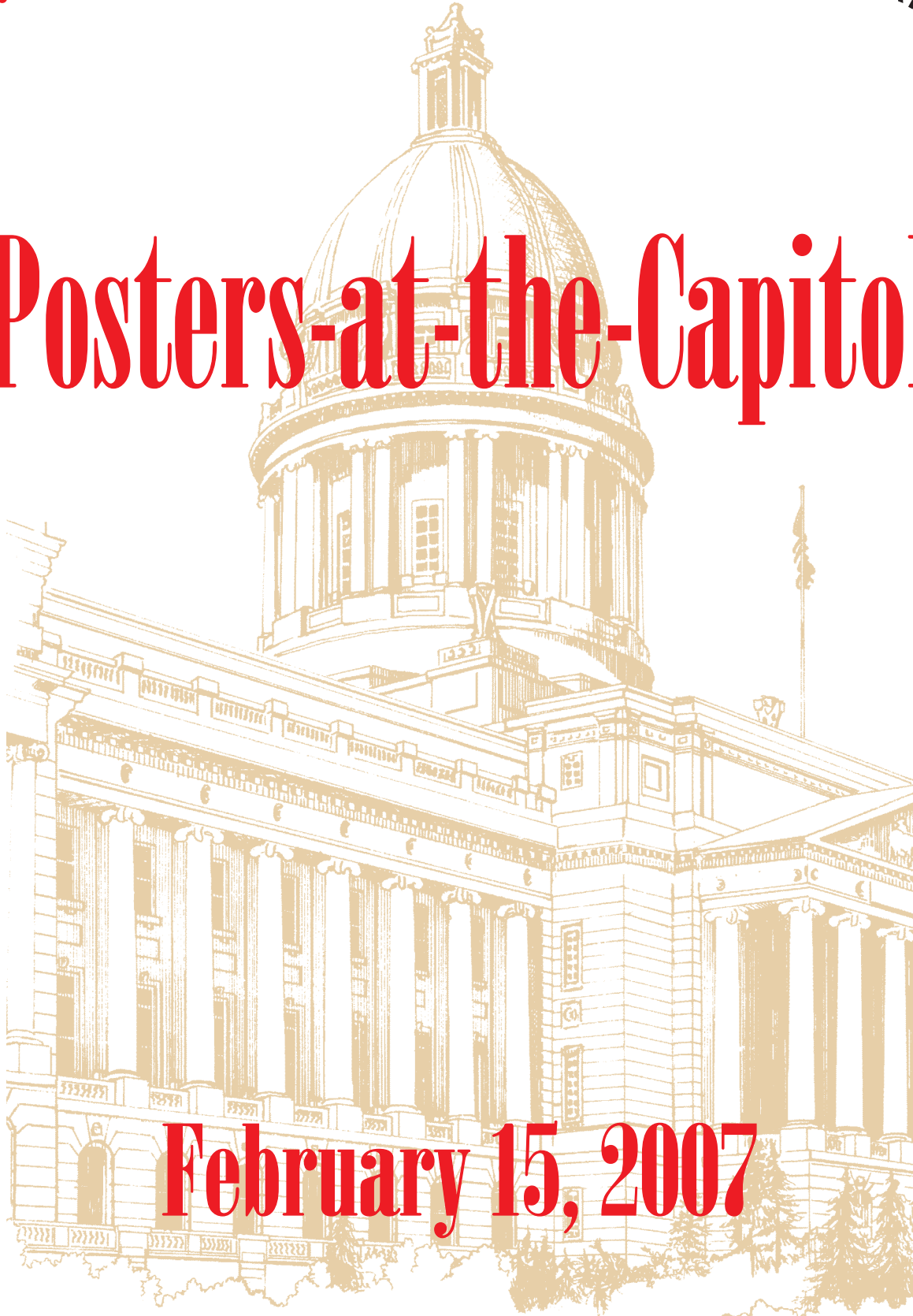


NORTHERN KENTUCKY UNIVERSITY • UNIVERSITY OF KENTUCKY

UNIVERSITY OF LOUISVILLE • WESTERN KENTUCKY UNIVERSITY • KENTUCKY COMMUNITY AND TECHNICAL COLLEGE SYSTEM

MURRAY STATE UNIVERSITY • MOREHEAD STATE UNIVERSITY • KENTUCKY STATE UNIVERSITY

# Posters-at-the-Capitol



## February 15, 2007

EASTERN KENTUCKY UNIVERSITY



## Welcome from President Joanne Glasser of Eastern Kentucky University:

Eastern Kentucky University is proud to participate in the sixth annual *Posters-at-the-Capitol* program because we believe it vividly demonstrates the high quality of our public universities, the tremendous value of public higher education in our Commonwealth and the scholarly and creative achievements of some of the best and brightest students you'll find anywhere.

Just as for every great artist there is a source of inspiration, for each of our participating students there is a wellspring of knowledge, wisdom and support that runs deep at Eastern. The projects represented in this exhibit reflect the collaborative efforts of dedicated members of our outstanding faculty – men and women who pass along to our students their own passion for excellence and for learning. As they nurture our students to reach deep within themselves and realize their full potential, they bring great honor to themselves, our University and the teaching profession.

Undergraduate research is an indisputably integral part of the teaching-learning process at EKU, where students and learning come first. As a “School of Opportunity,” we are committed to providing all our students with diverse educational opportunities that augment and enhance their classroom experiences and develop life-long habits of scholarship and intellectual curiosity. Each year, our students’ exemplary work is displayed in a week-long Undergraduate Presentation Showcase. This discovery and application of new knowledge is exhilarating for the student participants and uplifting to our entire campus community.

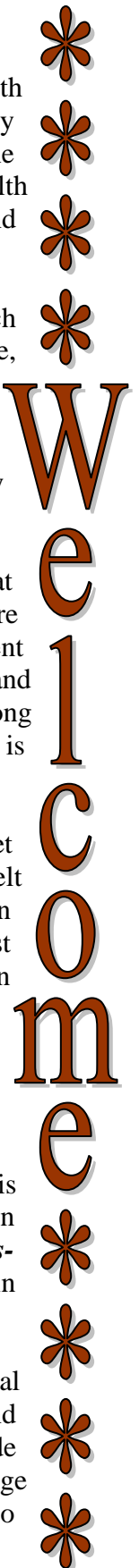
I applaud all the faculty mentors in the *Posters-at-the-Capitol* program for providing yet another quality learning experience for their students. To all the students, I offer my heartfelt congratulations and this challenge: let this experience be only the beginning of an invigorating educational journey. As I often say about Eastern Kentucky University, the best is yet to come in your life as long as you continue, in the words of Johann Wolfgang von Goethe, to “dream no small dreams.”



## Welcome from President Michael McCall of the Kentucky Community and Technical College System

The Kentucky Community and Technical College System is delighted to join Kentucky’s public postsecondary institutions in hosting this year’s celebration. I applaud the efforts of the *Posters-at-the-Capitol* Organizing Committee and our university partners in promoting innovative student research and scholarship.

Engaging students in substantive research projects stimulates critical thinking and builds a strong foundation for advanced research and professional development after graduation. Undergraduate research opportunities also provide student-scholars the added benefits of faculty expertise and mentorship. Moreover, college students with solid research skills typically achieve greater educational outcomes and are also more likely to pursue postgraduate studies than those without these valuable skills.



***President McCall's Welcome Cont'd.***

I am extremely pleased that this year, KCTCS students will have the opportunity to showcase their accomplishments in the research arena. KCTCS, where higher education begins for most Kentuckians, is committed to improving the quality of life for Kentuckians and the pursuit of applied research is one of the myriad ways KCTCS students can enhance economic development within the Commonwealth. Congratulations to the ***Posters-at-the Capitol*** scholars. I wish each of you continued success on your journey of scholarly achievement.



**Welcome from President Mary Evans Sias of  
Kentucky State University:**

***Posters-at-the-Capitol*** is both a worthwhile and enriching program for our students. It gives them the opportunity to do research and to receive much-deserved recognition for their work.

Clearly, undergraduate research is critical to student development and success. The experience also benefits students beyond their college years. The activity of research engages our minds, stimulates our curiosity, and expands our horizons.

In addition, the ***Posters-at-the-Capitol*** program brings together students from across the state and affords them the opportunity to interact, acquire different perspectives, and gain confidence in their work. We as college and university faculty and administrators, legislators, government officials, and members of the community must be ever vigilant to find ways to increase funding for research opportunities for our students as they endeavor to become effective and confident leaders, innovators, and problem solvers in the work force and our communities.

Kentucky State University congratulates you on the 2007 ***Posters-at-the-Capitol*** and wishes you much success.



**Welcome from President Wayne Andrews of  
Morehead State University:**

I am delighted that the legislature and the public again will have the opportunity to observe and interact with our undergraduate students participating in the ***Posters-at-the-Capitol***. These student projects, completed in conjunction with faculty members outside the traditional classroom setting, provide an excellent example of the personal, value-added educational opportunities available at Morehead State University. I take great pride in the priority that we have placed on providing these types of high quality research experiences for our students, and I am committed to the continued expansion of these opportunities through initiatives such as our

Undergraduate Research Fellowship program.

*President Andrew's Welcome Cont'd.*

In an age of declining budgets, larger classes, and an increasing emphasis on less personal forms of instruction through the Internet, it is critical that we continue to recognize the importance of one-on-one faculty-student mentoring relationships in the educational process. The involvement of undergraduate students with faculty in research, scholarship, and other creative endeavors provides the type of rich academic environment necessary for the development of leaders with the intellectual skills and vision to guide the future social and economic development of our Commonwealth and the Nation.

It is very gratifying to me to see the commitment of Kentucky's public institutions of higher education to faculty-mentored undergraduate research and the pursuit of academic excellence.



**Welcome from President Randy Dunn of  
Murray State University:**

This year marks the **Sixth Anniversary** of *Posters-at-the-Capitol*. Murray State's involvement in this worthy event is both a testament to our students, who are seeking out these kinds of learning opportunities in growing numbers, and to our University as we all work to provide a greater number of high quality, research-based teaching and learning opportunities for MSU students.

Murray State University places a high premium on programs that promote one-on-one interaction between our faculty and students. Through our Undergraduate Research and Scholarly Activity office and our system of Residential Colleges, Murray State continuously supports faculty-student interaction. By providing our students with these kinds of learning opportunities, Murray State—along with all of Kentucky's public universities—is meeting the objectives of the Council on Postsecondary Education and the Legislature by ensuring that our graduates are well prepared for life and work.

