection of sediment cores

ACADEMIC SERVICES AND AWARDS

1999: Student Travel Grant Award, American Geophysical Union

1999: Dissertations Symposium on Chemical Oceanography Invited Participant (DISCO XV)

1998: National Science Foundation Travel Award to attend Fifty Years of Ocean Discovery Meeting

1998: Student Travel Grant Award, Department of Oceanography, Florida State University

1998: Thalassic Society Student Travel Grant Award, Florida State University

1997: Oceanography Student of the Year Award, Florida State University

1997: NOAA Estuarine Graduate Research Fellowship

1995 to present: College of Arts and Sciences Student Advisory Committee

1995 to present: Thalassic Society Graduate Student Organization President

1995: Oak Ridge Institute for Science and Education Graduate Fellowship

1994: Savannah River Ecology Laboratory Undergraduate Research Fellowship

PROFESSIONAL SOCIETIES

American Society of Limnology and Oceanography

American Geophysical Union

Estuarine Research Federation

The Oceanography Society

FUNDED PROJECTS

Determination of Rn-222 in Natural Waters via Electret Ion Chambers. Pis – D. Reide Corbett and W. Burnett. Rad Elec Inc. \$5,500. 1995-1996.

Use of Artificial Tracers to Determine the Impact of Small-Scale Domestic Sewage Systems on Apalachicola Bay. Pis – D. Reide Corbett and W. Burnett. NOAA \$70,500. 1997-2000.

Water Quality within Apalachicola National Estuarine Reserve. Pis – D. Reide Corbett and R. Iverson. Florida Department of Health \$111,288. 1997-1999.

Determination of an On-site Sewage Set-back for Seasonally Inundated Wetlands. Pis – J. Chanton, W.C. Burnett, and D. R. Corbett. Florida Department of Health \$75,000. 1999-2000.

Tracer Techniques to Evaluate Rates of Non-point Source Pollution from Barrier Islands to Surface Water. Pis – W.C. Burnett, J. Chanton, and D. R. Corbett, Florida Sea Grant College Program \$172,500. 2000-2002

PUBLICATIONS IN PEER-REVIEWED JOURNALS

Corbett, D. R., W.C. Burnett, P.H. Cable, and S.B. Clark. 1997. Radon tracing of groundwater input to Par Pond, Savannah River Site. Journal of Hydrology, 203, 209-227.

Cable, J.E., W.C. Burnett, J.P. Chanton, D.R. Corbett, and P.H. Cable. 1997. Field evaluations of seepage meters the coastal marine environment. Estuarine, Coastal and Shelf Science, 45, 367-375.

Burnett, W.C., D.R. Corbett, M. Schultz, E.P. Horwitz, R. Chiarizia, M. Dietz, A. Thakkar, M. Fern. 1997. Preconcentration of actinide elements from soils and large volume water samples using extraction chromatography. Journal of Radioanalytical and Nuclear Chemistry, 226, 121-127.

Corbett, D. R., W.C. Burnett, P.H. Cable, and S.B. Clark. 1998. A multiple approach to the determination of radon fluxes from sediments. Journal of Radioanalytical and Nuclear Chemistry, 236(1-2), 247-252.

Dillon, K.S., D.R. Corbett, J.P. Chanton, W.C. Burnett, D.J. Furbish. 1999. The use of sulfur hexafluoride as a tracer of septic tank effluent in the Florida Keys. Journal of Hydrology, 220, 129-140.

Corbett, D.R., J.P. Chanton, W.C. Burnett, K.S. Dillon, C. Rutkowski, and J. Fourqurean. 1999. Patterns of groundwater discharge into Florida Bay. Limnology and Oceanography, 44(4), 973-1185.

Swarzenski, P. W., D.R. Corbett, J.M. Smoak and B.A. McKee. 1999. The Use of U-series Radionuclides and Transient Tracers in Oceanography –An Overview- In: Issues in Environmental Science and Technology, Eds., R.E. Hester and R.M. Harrison. The Royal Society of Chemistry, UK, No. 13. In press.

Corbett, D.R., L. Kump, K.S. Dillon, W.C. Burnett, J.P. Chanton. 1999. Fate of wastewater-borne nutrients under low discharge conditions in the subsurface of the Florida Keys, USA. Marine Chemistry, In press.

Dillon, K.S., D.R. Corbett, J.P. Chanton, W.C. Burnett. 1999. Groundwater flow in the Florida Keys: Impacts of wastewater injection wells. Groundwater. In revision.

