Fifth Annual Symposium of Artists & Scholars
Celebrating Student Excellence
April 18 & 19, 2013
The Symposium of Artists and Scholars celebrates the scholarship and creativity of the Randolph College student body through two days devoted entirely to our students’ accomplishments.

The College’s fifth Symposium brings together students from numerous academic areas to share their research and creative projects with the campus and greater Lynchburg communities.

The Symposium will feature student scholarship from subject areas ranging from physics and biology to history and art. The presentations are grouped in ways that highlight the interdisciplinary and multidisciplinary themes that emerge in a liberal arts environment.

The abstracts in the program attest to the original work students have produced in their courses, senior theses, summer research experiences, and independent projects.

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Student Scholarship Committee  Inside back cover
April 18, 2013

Dear Symposium Attendee,

Welcome to Randolph College’s 2013 Symposium of Artists and Scholars.

Randolph College’s mission is to prepare students to engage the world critically and creatively, live and work honorably, and experience life abundantly. As president of Randolph College, I continue to be impressed by the intelligence, creativity, and passion shown by our students both in and out of the classroom. Since the College’s founding in 1891 as Randolph-Macon Woman’s College, this institution has remained dedicated to providing an excellent liberal arts education. That has not, nor will it ever, change. Today, 122 years later, our students continue to rise to the challenge.

The talks, performances, exhibits, and posters featured in this year’s Symposium reflect the variety of disciplines we offer at Randolph College, and they are just a sampling of the learning that takes place on this campus each year. Thanks to the dedication of our faculty members, our students have the opportunity to develop close relationships with faculty mentors and often partner with faculty on important research. We are fortunate to be able to share the results of these endeavors each year during this Symposium of Artists and Scholars.

I would like to thank the committee members who worked hard to organize this Symposium as well as all of the students who submitted proposals. I am especially appreciative of the dedicated faculty members who go beyond their responsibilities in the classroom to foster and nurture these scholars and artists.

I hope that you enjoy Randolph College’s 2013 Symposium of Artists and Scholars.

Sincerely,

John E. Klein
President

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Keynote Address

by Jim Peterson

“The Dynamic Stall”

Jim Peterson is an accomplished poet, playwright, and novelist as well as a beloved English professor at Randolph College. He has published four full-length collections of poetry—*The Man Who Grew Silent*, *An Afternoon with K*, *The Owning Stone*, and *The Bob and Weave*—three chapbooks, and a novel, *Paper Crown*. His poems have appeared in several prestigious journals and have won awards including the Benjamin Saltman Award from Red Hen Press, an Academy of American Poets Award, and a Fellowship in Poetry from the Virginia Arts Commission. His plays have been produced in college and regional theatres. During his 15 years with Randolph-Macon Woman’s College and Randolph College, Peterson has served as coordinator of the creative writing program, the visiting writers series, and as the College’s writer in residence. He will retire this summer and devote more time to writing, including several poetry, fiction, and non-fiction projects that are waiting for his attention. He also plans to travel the country with his wife, Harriet, and their charismatic Welsh Corgi, Mama Kilya, in their camper, which they affectionately call “the TARDIS.”
Thursday, April 18, 2013
7 P.M.  Nichols Theatre, Student Center

Keynote Address  Jim Peterson
“The Dynamic Stall”

STUDENT PRESENTATIONS
8–9:15 P.M.  Nichols Theatre, Student Center

Session 0a: “What Gets In: Mind, Body, Society”
• Ryan Blackwell, “Liberal Arts in Crisis? The Evolution of an Institution”
• Laura Word and Michael Taylor, “Comprehensive Analysis of Conventional and Forage Diets on Organic, Free-range Gallus gallus domesticus (Chicken) Laying Hen Health, Egg Quality, and Pathogen Carriage”
• Ryan Woolson, “The Jewish-American Lobby”

Session 0b: “Bodies in (E)Motion”
• Samantha Suzuki, Mariah Reed, and Angelina Carrili, “Choices”
• Jim Kwon and Thawda Aung, “Mobile Monitoring: Assessing Gate Speed, Step Count and Step-Step Variability in Natural Environments Using Cellular Phones”
• Erin Vasta, Amanda Fischer, Colton Wood, Adam Fabrikiewicz, and Rachel Cox, “In Cursive, I Love You”
• Hannah Coleman, “The Experience of Female Students Interacting in the Hookup World”

Friday, April 19, 2013
1:15–2:30 P.M.  Nichols Theatre, Student Center

Session 1a: “Models, Maps, Music, and Manic Pixie Dream Girls”
• Tu Nguyen, “A Simplified Model to Determine the Runoff Reduction Credit for Rainwater Harvesting”
• Julianna Joyce, “Deciphering the Manic Pixie Mythos: Contemporary Film Depictions of Alternative Femininity”
• Shuang Li, “Facing the Ensemble: A Conductor’s View of Music Performance”
• Zhe Zhang, “Strengthening the Four Color Theorem”

Session 1b: “Civic Engagement, Community Responsibility”
• Brooke Edwards, “Comparing Energy Use for Municipal and Bottled Water”
• Andrew Schaeffer, “To Sell or Not to Sell: Alternative Guidelines for Deaccessioning Artworks”
• Azueen Abbassi, Lee Nutter, and Kayya Pradhan, “Improving Lynchburg’s Bus System through Sustainable Innovation”
• Leah Lagesse, “Keeping Students Engaged and On-task in Cooperative Learning Situations”

2:45–4:15 P.M.  Nichols Theatre, Student Center

Session 2a: “When Ignorance Isn’t Bliss”
• Marisa Mendez, “Behind the Scenes: A Look at the Costumes and Gender Roles in Ballet”
• Sarah Carter, Connor Dye, Amy Jacobs, and Stephan West, “Is it Possible to Buy a (USDA-Defined) Balanced Meal in Lynchburg’s Food Desert?”
• Morgan Thompson, “The Effect of the Color Red and Candidate Sex on Interview Outcomes”
• Millie Symms, “The First-Generation College Student Experience at Randolph College”

Session 2b: “Life: Recreation, Procreation, Preservation”
• Sara Graul and Ejl Shadrach, “Digitizing the Randolph College Natural History Collection”
• Sarah Maki, “Isn’t It Bromantic?: Masculinities on Television’s Popular Sitcom How I Met Your Mother”
• Thomas Whitehead, “Living with Free Will: How to Cope with Compatibilism”
• Lauren Dowdle, “Sexual Dimorphism in Lizards: Does Sexual Selection Tell the Full Story?”
• Catherine Godley, “The Construction of Gender on Facebook”

