The Class of 2013

Doctor of Philosophy Degrees

College of Engineering and Mines

Dr. Douglas J. Goering, Dean

Abhijit Chatterjee **

Ph.D. Engineering: Environmental Engineering

B.S., Calcutta University (India), 2000; M.T., Jadavpur University (India), 2004.

Thesis: Modeling Biosorption of Cadmium, Zinc, and Lead onto Native and Immobilized Citrus Peels in Batch and Fixed Bed Reactors

Biosorption by citrus peels removed cadmium, lead and zinc in batch and fixed bed reactors. The investigation included competition by other metals and calcium, treatment of mining effluent, alginate-immobilization of peels, acidic desorption of saturated column, and modeling breakthrough curves considering external film diffusion, intra-particle mass transfer and/or surface reaction.

Major Professor: Dr. Silke Schiewer

Yanhong Gu *

Ph.D. Engineering: Mechanical

B.E., Luoyang Institute of Technology (China), 1999; M.E., China University of Geosciences, 2002.

Thesis: Corrosion Behavior and Residual Stress of Microarc Oxidation Coated AZ31 Magnesium Alloy for Biomedical Applications

Microarc oxidation coatings were produced on magnesium alloys under varying pulse frequency, applied voltage, oxidation time and electrolyte concentrations. The effects of the above four control parameters on residual stresses and corrosion behavior were analyzed. Predictive models of residual stresses, corrosion rates and corrosion mechanism were proposed.

Major Professor: Dr. Sukumar Bandopadhyay

Christopher Raye Hecker *

Ph.D. Computer Security: Interdisciplinary Program

B.S., University of Alaska Fairbanks, 1997; M.S., University of Alaska Fairbanks, 2007.

Thesis: A Methodology for Intelligent Honeypot Deployment and Active Engagement of Attackers

This research effort provides a methodology to dynamically generate context-appropriate honeynets. The honeynet conforms to the target environment using passive or increasing degrees of active scanning. The gathered information aids the administrator in creating a network topology and understanding the flux of devices in the network.

Major Professors: Dr. Kara Nance and Dr. Brian Hay

Eunkyoung Hong *

Ph.D. Climate Change Policy and Assessment: Interdisciplinary Program

B.Ag., Seoul Women's University (South Korea), 2000; M.C.P., Seoul National University (South Korea), 2003; M.S., Royal Institute of Technology (Sweden), 2007.

Thesis: Permafrost Settlement Caused by Climate Warming in Alaska and the Estimation of Its Damage Costs for Public Infrastructure

The Permafrost Settlement Hazard Index in Alaska was developed. Costs of damage to public infrastructure in Alaska caused by permafrost settlement related to climate warming were estimated and some alternative construction methods were reviewed as adaptation methods with a focus on cost effectiveness in order to decrease damage costs.

Major Professor: Dr. Sarah Trainor

Daisy Huang

Ph.D. Mechanical Engineering and Applied Physics: Interdisciplinary Program

B.S., University of California-Berkeley, 1999; M.S., Santa Clara University (California), 2005.

Thesis: Size Effects in Mesoscale Mechanical Testing of Snow

Natural snow was collected, studied, and analyzed as a geotechnical material. Indentation, unconfined compression, and cone penetration tests were executed on different size scales, and size effects were observed.

Major Professor: Dr. Jonah Lee

College of Liberal Arts

Mr. Todd Sherman, Dean

Rachel Gianni Abbott

Ph.D. Scandinavian Studies: Interdisciplinary Program

B.A., Whitman College (Washington), 2000; M.A., Utah State University, 2004.

Thesis: The Scandinavian Immigrant Experience in Utah, 1850 – 1920: Using Material Culture to Interpret Cultural Adaptation

From 1850 – 1920, over 25,000 Scandinavians immigrated to Utah to join fellow Mormons. This dissertation examines the immigrants' material culture and reveals that rather than jettisoning homeland heritage (as previous studies concluded), Scandinavian immigrants maintained and modified traditional folkways, skills, and crafts while comingling them with new cultural traditions.

