Randolph College

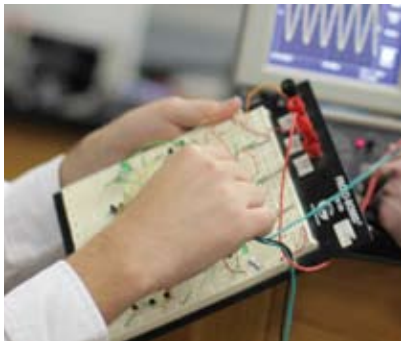
Founded as Randolph-Macon Woman's College in 1891




Third Symposium of Artists & Scholars

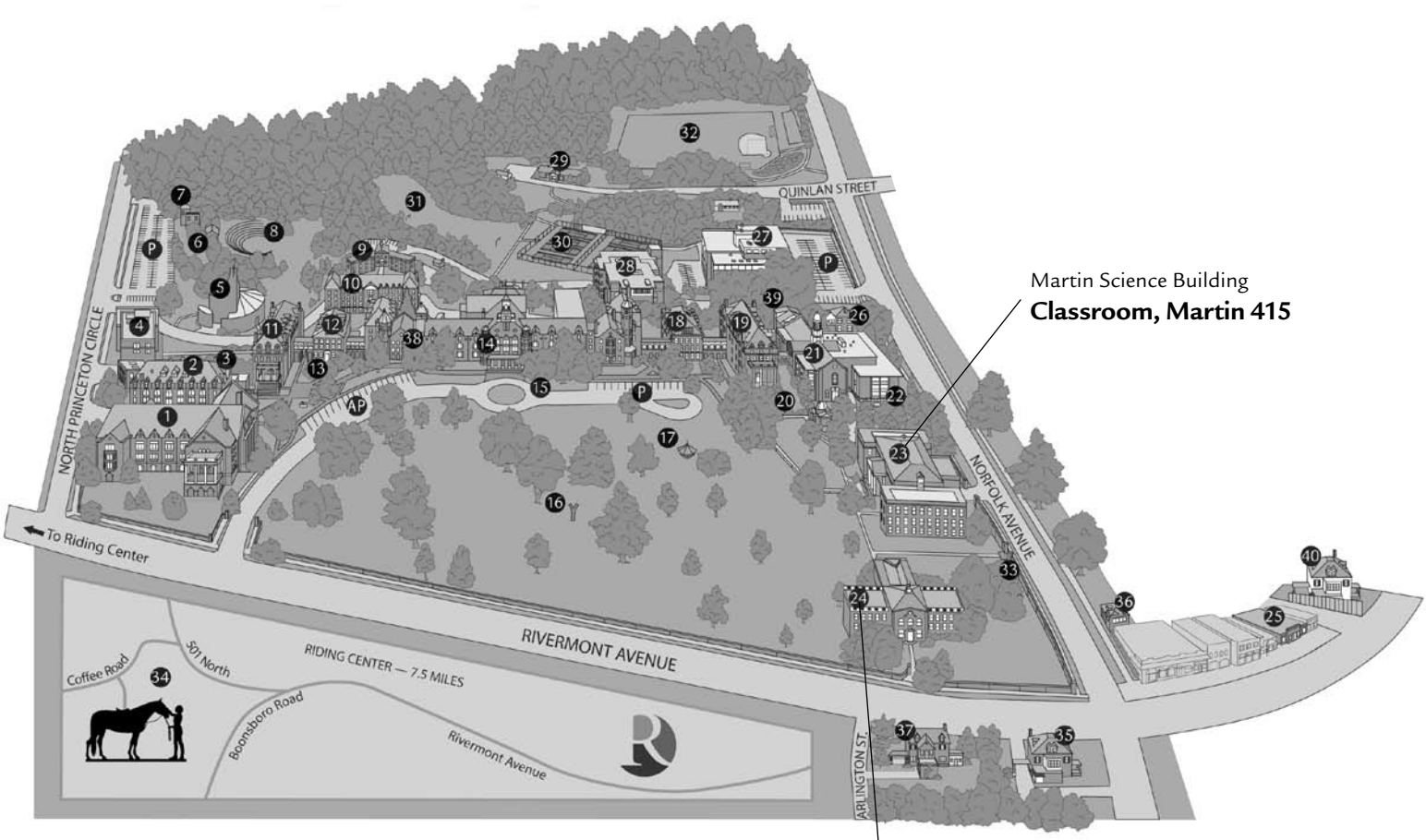
Celebrating Student Excellence

April 22, 2011



Randolph College

1 Smith Memorial Building and Smith Hall Theatre and Smith Banquet Hall
2 Wright Residence Hall
3 Cheatham Dining Hall
4 Bell Residence Hall
5 Houston Memorial Chapel
6 The Pines Cottage
7 Winfree Observatory
8 The Mabel K. Whiteside Greek Theatre (The Dell)
9 Terrell Health and Counseling Centers
10 Webb Residence Hall
11 West Residence Hall and Darden Center
12 Thoresen Hall (Admissions Office)
13 Sundial
14 Main Hall (student center, administrative offices, residence hall, classrooms, Dept. of Safety and Security)
15 Even Post
16 Odd Tree
17 Gazebo
18 Psychology Building
19 Moore Residence Hall
20 Mary's Garden
21 Lipscomb Library
22 Botanic Garden
23 **Martin Science Building**
24 **Presser Hall** and The Wimberly Recital Hall
25 The Macon Bookshop
26 Norfolk House
27 Physical Education and Recreation Building
28 Leggett Building and Thoresen Theatre
29 Maier Museum of Art
30 Tennis Courts
31 Athletic Field
32 Athletic Field
33 Margaret's Gate
34 Riding Center
35 Doyle House
36 Butler House
37 Casey Alumnae House
38 Learning Resources Center
39 Campus Post Office
40 The Rivermont House
P Parking Areas
AP Admissions Parking



Martin Science Building
Classroom, Martin 415

Presser Hall
The Wimberly Recital Hall
Presser Hall Lobby

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The Symposium of Artists and Scholars celebrates the scholarship and creativity of the Randolph College student body through an afternoon devoted entirely to our students' accomplishments.

The College's third 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 mathematics 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, study abroad, and independent projects.

welcome

April 22, 2011

Dear Symposium Attendee,