4:10–5:10 P.M.  Hampson Commons, Student Center

POSTER/EXHIBITION SESSION AND RECEPTION

2:45–4:15 P.M.  310 Conference Room, Student Center

Session 3a: “Taking a Second Look”
• Kiki Priest, “Kidnapping, Captivity, and the Narration of Survival: A Feminist Critical Reception of the Contemporary Film, A Separation”
• Jessica Neuman, “Ethics in the Advertising Industry”
• Michael BC Martin, “The Macabre in the Media”

Session 3b: “Asteroids! Vampires! Somnabulation!”
• Adam Fabrikiewicz, Amanda Fischer, Erin Vasta, Colton Wood, and Rachel Cox, “In Cursive, I Love You”
• Hartzel Gillespie, “Measuring Asteroid Occultations”
• Mimpansha Joshi, “The 365 Days Photo Challenge”
• Kristina Marinak and Sergio Rodriguez, “Examining the Role of Physical Contact between Allergenic Fungal Spores and Airway Epithelial Cells in the Expression of Muc5AC (Mucin)”
• Lien Pham, “Through My Eyes: Lynchburg Architecture from an International Student’s Perspective”
• Timothy Slesinger, “Investigating Methods of Inertial Navigation as a Tool for Mapping Complicated Human Motion such as that during Roller Coaster Rides”

STUDENT PRESENTATIONS (continued)
6–7:15 P.M.  Nichols Theatre, Student Center

Session 3a: “Taking a Second Look”
• Joanne Bourque, M.A.T., “Potential of Web-based Technology in Art Education: Use of a WebQuest to Facilitate Knowledge Transfer and Application”
• Marina Mendez, “Pappy’s Speech: A Novel Approach to Creative Collaboration”
• Brianne Roth, “Seeing it to the End: Morale and Motivations of British Soldiers at the Western Front, 1916-1918”
• Ireluwa Adeleye, “Unraveling Archeological History at Jefferson’s Poplar Forest using Geophysical Methods”

6–7:15 P.M.  310 Conference Room, Student Center

Session 3b: “Asteroids! Vampires! Somnabulation!”
• Chris Staats, “Hidden Knowledge: Asteroid Occultation Timing”
• Cameron Hall, “Dreamwalking: From a Script, to Film, to Fiction”
• Michael Harris, “Vampire Loads Are Sucking Us Dry: Energy Use at Randolph College”
• Qi Zhang, Mimpansha Joshi, and Evan Pai, “Water-Energy Nexus”
This project identifies the micro-earthquakes that followed the Virginia earthquake on August 23, 2011. Micro-earthquakes are very low-intensity earthquakes with magnitudes of 2.0 or less. These small aftershocks are usually difficult to locate using present conventional earthquake location techniques, but they are important tools in identifying the smaller, hidden faults on which they occur. Earthquake locating within the Central Virginia Seismic Zone (CVSZ) is further limited by the sparse seismological network stations, which makes it hard to identify arrival times of the aftershocks with high precision. We used a MATLAB program, sembSAC (Toteva 2008), to calculate these aftershocks more accurately. Our research involved a number of signal processing techniques, such as spectral filtering, semblance analysis and cross-correlation, to improve the quality of the records and identify the earthquake arrival times with diminishing uncertainty. We further try to understand the errors in analyzing earthquake data with signal processing. Project supported by the Randolph College Summer Research Program and the Randolph Innovative Student Experience Program.

Madeline Carmaine '13
"The Antioxidant Power of Pomegranate Juice and Juice Mixes"
Faculty Mentor: Ann Fabrikiewicz, Professor of Chemistry
Recent studies have linked the consumption of antioxidants with many positive health benefits, including preventing heart disease, cancer, and aging disorders. A good source of dietary antioxidants is fresh fruit juice. My research quantifies the antioxidant power of pure pomegranate juice, blueberry juice, cherry juice, and commercial mixes of these fruits. Additionally, I examine whether two classes of antioxidants, anthocyanidins and polyphenols, act together synergistically, giving a stronger antioxidant power together than the antioxidant each juice has separately. The presence of a synergistic effect would explain how small concentrations of individual antioxidants produce a strong overall antioxidant effect to these fruits.

Project supported by the Randolph Innovative Student Experience Program.

Lis Chacon '13, Huong Doan '14, Brooke Edwards '13, Hannah Edwards '16, Caitlin Glenen '14, Huong Nguyen '15, Tu Nguyen '15, Kolton Provancher '14, and Ethan Rosenberg '14
"A Local Food Economy as a Solution to Lynchburg’s Food Desert: What Role Can Randolph College Play?"
Faculty Mentor: John Abell, Professor of Economics
Our studies revealed the potential benefits of shifting Lynchburg’s economy in the direction of local food sustainability. Understanding how to move a local economy in this direction requires baseline information. Our student teams have taken a first step in this direction by surveying food outlets in the downtown area to determine if any of them offer locally sourced, seasonal, sustainably produced, and/or organic foods. Those results constitute the first part of our poster presentation. The second part explores the role that Randolph College can play in moving the community in the direction of local food sustainability, particularly in the areas of education, organic gardening, and dining services.

Huong Doan '14, Lis Chacon '13, Brooke Edwards '13, Hannah Edwards '16, Caitlin Glenen '14, Huong Nguyen '15, Tu Nguyen '15, Kolton Provancher ‘14, and Ethan Rosenberg ‘14
"A Local Food Economy as a Solution to Lynchburg’s Food Desert: What Role Can Randolph College Play?"
Faculty Mentor: John Abell, Professor of Economics

(See Lis Chacon, page 7)

"A Local Food Economy as a Solution to Lynchburg’s Food Desert: What Role Can Randolph College Play?"
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"A Local Food Economy as a Solution to Lynchburg’s Food Desert: What Role Can Randolph College Play?"
Faculty Mentor: John Abell, Professor of Economics

(See Lis Chacon, page 7)

Lauren Dees '13, Brooke Edwards '13 (presenting author), and Adam Eller '13 (presenting author)
"Thermal Mass Artwork"
Faculty Mentor: Karin Warren, Associate Professor and Herzog Family Chair in Environmental Studies
As part of an Energy and Society (EVST315) team project, we used principles of sustainability, passive-solar design, and thermal energy transfer, to decrease energy-consumption within interior spaces. Our project, “Thermal Mass Artwork,” incorporates various materials with beneficial thermal properties into existing building interiors in a practical, low-cost, and aesthetically pleasing manner. We researched the possibility of using thermal masses to harness solar energy...
for heating purposes and to absorb excess heat for cooling purposes. We then looked at how certain materials provide
inertia against rapid temperature changes within a given space, and we created a prototype utilizing cheap, abundant,
and environmentally friendly materials. Our resulting Thermal Mass Artwork prototype has the ability to decrease energy
consumption inside buildings and to reduce heating and cooling costs, and it demonstrates an example of artistic and
scientific creativity.