I join the *Posters-at-the-Capitol* Organizing Committee in inviting all of our Commonwealth's citizens to visit and review the work of Kentucky's most gifted students. These undergraduates are contributing ideas that are impacting communities and changing lives. Congratulations to all those students and faculty whose hard work has made *Posters-at-the-Capitol* possible.



**Welcome from President James Votruba of  
Northern Kentucky University:**

Two of the Strategic Goals of Northern Kentucky University are to “Strengthen our commitment to ‘up close and personal’ as a defining quality of the NKU experience”, and to “Expand student participation in undergraduate research and other forms of creative activity as a defining characteristic of NKU.” These goals point to the very important role that undergraduate research plays in the fabric of our university life. Direct interaction between faculty and students in undergraduate research and creative activities results in development by the students of critical thinking and analytic skills as well as oral and written communication...



### ***President Votruba's Welcome Cont'd.***

skills needed to present their work. These interactions also foster the deep intellectual bond between faculty member and student that is a defining characteristic of our students' education.

We are proud and pleased to present our students' work at this, the sixth ***Posters-at-the-Capitol***. We have observed the growth of this event and conclude that the quality of work has increased each year. These posters and presentations are the culmination of much effort by our students and their faculty mentors and exemplify the high quality work by undergraduate researchers at Northern Kentucky University. We know that the students displaying their work here are future leaders in the development of the intellectual infrastructure of the Commonwealth and are therefore confident of Kentucky's future.



### **Welcome from President Lee Todd of the University of Kentucky:**

Research is a powerful engine that helps drive the economic and educational missions of the Commonwealth. I believe some exposure to and participation in the research process is important for every college student's academic career. The experience opens the mind to new ideas and new possibilities.

Now in its sixth year, ***Posters-at-the-Capitol*** is an excellent opportunity to recognize undergraduate research as an essential part of the educational experience; one that benefits both students and faculty. For students, undergraduate research affords an opportunity to work collaboratively with faculty and peers, to participate directly in the creative process and the generation of knowledge, to experience the rewards of inquiry based learning, and to expand upon the lessons learned in the classroom. Through undergraduate research, students experience personally the intellectual passion that is the foundation of scholarship at the University of Kentucky.

For faculty, there is no more rewarding teaching opportunity than to serve as a mentor for an eager young mind. The goals that inspire faculty and establish teaching as one of the truly noble professions include opportunities to excite imagination, foster curiosity, and celebrate the values of academic scholarship. Supervision of undergraduate research and creativity projects maximize those kinds of teaching opportunities.

The University of Kentucky is proud of its strong commitment to undergraduate research and creativity. That commitment is reflected by our recent efforts to expand support of undergraduate scholarship, the creation of Kaleidoscope -- a new University journal dedicated to scholarly accomplishments of our undergraduates -- and the Annual National Conference on Undergraduate Research that was held at the University of Kentucky in 2001. We look forward to building upon this success.

Thank you for being a part of this event and remember research is never ending. It has no limits and can take you anywhere you are willing to explore. Enjoy the journey.



## **Welcome from President James Ramsey of the University of Louisville:**

The Legislative mandate given to the University of Louisville is to be a “preeminent metropolitan research university.” Building a strong research base is critical to our state. The University of Louisville is proud of its many outstanding faculty researchers and scholars who mentor undergraduate students in their laboratories and classrooms. The commitment to our students’ educational experience begins with enrollment, and their exposure to research comes early in their academic life. Through the *Posters-at-the-Capitol* program, our undergraduate students exchange their ideas and discoveries with the elected leaders to whom the citizens of Kentucky have entrusted their future. Instilling a passion for creativity and new knowledge among undergraduate students is vital to economic development and quality of life success. The *Posters-at-the-Capitol* program introduces undergraduate students to the importance of reporting scientific investigation and supporting crucial public investment in R&D.

This collaborative event among Kentucky’s public universities allows talented undergraduates to demonstrate their academic achievement and the effectiveness of Kentucky’s higher education system. The University of Louisville is proud of this program and its participants. We hope you will share our enthusiasm for the opportunities offered and visit with our students.



## **Welcome from President Gary Ransdell of Western Kentucky University:**

Western Kentucky University takes great pride in the fact that highly credentialed faculty from a wide array of academic disciplines involve undergraduate students in meaningful research activities. The comprehensive university in America has as its primary responsibility, the applied use of its intellectual capacity to identify and solve problems that exist in its region. The scholarly collaborations utilize the concepts learned in classrooms and laboratories, thereby better preparing students for the workforce and graduate/professional schools. WKU research projects also address issues important to constituents outside the University, thereby impacting the social and economic development of our community, counties, state, and nation.

As in previous years, it is gratifying to see the number and diversity of student scholars, along with their faculty mentors participating in this sixth Annual *Posters-at-the-Capitol* project. It is vitally important that our legislators meet these students and witness the tangible benefits accruing from ongoing student research at our universities and its potential impact on an improved quality of life for all Kentuckians. WKU is proud to participate in the *Posters-at-the-Capitol* project.

## *Posters-at-the-Capitol Organizing Committee*



John Mateja, Chair  
Jody Cofer, Program Specialist  
Murray State University  
[www.murraystate.edu](http://www.murraystate.edu)



Rose Perrine  
Eastern Kentucky University  
[www.eku.edu](http://www.eku.edu)



Lucian Yates, III  
Kentucky State University  
[www.kysu.edu](http://www.kysu.edu)



Bruce Mattingly  
Morehead State University  
[www.morehead.edu](http://www.morehead.edu)



Phil Schmidt  
Northern Kentucky University  
[www.nku.edu](http://www.nku.edu)



UNIVERSITY OF KENTUCKY  
Philipp Kraemer  
University of Kentucky  
[www.uky.edu](http://www.uky.edu)



Pamela Feldhoff  
University of Louisville  
[www.louisville.edu](http://www.louisville.edu)



Blaine Ferrell  
Western Kentucky University  
[www.wku.edu](http://www.wku.edu)

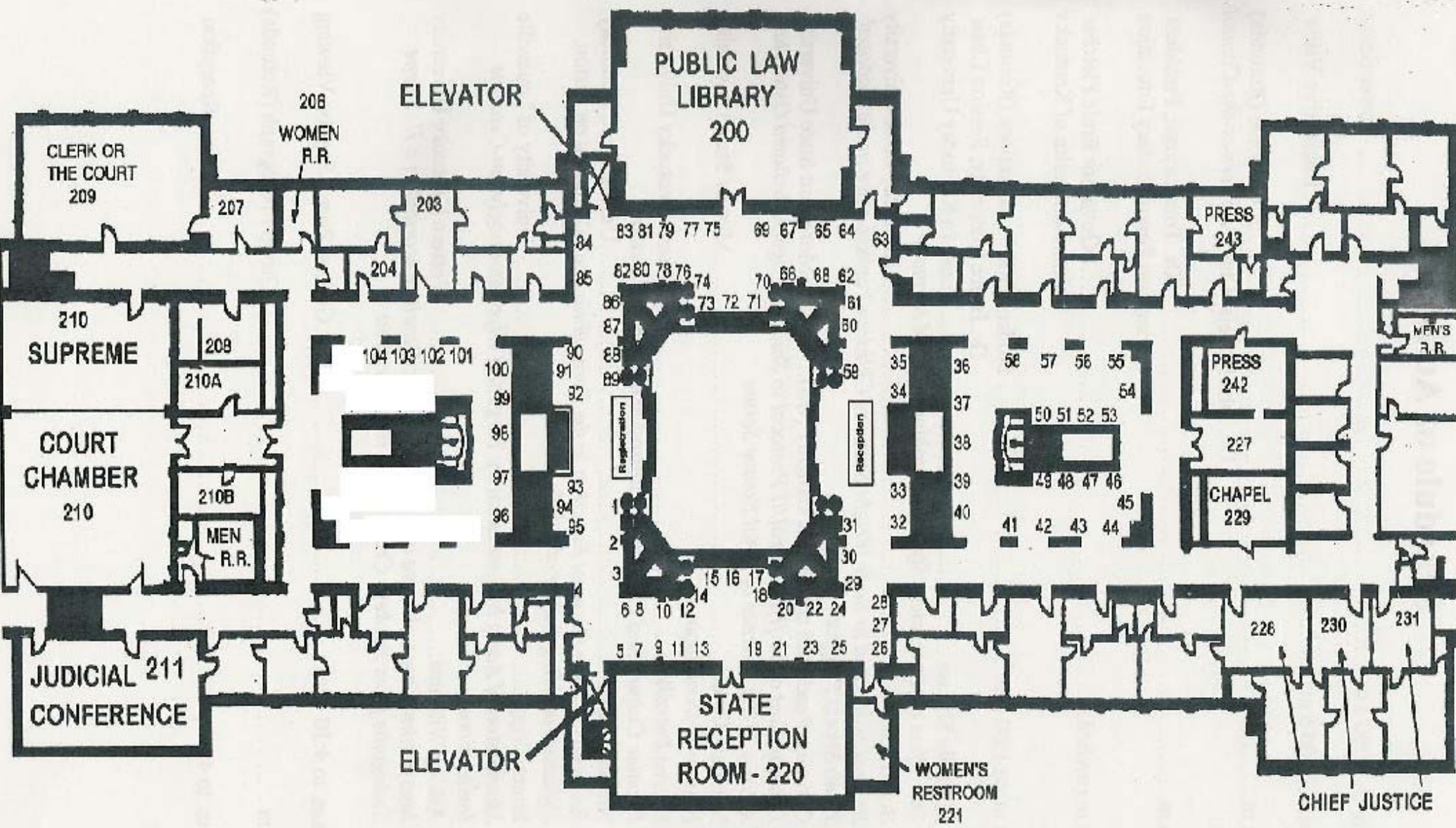


Mary Janssen  
Kentucky Community and  
Technical College System  
[www.kctcs.edu](http://www.kctcs.edu)