On behalf of Randolph College, I welcome you to the third *Symposium of Artists and Scholars: Celebrating Student Excellence.* A showcase for student achievement within the context of the liberal arts education, this Symposium highlights the excellence of intellectual inquiry and artistic expression characteristic of the Randolph College experience.

Our students are talented and creative thinkers. Our faculty mentors are exceptionally dedicated to helping students realize their passions. The talks and poster sessions presented as part of this Symposium result from collaborative research and scholarship opportunities unique to Randolph College. I am certain you will enjoy every session you attend.

I extend my thanks to the students who submitted proposals and to those who will be presenting; to the faculty members who supported these scholars and artists as they developed their original projects; and to the members of the planning committee whose efforts made this celebration a reality. Congratulations to all!

Sincerely,

John E. Klein
President

Keynote Address

by Constance Clark

"'They did not exist until Art had invented them': Science, Art, Technology, and History"

Randolph College is exceptionally pleased to welcome historian Constance Clark back to Lynchburg for the 2011 *Symposium of Artists and Scholars.* An authority on the evolution debate in America, Clark was an assistant professor of American culture at Randolph-Macon Woman's College and is currently associate professor of humanities and arts at Worcester Polytechnic Institute in Massachusetts.

In exploring the 100-year debate on evolution in American society, Clark has taken a new approach, focusing on the role of images including cartoons, paintings, sculptures, and schematics. Through her research on this fascinating and unexplored facet of the debate, she opens the door to wider study of the role of science and scientists in American culture, examining the ways in which imagery has been used to enhance—or to confound—the communication between scientists and the public at large on an issue of great public interest.