Major Professor: Dr. Mary Ehrlander

Alisha Susana Drabek **

Ph.D. Indigenous Studies

B.A., University of Arizona, 1994; M.F.A., University of Arizona, 1996.

Thesis: Liitukut Sugpiat'stun (We Are Learning How To Be Real People): Exploring Kodiak Alutiiq Literature Through Core Values

The decline of Kodiak Alutiiq oral traditions and a limited awareness or understanding of archived stories has kept them from being used in schools. This study catalogs an anthology of Alutiiq literature and provides an historical and values-based analysis of the educational significance of stories as tools for well-being.

Major Professor: Dr. Raymond Barnhardt

Keri M. Eggleston

Ph.D. Linguistics/Alaska Languages: Interdisciplinary Program

B.A., University of Alaska Fairbanks, 2001; M.A., University of Oregon, 2003.

Thesis: 575 Tlingit Verbs: A Study of Tlingit Verb Paradigms

Tlingit is a highly endangered and grammatically complex language indigenous to Southeast Alaska. The conjugation of verbs is not predictable in certain respects. This research documents complete paradigms for 575 Tlingit verbs and presents the associated grammar in a manner intelligible to both second language learners and linguists.

Major Professor: Dr. Gary Holton

Erin L. Johnson *

Ph.D. Clinical-Community Psychology

B.A., University of Alaska Anchorage, 2005; M.S., University of Alaska Anchorage, 2009.

Thesis: Secondary Trauma in Mental Healthcare Providers in Alaska

Mental healthcare providers in Alaska were surveyed regarding their levels of secondary trauma and potential associated factors. Approximately 20 percent of the respondents met criteria for posttraumatic stress disorder resulting from their work. Several professional and personal variables were found to be at risk for protective factors for experiencing secondary trauma.

Major Professor: Dr. Claudia Lampman

Larry S. LeDoux *

Ph.D. Digital Leadership in Cross-Cultural Learning: Interdisciplinary Program

B.S., University of Alaska Fairbanks, 1977; M.A.T., University of Alaska Fairbanks, 1981.

Thesis: Polishing the Mirror: A Multiple Methods Study of the Relationship Between Teaching Style and the Application of Technology in Alaska's Rural One-to-One Digital Classrooms

The effective use of digital learning tools is key to reforms that support Alaska Native and 21st century learner outcomes. A small, positive correlation between beliefs and the application of digital learning tools among teachers in Alaska's one-to-one laptop classrooms evidenced strong philosophical, professional and operational barriers that oppose systemic change.

Major Professor: Dr. John Monahan

Pamela Jo Lloyd *

Ph.D. Leadership in the Digital Age: Interdisciplinary Program

B.Ed., University of Alaska Anchorage, 1991; M.Ed., University of Alaska Anchorage, 2009.

Thesis: Digital Dead Ends Along Alaska's Information Highway: Broadband Access for Students and Teachers in Alaska's High School One-to-One Laptop Programs

The role of broadband availability was explored to investigate the differences in personal and classroom levels of technology adoption for teachers and students in one-to-one laptop environments, and to provide a snapshot of the social inequalities in rural communities that further exacerbate the impact of the digital divide on student learning.

Major Professor: Dr. John Monahan

Elizabeth K. Marino **

Ph.D. Anthropology

B.A., University of Notre Dame (Indiana), 2001; M.A., University of Alaska Fairbanks, 2006.

Thesis: Losing Ground: An Ethnography of Vulnerability and Climate Change in Shishmaref, Alaska

This dissertation is an ethnography of vulnerability in Shishmaref, Alaska. It traces the complex historical, social, cultural and environmental factors that contribute to flooding disasters in the village. As climatic changes affect the Arctic, ecological shift adds additional pressure to rural communities. This dissertation traces the construction of vulnerability across time.

Major Professor: Dr. Peter Schweitzer

Holly Jean McKinney

Ph.D. Anthropology

B.A., University of North Dakota - Grand Forks, 1997; M.A., University of Montana, 2001.

Thesis: Taphonomic Analysis of Fish Remains from the Mink Island Site (XMK-030): Implications for Zooarchaeological and Stable Isotopic Research

Zooarchaeological and stable isotopic methods are used to assess biostratinomic and diagenic agent effects on archaeologically deposited fish bones. The results are used to validate the Modified Bell stable isotope pretreatment method, establish stable isotope sample selection guidelines, and explore millennial-scale interactions among humans and fishes at Mink Island.

