

# AQUATIC & FISHERY SCIENCES

NEWSLETTER OF THE SCHOOL OF AQUATIC & FISHERY SCIENCES UNIVERSITY OF WASHINGTON AUTUMN 2005

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## Shark Research at SAFS

As the popularity of the Discovery Channel series “Shark Week” continues to demonstrate, sharks are a hot topic. Professor Vince Gallucci, leader of the SAFS lab that specializes in shark studies, offered two explanations for the public’s fascination with these creatures: “One aspect is psychological. Sharks represent the element of stark terror that attracts us, vicariously or actively. Sharks speak to the primordial in us.”

The other aspect pertains to the serious issue of the ecological role of sharks. Top-level predators like marine mammals and sharks interact with other elements in their environment in ways that still need to be explored—Vince noted, “Certainly, these animals are more complex than portrayed by our simple predation models.” Under Vince’s leadership, graduate and undergraduate students at SAFS are given opportunities to conduct basic and applied research on sharks of the northeast Pacific and the Atlantic.

Further information on the research projects described here can be found at the website, <http://fish.washington.edu/sharks>.

### Spiny Dogfish

Dogfish are an important economic resource in Washington. While Vince’s shark investigations emphasize basic research, the dogfish studies have a practical component. He and his students have been working with a commercial fishing company, Arrowac, which exports most of the Puget Sound dogfish catch to Europe (for use in fish ‘n chips). By getting access to Arrowac’s processing plant, graduate student Cindy Tribuzio (UW ’04) collected catch data

to study reproduction and reproductive timing of dogfish. This work enabled the fishery to time its harvest after the pupping season. Vince explained: “You don’t want to harvest just before the females pup; that could impact the stock’s ability to replenish itself. It’s all about sustainable harvest.”

Because Puget Sound dogfish stocks may be depressed, there is interest in developing a dogfish fishery in Alaska. Cindy is continuing her dogfish focus by pursuing basic studies of the Alaskan stocks as a PhD student at the University of Alaska Juneau.

Vince’s current graduate students are continuing dogfish research: Ian Taylor is working on reproductive potential of dogfish as a stock assessment tool and on meta population analysis. Nicci Vega is using demographic methods to investigate differences in dogfish stocks from Mexico to the Bering Sea; Jim Franks (student

*—continued on page 2, column 2*



Lee Hulbert (ADFG)

*Investigators place a smart-position-only tag on a salmon shark fin to study migration.*

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

# Vince Gallucci

BSc—Physics & Political Science (minor),  
State University of NY: Stony Brook

MSc—Biophysics. State University of NY:  
Buffalo

PhD—Statistics and Biomathematics,  
University of North Carolina: Raleigh &  
Chapel Hill

When Vince went to college, he studied physics, statistics and biomathematics. After earning his PhD, he took a postdoc at the (then) School of Fisheries and the Center for Quantitative Science in Forestry, Fisheries and Wildlife (CQS), an interdisciplinary unit jointly run by Fisheries and the College of Forest Resources. During his postdoc, he was introduced to stock assessment and has remained in this field, and at the UW, ever since. Recently, he was appointed director of CQS.

Vince spent much of his career conducting artisanal fishery research for the United Nations Food and Agriculture Organization, UN Educational, Scientific and Cultural Organization, and the US Agency for International Development. This work, he observed, “exposed me to the realities of life in developing countries and convinced me that artisanal fishing research can bring one as close to literally feeding the people as science can get.”

One USAID project involved helping Eritrea revive the Red Sea fisheries after the war with Ethiopia ended. Vince described the complicated social element: “Coastal populations were starving when the Red Sea was producing spiny lobsters as tall as I am because eating crustaceans was proscribed for religious reasons.” USAID work also took him to Kuwait, where huge catches of sardines were being largely consumed by flies while drying on the beach. A team member experimented with putting the same nets used for fishing on top of the drying sardines, which cut losses from 75% to only 15-20%. Vince remarked, “Such a simple solution, and you can’t write an equation for it!”

It was through his artisanal fishery research in Central America and the Red Sea that Vince first started to be interested in sharks. Then, after sampling for coldwater sharks in Alaska about 6 years ago, the hook was set, and Vince embarked on an intensive shark research program at SAFS.



Lee Hilbert (ADFG)

*Vince Gallucci (foreground) and crew use a cradle to lower a tagged salmon shark back into the water.*

—continued from page 1

of SAFS faculty Lorenz Hauser) is approaching the same question from the genetics point of view. And, Joel Rice’s stock assessment studies of Alaskan dogfish populations is complementing Cindy’s work.