# Schedule of Activities

- 9:00 a.m. to 11:00 a.m. .... Poster Setup
- 9:00 a.m. to 2:00 p.m. .... Legislative Visits
- 10:35 a.m.....Welcome (Rotunda)  
Dr. John Mateja, Chair, *Posters-at-the-Capitol*
- 10:40 a.m. (invited).....President David Williams  
Kentucky Senate
- 10:45 a.m. (invited).....Speaker Jody Richards  
Kentucky House of Representatives
- 10:50 a.m. (invited).....Dr. Tom Layzell, President  
Council on Postsecondary Education
- 10:55 a.m (invited).....Governor Ernie Fletcher  
Commonwealth of Kentucky
- 11:00 a.m. to 1:00 p.m. .... Student Oral Presentations (Rotunda)  
Dr. Philipp Kraemer, Session Chair
- Ashley Pinkham.....Eastern Kentucky University  
*PR Campaign to Preserve Eastern Kentucky's Water*
  - Melissa Seward.....Kentucky State University  
*Physical Activity Levels Of Preschool Children In A Random Survey*
  - Amanda Omohundro.....Morehead State University  
*Legalizing Casino Gambling in Kentucky's Appalachian Counties: An Analysis of Potential Socioeconomic Impacts and the Attitudes of Elected Officials Towards It*
  - Patrick Howell.....Murray State University  
*Fluctuating Asymmetry as a Measure of Stress from Habitat Disturbance*
  - Megan Culler.....University of Kentucky  
*Cellular Protein Interactions with the Cytoplasmic Tail of Paramyxovirus Fusion Proteins*
  - Meagan Martin.....University of Louisville  
*The Impact of Family Reading and Parenting Workshops on School Readiness in Preschool Children*
  - Ryan Farris.....Western Kentucky University  
*WKU Mechanical Engineering and Research*
- 11:00 a.m. to 4:00 p.m. ....General Poster Session Viewing
- 1:30 p.m.....Group Photograph (Rotunda)
- 2:00 p.m. to 3:30 p.m. .... Reception





SECOND FLOOR  
(JUDICIAL BRANCH)

## Eastern Kentucky University

| Poster No. | Student      |          | Faculty Mentor(s)                              | Page No. |
|------------|--------------|----------|--|----------|
| 92         | Alexander    | Jeremiah | Stephen Richter                                | 62       |
| 23         | Booth        | Brian    | Don Yow and Tyler Huffman                      | 26       |
| 23         | Bowles       | Wes      | Don Yow and Tyler Huffman                      | 26       |
| 105        | Bunting      | Erin     | Shirley O'Brien                                | 68       |
| 32         | Clemons      | Emily    | Alice Jones                                    | 32       |
| 55         | Colemire     | Billy    | Lisa Cox and Stephen Haggerty                  | 42       |
| 32         | Combs        | Jeff     | Alice Jones                                    | 32       |
| 78         | Courtney     | Sarah    | Eric Dueno                                     | 54       |
| 39         | Deigert      | David    | Walter Boroski, Alice Jones, and Danita LaSage | 35       |
| 23         | Emberson     | Matt     | Don Yow and Tyler Huffman                      | 26       |
| 81         | Fambrough    | Amy      | Joyce Hall Wolf                                | 56       |
| 17         | Hecky        | Anne     | Michele Gore                                   | 23       |
| 85         | Hensley      | Nina     | Stephen Richter                                | 58       |
| 23         | Higginbotham | Dayne    | Don Yow and Tyler Huffman                      | 26       |
| 32 & 39    | Hunter       | Jill     | Alice Jones, Walter Boroski, and Danita LaSage | 32 & 35  |
| 44         | Karbasi      | Amy      | Rosanne Lorden                                 | 37       |
| 72         | Lane         | Noemi    | Ann Bland                                      | 52       |
| 39         | Jolly        | Erin     | Walter Boroski, Alice Jones, and Danita LaSage | 35       |
| 54         | McCarrick    | Lucas    | Jon McChesney                                  | 42       |
| 78         | McCormick    | Lauren   | Eric Dueno                                     | 54       |
| 51         | McIntosh     | Sharon   | Lisa Cox and Stephen Haggerty                  | 40       |
| 54         | Morrison     | Michael  | Jon McChesney                                  | 42       |
| Oral only  | Pinkham      | Ashley   | K. Anderson Crooks                             | 74       |
| 116        | Powell       | Jennifer | Christopher Kulp                               | 73       |
| 54         | Remley       | Geri     | Jon McChesney                                  | 42       |
| 80         | Saylor       | Shalise  | Stephanie McSpirit                             | 55       |
| 23         | Stallard     | Micah    | Don Yow and Tyler Huffman                      | 26       |
| 54         | Walker       | Dusty    | Jon McChesney                                  | 42       |
| 4          | Wolfenbarger | Kimberly | Marcia Pierce                                  | 16       |
| 54         | Zike         | Ryan     | Jon McChesney                                  | 42       |

## Kentucky Community and Technical College System

| Poster No. | Student   |         | Faculty Mentor(s)                           | Page No. |
|------------|-----------|---------|---|----------|
| 3          | Hagen     | Leigh   | Timothy Dick                                | 16       |
| 13         | Jones     | Richard | Felix Akojie                                | 21       |
| 43         | Renfro    | Eva     | Roger Warren, Mary Janssen, and Dan Schultz | 37       |
| 3          | Revlett   | C. Rick | Timothy Dick                                | 16       |
| 75         | Shively   | Paul    | Micah Perkins                               | 53       |
| 108        | Sokolova  | Julia   | Felix Akojie and Samineni V. Suryanarayana  | 69       |
| 35         | Stallings | Michael | Charles Purvis                              | 33       |

## Kentucky State University

| Poster No. | Student |            | Faculty Mentor(s)  | Page No. |
|------------|---------|------------|--|----------|
| 36         | Banda   | Yankuba    | Narayanan Rajendran  | 34       |
| 33         | Cole    | Jeggan     | Bruce Hinds, Mainak Majumder, and Xin Zhan                   | 32       |
| 68         | Collins | Lauren     | Kirk Pomper and Jeremiah Lowe                                | 50       |
| 5          | Fleming | Adrienne   | John Sedlacek and Karen Friley                               | 17       |
| 102        | Haynes  | Carmen     | John Sedlacek and Karen Friley                               | 67       |
| 86         | Hogan   | Marques    | Steven Mims and Richard Onders                               | 58       |
| 25 & 57    | Hu      | Yoon-Hyeon | George F. Antonious and Tejinder S. Kochhar                  | 27 & 43  |
| 113        | Jenkins | Maurisha   | Changzheng Wang, Cecil Butler, Lingyu Huang, and Kirk Pomper | 72       |
| 47 & Oral  | Seward  | Melissa    | Myna Panemangalore, Martha Marlette, and Susan Templeton     | 38       |
| 61         | Short   | Heather    | Avinash Tope   | 45       |
| 25 & 57    | Somuah  | Michael    | George F. Antonious and Tejinder S. Kochhar                  | 27 & 43  |
| 86         | Wilhelm | Barbara    | Steven Mims and Richard Onders                               | 58       |
| 61         | Whitis  | Renee      | Avinash Tope   | 45       |

## Morehead State University

| Poster No. | Student   |              | Faculty Mentor(s)                              | Page No. |
|------------|-----------|--------------|--|----------|
| 59         | Atwood    | Bill         | Benjamin Malphrus                              | 44       |
| 91         | Auxier    | Andrew       | Darrin DeMoss                                  | 61       |
| 96         | Brown     | Courtney     | Sean Reilley                                   | 64       |
| 96         | Cates     | Rick         | Sean Reilley                                   | 64       |
| 12         | Dickerson | Lauren       | Denise Watkins                                 | 20       |
| 42         | Dillard   | Montreal     | April Miller and Morgan Smith                  | 36       |
| 59         | Ennis     | Megan        | Benjamin Malphrus                              | 44       |
| 104        | Flynn     | Heather      | Michelle B. Kunz                               | 68       |
| 71         | Grey      | Ryan         | Michael Fultz, Darrin Demoss, and David Peyton | 51       |
| 114        | Gulley    | Margaret     | Kathryn Mincey                                 | 72       |
| 8          | Hale      | Toby         | Bedri Cetiner                                  | 18       |
| 91         | Harmon    | Mirissa      | Darrin DeMoss                                  | 61       |
| 67         | Hatfield  | Rollie       | Gary O'Dell                                    | 49       |
| 76         | Hawkins   | Travers Cody | Michael Hail                                   | 53       |
| 91         | Howard    | Gregory      | Darrin DeMoss                                  | 61       |
| 95         | Hundley   | Marcus       | Wesely White and Luke Sherrill                 | 63       |
| 76         | Jones     | Aaron        | Michael Hail                                   | 53       |
| 91         | Manning   | Katherine    | Darrin DeMoss                                  | 61       |
| 94         | Miller    | Ryan         | Jeanie Lee                                     | 63       |
| 21         | Mills     | Nathan       | Fatma Mohamed                                  | 25       |
| Oral only  | Omohundro | Amanda       | Zachary Bortolot                               | 75       |
| 22         | Ratliff   | Valerie      | Janet Rice McCoy                               | 26       |
| 91         | Sargent   | Ashley       | Darrin DeMoss                                  | 61       |
| 9          | Staggs    | Wayne        | W. Frise and B. Cetiner                        | 19       |
| 96         | Voss      | Bernard      | Sean Reilley                                   | 64       |
| 76         | Webb      | Stephanie    | Michael Hail                                   | 53       |