Major Professors: Dr. Ben Potter and Dr. Diane Hanson

Mark Standley *

Ph.D. Digital Learning Leadership: Interdisciplinary Program

B.A., Southwest Texas State University, 1976; M.S., University of Oregon, 1993.

Thesis: Kids Getting Away with Learning: Student Perceptions of Learning in One-to-One Laptop Programs

This research explored student perceptions of learning in one-to-one laptop programs using grounded theory methods in focus groups in rural Alaskan high schools. The new literacies students develop were reflected in their perceptions and challenge researchers to re-examine learning theory in light of the nature of digital learning.

Major Professor: Dr. John Monahan

Amy Louise Vinlove *

Ph.D. Education Policy and Reform: Interdisciplinary Program

B.A., Brown University (Rhode Island), 1992; M.A., University of Colorado, 1995.

Thesis: Learning to Teach Where You Are: Preparation for Context-Responsive Teaching in Alaska's Teacher Certification Programs

The research completed for this project examined current practices relative to preparing context-responsive teachers in Alaska's elementary and secondary teacher certification programs. Context-responsive teaching was defined in this project as teaching that responds to individual student needs and interests, linguistic backgrounds, family characteristics, the local community and the natural environment.

Major Professor: Dr. Jean Richey

Robert E. Whicker *

Ph.D. Transformational Leadership in Technology: Interdisciplinary Program

B.S., University of Northern Colorado, 1977; M.Ed., Colorado State University, 1984.

Thesis: Framing Complexity: Teachers and Students Use of Technology in Alaska One-to-One Laptop Learning Environments

Evaluation through descriptive and predictive analysis of surveys by Alaska high school teachers and students in one-to-one laptop programs established levels of adoption in personal use, teachers' professional practice, and use in school. Teacher concerns about practice and implementation factors of the laptop programs were also examined.

Major Professor: Dr. John Monahan

College of Natural Science and Mathematics

Dr. Paul W. Layer, Dean

Peter Anthony Bieniek *

Ph.D. Atmospheric Sciences

B.S., Valparaiso University (Indiana), 2005; M.S., University of Alaska Fairbanks, 2007.

Thesis: Assessing River Ice Breakup Date, Coastal Tundra Vegetation and Climate Divisions in the Context of Alaska Climate Variability

Large-scale drivers of Alaska climate were investigated to advance seasonal forecasting. River ice breakup is earlier when spring temperatures are higher under clearer skies from reduced storminess. Objective methods revealed 13 climate divisions for Alaska, based on homogenous variability. Tundra vegetation responds to snow and sea ice, which impact temperatures.

Major Professor: Dr. Uma Bhatt

Lori Kristine Bogren

Ph.D. Biochemistry and Molecular Biology

B.A.S., University of Colorado-Boulder, 2000; M.S., Colorado State University, 2004.

Thesis: Resistance to Multi-Organ Failure and Metabolic Alterations after Global Ischemia/Reperfusion in the Arctic Ground Squirrel

Physiological changes after global ischemia/reperfusion were compared between I/R injury-prone rats and I/R injury-resistant arctic ground squirrels. Arctic ground squirrels were resistant to organ damage, systemic inflammation, and multi organ failure after I/R. This resistance may stem from arctic ground squirrels' resistance to metabolic alterations during I/R.

Major Professor: Dr. Kelly Drew

Maria Denise Bray

Ph.D. Biological Sciences

B.S., University of Alaska Fairbanks, 1998.

Thesis: Physical Activity, Body Composition and their Associations with Health in Yup'ik People

Activity and the prevention of excess adiposity are important to good health. This dissertation highlights key findings regarding the accuracy of assessment tools for measuring physical activity and body composition, as well as the associations between physical activity and body composition with health-related variables in Yup'ik people.

Major Professor: Dr. Bert Boyer

Robin Ann Bronen **

Ph.D. Climate Change Adaptation and Human Rights: Interdisciplinary Program

B.A., Tufts University (Massachusetts), 1981; J.D., University of California-Davis, 1987.