Corbett, D.R., K. Dillon, and W.C. Burnett. 1999. Tracing groundwater flow on a barrier island in the Northeast Gulf Of Mexico. Estuarine, Coastal, and Shelf Science. In revision.

- Corbett, D.R., K. Dillon, W.C. Burnett, and G. Schaefer. 1999. Groundwater nutrient dynamics downfield from wastewater systems on a barrier island in the Northeast Gulf of Mexico. Estuaries. In Review
- Corbett, D.R., K. Dillon, W.C. Burnett, J. Chanton. 1999. Estimating the groundwater contribution into Florida Bay via natural tracers, ^{222}Rn and CH_4 . Limnology and Oceanography. In Review.
- Corbett, D.R., K.S. Dillon, W.C. Burnett, J.P. Chanton. 1999. Tidal influences on groundwater flow in the Florida Keys, in prep., for submission to Journal of Hydrology.

TECHNICAL REPORTS, MEETING PROCEEDINGS, MISCELLANEOUS

- Burnett, W.C., J.P. Chanton, G. Weatherly, J.E. Young, G. Bugna, D.R. Corbett, and P. Cable. 1994. Freshwater Input to the Gulf of Mexico via Springs and Seeps, p. 67-73: In Northeastern Gulf of Mexico Physical Oceanography Workshop Proceedings, (ed) A. Clarke, Florida State University, Tallahassee, Florida
- Corbett, D. R. 1996. Radon Tracing of Groundwater Input to Par Pond, Savannah River Site. M.S. Thesis. Dept. of Oceanography, Florida State University.
- Burnett, W.C., J.E. Cable, D.R. Corbett, J.P. Chanton. 1996. Tracing Groundwater Flow into Surface Waters using Natural ^{222}Rn . In: Proceedings of the Groundwater Symposium, Land Ocean Interactions in the Coastal Zone (ed. R. Buddemeier), LOICZ/R&S/96-8, iv+179 pp.
- Chanton, J.P., W.C. Burnett, R.L. Iverson, D.R. Corbett, K.S. Dillon. 1997. Use of Natural and Artificial Tracers To Detect Subsurface Flow of Contaminated Groundwater in the Florida Keys National Marine Sanctuary. EPA Final Report #X994871-96-0.
- Corbett, D.R. 1998. Tracing Groundwater Flow on St. George Island. The Oyster Catcher, ANERR. Spring.
- Corbett, D.R. and R.L. Iverson. 1999. Groundwater And Nutrient Dynamics on a Strip Barrier Island in the Northeastern Gulf of Mexico. Florida Department of Health Final Report #C0005.

- In addition, I have over 20 abstracts published and have presented at more than 15 scientific meetings.

RESEARCH INTERESTS

D. Reide Corbett

Introduction

My main research interests are in coastal hydrology and environmental biogeochemistry. I have applied my knowledge and interest in these areas to interdisciplinary research in marine systems. My masters research focused on the quantification of groundwater discharge into surface waters using ^{222}Rn as a natural tracer. Many previous studies have neglected groundwater as a source of freshwater or dissolved constituents to aquatic systems because of the difficulty in locating and quantifying groundwater input. Elevated radon and methane concentrations observed in coastal and lake waters are good indicators of an external source such as groundwater inflow.

Currently, I am studying the transport, processing and fates of terrestrial organic carbon and nutrient between the Mississippi and the deposition sites on the shelf.

M.S. Research

I performed a ^{222}Rn mass balance to estimate the importance of groundwater to a lake in South Carolina. Benthic flux measurements from the sediments of the lake were incorporated into a mass balance equation, which accounted for all sources and sinks within the water body. Results suggested that groundwater discharge to this region is significant — up to 33% of the total freshwater inflow to the lake.

Ph.D. Research

My doctoral research primarily focused on groundwater/surface water interactions and the use of natural (^{222}Rn , CH_4 , ^{15}N) and artificial (SF_6 , ^{131}I , ^{32}P) tracers to obtain more information about this interface. I studied the groundwater/coastal zone system in the Florida Keys and a small barrier island in the Northeastern Gulf of Mexico. In the Keys, I focused on the contribution of nutrients into surface waters from subsurface waters (saline groundwater), which are elevated in nutrients due to the wastewater practices. I employed artificial tracers to help understand groundwater and nutrient dynamics in the subsurface. In addition, natural tracers were employed to provide estimates of the groundwater contribution to surface waters. I focused on the nutrient dynamics down-field from septic and aerobic wastewater tanks on St. George Island and the potential flux of nutrients into surface waters. My results indicated that groundwater flow on this barrier island is almost completely dependent on rainfall-induced hydraulic gradients. Natural and artificial tracers provided hydrologic information on the island's aquifer. In addition, monitoring of nutrient concentrations allowed an assessment of the nutrient removal processes as well as the contribution to the estuary and provided information which may be used to help in future water management decisions. It is this kind of interdisciplinary approach that I would promote in my future research and that of my students.