Hoang Doan '14 and Pujan Shrestha '15 (presenting author)
“Science and Math Links: Research-Based Teaching Institute”
Faculty Mentors: Peggy Schimmoeller, Professor of Education, Tatiana Gilstrap, Associate Professor of Environmental Studies and Physics, and Peter Sheldon, Professor of Physics and Chair of the Physics Department
We are science- and math-focused educators and researchers for and researching the effectiveness of lessons in science and mathematics classrooms. We ran a science-teaching institute during the summer of 2012 for teachers from the region and introduced hands-on and inquiry-based teaching methods. Some of these resources were tested in the Jubilee Family Development Center science summer camp that we run. Our project seeks to dispel some of the prevailing stereotypes of scientists and biases against science and math as careers. Our hope is to help children understand the beauty of science and math through discovery. We are studying changes in attitudes through surveys and changes in achievement through state standards test scores and class grades. The research presented is part of a larger, ongoing project begun in 1999.
Project supported by the State Council of Higher Education of Virginia.

Brooke Edwards '13 (presenting author), Lauren Dees '13, and Adam Eller '13 (presenting author)
“Thermal Mass Artwork”
Faculty Mentor: Karrie Warren, Associate Professor and Herzog Family Chair in Environmental Studies
(See Lauren Dees, page 8)

Adam Eller '13 (presenting author), Lauren Dees '13, and Brooke Edwards '13 (presenting author)
“Thermal Mass Artwork”
Faculty Mentor: Karrie Warren, Associate Professor and Herzog Family Chair in Environmental Studies
(See Lauren Dees, page 8)

Adam Fabirkievicz '14, Amanda Fischer '15, Erin Vasta '15, and Colton Wood '14
“In Cursive, I Love You”
Faculty Mentors: Brooke Marcy, Adjunct, Assistant Professor of Art, with assistance from Ryan Woodhouse, Visiting Instructor in Music
This exhibition contains a poem “In Cursive, I Love You” along with an artistic interpretation of the poem. The poem originated as an exploration of the concept of love and its relationship with imagery and abuse. After becoming involved with the art department and BFA program, Erin Vasta became interested in representing these concepts in a different artistic medium but drawing on the conventions of ekphrastic poetry. Also included in the exhibition is the film of a dance composed by Amanda Fischer. The dance is an expression of the poem through movement and is choreographed to music composed by Adam Fabirkievicz ’14, a music major, and Colton Wood ’14, a physics major.

Amanda Fischer ’15, Adam Fabirkievicz ’14, Erin Vasta ’15, and Colton Wood ’14
“In Cursive, I Love You”
Faculty Mentors: Brooke Marcy, Adjunct, Assistant Professor of Art, with assistance from Ryan Woodhouse, Visiting Instructor in Music
(See Adam Fabirkievicz ’14, page 8)

Hartzel Gillespie ’15
“Measuring Asteroid Occultations”
Faculty Mentors: Katrin Schenk, Assistant Professor of Physics, and Jack Gross, Adjunct Instructor in Physics
An asteroidal occultation occurs when an asteroid passes in front of a star from the viewpoint of some observer. By knowing where the star is located, the observer also knows where the asteroid is at the time when it is occulted. This allows the observer to pinpoint the location of an asteroid to great accuracy. With multiple observers, the shape of the asteroid can be determined as well, with the added benefit that the observer does not need to be able to see the asteroid directly. I discuss the asteroidal occultations visible in the Lynchburg area using data collected in the Randolph College Winfree Observatory and techniques developed for further asteroid occultation research. Asteroids observed include 211 Isolda, 469 Argentina, and 1679 Nevanlinna.
Project supported by the Randolph College Physics Department.

Caitlin Glennen ’14, Lis Chacon ’13, Huang Doan ’14, Brooke Edwards ’13, Hannah Edwards ’16, Huang Nguyen ’15, Tu Nguyen ’15, Kolton Provencher ’14, and Ethan Rosenberg ’14
“A Local Food Economy as a Solution to Lynchburg’s Food Desert: What Role Can Randolph College Play?”
Faculty Mentor: John Abel, Professor of Economics
(See Lis Chacon, page 7)

Chris Hollingsworth ’15, Zhara Adahman ’14, and Alexander Kwakye ’15
“Pups Call, Mothers Rush? Determining the Behavioral and Communicative Value of the Ultrasonic Calls Emitted by Mouse Pups”
Faculty Mentor: Katrin Schenk, Assistant Professor of Physics
(See Zhara Adahman ’14, page 6)

Mimansha Joshi ’14
“The 365 Days Photo Challenge”
Faculty Mentor: Karin Warren, Associate Professor and Herzog Family Chair in Environmental Studies
In the summer of 2010, I took up the 365 Day Photo Challenge, plotting a course of action that would help me grew as a photographer in a way that supported my career and personal aspirations. My goal was to take a photograph every day for an entire year and then share the photos online with accompanying commentary. Although the first few weeks were easy, the extent of the challenge became more apparent as the days passed, and it became difficult to find subjects for my photographs. But even on the days I was short of ideas, I stuck to the task. This experience was one of the most exciting and enriching tasks I have accomplished and helped me connect my photography to my professional goals in a meaningful way. If a picture is worth a 1,000 words, then my presentation will give the audience 365,000 words.

