From the President

A college education is an appreciating asset, like a wise investment that earns compounding interest over decades. That is because the knowledge, skills, and learning capabilities that students develop in college gain value as their careers progress and their responsibilities grow more complex. But if we simply give students access to great faculty, seminars, and curricula, stellar professional futures are not ensured.

That is because Millennials are looking for more from their college experience. Ambitious young people are interested in learning by doing, by challenging the norm, and by customizing their educational program with their own unique interests and goals, so that they can thrive by adapting and adjusting to the dizzying pace of change.

A rigorous education empowers our students to ask smart questions, adapt to challenges, draw upon multiple types of knowledge, distinguish between good and bad information, and learn fast and independently—and those skills are desperately needed in the current world of work and in battle.

Undergraduate research engages students fully in content and method, developing an integrated understanding of the complexity and context of any subject. Across the U.S., college students are conducting original research alongside faculty mentors—pursuing new knowledge vital to our society. Undergraduate research in the sciences, humanities, social sciences and arts—is one of the best ways to hone critical thinking, leadership and communication skills.

As a small university, Norwich is uniquely positioned to champion undergraduate research and scholarship. When we invest our time and resources to incorporate inquiry and research across the curriculum our students benefit intellectually, personally and professionally. Students learn to synthesize large amounts of information, pose important questions, envision research design, generate and analyze data and communicate their findings, to their peers on campus and on occasion at national conferences. Students gain self-confidence, independence of thought and action, perseverance in the face of adversity and often team collaboration.

Faculty gain fresh perspectives on their own work and a broader degree of insight as students probe original research questions and designs. Professors’ lectures and programs shift as they, too, wrestle with an open-ended scientific problem or data set that presents outside of the spectrum. Mentoring students to apply their theoretical knowledge and technical skills in new, often innovative, ways is not only rewarding for faculty but transformative for students.

Please join me in acknowledging the efforts of our student researchers and faculty advisors. Challenging the status quo is yesterday’s business. Great leaders are driven by the need to do something better to enrich their own lives and to better our world.
From the Provost and Dean of the Faculty

The first phase of any young scholar’s career often begins in close relationship with a faculty mentor and champion who encourages one to look closely, think creatively, ask questions – and then to do it all again. It is with sincere appreciation of the hard work of both our undergraduate scholars and their faculty mentors that I congratulate all of you on your scholarly and research achievements this year.

Creating knowledge and then putting that knowledge to work for the betterment of our shared communities is at the heart of Norwich University’s mission. As an institution that values faculty as teacher-scholars, it is natural for us to extend that ethos and tradition to our students in order to prepare them for lifelong learning and engaged, productive citizenship. This is why we support and encourage faculty to create opportunities for student research through our dynamic Undergraduate Research Program.

As I reflect upon the University’s bicentennial, I am struck by the enduring nature of Captain Alden Partridge’s conviction that experiential learning and service are imperative to good leadership. Each day, our faculty and students live out this founding principle, working diligently to cultivate the skills of communication, collaboration, innovation, perseverance, and resilience. Each day, we invest in each other to be of better service to the nation and to the world.

I would like to dedicate this week to the diverse successes and accomplishments of our students, the next generation of scholar-leaders. Thank you for your commitment to the good work on display this week, and thank you for your willingness to go beyond your curricular studies in order to fully embrace the opportunities available to you at Norwich. Your efforts empower a campus culture of curiosity, active thinking, and show the best of what Norwich can do.

Congratulations!

Sandra G. Affenito, PhD
Provost and Dean of the Faculty

From the Undergraduate Research Program Director

Welcome to the 17th Annual Norwich University Student Scholarship Celebration!

Since my arrival at Norwich in 2011, I have taken part in this event in different capacities. As a member of the Undergraduate Research Committee, I reviewed abstracts, moderated panels, and helped anxious student-scholars pin up their posters before the guests arrived. As a faculty mentor, I watched my students take ownership of their projects and respond to questions from the audience with the enthusiasm and confidence of seasoned scholars. Now, in my role as the Undergraduate Research Program Director, I have the opportunity to create spaces for the Norwich community to come together to engage in the big ideas that our rising scholars have been exploring over the course of the year in this culminating event.

This week we celebrate the pursuit of original research ideas at Norwich through oral presentations, multi-media projects, and posters from over 100 undergraduates. In order to conduct their research, many of these scholars traveled outside of their classrooms to archives, historical sites, and remote field locations. When I talk with these students about their research experiences, they often use the word “transformative” to describe them. The projects on our program speak to the transformative potential of the undergraduate research experience that is at the heart of the program’s mission. Our student-scholars are ambitious, creative, and innovative people with fresh perspectives and a contagious curiosity that drives them to ask questions and take risks to discover something new. I guarantee that you will be as inspired by the work they have produced as I am.

Thank you for taking part in the celebration and supporting undergraduate research at Norwich. I hope you enjoy this year’s event!

Amy Woodbury Tease, PhD
Undergraduate Research Program Director
2019 UNDERGRADUATE RESEARCH FELLOWSHIP RECIPIENTS

Weintz Research Scholars

The Weintz Research Scholars Program was established by Norwich University Trustee Fred Weintz Jr. ’47 and his wife, Betsy, to support the independent research endeavors of our highly promising undergraduate student-scholars. Weintz Scholars are selected based on the quality of their research proposals and their academic achievements.

