

# AQUATIC & FISHERY

SCIENCES

NEWSLETTER OF THE SCHOOL OF AQUATIC & FISHERY SCIENCES UNIVERSITY OF WASHINGTON AUTUMN 2004

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## New Research, New Hatchery

A longstanding feature of the school's teaching and research program has been the University of Washington Hatchery. The hatchery was established initially to maintain a salmon run for testing the effects of radioactivity on salmonid homing behavior. After this work ended, the hatchery mainly was used for long-term aquaculture research—how to culture salmon and trout and improve the technology. Professor Lauren Donaldson was a key figure throughout the radiation and aquaculture programs, and gained recognition for his development of a fast-growing rainbow trout, which became known as the Donaldson "super" trout.

In 2000, the school decided to reassess the hatchery program to determine its current state

and future directions. It formed a committee to examine both programmatic and physical attributes of the hatchery. The committee recommended renovating the hatchery's indoor facilities to accommodate changing research needs. It noted that the existing facility wasn't conducive to experiments that require replication. To address important questions in conservation, changes were clearly needed.

Once the need was defined, the committee focused on design. Committee member Kerry Naish, SAFS Assistant Professor, credits past hatchery manager Mark Tetric: "He designed a 'snap-and-click' hatchery so just one person could easily switch different-sized tanks without changing any plumbing." She also credited



*left to right:  
Dave Rose,  
hatchery  
technician;  
Jon Wittouck,  
hatchery manager;  
and  
Kerry Naish,  
assistant  
professor,  
in the renovated  
hatchery*

current hatchery manager Jon Wittouck and hatchery technician Dave Rose's important contribution to the design and construction process and to their ongoing role in supporting hatchery research programs. Wittouck described their roles as "providing consultation on aquatic system design and construction, acquisition of system components, physiological requirements of research animals, and monitoring strategies." In some cases, they also design and install the research systems.

The renovation was completed in early 2002. While the Donaldson rainbow trout runs that supported a selective breeding program were discontinued in the same year, the historical coho and chinook runs are still being maintained because the data they generate are still very valuable. "But," Naish said, "now the hatchery is truly experimental: With no restoration or harvest goals for our salmon run, we can focus on studying persistent issues in hatchery cultivation, hatchery-wild fish interactions, the long-term fate of fish in hatcheries, and so forth."

The hatchery renovation was designed especially to support long-term salmon research: Historically, comprehensive, long-term experiments to test whether hatchery releases pose a risk to wild fish, or whether hatcheries can be managed to reduce such risks have been limited. In particular, genetic experiments addressing these issues require rearing at least 3-4 generations. Because chinook salmon live 4-5 years, an experimental run must be maintained for 12-20 years. With the renovation, the facility now has the right staging environment to conduct such experiments.

Will taking 15-20 years to resolve an important conservation issue be "too little, too late"? Researchers like Naish are concerned about this, but they also believe the long-term experiments are absolutely necessary and urge conservation management of our fishery resources until we know more.

There may be an interim model: Naish and her

colleagues are looking into developing model systems using small fish, like medaka—which can produce multiple generations per year—to test principles and provide information while waiting for the long-term salmon data to be collected. Despite medaka being quite different from salmon, their genetic complexity is fairly similar to that for salmon when compared with other model systems.

The new facility has also proven useful for other SAFS faculty, including Jim Anderson, who is studying the effects of Columbia River dams on outmigrating salmon smolts. And Naish and collaborators at NOAA Fisheries are investigating two issues: how big or small wild and hatchery salmon populations can get before they experience loss of fitness due to inbreeding; and the possible long-term effects of genetic changes in hatchery fish due to inadvertent domestication. Naish added, "We are specifically testing the outcomes of management decisions, and seeking ways to avoid negative impacts, in an attempt to assist the Hatchery Reform Process currently underway in our state."