Alexander Kwakye ’15, Zhara Adahman ’14, and Chris Hollingsworth ’15
“Pups Call, Mothers Rush? Determining the Behavioral and Communicative Value of the Ultrasonic Calls Emitted by Mouse Pups”
Faculty Mentor: Katrin Schenk, Assistant Professor of Physics
(See Zhara Adahman ’14, page 6)

Kristina Marinak ’14 and Sergio Rodriguez ’14
“Examining the Role of Physical Contact between Allergic Fungal Spores and Airway Epithelial Cells in the Expression of Muc5AC (Mucin)”
Faculty Mentor: Amanda Rumore, Visiting Assistant Professor of Biology
Exposure to ubiquitous airborne fungi is associated with an increased risk of allergy, asthma, and chronic obstructive pulmonary disorder (COPD). Once inhaled, the fungi secrete allergens and toxins that exacerbate these diseases. In addition, interactions between sugars on the surface of the fungal spores and the epithelial cells lining the airway can cause an inflammatory response and increased mucous production. In this project we used molecular biology techniques to determine the overall importance of this physical interaction between spores of three common allergenic fungi (P.annulata, A.alternata, A.fumigatus) and human airway epithelial cells. We examined the response of the cells under conditions where they were either in direct contact with the fungal spores or separated by a membrane where the cells could still respond to molecules secreted by the fungi. Under these two conditions we found differences in the rate of cell death, the amount of inflammatory markers produced, and localization of the protein responsible for increased mucous production.
Project supported by the Randolph Innovative Student Experience Program.

Huong Nguyen ’15, Lis Chacon ’13, Huang Doan ’14, Brooke Edwards ’13, Hannah Edwards ’16, Caitlin Glennen ’14, Tu Nguyen ’15, Kolton Provencher ’14, and Ethan Rosenberg ’14
“A Local Food Economy as a Solution to Lynchburg’s Food Desert: What Role Can Randolph College Play?”
Faculty Mentor: John Abel, Professor of Economics
(See Lis Chacon, page 7)
Tu Nguyen ’15, Lis Chacon ’13, Huang Doan ’14, Brooke Edwards ’13, Hannah Edwards ’16, Caitlin Glennen ’14, Huang Nguyen ’15, Kolton Provencher ’14, and Ethan Rosenberger ’14

“A Local Food Economy as a Solution to Lynchburg’s Food Desert: What Role Can Randolph College Play?”
Faculty Mentor: John Abell, Professor of Economics (See Lis Chacon, page 7)

Lien Pham ’14

“Through My Eyes: Lynchburg Architecture from an International Student’s Perspective”
Faculty Mentor: Kathy Muehlmann, Chair of the Art Department, Professor of Art

This exhibition is an application of photography skills which I acquired in the photography class I took in my junior year at Randolph College. It is the blending of my liberal arts education and my curiosity to explore the world around me. As a residential student at Randolph College, I had not ventured out of “The Red Brick Wall” to explore the culture of Lynchburg. This exhibition reflects the city’s architecture and economic life through the images of buildings and houses, specifically focusing on the historic district. The photo exhibition presents the city’s life to the audience from a viewpoint of an international student with an outsider perspective in viewing and recording these historical buildings.
Project supported by the Randolph Innovative Student Experience Program

Kolton Provencher ’14, Lis Chacon ’13, Huang Doan ’14, Brooke Edwards ’13, Hannah Edwards ’16, Caitlin Glennen ’14, Huang Nguyen ’15, Tu Nguyen ’15, and Ethan Rosenberger ’14

“A Local Food Economy as a Solution to Lynchburg’s Food Desert: What Role Can Randolph College Play?”
Faculty Mentor: John Abell, Professor of Economics (See Lis Chacon, page 7)

Sergio Rodriguez ’14 and Kristina Marinak ’14

“Examining the Role of Physical Contact between Allergenic Fungal Spores and Airway Epithelial Cells in the Expression of Muc5AC (Mucin)”
Faculty Mentor: Amanda Rumore, Visiting Assistant Professor of Biology (See Kristina Marinak, page 9)

Ethan Rosenber’14, Lis Chacon’13, Huang Doan’14, Brooke Edwards’13, Hannah Edwards’16, Caitlin Glennen’14, Huang Nguyen’15, Tu Nguyen’15, and Kolton Provencher’14

“A Local Food Economy as a Solution to Lynchburg’s Food Desert: What Role Can Randolph College Play?”
Faculty Mentor: John Abell, Professor of Economics (See Lis Chacon, page 7)

Pujan Shrestha’15 (presenting author) and Hoang Doan’14

“Science and Math Links: Research-Based Teaching Institute”
Faculty Mentors: Peggy Schimmoeller, Professor of Education, Tatiana Gilstrap, Associate Professor of Environmental Studies and Physics, and Peter Sheldon, Professor of Physics and Chair of the Physics Department (See Hoang Doan’14, page 8)

Timothy Slesinger ’14

“Investigating Methods of Inertial Navigation as a Tool for Mapping Complicated Human Motion such as that during Roller Coaster Rides”
Faculty Mentor: Peter Sheldon, Chair of the Physics Department, Professor of Physics

Inertial navigation has long been used for measurement of position and orientation in commercial travel (boats, planes), but the systems are complicated and expensive. GPS is good for two-dimensional positioning on the surface of the Earth but not for orientation or altitude, and GPS signals are not always available. Recent improvements in micro-machined electromechanical systems (MEMS), however, have made the application of inertial techniques to individual human motion possible. We became interested in this project through our work in mapping roller coaster rides. In this project, we study how well various inertial navigation techniques work in relation to their portability and price using three different methods: accelerometers (measuring acceleration) and microelectromechanical integration, video analysis, and accelerometers corrected by gyroscopes (measuring orientation). We collect data using the new technology in the iPod Touch and compare it to data taken by a relatively high-tech Inertia Measurement Unit made for this purpose.
Project supported by the Randolph College Summer Research Program.