## Salmon Shark

SAFS researchers are also working with At Sea Processors, which has been providing samples of salmon sharks from the Bering Sea. Recently, Vince and graduate students Alexandre da Silva and Joel Rice helped establish that salmon sharks migrate annually from Alaskan waters to the San Francisco area and possibly further. The shark migration coincides with salmon migrating from the ocean to their home streams or lakes to spawn, with progressively more southerly stocks returning later in the year. This phenomenon has led to a hypothesis that the shark migration tracks with returning salmon stocks to ensure an adequate food supply.

Salmon shark studies are helping clarify the role of top predators in ecosystems: Vince said, “We know these animals feed intensively on salmon, many of which come from Alaskan hatcheries.” This raises the question of whether the greater number of salmon sharks seen in recent years is due to salmon hatchery production.

## Sixgill Shark

SAFS undergraduate Brian Langseth, and former undergraduate, Danny Badger, also have been helping the lab gain new insights into the role of sharks in ecosystem interactions.

Because so many of the sixgill sharks caught in Puget Sound are juveniles, researchers suggest that the Sound may be a nursery for this species. The sixgills are found in shallow waters, where they were heavily fished by sport fishermen. This led to a closure of the sixgill fishery until the dynamics of the species could be better understood. Further, given that local dogfish stocks support an important commercial fishery, interesting new management questions have arisen because sixgill sharks appear to be major predators of the dogfish.

Vince explained the implications: “We need to manage the dogfish fishery because it generates income, but we also are obliged to not harm other species, including sharks, in managing dogfish.” Thus, if dogfish represent a large part of the sixgill diet, then knowing how many dogfish are needed to ensure adequate reproduction levels is not enough; we also must know how many are needed to support the sixgill nursery. Vince added, “This is a good example of why we need to understand the ecological linkages in the food chain before entering into the management of fisheries.”

## Blue Shark

Graduate student Alexandre da Silva has been studying elasmobranchs, including sharks, for almost 10 years. His most recent work is focused on the Atlantic blue shark, which is frequently caught as bycatch in international tuna and swordfish fisheries in the North Atlantic. However, records of these bycatches are considered incomplete. Conducting stock assessments for

these animals is further complicated by their highly migratory nature.

Blue shark reproduction takes place in the mid-Atlantic, around the Azores and Canary Islands. This is where Alex conducted his initial research, studying the animals in their nursery areas, collecting juvenile and pregnant females. More recently, he has been using the tagging database developed by NMFS to conduct statistical and modeling analyses of blue sharks. Vince remarked, “This is a database with tens of thousands of entries derived from several decades of records on tagged and recaptured blue sharks.”

Alex is systematically attempting to clean the database of entry errors and address issues like unreported captures and lost tags. His goal is to develop new abundance estimates based upon mark-recapture and general linear model analyses, as well as conduct a thorough demographic analysis and a GIS-based study of the migratory patterns of the Atlantic blue shark.

## Summing Up

Vince noted the amazing progress made in recognizing the ecosystem roles that sharks play and the significance of cold-water sharks in the North Pacific. He observed, “It has been a joy to be a part of making scientists and managers aware of these points. But, the greatest joys have been the new discoveries about ecosystems, sharks, and even the mathematics of demography.”

To top it off, Vince has been able to work with outstanding graduate students from all over the world, who, as he remarked, “constantly surprise me with their dedication and intelligence. What else can a university professor ask for?”



*Blue shark in waters of the Azores archipelago*

# Bob Francis: 35 Years of “Kickin’ the



Kathy Francis

AFTER 35 YEARS DEDICATED to interdisciplinary research and teaching, SAFS Professor Bob Francis is retiring. In 1986, he joined the SAFS faculty, where he pursued studies ranging from mathematics to biology, oceanography and ecology, and most recently, sociology.

Retirement notwithstanding, Bob is planning to co-teach a class next spring with Steve Harrell from UW Environmental Anthropology, focusing on sustainability, which is a natural evolution from his popular Fish 101 course. The goal is to bring social science, natural science and marine policy students together to discuss concepts of sustainable natural resource policy from different perspectives.

Bob is a man of diverse interests—he has raised birds of prey, has been a wildlife photographer, and not surprisingly, given his Santa Barbara roots, a surfer. He is a jazz pianist, and recently has taken up creative writing and poetry. Bob’s students, colleagues and friends attest to how important his creativity has been in shaping a long, distinguished career in teaching and research.