## Murray State University

| Poster No. | Student        | Faculty Mentor(s)   | Page No. |
|------------|----------------|---|----------|
| 10         | Black          | Erin Ted Thiede   | 19       |
| 28         | Brian          | Zachary Kate He   | 29       |
| 103        | Broker         | Todd David Eaton  | 68       |
| 63         | Cathcart       | Erin Pat Williams and Kris-Ann Kaiser                                 | 47       |
| 98         | Collins        | Brittany Andy Baily, David Ferfuson, lin Handayani, and Chris Rodgers | 65       |
| 20         | Conner         | Dianna David Eaton  | 25       |
| 98         | Craig          | Brian Andy Baily, David Ferfuson, lin Handayani, and Chris Rodgers    | 65       |
| 63         | Criner         | William Pat Williams and Kris-Ann Kaiser                              | 47       |
| 87         | Cripps         | Rebecca George Kipphut  | 59       |
| 98         | Crouch         | David Andy Baily, David Ferfuson, lin Handayani, and Chris Rodgers    | 65       |
| 10         | Cummings       | Jason Ted Thiede  | 19       |
| 84         | Downing        | Tyler Suguru Nakamura   | 57       |
| 90         | Doyle          | Jackie Howard Whiteman  | 60       |
| 34         | Edwards        | Anna Kathleen Farrell   | 33       |
| 98         | Elliot         | Carrie Andy Baily, David Ferfuson, lin Handayani, and Chris Rodgers   | 65       |
| 84         | Elmore         | Zac Suguru Nakamura   | 57       |
| 98         | Fridy          | Grant Andy Baily, David Ferfuson, lin Handayani, and Chris Rodgers    | 65       |
| 58         | Fowler         | Annette Bommanna Loganathan   | 44       |
| Oral only  | Howell         | Patrick Terry Derting   | 75       |
| 90         | Krzton-Presson | Amy Howard Whiteman   | 60       |
| 38         | Lewzader       | Jonathan Edie Banner  | 35       |
| 77         | Lindley        | Jessica Dale Barnett and Teal Shultz                                  | 54       |
| 28         | Newborn        | Shane Kate He   | 29       |
| 98         | Parrish        | Justin Andy Baily, David Ferfuson, lin Handayani, and Chris Rodgers   | 65       |
| 29         | Patel          | Komal Kate He   | 29       |
| 84         | Phelps         | Cole Suguru Nakamura  | 57       |
| 16         | Phillips       | Lillian Lillian Daughaday   | 22       |
| 82         | Roberts        | Evan Pablo Molina   | 56       |
| 98         | Roberts        | Magan Andy Baily, David Ferfuson, lin Handayani, and Chris Rodgers    | 65       |
| 82         | Shaw           | Cynthia Pablo Molina  | 56       |
| 98         | Shirley        | Whitney Andy Baily, David Ferfuson, lin Handayani, and Chris Rodgers  | 65       |
| 63         | Sparks         | Justin Pat Williams and Kris-Ann Kaiser                               | 47       |
| 98         | Stuard         | Robert Andy Baily, David Ferfuson, lin Handayani, and Chris Rodgers   | 65       |
| 98         | Tapp           | Kaleb Andy Baily, David Ferfuson, lin Handayani, and Chris Rodgers    | 65       |
| 1          | West           | Andrew Claire Fuller  | 15       |

## Northern Kentucky University

| Poster No. | Student   |          | Faculty Mentor(s)                                     | Page No. |
|------------|-----------|----------|---|----------|
| 2          | Baldrige  | Ryan     | Patrick Schultheis, Krisit Martines, and Diane McGill | 15       |
| 56         | Creekmore | Wendy    | Kenneth Tankersley                                    | 43       |
| 100        | Forehan   | Wendy    | Judy Voelker  | 66       |
| 66         | Goins     | Sean     | Keith Walters   | 49       |
| 100        | Hester    | William  | Judy Voelker  | 66       |
| 2          | Ketron    | Adam     | Patrick Schultheis, Krisit Martines, and Diane McGill | 15       |
| 2          | Ledford   | John     | Patrick Schultheis, Krisit Martines, and Diane McGill | 15       |
| 66         | Morris    | Celeste  | Keith Walters   | 49       |
| 100        | Robinette | Daniel   | Judy Voelker  | 66       |
| 115        | Rowland   | Alyssa   | David Hogan   | 73       |
| 2          | Walter    | Jennifer | Patrick Schultheis, Krisit Martines, and Diane McGill | 15       |
| 40         | Wilson    | Robert   | Heather Bullen  | 36       |

## University of Kentucky

| Poster No. | Student     |             | Faculty Mentor(s)   | Page No. |
|------------|-------------|-------------|---|----------|
| 18         | Adami       | Megan       | Robin L. Cooper   | 23       |
| 18         | Badre       | Nick        | Robin L. Cooper   | 23       |
| 109        | Baumgardner | Jennifer    | Patricia V. Burkhart  | 70       |
| 18         | Bierbower   | Sonya       | Robin L. Cooper   | 23       |
| 50         | Bonistall   | Tara        | Kay Hoffman, Joanna Badagliacco, Joan Callahan, and Patricia Cooper | 40       |
| 64         | Clarke      | Matthew     | Wallis Miller, Michael Crutcher, and R. Schein                      | 48       |
| Oral only  | Culler      | Megan       | Becky Dutch   | 76       |
| 18         | Desai       | Mohati      | Robin L. Cooper   | 23       |
| 41         | Doring      | Tyler       | James Lumpp, James Hereford, and B. Malphrus                        | 36       |
| 7          | Duncan      | Amanda      | David Hamilton and David Olster                                     | 18       |
| 74         | Gillespie   | Megan Marie | Leonidos Bachas   | 52       |
| 107        | Grimes      | Carrie      | Suzanne Segerstrom  | 69       |
| 18         | Hayden      | Brent       | Robin L. Cooper   | 23       |
| 18         | Hughes      | Geoffrey    | Robin L. Cooper   | 23       |
| 30         | Ishmael     | Joshua      | John Nychka   | 30       |
| 112        | Jackson     | Nicholas    | Vijay Singh and Suresh Rajaputra                                    | 71       |
| 18         | Kolasa      | Justin      | Robin L. Cooper   | 23       |
| 117        | Lanham      | Kena        | Doug Steinke  | 74       |
| 69         | Martin      | Mitchell    | Gary Ferland  | 50       |
| 41         | McClure     | Dale        | James Lumpp, James Hereford, and B. Malphrus                        | 36       |
| 112        | Nicaise     | Sam         | Vijay Singh and Suresh Rajaputra                                    | 71       |
| 101        | Nicole      | Christina   | Brett Spear   | 67       |
| 109        | Ohlmann     | Ashleigh    | Patricia V. Burkhart  | 70       |
| 14         | Peacock     | Amanda      | Jonathan Golding  | 21       |
| 27         | Russell     | Neil        | Frank R. Etensohn   | 29       |
| 41         | Urb         | Daniel      | James Lumpp, James Hereford, and B. Malphrus                        | 36       |
| 26         | Wijerante   | Lavanya     | Kenneth L. Kirsh and Peter Wright                                   | 28       |
| 46         | Wulff       | Peter       | Karyn Esser   | 38       |



## University of Louisville

| Poster No. | Student        |             | Faculty Mentor(s)   | Page No. |
|------------|----------------|-------------|---|----------|
| 93         | Bajramovic     | Mirna       | Cynthia Corbitt and Monica Unseld                                   | 62       |
| 37         | Carter         | Kelly       | Barbara Burns   | 34       |
| 37         | Day            | Crystal     | Barbara Burns   | 34       |
| 31         | Garcia         | Enrique     | Tato Sokhadze   | 31       |
| 93         | Girugevich     | Michael     | Cynthia Corbitt and Monica Unseld                                   | 62       |
| 37         | Harris         | Carrie      | Barbara Burns   | 34       |
| 29         | Haulk          | Devan       | Pavel Zahorik   | 30       |
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| 37         | Unger          | Stephanie   | Barbara Burns   | 34       |
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## **1. Andrew West**

### **Murray State University**

**Mentor: Claire Fuller**

#### ***Affect of Water Quality of Symmetry Growth in Dragonfly Larvae, Plathemis Lydia***

Little is known about how water quality affects the growth and development of aquatic organisms. Body symmetry during growth is often a function of normal growth and may change in less than ideal conditions. For example, organisms in poor quality habitats are less symmetric. Thus, developmental symmetry could be used as an early indicator of water quality. If poor conditions can be caught early and corrected, there will be less impact on the environment. We are examining developmental symmetry of dragonfly larvae (*Plathemis lydia*) from ponds in Western Kentucky. Larvae and water samples were taken from 13 ponds in fall 2005 and 15 ponds in spring 2006 with an average of 10 larvae per pond. Each larva was examined by taking photographs through a dissecting microscope. Larvae were positioned in the pictures to check five different traits that had a left and a right portion (wings, abdomen and spike of 8th segment, leg joints, and setae). Water quality measures include both inorganic and organic contaminants as well as general measurements (e.g., temperature, dissolved oxygen). All measurements have been completed and analyses are currently being run to determine whether 1) different levels of developmental asymmetry occur among ponds and 2) whether developmental asymmetry is correlated with water quality.

## **2. Ryan Baldrige, Adam Ketron, John Ledford, and Jennifer Walter**

**Northern Kentucky University**

**Mentors: Patrick Schultheis, Kristi Martines, and Diane McGill**

#### ***Sub-cellular Localization of Two P-type ATPases, Atp13a1 and Atp13a2***

P-type ATPases are membrane proteins that transport their substrates against their concentration gradients. The focus of this study is two novel P-type ATPases termed Atp13a1 and Atp13a2. To date, nothing is known about their substrate specificity, sub-cellular localization or physiological function. The aim of this study was to determine the membrane location of Atp13a1 and Atp13a2 via western blotting and immunofluorescence. To facilitate their localization, HeLa cell lines expressing GFP and V5-His tagged versions of Atp13a1 and Atp13a2 were produced. Cell lysates from these cell lines were layered onto a sucrose density gradient (40%-10% sucrose) and were centrifuged at 100,000 x g for 16 hours to separate cell compartments. One milliliter fractions were harvested from the gradient after centrifugation and tested via western blot. Antibodies to organelle markers in ER, Golgi, and plasma membrane were used with antibodies to the GFP and V5-His tags to co-localize the ATPases with the organelles. To verify the sub-cellular fractionation data, immunofluorescence was also used to independently test the localization of each of the ATPases.

### **3. C. Rick Revlett and Leigh K. Hagen**

**Kentucky Community and Technical College System**

**Mentor: Timothy Dick**

#### ***Erythrocyte Expression of Polycystin 1***

Polycystic kidney disease (PKD) is one of the most common human genetic diseases, affecting approximately 1.24 million people worldwide. When either the PKD 1 gene on Chromosome 16 or the PKD 2 gene on Chromosome 4 is mutated, an individual develops kidney cysts which over time destroy healthy kidney tissue. Polycystin 1 is a transmembrane protein in kidney cells that functions in cell-cell matrix interactions. Polycystin 2 is a transmembrane protein that may serve as a calcium channel in conjunction with Polycystin 1. Polycystin 1 and Polycystin 2, if located on or in the erythrocyte, could serve as a model for the study of calcium channels. These channels in normal erythrocytes could then be compared to erythrocytes of an individual with PKD. The project presents results of immunohistochemical analysis of normal erythrocyte expression.

