

# AQUATIC & FISHERY

SCIENCES

NEWSLETTER OF THE SCHOOL OF AQUATIC & FISHERY SCIENCES UNIVERSITY OF WASHINGTON AUTUMN 2001

AUTUMN

## Undergraduate Research

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In 1997, President Richard McCormick challenged UW educators to focus on the scope and quality of undergraduate education, with particular emphasis on expanding the opportunities for research experience. The UW faculty has a leadership role at the forefront of innovative research. Our undergraduates are interested, capable, and willing to participate in research as important dimensions of their education. Our faculty and students combined make our university a premiere institution for undergraduate experiential education.

Since 1997, we have seen a tremendous increase in research opportunities for undergraduate research across campus departments, and the School of Aquatic & Fishery Sciences (SAFS) is among the leaders in this effort. SAFS has helped our undergraduates gain access to provocative faculty research programs in a variety of settings.

Many courses now routinely provide research orientation within the hypothesis-based structure of scientific method: questions are posed, data obtained and analyzed, and findings reported. Students have participated in research at unique field sites, such as the Alaska field camps, Friday Harbor Lab, and Big Beef Creek; as team members of research programs studying biodiversity in the Russian Far East;

as interns in the National Marine Fisheries Service stock assessment cruises in the Bering Sea; and through employment opportunities within SAFS and in the broader commercial industries that hire our graduates.

The SAFS undergraduate curriculum requires majors to complete a senior thesis which gives students a way to “put it all together”—using their experiences in our program to design and complete an independent research project, apply academic and critical thinking skills, and develop proficiency in communication, planning, project management, and networking.

In this issue, we feature undergraduates who have participated in different research projects within the School, and we highlight some of the settings in which undergrads gain practical skills and experience that they can apply in their future studies, jobs, and lives.

Students noted their genuine appreciation to those faculty who played key roles in facilitating their research experiences. Several also emphasized the importance of being proactive as a student—the sense of advantage in actively looking for opportunities, even when they may not be obvious, and introducing yourself to people involved in your area of interest.

—David Armstrong, Director  
Marcus Duke, Editor



<http://fish.washington.edu>

# A Whale of a Tale

KIMBERLY GENTHER

Junior, SAFS Major

Focus: marine mammals, especially killer whales

Goal: to become a marine mammalogist specializing in animal rescue and rehabilitation

Native Washingtonian Kimberly Genther has always been an animal lover. She credits her special interest in marine mammals partly to the many summers she spent yachting with her grandparents throughout the San Juan and Gulf Islands. Her interests made it fairly easy for SAFS Academic Advisor Lin Murdock to persuade her to major in Aquatic & Fishery Sciences.

As Kimberly's sophomore year was ending, Lin put her in touch with the new NOAA Alaska Fisheries Science Center/UW summer internship program, which provided opportunities for hands-on experience with marine mammals. Kimberly said, "This is very important because the field is so competitive. And it's important to meet people involved in this area." The internship included a scholarship to cover tuition for the summer.

Initially, Kimberly worked on a National Marine Mammal Laboratory (NMML) database of opportunistic marine mammal sightings at sea. Under Sally Mizroch's supervision, she documented sighting location errors by comparing database entries with the original observer forms: "If I found an error, I would record it in the database, and correct it to the best of my ability."

For the internship's required field component, Kimberly spent 12 days working with Ken Balcomb and his staff at the Center for Whale Research (CWR) on San Juan Island. The CWR is largely funded by Earthwatch, which assembles international teams of volunteers to participate in Balcomb's program. Because of Kimberly's major and her familiarity with the San Juans and Washington, she wound up working as part of the staff: "I shared my expertise on the area, the whales, the issues, and so forth with the volunteers."