Postdoctoral Research

My current research focuses primarily on the biogeochemical cycling of carbon and nutrients in river-dominated coastal regions. The magnitude and nature of carbon storage in continental shelf sediments is an important on the global CO_2 budget. Deltaic shelves are particularly important since approximately 80% of the total organic carbon preserved in the marine sediments occurs in these regions; however, these areas remain largely understudied. I am currently using a combination of remote sensing, biological, and geochemical techniques to examine the spatial and temporal coupling between surface water phytoplankton productivity and the flux of organic matter to the seabed

Research Interests

D. Reide Corbett

Looking Ahead

Coastal waters, including productive estuarine systems, are one of our most precious resources. Unfortunately, anthropogenic impacts, such as chemical spills and wastewater disposal, have severely impacted much of this viable resource. I would like to focus my future research on developing a better understanding of surface water/groundwater processes which will help protect, manage, and remediate our water resources. I am particularly interested in radio/stable-isotope applications and biogeochemical problems associated with the ground water/surface water interface near the coastal zone. My main interest is to pursue studies of the contribution groundwater makes to elemental budgets of aquatic systems, through either natural or anthropogenic inputs. I would like to use stable isotopes to help better understand biogeochemical processes of impacted areas as well as more pristine environments. It will be necessary to develop new innovative procedures for stable isotopic measurements. For example, phosphate oxygen ($P^{18}O_4$) is not currently utilized as a potential source indicator of contaminant phosphate in groundwater/surface water systems. Phosphate oxygen will have a different signature dependent on the environment in which it was formed.

These are the types of studies I would like to pursue and believe that the East Carolina University offers an extraordinary environment for this sort of research. Coastal science has many parallel applications in lakes, wetlands, and the marine environment. My background in coastal hydrogeology, nutrient dynamics, and radiochemistry would be beneficial in establishing an active research program and collaborative projects within your department.

TEACHING INTERESTS

D. Reide Corbett

I have experience working with students on several levels, including teaching, mentoring, field instruction, and informal laboratory instruction. Initially, I taught as a senior undergraduate student when I was asked to lead a field and laboratory course as part of an EarthWatch volunteer program, which allows volunteers to help on scientific research projects around the globe. Since that initial experience with education, I have been excited about working with students, particularly on research projects. Also while a graduate student, I have worked closely with many undergraduate students at Florida State University (FSU) on their independent study projects. At least one of those students continued on for a graduate degree. My close interactions with these students helped me learn to identify students who are interested in studying science. It has also shown me new approaches on how to involve undergraduates in research.

My primary lecture experience comes from an elementary oceanography course for undergraduates, which I developed for a local community college, Keiser College. I have also been involved in many teaching activities at FSU, both as a teaching assistant and guest instructor.

I outline below a listing of courses I would be interested in teaching at the Washington State University.

Introductory Oceanography

Although this course does not directly relate to the Chemistry Department, I have presented it here since most of my experience involves this course. Oceanography would fit well within the curriculum of the Program in Environmental Science and Regional Planning. The course would offer students an introduction of the coastal environment and associated resources.

This course gives students a basic understanding of the geology, physics, chemistry, and biology of the oceans. In the past, I have begun this course by setting the stage for the earth's formation, describing the geography and morphology of the ocean basin's, discussing plate tectonics, and investigating how geology influences climate, nature, and society. Ocean circulation, tides, and waves will be discussed, as well as the chemistry of seawater. A description of the ocean's habitats, productivity, food webs, and marine life is also included. The importance of protecting all components of the oceans is discussed at the end of the course as it directly relates to humans, their food sources, and economics. This course can be tailored for non-science majors or as a slightly more rigorous introduction for marine-science oriented undergraduates.

Coastal Resource Management

This course will allow you to develop skills in the management of coastal and marine resources by examining the technical and analytical frameworks available to assist management and the particular contexts and issues presented by coastal and marine environments. This course would focus on coastal resource assessment and management. Rural and urban soil conservation. Water resources and fisheries management will be discussed. In addition, rehabilitation of degraded environments, wetland restoration, aquaculture and permaculture, and water quality monitoring programs will be covered. Carolina and global perspectives would be introduced. Guest lectures from practitioners and field-based activities would also be included. Field trips will be used to enhance lectures and problem-solving.