Thesis: Climate-Induced Community Relocations: Creating an Adaptive Governance Framework Based in Human Rights

In Alaska, decreasing Arctic sea ice and thawing permafrost are accelerating flooding and erosion and threatening indigenous communities. This dissertation describes the steps that federal, state, and tribal governments have taken to relocate three of these communities. Guiding human rights principles of climigration and an adaptive governance framework are proposed.

Major Professor: Dr. F. Stuart "Terry" Chapin III

Helena Marion Buurman

Ph.D. Geophysics

B.S., University of Edinburgh (Scotland), 2006; M.S., University of Alaska Fairbanks, 2008.

Thesis: Volcano Seismicity in Alaska

Volcanic earthquakes can show us how volcanic systems work. I use volcano seismicity to track the progression of magma as it moves through the crust during eruptions. I also examine 10 years of volcano seismic data recorded at 46 different volcanoes to determine what controls volcanic activity in Alaska.

Major Professor: Dr. Michael West

Nicole DeRoin **

Ph.D. Geophysics

B.A., Hastings College (California), 2004.

Thesis: Methods for Monitoring and Forecasting Volcanic Hazards and Eruptions Using Seismology and Other Geophysical Data

The relationship of seismicity and physical characteristics of eruption phenomena at three volcanoes was studied. Correlations between plume heights, rockfall sizes and rockfall run-out distances and seismicity were found. A method for detecting tremor was found by modeling duration-amplitude distributions of volcanic tremor with an exponential law.

Major Professor: Dr. Stephen McNutt

Yuning Fu **

Ph.D. Geophysics

B.S., Wuhan University (China), 2005; M.S., Wuhan University (China), 2007.

Thesis: Loading Deformation on Various Timescales Using GPS and GRACE Measurements

The effect of using inconsistent reference frame to correct Ocean Tidal Loading on GPS coordinate solutions was examined. Two geodetic observations, GPS and GRACE, were used to investigate the seasonal and long-term loading deformation in the Nepalese Himalaya, and seasonal hydrology loading effects in southern Alaska.

Major Professor: Dr. Jeffrey Freymueller

Ronni Grapenthin *

Ph.D. Geophysics

Diplom, Humboldt-Universitat Zu Berlin (Germany), 2007.

Thesis: Volcano Deformation and Subdaily GPS Products

Daily averages of GPS positions are utilized to infer characteristics of the magmatic systems of Redoubt (Alaska) and Bezymianny (Kamchatka) volcanoes. Subdaily GPS data is used to visualize and analyze the dynamics of the 2011 Tohoku earthquake (Japan) and to demonstrate the detectability of volcanic plumes in GPS data.

Major Professor: Dr. Jeffrey Freymueller

Sarah Massey Henton

Ph.D. Geology

B.A., University of Newcastle (England), 2004; B.Sc., The Open University (England), 2008.

Thesis: Experiment vs. Nature: Using Amphiboles to Test Models of Magma Storage and Pre-Eruptive Magma Dynamics Preceding the 2006 Eruption of Augustine Volcano, Alaska

An investigation of magma storage and pre-eruptive magma heating preceding the 2006 eruption of Augustine Volcano, Alaska. This study used techniques in petrology and experimental petrology to refine models of the magmatic pulling system of one of Alaska's most active volcanoes.

Major Professor: Dr. Jessica Larsen

Keiko Akasofu Herrick

Ph.D. Biological Sciences

B.A., Johns Hopkins University (Maryland), 1991; M.A., University of Connecticut, 1994.

Thesis: Predictive Modeling of Avian Influenza in Wild Birds

Using the Random Forests algorithm, I constructed predictive models for avian influenza virus in wild birds. Various algorithms were evaluated to correct highly imbalanced prevalence often found in wildlife surveillance data. Cold regions consistently displayed the highest relative predicted occurrence scores over the warm and temperate regions usually modeled.

Major Professors: Dr. Falk Huettmann and Dr. Barbara Taylor

Kimberly Erin Iceman

Ph.D. Biological Sciences

B.S., University of Utah, 2005.