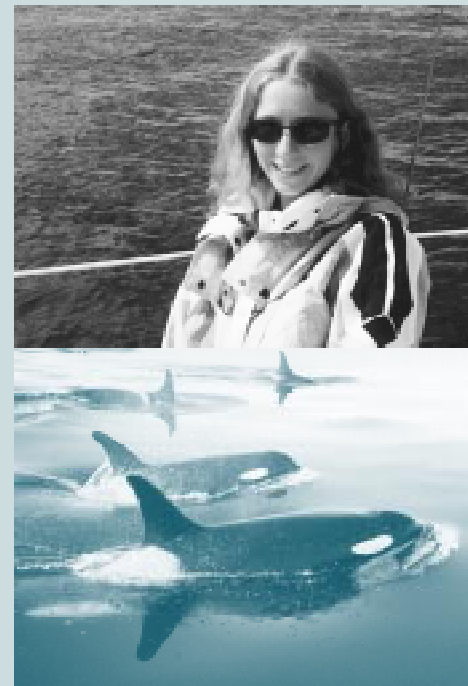
Kimberly described the field work: "CWR has ID'ed all the southern resident killer whales by photographing the right and left saddle patch of each whale since 1979." Each summer, CWR confirms presence of individual whales and documents changes like dorsal fin growth. Also, observers document behavior and boat activity to help determine why local populations are declining. She said, "The three major theories for the decline are toxins, lack of food, and the whale-watching industry." She thinks toxins are the main

cause: "Last winter, Peter Ross (Canada Department of Fish & Oceans, Nanaimo) spoke at a school seminar. He's studied the effects of PCBs on marine mammals. He said beluga whales in the St. Lawrence Seaway were thought to have the highest levels of PCBs in their blubber, which was associated with reproductive and immune system failure. He also studied blubber from local killer whales, and found PCB levels almost three times higher than in the belugas!"

Kimberly's field and lab work were interrelated. She said, "Data collected from the field can be added to the sightings database." And the lab work was the impetus for several papers. With Sally's encouragement, she is writing about beaked whales, which are very scarce and poorly understood: "There are only about 60 entries out of 17,000 sightings in the NMML database."

Through the internship program, Kimberly was able to pursue a lifelong interest: "Connecting with Balcomb and the CWR opens many future possibilities." She may use her experience to write her senior project, and is considering getting involved in Earthwatch's beaked whale program.

Kimberly would really like to see SAFS develop a formal marine mammal program: "Given our area—with its abundance of marine mammals like whales, porpoises, otters, and seals—and SAFS' expertise and resources, the School could attract and train the top students."



# In Search of Sharks on the High Seas

DANNY BADGER

Sophomore, SAFS Major

Focus: sharks, apex predators

Goal: to work with conservation efforts to protect the oceans, particularly sharks

Danny, who hails from Bainbridge Island, Washington, was exposed to field research on the high seas early in his college studies. He came about his adventure serendipitously:

As a freshman, he was enrolled in Bob Francis' Fish 101. Danny told Bob he was interested in sharks—he has been fascinated by them ever since he watched the Discovery Channel's annual "Shark Week" in sixth grade—and Bob introduced him to Vince Gallucci, who specializes in shark research. Vince persuaded Danny to take his shark ecology class last spring and eventually hired him as a class assistant.

One day last summer, Vince asked Danny to fill a vacancy in the science staff for NOAA's triennial groundfish survey. Danny said, "Sure, why not?"

With help from Vince and

Academic Advisor Lin Murdock, he got a scholarship to cover loss of income from his summer job while at sea.

Danny described the cruise: "It was amazing! It was very hard and I've never done anything like it." Typically, his day started shortly after the crew of the bottom trawler set the net. He and other scientists sampled fish from the catch. He said, "We sorted, weighed, measured, and sexed; we took blood and tissue samples, and examined stomach contents. The objective was to collect data for every species brought up, but I focused on dogfish for Vince's shark project."

Why dogfish? He replied, "Since 1985, some sources report it as the second most lucrative commercial fishery in Puget Sound." He added that declining dogfish stocks in our area underscore the need for better data.

A highlight of Danny's trip was the discovery of an identification error. He said, "We thought we were getting two of the three known species of cat sharks, but we did further research and found we were in fact getting the third species instead of the first. This was a real boost for me."

When asked why sharks have become so popular in recent years, Danny cited one reason as "the public's increasing awareness that eliminating any species—especially an apex predator—is not good."

The summer cruise helped Danny determine his future direction: "I want to study live animals, one because I dislike killing animals, and two because I'm interested in animal behavior." He is considering a double major in fisheries and wildlife that will focus on apex predators in the sea and on land.

Danny emphasized his appreciation of the NOAA scientists, especially field party chief, Mark Wilkins. He noted, "They tolerated my incessant questions and showed me many ways to identify a species, and they elaborated on various aspects of a species if I asked them." He also acknowledged Gallucci's attention and devotion: "He constantly ensures that I am learning as much as possible from every single experience. Between the efforts of Lin Murdock, Bob Francis, and Vince Gallucci, my freshman year brought me more exciting experiences than I thought possible when entering a 'large' university."