Erin Vasta ’15, Adam Fabirkiewicz ’14, Amanda Fischer ’15, and Colton Wood ’14

“In Cursive, I Love You”
Faculty Mentors: Brooke Marcy, Adjunct, Assistant Professor of Art, with assistance from Ryan Woodhouse, Visiting Instructor in Music (See Adam Fabirkiewicz’14, page 8)

Colton Wood ’14, Adam Fabirkiewicz ’14, Amanda Fischer ’15, and Erin Vasta ’15

“In Cursive, I Love You”
Faculty Mentors: Brooke Marcy, Adjunct, Assistant Professor of Art, with assistance from Ryan Woodhouse, Visiting Instructor in Music (See Adam Fabirkiewicz’14, page 8)

PRESENTATIONS

Azeeza Abbasi ’15, Lee Nutter ’13, and Kayya Pradhan ’14

“Improving Lynchburg’s Bus System through Sustainable Innovation”
Faculty Mentor: Karin Warren, Associate Professor and Herzog Family Chair in Environmental Studies

In Lynchburg, many people living below the poverty line do not have easy access to affordable food access points, a result of the city’s “food desert” problem and the fact that the bus routes to distant grocery stores do not always reach people living in such areas. In addition, inefficient bus routes make for long waits and increased fossil fuel usage. Our project redesigns some of the bus routes and creates a food shuttle route in Lynchburg to reduce long-term energy consumption and give more people access to food pantries and grocery stores, thus contributing to Lynchburg’s social and environmental sustainability.

Ireoluwa Adeleye ’14

“Unraveling Archeological History at Jefferson’s Poplar Forest using Geophysical Methods”
Faculty Mentors: Sarah Lawson, Assistant Professor of Environmental Science and Physics, and Karin Warren, Associate Professor and Herzog Family Chair in Environmental Studies

Most people think of Monticello when they think of Thomas Jefferson, but he also maintained a leisure home at Poplar Forest, Virginia, where archaeological discovery and research is underway to determine how to authentically restore the house and grounds. My project involves the use of geophysical methods, including soil particle size analysis and ground-penetrating radar, to unravel some of the history at Poplar Forest. Soil analysis reveals the kind of rocks used for the pavement of Jefferson’s house, which can indicate a construction and pathway timeline. Based on stories that dated from Jefferson’s time, there may have been a blacksmith’s shop, slave cabins, and probably a carpentry shop. Using ground-penetrating radar, we can search for remnants from these structures, such as metal fragments from the tool shop, and attempt to piece together their original locations. This work will contribute to the efforts of authentic and educational restoration at Poplar Forest.
Project supported by the Randolph Environmental Studies and Science Department.

Thawda Aung ’13 and Jim Koon ’14

“Mobile Monitoring: Assessing Gate Speed, Step Count and Step-Step Variability in Natural Environments Using Cellular Phones”
Faculty Mentor: Katrin Schenk, Assistant Professor of Physics

Gait speed, step count, and inter-step length variability are highly relevant measures of individual functional status. Our research suggests that cellular telephones may be repurposed to measure a community-dwelling individual’s functional status in a noninvasive, continuous, precise, and inexpensive manner. In a previous study, we validated our methods for detecting gait speed and step counts from accelerometer data collected from cellular phones. The algorithms used in this study were developed for subjects walking on a treadmill. We report here a generalization of these algorithms to include more natural environments. Volunteers collected data under a variety of conditions, including shopping, city walking, walking on an outdoor track, climbing and descending steps, and driving. Subjects kept a detailed log of their activities. Subjects also wore a pedometer and used a hand-held counter to specifically quantify steps. Gait speed was cross-validated through the track data; footfalls were cross-validated by pedometer and counter.
Project supported by the Alzheimers’s Association in collaboration with the University of Nebraska Medical Center and Northwestern University.
Ryan Blackwell '13
“Liberal Arts in Crisis? The Evolution of an Institution”
Faculty Mentor: Jennifer Gauthier, Associate Professor of Communication Studies
This thesis examines the coming together of my scholarly work in the field of communications and my creative work in film. It is a response to the tremendous feeling of gratitude that I have for Randolph College in particular and liberal arts education in general. I believe in the superiority of a broad education to a narrow one, and I hope that my film will cause others to also believe in the strength and importance of a liberal arts education, even in today’s fast-paced, goal-oriented, win-or-lose society. My intent was to use Randolph College as a case study as part of the larger argument, and therefore the identity, history, ideology, legacy, and future of the College figure prominently.
Project supported by the Randolph Innovative Student Experience Program and the Blackwell family.

Joanne Bourque, M.A.T.
Potential of Web-based Technology in Art Education: Use of a WebQuest to Facilitate “Knowledge Transfer and Application”
Faculty Mentor: Roberta Parker, Adjunct Instructor in Education
Web-based technologies have been shown to positively influence student motivation and achievement; unfortunately, art educators have fallen behind in implementing technology-driven instruction, which leaves their students at a disadvantage. Art education provides students with numerous valuable skills: observation, awareness, self-reflection, inquiry research, and ways to represent or interact with the world. Recently, researchers have highlighted how integrating art instruction with technology has the potential to develop these skills to a greater extent. This study explores the potential of WebQuest, a web-based activity, in influencing student achievement. WebQuest offers students a new vehicle for learning that incorporates guided inquiry, independent investigation, and student collaboration. With the use of this technology, students can develop a more thorough artistic knowledge base and better apply the knowledge and skills they have learned when completing assessments and creating artworks.

Sarah Carter ’14, Connor Dye ’15, Amy Jacobs ’14, and Stephany West ’15
“Is it Possible to Buy a (USDA-defined) Balanced Meal in Lynchburg’s Food Desert?”
Faculty Mentor: John Abell, Professor of Economics
Previous research established that Lynchburg’s downtown is a food desert, meaning that many residents do not have easy access to affordable and nutritious food. This year’s project asks the following questions: Suppose that downtown Lynchburg residents wish to buy not just food, but a balanced meal, as defined by the U.S. Department of Agriculture. Is this possible? What kinds of foods might make up such a balanced meal? What would be the nutritional content? What would such meals cost? To answer these questions, students split into three teams and collected data from the following five categories of food outlets: convenience stores, grocery stores, fast food restaurants, Hanna’s Health store, and the Lynchburg Community Market. Using the new USDA food plate and portion size guidelines, the teams determined whether it is possible to feed a family of four a balanced meal in any of the various food outlets serving the downtown area.

Hannah Coleman ’13
“The Experience of Female Students Interacting in the Hookup World”
Faculty Mentor: Danielle Currier, Assistant Professor of Sociology
Current research on sexuality shows that while women “hook up” at similar rates to men, they are more emotionally and physically satisfied in committed relationships because they are more likely to experience sexual pleasure with a permanent partner. What current studies do not research, however, are external variables affecting women’s happiness in hookups and relationships. Using interview data from a small southern liberal arts college, I address the personal and social conflicts women experience in being simultaneously receptive to hookups and socially stigmatized for participating in such activities. I examine the gendered double standard in college hookups, focusing on ways women self-present in this world without being socially stigmatized, and consider the following questions: why do we as a society still believe that women are unable to participate in casual sex; how do women navigate this world without being stigmatized; and how do women cope with stigmatization?