Emran Babak (Dr. Travis Morris)
Analyzing the Taliban’s Official Website, Al-Emarah

Emma Bunker (Dr. Joe Latulippe)
Understanding the effects of Alzheimer’s disease associated Amyloid beta on PLC

Danielle Dalton (Dr. Darlene Olsen)
Understanding the factors relating to physical activity of college students: A meta-analysis

Kathryn Farnum (Dr. Allison Neal)
Temporal variation in trematode infections related to snail host longevity

Raymond Kavombwe (Dr. Joe Latulippe)
An Intersection of Math and Medicine: Modeling Depression Kinetics

Research Fellows

Emmanuel Adu (John Puleio)
Investigating factors that affect performance and quality in basic or elementary schools in Berekum, Ghana

Alex Arvizo (Dr. Rowly Brucken)
Sweeping Dirt Under the Matador’s Cape: The Impact of the Amnesty law of 1977 in uniting or dividing Spain and the impact on the general public in the immediate five years

Thaddeus Booth Trudo (Dr. Steven Soderbergen)
Norwich University’s Forgotten Civil War Alumni

Mallory Dutil (Dr. Tara Kulkarni)
Water Scarcity: An Insecurity Catalyst

Tyler Elliott (Dr. Tara Kulkarni)
Plastic Waste to Plastic Roads

Shawnae Evans (Dr. Thomas Shell)
The attachment of dopamine to Vitamin B12 to deliver a target drug to the brain in order to potentially improve treatment of Parkinson Disease symptoms

Angela Moore (Dr. Jeremy Hansen)
Determining a Tight Upper Bound on the Complexity of Finding Partial Collisions in Cryptographic Hash Algorithms

Nirmal Tamang (Dr. Tara Kulkarni and Dr. Moses Tefe)
Electric Public Transportation: A Pathway to clean air and better health in Kathmandu, Nepal

2018-2019 UNDERGRADUATE RESEARCH TRAVEL GRANT RECIPIENTS

Travel Grants provide funding to students to present completed research projects at conferences, workshops, seminars, and professional meetings.

Alex Arvizo
Christopher Barrathorn
D’Shealyn Bullock
Anissa Garney
Taylor Garych
Jason Guth
Hailee Holt
Sarah Ingraham
Thomas Lesourd
Dylan O’Brien
Nyla Lennon
Jacob Markwood
Sarah McLean
Isabelle Moss
Shayla Maya
Emily Oliver
Heather Peterson
Daisy Ramirez
James Reed
Fredrick Sherence
Colter Sheveland
Christopher Schweick
Daniela Tupy
Zoraya Webster
Warren Yacawych
Dillon Zites

Honors Program Medallion Recipients

Kathryn Albretsen (Biology)
DEBLI: Signaling Intersectome Investigation
Mentor: Dr. Karen Hinkle

Carissa DeKalb (Mechanical Engineering)
Swinging Fastest Mechanism for Wheelchair
Mentor: Dr. Darner Friend

Matthew Hilton (Political Science)
Presidential Responses to School Shootings
Mentor: Dr. Jason Jagemann

Torri Hixon (International Business)
What makes a brewery successful in Vermont?
Mentor: Dr. Kahwa Douguish

Garret Louth (History and Studies in War and Peace)
From the Sins of Our Fathers: British Influence on Israeli Countersurgency
Mentor: Dr. Steven Soderbergen

Benjamin Pulinaskas (Chemistry)
A Review of the Biochemical Effects of Seleneostrene and Current Selenium Intake Guidelines
Mentor: Dr. Seth Frisbie and Dr. Ethan Guth

Anyamanee Saksri (Biochemistry)
The Development of Micrnsatellite Primers for Trematodes
Mentor: Dr. Allison Neal

Spencer Duhamel (English)
Rhetorics of Rural Resistance: The Fight for Community and Sustainability in Central Vermont
Mentor: Dr. Dalyn Luedtke
2018-2019 Apprentice Grant Recipients

These competitive grants provide undergraduates with high-impact learning experiences and give faculty support for specific research projects and curriculum development initiatives. The goals of the apprenticeship are to increase faculty productivity and to introduce students to professional life while developing their communication, analytical, writing, and research skills. Apprentice Grants are part of the Provost Chase Scholarship Initiatives, and are awarded for a single semester, an academic year, or summer.

Summer 2018

Sean Prentiss and Josie Gibb (English)
Advanced Creative Nonfiction: A Writer’s Guide and Anthology

Jeremy Hansen and Isabelle Moss (Computer Science)
Teaching Programming to Refugees

2018-19 Academic Year

Nadia Al-Aubaidy and Andrew Roberge (Construction Management)
Integrating Green BIM with Life Cycle Cost Analysis of Green Building

Matthew Lutz and Duncan Regnery (Architecture + Art)
Rethinking the Dumb Box: Evaluation of High Performance Upgrades and Renewable Energy Integration for Pre-engineered Metal Buildings

Simon Pearish, KC Herne and James McKenna (Biology)
WTR Enhanced Aggregate: An Experimental Media for Stormwater Treatment

Fall 2018

Eleanor D’Aponte and Edmond Biruta (Architecture + Art)
“The Tapestry of Concrete”: Design research for, and casting of concrete panels, using the technique of fabric-formwork

Spring 2019

Wendy Cox and Sheldon Rogers (Architecture + Art)
Integrating the Virtual: Setting up background research and protocols for integrating virtual reality into the curriculum at the School of Architecture + Art plus providing opportunities for disciplines campus wide

Prof. Eleanor D’Aponte, Edmond Biruta and Jordan Kakur (Architecture + Art)
“The Tapestry of Concrete”: Design research for, and casting of concrete panels, using the technique of fabric-formwork

Elizabeth Gurian and Rebecca Finley (Criminal Justice)
Serial and Mass Murder: Understanding Multicide Through Theoretical Explanations, Offending Patterns, and Outcomes

Karen Hinkle and Warren Yacawych (Biology)
Molecular Signals Involved in Early Stages of Vertebrate Brain Development: Exploring the Interaction Between CRK/CRKL and SH2 Family Members

Robert Knapik and John Rotter (Physics)
On the Connection Between Late Pulsing and Double Pulsing in Large Area Photomultiplier Tubes

Tara Kulkarni and Camryn Anderson (Civil & Environmental Engineering)
Connecting green stormwater infrastructure with energy resilience and health outcomes in resilient cities