Photos (clockwise from top left)

*Kimber Genter (A. Bracken)*

*Danny Badger tries on the latest fashion—a small skate—in headgear (L. Britt)*

*Mark Wilkins describes characteristics of a rockfish to help Danny improve his ID skills (L. Britt)*

*Killer whales off the San Juan Islands (K. Genter)*

# R

## esearch in the Russian Far East

Photos  
(clockwise from top  
left)

*Trevor Anderson  
collects insects near  
the Takoe River,  
Sakhalin Island  
(S. Deschamps)*

*Margarita  
Reimer and  
colleagues collect  
samples at Lake  
Malyi  
Pribrezhnaye  
(D. Stevenson)*

*Sunk half-way  
into the mud,  
Margarita  
experiences the joys  
and perils of field  
work  
(P. Woods)*

*Trevor sorts insects  
at night by the  
Leonidovka River,  
Sakhalin Island  
(D. Bennett)*

*map illustration  
Josh London*



## to the ends of the earth

The International Kuril Island Project/International Sakhalin Island Project (IKIP/ISIP) is directed by SAFS faculty Ted Pietsch and supported by the National Science Foundation (NSF). Through these projects, teams of scientists from the USA, Russia, and Japan have been collecting information on the little known flora and fauna in and around the Sea of Okhotsk. Their goal is to learn about the biological patterns and processes and develop conservation strategies for this remote, sensitive area.

The Research Experience for Undergraduates (REU) program, also supported by NSF, provides students opportunities to gain practical research experience. Ted obtained REU funding for two undergraduates to go to the Kuril Islands last summer; 25 students submitted applications and were interviewed. The end result was that Margarita Reimer (SAFS) and Trevor Anderson (Zoology) got the opportunity to do something that few American students ever have done—conduct research in the Russian Far East!

<http://artedi.fish.washington.edu/okhotskia/>

## TREVOR ANDERSON

Post-baccalaureate, Zoology

Focus: invertebrates

Goal: to work in diversity  
and conservation research

Trevor, who comes from Ravensdale, Washington, had studied marine invertebrates prior to joining the project. With IKIP/ISIP, he was assigned to collect insects, which he described as “an incredibly diverse group—this gave me an opportunity to sample and experience biological diversity in a very tangible way.”

Trevor, who also went to the Kurils in summer 2000, described his field work: “In 2000, we were based on a boat and landed by zodiac on the islands daily. This year we spent seven weeks on Sakhalin and Moneron islands—a very different experience both for collecting and cultural interaction.” He and his colleagues traveled in an old Russian troop transport; the bone-rattling and poorly ventilated vehicle was affectionately called “Shake ‘n Bake.”

The days were long, often exceeding 12 hours. At one point, the crew camped continuously for 10 days: “We would get up, make short trips to collecting sites, and then scatter, eating lunch on the run, collecting all day. After dinner, we’d collect some more, and after that, possibly set up a light trap and collect at night.” His group tried to sample as many habitats and get the highest diversity as possible. The high cost of field time and volume of specimens limited processing and identification; once back in the states, the samples were sent to experts for further identification.

Trevor described working with the scientists: “The cultural aspects were astounding. Technically, Japan and Russia are still at war—they never signed a peace treaty. To talk with them about this and other facets from their world view of daily life was fascinating.” He rated his field experience as “one of the greatest of my life. It was hard work and conditions were difficult. Still, I would highly recommend this to undergraduates interested in experiencing science.”

He credits his IKIP/ISIP work as having helped give him direction for the future. He also acknowledged Ted’s inspirational role: “I’ve never met anyone who thinks so big and accomplishes what he sets out to do. And, he has been very helpful with trying to find new opportunities for me.”

## MARGARITA REIMER

Senior, SAFS Major

Focus: fishes and invertebrates

Goal: graduate studies in  
ichthyology and systematics

Margarita comes from New Orleans, where she started college at Tulane University. Her mother’s background in marine sciences influenced her choice to pursue ichthyology, systematics, and biogeography. Tulane University had no marine program; when she looked into SAFS and the Fish Collection, she knew it was where she wanted to be.

Before becoming an SAFS major, Margarita talked with Ted about the IKIP project: “It sounded like a great opportunity: the region in question is largely uninhabited and fairly pristine, providing a unique chance to look at species diversity. So, I applied for the Sakhalin Island Project and was fortunate enough to be selected.”