### **4. Kimberly Wolfinbarger**

**Eastern Kentucky University**

**Mentor: Marcia Pierce**

#### ***Identification of Antimicrobial Resistance amongst Strains of Streptococcus Pyogenes in Kentucky***

One of the most frequent pathogens to infect humans is *Streptococcus pyogenes*. Acute diseases associated with *S. pyogenes* occur mostly in the respiratory tract, bloodstream, or the skin. Individuals infected with the bacteria are commonly treated by the use of an antibiotic. In this study, sixty-nine clinical isolates of *Streptococcus pyogenes* were examined to identify strains that presented antimicrobial resistance. Kirby Bauer diffusion plates were used to identify resistant strains. Of the sixty-nine isolates, nine strains showed antimicrobial resistance to certain antibiotics. Antimicrobial resistance to erythromycin was detected in nine of the isolates (13%), resistance to clindamycin was detected in three of the isolates (4.3%), clarithromycin resistance was detected in six isolates (8.7%), and lincomycin resistance was detected in three isolates (4.3%). No strains exhibited penicillin resistance. One strain demonstrated MLSB (macrolide, lincosamide, and streptogramin-B) resistance to erythromycin. Strains that demonstrated antimicrobial resistance to erythromycin, clindamycin, clarithromycin, and lincomycin were further examined for the presence of the genes *mefA*, *ermB*, or *ermTR* by the use of Polymerase Chain Reaction techniques and electrophoresis.

## **5. Adrienne Fleming**

**Kentucky State University**

**Mentors: John Sedlacek and Karen Friley**

***Impact of Cry 3Bb Bt Transformed Corn Kernels on Life History Attributes of Several Stored Grain Beetle Pests***

Laboratory experiments were conducted to examine the impact of *Bacillus thuringiensis* (Bt) corn hybrids containing Cry 3Bb protein genes on mortality and progeny production of maize weevil, *Sitophilus zeamais*, red flour beetle, *Tribolium castaneum*, and sawtoothed grain beetle, *Oryzaephilus surinamensis*, three common pests of stored grain. Approximately 8.5 g of either Yieldgard® Corn Borer, Yieldgard® Rootworm, Yieldgard® Plus, or conventional corn used as a control were placed in ventilated vials. Nine maize weevils or 10 red flour beetles or sawtoothed grain beetles were added to each vial. The vials were placed in an environmental growth chamber set to 27 + 1°C, > 60% RH and complete darkness. Three replicates, each containing five vials of each treatment were used. Mortality was quantified after one week and adults were removed. Progeny checks began two weeks after adults were removed and were done daily for six weeks. Percent mortality was low with all insects in all treatments. Maize weevil progeny emergence was the same in all treatments. However, progeny emergence was lowest in the conventional corn used as a control for both red flour beetle and sawtoothed grain beetle. Results indicate that these three Bt corn hybrids have no negative impact on maize weevil, red four beetle or sawtoothed grain beetle life history attributes.

## **6. Sarah McMaine, Jonathan Beaty, and Holy Conley**

**Western Kentucky University**

**Mentor: Marty Boman**

***The Kelly Autism Program: Independence and Productivity for Individuals with Autism Spectrum Disorders***

The Kelly Autism Program was developed for adolescents and young adults diagnosed within the Autism Spectrum continuum in south central Kentucky. The program has three powerful goals: independence, productivity, and community involvement, and provides educational support, social skills development and expansion, leisure/recreation development, community involvement, and transitions support for the students. Focusing on the needs of three distinct age groups including junior high, senior high, and post-secondary students, the program works closely with the schools to offer educational support in developing transition goals. By offering tutoring, students' skills in literacy, functional math, technology and daily living activities are improved. In the area of social skills, the group has developed a Teen Council where they can practice leadership and group skill-building. Since the program is housed on the campus of Western Kentucky University, there are many social events for their participation. The students interact weekly or daily with their peers and the college community. Recreation and leisure activities are plentiful on the campus since they are allowed access to the Health and Fitness Center. This past summer the students took part in rock climbing, canoeing, and other various outdoor activities. Community involvement is a huge component for the program as the students created, printed, and sold Christmas cards so that they could raise their own money. Their goal was to adopt families in the community for the holiday season. They also have made baskets for a number of nursing homes, and sorted clothes for redistribution for one of the local churches.



## **7. Amanda Duncan**

**University of Kentucky**

**Mentors: David Hamilton and David Olster**

***Saving the Commonwealth by Educating its Women: The Works Progress Administration in Kentucky, 1935-1937***

The Works Progress Administration was implemented in 1935 after a Presidential Mandate by President Roosevelt. President Roosevelt expected the WPA to provide work for the millions of Americans on welfare, while also providing valuable improvements to the communities where these men and women lived. The WPA has been regarded as a failure by many historians because it did not truly modernize most of the country due to lack of funds and President Roosevelt's fear of deficit spending. In Kentucky, from the program's inception to 1937, the public and those who sponsored and worked on WPA projects felt quite differently. Based on the Goodman-Paxton Papers, the WPA provided jobs and improvements that would not have otherwise been available. For women, the WPA provided gender specific work. The Training Work Centers, housed in various communities throughout the state and funded by both state and federal money, provided women with the chance to support their families and learn valuable skills. Women learned to sew, make a complete family wardrobe, and learned basic hygiene and family health skills. Women also worked as teachers, educating adults and nursery school children. This service taught Kentuckians to read and write, and gave children an early start on education. In short, the WPA in Kentucky, while not creating social change, provided the mechanisms needed to modernize the state. Not only were women learning how to care for themselves and their families, they were providing services to the state.

## **8. Toby A. Hale**

**Morehead State University**

**Mentor: Bedri Cetiner**

***Electromagnetic Analysis of a MEMS Integrated Frequency Reconfigurable Antenna***

The necessity for reconfigurable antennas increases as wireless technology is modified and improved, since many wireless devices utilize more than one frequency band. One simple class of antennas that can be employed as reconfigurable antennas is the annular slot. By using a full wave analysis tool based on finite element method, modeling of a two concentric annular slot antenna has been performed to determine the resonant frequencies and radiation patterns of this micro-electro-mechanical systems (MEMS) integrated multi-frequency antenna. This design and analysis is executed for a low frequency bandwidth when the inner slot is neglected and only the outer slot is excited. Then, by using a MEMS switch to connect the feed to the inner slot, and shorting the outer slot, a model of the antenna for a high frequency bandwidth is created, and an analysis of its return loss, as well as its radiation patterns, is performed.

## **9. Wayne Staggs**

**Morehead State University**

**Mentors: W. Grise and B. Cetiner**

### ***Integration of Left-Handed Materials with RF MEMS Devices***

The results of research on the integration of two exciting technologies in the microwave electronics discipline, viz., radio-frequency microelectromechanical systems (RF-MEMS), and negative refractive index metamaterials (NRM). RF-MEMS technology has made possible the tailoring of the responses of microwave frequency circuits by means of microscopically small switches. When these tiny switches are actuated mechanically, it becomes possible to create alternative realizations of such standard microwave circuit elements as phase shifters, periodic filters, and antenna elements that are much smaller and consume less power than conventional RF circuits. Negative refractive index metamaterials display negative dielectric permittivity and negative magnetic permeability. When propagating through these structures, electromagnetic waves show properties such as backwards power flow, and the ability to focus subwavelength radiation. Thus, an NRM focuses both propagating waves along with evanescent waves that originate from an object, so bypassing the conventional diffraction limit – so-called perfect lensing. The novel contribution of this research is that for the first time both of these technologies are being integrated together, thus combining the tunability and microscopic control of propagation characteristics due to RF-MEMS with the unusual lensing properties of NRM elements. The research has utilized the facilities of Morehead State University's Space Science Center to design and simulate the circuitry and to test the resulting circuits. The circuits include a microstrip transmission line as a proof of concept, as well as a dual-band branch-line coupler, with the dual frequencies separated by non-harmonic intervals; synthesis with such intervals is difficult for conventional microwave circuits.

## **10. Jason Cummings and Erin Black**

**Murray State University**

**Mentor: Ted Thiede**

### ***Three-phase Mass Transfer Fuel System***

Issues on our current fossil fuel consumption are common place, with petroleum as one of the most debated. Vehicles are the main users of petroleum. One alternative to petroleum for vehicular fuel is natural oils. Bio-diesel fuel is produced from renewable sources such as soy or canola oils. Trans-esterification of oils is performed to produce properties that enable atomization and burning in diesel engines. Diesel engines can also run on pure vegetable oil (PVO); however, pre-heating is necessary for proper combustion. Systems that use only natural oils are being studied. One proposed solution is the three-phase mass transfer system. Three-phase mass transfer systems use solids, liquids, gases and a series of chambers to create combustible vapor/mist from the oil. Durable solid particles transport oil from a tank to a chamber where pressurized air enters. Gas then comes in contact with the saturated, oil containing solid, causing evaporation, thus creating a liquid-vapor mixture which is delivered to pistons for combustion. Our objective is to produce a system that allows an internal combustion engine to run solely and reliably on PVO at room temperature. The PVO fuel being used is canola oil. Canola oil properties will be used to perform calculations to determine flow rate properties, system dimensions, and ideal particle properties.

## **11. Faraz Ahmed Jeelani**

**University of Louisville**

**Mentors: Binks Wattenberg, Erin Brock, Christine Simmons, and Deanna Siow**

### ***Optimizing the Production of Sphingosine Kinase***

A metabolizing agent known as sphingosine kinase (SphK) phosphorylates the lipid molecule sphingosine, thereby converting it to sphingosine-1-phosphate (S1P). Sphingosine-1-phosphate is an extremely vital and diverse lipid which directs many signaling pathways throughout the cell. S1P-mediated signaling regulates cytoskeletal rearrangements, cell motility, angiogenesis, vascular maturation, cardiac development, cell growth and proliferation, and other higher-order functions. Considering its importance, one must analyze the factors that are involved S1P's regulation, thus leading directly to the analysis of SphK. Sphingosine kinase is activated by numerous external stimuli, many of which share similar cellular roles with SphK, such as the initiation of numerous signal transduction pathways related to growth, development, motility, and nerve responses. Moreover, it is found to be present in at least two different isotypes in eukaryotic cells, SphK1 and SphK2; each has its own unique spatial arrangement and molecular characteristics. Such differentiation in accordance with their kinetic and temporal properties, tissue distribution, and function, in general, implies that the methods of regulation of each isotype may vary. In our project, the experiments are designed to focus only on the activity and regulation of SphK1. Overall, our objective is to establish growth and isolation conditions that yield the greatest levels of active, well folded sphingosine kinase in bacterial cells. The vector utilized in the cloning process will be pET-30b, and we will transform the SphK DNA into XL2-Blue Ultra-competent cells. After analyzing the optimal parameters of production, knowledge of SphK's behavior can hopefully be regulated.

