2017-2018 Graduate School Dissertation Year Fellows

Awardees, information, and abstracts

Erika Baril
Program/Dept: Education
Dissertation Chair/Advisor: Leslie Couse
Abstract: Part C of the Individuals with Disabilities Education Act provides early intervention (EI) services for children birth to 3 with delays and disabilities to help them reach their maximum potential. Communication impairment or delay is the most common reason for receiving EI. Coaching the caregiver versus child-focused therapy is the evidence-based, currently recommended intervention approach in EI. Coaching enhances caregivers' ability to facilitate their children's communication during everyday learning opportunities. Research indicates a significant gap between this recommended approach and actual practice. Anecdotal evidence suggests this gap exists in New Hampshire (NH). This study aims to (1) examine factors influencing EI providers' implementation of coaching caregivers of children with communication disabilities and (2) propose improvements for implementation in NH's Part C program. Better implementation of caregiver coaching practices in EI increases the likelihood of improving children's communication outcomes and development, and may reduce or eliminate the need for future interventions.

Daniel Charles
Program/Dept: Chemical Engineering
Dissertation Chair/Advisor: Xiaowei Teng
Abstract: Energy storage devices have become essential for daily life for their use in mobile electronics such as laptops, smart phones and electric vehicles. Furthermore, electrochemical energy storage devices are also vital for the adaptation of alternative energy sources, such as wind and solar energy, to the current electric grid. My research on aqueous electrochemical energy storage devices beyond lithium using vanadium oxides electrodes will provide insight into the charge-discharge mechanisms and possible pathways which may lead to the development of more environmentally friendly/sustainable energy storage devices with improved storage capacity, cycling life and safety, as well as reduced cost.

Matthew Cheney
Program/Dept: English
Dissertation Chair/Advisor: Robin Hackett
Abstract: My dissertation explores how three 20th century novelists negotiate important but incommensurable values: the value of the work of art for itself and the value of the work of art for socio-political purposes. For each writer, a moment of personal and political crisis (the rise of fascism in Europe, the advent of AIDS in New York, the end of apartheid in South Africa) brought these values into conflict, and each felt some need to meld fiction and nonfiction in a form Virginia Woolf called "the essay-novel". This is a new lens with which to study these particular writers, and it further adds to our understanding of fiction and nonfiction as genres, but ultimately I believe the significance of this project extends further, because the question the three writers wrestle with is one that haunts us all: How might my work speak in a world of crisis?

Amanda Daly
Program/Dept: Earth and Environmental Science
Dissertation Chair/Advisor: Stuart Grandy
Abstract: With a rapidly expanding global population and ever more devastating repercussions of pollution and climate change, we face the challenge of feeding humanity without degrading soils or the environment. One avenue is to improve our delivery of nutrients to crops, thereby reducing air and groundwater pollution, sustaining soil health, and supporting productive food systems. To manage nutrients effectively we must first understand the role of soil microbes, which are integral in provisioning nutrients like nitrogen to crop plants. We must also evaluate how these processes respond to the stresses of climate change including drought. My research seeks to determine the extent to which soil microbes provide plants with organic nitrogen in systems impacted by drought, and how plant roots and agricultural management can alter these dynamics. This work should enable us to design management strategies for sustainable food production systems to feed our growing population while preserving the environment.

Carla Evans
Program/Dept: Education
Dissertation Chair/Advisor: Todd DeMitchell
Abstract: New federal legislation allows states to apply to pilot innovative K-12 assessment and accountability systems. These systems can be designed so that they do not rely on annual state-level achievement tests to determine students' proficiency in English language arts (ELA) and math. Only New Hampshire's Performance Assessment of Competency Education (PACE) has been approved. The purpose of my dissertation is to investigate the effects of the first two years of the PACE pilot (2014-2016) on 8th grade student achievement outcomes in ELA and math. PACE students will be matched with demographically similar control students so that unbiased estimates of treatment effects can be modeled. Analyses will examine PACE vs. non-PACE student performance on the state achievement test overall, as well as higher- and lower-order thinking items. Findings may interest educators and policymakers that seek empirical analyses of student performance resulting from an innovative assessment and accountability system.