MD: Why have you been increasingly incorporating socio-economics in your research?

BF: This is because we keep finding the world is bigger than we thought, and we can learn from people who approach these issues from a very different viewpoint. We’re trying to develop an understanding of how humans and marine ecosystems interact with the specific focus on the Northern California Current region. The system we study is highly interconnected—mixed fisheries, different gear types, and so forth. These interconnections can impact economics either directly—one fleet’s catch affects another fleet’s catch—or indirectly through the ecology—one fleet’s impact on an ecosystem component can ripple through the system and eventually affect another fleet.

MD: You’re using an untraditional approach to modeling.

BF: A lot of policy making is reactive because we wait until things go bad and then we try to fix them, which is very difficult when people’s livelihoods are at stake. Our approach to policy making is proactive because we’re trying to figure out what to avoid and how to do so.

MD: The title of your presentation at the final school seminar this December, “35 Years of Kickin’ the Dog: Reflections on a Career in Fisheries,” is somewhat enigmatic.

BF: It goes like this: If you kick a rock, by applying the laws of physics, you have a good idea of what will happen. But if you kick a dog, that’s another story entirely. The science we pursue is about kicking “dogs”—in our case, ecosystems or populations. These living, biological systems do not simply respond to the laws of physics, and may not respond according to mathematical modeling developed for physics. Math is very important, of course, but it’s not predictive. It won’t tell you if the dog will bite you or fall over dead.

MD: Creativity has been very important in your approach to learning and teaching.

# Dog”

BF: I have to be creative if I want to inspire others. I've hired an artist to visualize complicated ecosystem concepts. I had an improvisational theater group interact with my Fish 101 students to bring perspective to topical issues.

MD: You even played a piano composition to illustrate climatic phenomena.

BF: I used the cadence in music to illustrate cadences in nature: My audience could easily distinguish when I alternated the meter of a piano piece between 3/4 and 4/4 time. I related this to our search for cadences or signals in climate patterns. These were much easier to illustrate—whether annual, decadal or millennial—using musical polyrhythms than using graphs.

MD: You've given much thought to heart and faith in conjunction with science.

BF: I have been trying to understand what's in my heart because this influences us in what we do and how we relate to the world. A lot of science is about trying to describe the beauty of nature—to me, that's about “heart.” Terry Tempest Williams wrote, “Faith is the centerpiece of a connected life. It allows us to live by the grace of invisible strands.... Faith becomes the teacher in the absence of fact.” This really stuck with me and I've always passed this on to my Fish 101 class. There are things beyond knowing, beyond the objective world, that seem to center human beings. This is hard to convey to young scientists because they need to develop strong, objective skills, but they also need to look beyond just “reduction” science.

MD: After 35 years of learning, creating, and teaching, what stands out for you?

BF: Context is critical in using science to help make decisions in fisheries management. We've done some really good science to show how the natural world is structured, but because fisheries policy is so model-driven, it's very difficult to use knowledge to develop policy.

For example, the school's Alaska Salmon Program, which focuses on biocomplexity, has shown that salmon need a complex population structure to survive. However, this kind of insight does not lend itself to predictive modeling. That said, it seems to me that policy should focus as much attention on maintaining ecological structure as in maintaining abundance. This will require a different way of passing on knowledge to decision makers. We need to do this in the right context.



Bob employed artist Amity Femia to help graphically depict interactions between three major components of our Pacific Northwest coastal marine fishery: ecosystem, economy, and management.

# From the Director

On October 18<sup>th</sup>, 2005, the school hosted the 36<sup>th</sup> annual honors convocation. At this event, we acknowledged our student scholarship recipients and our donors who have, through their generosity, made those scholarships possible (see page 10).

Your contributions also enable the school to engage in activities that enrich the lives of our staff and faculty, improve our ability to recruit the best faculty in the world, and allow us to enhance our endowment funds when special recognition is demanded. Examples include annual faculty, staff and graduate student retreats, and the recently established endowment for Marsha Landolt and Robert Busch.

Contributions to the school also help us to remain connected to our many alumni and friends. In September 2005, the school hosted the first-ever reception for alumni and associates at the American Fisheries Society annual meeting in Anchorage, Alaska (facing page) to wide acclaim. This event gave many people a chance to reconnect with colleagues, former classmates, and SAFS faculty. It also afforded the opportunity to forge new connections with SAFS researchers.