Thesis: Raphé Chemosensory Amplifier: A CO_2-Sensitive Brain Network

Three distinct types of brainstem raphé neurons sensitive to CO_2/pH were electrophysiologically and histologically characterized in an intact rodent system. Results suggest that together these chemosensitive neuron groups interact as a "raphé chemosensory amplifier" network to sense and respond to changes in tissue CO_2/pH, affect ventilation, and promote homeostasis.

Major Professor: Dr. Michael Harris

Elchin Jafarov

Ph.D. Geology and Geophysics

B.S., Azerbaijan State Oil Academy, 2001; M.S., Azerbaijan State Oil Academy, 2003; M.A., University of Alaska Fairbanks, 2007.

Thesis: The Effects of Changes in Climate and Other Environmental Factors on Permafrost Evolution

The central objective in this study was to predict permafrost thermal dynamics during the 21st century using high resolution climate datasets. As an additional outcome of this objective, permafrost modeling was improved by using better snow parametrization methods and addressing consequences of forest fires on permafrost.

Major Professor: Dr. Vladimir Romanovsky

Poul Flyvholm Jensen

Ph.D. Space Physics

B.Sc., University of Copenhagen (Denmark), 1993.

Thesis: Analysis of Methods for Solar Wind Propagation from Lagrangian Point L1 to Earth

Several methods for extrapolating solar wind data from an upstream location (Lagrangian Point L1) to the magnetosphere using data from a single satellite were explored. Results may help improve accuracy of such extrapolated data, which is widely used for magnetospheric research and short-term forecasting of geomagnetic activity.

Major Professor: Dr. William Bristow

Ryan P. Kovach **

Ph.D. Biological Sciences: Wildlife Biology

B.S., University of Montana, 2008.

Thesis: Salmonid Phenology, Microevolution, and Genetic Variation in a Warming Alaskan Stream

A critical question in ecology is how populations will respond to climate warming. Long-term demographic, genetic, and environmental data were used to determine the patterns, mechanisms, and consequences of climate-induced changes in salmon migration timing. Migration timing shifted substantially, partially due to evolution, but abundances and genetic diversity were stable.

Major Professors: Dr. David Tallmon and Dr. Mark Lindberg

Dominick Joseph Lemas **

Ph.D. Biochemistry and Molecular Biology

B.S., University of Vermont, 2006.

Thesis: Gene-By-Diet Interactions and Obesity Among Yup'ik People Living In Southwest Alaska

An investigation of gene-by-diet interactions that modified genetic risk of developing obesity in Yup'ik people used genetic markers in obesity candidate genes and nitrogen stable isotope ratios of red blood cells as a biomarker for marine-derived n-3 polyunsaturated fatty acids intake to evaluate changes in obesity-related phenotypes.

Major Professor: Dr. Bert Boyer

Taryn M. Lopez

Ph.D. Environmental Chemistry

B.S., University of Wisconsin - Eau Claire, 2003; M.S., Michigan Technical University, 2006.

Thesis: Characterization and Interpretation of Volcanic Activity at Redoubt, Bezymianny and Karymsky Volcanoes Though Direct and Remote Measurements of Volcanic Emissions

Volcanic emissions measurements can be used to characterize eruptive activity and infer subsurface processes at active volcanoes. This dissertation uses direct and remote volcanic emissions measurements to: (1) quantify SO_2 emissions from Redoubt Volcano, (2) detect magma ascent at Bezymianny Volcano, and (3) remotely characterize diverse activity at Karymsky Volcano.

Major Professor: Dr. Catherine Cahill

Xuanye Ma **

Ph.D. Space Physics

B.S., University of Science and Technology (China), 2008.

Thesis: Kelvin-Helmholtz Instability and Magnetic Reconnection at the Earth's Magnetospheric Boundary

Entropy can strongly increase only for small inflow plasma beta conditions. A field-aligned current can be generated by a guide magnetic field, a perpendicular shear flow, and inclusion of Hall physics. Magnetic reconnection is strongly modified by mutual interaction with Kelvin-Helmholtz modes for southward interplanetary magnetic field conditions.