Clark's highly acclaimed 2009 book, *God—or Gorilla: Images of Evolution in the Jazz Age,* presents an analysis of how the evolution debate played out as a war of visual imagery in the era surrounding the famous Scopes trial that captured the attention of the nation in the 1920s. As Clark points out, "The debate was about so much more than the substance of the science itself." The same is true of this important book.

schedule

1:30–2:30 P.M. ***The Wimberly Recital Hall***

Keynote Address

Constance Clark
"'They did not exist until Art had invented them': Science, Art, Technology, and History"

3–4 P.M. ***The Wimberly Recital Hall***

Session 1a: "Environmental Excursions"

- Ravi Shukla, "Few? Many? All?: Identifying the Culprits of Environmental Destruction"
- Wenjun Xu, "Has Environmental Education Awakened the Consumer Conscience? An Analysis of College Students' Environmental Literacy and Willingness to Pay for Organic Products"
- Lucas Brady and Isabelle Dom, "Inner City Food Deserts: Case Study of Lynchburg, VA"

3–4 P.M. ***Martin 415***

Session 1b: "The Art of Science? The Science of Art?"

- Lydia Kirchner, "Nature Perfected: The Art of Botanical Illustration"
- Arielle Orem, "Corporations and Contemporary Art: The Museum as a Medium for Corporate Advertising"
- Poojan Pyakurel, "A Theoretical Investigation of the Carcinogenicity of Polycyclic Aromatic Hydrocarbons (PAHs): Diol Epoxide Formation and One Electron Oxidation"

4:15–5:15 P.M. ***The Wimberly Recital Hall***

Session 2: "Marriage, Monuments, and Measurements"

- Kathleen Conti, "The National D-Day Memorial and American Memory"
- Shi Hua, "Finger Digit Ratio as a Predictor of Bargaining Behaviors of Children and Adults in the Ultimatum Game"
- Annamarie Pagel, "Marriage in Victorian England: Legislating Toward Modernity"

5:15–6:15 P.M. ***Presser Hall Lobby***

Session 3: Poster Presentations and Reception

- Thawda Aung, "Cryptology with Mathematica"
- Meredith Humphreys, "Science and Math Links: Research Based Teaching"
- Ludovic Lemaitre, "Edible Landscaping at Randolph College and Beyond"
- Poojan Pyakurel, "Investigation of the Properties of Luminescent Transition Metal Compounds in Silicon Dioxide Polymers"
- Erinn Sudol and Louise Searle, "Partnering with Local Government to Promote Sustainable Development: Using GIS to Assess Community Open Space"

abstracts

Thawda Aung '13
"Cryptology with Mathematica"
Faculty Mentor: Yesem Kurt, Assistant Professor of Mathematics
Cryptology is the study of encoding and decoding secret messages to enable users to communicate securely over an insecure channel in a way that guarantees their transmissions' privacy and authenticity. For example, the Internet is an insecure channel, yet we do secure transactions such as banking, shopping, and mail exchanges through it. Cryptology gives us the mechanisms that make these transactions possible and practical. In a 2010 Spring semester independent study, I worked on a project in which I studied the mathematics behind cryptography. In the Randolph College Summer Research Program 2010, I implemented, with a software called Mathematica, various cryptosystems and attacks against them as well as some famous ciphers. In this poster presentation, I will share my work from the summer research project and demonstrate how some cryptosystems work in practice using the programs I have written in Mathematica.

Lucas Brady '11, Isabelle Dom '12, Ludovic Lemaitre '11, Mareeha Niaz '12, Louise Searle '12, Reid Winkler '12
"Inner City Food Deserts: Case Study of Lynchburg, VA"
Faculty Mentor: John Abell, Professor of Economics
"Food deserts" are found in inner-city areas where residents have limited access to affordable healthy food. These food deserts occur because grocery stores have abandoned downtown areas in favor of more profitable suburban areas that are perceived as safer. One typically associates food deserts with major cities, yet downtown Lynchburg shares many of the same characteristics. For example, the last downtown grocery store closed in 1973, forcing area residents who often do not own a vehicle to travel as long as forty minutes by bus to the nearest grocery store. In addition, food deserts often occur in impoverished areas and can result in poor nutrition, diabetes, and obesity. Our project necessitated hands-on data collection from numerous downtown corner markets and nearby grocery stores. The project's goal is to test the hypothesis that downtown Lynchburg indeed qualifies as a food desert and to examine the social and political implications.