Events such as these are made possible with the help of the school's unrestricted fund, which gives us the flexibility to support emerging needs and activities as they arise. We would like to provide you the opportunity to contribute to this fund so we can continue to underwrite these highly productive events, which perpetuate the sense of community we are so fortunate to have at SAFS. To this end, we enclose a self-addressed, stamped envelope for your convenience.

Also, we would like to hear what you have been doing lately, and invite you to tell us about your recent activities, both in your professional and private life: you can either use the inside flap of the attached envelope or use our website form at <http://fishb.washington.edu/alumni/update.html>.

Regardless of your decision about current or future donations, we reiterate how much we appreciate your past support.

For more information, please see our webpage, <http://fishb.washington.edu/giving.html> or contact Linda Maxson, [lmaxson@u.washington.edu](mailto:lmaxson@u.washington.edu), 206-221-6808.



*Gordon Kruse, faculty, University of Alaska;  
Teresa Turk, MS 2000*



*Danny Badger, BS 2004; Vince Gallucci, faculty;  
Jason Gasper, MS (Marine Affairs) 2004;  
Cindy Tribuzio, MS 2004*



*Eric Eisenhardt, MS 2001; Jim Iannelli, PhD 1993;  
David Armstrong, Director;  
Tom Quinn, faculty, MS 1978, PhD 1981*



*Photos: David Armstrong and Linda Maxson*

*Graduate students:  
Kirstan Holsman, Alison Cross, Donna Hauser*

# Alumni & Associates Reception

*These photos represent a small cross-section of the many alumni, current students, faculty, colleagues, and friends that attended the SAFS reception at the American Fisheries Society annual meeting in Anchorage, Alaska, in September 2005.*



*Bruce Leaman, Director, Halibut Commission;  
Don Gunderson, faculty; Dave Armstrong, Director;  
Raymond Buckley, PhD 1997*



*Scott Gende, PhD 2002; Jennifer Boldt;  
Chris Rooper, PhD 2002; Ami Reifenstein*



*John Meldrim, PhD 1968*



*Jamal Moss, MS 2001; Jeff Napp,  
Alaska Fisheries Science Center*



*Graduate student Greer Anderson;  
Mary Austill Lott, MS 2004; graduate students  
Harry Rich and Joe Anderson*



*Tom Kline, MS 1983;  
Scott Bonar, PhD 1990*



*Brad Stevens, PhD 1982;  
Duane Stevenson, PhD 2002*



*Kerry Naish, faculty; Erin McClelland, MS 2004;  
Walt Dickoff, faculty; Fred Utter, affiliate faculty*



*Dave Eggleston, PhD 1982; Ashton;  
Tom Shirley, faculty, University of Alaska*

# Degrees Awarded, 2004–2005

The following lists acknowledge students who earned BS, MS, and PhD degrees for the academic year 2004–05. 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

Gretchen Arentzen	Loren Henry	Benjamin Nelson
Karen Avery	Jonathan Hill	Jesse Nitz
David Barbee	Colin Hofmann	Mia Norheim
Toby Black	William Holden	Kyle Ostenson*
Kimberly Briggs	Andrew Kingham	Allison Reagan
Rusty Brown	Erin Lowery	America Schaaf
Kristin Bush	Cyrus Ma	Christie Shavey
Michael Cotter	Jennifer Marsh	Morgan Sternberg*, †
Cody Dunagan	James Mattila	Kevin Turner*, ††
Leslie Fritzier	Andee Meldrum	Chadwick Wheeler
Joy Gerhard	Teresa Mongillo	Jennifer Wong
Todd Goodsell	Christopher Monson	Eleanor Ziegler
Marco Hatch	Brian Moore*	

\*Degree with Distinction (COFS honors)

†Summa Cum Laude (UW GPA-based honors)

††Cum Laude (UW GPA-based honors)