## **12. Lauren Dickerson**

**Morehead State University**

**Mentor: Denise Watkins**

### ***Behind the "Razzle Dazzle": A Scholarly Approach to Costume Design for the Popular Musical, "Chicago"***

Most individuals can appreciate theatrical costume design in an aesthetic sense. This project, however, focuses on design from a research perspective. A costume designer must take into consideration time period, geographical location, and historical and social perspective, as well as the play's placement in theatre history. Each costume must reflect these aspects while dealing with character analysis, theme, style, and the designer's artistic vision. The research and artistic process involved make theatrical design a more scholarly project than many realize. This project aims to demonstrate the process of designing costumes for the popular musical "Chicago".

### **13. Richard Jones**

**Kentucky Community and Technical College System**

**Mentor: Felix Akojie**

#### ***Pilot Studies on Pathogenic and Non-Pathogenic Microbes in Public Places***

Swab samples were taken at various locations in Paducah, Kentucky, including vending machines, computer labs, and the library of West Kentucky Community and Technical College, desks and lockers in a local school, and the pharmacy and produce sections of a retail chain store. The samples were cultured on Tryptic Soy Agar (TSA) plates, and each type of microbe was isolated on its own TSA plate. The pure cultures were allowed to incubate, and then a variety of staining techniques and biochemical tests were performed to determine the types of microbes present. Samples analyzed from the produce section of the chain store provide some insight into whether the recent *Escherichia coli* outbreaks in the United States are still of concern in Paducah, Kentucky.

### **14. Amanda Peacock**

**University of Kentucky**

**Mentor: Jonathan Golding**

#### ***The Impact of Instructions to Disregard on Child Witness Credibility***

Previous research has found that a child witness is seen as less credible than an adult witness in a criminal case. Other research has shown that a judge's instructions to disregard inadmissible testimony can create a boomerang effect, in which jurors are influenced more by the inadmissible testimony than if no admonishment had been provided. The purpose of the current study is to investigate the effect of a judge's instructions to disregard when the inadmissible testimony was provided by a child witness. Student participants will read one of four versions of a fictitious criminal trial summary in which a child or adult witness provides testimony and that testimony is followed by either instructions to disregard or no instructions to disregard. It is hypothesized that a boomerang effect, which will cause an increase in guilty verdicts, will be found with both witnesses. It is also predicted that instructions to disregard will enhance the credibility of the child witness more than that of the adult witness.

## **15. Matt Siebert and Ryan Farris (Oral & Poster Presentation)**

**Western Kentucky University**

**Mentor: Chris Byrne**

***WKU Mechanical Engineering and Research***

The program in Mechanical Engineering at WKU is based upon close interaction between students and faculty through a variety of professional activities. This interaction is intended to better prepare students for their careers while exposing them to a variety of activities beyond those offered in the curriculum. As an example of this effort, two activities will be described that share a common thread, but one is being conducted within the curriculum and the other outside of the curriculum. A funded program aimed at developing a patented composite materials technology is being conducted with the aid of paid undergraduate ME student research assistants. Some of the many extracurricular contributions of students Ryan Farris and Matthew Seibert in the process development and characterization of novel carbon-polymer composites are presented. This research activity has supported many ME students over the past 3 years, providing them an avenue for expanding their knowledge base past that contained in the curriculum, while exposing them to the nuances of research. This same program has been the springboard for the creation of a 2006-2007 ME senior design project. In that curricular activity, the same two students are tasked with the development, design, and verification of a highly controlled carbonization furnace suitable for production on an industrial level.

## **16. Lillian Phillips**

**Murray State University**

**Mentor: Lillian Daughaday**

***America and Japan: A Cultural Communication***

The United States and Japan are two distinctly different countries with differing values that are products of unique history. However, with our shrinking world, there has been an increasing exchange of popular media between our countries. The purpose of this study is to track a few values from each culture through the history and see how and if globalization affects these cultural values.



## **17. Anne Hecky**

**Eastern Kentucky University**

**Mentor: Michele Gore**

### ***Methamphetamines: Providing Preventative Resources for Educators***

Methamphetamines have quickly become the new drug epidemic in the United States. They are now widespread across the nation and small home meth labs have developed in almost every state. Home meth labs have become a problem because the ingredients to make the powerful drug are easy to come by and there are endless recipes available on the internet on how to make it. Upon taking a closer look, we see that methamphetamines not only harm the bodies that they are being snorted, inhaled, ingested, or injected into, but also the communities in which there are small home labs and more importantly the children that live in those homes. Just being in the home leads to many short and long term health problems for children, puts them at higher risk for abuse and neglect, as well as putting them in extreme danger due to the instability of the chemicals used in the cooking process. There are many training programs available for police departments, health care professionals, and social service agencies in how to detect and deal with home meth labs. There, however, needs to be additional training for other professionals who encounter these vulnerable children. One primary avenue that could be pursued is a training program for teachers so that they can learn how to identify children that may be exposed to meth and how to address the problem as educators. Through research and community assessment this project will identify a need for such a program and provide the tools and resources needed for dissemination of materials to schools.

## **18. Nick Badre, Brent Hayden, Justin Kolasa, Geoffrey Hughes, Sonya Bierbower, Megan Adami, and Mohati Desai**

**University of Kentucky**

**Mentor: Robin L. Cooper**

### ***Research in Neurophysiology: Calcium's role in Synaptic Transmission, Facilitation, and Behavioral Regulation***

The cacTS2 *Drosophila* line has reduced Ca<sup>2+</sup> channel function at raised temperatures. Here, we used the cacTS2 strain to investigate the behavioral and electrophysiological response in both vision and olfaction in adult *Drosophila*. Our experiments came to the following conclusions: (1) Cac mutant larvae have significant learning abilities at room temperature and (2) they show no significant sign of learning at higher temperature. Since clinically the regulation of calcium channel function in conditions of epilepsy and convulsions are used, the long-term effect of reducing calcium channel function is of interest. Short-term facilitation is particularly prominent at many neuromuscular junctions in crustaceans and is important in grading muscular contractions. Currently we are analyzing if the occurrences in characteristics of quantal events can be clustered into groups. This provides novel approaches in determining subsets of the single evoked quanta. Most animals assess the environment in which they live and consequently alter their behavior according to various stimuli. Addition of physiological observations allow for an expanded analysis of the crayfish's behavioral as well as autonomic responses. Preliminary evidence indicates crayfish experienced high levels of stress when prevented from moving freely between environments at their own discretion.

## **19. Joey Grubb, Christie Carter, Tara McDonald, Rebecca Smith, and Felecia Wells**

**Western Kentucky University**

**Mentors: Mary Lloyd Moore, Richard Dressler, Frank Kersting, and Lisa Murphy**  
***WKU's Clinical Education Complex: Collaborative Training in a Multidisciplinary Setting***

Western Kentucky University supports multidisciplinary training. To that end, the Clinical Education Complex houses 6 programs: Speech, Language and Hearing Clinic, Acquired Brain Injury Resource Program, Family Counseling Center, Early Childhood Center, Family Resource Program, and the Kelly Autism Program. In this setting, students have the opportunity to not only acquire necessary skills in their discipline but to also learn critical teaming concepts. As graduates, these students learn not only requisite discipline clinical skills but also the importance of collaborative service provision to assist families in raising their children. For example, when a family with an autistic child enrolls in the Kelly Autism Program, that family may also participate in the Speech-Language Clinic as well as Family Counseling. Students have the opportunity to work with faculty from other disciplines, as well as with other students. Training in such a milieu provides students with a philosophical perspective of collaboration and team service provision as they accept roles in schools, as well as health care and medical settings. In the first 4 months of operation, there has been a conscious effort on the part of the faculty to build these collaborative teams to provide comprehensive services to families and their children. An initial survey of students captures their perspective on teaming and collaboration. A survey a year later will determine the degree of change in students' perceptions on teaming and collaboration. Students who are actively engaged in the teaming process will be surveyed separately to determine their perceptual change as differentiated from students not actively engaged in the process. The question is: do student perceptions of teaming and collaboration change as result of proximity or are more active measures required. The poster will present information on the Clinical Education Complex's programs as well as initial survey results.

## **20. Dianna Conner**

**Murray State University**

**Mentor: David Eaton**

### ***Subprime Lending and Housing Market Values: Is there a Relationship?***

Over the past five years, housing values have increased nationally by an average of 68.3%. While low-interest rates have contributed to the recent surge in property values, subprime lending has also played a pivotal role. Subprime lending is lending to consumers with "bad" or nonexistent credit, as well as lending to consumers with "good" credit by offering a wide variety of products that the prime market does not have. For example, "good-credit" borrowers are offered financing on 100% of the home's value using an interest-only loan, and also financing on second mortgages which allow consumers to extract up to 115% of the home's value. Products such as these have not only brought about many changes to the mortgage industry, but also have made housing more affordable and attractive. The Depository Institutions Deregulatory and Monetary Control Act in 1980 helped launch the idea of subprime lending by lifting constraints on rate caps and allowing mortgage companies to cater their products to a diverse consumer base in terms of risk. The subprime market hit an all time high in 2005, capturing 23% of the market share by originating \$650 billion in nonconforming loans. By increasing the amount of potential home-buyers in the market, I anticipate that subprime lending will cause housing values to increase. Specifically, this study will use differences in state usury laws to isolate the impact of the subprime market on the housing market values.

## **21. Nathan Mills**

**Morehead State University**

**Mentor: Fatma Mohamed**

### ***The Impact of a Firms' Strategic Alliance on its Innovation on Software Industry***

A firm is embedded in networks of relationships that often provide resources beyond those available from internal sources alone. The most important of a firm's network of relationships are termed strategic alliances. A firm entry into strategic alliances is about leveraging the value of its internal resources with the external resources of its partners. From this relationship a firm may draw upon the resources those alliances generate to introduce new technologies or products to the market. To assess the effects of a firm's strategic alliances on firm innovation in high tech industries, using a sample of 49 firms in software industry, this study propose that there is a positive relationship between firms' strategic alliance and its innovation.

