



Class of May, 2009

UNIVERSITY  
HONORS  
SCHOLARS



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Eastern Connecticut State University  
83 Windham Street  
Willimantic, CT 06226

*Connecticut's Public Liberal Arts University*



## *ACKNOWLEDGEMENTS*

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Successful thesis projects are typically the result of the contributions of many people; but none are more important than those of the thesis advisor. The following professors should be recognized for their conscientious mentoring of their respective Honors Scholar.

Professor Charles Booth, Department of Biology  
Professor Jennifer Brown, Department of Economics  
Professor Elizabeth Cowles, Department of Biology  
Professor Daniel Donaghy, Department of English  
Professor Peter Drzewiecki, Department of Environmental Earth Science  
Professor Kimberly Dugan, Department of Sociology  
Professor Peter Johnson, Department of Mathematics  
Professor Mizan Khan, Department of Mathematics  
Professor Adam Lambert, Department of Biology  
Professor William Lugo, Department of Sociology  
Professor Denise Matthews, Department of Communications  
Professor Kelly Molkenthin, Department of Mathematics  
Professor William Salka, Department of Political Science  
Professor Russell Sampson, Department of Physical Sciences

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Professor Jennifer Brown, Department of Economics  
Professor Kimberly Dugan, Department of Sociology  
Professor Madeleine Fugere, Department of Psychology  
Professor Jeanelle Day, Department of Education  
Professor Maureen McDonnell, Department of English  
Professor William Salka, Department of Political Science

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Special thanks to  
Zosia Carlquist, Honors Program Secretary,  
for her creative and skillful editing of this booklet.

*INTRODUCTION*

The students featured on the following pages are to be congratulated for their outstanding academic achievements. These students have responded exceptionally well to the challenges and opportunities afforded them through their participation in the University Honors Program, with their efforts culminating in the production of an original work of scholarship. Their respective accomplishments reflect well on the University, the academic departments of their respective majors, and the Honors Program. The quality of the theses summarized on the following pages continues a growing tradition of quality undergraduate scholarship produced by Honors students and sets a high standard for future Honors graduates.

Phillip F. Elliott  
Director  
University Honors Program



*Achievement*





**JAIME E. SELIGMANN**

Dual Majors: Biochemistry and Biology  
Minor: Mathematics

Plans to Attend Medical School

**Thesis Title:** The Synergistic Effects of Insecticides on Various Pest Populations

My thesis was based on the increasing environmental and health concerns surrounding the subject of insecticides. I aimed research towards developing combinations of prevalent insecticides that could have a greater efficacy on common pests using lower dosages than the individual chemicals alone. I determined the LD30 and LD50 (30% mortality rate and 50% mortality rate of insects, respectively) for insecticides with different modes of action on each pest species. Although more research is intended to solidify results, I have found that certain combinations of insecticides with differing modes of action are, in fact, synergistic, while those with the same modes of action are not synergistic.



**ANDREA L. ZULLO**

Major: Biology  
Minor: Spanish

Pursue Masters Degree in Biology and Secondary Education Certification at Southern Connecticut State University

**Thesis Title:** *Rhagoletis meigenii* granivory on non-native *Berberis thunbergii* in eastern Connecticut

*Berberis thunbergii* (Japanese barberry) is an invasive plant found in many forests in the northeast. *Rhagoletis meigenii*, a small fly, lays its eggs inside the fruit. The larva will eat the seeds of the fruit when the hatch as part of their life history. I identified the current levels of infestation of *B. thunbergii* by *R. meigenii* at several locations in northeastern Connecticut in order to determine if *R. meigenii* might be used as a form of biological control.



**LUKE G. BOYD**

Major: Political Science

Pursue a career in Civil Service for the State of Louisiana

**Thesis Title:** Gay Rights in the Anglosphere: The Affect of Political Opportunity Structures on Movement Success

I framed my analysis of gay rights with the largest, oldest, and most successful English-speaking democracies: Australia, Canada, the United Kingdom and the United States and sought out the statutory archives of each of these states to determine their acceptance of the Gay Rights Movement across the goals of same-sex marriage, couple adoption, and anti-discrimination legislation. I departed from the traditional school of the political opportunity structure which focuses on institutional opportunities, to incorporate religious beliefs and secularism as an intervening variable. I found that while similar in many ways, each state deals with the gay rights question in a unique fashion. Some legislate top-down, while others devolve the political question to localities and territories. Those more traditionally European (Canada, UK), are more tolerant and devoid of religious zealotry, while the U.S. and Australia still harbor political elites who refuse to acknowledge the Gay Rights Movement. I learned that the movement has already been successful in the 'Anglosphere' as gay people have many freedoms guaranteed to all citizens. A larger study could focus on those states that still condone violence towards its gay population, and the prospect of global freedom for the gay community. organizational commitment.



