The year in undergraduate research

The 2015-16 academic year has been tremendously successful both in terms of the quality of undergraduate research performed on this campus and the growth in the College’s programs supporting and fostering participation in undergraduate research by students and faculty mentors alike.

As in past Highlights, a majority of this booklet focuses on the College’s Undergraduate Summer Research Fellowship program. The student researchers featured in this report have distinguished themselves by their active involvement in research at the undergraduate level. Of particular note is the award of the first David F. Berger Summer Research Fellowship (p. 2) to Quintin Casella (Biology). This endowed fellowship was made possible by the very generous gift to the College’s Undergraduate Research program by Dr. Michael Bond ’75 and Dr. Wayne Marley ’75 to honor the significant contributions in mentoring undergraduate student researchers by Dr. David F. Berger, Professor of Psychology, Emeritus.

The College is also pleased to announce its second President’s Recognition for Engaged Learning and Leadership Designation in Undergraduate Research. The award was made to Matthew Ellis ’16 for his high-level achievements and participation in independent research in computational chemistry (see p. 17).

The College continues to recognize the extraordinary passion and commitment of faculty in mentoring undergraduate research students. This year’s Outstanding Achievement in Mentoring Undergraduate Research Award was made to Dr. Peter Ducey (Biological Sciences Department) for his high-level achievements in mentoring undergraduate research students at Cortland (see p. 18).

It should not be overlooked the extent to which SUNY Cortland students participate in presenting their research on the regional and national stages. This past year more than 30 of our students presented at conferences from San Diego, CA to Asheville, NC, to the prestigious SUNY-wide Innovation Exploration Forum at the NY State Legislature in Albany.

Sustaining the growth in SUNY Cortland’s undergraduate research program remains an important goal of the institution with direct impact on student learning, recruitment, and retention. With this in mind, the Undergraduate Research Council looks forward to the next year.

Christopher McRoberts
Director, Undergraduate Research Council
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Profiles of psychological resilience: Electroencephalography of fixation, emotional challenge, and recovery

“The opportunity to be immersed in a research environment has inspired and prepared me for a lifetime of learning. It has solidified my aspirations to enter a career in academia.”

Stefania’s research focuses on intra-individual resilience. Using specific patterns of electroencephalography (EEG) and electrodermal activity (EDA), she measures psychological qualities of emotion, attention, and homeostatic regulation. She will be examining the time course of emotional responding to negatively-loaded images with an emphasis on the fixation points that appear to the participant just before the picture. Using the EEGLAB module of MatLab, Stefania and Dr. Eaton are quantifying features of neural activity during the presentation of the fixation points, photographs, and during inter-trial periods. Stefania hypothesizes that the fixation point itself will become a conditioned emotional elicitor once the first negative emotion picture has been presented. These data might lead to some important clues about how resilient people regulate their physiological responses to negative life events. They hope that this research leads to improved interventions for individuals diagnosed with PTSD and mood-related psychological disorders. They are looking forward to seeing the results of this summer’s research!

Faculty Mentor
Leslie Eaton, Professor, Psychology

“Stefania had already become a highly skilled EEG technician last semester. This summer program afforded her the opportunity to gain a set of attributes that doctoral programs seek in prospective students, but rarely see in undergraduate applicants.”
Quintin is testing the effectiveness of biodegradable, benthic barrier mats as an invasive species management technique in Raquette Lake, NY. This experiment will pilot a new approach for preventing the spread of the invasive aquatic plant, Variable Leaf Watermilfoil (*Myriophyllum heterophyllum*). This technique involves covering sections of the lake floor with large tarps in order to shade out and kill the VLM underneath. Typically, these tarps are made of a plastic material and are removed after a year to allow native species to recolonize. Quintin’s experiment will use a biodegradable material instead of the standard plastic matting in order to prevent pollution and eliminate the labor involved in pulling out the matting. This experiment may create a more effective method to control a devastating invasive species.