## MS Degrees

- Chambers, Melinda—Population structure and recovery dynamics of black abalones (*Haliotis cracherodii*) from withering syndrome in the California Islands (VanBlaricom)
- Chasco, Brandon—Estimating stock abundance and migration timing in a mixed-stock fishery for sockeye salmon (*Oncorhynchus nerka*) in Chignik, Alaska (Hilborn)
- Erickson, Michael—Vertebrate communities in bedrock and gravel bottomed streams of the Willapa Basin (Quinn)
- Erickson, Aleta—Effects of human trampling in the barnacle zone along a gradient of use in Olympic National Park (VanBlaricom)
- Fay, Gavin—A Bayesian stochastic metapopulation model for Steller sea lions in Alaska (Punt)
- Flynn, Lucy—Quantification and prediction of Bristol Bay sockeye salmon (*O. nerka*) run timing (Hilborn)
- Fraser, Whitney—Dechlorinating bacteria in chloroethene-contaminated groundwater: quantitation and correlation (Herwig)
- Heatwole, Danelle—Insect-habitat associations in salt marshes of northern Puget Sound: Implications of tidal restriction and predicted response to restoration (Simenstad)
- Hutchinson, Charles—Using radioisotopes in the age determination of shorttraker (*Sebastes borealis*) and canary (*Sebastes pinniger*) rockfish and estimating age at sexual maturity for shorttraker rockfish (Gunderson)
- Jorgensen, Elaina—Identification, distribution, and relative abundance of paralarval gonatid squids (Cephalopoda: Oegopsida: Gonatidae) from the Gulf of Alaska, 2001–2003 (Pietsch)
- Lott, Mary Austill—Habitat-specific feeding ecology of ocean-type juvenile chinook salmon (*Oncorhynchus tshawytscha*) in three shallow-water wetlands in the Lower Columbia River Estuary (Simenstad)



Jackie Carter

Graduate students in the Alaska Salmon Program sampling benthic invertebrates, Whitefish Creek, Lake Aleknagik.



McCarthy, Sarah—Trophic performance of *Oncorhynchus mykiss* in tributaries of the South Fork Trinity River, northern California (Beauchamp)

McClelland, Erin—Outbreeding depression in fishes: Meta-analysis and a case study on coho salmon (*Oncorhynchus kisutch*) (Naish)

McIntyre, Jennifer—Bioaccumulation of mercury and organochlorines in the food web of Lake Washington (Beauchamp)

Menon, Muktha—Spatio-temporal modeling of Pacific sleeper shark (*Somniosus pacificus*) and spiny dogfish (*Squalus acanthias*) bycatch in the northeast Pacific Ocean (Gallucci)

Nelson, Mark—Spatial and temporal effects of El Niño on the feeding habits of Pacific hake (*Merluccius productus*) (Miller)

Nelson, Sonya—Analysis of larval and juvenile performance of hybrid and inbred families of Pacific oysters *Crassostrea gigas* (Friedman)

Newell, Jennifer—Migration and movement patterns of adult sockeye salmon (*Oncorhynchus nerka*) in Lake Washington (Quinn)

Perrins, Jake—Ozone treatment of ballast water for the reduction of non-indigenous aquatic organisms: laboratory and shipboard experiments (Herwig)

Rentmeester, Steven—An assessment of large woody debris and riparian forest resources at Ellsworth Creek Watershed and a comparison of riparian management options (Conquest)

Scheuerell, Jennifer—Foraging behavior of a pelagic predator and long-term shifts in dominance between coexisting zooplankton species (Schindler)

Sergeant, Chris—Effects of bottom slope, substrate, cover, predators and ontogeny on lentic habitat preference by juvenile chinook salmon (*Oncorhynchus tshawytscha*) in experimental arenas (Beauchamp)

Tribuzio, Cindy—An investigation of the reproductive physiology of two North Pacific shark species: spiny dogfish (*Squalus acanthias*) and salmon shark (*Lamna ditropis*) (Gallucci)

Weis, Lucie—The effects of San Juan County, Washington, marine protected areas on larval rockfish production (Miller)

Wiedenmann, John—Evidence of density-dependent age-1 recruitment in bluefish, *Pomatomus salatrix*, in the northwest Atlantic (Essington)

Woods, Pamela—Geographic variation in the shiner perch, *Cymatogaster aggregata* Gibbons (Teleostei: Embiotocidae): analyses of shape in the body and lower pharyngeal jaw (Pietsch)

Zhong, Hua (Judy)—Describing ecological communities: combining mechanistic and statistical models using aquatic communities data (Conquest)

Zorich, Nathan—Foraging behavior and swimming speed of the northern pike-minnow (*Ptychocheilus oregonensis*) in the Columbia River (Anderson)

## PhD Degrees

Abrey, Caryn—Biodiversity in the early life history of sockeye salmon (*Oncorhynchus nerka*): Emergence timing, an ontogenetic shift, and population productivity (Quinn)

Agostini, Vera—Climate, ecology and productivity of Pacific sardine (*Sardinops sagax*) and hake (*Merluccius productus*) (Francis)