**CARA L. BROWN**

Major: Political Science  
Concentration: 7-12 Certification

Plans to teach High School History/Social Studies and attend Graduate School

**Thesis Title:** Determinants of Voter Turnout Across the American States: An Analysis of the 2004 Presidential Election

My thesis examined determinants of voter turnout in the 2004 Presidential election using state-level data. I examined the relationships between voter turnout and individual-level variables, such as age, race, income, gender, marital status, education, and residential mobility, as well as aggregate variables, such as region, legislative term limits, ballot initiatives, registration laws, political party strength, strength of alternative parties, and electoral competition. I found that at the state-level in the 2004 Presidential election, race, marital status, voter registration laws, and electoral competition were important determinants of voter turnout rates. Based on my research, I would recommend that states consider revising their voter registration laws to allow later registration closing dates or perhaps even Election-Day registration.



**ZACHARY M. DOTY**

Major: Economics

**Thesis Title:** Sweden and the United States:  
An Environmental Kuznets Curve Analysis

According to Environmental Kuznets Curve (EKC), as income increases, noxious emissions should decrease. My thesis examines how income effects noxious CO2 emissions for the countries of the United States and Sweden, during the period 1980-2004. Initially, it appeared that although the United States and Sweden are comparable in terms of income per capita, Sweden appears to follow the EKC while the United States does not. Using self-generated econometrical models, as well as first hand experience with both cultures, I sought to determine the degree to which either country illustrated the predictions of the EKC.



**JENNIFER R. ROYALS**

Major: Environmental Earth Science

Anticipates Teaching Elementary Education  
and Pursue Masters Degree in Secondary Education

**Thesis Title:** Sequence Stratigraphic Interpretation  
of the Jurassic Portland Formation,  
Hartford Basin, CT

For my thesis I examined the red rocks of Manchester, a part of the Portland Formation in the Hartford Basin. I measured a 55-meter section, and using drafting software, plotted this data into stratigraphic columns. Based on my data, I determined that a braided river deposited this outcrop in the Jurassic period, which agrees with findings from nearby outcrops.



**JOHN S. FOURNIER**

Major: Political Science, Sociology  
Minor: Criminology

Pursue Masters Degree and PhD in Sociology  
at the University of Connecticut

**Thesis Title:** Absentee Landlords and  
Off-Campus Alcohol Abuse

It has always been my interest to make an observable impact on my local community. For this reason, I chose to engage in research that might be useful to the Willimantic Police, ECSU administrators, and the town of Windham. My research focused on the rates of high risk drinking among college students renting properties in Willimantic. Through the generous cooperation of many faculty, I was allowed to survey several hundred ECSU students and compile a substantial amount of data. In the course of this study, I found that students who rented from absentee landlords reported a significantly higher rate of binge and high-risk alcohol consumption. It is my hope that the community is able to put this data to good use.



**SCOTT G. SEAMAN**

Major: Mathematics  
Concentration: Secondary Education

Anticipates Teaching Secondary Education

**Thesis Title:** Cycles of Weighted Graphs: The  
Chinese Postman and Traveling Salesman Problems

This thesis is a part of the mathematical branch of study known as Graph Theory. The “graphs” of graph theory are collections of vertices and the edges that connect them, and are often discussed in terms of the specific sequences of these vertices and edges contained within. In this thesis, I introduce the topic of graph theory, discuss some historically important theorems and their proofs, and discuss two well-known and related problems: The Chinese Postman Problem and The Traveling Salesman Problem.



**BRISA PALIKUQI**

Double Majors: Biochemistry and Biology

Pursue PhD in Biochemistry or Biology

**Thesis Title:** Electrophoretic Analysis of Muscles of Blue Crab

In my thesis research I tried to find out whether there is a difference in protein content among the muscles that control the movement of different legs in the Blue Crab. Using SDS Electrophoresis I compared protein content in the red and white muscles fibers of legs that are used for different purposes. I also studied protein content in atrophied muscles that have lost their load due to leg loss.



**PETER E. REINHOLD**

Double Majors: Biochemistry and Biology

Pursue Graduate Studies at the University of Connecticut

**Thesis Title:** Growth and Mutagenesis of Halobacterium NRC-1 on the Surface of Mars

For my thesis I explored the subject of astrobiology, an interest stimulated by an Honors Colloquium on this subject. With the aid of my faculty mentors, I formulated a hypothesis based upon current findings by NASA missions to Mars. We decided to examine whether a form of halophile (salt-loving bacteria) could have possibly existed on a transitioning Martian surface. We reasoned that ultraviolet radiation may have provided the means for a cold-adapted halophile. In order to test my hypothesis I set up an ultraviolet light above agar dishes containing Halobacterium NRC-1. I then incubated the plates in varying temperatures and monitored growth following U.V.C. radiation. I determined that the U.V.C. radiation had no effect on the growth of the organism and temperature became the only factor affecting growth.