Rachel Cox ’13, Adam Fabirkiewicz ’14, Amanda Fischer ’15, Erin Vasta ’15, Colton Wood ’14
“In Cursive, I Love You”
Faculty Mentor: Brooke Marcy, Adjunct Assistant Professor of Art
(See Adam Fabirkiewicz ’14, page 13)

Lauren Dowdle ’13
“Sexual Dimorphism in Lizards: Does Sexual Selection Tell the Full Story?”
Faculty Mentor: Kristen Bliss, Chair of the Biology Department, Associate Professor of Biology
A survey of approximately 50 articles was conducted on sexual dimorphism in lizards. Sexual dimorphism is the difference between the sexes of a species, not including sexual organ differences. There are many types of dimorphisms including size, shape, and color dimorphisms. The research question for this project was, “Is sexual selection the singular cause of sexual dimorphism or does it simply play a role, influenced by other forces, in the causation of sexual dimorphism?” Other forces involved in causing sexual dimorphism are fecundity selection, energy allocation, and sex hormones like testosterone. The research revealed that sexual selection does play a role in causing sexual dimorphism, but the other forces along with sexual selection can cause dimorphism either alone or in concert with each other. For example, individual species’ dimorphisms are caused by one force acting alone, but in some groups of lizards two or more forces act together to cause dimorphism.

Connor Dye ’14, Sarah Carter ’14, Amy Jacobs ’14, and Stephany West ’15
“Is it Possible to Buy a (USDA-defined) Balanced Meal in Lynchburg’s Food Desert?”
Faculty Mentor: John Abell, Professor of Economics
(See Sarah Carter ’14, page 12)

Brooke Edwards ’13
“Comparing Energy Use for Municipal and Bottled Water”
Faculty Mentor: Sarah Lawson, Assistant Professor of Environmental Science and Physics
Because energy today is in high demand and living sustainably is becoming more recognized as a need, it is important to think of changes we can make in our everyday lives to save energy. One overlooked use of energy is the supply and distribution of water, including that of bottled water and municipal water. This study compares the energy consumption of municipal water to that of bottled water in Lynchburg, Virginia. Our comparison of the supply and distribution cycles of municipal and bottled water from source to point of consumption indicates that energy use for municipal water and for bottled water is significant and that both industries have opportunities for improvement.
Project supported by the Randolph Innovative Student Experience Program.

Adam Eller ’13
“Environmental Pathways of Polybrominated Diphenyl Ethers (PBDEs) Entering the James River”
Faculty Mentors: Karin Warren, Associate Professor and Herzog Family Chair in Environmental Studies; Sarah Lawson, Assistant Professor of Environmental Science and Physics; and William Bare, Chair of the Chemistry Department, Associate Professor of Chemistry
Polybrominated diphenyl ethers (PBDEs) are anthropogenic chemicals added to numerous consumer products in order to meet fire-safety standards. Originally thought to be inert and non-toxic, PBDEs may actually pose severe health risks to humans and other species, according to emerging scientific data. Traces of these brominated flame retardants have been found in the blood and tissues of virtually every person or creature tested, even in remote areas of the world. While water research has demonstrated the presence of PBDEs in coastal waters of the U.S., much less is known about the presence of PBDEs in inland surface waters, particularly in central Virginia. This research project quantifies the point-source discharge of PBDEs occurring from the Lynchburg Regional Wastewater Treatment Plant and examines the concentration of PBDEs.
Project supported by Randolph’s Environmental Studies and Science Department and Randolph’s Chemistry Department.

Adam Fabirkiewicz ’14, Amanda Fischer ’15, Erin Vasta ’15, Colton Wood ’14, and Rachel Cox ’13
“In Cursive, I Love You”
Faculty Mentor: Brooke Marcy, Adjunct Assistant Professor of Art
This performance uses an original poem, “In Cursive, I Love You,” written by Erin Vasta ’15 as inspiration for the music and movement. The composers, Adam Fabirkiewicz ’14 and Colton Wood ’14, use the poem to inspire their composition of the music, which they will perform live. The choreographer, Amanda Fischer ’15, used a combination of the message of the poem and the music to create a contemporary dance. Rachel Cox ’13 designed the lighting to enhance the visual experience. The poem influenced decisions about costuming and lighting for the performance. The purpose of this performance is to illustrate how different types of artists can collaborate to create works of great depth.
Amanda Fischer ’15, Adam Fabrikewicz ’14, Erin Vasta ’15, Colton Wood ’14, and Rachel Cox ’13
“In Cursive, I Love You”
Faculty Mentor: Brooke Marcy, Adjunct Assistant Professor of Art
(See Adam Fabrikewicz ’14, page 13)

Catherine Godley ’13
“The Construction of Gender on Facebook”
Faculty Mentor: Jennifer Gauthier, Associate Professor of Communication Studies
In today’s digital world, social networking sites have become widely popular throughout the world. While these websites are typically viewed as communication tools, they are also often used as forms of self-expression. An individual’s profile can be viewed as an extension of himself or herself; however, it only shows part of the picture. The individual differences in the information posted on these social networking sites and the way the websites are used can say a lot about the identity the creator is trying to create for him- or herself and others. My study looks at the profile pages of college students through a cyberfeminist perspective to determine how individuals construct their gender identities on Facebook, how men and women use Facebook differently, and what these differences imply about the construction of gender.

Sara Graul ’13 and Eli Shadrach ’14
“Digitizing the Randolph College Natural History Collection”
Faculty Mentor: Douglas Shedd, The Catherine Ehrman Thoresen ’23 and William E. Thoresen Professor of Biology
Staff Mentor: Emily Smith ’12, Randolph College Natural History Collection curatorial coordinator
We have begun a project, under the direction of Douglas Shedd and Emily Smith, to digitize the holdings of the natural history collection at Randolph College, with an emphasis on the avian collection. Natural history specimens are key reference tools for examining the characteristics of species, for making comparisons between species, and for conducting studies of evolutionary changes in past and present populations. As a result of our work, the Randolph College avian collection soon will be available to researchers worldwide through an online, visual database. Eventually, the collected data may be uploaded to international databases such as ORNIS and Encylopedia of Life. Over the course of our work, we learned a great deal about the difference between photography as art versus photography as a scientific reference and developed new techniques appropriate for capturing scientific images suitable for use in a digitized collection catalog.
Project supported by the Virginia Academy of Science.