**Faculty Mentor**

Angela M. Pagano, Associate Professor, Biological Sciences

“It is inspiring to mentor a research student like Quintin. His enthusiasm and desire to better understand the Raquette Lake ecosystem, help drive the project both forward and in new directions. It’s a relationship that benefits us both.”
Anna Gorall
International Studies/Archaeology

Çadir Höyük: Stability or change in the shadow of a failing empire?

“This summer’s research has made it possible to gain experience as an archaeologist, both in the lab and in the field. The opportunity to conduct my own research has been critical in my educational goals as an undergraduate.”

Anna’s research project is to use ceramic analysis to investigate the fate of rural settlements in the Hittite Empire during and after the period of collapse (ca. 1200 BCE). The research is taking place at the archaeological site Çadir Höyük in central Turkey, one of those settlements within the Empire. During the height of the Hittites, standardized pottery was provided to its surrounding villages. By categorizing ceramics based on structural differences, Anna will determine whether the amount of standard Hittite pottery found at the site changes in the periods before, during, and after the Hittite collapse. Changes in the materials and methods used in pottery creation, its form/function (e.g., cooking, serving, storage), and decoration will allow her to assess socioeconomic changes occurring in the village during these periods.

Faculty Mentor
Sharon Steadman, Professor,
Sociology/Anthropology

“Anna took to pottery analysis as if she was already a professional. She operated way ahead of schedule and produced significant results in just a few weeks. She has also turned out to be a great field archaeologist and has been a real asset to the archaeological project this season.”
Neuroprotective effect of stem cells

Joe’s research this summer involves understanding the neuroprotective effect of stem cells. Currently there is no effective treatment for major central nervous system injuries or disorders, but several studies have demonstrated that stem cells can promote neural recovery after several forms of injury including stroke and neurodegenerative diseases. Joe is using arsenic to induce oxidative stress in neurons, and has shown that soluble factors that stem cells release protect the neurons from damage. He is currently in the process of identifying the soluble factor(s) responsible for the neuroprotection and the potential mechanism, and expects that his data may lead to a new mechanism of how stem cells can protect neurons against injury potentially leading to human treatments.

Faculty Mentor
Theresa Curtis, Associate Professor, Biological Sciences

“The fellowship has provided me with a new found respect for those who devote their lives to discover the unknown. I have also expanded my knowledge of neuroscience and have gained confidence as a researcher.”

“Joe has generated interesting data this summer to add to our understanding of neuroprotection. It has been rewarding to watch Joe become an independent, inquisitive, and engaged researcher.”
Adam Hocking
Conservation Biology

Bryophytes of Hoxie Gorge: Ecology, diversity, online field guide

“The experience of working with Dr. Baroni, in developing field skills and laboratory microscopy and imaging techniques was rewarding and essential to producing a thorough study.”

Adam is investigating bryophyte (mosses and liverworts) diversity of the College’s Hoxie Gorge Field Campus with the goal to provide a base-line assessment of bryophyte species richness and ecological diversity of these organisms. His research involves field collection of bryophytes from various habitats and substrates at Hoxie Gorge and laboratory analyses using light microscopy. From the 150 collections made to date, nearly 80 different species of bryophytes are now recognized and fully documented including several species known to be rare in New York State. To make these taxonomic and ecologic data available to future researchers and conservation biologists, bryophytes are being curated into SUNY Cortland’s Herbarium and Adam is developing a website which will assist those interested in bryophyte identification, especially for Hoxie Gorge and central New York.

Faculty Mentor
Timothy Baroni, Distinguished Professor, Biological Sciences

“Having received training in field studies, Adam is the perfect student to complete the task of a much needed survey of the Bryophytes of Hoxie Gorge.”
Beginning in 300 CE in Mesoamerica, the Maya culture developed a sky-blue pigment, known as Maya Blue, which has lasted hundreds of years in harsh burial conditions. During rituals this colorant, representing water, was applied to pottery in honor of the Rain God Chaac. Kelly's research includes recreating Maya Blue pigments combining a unique clay material and natural indigo dye derived from plants. She digs and processes locally sourced clay and applies the pigment to pottery vessels she creates in the Maya tradition. Her research will benefit a Maya descendant community in Belize enabling them to regain a lost technique of their culture while incorporating these processes in their own ceramic work.