Hamidreza Anajafi Marzijarani
Program/Dept: Civil Engineering
Dissertation Chair/Advisor: Raymond Cook
Abstract: This study suggests solutions to improve seismic design and performance of nonstructural components (NSCs) in buildings (e.g., ceilings, partition walls, mechanical and electrical equipment, computer servers, elevators) in order to (i) minimize the potential for injuries caused by detachment of NSCs during earthquakes, and (ii) increase the likelihood that a building remains functional after an earthquake. Increasing life-safety is a basic performance objective in earthquake engineering while maintaining the functionality is of paramount importance particularly for essential facilities (e.g., hospitals). As an added benefit, improving seismic design and performance of NSCs would also result in the reduction of dollar-losses associated with earthquake-induced damages. The specific goals of this research will help achieve the aforementioned objectives by proposing improved design code equations for NSCs as well as a novel partial-floor-isolation system to decrease the earthquake input energy to a building, and hence, better protect NSCs and the building itself.

Cameron Mcintire
Program/Dept: Environmental Studies
Dissertation Chair/Advisor: Heidi Asbjornsen
Abstract: Dissertation title: Impacts and management of foliar pathogens on eastern white pine in the northeastern United States. This research addresses an emerging forest disease impacting eastern white pine in the New England region. Since 2009 a suite of fungal pathogens has caused needle defoliation in pine stands, resulting in a significant loss of foliage throughout the summer months and tree death in extreme cases. These defoliations have direct and indirect cascading effects on tree growth, hydraulic function, nutrient dynamics, and ecosystem processes. The purpose of my dissertation work is to quantify the impacts of this new disease outbreak on tree health and to test hypotheses regarding pathways of tree mortality. Finally, an applied chapter of this research will test silvicultural prescriptions for mitigating the negative impacts of this disease, with the ultimate goal of developing management recommendations for foresters and private land owners in the region.

Justine Oliva
Program/Dept: History
Dissertation Chair/Advisor: Jessica Lepler
Abstract: As the common phrase "it's not what you know, but who you know" indicates, friendship informs power in contemporary society. Using the life and works of the salonnière and author Anne C. L. Botta (1815-1891), my dissertation shows that, like today, friendship stood central to nineteenth-century power structures. Botta's New York City salon, which ran intermittently between 1845 and 1891, attracted many of the most renowned authors, artists, politicians, and businessmen of the day. Presenting networking opportunities to its guests and fostering a sense of group identity among them, Botta's salon doubled as an informal gathering of friends and a codifying community of professional elites. Collapsing perceived boundaries between public and private life, my dissertation will shed light on the development of the modern United States by revealing the extent to which its political, economic, and ideological foundations were rooted in, and dependent on, female-directed social networks.

Mirkat Oshone
Program/Dept: Civil Engineering
Dissertation Chair/Advisor: Jo S. Daniel
Abstract: Most people have experienced road disruptions and uncomfortable rides arising from cracks on asphalt pavements during travel. Premature failure of pavements should be avoided as it lowers ride quality, elevates the chance of road accidents, and impels agencies to spend a considerable amount of taxpayers' money on pavement maintenance and rehabilitation. My research is intended to develop more effective and efficient material specification (selection and proportioning) and pavement design approaches that ensure high performing pavements. The study aims to identify and recommend an index parameter or performance prediction model with the highest capability to predict whether or not a pavement will crack. The increased accuracy in the design and prediction methods realized from this study will enable owner state agencies to avoid failure for a given period of time based on accurately predicted pavement lives, saving billions of taxpayers' dollars per year

Nathaniel Stafford
Program/Dept: Psychology
Dissertation Chair/Advisor: Robert Druggan
Abstract: For millions of Americans, experiencing severe psychological stress results in debilitating depression, and yet many are nonresponsive to first-line antidepressant treatment. In response, clinicians have shifted their focus from reactive drug therapy (i.e., antidepressants) to promoting stress-protective factors. These stress-protective, or resilience, factors can be a product of learned coping responses, healthy lifestyle choices, or an innate resilience not attributable to specific experiences. However, the existing preclinical models examining the neurobiology of stress resilience do not assess innate resilience. Rather, the current models identify resilience after the subject has been manipulated (e.g., learn a coping response), which may mask factors associated with true innate resilience. The purpose of this dissertation is to establish a non-invasive, proactive model that predicts innate stress resilience, which will open routes for novel therapeutic approaches that proactively prevent the development of depressive symptoms.