Margarita worked with the fish group for two weeks on land, but then they transferred to the ship-based expedition. Her group focused exclusively on Sakhalin Island, primarily collecting freshwater fishes: “We wanted a good representative sample, in terms of species diversity and relative abundance.” The team sampled as many different habitats as possible at each site.

The boat-based leg of the trip differed from land work markedly: “Ship-based landings were time consuming due to travel time, and often hampered by weather and terrain,” she said, “and we basically had to plan one day at a time.”

Margarita also collected invertebrate specimens: “Allison Colwell (USGS Western Fisheries Research Center) recruited me to collect oligochaete worms, primarily Tubificids.”

Margarita echoes Trevor’s impressions: “It was wonderful working with Russian and Japanese scientists. I had prior field experience; however, not in a foreign country.” She noted that daily frustrations and many natural obstacles forced American scientists like herself to adapt to a wide range of conditions: “On Sakhalin, we were limited by so many variables...we routinely changed our sampling design, and because supplies couldn’t be replaced once in the field, we learned to jury-rig a lot of equipment.”

Margarita’s undergraduate research experience directly ties in with her past and with her future aspirations, which she hopes will be further ichthyological studies in graduate school. She characterized her experience: “The opportunity to conduct novel field work and evaluate it with the aid of experienced advisors was invaluable.”

# T raining for the World of Molecular Genetics

JENNIFER CABARRUS

Senior, SAFS Major

Focus: toxicology and conservation

Goal: a job that applies molecular biology

By seventh grade, Jennifer knew she wanted to become a marine biologist. After attending Shoreline Community College, she transferred to the UW as an Oceanography major, studying biological oceanography, which focused on plankton. “Then,” she said, “SAFS Advisor Lin Murdock encouraged me to minor in aquatic and fishery sciences. Because I wanted to work with larger organisms, I ended up switching my major to Aquatic and Fishery Sciences.”

Jennifer is interested in toxicology and genetics, which she would like to study within the context of conservation, specifically for marine mammals. She credits Chris Grue’s Wildlife Toxicology class for inspiring her direction.

Jennifer is gaining practical experience working as staff for two graduate students—Todd Seamons and Jennifer McLean—in the Marine Molecular Biotechnology Lab (run by SAFS and Oceanography). The job was designed to provide a subject and experience for her undergraduate senior thesis. She said, “I couldn’t pass up the opportunity to learn practical skills, have a thesis topic, and get paid to do it!”

Jennifer’s work entails performing polymerase chain reactions (PCRs) on fin clips that Todd collected from salmon in Snow Creek (Olympic Peninsula, Washington), as well as preparing gels and doing electrophoresis. She described the objective: “We’re looking for a hybrid population between steelhead and cutthroat trout. I’m studying the frequency of hybrids and where they occur.”

Jennifer explained the importance of PCR in research: “You can do PCRs with almost no DNA to greatly increase the sample quantity.” This experience has encouraged her to take some genetics classes in her senior year.

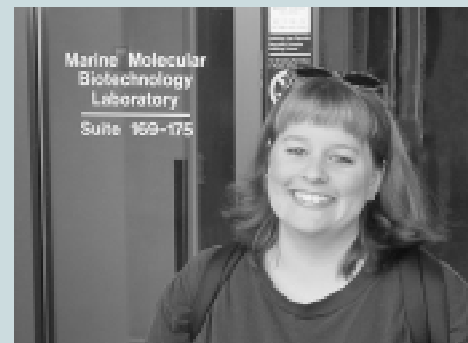
<http://depts.washington.edu/mmb/>

Her work goes beyond performing PCRs: “I do literature searches, and assemble materials and supplies for field work.” Jennifer anticipates gaining more new skills as well: “I will be learning a different type of extraction method, using ethanol precipitation, and I may get to go sampling to get some field experience. Todd and Jennifer are willing to teach me pretty much anything I want to learn.”

Once she earns her BS, Jennifer hopes to get a job in a molecular biology lab. She said, “I really love what I’m doing at MMBL. And I think the experience I’m gaining here will make it easier to find work in that area.” And, she considers it important to have some practical experience to bring to graduate school.

Jennifer has advice for students planning to transfer to the UW from a two-year school: “It’s very important to take courses such as biology, physics, and chemistry in community college. Besides time conflicts, having to catch up on all the prerequisites makes it harder to focus on your major. If you get all the prereqs out of the way before transferring, I think you will enjoy your experience here much more.”