Tara Kulkarni and Lily Marszalkowski (Civil & Environmental Engineering)
Service-learning in Environmental Engineering

Darlene Olsen and Callie Pokorski (Mathematics)
A Comprehensive Assessment of the Statistical Methods used to Analyze Time Course RNA sequencing Data

Thomas Shell and Gracie Dominguez (Chemistry)
Tissue Penetrating Photopharmaceuticals to Improve the Treatment of Cancer

David Westerman and Caitlin Heale (Earth & Environmental Science)
Temporal Constraints on the Conditions of Silurian Extension in the Northern Appalachians

Summer 2018

Karen Hinkle and Warren Yacawych (Biology)
Molecular Signals Involved in Early Stages of Vertebrate Brain Development: Exploring the Interaction Between CRK/CRKL and SH2 Family Members

Wendy Cox and Sheldon Rogers (Architecture + Art)
Integrating the Virtual: Setting up background research and protocols for integrating virtual reality into the curriculum at the School of Architecture + Art plus providing opportunities for disciplines campus wide

Prof. Eleanor D’Aponte, Edmond Biruta and Jordan Kakur (Architecture + Art)
“The Tapestry of Concrete”: Design research for, and casting of concrete panels, using the technique of fabric-formwork

Elizabeth Gurian and Rebecca Finley (Criminal Justice)
Serial and Mass Murder: Understanding Multicide Through Theoretical Explanations, Offending Patterns, and Outcomes

Karen Hinkle and Warren Yacawych (Biology)
Molecular Signals Involved in Early Stages of Vertebrate Brain Development: Exploring the Interaction Between CRK/CRKL and SH2 Family Members

2018-2019 Vermont Genetics Network Funded Undergraduate Research

The Vermont Genetics Network (VGN) supports student and faculty research and is funded by the National Institute of General Medical Sciences (NIGMS), and is part of a National Institutes of Health (NIH) initiative called IDEA Networks of Biomedical Research Excellence (INBRE) to build biomedical research infrastructure at Baccalaureate Partner Institutions (BPIs) including Norwich University.

Molly Alfond (Dr. Joe Latulippe)
“Quantifying the Effects of a Slow Accumulation of Aβ on Calcium Signaling Through the Ryabonoid Receptor”

Emma Bunker (Dr. Joe Latulippe)
“A Mathematical Model for the Impact of Aβ on IP3 Production Process”

Mallory Dutli (Dr. Thomas Shell)
“Photopharmaceutical Therapy Utilizing Vitamin B12 as a Molecular Scaffold”

Lauren Kenneally (B. Shiner and B. Watts)
“Healthcare processes contributing to suicide risk during and after residential substance abuse treatment”

Colter Sheveland (Dr. Thomas Shell)
“Control of Tyrosine Kinase Inhibiting Drugs Using Long-wavelength Light”

Tom Wagner (Dr. Joe Latulippe)
“Quantifying the Effect of Aβ on Calcium Regulation in a Whole Cell Model of a Neuron”

Warren Yacawych (B. Chandler, A. Schmoker, J. Weinhardt, C. Kearns, K. Hinkle, A. Ebert, B. Ballif)
“Active Aβ Induces SH-Family Proteins Binding to the CRKL-SH2 via YxxP Motif”

Dillon Zites (Dr. Thomas Shell)
“Light Medicated Cancer Treatment Utilizing Cândalanan Derivative”

Molly Alfond (Dr. Joe Latulippe)
“Quantifying the Effects of a Slow Accumulation of Aβ on Calcium Signaling Through the Ryabonoid Receptor”

Emma Bunker (Dr. Joe Latulippe)
“A Mathematical Model for the Impact of Aβ on IP3 Production Process”

Mallory Dutli (Dr. Thomas Shell)
“Photopharmaceutical Therapy Utilizing Vitamin B12 as a Molecular Scaffold”

Lauren Kenneally (B. Shiner and B. Watts)
“Healthcare processes contributing to suicide risk during and after residential substance abuse treatment”

Colter Sheveland (Dr. Thomas Shell)
“Control of Tyrosine Kinase Inhibiting Drugs Using Long-wavelength Light”

Tom Wagner (Dr. Joe Latulippe)
“Quantifying the Effect of Aβ on Calcium Regulation in a Whole Cell Model of a Neuron”

Warren Yacawych (B. Chandler, A. Schmoker, J. Weinhardt, C. Kearns, K. Hinkle, A. Ebert, B. Ballif)
“Active Aβ Induces SH-Family Proteins Binding to the CRKL-SH2 via YxxP Motif”

Dillon Zites (Dr. Thomas Shell)
“Light Medicated Cancer Treatment Utilizing Cândalanan Derivative”

Molly Alfond (Dr. Joe Latulippe)
“Quantifying the Effects of a Slow Accumulation of Aβ on Calcium Signaling Through the Ryabonoid Receptor”

Emma Bunker (Dr. Joe Latulippe)
“A Mathematical Model for the Impact of Aβ on IP3 Production Process”

Mallory Dutli (Dr. Thomas Shell)
“Photopharmaceutical Therapy Utilizing Vitamin B12 as a Molecular Scaffold”

Lauren Kenneally (B. Shiner and B. Watts)
“Healthcare processes contributing to suicide risk during and after residential substance abuse treatment”

Colter Sheveland (Dr. Thomas Shell)
“Control of Tyrosine Kinase Inhibiting Drugs Using Long-wavelength Light”

Tom Wagner (Dr. Joe Latulippe)
“Quantifying the Effect of Aβ on Calcium Regulation in a Whole Cell Model of a Neuron”

Warren Yacawych (B. Chandler, A. Schmoker, J. Weinhardt, C. Kearns, K. Hinkle, A. Ebert, B. Ballif)
“Active Aβ Induces SH-Family Proteins Binding to the CRKL-SH2 via YxxP Motif”