Kathleen Conti '11
"The National D-Day Memorial and American Memory"
Faculty Mentor: John d'Entremont, Professor of History
Hundreds of World War II veterans die each day. While many surviving veterans fear that people are forgetting the greatest war, fought by the greatest generation, the fiftieth anniversary sparked a flurry of interest. Bedford, Virginia was chosen as the site for the National D-Day Memorial. Nineteen of the "Bedford Boys" died in the Normandy invasion, purportedly the highest-per-capita loss of any town in any Allied nation. The Memorial's existence, however, has been fraught with strife from bankruptcy issues in 2009 to the June 2010 installation of a bust of Joseph Stalin. Varying constituencies have disputed its purpose and future, muddling its effectiveness. Although built "in tribute to the valor, fidelity and sacrifice of Allied Forces on D-Day, June 6, 1944," the National D-Day Memorial has become a battleground over the place of World War II in American memory.

Isabelle Dom '12, Ludovic Lemaitre '11, Mareeha Niaz '12, Louise Searle '12, Reid Winkler '12, Lucas Brady '11
"Inner City Food Deserts: Case Study of Lynchburg, VA"
Faculty Mentor: John Abell, Professor of Economics
(See Lucas Brady, page 5)

Shi Hua '11
"Finger Digit Ratio as a Predictor of Bargaining Behaviors of Children and Adults in the Ultimatum Game"
Faculty Mentors: Dennis Goff, Professor of Psychology, and Beth Schwartz, Professor of Psychology
Finger digit ratio is believed to reflect the influence of prenatal androgen exposure during development. This ratio between the lengths of the index and ring fingers is also referred to as 2D:4D. Previous studies rarely explored digit ratio's predictability of economic behaviors among children. In the present study child participants will play the

Ultimatum Game. It is expected that children with smaller digit ratios will be more likely to reject unfair offers. Similar results are expected among adults.

Meredith Humphreys '12
"Science and Math Links: Research Based Teaching"
Faculty Mentors: Tatiana Gilstrap, Assistant Professor of Environmental Studies and Physics,
Peggy Schimmoeller, Professor of Education, and Peter Sheldon, Associate Professor of Physics
The study investigates and promotes the effects of using a hands-on and inquiry-based method on students' and teachers' attitudes toward science, teachers' use of research-based instructional practices, and student achievement. Through this project we wished to improve achievement and eliminate science and math stereotypes. We also wanted to provide teachers with accurate and verified knowledge, professional development, and resources to enhance science and math education. To meet these goals, a week-long teaching institute was hosted on campus for 60 local teachers. We used the Draw-A-Scientist Test to determine students' and teachers' stereotypes in science, as well as pre- and post-intervention surveys for both teachers and students. The student surveys were given to the teachers' current class and then to their new class in September. Classroom observations were also conducted using RTOP (Reformed Teaching Observation Protocol).

Lydia Kirchner, '11
"Nature Perfected: The Art of Botanical Illustration"
Faculty Mentor: Andrea Campbell, Associate Professor of Art History

Bridging the gap between art and science, "Nature Perfected: The Art of Botanical Illustration" surveys a small selection of European wall charts produced from 1905 to 1975, discovered in the attic of Randolph College's Martin Science Building. Wall charts were introduced during the German state education reform in 1820 to enhance teaching through visual communication as increasing class sizes lent fewer opportunities for hands-on experiences. Botanical illustration has been used to represent specimens of nature since the first century BCE and gained significant popularity through advancement of printing technology. While artists apply scientific concepts such as color theory to perfect their technique, scientists rely on art to conceptualize their subject. In observing nature, scientists and artists alike manipulate and improve nature for better understanding of their subjects. The integration of art and science is evident in the stunning illustrations of the botanical wall charts.

Ludovic Lemaitre '11
"Edible Landscaping at Randolph College and Beyond"
Faculty Mentor: Karin Warren, Associate Professor of Environmental Studies
Edible landscaping is the practice of creating a constructed landscape composed partly or entirely of food-producing plants. This practice represents many advantages over strictly ornamental landscapes because the planted species produce a diverse array of local, nutritious, and cheap food. Depending on the site conditions (soil quality, slope, climate, etc) and use (front-yard, parking lot, college campus, public park, etc), the task of creating an edible landscape can represent various degrees of challenge. The objective of this work is to establish a list of adequate species for campus use, as well as to locate the best areas for their establishment. Considered factors for this project include liabilities to students, aesthetics, low maintenance needs for Buildings & Grounds, etc. In other words, do not expect to see the iconic apple tree in this list but instead a renaissance of species that you might not even have suspected of being edible.