Kara Anne Rodenhizer-Stampfli
Program/Dept: Psychology
Dissertation Chair/Advisor: Katie Edwards
Abstract: Adolescents are exposed to 10.5 hours of media a day (Rideout, Foehr, & Roberts, 2010) making exposure to sexually explicit (SEM) and sexually violent media (SVM) inevitable. For some, exposure to SEM/SVM is associated with adverse outcomes specific to dating violence (DV) and sexual violence (SV) attitudes (e.g., acceptance of DV/SV) and behaviors (e.g., victimization and perpetration). Moreover, research has disproportionately focused on how SEM/SVM relate to DV/SV without examining factors that may buffer against the negative impacts of exposure. One such factor is media literacy, which research has documented is effective in reducing health-risk behaviors, including risky sexual behaviors and peer aggression (Jeong, Cho & Hwang, 2012). The aim of the current study is to examine how media literacy may moderate the impact of exposure to SEM/SVM on DV/SV attitudes and behaviors using a rigorous methodological design (i.e., prospective, large sample of adolescents across 13 schools).

Ryan Stephens
Program/Dept: Environmental Studies
Dissertation Chair/Advisor: Rebecca Rowe
Abstract: New England forests are facing increasing pressure from climate change, invasive species, and timber harvest. Managing for forest health in the face of these disturbances requires a better understanding of the interactions among species. My research examines how the linkages among small mammals, truffles, and trees may influence ecosystem resilience. In New England forests, the diet of small mammals consists largely of truffles, the underground fruiting bodies of mycorrhizal fungi. Mycorrhizal fungi supply nutrients to trees which are necessary for their establishment and growth. Because these fungi rely on animals for dispersal, small mammals play a critical role in promoting forest health. My project explores how changes in the types and abundance of small mammals influence mycorrhizal dispersal and provides new insight into truffle diversity in New England. This research answers fundamental questions in ecology about how animals contribute to ecosystem health and has applied relevance for sustainable forest management.

Elizabeth Sheckler
Program/Dept: English
Dissertation Chair/Advisor: James Krasner
Abstract: In the most recent election, there was a quiet revolution amidst the bombast and glitz. While disagreeing on almost everything, remarkably, both candidates agreed that women disproportionately provided uncompensated care for children and the sick. Both thereby promised quality childcare; but the argument itself interests me most. That both candidates publicly recognized the shadowy presence of caregiving labor and its immense toll on millions of citizens is unprecedented. With our aging population and increasing nursing shortages, our understanding and revaluing of caregiving as essential to social functionality becomes increasingly urgent. In my dissertation, "No Lack of Beds: Spaces of Care in the Victorian Novel," I explore the history of caregiving, and its relationship to gender, through literature. My project explores how female caregivers used spaces, like the home and the hospital, to consolidate authority, and how their efforts were thwarted, shaping the medical system we know today.

Guangxing Yang
Program/Dept: Chemical Engineering
Dissertation Chair/Advisor: Xiowei Teng
Abstract: Energy production through the combustion of the fossil fuel results in greenhouse effect, air pollution, and energy crisis. Therefore, fuel cell as an alternative energy device has become attractive for its various advantages such as higher thermodynamic efficiency, generation of less pollutants, and using a variety fuels beyond fossil fuels. Direct Ethanol Fuel Cell (DEFC) is a promising device converting ethanol to electricity at the anode by the ethanol oxidation reaction (EOR). Ethanol is safe, environmental-friendly fuel, and it delivers high volumetric energy density compared with hydrogen and methanol. Conversion of ethanol into electricity requires the usage of catalysts to enhance the reaction rate of EOR. However, the lack of effective catalysts for EOR is the major bottle-neck for the development of DEFC. The objective of my PhD research is to develop new type of Pt-based catalyst for the EOR, and thus contribute to the implementation of DEFC technology.

Miroslav Zecevic
Program/Dept: Mechanical Engineering
Dissertation Chair/Advisor: Marko Knezevic
Abstract: Physics-based framework incorporating microstructure evolution for predicting behavior of advanced metallic materials during their thermo-mechanical processing Most of today's products either poses metallic parts and/or were manufactured by machines consisting of metallic components. Each one of these metallic parts is produced by a specific sequence of heating and shaping operations. Considering the amount of metallic components in modern technology even an incremental improvement in the manufacturing process of metallic components could result in a large saving of time, material, and energy. The successful completion of the proposed research will provide a practical simulation tool that can accurately predict microstructure evolution and mechanical response of metals during manufacturing. The developed model will serve as an enabling technology for advanced development of manufacturing processes, for controlling mechanical behavior of metals via tailoring microstructural features, and for subsequent component performance testing while saving countless person-hours and money spent on experimental research.