She urges undergrads to seek similar research opportunities: “It’s been really amazing for me; I think everyone needs this experience.” She thinks the UW, and especially SAFS, excel at this: “I know someone from another university who didn’t have the research opportunities we have. Now she’s doing an internship just to get the experience she needs to get a job. SAFS gives you a jump on getting the skills and experience you need to compete in the job market.”



Photos (left top to bottom)

Jennifer Cabarrus (S. Robertson)

Jennifer resuspends DNA for a study on hybrid trout

(S. Robertson)

# A

# dventures in the Alaskan Outback

JON SCORDINO

Senior, SAFS Major

Focus: salmon and bear predation

Goal: to study fisheries and wildlife interactions

Jon became interested in fish and wildlife early on. When he was two, his dad took him to the Pribilof Islands, where he was doing fur seal research. By the second grade, Jon

could identify most Puget Sound fish species.

His long-term interests and his desire for the “Alaskan experience” were the impetus for applying to the School’s Alaska Summer Course, which entailed six weeks of study at the Alaska Salmon Program’s (ASP) field station in the Wood River Lakes system north of Bristol Bay.

Jon described some of the things that students learned about in the summer course: “We learned a lot of about limnology, species composition, and insects. We also monitored how adult sockeye moved through Hansen Creek, and we monitored daily the positions of tagged fish using

GPS. And we recorded how many fish were killed by bears and other natural causes.”

The course included lectures on the importance of limnological studies, which Jon explained: “The amount of nutrients in the system controls fish production and growth and affects how many salmon return to spawn and how much money fishers and processors will make.” He added, “We also looked at how fishing districts work, so we learned about management and politics.”

After morning lectures and field work, students returned to camp by mid-afternoon to pursue individual projects. Jon described his individual study, which he hopes to use for his senior thesis: “I wanted to compare the ‘catchability’ of salmon in different creeks with bear usage of the streams.”

Days ended typically with students writing papers based on their studies.

Jon’s study was mostly about learning the scientific method but included a practical aspect: “Bears can migrate over great distances. I wanted to see if bears chose where they went because fishing was easier or because of some territorial instinct—were they spread out evenly or did they target certain streams?” He credits the study with teaching him how to adapt his methods: “Things in the field didn’t happen as I expected they would when I wrote my proposal.”

Jon gained further practical experience as an ASP employee: “Before the course, I worked on the Port Moller test fishery, which helps fine-tune the Bristol Bay forecasts.” Working on a longliner, he learned not only how to catch the fish, but what it was like sleeping at sea—“getting tossed around, hearing the anchor slapping up against the hull in the morning.”

He also worked at the Chignik Lake camp (Alaska Peninsula), which he described as the “true” Alaskan experience: “We had to jury-rig boat motors; bears walked right through camp.” He particularly appreciated meeting the local Aleuts: “Their culture and way of living were very interesting.” The work was similar to Wood River, with limnology and fish sampling, and included some bathymetric surveys using GPS. Jon said this work helped him to become more self-reliant and adaptive.

Jon highly recommends the summer class for people new to field research: “It’s a great way to learn about practical aspects of field work such as piloting a boat and netting fish.”

<http://fish.washington.edu/research/alaska/>

Photos (right, top to bottom)

*Jon Scordino (G. Wade)*

*Jon imitates bears trying to catch salmon to see what happens when the fish scatter to avoid them (J. Jorgenson)*



# 210

## FISHERIES TECHNIQUES

In Bruce Miller's class, undergraduates learn basic skills required for jobs and research in fisheries-related fields. Students gain hands-on experience with standard research techniques and gear...and fish, too. In the field, they all get a turn at beach seining and processing trawl hauls on a fishing vessel. In the lab, they remove and age otoliths (fish ear bones), age scales, and conduct a stomach content analysis. And, of course, they learn basic computer programs to manage and interpret their data, and learn to write technical reports based on their own data.

# 324

## SUSTAINABLE AQUACULTURE AND FOOD PRODUCTION

In Faye Dong's class, students learn how aquaculture and food production from aquatic plant and animal species contribute to a sustainable aquatic environment. A highlight of the last class was a trip to an aquaculture facility in Quilcine, Washington—Taylor Shellfish Farm, which raises mussels, clams, scallops, oysters, and geoducks. Faye said, "The tour helped students to understand different aquaculture systems, and the opportunities and limitations of obtaining food and other products from the ocean and aquatic systems." The facility also provides research opportunities for SAFS students through internships.