Branch, Trevor—The influence of individual transferable quotas on discarding and fishing behavior in multispecies fisheries (Hilborn)

Brauner Lando, Jody—Incorporating uncertainty into freshwater habitat restoration (Hilborn)

Drake, Deanne—Fate and influence of salmon nutrients in riparian soils and trees: Seasonal to multi-century patterns (Naiman)

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

Gray, Ayesha—The Salmon River estuary: restoring tidal inundation and tracking ecosystem response (Simenstad)

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

Minte-Vera, Carolina—Meta-analysis of density-dependent somatic growth (Hilborn)

Paranjpye, Rohinee—The role of a *Vibrio vulnificus* type IV pilin in pathogenesis and in persistence in oysters (Dickhoff)

Purcell, Maureen—Characterization of the innate immune response to infectious hematopoietic necrosis virus in rainbow trout (Herwig)

Speckman, Suzann—Characterizing fish schools in relation to the marine environment and their use by seabirds in Lower Cook Inlet, Alaska (Parrish)

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

Winter, Andreas—Comparative analyses of the acoustically determined abundance and distribution of age-0 wall-eye pollock in the Eastern Bering Sea (Swartzman)

# Student Awards, 2005-2006

*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 2005-06, 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**

Matthew Baker, Ivonne Ortiz, Alexandre da Silva

## **Achievement Rewards for College Scientists**

Suresh Sethi

## **Donald E. Bevan Endowed Fund in Fisheries**

## **Wilbert McLeod Chapman Memorial Scholarship**

Zachary Baldwin, Amanda Bradford, Stephanie Carlson

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

Cristiane Elfes

## **Herbert T. Domenici Scholarship**

Joshua Latterell

## **Lauren R. Donaldson Scholarship**

Sarah Spilseth

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

Eva Dusek, Jessica Hayden-Spear, Ivonne Ortiz, Mary Ramirez, Jonathan Reum, Alexandre da Silva, Scott Stolnack

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

Dionne Andersen, Jessica Hayden-Spear

## **Faculty Merit Award**

Anne Beaudreau, Stephanie Carlson, Marco Hatch, Joshua Latterell, Erin Lowery, Harry Rich

## **Fisheries Memorial Award**

Neala Kendall

## **Gilbert Ichthyology Research Fund**

Zachary Baldwin, Daniel Garrett, Christopher Kenaley, Rachel Schoen

## **Graduate School Top Scholar Award**

Katy Doctor, Suresh Sethi

## **John E. Halver Fellowship**

Sage Chaiyapechara, Laura Hoberecht

## **Roy Jensen Research Fellowship**

Catherine Curran

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

Alison Agness, Matthew Baker, Anne Beaudreau, Amanda Bradford, Stephanie Carlson, Sage Chaiyapechara, Eva Dusek, Susan Johnson, Jocelyn Lin, Carey McGilliard, Danielle Mitchell, Anthony Orr, Jonathan Reum, Lauren Rogers, Erik Schoen, Raymond Timm II, Andreas Winter

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

Joseph Anderson

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

Kristina Straus

## **Vincent Liguori Fellowship**

Joshua Bouma, Colleen Burge

## **Victor and Tamara Loosanoff Fellowship**

Eva Dusek, Kirstin Holsman, Susan Johnson, P. Sean McDonald, Jonathan Reum

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

Greer Anderson, Matthew Baker, Anne Beaudreau, Eva Dusek, Susan Johnson, Jocelyn Lin, Carey McGilliard, Danielle Mitchell, Mary Ramirez, Jonathan Reum, Lauren Rogers, Erik Schoen, Alexandre da Silva, Scott Stolnack, Kristina Straus, Raymond Timm II, Andreas Winter

## **Gilbert B. Pauley Award**

Donna Hauser, Michael Mazur

## **John G. Peterson Scholarship**

Matthew Baker, Ivonne Ortiz, Vija Pelekis

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

Kristina Straus, Jordan Watson

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

Daniel Luck

## **Robert E. Resoff Scholarship**

Brian Langseth

## **Oscar Skau Student Research Fund**

## **W. F. Thompson Scholarship**

Amanda Bradford, Danielle Mitchell

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

Jessica Hayden-Spear, Sharon VillageCenter

# Gifts, 2004–2005

*The many alumni and friends of our school play an important role in supporting our programs through their generous financial gifts. During the 2004–2005 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.*

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