Cameron Hall ’13
“Sleepwalking: From Script, to Film, to Fiction”
Faculty Mentors: Bunny Godjohn, Assistant Professor of English, and Chad Beck, Chair of the Communication Studies Department, Assistant Professor of Communication Studies
For my senior project, I have developed characters and situations that find their final form in a drama, fiction, and a short film. The piece follows a protagonist who has lost control of his subconscious and how he is able to find purpose in his life while helping a mother and child find connection in theirs. The film illustrates specific creative aesthetics (linear editing process, micro-budget DSLR filmmaking, flash fiction writing, screenwriting) and both applies and critiques theoretical perspectives (feminism and post-feminism, hegemonic masculinity) through the characters and their relationships. I also engage literary connections, influenced by examples such as Roman Polanski’s adaptation of Thomas Hardy’s Tess of the D’Urbervilles for his film Tess. During my presentation I will discuss the pitfalls and opportunities I have discovered.
Project supported by the Randolph Innovative Student Experience Program.

Michael Harris ’13
“Vampire Loads Are Sucking Us Dry: Energy Use at Randolph College”
Faculty Mentor: Sarah Lawson, Assistant Professor of Environmental Science and Physics
The importance of reducing energy use has received widespread attention in recent years as greenhouse gases accumulate and fossil fuels are depleted. Implementing energy-saving technology and behaviors in buildings can produce large returns within a relatively short time frame and reduce electric and gas expenditures, which is especially relevant in our current economy. We examined energy use in two residential and two academic buildings on the Randolph College campus. From the data collected, we analyzed trends for day and night-time energy use, vampire load effects, and student behavior. Based on this analysis, we conclude that significant energy savings are possible with minor modifications.

Amy Jacobs ’14, Sarah Carter ’14, Connor Dye ’15, and Stephany West ’15
“Is it Possible to Buy a (USDA-defined) Balanced Meal in Lynchburg’s Food Desert?”
Faculty Mentor: John Abell, Professor of Economics
(See Sarah Carter ’14, page 12)

Mimansa Joshi ’14, Evan Pai ’13, and Qi Zhang ’13
“Water-Energy Nexus”
Faculty Mentor: Sarah Lawson, Assistant Professor of Environmental Science and Physics
Water and energy are recognized as indispensable inputs in modern times, and there exists an undeniable connection between them. The interconnectedness between them is frequently overlooked, though both play a major role in almost all industry sectors today. The relationship between the two involves water use in the production of electricity energy to collect, clean, move, store, and dispose water. The presentation will address topics such as the impact of climate change on water supplies including changes in runoff and infiltration due to changes in rainfall intensity, distribution, and quantities. We assessed use of water in energy production in energy sources like hydropower, coal, and nuclear. After researching on oil spills and hydraulic fracking, we included topics on contamination of water due to energy use and use of energy for distribution and treatment of water.

Juliana Joyce ’13
“Digging the Manic Pixie Mythos: Contemporary Film Depictions of Alternative Femininity”
Faculty Mentor: Chad Beck, Chair of the Communication Studies Department, Assistant Professor of Communication Studies
With unusually colored hair, a thrift-shop aesthetic, an affinity for the Smiths, and enough social awkwardness to be lovable, the alternative girl has found her way out of the feverish dreams of those teenage “posts” and onto the silver screen. Over the last 20 years, television and film have increasingly featured quirky, alternative female characters alongside the usual homogenized embodiments of ideal feminine beauty. These new characters fall into the trope of the Manic Pixie Dream Girl, a character coined after Kirsten Dunst’s character in Elizabettown. Despite their alternative appearance and personal backgrounds, however, these characters still perpetuate traditional ideas of femininity and beauty that are problematic and patriarchal, presenting a flawed representation of both the alternative lifestyle and womanhood.

Shuang Li ’14
“Facing the Ensemble: A Conductor’s View of Music Performance”
Faculty Mentor: Randall Spear, Associate Professor of Music
To an audience member, a conductor may seem to perform in silence merely waving a baton from the confined space of the podium to elicit great music. But the baton is not a conductor’s only instrument. Her hands, arms, body, and face must convey how the music should be performed. She must have extensive knowledge of instruments, music theory, and music history, and an ear for analyzing sound in real time. For a novice, the required levels of preparation, nerve, and responsibility can be overwhelming. After mastering basic techniques, she must apply multiple layers of conducting styles and concepts to real rehearsals. This training has benefited from video technology, and recording rehearsals is now the
most common method of assessing and improving craft. Using videos and an account of my own growth as a conductor, I document my progress and discuss the rich experience of conducting ensembles on stage.

Sarah Maki ’13

“Isn’t It Romantic? Masculinities on Television’s Popular Sitcom How I Met Your Mother”
Faculty Mentor: Chad Beck, Chair of the Communication Studies Department, Assistant Professor of Communication Studies

In social settings, males are careful to draw definitive lines between their heterosexual relationships and homosexual relationships, and recently a term has arisen to accentuate that: the bromance. These bromances are affectionate, sometimes homoerotic, and emotional, but never homosexual. This study focuses on the increasing popularity of the bromance in prime-time television situation comedies and on the specific male relationships and masculinities in the CBS series How I Met Your Mother. My analysis of the relationships in this series explores rationales for the acceptance of relationships that straddle heterosexuality and homosexuality and identifies how heteronormative ideology is perpetuated. The defining characteristics of the male characters, their interpersonal relationships, and the development of their masculinities as the series progresses are the basis of understanding why these male characters are successful in maintaining their masculinities and sexual identities.

Marisa Mendez ’13

“Behind the Scenes: A Look at the Costumes and Gender Roles in Ballet”
Faculty Mentor: Marjorie Wheeler-Barclay, British History Program Coordinator, Chair of the History Department, Charles A. Dana Professor of History

Tutus, pink tights, and pointe shoes have long been the defining characteristics of a ballerina. This image, however, was not always what ballerinas looked like. Throughout the last 200 years, ballet costume has been changing and evolving to cope with not only the needs of ballerinas but also the demands of audiences to keep the ballet new and fresh. Who was the first ballerina to dance on her toes? Why did the tutu shorten over the last 200 years? Who was George Balanchine? In addition, though ballerinas have long been the face of ballet, men have dominated behind the scenes, controlling companies, creating ballets, and teaching the dancers. In this talk I explore the gender balance in ballet and how costume has affected that balance.