Major Professors: Dr. Antonius Otto and Dr. Curt Szuberla

Jacob Raymond Mongrain **

Ph.D. Geology

B.S., University of Maine, 2001; M.S., University of Alaska Fairbanks, 2006.

Thesis: Depositional Systems, Paleoclimate, and Provenance of the Late Miocene to Pliocene Beluga and Sterling Formations, Cook Inlet Forearc Basin, Alaska

Investigation of the Beluga and Sterling formations of the Cook Inlet forearc basin, Alaska, revealed significant differences in depositional style. These differences are ascribed to sediment-flux changes between transverse-axial dominated (Beluga Fm.) and axial dominated (Sterling Fm.) fluvial systems attributed to exhumation in the Alaska Range ~11 Ma

Major Professor: Dr. Paul McCarthy

Sarah Heather Nash

Ph.D. Biological Sciences

B.A., University of Cambridge (United Kingdom), 2007.

Thesis: Developing Stable Isotope Biomarkers of Yup'ik Traditional and Market Foods to Detect Associations with Chronic Disease Risk

This dissertation validated biomarkers of Yup'ik traditional and market food intake based on naturally occurring variations in carbon and nitrogen stable isotope ratios. It then presented applications of these biomarkers to investigate dietary patterns and associations of diet with chronic disease risk factors in Yup'ik people.

Major Professor: Dr. Diane O'Brien

Owen Kelly Neill

Ph.D. Geology

B.A., Amherst College (Massachusetts), 2007; M.S., University of Hawaii - Manoa, 2009.

Thesis: Petrologic and Geochemical Tracers of Magmatic Movement in Volcanic Arc Systems: Case Studies from the Aleutian Islands and Kamchatka, Russia

In this dissertation, different geochemical tracers are used to investigate magmatic processes at Kasatochi Island volcano, located in the Aleutian Islands, and at Bezymianny Volcano, located in Kamchatka, Russia.

Major Professors: Dr. Jessica Larsen and Dr. Pavel Izbekov

Amanda Leigh Robertson **

Ph.D. Biological Sciences: Wildlife Biology and Conservation

B.S., Florida Institute of Technology, 2004; M.S., Tulane University (Louisiana), 2007.

Thesis: Acclimation and Migration Potential of a Boreal Forest Tree, Balsam Poplar (*Populus balsamifera* L.) in a Changing Climate

Within a species, local adaptation may cause populations to respond differently to climate change. I investigated the roles of acclimation and adaptation in tree-growth responses to increased temperature. Growth of balsam poplar increased 27 – 69 percent due to 3 – 8 degree Celsius experimental warming, and differed among populations. Projected climate-change impacts should include population-level differences.

Major Professors: Dr. Matthew Olson and Dr. Naoki Takebayashi

James D. Stone

Ph.D. Biological Sciences

B.A., Rice University (Texas), 2004.

Thesis: Experimental and Theoretical Studies of the Pollination Ecology of Gynodioecy

Gynodioecy, describing populations of females and hermaphrodites, is surprisingly common among plants. Pollination ecology helps account for this prevalence as well as the remarkable variation observed in gynodioecious sex ratios. I use theoretical and empirical approaches to describe pollinators' role in the evolution and maintenance of gynodioecy.

Major Professors: Dr. Matthew Olson and Dr. Naoki Takebayashi

Huy Nguyen Quang Tran **

Ph.D. Atmospheric Sciences

B.E., Ho Chi Minh City University of Technology (Vietnam), 2004; M.S., Asian Institute of Technology (Thailand), 2008.

Thesis: Analysis of Model and Observation Data for the Development of a Public $PM_{2.5}$ Air-Quality Advisories Tool (AQuAT)

An air-quality advisory tool that combines mobile measurements of particulate matter less than or equal to 2.5μm in diameter ($PM_{2.5}$) with outputs of an air-quality model was developed to interpolate $PM_{2.5}$-measurements into unmonitored neighborhoods in Fairbanks, Alaska, and to provide a spatially differentiated public air-quality advisory.

Major Professor: Dr. Nicole Mölders

Heidi L. Weigner **

Ph.D. Biological Sciences

B.S., University of Alaska Anchorage, 2001.