## SAFS UNDERGRAD RESEARCH COURSES

# 499

## UNDERGRADUATE RESEARCH

### Human Exploration & Development of Space University Partners (HEDS-UP)

In Frieda Taub's course, "Student Design Team for Closed Ecological Systems," students are encouraged to use their imagination and innovation to develop regenerative life-support systems, which are crucial to the advancement of space exploration. With support from HEDS-UP, Washington NASA Space Grant Consortium, and SAFS, students design and build closed ecological systems that support a population of invertebrates for at least a month.

A class highlight is the opportunity for two students to compete with other student teams at the Lunar and Planetary Institute in Houston, where they present their experiments. Frieda said, "Even for students who don't go to Houston, the effort provides them focus—three students presented posters at the UW Undergraduate Research Symposium this year." Ultimately, students who participate in this class may have a voice in developing space exploration. Frieda observed, "Students are delighted when they discover they can ask a scientific question and find the answer by experimental results—not from the text or instructor, but from the organisms."

### Friday Harbor Laboratories: Apprenticeships in Marine Fish Ecology

Marine protected areas (MPAs) may help restore and conserve living aquatic resources by protecting fishes and habitat. In this course, taught by Don Gunderson, Bruce Miller, and David Fluharty, students study MPAs established around the San Juan Islands. This quarter-long "immersion" course teaches students how to conduct independent research.

Small classes and long days include individualized attention and intensive learning. Students study local fish species and oceanography, and collect data on field trips, which they analyze and present in reports (see website). Students can make useful contributions. Don said, "While MPAs protect adults, we don't know how well they're doing for juveniles. The students' work may help determine what needs to be done."

Last year's class submitted their reports to the San Juan County Marine Resources Committee and worked with the Committee to evaluate MPA policy.

<http://fish.washington.edu/classes/fish499/>





Photos  
(from top)

*Fish 210*  
*Students collecting samples from a beach seine*  
(D. Cooper)



*Fish 324*  
*Co-instructor Joth Davis gives students an overview of an aquaculture facility*  
(F. Dong)



*Fish 499*  
*The HEDS-UP class—tomorrow's space explorers?*  
(Anonymous)



*Fish 499*  
*Friday Harbor apprenticeship students use a midwater trawl net to sample juvenile and larval fishes in the water column*  
(N. Lowe)



Anonymous

## Gifts

### John G. Peterson Endowed Scholarship

John Peterson graduated from the School of Fisheries in 1940. He put his academic studies to good use, initially investigating shark resources in South America, Mexico, and the US West Coast for the California Packing Corporation. Over the years, he worked with numerous seafood processing organizations, eventually becoming president and CEO of Ocean Beauty Seafoods, Inc., in Seattle. He also established his own company and has worked as a seafood consultant.

John has been active in professional associations, advisory boards, and commissions for the last 30 years; he was a member of our school's Visiting Committee for over 10 years and continues to be a "friend of Fisheries."

The John G. Peterson Endowed Scholarship supports undergraduate and graduate students with a focus on the fish and shellfish populations of the Bering Sea and Gulf of Alaska, an area for which John is especially concerned. John and Hazel Peterson established the fund in 1998. Earlier this year, the Petersons made an additional contribution of \$100,000 to the fund.

The most recent recipient of funding from the Peterson Endowed Scholarship was graduate student Suzann Speckman. Suzann, who is studying fish and zooplankton in Alaskan waters, credits the award with helping her to "continue progressing towards graduation."

John hopes his latest addition to the scholarship fund will enable students to pursue research that will help achieve and maintain productive and healthy fish and shellfish populations "into eternity." The School's faculty, students, and staff deeply appreciate John's continuing commitment and dedication to supporting our program.



J. Suppan

## CAROLYN FRIEDMAN

Assistant Professor

PhD in Comparative Pathology, UC Davis (1990)

Focus: Bacterial disease of oysters in the Pacific Northwest

Specialty: Invertebrate pathology

### NEWSAFS

**Carolyn**, who hails from San Francisco, is our newest faculty member. She's been interested in fishes and marine invertebrates since her youth—by age 9, she knew she wanted to be a marine biologist.