Marisa Mendez ’13

“Pappy’s Speech: A Novel Approach to Creative Collaboration”
Faculty Mentor: Laura-Gray Street, Assistant Professor of English

Most novels have one author on the byline. J.K. Rowling is the sole author of the Harry Potter series. Kathryn Stockett is the only name to appear on the cover of The Help. If you flip through the beginning pages of a book, however, the author lists several, if not dozens, of names of people who helped create the novel. Who are these people who help them? What do they do? What would happen if this aid occurs on a much smaller scale? In this talk I discuss how Professor Laura-Gray Street was able to revise, rewrite, and rework her novel, Pappy’s Speech, over the course of the summer with a student’s help. I explore what we researched and discussed and what truly goes into writing a novel.

Project supported by the Randolph College Summer Research Program.

Tu Nguyen ’15

“A Simplified Model to Determine the Runoff Reduction Credit for Rainwater Harvesting”
Faculty Mentor: Sarah Lawson, Assistant Professor of Environmental Science and Physics

The negative effects of stormwater runoff on surface waters such as the Chesapeake Bay and the high costs of treating this runoff have led to increasingly stringent stormwater regulations. Many states are putting more emphasis on reducing the total volume of runoff from sites. This increased attention to volume reduction has made rainwater harvesting a viable option for stormwater management. Estimating the effectiveness of rainwater harvesting for runoff reduction has proven difficult, so the state of Virginia has created a model to determine the runoff credit from tank size and demand for harvested rainwater. Because using this model is quite time consuming and challenging for designers, we have developed a simplified version that allows designers to determine their desired runoff credit more easily. We plan to expand the model for other states in the U.S.

Lee Nutter ’13, Auzeen Abbassi ’15, and Kayya Pradhan ’14

“Improving Lynchburg’s Bus System through Sustainable Innovation”
Faculty Mentor: Karin Warren, Associate Professor and Herzog Family Chair in Environmental Studies

(See Auzeen Abbassi ’15, page 11)
Chris Staats '13
"Hidden Knowledge: Asteroid Occultation Timing"
Faculty Mentor: Jack Gross, Adjunct Instructor in Physics; and Peter Sheldon, Chair of the Physics Department, Professor of Physics
A number of studies have compared the effect of conventional versus free-range, organic rearing practices on chicken health and the quality of chicken products intended for human consumption. However, the impact of forage access on the quality of eggs from organic, free-range hens has not been effectively assessed. In this study, we compared the performance of hens reared in a free-range enclosure with ample forage to those reared in a free-range enclosure without forage. Both groups were fed an organic, grain-based ration and monitored for 14 weeks. Forage access had no significant effect on laying hen production. A number of studies have compared the effect of conventional versus free-range, organic rearing practices on chicken health and the quality of chicken products intended for human consumption. However, the impact of forage access on the quality of eggs from organic, free-range hens has not been effectively assessed. In this study, we compared the performance of hens reared in a free-range enclosure with ample forage to those reared in a free-range enclosure without forage. Both groups were fed an organic, grain-based ration and monitored for 14 weeks. Forage access had no significant effect on laying hen production. A number of studies have compared the effect of conventional versus free-range, organic rearing practices on chicken health and the quality of chicken products intended for human consumption. However, the impact of forage access on the quality of eggs from organic, free-range hens has not been effectively assessed. In this study, we compared the performance of hens reared in a free-range enclosure with ample forage to those reared in a free-range enclosure without forage. Both groups were fed an organic, grain-based ration and monitored for 14 weeks. Forage access had no significant effect on laying hen production. A number of studies have compared the effect of conventional versus free-range, organic rearing practices on chicken health and the quality of chicken products intended for human consumption. However, the impact of forage access on the quality of eggs from organic, free-range hens has not been effectively assessed. In this study, we compared the performance of hens reared in a free-range enclosure with ample forage to those reared in a free-range enclosure without forage. Both groups were fed an organic, grain-based ration and monitored for 14 weeks. Forage access had no significant effect on laying hen production. A number of studies have compared the effect of conventional versus free-range, organic rearing practices on chicken health and the quality of chicken products intended for human consumption. However, the impact of forage access on the quality of eggs from organic, free-range hens has not been effectively assessed. In this study, we compared the performance of hens reared in a free-range enclosure with ample forage to those reared in a free-range enclosure without forage. Both groups were fed an organic, grain-based ration and monitored for 14 weeks. Forage access had no significant effect on laying hen production. A number of studies have compared the effect of conventional versus free-range, organic rearing practices on chicken health and the quality of chicken products intended for human consumption. However, the impact of forage access on the quality of eggs from organic, free-range hens has not been effectively assessed. In this study, we compared the performance of hens reared in a free-range enclosure with ample forage to those reared in a free-range enclosure without forage. Both groups were fed an organic, grain-based ration and monitored for 14 weeks. Forage access had no significant effect on laying hen production. A number of studies have compared the effect of conventional versus free-range, organic rearing practices on chicken health and the quality of chicken products intended for human consumption. However, the impact of forage access on the quality of eggs from organic, free-range hens has not been effectively assessed. In this study, we compared the performance of hens reared in a free-range enclosure with ample forage to those reared in a free-range enclosure without forage. Both groups were fed an organic, grain-based ration and monitored for 14 weeks. Forage access had no significant effect on laying hen produc
Qi Zhang ’13, Mimansha Joshi ’14, and Evan Pai ’13
“Water-Energy Nexus”
Faculty Mentor: Sarah Lawson, Assistant Professor of Environmental Science and Physics
(See Mimansha Joshi ’14, page 15)

Zhe Zhang ’15
“Strengthening the Four Color Theorem”
Faculty Mentor: Marc Ordower, Associate Professor of Mathematics
The celebrated Four Color Theorem was finally proven by Kenneth Appel and Wolfgang Hacken in 1976 after more than a century of attempts. The theorem states a fundamental truth known to any cartographer: to color any map of contiguous regions, real or imaginary, so that no two regions that share a border are colored the same requires no more than four colors. In this talk, we describe our progress in formulating and proving a stronger theorem by adding additional restrictions to the coloring, while still maintaining a four-color maximum.