Teaching Interests

D. Reide Corbett

Marine Isotopic Chemistry

This course provides an introductory, graduate-level treatment of the physical processes and geological constraints that govern the occurrence and transport of mass and energy—water, dissolved chemical substances, heat, and mechanical energy—within the Earth's crust.

Emphasis will be placed on how transport is influenced by fluid, soil and rock properties, and by topographic, stratigraphic and structural boundaries. Treatments of saturated flow, using Darcian and nonlinear flow laws, and unsaturated flow, emphasizing its nonlinear character, will be discussed and related to the corresponding geologic conditions. Essential concepts underlying modeling of transport in geological material, including analytical and elementary numerical treatments, and the associated boundary specifications will be discussed. The various tools used to monitor and evaluate the occurrence and movement of subsurface waters will be introduced. Field excursions will be used to relate lectures to real world problems.

Radioisotope Geochemistry

A detailed approach to studying geologic and geochemical processes will be addressed through the application of radioactive tracers. Dating methods for geologic and hydrologic systems will be discussed with the introduction of primordial, artificial, and cosmogenic radioactive isotopes. The mathematical description of radioactive decay and ingrowth and the advantages of radiogenic isotopes will be presented. Measurement techniques and instrumentation will be introduced to aid students in understanding radio-isotopic research. Individual or class projects will be used to reinforce concepts from the lecture.

JENNIFER KLUG

Search Committee Chair
Ecologist Position
Biology Department
Fairfield University
Fairfield, CT 06430

19 November 2000

I wish to apply for the assistant professor position in Ecology offered through the Biology Department. Currently, I am a doctoral student in the Department of Zoology at the University of Wisconsin - Madison where I will finish my degree in December of 2000. I am interested in this position because of Fairfield University's commitment to excellent teaching as well as the focus on undergraduate research opportunities.

My interest in teaching at a school like Fairfield University stems from my experience as an undergraduate at Indiana University. I received my degree from the Department of Geological Sciences which is a relatively small department at Indiana. Classes in my major were small, and by comparing my major classes with those I took outside the department, I learned the value of one-on-one contact with my professors. In addition to teaching introductory and general ecology and environmental science courses, I am excited about the possibility of developing upper level courses in algal ecology and/or limnology. I'd also be interested in teaching seminar classes such as career development.

My research focuses on the response of aquatic communities to environmental disturbances. For my master's research, I studied the responses of phytoplankton and zooplankton communities exposed to experimental pH perturbations. In my doctoral research, I've broadened my approach to use empirical and modeling techniques to study the effects of multiple perturbations, (specifically, changes in nitrogen, phosphorus, and colored dissolved organic matter concentrations), on phytoplankton communities. One of the main messages of this work is that knowledge of the interactions among species is crucial for predicting how a community will respond to changes in the environment.

I participated in research as an undergraduate and firmly believe that hands-on experience is crucial for undergraduates. Thus, I look forward to involving undergraduate students in my research program. Phytoplankton are particularly suited to undergraduate research because of their short generation times and ease of manipulation. In addition, aquatic systems are often highly disturbed. Working in these systems is a powerful way to engage students who are interested in environmental problems.

Enclosed, you will find a copy of my curriculum vitae, graduate transcripts, statements of teaching and research interests, and several reprints. Letters of recommendation are being sent directly by Tony Ives (my advisor), Steve Carpenter, and Linda Graham (two of my committee members).

Please note that my spouse, Tod Osier, is also applying for this position. Although we are both ecologists who work with photosynthetic organisms, our expertise spans a number of kingdoms and levels of biological organization. We believe our diverse interests within the field of ecology would be an asset to the Biology department and are interested in learning about the options for dual-career couples at Fairfield University, including the possibility of splitting this position.

Thank you for considering my application.

Sincerely,
Jennifer L. Klug
608-262-9226
jlklug@students.wisc.edu

Statement of Research Interests - Jennifer L. Klug

I am interested in how changes in the environment affect ecological communities. Specifically, I study how organisms are directly affected by changes in the environment and how the interactions among organisms affect overall community responses to environmental change. The types of questions I address include: What are the mechanisms for direct effects of environmental change on organisms? How are direct effects of these changes modified by interactions among species to determine the change in density of a particular species? Can the effects of multiple environmental changes be predicted based on information obtained from observing an ecosystem experiencing a single perturbation? This last question is especially important because it is unlikely that we will have the time and resources to study every environmental change in isolation. Thus, it is crucial to be able to anticipate the ecological changes that may occur if an ecosystem is exposed to multiple environmental changes.