## **22. Valerie Ratliff**

**Morehead State University**

**Mentor: Janet Rice McCoy**

***Fighting and Feuding in the 19th Century Press: A Frame Analysis of the Rowan County War***

Using Goffman's theory of framing, this textual analysis examines a series of articles featured in The New York Times regarding the Martin-Tolliver feud or Rowan County War as it is also known. This conflict gained attention in the national media for Eastern Kentucky in general, and for Rowan County in particular, when twenty-two people were killed over a three-year period. This clash stemmed from lingering animosity from the Civil War and ended on June 22, 1887. This study examines how the national media reported the events that occurred during this turbulent period. Frame analysis is used to determine whether or not the articles portrayed the inhabitants of Eastern Kentucky in ways that may have contributed to the stereotypes of the region relating to gender, race, and class. This study is especially important since portrayals of Rowan County in the press helped persuade missionaries Frank Button and his mother Phoebe to establish a church and school in Morehead as emissaries of the Kentucky Christian Church Board.

## **23. Brian Booth, Wes Bowles, Matt Emberson, Dayne Higginbotham, and Micah Stallard**

**Eastern Kentucky University**

**Mentors: Don Yow and Tyler Huffman**

***The Real "Ken-tah-ten" (Land Of Tomorrow)***

Eastern Kentucky enjoys a rich cultural heritage and an attractive, diverse physical landscape. The southern Appalachians extend into the eastern portion of the state. The physical features found amid the Eastern Coal Field, along the Pottsville Escarpment, include numerous natural arches such as Natural Bridge and Sand Gap Arch. Waterfalls also dot the landscape. The most prominent, Cumberland Falls, generates one of only two moonbows found in the world. Eastern Kentucky's geology is mainly composed of sandstone and shale with some limestone along the Pine Mountain Thrust Fault. The region's abundant natural resources include rich biodiversity, plentiful bituminous coal, hardwood timber and miles of attractive landscapes. The cultural landscape is scattered with small country churches, family owned general stores and agricultural homesteads. Scottish, Irish and English descendants originally settled the region in the early 1700s. The art of constructing handcrafted goods has been passed down through generations, reflecting the hard work and dedication of Kentuckians. Other vibrant and distinctive cultural aspects of the region include music, storytelling and a unique way of life that harkens back to, "the good ole days".

## **24. Lou Anne Kirby, Brandon Hesson, Jason Kondracki, Max Karavayev, Adam Thomas, Kevin Wingard, Phillip Clark, and Paul Lancette**

**Western Kentucky University**

**Mentors: Mark Cambron, Walter Collett, and Stacy Wilson**

***WKU Electrical Engineering Senior Projects***

The senior project experience is an important capstone for the electrical engineering program at Western Kentucky University. Students are involved from conception to implementation in a variety of projects that cover the spectrum of electrical engineering. This year some of the senior projects include projects from the power industry, electronics, manufacturing industry, and robotics. This poster presents a sample of the current electrical engineering senior projects. One project in this poster presents a solution to the mercury emission problem faced by the power industry. Another project presented demonstrates a method for testing transformers using simulation methods and hardware methods. The third project on this poster describes the creation of a robotic fish. These projects highlight the achievements of the electrical engineering students at WKU.

## **25. Yoon-Hyeon Hu and Michael O. Somuah**

**Kentucky State University**

**Mentors: George F. Antonious and Tejinder S. Kochhar**

***Organic Pesticides from Hot Pepper Extracts***

Many studies have indicated potential ecological damage due to the widespread use of synthetic pesticides. Basic and applied research to provide alternative pesticides with low impact on human health and environmental quality is needed. This investigation was designed to: 1) test the toxicity of new hot pepper fruit extracts to cabbage looper larvae; 2) test the repellency of new hot pepper fruit extracts to spider mites; 3) characterize the biochemical composition of hot pepper fruit extracts for potential identification of compounds responsible for toxicity and/or repellency; and 4) select candidate hot pepper accession(s) producing most effective (toxic and/or repellent) phytochemicals for use as pest control agents. Crude extracts of hot pepper accessions of *Capsicum chinense*, *C. frutescens*, *C. baccatum*, and *C. annum* were prepared using methanol and analyzed for pentadecanoic acid methyl ester, hexadecanoic acid methyl ester, and octadecanoic acid methyl ester. Bioassays of pure standards of decanoic acid methyl esters using cabbage looper, *Trichopulsia ni* larvae have shown that pentadecanoic acid methyl ester was the most effective (74% mortality) compared to hexadecanoic and octadecanoic acid methyl esters. Concentrations of decanoic acid methyl esters varied among hot pepper accessions. Accessions PI-632921 (*C. annum*), PI-257051(*C. frutescens*), and PI-239703(*C. frutescens*) contained the highest concentration of pentadecanoic acid methyl ester (827.5 µg/g), hexadecanoic acid methyl ester (969.7 µg/g), and octadecanoic acid methyl ester (1546.6 µg/g), respectively. This research provides an option for organic growers who are seeking alternative to synthetic pesticides.



## **26. Lavanya Wijeratne**

**University of Kentucky**

**Mentors: Kenneth L. Kirsh and Peter Wright**

### ***Predictors of Successful Outcomes in Chronic Pain Patients***

A total of 125 patient charts from The Pain Treatment Center of the Bluegrass were audited using an Opioid Functioning Chart Audit Tool, which included the Pain Assessment and Documentation Tool (PADT) and the Opioid Risk Tool (ORT). The sample comprised 62 women and 63 men with an average age of 48.1 years (range = 20-76). Most (94.3%) were Caucasian; a total of 74 (59.7%) were married and 30 (24.2%) were divorced. The most common pain concerns were low back (58.4%), leg (17.6%), and neck pain (16.8%). Average length of the pain concern was 8.8 years (range = 8 months to 36 years). According to the ORT, 40.3% had low risk for abuse or addiction, 36.3% had moderate risk, and 23.4% fell into a high risk category. Patients in the moderate to high risk category were more likely to have positive urine drug screens for illicit drugs (Chi-Square = 19.3,  $p < .0001$ ). Overall, 30 (25%) had better functioning on opioid therapy while 80 (66.7%) remained the same. Pain scores did decrease from 7.2/10 to 5.3/10 with use of opioids. The treatment of chronic non-cancer pain with opioids has become common practice, but remains controversial. This study offers some insight that opioid management can lead to reduction in overall pain scores, but it is clear that more focus needs to be placed on increasing functionality in treating chronic pain and assessing risk profiles for abuse and addiction. Long-term, prospective trials are needed to help us better define appropriate candidates for opioid therapy.

## **27. Neil Russell**

**University of Kentucky**

**Mentor: Frank R. Ettensohn**

***Taphonomy of Late Ordovician Cyclocystoids from the Millersburg Member, Lexington Limestone, Central Kentucky***

Eight specimens from the very rare echinoderm class Cyclocystoidea were recovered on the base of a bed from a former outcrop along I-64 near Winchester, Kentucky. Although no longer extant, the outcrop exposed nodular limestones and shales and a few, coarse-grained, through-going limestone beds in the Millersburg Member from uppermost, Edenian parts of the Lexington Limestone. Based on marginal ossicle count (40-60), disc percent of test (83%-86%), test diameter (16-50 mm), the circle-to-ovoid skeletal morphology, and presence in Edenian rocks, the specimens most likely represent the species *Polytryphocycloides depressus*. Occurrence of this species in central Kentucky may possibly expand its known geographic range. Cyclocystoids are typically encrusters, found on the tops of firm- or hardground beds. In this occurrence, however, the specimens occur on the base of one of the through-going beds. Notably, the cyclocystoids are part of a basal, lag-like concentration with bryozoans, brachiopods, and gastropods in rocks that exhibit subtle planar cross-bedding and graded bedding, features that are indicative of shallow, open-marine storm deposits in the Lexington and Millersburg. The cyclocystoids display taphonomic evidence of transportation and deposition, including contorted and fractured marginal rings, misaligned and missing ossicles, thecae draped over other fossil shells, and possible upside-down orientation. Such a transported fossil assemblage containing cyclocystoids is a heretofore unreported phenomenon and implies that the organisms were gregarious, as well as the nature of the community and environment in which they lived. Previously unknown aspects of hydrodynamic stability, thecal strength, and the nature of attachment are also suggested by the occurrence.

## **28. Shane Newborn, Zachary Brian, and Komal Patel**

**Murray State University**

**Mentor: Kate He**

***Taxonomical and Ecological Patterns of Non-native Vascular Plants of Kentucky***

Taxonomic and ecological patterns of non-native vascular plants of Kentucky are presented. It is concluded that there are a total of 540 non-native species found among 85 families and 39 orders in the flora. Most non-native species are introduced either from Europe or Asia mainly due to the history of human colonization and global trade and travel. Taxonomic heterogeneity is found at both family and genus levels. *Asteraceae* (Aster family) and *Poaceae* (Grass family) are the largest families in the Kentucky flora, which contribute 28% of the total numbers of non-native species. The results also suggest that species traits in morphology, life history, and ecology play a major role in the processes of naturalization and invasion. The patterns of species distribution indicate that the occurrence of invasive plants throughout the state are highly associated with anthropogenic disturbances. The study provides pertinent information for plant invasion research and conservation management.

## **29. Devan Haulk**

**University of Louisville**

**Mentor: Pavel Zahorik**

### ***Directional Sound Localization Adaptation in Realistic Acoustic Environments***

The precedence effect is a well known phenomenon in the area of psychological acoustics. Previous experiments have looked at the precedence effect in relatively unrealistic situations. This experiment examines the precedence effect in more natural settings with multiple echoes. Because it has been found in previous studies that there is a build-up of the precedence effect over the course of a conditioning train with a single echo, it is of interest to determine if this effect persists in more natural settings with multiple echoes. In this experiment, subjects were asked to perform a forced choice left/right spatial discrimination tasks using virtual acoustics that modeled a real room with multiple echoes and reverberation. Conditioning stimuli consisted of a twelve click conditioning train followed by a test click. Non conditioned stimuli, which consisted only of a test click, were also presented in the same manner. A significant difference in task performance was observed between the two stimulus conditions. These observed differences in performance were most likely due to echo suppression build-up resulting from the conditioning train presented before the test click. A pilot study was run during the summer resulting in the current study that utilizes a wider range of stimuli echo delays and addresses issues of subject bias.