Dillon Zites (Dr. Thomas Shell)
“Light Medicated Cancer Treatment Utilizing Cândalanan Derivative”
Tuesday, April 30th
Oral Presentations
Todd Multipurpose Room, Kreitzberg Library
9:30-10:00 a.m.
Chance Shiwa (Dr. Stephanie Maas)
Assessing Police Data for Possible Racial Bias
10:00-10:30 a.m.
Nicholas Fogerty (Dr. Stephanie Maas)
Recovery Programs for Substance Abuse on College Campuses
10:30-11:00 a.m.
Warren Yacawych (Dr. Megan Doczi)
The Maternal Environment, Hypothalamic Development, and the Insulin Receptor: Cracking the code to the 21st Century Obesity Crisis
11:00-11:30 a.m.
KC Herne and James McKenna (Dr. Simon Pearish)
WTR Enhanced Aggregate, An Experimental Media for Stormwater Treatment
11:30 a.m.-12:00 p.m.
Warren Yacawych (Dr. Karen Hinkle)
From Neural Tube to Cortex: The Molecular Signals Organizing the Embryonic Brain
12:00-12:30 p.m.
Garrett Chapel (Dr. Stephanie Maas)
Safe work zones: Base rate of cars and trucks
12:30-1:00 p.m.
Jon Cullen, Brenden Apolinario, Victoria Hastings, Cameron Reed, Kyle Walter (Dr. Lynne Krieman)
Improving Access to Telemedicine Mental Health for Rural Veterans with Posttraumatic Stress Disorder

Wednesday, May 1st
NR441: Nursing Capstone Presentations
South Instruction Room, Kreitzberg Library
9:00-11:00 a.m.
Undergraduates in the Nursing Capstone course will present their research projects, which reflect integration of all aspects of their curriculum. This is a drop-in event, so please come at any time during the two-hour block to talk with these undergraduates in the School of Nursing about their projects.

Liesel Baker, Effectiveness of ABCDEF Bundles on the Prevention of Post ICU Syndrome
Cameron Beevy, Nursing Shifts Effects on Nurse Fatigue and Patient Outcomes
Amy Blake, Reducing Weight Bias to Improve Quality of Care in the Healthcare Setting
Danielle Boucher, Use of HEART Score in Patients with Acute Coronary Syndrome
Emma Bremner, Evaluating Best Practices for External Fixation Devices to Reduce Surgical Site Infections
Holly Brown, Music as a Adjunct to Pharmacological Therapies and Its Efficacy in the Treatment of Cancer-Related Pain
Maggie Conroy, Alcohol use prevention methods in adolescents Michaela Carley, The Role of the Advanced Practice Nurse in Improving Trauma Quality Metrics
Febchukwu Eze, Improving Nursing Actions on Patients with Hemorrhages and TBI in the NICU
Rachael Holt-Gosselin, Pain Management in the Postoperative Opioid-Dependent Patient
Katelynn Irish, Structured Living for Homeless Mental Health Patients
Rachel Johnson, The Evaluation of Non-Pharmacological Interventions to Promote Nicotine Cessation in Pregnant Women
Abigail Jumper, Effect of Cultural Competency on Elder Abuse
Lauren Kenneally, Veterans and Inpatient Suicide Screening
Courtney Lewis, The Influence of Electronic Nicotine Device Systems on Smoking Cessation and Reduction
Faith Lloyd, The Effectiveness of a Plant-Based Diet on Type 2 Diabetes Mellitus
Farid Nawabi, Reducing Alarm Fatigue Amongst Cardiac Nurses
Rhiannon Page, Literature Review on Outcomes of Marijuana Use During Pregnancy
Erin Proctor, Alternative Evaluation Tools to Improve Pain Outcomes in Patients with Chronic Pain Compared to the Numeric Scale
Kaylee Relation, Incredibility and Horizontal Violence in the Nursing Profession and Cognitive Rehearsal as an Intervention
Morgan Sayers, Non-pharmacological Methods in the Management of Neonatal Abstinence Syndrome
Andrea Scalisi, Nurse Support of ExclusiveBreastfeeding After Neomate Discharge from NICU
Samantha Smith, Compassion Fatigue in Oncology Nurses
Kristine Stecker, Implementation of Non-pharmacologic Delirium Prevention Protocols in Critical Care

Oral Presentations
Todd Multipurpose Room, Kreitzberg Library
9:30-10:00 a.m.
Nicholas Osborne (Dr. Stephanie Maas)
Post Overdose Follow up procedures
10:00-10:30 a.m.
Rachel Kelly (Dr. Stephanie Maas)
Systematic Review of Risk and Need Assessment Instruments

Mechanical Engineering Capstone Design
Oral Presentations
Milano Ballroom
1:00-3:30 p.m.
Alfred Freed, Caryn Ojemann, Brendan Watson, Cody Moore (Dr. Danner Friend)
Improving Nursing Actions on Patients with Veterans and Inpatient Suicide Screening

Jacob Erickson, Nick Skinner, Arran Chivell, Shane Hutchins (Dr. Brian Budke)
Inflatable Solar Array for Martian Transit: ISA-MAT

Thursday, May 2nd
Oral Presentations
Todd Multipurpose Room, Kreitzberg Library
9:30-10:00 a.m.
Kyle Lunde (Dr. Stephanie Maas)
Substance Abuse Recovery Programs on College Campuses
10:00-10:30 a.m.
Andrew Jumper (Dr. Stephanie Maas)
Vermont State Police Traffic Data Analysis
10:30-11:00 a.m.
Brittany Rhodes (Dr. Stephanie Maas)
Recidivism Prevention Program Evaluation
11:00-11:30 a.m.
Dillon Zites (Dr. Thomas Shell)
Light Mediated Cancer Treatment Utilizing Cobalamin Derivatives
11:30 a.m.-12:00 p.m.
Kimberly Evans (Dr. Stephanie Maas)
Recovery Programs for Substance Abuse on College Campuses
12:00-12:30 p.m.
Evan Bowley (Dr. Stephanie Maas)
Combating the Illicit Use of Cryptocurrencies in Transnational Trade
12:30-1:00 p.m.
Conor Griffin and Lidanis Quinones (Dr. Stephanie Maas)
Alcohol abuse on college campuses