Beyond salmon studies, the facility is designed to accommodate diverse research foci, including Russ Herwig's study of exotic species introductions through ballast water, Chris Grue's ecotoxicology research, Tom Quinn's behavioral work, and Dave Beauchamp's study of habitat usage and predator-prey behavior. Newly hired faculty are also expected to be active in the hatchery: For example, the new Western Regional Aquaculture Center director, Graham Young, a physiologist who focuses on salmon reproduction, and Claire Horner-Devine, a microbial ecologist interested in using replicated spaces for mesocosm research.

The flexibility of the new hatchery design will not only serve the aim of using the salmon run for long-term research, but will also meet the needs of researchers working on a broad range of organisms—from microbes to fish.



Background and right: Jon Wittouck; left: Marcus Duke

# Tim Essington

Assistant Professor  
PhD, University of Wisconsin, 1999

*Specialities: marine fish ecology and biology, food web interactions,  
marine fisheries—estuarine and coastal*

<http://fish.washington.edu/essington>

Tim hails from the Detroit area. He attributes his attraction to marine science in part to spending many days in his youth fishing, snorkeling, and playing in the water. Then, as an undergraduate, his physiology instructor invited him to attend some graduate seminars, which sparked his interest in aquatic research.

Tim pursued his Master's degree at the University of Minnesota, focusing on reproductive behavior and potential interactions between brook and brown trout. For his PhD, under the supervision of Jim Kitchell in the Center for Limnology (University of Wisconsin), he studied predator-prey interactions and conducted whole-system experiments. Specifically, he looked at spatial patterns of predation induced by large-mouth bass, a keystone predator in small lake ecosystems: how and why these fish moved around small lakes.

For his post-doctoral work, Tim changed his focus to marine research, working on a project on food-web dynamics and fisheries in the central Pacific through the NOAA Fisheries Honolulu lab. He reflected, "I went from studying brook trout in small, freshwater systems to studying tunas, marlins, and sharks in the central Pacific." At this time, Tim started focusing on fisheries—he said, "Once you get involved in larger systems you can't ignore people any more." He worked on estimating how much these fishes were eating. Because of scarce data, he combined different sources of data to get a more complete picture. Through this work, Tim expanded his toolkit, learning quantitative methods, oceanography, and fish life histories.

Prior to coming to SAFS, Tim was a faculty member of the Marine Sciences Research Center at SUNY Stony Brook. There, he focused on the effects of the *Loligo* squid fishery—the biggest in New York in terms of landings—on recovery of depleted stocks like monkfish and silver hake, which eat a lot of squid. Through diet analysis, bioenergetic and population models, and other methods, he looked for stock recovery responses under different scenarios, including unrestricted versus restricted squid fishing.

At SAFS, Tim will continue some prior investigations and concentrate on Puget Sound. He is working with NOAA Fisheries' Alaska Fisheries Science Center (AFSC) and Northwest Fisheries Science Center (NWFSC) to develop ecosystem



models for use as fisheries decision support tools—an extension of his long-term focus in this area. Tim expanded: "I'm collaborating with Pat Livingston at AFSC through the NOAA Fisheries/Sea Grant graduate fellowship in population dynamics and working with Phil Levin at NWFSC."

Tim also hopes to compare the ecology of the North American east and west coast shelves to determine how differences in size and gradient might affect food-web dynamics. And he would like to study spatial aspects of food dynamics—how predators find prey, how prey avoid predators, why they succeed or don't succeed.

Tim's teaching agenda includes the new Fish 420 course, Marine Fish Ecology, and the revamped Fish 210, Methods and Approaches in Aquatic and Fishery Sciences. Working with other faculty to overhaul Fish 210 was a positive experience for Tim: "At SAFS, the curriculum committee does not view courses as static; they're very dynamic, which I find exceptional." Fish 210 now introduces tools and approaches used to study aquatic systems and fisheries, and integrates research topics collected from numerous SAFS faculty.

In Fish 420, he teaches students how to critically analyze contemporary theories of marine fish ecology and to understand how the marine environment affects the ecology of marine fishes; he also introduces them to the quantitative methods used in marine fish ecology.