Faculty Mentor
Jeremiah Donovan, Professor, Art and Art History

"Kelly’s research has resulted in new perspectives on the use of earth materials used in Maya pottery. It has been inspiring to see her develop an interdisciplinary project combining geological, archaeological, and ceramic studio practices."
Caitlin Rasefske
Exercise Science

Emergency contraceptive (EC) dispensation in college health centers

“Conducting research this summer as an Undergraduate Research Fellow has been a wonderful experience. I have had the opportunity to enhance my research skills alongside my advisor Dr. Curtis and we are excited to see how our results unfold.”

Caitlin is surveying a sample of public and private New York State colleges to determine when students are most likely to receive emergency contraception (EC) from college health services and the policies related to EC dispensation. EC is a form of birth control that can be used to prevent pregnancy up to five days after unprotected sex, or after another form of contraception fails. Through this research Caitlin will identify patterns in EC dispensation, so that participating colleges can initiate targeted health interventions — prior to these times to reduce students’ sexual risk behaviors. The policy analysis will highlight current and best practices with regard to EC dispensation, and further improve student access to this important health service.

Faculty Mentor
Jena Nicols Curtis, Associate Professor, Health

“Watching Cait first plot and then identify trends in her data was amazing. We kept looking from the computer screen to each other and saying, ‘Look at THAT!’ Over the course of the summer I could actually see her enthusiasm and confidence in herself as a researcher continue to grow.”
Biochemical analysis of Legionella pneumophila attachment to biofilms of other bacterial species

“Conducting full time research in Dr. Chatfield’s lab has been an exceptional experience! I have learned and practiced proper laboratory etiquette, and have been exposed to both the challenges and rewards that accompany full time research.”

Cassidy’s summer research project has been dedicated to investigating the pathogenic bacteria, Legionella pneumophila, which is the cause of the well-known infection, Legionnaires’ disease. More specifically, her project focuses on the specific attachment mechanism that L. pneumophila uses when it adheres to man-made water systems. She is investigating the attachment of L. pneumophila with two commonly found water system biofilm isolates – Acidovorax and Pelomonas. Previous research has shown that L. pneumophila readily adheres to Acidovorax, however the adherence to Pelomonas is significantly less. Through a series of experiments including adherence assays, staining, and imaging with fluorescence microscopy, she hopes to propose a universal attachment mechanism of L. pneumophila that could be used in future research to inhibit this attachment and stop the outbreak of this deadly infection.

Faculty Mentor
Christa Chatfield, Assistant Professor, Biological Sciences

“Having students like Cassidy around the lab in the summer is so enjoyable — training young researchers is one of the best aspects of my job, and working with them full time in the summer means we can get much more accomplished.”
The goal of Allison’s summer research project is to determine the differences in un-weighted run economy of trained endurance athletes. By reducing an individual’s weight, the stride frequency changes and this can effect the individual’s oxygen consumption while running. To reduce the individuals body weight, Allison and her mentor, Dr. Hokanson, used the Alter G treadmill in the exercise physiology lab. Allison’s research includes collecting oxygen consumption using the VO$_2$ analyzer and the breathable mask. After data are collected, Allison will calculate run economy of each individual and create a run economy curve to look at the differences in run economy of weighted vs. un-weighted running. The results of this study can better help exercise scientist and athletic coaches with rehabilitation of athletes or to see if it is a beneficial way for endurance athletes to train.

“My research was exciting because I got to connect it to something that I love to do: running. It was really interesting to look at the data we collected compared to studies we have done in the past with college students that are not runners.”

Faculty Mentor
James Hokanson, Associate Professor, Kinesiology
“Allison’s undergraduate research project has given her the opportunity to develop skills outside the classroom: organization, problem solving, effective communication, and analyzing results.”
Alyssa Smeding
Business Economics/Human Resource Management

Examining the gender wage gap

“The Summer Research Fellowship has given me an opportunity to research a topic I feel so passionately about. Investigating the wage gap and making my own observations on the topic has been an incredibly rewarding process.”