Please join us for the 17th Annual Poster Session and Awards Ceremony, where we honor our 2019 Weintra Scholars, Summer Research Fellowship recipients, Honors Program Medallion recipients, Friends of the Kreitzberg Library Award recipients, Apprentice Grant recipients, and Travel Grant recipients and celebrate the accomplishments of our thriving undergraduate research community!
An Experimental Research Study using EEG to Monitor Language Comprehension Networks in the Brain
Angelina Coronado (Dr. Mark Stefani)

Current models of language processing suggest the temporal lobe of the brain as the site for word comprehension, and the frontal lobe as the site for language and speech production. However, new research proposes that this model is too simple; there appears to be a larger role for the frontal lobe in language comprehension. This project seeks to define the role of the frontal lobe in language comprehension using the technique of electroencephalography (EEG). EEG is a way to measure electrical activity on the surface of the brain, for this experiment, it will be monitored for differences associated with initial word comprehension and learning. During the phases of the experiment, participants will be asked to make judgements on the meaning of certain words in sentences. We predict that learning a word between the experiment phases will be primarily associated with changes in electrical activity at the frontal midline electrode (Fz and Fpz). This research will contribute to the further defining of frontal lobe functions in language comprehension, as well as a base for future studies that handle word comprehension in left handed people who have language areas in different parts of the brain.

Challenges of Achieving Highest Green Standards for Vermont Homeowners and Investors
Jillian Fortunati (Dr. Nadia Al-Aubidy)

Green buildings are designed and built to let in more natural light, save electricity, have better air quality, consume less materials as well as less water and make more efficient uses of the land during both the construction and operation phases. Green buildings have become a goal that the construction industry aims at achieving especially with the rapidly growing population and demand for resources. Thus, this research is evolved to study and identify the challenges that prevent the Vermont homeowners and prospective homeowners from reaching the highest standards of green buildings, in the residential sector.

Perceived Barriers to Concussion Reporting within a Senior Military College
Anissa Garney (Dr. Gregory Janczaitis)
Wein Rice Research Scholar

The purpose of this qualitative study was to explore the current perception of concussions and potential barriers to concussion reporting at Norwich University, a senior military college. Within recent years, there has been a greater importance placed upon concussion research, with the greatest emphasis placed on the perceptions and opinions of coaches, athletics staffs (including athletic trainers), and high school athletes. Within the military, head injuries are also an ever-present concern; however, perceptions of concussion in military personnel have not been investigated. The Reserve Officers’ Training Corps (ROTC) falls into an odd space within all of this. Some ROTC cadets are involved in athletics, but many are not, leaving them with potential fears of reporting their concussion. Empirically, there are many misconceptions on campus involving what could happen if a concussion is reported, and directly identifying student’s largest concerns could assist in creating more effective concussion education. By conducting one-on-one interviews with ROTC cadets, themes within concussion reporting were identified that could potentially improve education. By developing a foundation of understanding for ROTC cadet’s perceptions, improved education could potentially lead to an increase in reporting, and thus improve patient care.

Quantitative Meta-Analysis of Blueberry Supplementation on Neuronal Aging in Aged Rats
Elizabeth Gregory (Dr. Matthew Thomas)
Wein Rice Research Scholar

Many studies have found that there is a link between cognitive performance and the supplementation of blueberries in the diet of aged populations, both human and animal. This project examined the overall effect of blueberry and blueberry products on neuronal aging across multiple studies conducted on aged rats. Age-related declines in memory are associated with the accumulation of Reactive Oxygen Species (ROS) in various parts of the brain, specifically the hippocampus. The same chemical compound that gives blueberries its’ unique, rich color also acts as an antioxidant. By definition, antioxidants are not easily reactive to the oxygen species making them the body’s first line of defense in the dispersal and prevention of further accumulation of ROS in the brain. Unlike other fruits, blueberries contain certain sugars that allow its antioxidants to cross the blood-brain barrier specifically at the hippocampus, thus their ability to affect memory performance. Each study was selected based on their subject demographics (rats, aged 19 months or older) and supplementation type (blueberry supplementation). All articles were open-access peer-reviewed studies. Statistics were calculated using IBM SPSS software. In comparing the results of the cognitive tests, there was a strong correlation [pearson’s r= .551] between supplementation amount and diet length. This supports the “threshold hypothesis” (Malin et al. 2011) that suggests there is a certain concentration of antioxidants that needs to be met in order to maintain and inhibit memory impairment. Although not relatively weak, there was also a correlation between diet length and results on various memory tests (r=2.65). Overall, it was found that blueberry supplementation has diverse effects on aged related declines in memory and neuronal aging in aged rats.

Moscow Metro: An Underground Monument
Michael Menn (Prof. Daniel Sagan)

Not everyone knows that a metro system can be beautiful. In the United States of America, most of the metro stations are dirty, expensive, and not colorful and they do not catch your eye when you are in there. Moscow Metro is the opposite. Moscow Metro has a long history and it still然有 a dream of an underground palace for the people. Moscow government wanted to build it not only for the poor people, but also for the rich. The architecture of every station is different even though it has engineering similarities. Because every station is different and unique, people usually spend almost 20 minutes wandering around the station, looking at all of the architecture and art aspects of the station. Of course, there was a period in history in which the stations would be minimalistic and not have anything beautiful, but that period ended in 2005 when Moscow’s main architect Sergey Kuznetsov signed off on the metro stations. They have a new modern look and they still have the rich architecture and art aspect in them.