# Student Awards, 2004-2005

*SAFS is very fortunate to be the beneficiary of numerous endowments, which help attract the best graduate applicants, support undergraduate research, fund faculty and student programs, upgrade equipment and facilities, and leverage other funding sources. We acknowledge below the students presented with awards for academic year 2004-05, and also those endowments from which no award was made this year but which will continue to support our students, faculty, and staff in the future.*

## **Melvin G. Anderson Scholarship in Fisheries**

Kathryn Sweeney  
Susan Wang

## **Wilbert McLeod Chapman Memorial Scholarship**

Robyn Redekopp

## **John N. Cobb Scholarship in Fisheries**

Amanda Bradford

## **Lauren R. Donaldson Scholarship**

Neala Kendall

## **Claire L. & Evelyn S. Egtvedt Fellowship**

Greer Anderson  
Amanda Bradford  
Whitney Fraser  
Donna Hauser  
Jessica Hayden-Spear  
Neala Kendall  
Jocelyn Lin  
Carey McGilliard  
Jonathan Reum  
Lauren Rogers  
Heather Smith  
Susan Wang  
Stephani Zador

## **Floyd E. Ellis Memorial Scholarship**

Teresa Jewell

## **James and Joy Ellis Scholarship in Fisheries**

Marco Hatch

## **Faculty Merit Award**

Trevor Branch  
Michael Dauer  
Gavin Fay  
Lucy Flynn  
Kristin Laidre  
Maureen Purcell  
Kevin Turner

## **Fisheries Memorial Award**

Trevor Branch  
Gavin Fay  
Lucy Flynn

## **John E. Halver Fellowship**

Laura Hoberecht

## **H. Mason Keeler Endowment for Excellence**

Caryn Abrey  
Vera Agostini  
Greer Anderson  
Joe Anderson  
Anne Beaudreau  
Alisa Bieber  
Stephanie Carlson  
Catherine Curran  
James Franks  
Whitney Fraser  
Jocelyn Lin  
Joshua London  
Carey McGilliard  
Danielle Mitchell  
Jonathan Reum  
Erik Schoen  
Susan Wang  
Andreas Winter

## **H. Mason Keeler Lake Washington Fund**

Joseph Anderson  
Jenny Newell

## **Keeler Memorial Scholarship Fund**

Gretchen Arentzen

## **Marsha Landolt & Robert Busch Endowed Fund in Aquatic and Fisheries Sciences**

Carolina Minte-Vera

## **Vincent Liguori Fellowship**

Jonathan Reum

## **Shao-Wen Ling Memorial Scholarship**

Carey McGilliard

## **Galen and Helen Maxfield Fisheries Scholarship**

Erin Lowery  
Brian Langseth

## **John G. Peterson Scholarship**

Bethany Lee

## **William H. Pierre, Sr. Fellowship**

Kirstin Holsman  
Erik Schoen

## **Edward Allen Power Scholarship in Fisheries**

Kathryn Sweeney

## **Robert E. Resoff Scholarship**

Michael Dauer  
Kevin Turner

## **Samuel and Althea Stroum Scholarship**

Carey McGilliard

## **Richard T. Whiteleather Endowed Scholarship**

Anne Beaudreau  
Jessica Hayden-Spea

# In Memory of...

*The year 2004 has seen the passing of four renowned long-time faculty and staff. We pay tribute to them here.*

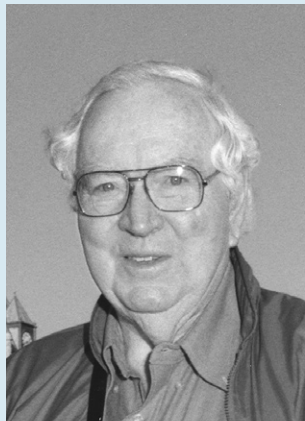
## Professor Don Rogers 1932-2004

Don came to UW Fisheries as a student in 1959 and joined the faculty in 1969, from which he retired in 1997. Even then, he continued to work on Alaskan sockeye salmon in Bristol Bay. His long-term association with and leadership of the School's Alaska Salmon Program earned him the nickname of "Emperor of the North." SAFS faculty member Tom Quinn reflected: "Before climate change, biocomplexity, and ecosystem management became topical, Don was studying them. He helped build and maintain a truly unique, ecosystem-based, long-term research program. Countless fisheries students and scientists worked with Don in Alaska, and many consider those to have been their most memorable years."