Ludovic Lemaitre '11, Mareeha Niaz '12, Louise Searle '12, Reid Winkler '12, Lucas Brady '11, Isabelle Dom '12
"Inner City Food Deserts: Case Study of Lynchburg, VA"
Faculty Mentor: John Abell, Professor of Economics
(See Lucas Brady, page 5)

Mareeha Niaz '12, Louise Searle '12, Reid Winkler '12, Lucas Brady '11, Isabelle Dom '12, Ludovic Lemaitre '11
"Inner City Food Deserts: Case Study of Lynchburg, VA"
Faculty Mentor: John Abell, Professor of Economics
(See Lucas Brady, page 5)

Arielle Orem '11
"Corporations and Contemporary Art: The Museum as a Medium for Corporate Advertising"
Faculty Mentor: Chad Beck, Assistant Professor of Communication Studies
Procuring funding to support the arts has always been a difficult task. Initially, museums were sustained by wealthy individual donors and government funds. Today, in an increasingly tight economy, government funding for the arts

in the United States has decreased significantly and museums are forced to seek out alternative sources of financial support. Corporations, in an effort to spread their brand to affluent, elite communities, have eagerly partnered with contemporary art museums to fund exhibitions, special events, and educational programs. At one time an institution devoted solely to serving the public need for spaces of creative expression and public discourse, the contemporary museum has been transformed into a vehicle for corporate advertising. This research is focused primarily on the influence that corporate sponsorship has over which artists and artworks are displayed in the museum and how the partnerships between a public institution and private corporation impact the mission of the museum.

Annamarie Pagel '11
"Marriage in Victorian England: Legislating Toward Modernity"
Faculty Mentor: Marjorie Wheeler-Barclay, Professor of History
The institution of marriage in Victorian England underwent dramatic changes throughout the nineteenth century. A religious institution at the turn of the century, marriage was under sole jurisdiction of the Church of England and its ecclesiastical courts. However, by the end of the century, marriage became more secular as ecclesiastical courts lost much of their influence. Additionally, the ideal marriage became based on a companionate, loving relationship between spouses rather than a strategic match made to benefit each family. The perception of children within a marriage also changed as they began to be seen as an essential part of their parents' companionate relationship rather than resources to be used. Changing social ideals gave rise to dissatisfaction with existing legal regulations pertaining to marriage and new legislation allowed the modern ideal to spread more widely and deeply in society. This paper will argue that the Divorce Reform Act of 1858, the Married Women's Property Acts of 1870 and 1882, and the birth control movement modernized the institution of marriage throughout the nineteenth century.

Poojan Pyakurel '11
"Investigation of the Properties of Luminescent Transition Metal Compounds in Silicon Dioxide Polymers"
Faculty Mentor: William Bare, Associate Professor of Chemistry
The present research was conducted to synthesize polymers doped with luminescent compounds that could be used to measure oxygen concentration and to investigate the luminescent properties of $Re(bpy)(CO)_3Cl$ and $Re(bpy)(CO)_3$pyridine doped in silicon dioxide polymers. $Re(bpy)(CO)_3Cl$ and $Re(bpy)(CO)_3$pyridine have been used to accurately measure oxygen quenching, and hence oxygen concentration in solutions. However, there are many limitations such as non-reusability and inconvenience with gaseous samples with solution measurements. Therefore, silicon dioxide polymers were prepared by adding the luminescent compounds in a sol gel recipe. This produced sol gel polymers, which were used to measure the oxygen concentrations in various standards. The results obtained were only fairly accurate in the beginning but were significantly improved after humidity was controlled during the measurements. The polymers were robust and were found to be sensitive not only to oxygen but also to humidity.