**AMY E. GROVER**

Major: Mathematics

Pursue a Career as an Actuary

**Thesis Title:** Dynamical Systems and Their Applications to Finance

I applied dynamical system models to two publicly-traded stocks, American Airlines and Southwest Airlines in an attempt to build a model that would accurately predict the respective stock prices. The first model, applied to American Airlines, was a random walk model,  $P_{(t+1)} = P_t * \text{rand}(x)$  \* weighted average, for  $t = 1, 2, 3, \dots$ , where  $P_t$  is the value at the previous point and  $\text{rand}(x)$  is a random variable  $x$ . This model predicted prices that were excessively high or extremely low. Subsequently, I attempted the process with Southwest Airlines stock prices. However, the results for this were even more varied and demonstrated that this method did not work to chart stock prices. Next, I tried the Hurst model,  $(R/S) = (aN)^H$ , where  $R$  is the difference between the maximum and the minimum within a certain period of time,  $S$  is the standard deviation for the same period of time,  $N$  is the period of time,  $a$  is a constant, and  $H$  is the Hurst coefficient. Using this equation, I solved for the Hurst Coefficient,  $H$ . The Hurst coefficient for American Airlines was 0.676 and the coefficient for Southwest Airlines was 0.704. This model proved to be fairly reliable, and also revealed that the amount of time that affects current stock prices is no more than 30 months for American Airlines and no more than 15 months for Southwest Airlines. Overall, the ability to estimate stock prices relies heavily on the fact that stocks do have a cutoff point and any data before that cutoff point really does not matter when trying to estimate future values.



**STEPHANIE M. GRUESSNER**

Major: English

Minors: Writing, Spanish

Pursue Masters Program at Southern Connecticut State University to Study Fiction Writing

**Thesis Title:** They Fell Like Confetti: A Collection of Short Stories

This collection of short stories chronicles chapters in the life of a young female protagonist from her childhood through her twenties. Through a series of miscalculations, lies, and cutthroat family meals, this protagonist struggles with her identity. Each story finds this same narrator immersed in a search for human connection that plays out through radio static, personal stories, and awkward convenience store holdups with near-strangers. Most importantly, I hope these stories explore expression and communication, both being conscious and fierce needs to be understood not simply by oneself but by others.



**CODY M. GUARNIERI**

Dual Majors: Political Science,  
History & Social Science

Will attend the University of Connecticut  
School of Law

**Thesis Title:** Electoral Fairness: Assessing the  
Electoral Impact of Campaign Finance  
Regulations on Gubernatorial Elections

I performed a statistical analysis to consider the effects of states' campaign finance regulations on electoral competition. My analysis considered 47 contests in 45 states in 2004 and 2006. I conclude that there is evidence that suggests that more stringent campaign finance regulations in a state tend to aid the electoral fortunes of Democratic candidates, while damaging the fortunes of Republican candidates.



**KERIN JAROS-DRESSLER**

Major: Communication  
Minor: Theater

Pursue a Career in  
Video Production and Advertising

**Thesis Title:** Design Center East:  
Designing a Video Advertisement

For my thesis, I produced two television commercials for a local Willimantic business that are currently being broadcast on Lifetime and HGTV. I evaluated the effectiveness of increased customer traffic and sales. In addition to creating two television commercials, my thesis project included a narrative in which I describe, and reflect on, the entire experience of taking on the roles of producer, writer, director, editor, and media buyer.



**SARA E. HANRAHAN**

Major: Mathematics  
Concentration: Secondary Education

Plans to Teach High School Mathematics

**Thesis Title:** On the Intersection of Modular Circles  
with the Modular Hyperbola  $xy \equiv 1 \pmod{n}$

The question that inspired my thesis was to find formulas to count the number of intersections of modular circles with the modular hyperbola  $xy \equiv 1 \pmod{n}$ . I conducted simulations using MAPLE mathematics software, studied the data, and subsequently discovered the target formulas. The largest part of my thesis concerns the process of proving these formulas. With the help of many different strategies, previous research in related topics, and the guidance of my advisor, I was able to successfully write proofs to confirm my findings. Having proven the formulas for the number of intersections between these sets, I expanded my thesis to determine formulas to count the number of modular circles given a value of  $n$ . Following the same procedure, the formulas and proofs proved reliable. Finally, I attempted to determine formulas to count the intersection of the modular hyperbola with the difference of squares. Although the accuracy of these formulas is supported by the data generated using a MAPLE program, formal proofs have not yet been developed.



**DREW L. MIZAK**

Major: Political Science  
Minor: History

Plans to Teach High School History/Social Studies  
Pursue Graduate School

**Thesis Title:** No Legislator Left Behind: A Case  
Study on How the Congressional Lawmaking  
Structure Often Renders Complex  
Legislation Ineffective

For my thesis I used the No Child Left Behind Act as a case study to examine the internal lawmaking structure of the United States Congress. My study examined the political context that produced NCLB, and used the law to understand and illustrate the American legislative process. My study examined the growing belief that the American political structure is incapable of addressing and solving pressing complex problems. I found that due to the negotiations that go on behind the scenes, the president, senators, and representatives all get part of their ideas into the final bill. My study found the concessions that are made to ensure passage often weaken the final product and make the law difficult to implement.