Alyssa is researching the current wage gap between males and females in the United States. Using two separate data sources, she will determine what affects the gender pay gap. To do so, she uses previous literature to help determine possible factors that may affect an individual’s salary such as occupation, gender, marital status, and household income. She then uses regression analysis to determine the amount of influence these factors have on wages. In addition to this, she examines other factors that may contribute to the wage gap in the U.S., such as occupational sex segregation and comparable worth. Using her findings and the help of her mentor, Dr. Kathleen Burke, Alyssa is able to gather a more comprehensive understanding of the cause of the wage discrepancy in the United States.

Faculty Mentor
Kathleen Burke, Professor, Economics

“Alyssa is passionate about understanding an issue. She thinks critically and is innovative in her solutions to problems. She is also a hard worker who likes to explore the meaning in the data. She helps to inspire me to explore things further.”
Patrick Viscome
Business Economics/Finance

Intrinsic valuation model

“I am excited to create something that has the possibility of helping others reach their financial goals. With better investment decisions, I can help enable others to live richer and more fulfilling lives.

Patrick’s research will be on creating a user-friendly valuation model to estimate a publicly traded company’s value. His research focuses on forecasting a company’s financial statements and performing a discounted cash flow analysis for valuation. The model will also be able to reverse-engineer the market price to see what assumptions the market must hold to justify its current market price. The aim of this research is to aid investors in making better investment decisions. After the markets collapsed in 2000 and again in 2008, it became increasingly apparent that the complex tools used to safeguard many Wall Street professionals needed to be simplified to safeguard the novice investor too. Patrick’s research experience sets out to create this tool with the benefit of the Bloomberg terminals. Pat and faculty mentor Tim Phillips hope that these results will benefit future users regardless of their level of investment sophistication.

Faculty Mentor
Timothy Phillips, Associate Professor, Economics

“I feel that one of the most interesting things about Pat’s equity valuation model is that any user can alter the assumptions about many different variables such as the growth rate or the future level of interest rates to fit their own expectations and thereby alter the expected value of the stock.”
Other Undergraduate Research Awards

2015-16 Undergraduate Research Council Travel Grant to attend conferences in which they were a presenter

Gabrielle Alcindor, Annual Conference of the NY African(a) Studies Assoc. (New York, NY)
Adesola Belo, Annual Conference of the NY African(a) Studies Assoc. (New York, NY)
Ashlee Boughton, National Northeastern Recreation Research Symposium (Annapolis, MD)
Xavier Campbell, NY State Political Science Association Annual Meeting (New Paltz, NY)
Matthew Ellis, American Chemical Society National Meeting (San Diego, CA)
Heather Eriksson, NY State Reading Association Conference (Saratoga Springs, NY)
Dierdre Kirkem, Annual Conference of the NY African(a) Studies Assoc. (New York, NY)
Joseph Kraai, American Chemical Society National Meeting (San Diego, CA)
Claire Leggett, National Conference on Undergraduate Research (Asheville, NC)
Sophie-Louise Jackson, Science Teachers Association of NY State (Rochester, NY)
Iva Markicevic, National Conference on Undergraduate Research (Asheville, NC)
Anthony Terzolo, Rochester Symposium for Physics Students (Rochester, NY)
Weifeng Zheng, National Conference on Undergraduate Research (Asheville, NC)

2015-16 Undergraduate Research Council Small Grants

Matthew Chase & Christy Donker: Relationship between road salt and the Tioughnioga River water quality in Cortland, NY
David Elmer: Myco-degradation of plastics
Jenna Zaia: Determining if the Lcl-adhesion promotes Legionella adherence to environmental Acidovorax biofilms

2016-17 Undergraduate Research Council Undergraduate Research Assistant Awards

Helena Baert & Matthew Madden, Physical Education
Eric Lind, James Hokanson, Deborah Van Langen, Larissa True & R. Fiddler, Kinesiology
Kathryn Kramer, Art and Art History
Cathy MacDonald & Rebecca Bryan, Physical Education
Mellisa Morris, Physics
Joshua Peck, Psychology
Vaughn Randall, Art and Art History
Ryan Vooris & Tara Mahoney, Sport Management
Dennis Weng, Political Science
The College’s annual Transformations conference was held April 8th in Sperry Center. The event focuses on student research, defined as an original investigation or creative activity through the primary efforts of a student or group of students. One hundred and thirty five SUNY Cortland undergraduate student authors or co-authors presented their research and creative projects in either oral or poster format. Special sessions were devoted to last year’s Summer Research Fellows.