Carolyn's ongoing work as a shellfish pathologist with the California Department of Fish & Game's (CDF&G) Bodega Bay Marine Lab (BML), which she started while in graduate school, precluded the usual post-doctoral track. She continues her affiliation with the lab to this day. In 1991, she accepted an adjunct faculty appointment with the UC Davis School of Veterinary Medicine, which she still holds.

MD: Why invertebrate pathology?

CF: It was serendipity: before graduate school, I took the invertebrate zoology and biomechanics classes at Friday Harbor Labs. I liked the area and the UW, so I moved to Seattle and was hired by the US Fish & Wildlife Service Fish Pathology Lab. On the basis of this experience, I decided to combine my interest in marine invertebrates and pathology in my graduate studies.

MD: What are some examples of research you've pursued?

CF: Several projects have centered around Withering Syndrome (WS), a chronic, degenerative, rickettsial disease of abalone. Studies included identifying and characterizing the causative agent, and optimizing a polymerase chain reaction diagnostic test for detecting the bacterium. We are developing a treatment of abalone infected with the rickettsial bacterium in farms to reduce losses. Another study is looking at environmental parameters associated with El Niño and seasonal warm-water events that contribute to development and spread of WS.

I have been collaborating with researchers from BML and the Pacific Shellfish Institute to investigate mass mortality of Pacific oysters on the Pacific Coast. This is a non-infectious, stress-related disease; its magnitude and cause(s) can vary be-

tween seasons. It is usually associated with elevated temperatures and, in some cases, phytoplankton blooms and low dissolved oxygen levels. We are working to selectively breed oysters that survive in the affected regions (CA and WA). I'll be continuing many of these studies here.

MD: You are pursuing a new direction here.

CF: I'm interested in developing a culture industry for the pinto abalone and, within a conservation context, investigating ways to reestablish this species. I am also interested in collaborating with Don Gunderson on looking at the health of spot prawns in relation to population dynamics and management.

MD: What motivated you to come to SAFS?

CF: The UW has an excellent reputation. I wanted to teach and interact more with students; SAFS gives me better access to students than I had at BML. The regulatory aspects of CDF&G were placing increased demands on me without providing additional resources. Also, some of my research is focused up here.

MD: How do you see yourself contributing to our program?

CF: I want to pursue aquatic animal culture, not only for food production but also in the context of conservation, management, and endangered species restoration. Students are interested in culture beyond its role in producing food.

MD: What courses will you teach?

CF: I'll co-teach Fish 324, "Sustainable Aquaculture," with Faye Dong in winter 2002. My goal is to give students information that they need to know to be successful in aquaculture irrespective of their individual goals. For students who want to learn the "how to" aspects of culture, we might offer seminars and internships at culture facilities. Also, I will teach the aquatic animal health course, currently called Fish Diseases.

MD: What's your vision of SAFS' future?

CF: I would like to see a popular track in aquaculture, with increased enrollment of majors and non-majors such as Zoology students. I would like to expose SAFS students to diverse types of research including combined wet laboratory and field experiments conducted in conjunction with physiological, immunological and/or cellular analyses. I'd like to see more interaction

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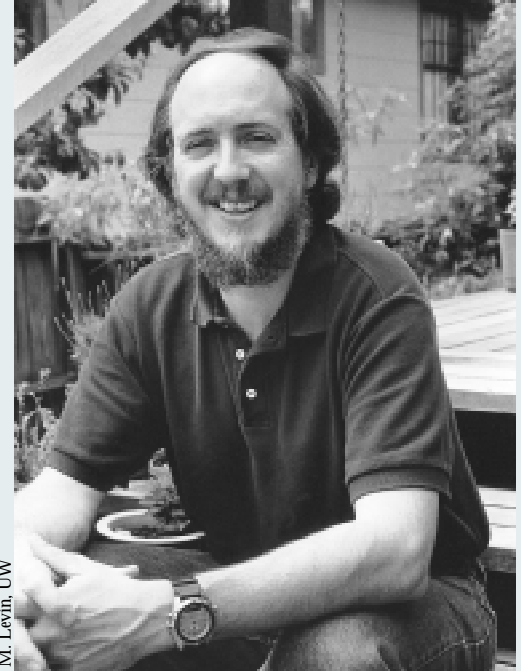
## CHARLES "SI" SIMENSTAD

Associate Research Professor  
Coordinator, Wetland Ecosystem Team

MS in Fisheries (1971)

Specialties: Estuarine & coastal ecology,  
food web structure, juvenile salmon ecology

### FACULTY



M. Levin, UW

Si is a “lifer” at SAFS—his tenure here, including undergraduate and graduate studies, spans nearly 35 years. Earlier this year, the SAFS faculty approved his promotion to associate research professor—an acknowledgment of his valuable, long-term contributions to the School.