The effects of environmental change on organisms can be measured in different ways (e.g., physiological or behavioral responses). I study the effects of environmental change on communities of organisms by measuring changes in population density. Environmental change can affect population density by having a direct physiological effect on a particular species or by having an indirect effect due to changing the densities of other species with which the focal species interacts. For example, in my master's work, I found that the densities of diatom and chlorophyte phytoplankton would decline if they were exposed to increased acidity in isolation (i.e., a direct negative effect of acidity). When acidity was low, these groups of phytoplankton competed for resources, but diatoms were the stronger competitor. Thus, because acidity led to a decline in diatoms, chlorophytes experienced a more favorable competitive environment at high acidity. My experiment showed that the direct negative effect of acidity on chlorophytes was not as strong as the indirect positive effect brought about by the decline of their competitors (diatom phytoplankton). That is, chlorophyte density increased with increasing acidity even though there was a direct negative effect of acidity (Klug et al. 2000). This example highlights the importance of looking at both direct and indirect effects of environmental change.

Another component of my research involves using long-term data to identify changes in species composition of communities that may be due to environmental changes. I then use experiments to test the hypothesis that the observed changes in species composition were due to the environmental change. For example, in my dissertation work, I used long-term data collected as part of a series of whole-lake experiments to show that increased nutrient loading and changes in colored dissolved organic matter (CDOM) were responsible for changes in the biomass of particular groups of phytoplankton (e.g., cyanobacteria and chlorophytes) (Klug and Cottingham, in review). CDOM is a mixture of organic compounds which give brown-water lakes their characteristic color. CDOM input and nutrient loading are heavily influenced by land use in the watershed; therefore, human activities such as agriculture, logging, and wetland drainage have large impacts on the nutrient and CDOM concentrations in lakes. Changes in CDOM concentration can have many different effects on phytoplankton, and I've used short-term experiments to look at some of the mechanisms which may be responsible for the effects of CDOM on phytoplankton biomass. My experiments showed that one effect of increasing CDOM is negative, caused by CDOM absorbing light which leads to less light available for photosynthesis. However, CDOM also had a positive effect on phytoplankton biomass, due to growth stimulation by nutrients present in the CDOM. Given both positive and negative effects, the challenge is to predict the overall net effect. In my experiments, phytoplankton biomass increased in response to increased CDOM concentration, suggesting that the positive effect due to nutrients present in the CDOM outweighed the negative effect of decreased light availability (Klug, in review).

In addition to my primary research interests, my work has been enhanced by collaborating with other scientists who have different expertise. As part of a National Center for Ecological Analysis and Synthesis working group on community dynamics, I gained experience in the analysis of complex data. Using long-term data collected from 35 north temperate lakes, I've been exploring the role of spring conditions (e.g., temperature, algal resources) in determining the composition of summer zooplankton communities. Another working group project that I was involved in proposed a new framework for thinking about the variability of communities (Micheli et al. 1999). I've also collaborated with Tony Ives (my advisor) and Kevin Gross (a fellow graduate student) on a theoretical project which modeled the effects of species diversity on the stability of communities. For this work, we measured stability as the degree of fluctuations in community biomass over time (Ives et al. 1999, Ives et al. 2000).

My own undergraduate experience, as well as working with undergraduate students at University of Wisconsin, has convinced me that participation in research projects is a vital part of undergraduate education. The most influential experiences of my undergraduate career were summers spent participating in research with Kay Gross at Michigan State University and Cliff Dahm at University of New Mexico. These summers gave me a head start for graduate school and showed me that I was on the right career path. I have been fortunate in my graduate career to have the opportunity to supervise a number of undergraduate researchers and have found the experience both personally and professionally rewarding. My field experiments could not have been completed without the dedication and hard work of Keitha Beelick, Alison Colby, Victoria Jager, and Shelley Schmidt. I believe that my skills and interests would fit in well with the current strengths in the Biology department at Fairfield University. In the next 5-10 years, I see my research continuing along several pathways. I will continue to work on the effects of multiple environmental changes on communities, focusing on interactions among environmental changes. I'd like to expand my current work to see if it is possible to generalize when we might expect interactions among environmental changes to occur. This work would likely be a combination of comparative analyses of existing data, as well as new experiments. In addition, I plan to continue to work on the phytoplankton communities of darkly stained lakes. Phytoplankton living in these lakes have unique challenges because there is little light available for photosynthesis. These species have fascinating strategies for balancing their light and nutrient requirements including vertical migration which allows them to stay in the light saturated zone during the day and migrate to the dark, nutrient rich bottom waters at night. In addition, some species may gain nutrients through phagotrophic ingestion of bacteria. I'm interested in studying this system both because the biology is interesting and because there is increasing evidence that darkly stained lakes differ in response to environmental change when compared with clear lakes. This work would combine observational studies of the ecology of phytoplankton in darkly stained lakes with experiments designed to explore the hypotheses suggested by the observations.