Thesis: Freshwater Fish Biogeography in the Bering Glacier Region, Alaska

Bering Glacier, Alaska, is Earth's largest surging glacier. Surges and retreats lead to a dynamic environment for aquatic communities. Purposes of this study are to characterize fish communities and provide information relevant to their management for BLM. Given Bering Glacier's remoteness, little information exists regarding its fish communities.

Major Professors: Dr. Kris Hundertmark and Dr. Frank von Hippel

School of Education

Dr. Allan Morotti, Dean

Caitlin Nicole Montague-Winebarger *

Ph.D. Cross-Cultural Studies in Education: Interdisciplinary Program

B.A., Washington State University, 2006; M.Ed., University of Alaska Fairbanks, 2010.

Thesis: "That's a Hard Question": Undergraduate Students Talk About Culture

An interdisciplinary and highly situated ethnographic study examining the ability of undergraduates in two culture-oriented courses to articulate a framework for describing culture, cross-culture, and cultural difference used both auto-ethnographic narrative and semi-structured interviews to better understand the existence of said frameworks, their development, and impact on multicultural teacher education.

Major Professors: Dr. Beth Leonard and Dr. Maureen Hogan

School of Fisheries and Ocean Sciences

Dr. Michael A. Castellini, Dean

Bradley Wray Barr **

Ph.D. Ocean Wilderness Stewardship: Interdisciplinary Program

B.S., University of Maine, 1977; M.S., University of Massachusetts, 1987.

Thesis: Ocean Wilderness in Theory and Practice

"Wilderness" is an idea routinely linked to the land, but rarely to the sea. This research explored how wilderness is defined, how wilderness qualities of ocean waters are perceived, identified wilderness waters designated in North America, and offered recommendations regarding appropriate identification and management of future ocean wilderness areas.

Major Professors: Dr. Andrew Kliskey and Dr. Gordon Kruse

Benjamin John Daly *

Ph.D. Fisheries

B.S., Hobart College (New York), 2003; M.S., University of Alaska Fairbanks, 2007.

Thesis: Red King Crab Hatchery Culture and Ecological Requirements: Applications for Stock Enhancement

Stock enhancement is being considered for red king crabs in Alaska. My research addresses bottlenecks associated with hatchery production and lays groundwork for developing release strategies. I demonstrate that hatchery production can be improved with specific rearing protocols and suggest that releases during the early juvenile stages may be beneficial.

Major Professor: Dr. Ginny Eckert

* *Summer degree recipient*
** *December degree recipient*

Michael R. Garvin **

Ph.D. Fisheries

B.S., University of Washington, 1991; M.S., University of Alaska Fairbanks, 2008.

Thesis: Population Genetics and Mixed Stock Analysis of Chum Salmon (*Oncorhynchus keta*) with Molecular Genetics

Genetic information from salmon caught in the marine environment is used to assign individual fish to a population of origin. This dissertation describes methods to perform these analyses and identifies possible reasons for genetic similarities among chum salmon populations in western Alaska, which are important for subsistence and commercial fisheries.

Major Professor: Dr. Anthony Gharrett

Tammy Dee Hoem Neher **

Ph.D. Fisheries

B.S., Boise State University (Idaho), 1998; M.S., Boise State University (Idaho), 2002.

Thesis: The Influence of Estuarine Habitats on Expression of Life History Characteristics of Coho Salmon Smolts in South-Central Alaska

I examined habitat use and trait expression in juvenile coho salmon occupying two contrasting estuaries. Young salmon reared in estuaries for extended time periods and patterns of use were related to environmental conditions. This work highlights how functioning estuary habitats can contribute to resilience of salmon populations to changing environments.

Major Professor: Dr. Amanda Rosenberger

Katharine Bollinger Miller

Ph.D. Oceanography

B.A., University of Puget Sound (Washington), 1985; M.A., University of Washington, 1989.

Thesis: Predicting Distributions of Estuarine Associated Fish and Invertebrates in Southeast Alaska

Estuaries in Southeast Alaska provide habitat for juveniles and adults of commercial fish and invertebrates. This study uses advanced machine learning algorithms to develop accurate (>70 percent) predictive models of species occurrence and community composition in relation to regional patterns of precipitation, tidal energy, abundance of intertidal habitat, and vegetation.