Initially, Si was attracted to working with animals in their natural environment because of the setting—be it stream or ocean. He then became interested in the environmental aspects of larger aquatic systems that support fishes and fisheries.

After Si’s freshman year, he worked off the Aleutian Islands, studying the effects of radiation on fishes; later, he worked on the Elliott Bay/Duwamish River studies. He continued both foci through graduate school and as a fishery biologist for the Fisheries Research Institute (FRI).

By the mid-1970s, nearshore community ecology had become a cornerstone of his long-term research focus. He credits Ernie Salo, Bruce Miller, and former FRI Director Bud Burgner as major influences in his education and experience.

The early 1980s saw the beginnings of the Wetland Ecosystem Team (WET), an informal science team that conducts programmatic research. The initial research, with FRI biologist Ron Thom (now at Battelle Marine Sciences Lab), focused on community-scale structure and interactions of fishes and wetlands, and how to restore the relationships to a natural state.

MD: Was the restoration research driven by mitigation projects?

CS: At first, it was a response to mitigation for permit actions under the Clean Water Act. That work was the impetus for developing habitat restoration for salmon recovery.

MD: Was there a guiding theme that led from the early nearshore work to the programmatic focus of WET?

CS: For years, my colleague, fishery biologist Jeff Cordell, and I had a fish stomach processing shop, which accumulated knowledge somewhat haphazardly for numerous, often unrelated projects. We decided instead to focus on habitat and fish ecology studies to understand juvenile fish use of estuaries and coastal wetlands. This attracted graduate students who formed a team in which we learn from and help each other. Combining this with a critical mass of research focusing on the same

theories, concepts, and tests culminated in WET.

MD: By the mid-1990s, WET research had expanded into large ecosystems.

CS: The epitome of this was the NSF-funded Columbia River Estuarine Turbidity Maxima study, which looked at a large estuary and watershed in which wetlands played a major role. This work exemplified our expanding interdisciplinary approach to understanding estuarine ecology: With collaborators from the UW and other universities, we looked at sedimentology, geomorphology, climatology, and so forth, to help our students learn how systems function and restore because these processes can regulate the rates and patterns of restoration.

Now we’re studying invasive species, largely due to Jeff’s prominence in the field. We’ve undertaken “NearPRISM,” focusing on the Puget Sound estuarine–nearshore interface from a process rather than descriptive approach. This is important for understanding how humans alter those processes.

With Battelle and Ron Thom, we are studying the effects of ferries and terminals on eelgrass to strategize for scientific and mitigation policy. And we’re immersed in large-scale issues about restoring entire ecosystems. Our Salmon River study is looking at restoration sites across the spectrum of ages and locations, and our studies in San Francisco Bay/Sacramento–San Joaquin Delta focus on the results of intentional and unintentional restoration of emergent wetlands.

MD: What is the state of restoration?

CJ: Restoration takes time. The trick is to kick it in the right direction and then let natural processes occur. Within decades, sites can approach “comparability” to natural states, but much depends on the setting and how stressed and limited it is.

MD: What opportunities does your new faculty status present?

CS: Jeff and I have been advising students for years; now this

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with our aquaculture community and conservation and management groups like the Washington Department of Fish & Wildlife, where one can learn about current issues and develop appropriate research programs. I enjoy interdisciplinary research and am interested in collaborating with ecologists in our department to examine the effects of disease on population dynamics.”

*Carolyn is married and has a 4-year-old son. Hobbies include horseback riding (dressage which is on a back burner for now having just sold her horse of ten years), reading, hiking, and spending time with her family.*

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is more direct and explicit because I can chair a student’s thesis committee. Probably the biggest change is my ability to influence the school’s programmatic direction. I can vote, but more importantly, I have a voice. Also, I hope to give our staff a better voice with the faculty.

MD: Where do you see the school headed?

CS: I’d like us to take a bigger role in regional applied science issues. I would encourage greater contributions and involvement in issues like the Endangered Species Act. I’ve been involved in such issues all along, and I’d like faculty and students to get more involved.

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