Statement of Teaching Interests - Jennifer L. Klug

My ultimate goals as a teacher are 1) to teach students to gather, evaluate, synthesize, and communicate scientific information, 2) to familiarize students, through courses and research opportunities, with the science of ecology, and 3) to provide interested students with the tools necessary to pursue careers in ecology and/or environmental science. The proximate tools I will use to meet these goals include developing a learning environment that stresses concepts rather than facts, providing students with plenty of hands-on learning experiences, and encouraging students to take responsibility for their education.

Regardless of course topic, I will ask students to be more than passive vessels of knowledge. In many cases, I will combine lectures with student-led discussions of primary literature. We used this technique in the ecology course I assisted with at University of Wisconsin and I found that students generally understood the concepts better because they were asked to explain them to their peers. This could be particularly appropriate in an upper level class for which the primary literature would be a critical component. Even in introductory classes, readings from the primary literature and news media are crucial to ensure that students learn how to evaluate the kind of scientific information they see every day in the newspaper. Another way to engage students is through hands-on experiences, which give students a chance to practice what they are learning. For a laboratory class, one technique that I am particularly excited about is letting groups of students learn the process of science by formulating their own questions, designing their own experiments, and analyzing their own results. This can be challenging for introductory students. However, by meeting with students at each step, I can facilitate their learning while still allowing them to discover the process on their own. One of my collaborators, Janet Fischer, uses this format in her ecology class, and several students have decided to go to graduate school to continue to work on the topics they studied for their group project.

As a graduate student at the University of Wisconsin, I have had rewarding experiences participating in both introductory and upper-level courses. When I taught the laboratory portion of Animal Biology, the students were mostly freshmen and sophomores. Many of them were not science majors, and one of my goals was to show them that biology affected their lives in ways they might not have thought of. I learned how to engage students who were taking the course to fulfill a science requirement without watering down the material that science majors needed to succeed in upper-level courses. I also taught the laboratory portion of an upper-level General Ecology course where most students were botany, wildlife ecology, or zoology majors. One of the focuses of the course was to consider humans as a component of ecological systems. That experience taught me how to integrate current environmental problems with basic ecological theory through readings and laboratory exercises. I was awarded a Graduate School Excellence in Teaching award based on my work in Animal Biology and General Ecology. Currently, I am co-teaching a seminar in professional development designed for new graduate students. This course covers topics related to success in graduate school and provides students with tools needed to choose and prepare for careers in ecology. I believe professional development courses are also extremely valuable for undergraduates and would be interested in teaching such a class.

The transfer of knowledge is not one-way, and I've learned a lot about biology and ecology from my students. Students ask hard questions, and their questions have challenged me to think about what I'm teaching them from a number of different perspectives. In addition, advising and supervising undergraduate researchers has been a learning experience. When I helped Shelley Schmidt (one of my field assistants) with a research project for one of her classes, I tried to provide the support she needed without giving her all the answers. Although there were

some frustrating circumstances (proving that I didn't have all the answers either), I believe that she now has a better understanding about the process of experimental science and has gained confidence in her abilities. I will continue take the approach of support without spoon-feeding in advising undergraduate students who work in my lab.

My commitment to the importance of research opportunities for undergraduates was initiated when I was an undergraduate myself. As an undergraduate, I participated in the National Science Foundation Research Experience for Undergraduates (REU) program. As part of this program, I gained skills that I would never have learned in a class, and I look forward to providing undergraduate students with similar experiences. Phytoplankton are particularly well-suited for undergraduate research because of their short generation times and ease of manipulation. In addition, phytoplankton, like higher plants, display a wide range of ecological strategies. The diversity in phytoplankton lifestyles is fascinating, and often surprising to students used to studying the ecology of macroorganisms. Learning about interesting and surprising organisms is a particularly effective way to get students enthused about the diversity in all life.