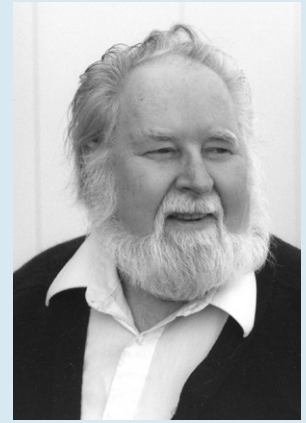
## Samuel P. Felton 1919-2004

Sam was a Senior Research Associate at SAFS. He remained active in research well into retirement, devoting over 50 years to the pursuit of biochemistry, microbiology, and fish nutrition research. Long-time colleague, Professor Emeritus John Halver, worked with Sam for nearly a half-century, publishing papers on fish biochemistry, nutritional requirements and metabolism. His commitment to research was borne out by his last paper being published this year. Sam's accomplishments were noted in the International Biographical Centre's publication, "2000 Outstanding Scholars of the 21st Century."



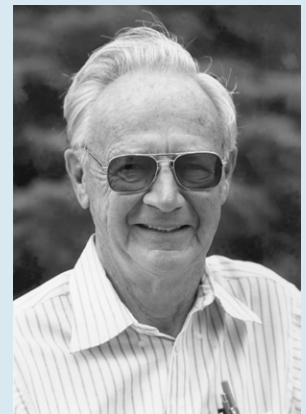
## Professor George Brown 1924-2004

George was a professor at SAFS for 37 years. He came to Fisheries in 1967, specializing in fish biochemistry and toxicology, as well as the effects of water pollution. He studied primitive fishes in addition to local fishes, and was especially renowned for his longstanding research into the coelacanth, an ancient fish species once thought to have been extinct. George was a co-founder of the Society for the Protection of Old Fishes, a group that promotes understanding and preservation of old fish species.



## Professor William F. Royce 1916-2004

Bill Royce was renowned for his research on marine fishery management issues in academia, resource management agencies, the United Nations and foreign governments. In 1958, he simultaneously joined the College of Fisheries faculty and became director of the Fisheries Research Institute, where he successfully led studies of salmon and the aquatic environment. In the early '60s, he gained recognition for predicting an enormous resurgence in the Alaska salmon populations. Bill was an industry pioneer and outspoken champion for managing important non-salmonid fish populations as well, including tuna, marlin, flounder, and haddock. Several of his textbooks are still used in university programs today.



# Degrees Awarded, 2003–2004

The following lists acknowledge students who earned BS, MS, and PhD degrees for the academic year 2003–04.

The thesis and dissertation titles illustrate the breadth and scope of our graduate research, and highlight topical investigations at SAFS. (Advising professors for graduate students are indicated in parentheses.)

## BS Degrees

Jason Addison\*  
Adam Amundsen  
Daniel Badger\*  
Jackie Carter  
Rolando Cruz  
Catherine Curran\*  
Michael Dauer\*†  
Lisa DeForest\*††  
Matthew Everett  
Timothy Ewing  
Kenton Finkbeiner  
Kimberly Genther  
Jerald Gregory  
John Hargrove  
Christina Hoefsmit  
Thuy Huynh  
Kathy Ireland  
Mikayla Jacobson  
Cortney Jensen  
Laura LaFrance  
Rachel Latham  
Ryan Lindsay  
Kimberly McDonald  
Autumn Miller\*  
Kimberly Mills  
Jared Mitts  
Maximillian Rogers  
David Sowle  
Emily Thompson\*†  
Alecia Van Atta  
Thomas Wade  
Peter Westley†  
G. Andrew Whitehouse

\*Degree with Distinction (COFS honors)

†Magna Cum Laude  
(UW GPA-based honors)

††Cum Laude (UW GPA-based honors)