Major Professor: Dr. Brenda Norcross

Jason T. Stolarski

Ph.D. Fisheries

B.S., University of Massachusetts Amherst, 2004; M.S., West Virginia University, 2007.

Thesis: Growth and Energetic Condition of Dolly Varden Char in Coastal Arctic Waters

Gaps in our understanding of Dolly Varden char ecology in the Alaskan Arctic impede management and our ability to predict the effects of climate change. We developed and validated non-lethal, scale-based aging and energy-based condition indices. Growth varied among demographics and over time in response to landscape-scale environmental characteristics.

Major Professors: Dr. Anupma Prakash and Dr. Trent Sutton

Kray Fleming Van Kirk *

Ph.D. Fisheries

B.A., Linfield College (Oregon), 1987; B.S., Sheldon Jackson College (Alaska), 2001; M.S., University of Alaska Fairbanks, 2008.

Thesis: Multispecies Age-Structured Assessment Modeling as a Tool of Fisheries Management in the Gulf of Alaska

A multispecies age-structured assessment model for the Gulf of Alaska is developed to assess the effects of integrating predation mortality into stock assessment efforts. Trophic structure, predator functional response, model response to flawed data and assumptions, and multispecies biological reference points and harvest control rules are examined.

Major Professor: Dr. Terrance Quinn II

School of Natural Resources and Agricultural Sciences

Dr. Stephen D. Sparrow, Interim Dean

Peter Martin Anthony **

Ph.D. Natural Resources and Sustainability

B.A., St. Olaf College (Minnesota), 1999.

Thesis: Soil Fertility and Corn and Soybean Yield and Quality in a Six-Year Nitrogen and Phosphorus Fertilization Experiment

Within agricultural fields, soils differ in ability to supply nutrients to crops and crops vary in demand for nutrients. Our research quantified this variability in nutrient supply and crop demand, determining ways for farmers to apply supplemental nutrients in amounts that optimize yield while minimizing economic and environmental risk.

Major Professor: Dr. Stephen Sparrow

Carolyn K. Levings **

Ph.D. Botany: Interdisciplinary Program

B.F.A., Oklahoma State University - Stillwater, 2000; B.S., University of Oklahoma, 2004; M.S., Miami University (Ohio), 2006.

Thesis: Anatomical and Mechanical Characteristics of Woods Used to Manufacture Bassoons

Bassoon resonant and non-resonant woods were compared and found to be statistically different using anatomy and tapping. Two Alaska hardwoods were compared to the resonant and non-resonant woods and found to group with the non-resonant wood. Lists of resonant characters and resonant North American hardwoods (incomplete) were compiled.

Major Professor: Dr. Valerie Barber

Kimberley Anne Camille Maher

Ph.D. Forest Science: Interdisciplinary Program

B.S., Boston College (Massachusetts), 1998; M.S., University of Alaska Fairbanks, 2005.

Thesis: Birch, Berries, and the Boreal Forest: Activities and Impacts of Harvesting Non-Timber Forest Products in Interior Alaska

Non-timber forest products contribute to livelihoods and economies in Interior Alaska, but are poorly documented. This interdisciplinary dissertation uses survey, interview, and tree ring data to investigate harvest activities and impacts. Results show harvesting NTFPs is widespread; harvesters often seek intangible benefits; and climate change may impact NTFP availability.

Major Professor: Dr. Glenn Juday

Brian D. Young **

Ph.D. Natural Resources and Sustainability

B.S., Lewis and Clark College (Oregon), 1996; M.S., University of Alaska Fairbanks, 2009.

Thesis: Diversity in the Boreal Forest of Alaska: Distribution and Impacts on Ecosystem Services

Sustainable forest management requires a clear understanding of the biological diversity of forested ecosystems. In this dissertation, I examined forest diversity in terms of species richness, evenness, and structure using existing forest inventories within the boreal forest of Alaska in four distinct frameworks: Recruitment, Patterns, Predictions, and Production.

Major Professor: Dr. John Yarie