Creating a Formula for the Star Chromatic Index of Complete Graphs
Angela Moore (Dr. Addie Armstrong)

In mathematics, we use graphs to represent relationships between different objects, including animals in biological models or computers in computer networks and more. One mathematical property of a graph is edge colorings, which are the assignment of colors to the edges in such a way that two adjacent edges cannot be the same color. In my research, I studied the star chromatic index of complete graphs. The star chromatic index is the minimum number of colors needed to color a proper edge coloring of a graph so that no two consecutive edges can be colored with only two colors. The goal of this research was to create a formula that will represent the star chromatic indices of complete graphs, i.e. graphs where each pair of vertices is connected by an edge. My main results are two methods for finding the star chromatic index: one for complete graph and a second for cycle graphs.

The Use of Long-Wavelength Light to Control Active Chemotherapy Drug Release
Colter Sheveland (Dr. Thomas Shell)
Wein Rice Research Scholar

Uncontrolled and uninhibited cell reproduction leads to tumor formation and all chemotherapy drugs that inhibit cell reproduction cause a wide range of adverse side effects due to their interactions with healthy cells, ultimately leading to cell death of non-cancerous cells. A strategy to append chemotherapeutic drugs to the structure of Vitamin B12 (cobalamin) allows for a controlled the release of the drug in a localized area of tissue using light that can effectively penetrate tissue. A light-responsive molecule known as a fluorophore is attached to Vitamin B12 allowing it to target light beyond its typical absorbance range. It is important to note that when the drug is attached to cobalamin it remains inactive and unable to diffuse out of its compartmentalized site within a cell, preventing it from interacting with cellular machinery. Only when the cobalamin conjugates are exposed to tissue-penetrable light is the drug released to produce its desired effect, offering a tightly controlled drug administration technique. These conjugates will be introduced into cell cultures containing cancerous cells. We hypothesized that cell death will only occur in areas that have been exposed to light. This approach of using photosactivatable compounds offers a promising technique to regulate chemotherapy drug activity to minimize side effects and an alternative to exposing the entire body to useful but potent drugs.

Light Mediated Cancer Treatment Utilizing Cobalamin Derivatives
Dillon Zites (Dr. Thomas Shell)

Skin cancer is the most common form of cancer in the United States with over a million new cases diagnosed per year. Most chemotherapy drugs cause off-target drug interactions resulting in harmful side effects. Therefore, localized treatment of cancerous cells is vital for improving the treatment of the disease. The concept of photopharmacological therapy (PPT) has been a topic of research for decades due to its potential for localized treatment of cancerous tissue. The challenge has been developing compounds that release active drugs when illuminated with specific light wavelengths that are capable of penetrating tissue deeply. Effective PPT compounds must be activated by light wavelengths within what is referred to as the optical window of tissue (600 – 900 nm). We have developed molecules that are Vitamin B12 derivatives that result in inactivation of chemotherapy drugs until the molecule is exposed to appropriate light wavelengths that effectively penetrating tissue. Illumination of the molecule causes the release of the active anticancer drug allowing it to have normal biological effects. The Vitamin B12 derivatives target cancerous cells for treatment, in comparison to healthy cells, because of the increased requirement of vitamins for these rapidly dividing cells. We have developed a variety of Vitamin B12 drug molecules that cause death of cancer cells when exposed to light. These PPT molecules have the potential to improve the treatment of cancer by reducing off-target drug interactions, reducing side effects, and potentially allowing for more potent drugs to be administered due to the ability to target the drug activity to cancerous tissue rather than healthy cells.
Department of Biology

Essential Retinal, Optic Tract, and Vascular Developmental Regulator DCBLD2 Interacts With Ras-Signaling Member CRB2 in a Phosphorylation-Dependent Manner

Jacob Markwood (Dr. Karen Hinkle)

Abl Kinase Induces Binding of SH2-2 Domain Containing Family Members to the Crdk SH2 Domain via YxxP Motifs

Warren Yacawych (Dr. Karen Hinkle)

Department of Chemistry and Biochemistry

The Use of Long-Wavelength Light to Control Active Chemotherapy Drug Release

Colter Sheveland (Profs. Mike Kelley and Tom Descoteaux)

Light Mediated Cancer Treatment Utilizing Cobalamin Derivatives

Dillon Zites (Dr. Thomas Shell)

Department of Earth & Environmental Science

The Impacts of Cut Trails on Paine Mountain

Robert Castronovo (Prof. Ben DeJong)

Analysis of Groundwater, Surface Water, and Soil Moisture and the Effect of Precipitation Events

Noah Huelsing (Prof. Laurence Becker)

Cross-Contact Water Chemistry Modeling

Zachary Mason (Prof. Ben Dejong)

The Glacial Stratigraphy of the Nasmith Brook Basin: A Comparison to Glaciation in Central Vermont

Kurt Rogers (Drs. Richard Dunn and George Springston)

Study of the influences on the hydrochemistry of the Dog River, Central Vermont

Jerica Wilson (Dr. Chris Koteas)

The David Crawford School of Engineering

Civil Engineering and Construction Management

Norwich University Student Steel Bridge


Centralization of Stowe Recreational Fields

Jacob Center, Jake Giannelli, Colin Johnson, Connor Loughran, P.J. Testino (Profs. Moses Tefe and Jack Patterson)

Kreitzberg Arena Press Box

Ethan Bell, Janice Bolton, Michael Gibson-Davis, Matt Pelletier, Griffin Sperry (Prof. Tom Descoteaux)

Stony Brook Bridge

Jesse Daniells, Alonzo Hilario, Roger Laflamme, Alexander Vahadij, Leslie Villasenor, Michael Wenrich (Profs. Adam Sevi and Tom Descoteaux)

Vermont Roofing Study

Christopher Clain, Cody Clauson, Matthew Maze (Prof. Nadia Al-Aubaidy)

Prosper Valley (Vermont) School Bridge

Sean Concannon, Bailey Johansen, Nick Kenney, Cole LaFleche, Justin McRedmond, Kevin Stanley, Luis Vaz (Profs. Ed Schmeckpeper and Tom Descoteaux)