## MS Degrees

Gregory Buck—Migratory pathways of maturing sockeye salmon in Bristol Bay, Alaska (Quinn)  
Karl Burton—Implications of instream flow management for spawning, incubating and emerging Cedar River steelhead (*Oncorhynchus mykiss*) (Sibley)  
Rose Marie Defawe—Attenuation of fecal coliforms and *Escherichia coli* in the Nooksack River basin stream sediments, Whatcom County, Washington (Herwig)  
Kim Dietrich—Factors affecting seabird bycatch in Alaska longline fisheries (Parrish)  
Geoff Hosack—Effects of *Zostera marina* and *Crassostrea gigas* culture on the intertidal communities of Willapa Bay, Washington (Armstrong)  
Kerensa King—4-nonylphenol and smoltification in juvenile Pacific salmonids—effects of intraperitoneal and aqueous exposures (Grue)  
Melinda Chambers—Population structure and recovery dynamics of black abalones (*Haliotis cracherodii*) from Withering Syndrome in the California Islands (VanBlaricom)  
Brandon Chasco—Estimating stock abundance and migration timing in a mixed-stock fishery for sockeye salmon (*Oncorhynchus nerka*) in Chignik, Alaska (Hilborn)  
Gavin Fay—A Bayesian stochastic metapopulation model for Steller sea lions in Alaska (Punt)  
Danelle Heatwole—Insect-habitat associations in salt marshes of northern Puget Sound: Implications of tidal restriction and predicted response to restoration (Simenstad)

Erin McClelland—Outbreeding depression in fishes: Meta-analysis and a case study on coho salmon (*Oncorhynchus kisutch*) (Naish)  
Jennifer McIntyre—Bioaccumulation of mercury and organochlorines in the food web of Lake Washington (Beauchamp)  
Muktha Menon—Spatio-temporal modeling of Pacific sleeper shark (*Somniosus pacificus*) and spiny dogfish (*Squalus acanthias*) bycatch in the northeast Pacific Ocean (Gallucci)  
Mark Nelson—Spatial and temporal effects of El Niño on the feeding habits of Pacific hake (*Merluccius productus*) (Miller)  
Steven Rentmeester—An assessment of large woody debris and riparian forest resources at Ellsworth Creek Watershed and a comparison of riparian management options (Conquest)  
Cindy Tribuzio—An investigation of the reproductive physiology of two north Pacific shark species: spiny dogfish (*Squalus acanthias*) and salmon shark (*Lamna ditropis*) (Gallucci)  
Lucie Weis—The effects of San Juan County, Washington, marine protected areas on larval rockfish production (Miller)  
John Wiedenmann—Evidence of density-dependent age-1 recruitment in bluefish, *Pomatomus saltatrix*, in the northwest Atlantic (Essington)  
Hua (Judy) Zhong—Describing ecological communities: combining mechanistic and statistical models using aquatic communities data (Conquest)  
Nathan Zorich—Foraging behavior and swimming speed of the northern pike-minnow (*Ptychocheilus oregonensis*) in the Columbia River (Anderson)

*Continued on last page*

# Gifts, 2003–2004

*The many alumni and friends of our school play an important role in supporting our programs through their generous financial gifts. During the 2003–2004 academic year, our donors continued their longstanding charitable support of the School of Aquatic and Fishery Sciences. By way of the following list, we acknowledge and thank our many benefactors for their sustained support.*

## over \$10,000

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Dr. Helen R. Zakour  
Mr. Stephen L. Zebold

# Degrees Awarded

Continued from page 6

## PhD Degrees

John Field—Application of ecosystem-based fishery management approaches in the northern California current (Francis)

Kristin Laidre—Space use patterns of narwhals (*Monodon monoceros*) in the high Arctic (VanBlaricom)

Michael Mazur—Linking visual foraging with temporal prey distributions to model trophic interactions in Lake Washington (Beauchamp)

Andrew Pierce—Endocrine growth regulation in salmon: mechanisms of nutritional regulation of the growth axis (Dickhoff)

Laurie Weitkamp—Ocean conditions, marine survival, and performance of juvenile chinook (*Oncorhynchus tshawytscha*) and coho (*O. kisutch*) salmon in southeast Alaska (Francis)

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Comments are welcome.

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