Joseph Hannett (undergraduate Biology student, 2016 SRF awardee) presenting his research on stem cells.

Dylan Krystoff (undergraduate Chemistry student, 2014 SRF awardee) presenting his research co-authored with Michelle McGuinnis (2015 SRF awardee) on anaerobic microbes.
The fourth SUNY-wide symposium of undergraduate research and creative activities took place on Tuesday February 24th, 2016 at the New York State Legislative Office Building in Albany, NY. This showcase featured research, scholarly, and creative activities by undergraduate students from across all 64 SUNY institutions, including four-year institutions and community colleges, emphasizing undergraduate student research projects and their impact on New York State.

This celebration is designed to bring together some of SUNY’s most talented undergraduate scholars with SUNY Administration officials and members of our New York State Legislative delegation and their office staff. The midday poster session allowed SUNY undergraduates the opportunity to present their research and creative academic projects to a large audience at Albany’s Legislative Office Building.

Two SUNY Cortland research projects conducted by undergraduate students were selected through a campus-wide competitive review to represent Cortland at this event. Exercise science major Corey Temple presented on her research “Running economy on a normal and lower-body positive pressure treadmill” and Psychology major Elizabeth Clair Toal presented her research entitled: "Environmental enrichment reduces stress-induced relapse over protracted withdrawal periods in ethanol taking rats.”

Corey Temple (left center) and Elizabeth Claire Toal (right center) shown presenting their research with their faculty mentors (Dr. James Hokanson, Kinesiology, far left) and Dr. Joshua Peck (Psychology, far right).
NCUR is the premier national conference dedicated to undergraduate research. The annual conference gives undergraduate scholars in all fields and from all types of institutions of higher learning a forum to share the results of their work through posters, presentations, performances and works of art. NCUR showcases research in all fields of study. Students can give oral presentations, participate in poster sessions, present original artwork, or give a performance in dance, music or theater. More than 2,800 faculty and students from over 300 institutions attend, making it the largest celebration of undergraduate research in the United States.

SUNY Cortland was honored to send four of its students to this prestigious event. The following students presented their research at NCUR: Claire Leggett, History major, mentored by History Professor Gigi Peterson; Iva Markicevic, an adolescence education: English major mentored by Assistant Professor of English Sarah Hobson; Stephanie Offutt, an archaeology and international studies dual major mentored by Professor of Sociology/Anthropology Sharon Steadman; and Weifeng Zhen, a biochemistry major mentored by Assistant Professor of Chemistry Katherine Hicks.
More than 500 students and faculty from across the SUNY and CUNY systems mingled at SUNY Cobleskill on April 15 as they presented their research in the Second Annual SUNY Undergraduate Research Conference. The conference featured 190 poster presentations and a full day of oral presentations—95 of them—highlighting some of the best the SUNY system has to offer.

Fifteen SUNY Cortland student presented their research at the 2016 SURC including: Patrick Brown, Exercise Science; Elise Cusimano, Exercise Science; Kayla Hampton, Physical Education; Claire Legget, History; Bryan Nardo, Physical Education; Meghan Peysson, Social Philosophy; Mackenzie Pish, Philosophy; Makenzie Schrader, Psychology; Meghan Terry, Sociology; Anthony Terzolo, Physics; Kaitlyn Thompson, Sociology; Nicholas Vachon, Physical Education; Lauren Vaughen, Physical Education; Renee Walker; Physical Education; & Jenna Zaia, Biology.
SUNY Cortland’s Undergraduate Research Council is pleased to announce its newest recipient of the President’s Recognition for Engaged learning and Leadership Designation in Undergraduate Research – Mr. Matthew Ellis. The President’s Recognition for Engaged Learning and Leadership is conferred upon students who have achieved exceptionally high level of engaged learning and are student leaders.