Burlington International Airport

Matthew Clark, Austin MacKay, Matthew Visgauss (Profs. Moses Tefe and Jack Patterson)

Vermont State Ski Dorm Slope Stability

Andrew Ciccarino, Aidan Sentelik, Sean Svab, Stephen Briganti, Zachary Morris (Profs. Mike Kelley and Adam Sevi)

River Corridor Development Plan

Allyson Cleary, Naveed Johnson, Joseph Kim, Peter Madsen, Jack Mallen, Reid Weber (Profs. Tara Kulkarni and Mike Kelley)

Mechanical Engineering

Pistol Wear and Abrasion Team

John Lemay, Matthew Gendron, Matt Sarro, Hayden Cooper (Dr. Danner Friend)

Solar Kiln

Dylan Bruns, Keegan Brock, Kaylynn Butchko (Prof. Charles White)

Department of English & Communications

Video Essay: Jane Austen and Her Influence on the Modern Era

Josie Gibbs (Dr. Amy Woodbury Tease)

Video Essay: Sculpting in Time: The Cinematic Language of Andrei Tarkovsky

Nick Veldey (Dr. Amy Woodbury Tease)

Department of Health & Human Performance

Perceived Barriers to Concussion Reporting within a Senior Military College Population

Anissa Garnsey (Dr. Gregory Jancaitis)

Department of Mathematics

Quantifying the Effects of a Slow Accumulation of Amyloid-beta on Calcium Signaling through the Ryanodine Receptor

Molly Alford (Dr. Joe Latulippe)

A Mathematical Model for the Impact of AfI on IP3 Production

Emma Bunker (Dr. Joe Latulippe)

Creating a Formula for the Star Chromatic Index of Complete Graphs

Angela Moore (Dr. Addie Armstrong)

2019 POSTER PRESENTATIONS

(LISTED ALPHABETICALLY BY DEPARTMENT)

Department of Biology

Essential Retinal, Optic Tract, and Vascular Developmental Regulator DCBLD2 Interacts With Ras-Signaling Member CRB2 in a Phosphorylation-Dependent Manner

Jacob Markwood (Dr. Karen Hinkle)

Abl Kinase Induces Binding of SH2-2 Domain Containing Family Members to the Crdk SH2 Domain via YxxP Motifs

Warren Yacawych (Dr. Karen Hinkle)

Department of Chemistry and Biochemistry

The Use of Long-Wavelength Light to Control Active Chemotherapy Drug Release

Colter Sheveland (Profs. Mike Kelley and Tom Descoteaux)

Light Mediated Cancer Treatment Utilizing Cobalamin Derivatives

Dillon Zites (Dr. Thomas Shell)

Department of Earth & Environmental Science

The Impacts of Cut Trails on Paine Mountain

Robert Castronovo (Prof. Ben DeJong)

Analysis of Groundwater, Surface Water, and Soil Moisture and the Effect of Precipitation Events

Noah Huelsing (Prof. Laurence Becker)

Cross-Contact Water Chemistry Modeling

Zachary Mason (Prof. Ben Dejong)

The Glacial Stratigraphy of the Nasmith Brook Basin: A Comparison to Glaciation in Central Vermont

Kurt Rogers (Drs. Richard Dunn and George Springston)

Study of the influences on the hydrochemistry of the Dog River, Central Vermont

Jerica Wilson (Dr. Chris Koteas)

The David Crawford School of Engineering

Civil Engineering and Construction Management

Norwich University Student Steel Bridge


Centralization of Stowe Recreational Fields

Jacob Center, Jake Giannelli, Colin Johnson, Connor Loughran, P.J. Testino (Profs. Moses Tefe and Jack Patterson)

Kreitzberg Arena Press Box

Ethan Bell, Janice Bolton, Michael Gibson-Davis, Matt Pelletier, Griffin Sperry (Prof. Tom Descoteaux)

Stony Brook Bridge

Jesse Daniells, Alonzo Hilario, Roger Laflamme, Alexander Vahadij, Leslie Villasenor, Michael Wenrich (Profs. Adam Sevi and Tom Descoteaux)

Vermont Roofing Study

Christopher Clain, Cody Clauson, Matthew Maze (Prof. Nadia Al-Aubaidy)

Prosper Valley (Vermont) School Bridge

Sean Concannon, Bailey Johansen, Nick Kenney, Cole LaFleche, Justin McRedmond, Kevin Stanley, Luis Vaz (Profs. Ed Schmeckpeper and Tom Descoteaux)

Burlington International Airport

Matthew Clark, Austin MacKay, Matthew Visgauss (Profs. Moses Tefe and Jack Patterson)

Vermont State Ski Dorm Slope Stability

Andrew Ciccarino, Aidan Sentelik, Sean Svab, Stephen Briganti, Zachary Morris (Profs. Mike Kelley and Adam Sevi)

River Corridor Development Plan

Allyson Cleary, Naveed Johnson, Joseph Kim, Peter Madsen, Jack Mallen, Reid Weber (Profs. Tara Kulkarni and Mike Kelley)

Mechanical Engineering

Pistol Wear and Abrasion Team

John Lemay, Matthew Gendron, Matt Sarro, Hayden Cooper (Dr. Danner Friend)

Solar Kiln

Dylan Bruns, Keegan Brock, Kaylynn Butchko (Prof. Charles White)

Department of English & Communications

Video Essay: Jane Austen and Her Influence on the Modern Era

Josie Gibbs (Dr. Amy Woodbury Tease)

Video Essay: Sculpting in Time: The Cinematic Language of Andrei Tarkovsky

Nick Veldey (Dr. Amy Woodbury Tease)

Department of Health & Human Performance

Perceived Barriers to Concussion Reporting within a Senior Military College Population

Anissa Garnsey (Dr. Gregory Jancaitis)

Department of Mathematics

Quantifying the Effects of a Slow Accumulation of Amyloid-beta on Calcium Signaling through the Ryanodine Receptor

Molly Alford (Dr. Joe Latulippe)

A Mathematical Model for the Impact of AfI on IP3 Production

Emma Bunker (Dr. Joe Latulippe)

Creating a Formula for the Star Chromatic Index of Complete Graphs

Angela Moore (Dr. Addie Armstrong)

2019 Friends of the Kreitzberg Library Awards for Outstanding Student Research Papers

The Library Paper Prizes were funded by the Friends of Kreitzberg Library to reward excellent student writing utilizing library resources.