Poojan Pyakurel '11
"A Theoretical Investigation of the Carcinogenicity of Polycyclic Aromatic Hydrocarbons (PAHs): Diol Epoxide Formation and One Electron Oxidation"
Faculty Mentor: Kurt Seidman, Professor of Chemistry
Polycyclic Aromatic Hydrocarbons (PAHs) are made up of two or more benzene rings attached together. PAHs were identified as human carcinogens in the early twentieth century after the observation of high incidence of cancer among chimney sweepers. They are formed by incomplete combustion of organic compounds and are ubiquitous in the environment. Experimental evidence suggests that the carcinogenic PAHs have a wide range of potency, and scientists are interested in correlating the structural features of the PAHs to their carcinogenicity. Therefore, various theories such as the diol epoxide formation and one electron oxidation have been developed. All the theories developed so far have numerous exceptions, and thus more than one theory is needed for a more accurate prediction of the carcinogenicity of these compounds. The present study will look at a variety of structural features at once by using multi-linear repression analysis. Such multi-linear regression analyses are predicted to give more accurate results than the calculations currently used.

Louise Searle '12 and Erinn Sudol '12
"Partnering with Local Government to Promote Sustainable Development: Using GIS to Assess Community Open Space"
Faculty Mentor: Rick Barnes, Professor of Psychology and Environmental Studies
Research partnerships between colleges and local government can be an effective way to promote sustainability at the community level. This project applied principles of conservation development to the analysis of undeveloped land in Lynchburg, Virginia. Because of increasing population, Lynchburg must evaluate carefully use of its remaining vacant

properties to protect environmental quality. GIS data were used to assess environmental characteristics of vacant land (such as floodplains, slopes, land cover, and wildlife corridors), and to make recommendations for prioritizing areas for conservation and development. Student researchers learned to use GIS software and participated in meetings with local planning officials about environmental planning initiatives. The study was conducted in collaboration with the Lynchburg Department of Community Development and will inform the City's decisions about future land use. The project provided students with an exceptional opportunity to apply their knowledge of sustainable planning to a significant community issue.

Louise Searle '12, Reid Winkler '12, Lucas Brady '11, Isabelle Dom '12, Ludovic Lemaitre '11, Mareeha Niaz '12
"Inner City Food Deserts: Case Study of Lynchburg, VA"
Faculty Mentor: John Abell, Professor of Economics
(See Lucas Brady, page 5)

Ravi Shukla '12
"Few? Many? All? Identifying the Culprits of Environmental Destruction"
Faculty Mentor: David Schwartz, Professor of Philosophy
Emission from even a single car, theoretically, pollutes the environment. But when that car is one among 600 million cars worldwide, does its contribution toward pollution count? Issues of this nature are known as collective action problems. Isolated individual actions may have negligible effects, but collectively they add up to major consequences. Hence, establishing moral culpability in such cases is very difficult. In the past, philosophers have tried to resolve this problem through utilitarian as well as deontological reasoning. However, this paper approaches the issue from John Rawls' conception of justice. By drawing upon the concept of inter-generational responsibility, this paper aims to provide a new foundation for linking environmental damage to moral wrongdoing.

Erinn Sudol '12 and Louise Searle '12
"Partnering with Local Government to Promote Sustainable Development: Using GIS to Assess Community Open Space"
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Reid Winkler '12, Lucas Brady '11, Isabelle Dom '12, Ludovic Lemaitre '11, Mareeha Niaz '12, Louise Searle '12
"Inner City Food Deserts: Case Study of Lynchburg, VA"
Faculty Mentor: John Abell, Professor of Economics
(See Lucas Brady, page 5)

Wenjun Xu '11
"Has Environmental Education Awakened the Consumer Conscience? An Analysis of College Students' Environmental Literacy and Willingness to Pay for Organic Products"
Faculty Mentor: John Abell, Professor of Economics
In recent years, the movement for sustainable consumption has gained increasing popularity among the public. Increasingly consumers are concerned about the environment while making purchasing decisions. At the same time, however, the sustainable products market remains small with price premiums that discourage many consumers from going green. To further expand this market, many hope to awaken the consumer conscience through environmental literacy that correlates with sustainable purchasing behaviors. In this study, I examine the relationship between college students' environmental literacy and their willingness to pay a price premium for sustainable products in the Greater Lynchburg area. Significant findings may assist policy makers in better positioning environmental education in the development of a sustainable economy.

Symposium sponsored by the
Betty Jo Denton Heick Annual Symposium Endowed Fund

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