Mr. Ellis has been actively engaged in multiple original research projects while at SUNY Cortland. Matt began working in the laboratory of Dr. Karen Downey (Assistant Professor of Chemistry) where he researched computational modeling of metallo-organic catalysts.

In 2015, Matt was a recipient of a prestigious SUNY Cortland Summer Research Fellowship and continuously engaged in independent research through the Chemistry Department. Matt was the first author on a well-received peer-reviewed publication in *International Journal of Quantum Chemistry*. Matt also has presented his research in at several regional and national professional meetings including the American Chemical Society Conference, SUNY Undergraduate Research Conference and also made presentations at the SUNY Cortland’s *Transformations* event.

Mr. Ellis graduated Cortland in May 2016 with a BS in Chemistry. He is beginning working on his PhD at Florida State University where he will be researching materials chemistry, largely for energy applications including light-harvesting and energy storage.
Outstanding Achievement in Mentoring Undergraduate Research Award

Peter Ducey

This award recognizes faculty who have demonstrated extraordinary commitment as mentors of Cortland’s undergraduate students in research, scholarship or creative activities. This year’s awardee, Dr. Peter Ducey, Biological Sciences Department, has a long and sustained record of passion and dedication to mentoring undergraduate researchers. Beginning during his first year as Assistant Professor in 1990, Dr. Ducey has shown an impressive and continual record of mentoring student researchers and has amassed a remarkable number of publications with student co-authors over his twenty six-year career in SUNY Cortland’s Biological Sciences Department. Ducey adds this award to a long list of other recognitions including the SUNY Chancellor’s Award for Excellence in Teaching, SUNY Cortland’s Outstanding Achievement in Research Award, the Excellence in Research and Scholarship Award. He has mentored more than 90 independent students and summer research fellows. He is driven by the understanding that involvement in undergraduate research opportunities can be a transformative experience not only for students pursuing graduate degrees and careers within the sciences but for students on a wide variety of career trajectories. His student recommenders, in particular, have indicated their research experiences under his direction and his mentoring had a very positive and lasting impact on their professional and personal development.

“Although my academic career was embedded with many proficient educators who sought to foster student interest and critical thinking, Dr. Ducey was the most influential. He is an outstanding mentor to me because his support was and remains to this day ceaseless.”

Nicole Chodkowski
SUNY Cortland ‘10
PhD Candidate, Ball State University
Undergraduate research at SUNY Cortland remains strong due in part to the generosity of donors. Gifts are used to enrich our programs, provide direct support for important student-faculty research collaborations, and to recognize our top student researchers and their faculty mentors. Financial support at any level makes a statement and is appreciated.

Donations to the Undergraduate Research Fund can be made online or by mail. Please make your check payable to: Cortland College Foundation and indicate on check the name of the Undergraduate Research Fund. Mail to: Cortland College Foundation, Inc., P.O. Box 2000, Cortland, NY 13045. You can also make an online donation at: cortland.edu/giving and click the Give Now option on the right side of the page.
SUNY Cortland’s Undergraduate Research Council promotes SUNY Cortland as an institution fully committed to student research, scholarship, and creative pursuits. To this end, the Council will assure that faculty and students have easy access to information and resources on best practices, mentoring, student publishing, and other forums for the dissemination of students’ scholarly works. Through funding provided by the offices of the Provost’s and Sponsored Programs, partnerships with Office for Resident Life and Housing, Financial Aid Office and the generosity of donors to the College Foundation, the Undergraduate Research Council directly supports research projects through a number of competitive fellowships and grants.

**URC Director:** Christopher McRoberts  
**URC Members:** Phil Buckenmeyer, Jeremiah Donovan, Terrence Fitzgerald, Jill Murphy, Richard Powell, Mark Prus, Sharon Steadman, Maria Timberlake, and Orvil White  
**Administrative Support:** Haley Zurell

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