Freshmen/Sophomore Humanities:

Abby Hesseltin


Sponsor: Dr. Timothy Parker

Freshmen/Sophomore Technical:

Hailie Holt and Abby Weber

Using Sound-Activated Noise Meters to Reduce Noise in Neonatal Intensive Care Units.

Sponsor: Dr. Lynne Kinnam

Junior Humanities:

Nicholas Veldey

In the Zone: Adaptation in Roadside Picnic and Stalker.

Sponsor: Dr. Amy Woodbury Tease

Junior Technical:

Warren Yacawych

Insulin Receptor Localization in the Hypothalamus of the Embryonic Chicken.

Sponsor: Dr. Megan Doczi

Senior Humanities:

Spencer Duhamel

“Rhetorics of Rural Resistance: The Fight for Community and Sustainability in Central Vermont.”

Sponsor: Dr. Dalyn Luedtke

Senior Technical:

Lydia Guy

Effect of Probiotics on Gut Dysbiosis and Neurotransmitter Modulation in Psychiatric Disorders via the Gut-Brain Axis.

Sponsor: Dr. Karen Hinkle

Senior Humanities:

Emily Fernald

“The Dark Web: Evolving the Crime Community”

Sponsor: Prof. Michel Kabay

University Archives:

Ben Forsman

“A Study of Student Use of Library Resources”

Sponsor: Prof. Michel Kabay

Shelley Zacher

“Military Brutality: A study of Hazing at Military Academies.”

Sponsor: Dr. Karen Hinkle

2018-19 Friends of the Kreitzberg Library Committee

Wendy Cox, Tabetha Hole, Yangmo Ku, Carl Martin, Allison Neal, Christa Stook, Jessica Wood
2019 POSTER PRESENTATIONS
(CONTINUED)

Department of Psychology and Education

An Experimental Research Study using EEG to Monitor Language Comprehension Networks in the Brain
Angelina Coronado (Dr. Mark Stefani)

Quantitative Meta-Analysis of Blueberry Supplementation on Neuronal Aging in Aged Rats
Elizabeth Gregory (Dr. Matthew Thomas)

School of Architecture+Art

Moscow Metro: An Underground Monument of Architecture
Michael Menn (Prof. Daniel Sagan)

School of Justice Studies & Sociology

Website: Threats to Rental Vehicle Safety
Ebbett Couchman (Dr. Stephanie Maas)

Website: Emergency Preparedness for Hotel Businesses
Alexander Esteve (Dr. Stephanie Maas)

Post-Arrest Response to Domestic Violence
Ariana Lacombe (Dr. Stephanie Maas)

Risk/Need Assessment Instruments
Angela Liu (Dr. Stephanie Maas)

Academic Accommodation and Academic Accessibility in Higher Education
Aurise Miedico (Dr. Stephanie Maas and Dr. Brian Glenney)

Post-Arrest Protocol of Domestic Violence Incidences
Niki Skickova (Dr. Stephanie Maas)

Safe Work Zones Data
Steven Townsend (Dr. Stephanie Maas)

Department of Physics

Quantifying the Effects of Amyloid-Beta on Calcium Regulation in a Whole Cell Model of a Neuron
Thomas Wagner (Dr. Joe Latulippe)

Simulating the Response of a Large Area Photomultiplier Tube
Robert Ferm, John Rotter, Kurt Slichenmyer, Nathan Ures, Thomas Wagner, Kaylee Walker (Dr. Rob Knapik)

School of Nursing

Using Sound-Activated Noise Meters to Reduce Noise in Neonatal Intensive Care Units
Hailee Holt, Abby Weber (Dr. Llynne Kiernan)

South Burlington Police Department Police Retention Survey
William Hodges, Matthew Pierce
(Dr. Stephanie Maas)

Police Recruitment
Travis Lampron, Dustin Spatz, Rachael Townsend (Dr. Stephanie Maas)
Extending Our Gratitude

The Undergraduate Research Committee would like to thank the Chase family, alumnus J. Fred Weintz, Jr. ’47, his late wife Betsy, and the Politi family for their generous support of the Norwich University Undergraduate Research Program. We are deeply indebted to these families for the opportunities they have opened up to our undergraduates and for demonstrating their belief in the value of the undergraduate research experience through their munificent gifts.

The Student Scholarship Celebration would not have been possible without support and participation from the Norwich University community, especially:

President Richard W. Schneider
Dr. Sandra Affenito
Dr. Natalia Blank
Dr. Karen Hinkle
Dean Ted Kohn
Dean Michael McGinnis
Dean Aron Temkin
Dr. Lea Williams

2018-19 Undergraduate Research Committee

Dr. Nadia Al-Aubidy
Dr. Addie Armstrong
Dr. Mark Boonshoft
Dr. Christopher Koteas
Dr. Kyle Pivetti
Dr. Huw Read

2018-19 Undergraduate Research Ambassadors

Angelina Coronado, Anissa Garnsey, Elizabeth Gregory, Brielle King, Colter Sheveland, Thomas Wagner, Warren Yacawych, Dillon Zites

Special thanks to Cristy Boarman of the Office of Academic Research for all of her help in coordinating this event!
Questions about the Undergraduate Research Program?

Contact Dr. Amy Woodbury Tease,
Undergraduate Research Program Director
at undergraduateresearch@norwich.edu.