## **30. Joshua Ishmael**

**University of Kentucky**

**Mentor: John Nychka**

### ***Improved Materials for Dental Restoratives***

Dental restorative materials are varied and include mercury amalgams, gold, porcelain, and polymeric resins. The latter has quickly become the most common type of dental restorative. While polymeric resins have been considerably improved during their short lifetime, there is significant need to further improve their performance. The main problem associated with polymeric materials is that curing shrinkage results in separation of the filling from the tooth, additional cavities, or severe pain. By eliminating curing shrinkage, these common problems can be corrected. Attempts have been made to reduce shrinkage yet acceptable solutions to eliminate shrinkage do not exist. This work describes a series of experiments designed to measure the shrinkage of polymeric resins. Difficulties arise, however, because no existing tests can measure the shrinkage, as it would occur in a tooth. Thus, the primary goal of this work has been to develop a new experimental method to measure shrinkage in a model situation. Interactions with the surroundings, such as the tooth, affect the manner in which shrinkage occurs; physical properties of the resin are not the sole determinant in assessing feasible solutions. Thus, these new tests must incorporate appropriate conditions so that the response of the material will be representative of its behavior in the tooth. Once shrinkage behavior of these materials is characterized, one can begin to make alterations to reduce or eliminate the shrinkage. We propose the concept of smart dental materials as a strategy to eliminate shrinkage.

## **31. Steven Kniffley, Jr. and Enrique Garcia**

**University of Louisville**

**Mentor: Tato Sokhadze**

### ***STUDY 1: Event-Related Potential Study of Psychomotor Slowing in Bipolar Disorder***

Many psychiatric disorders affecting mood, and among them bipolar disorder (BD), are associated with distinct patterns of psychomotor slowing that can be revealed during behavioral tests. This pilot study investigated how the brain reacts to sensory signals, and why reactions to such stimuli are impaired in patients with BD even when they do not present symptoms of mood disturbances. Event-related potential (ERP) recording technique was used to analyze time course of information processing stages and reveal timing and topography of processing abnormalities in psychopathologies. Reaction time (RT) is used to assess motor response speed during behavioral tests. The purpose of this study was to evaluate the role of perceptual and motor demands of the task on cognitive processes and behavioral performance in group of patients with bipolar disorder and collect pilot data. Eleven euthymic patients with BD and eleven healthy subjects participated in the study. The experiment represented a modification of visual target detection task and examined the differential cortical reactivity to task demands (overt motor vs. silent count) and signal features (masked vs. non-masked). We used Electrical Geodesics Inc. electroencephalograph to record brain waves from 128 location of the scalp. The group of bipolar patients compared to controls in our study showed longer RT and delayed cognitive ERPs in oddball task with motor demands. ERP indices of stimulus property evaluation and classification speed were different between groups regardless of the type of response demands. These ERP findings suggest that slow speed of response-related processes, along with the slow perceptual stimulus-evaluation processes, might be important components of the psychomotor impairments in patients with BD.

### ***STUDY 2: Effects of Emotional Distracters on Performance in Cognitive Tasks in Remitted Patients with Bipolar Disorder***

Patients with bipolar disorder (BD) even in euthymia reveal a pattern of responses across behavioral, electrocortical and autonomic measures that suggest an enhanced processing of task-irrelevant, mood-congruent and motivationally salient emotional stimuli with concurrent deficits in the processing of task-relevant emotionally neutral stimuli. The study used behavioral tasks aimed to infer dysfunctions of emotion and cognition processes, analyzing overt responses, dense-array event-related potentials (ERP), and autonomic outcomes in 12 euthymic BD patients and 12 control subjects. In this experimental study we used modifications of a three-category oddball task: facial emotional expressions both as target and distracter stimuli; ERPs to targets, standards, and distracters, as well as difference waves (target-minus-standard; target-minus-distracter) were calculated at topographical regions-of-interest and compared across all conditions using ANOVA. Bipolar patients, compared with controls, demonstrated more interference effects expressed in delayed reaction time and lower accuracy, and prolonged latencies of endogenous ERP indices (P2a, N2b, P3a, P3b) when distracters were stimulated (facial expressions) with emotional content, and demonstrated lower interference effects to emotionally neutral target and standard stimuli. Tonic autonomic measures (heart rate, HRV, SCL, respiration, etc.) also showed between group differences in conditions with emotional distracters. This study develops innovative psychophysiological measurement approach by combining 128 channel ERP and autonomic activity recordings for more comprehensive assessment of the physiological manifestations of residual emotional disturbances in euthymic patients with BD. The proposed methodology has practical value and usefulness in the cognitive and emotional impairment assessment process in mood disorders. Dense-array ERPs techniques make the recording of activity of the brain areas involved in cognitive and emotional processes possible. Affective states are under the control of a more primitive limbic system, which governs activity of the autonomic nervous system. Integration of both cortical and autonomic measures may have clinical significance in the study of mood disorders.

## **32. Emily Clemons, Jeff Combs, and Jill Hunter**

**Eastern Kentucky University**

**Mentor: Alice Jones**

### ***Understanding Eastern Kentucky Ecosystems: Three Studies***

Three different projects conducted by students working with the Eastern Kentucky Environmental Research Institute at EKU are featured in this poster. “Woody Plant Species Compositional Response to a Timber Harvest in South-Central Kentucky” (Emily Clemons), compared a site logged in 1996 with nearby unlogged control site to examine the regeneration of forest structure post-timbering. Prior to harvest, the logged site was divided into 25 plots, and an unharvested control area was established consisting of 16 plots. This followup ten years after the timber harvest examined forest composition information was collected in the same manner from both the harvested and unharvested plot sites. “Ground-Truthing Remotely Sensed Data In a Small Watershed on the Urban/Rural Fringe” (Jill Hunter), tested methods of generating a land coverage at reasonable cost by combining the National Land Cover Dataset (NLCD), the National Agriculture Imagery Program digital orthophotography, and a limited number of field observations to produce a revised polygonal land use layer. While the NLCD is good for GIS applications at the state scale, it much less accurate at the small watershed scale where many land management decisions take place. “The Big Dip” (Evan Smith, Jeff Combs, and others) was a diagnostic sampling of 917 headwaters streams in Southeastern Kentucky conducted by a team of both EKU students and community members in Letcher county. The geographic distribution of the eight parameters tested and their implications for ecological and community health will be presented.

## **33. Jeggan Cole**

**Kentucky State University**

**Mentors: Bruce Hinds, Mainak Majumder, and Xin Zhan**

### ***Measurement of Carboxyl Density and Electrostatic Modeling of CNT Membranes***

An array of Carbon-nanotubes was incorporated across a polymer film to form a well ordered nanoporous structure. These membrane can emulate the selective transport and extraordinarily fast flow possible in biological cellular channels. With continuous experimental research on these synthetic membranes, it could lead to wide range potential applications such as: chemical separations, bio-sensors, and drug delivery. A major challenge for current membranes is to achieve high flux with high selectivity. This requires high density of uniform pores, ability to functionalize the pore entrances, and short non-tortuous path of channels for increased flux.

### **34. Anna Edwards**

**Murray State University**

**Mentor: Kathleen Farrell**

#### ***Back to Basics: Nursing Interventions that Decrease Ventilator Pneumonia***

Purpose: To recognize the benefits of basic nursing interventions and their significance in decreasing Ventilator associated pneumonia (VAP) and to evaluate the impact of using the VAP Bundle in delivering quality nursing care. Research Question: Is Ventilator associated pneumonia (VAP) preventable with the implementation of the VAP bundle? Significance/Background: Basic nursing interventions can decrease and possibly eradicate VAP, which is the most common and lethal nosocomial infection. As part of its 100,000 Lives Campaign, The Institute for Healthcare Improvement (IHI) advocated the use of life-saving interventions (bundles) to reduce or prevent VAP. This research examines the VAP occurrence rate and nurses' perception of the implementation process. Method: Prevalence aggregate data was examined to determine the implemented Ventilator bundle's effectiveness in decreasing the occurrence rates of VAP. Nursing staff (n=30) were surveyed to gain their perspective of the VAP bundle implementation process. Design: A quantitative, retrospective cohort study of all ventilated patients from February 1, 2006 - July 31, 2006 and a descriptive study of nurses' perception of the VAP bundle implementation process in a small, rural hospital in the south central United States to determine the effectiveness of a Ventilator Bundle project on patient outcomes. Findings: Preliminary findings suggest the NNIS risk index rate decreased from 9.85% to 2.67%. Nursing reports correlate VAP bundle implementation with favorable process and clinical outcomes. Implementation of VAP bundle has significant benefits to increasing positive patient outcomes.

### **35. Michael Stallings**

**Kentucky Community and Technical College System**

**Mentor: Charles Purvis**

#### ***Type III Secretion Systems in Bacteria: Potential Target for "Magic Bullets?"***

Numerous human, animal, and plant pathogenic strains of Gram-negative bacteria have been shown to produce a unique set of proteins involved in the pathologies of host cells. Non-pathogenic strains do not produce these proteins. Collectively, these proteins function in what has been termed the Type III Secretion System. To those strains possessing the capability of producing them, these proteins are therefore considered one of their virulence factors. In this "age of antibiotics," it is easy to assume that administration of drugs is a quick and effective "fix" for any infectious disease. Due to the relatively low selective toxicity of antibiotics, even normal microbiota are subject to their effects, and benefits are lost. This project reviews current research dealing with Type III Secretion Systems, and inhibition effects of current technologies on their expression or virulence. The project investigates development of novel methods to control pathogens while leaving non-pathogens unaffected.

### **36. Yankuba Banda**

**Kentucky State University**

**Mentor: Narayanan Rajendran**

#### ***Microbial Characterization of Exiguobacterium Acetylicum SN, a New Strain of Soil Isolate from Capsicum-Grown Soil***

Soil bacteria are more common in natural habitats and represent a spectrum of complexity of bacterial community. By adopting different mechanisms such as preventing phytopathogens, many of them play vital roles in the biodegradation of major compounds as well as enhance the growth of many plants. In our earlier studies, *Exiguobacterium acetylicum* strain SN one of the leading soil bacteria was isolated from the capsicum-grown soil by the second author (mentor).

In the present study, a partial characterization of this soil bacterium was carried out by using various microbiological methods. *E. acetylicum* SN is a yellowish, aerobic and motile bacterium. The straining technique proves it is a Gram positive bacterium. Based on the growth curve study in Nutrient Broth, the optimal growth of this strain was observed at 38-42 hours. The serial dilution and the spread plate techniques had yielded a frequency of the viable colony count at  $2.7 \times 10^9$  CFU/mL. Based on the selective media analysis it was proved that this strain belongs to fermentative group and can ferment Glucose, Maltose and Sucrose, except Mannitol. Differential media analysis indicates that this bacterium can grow well in Nutrient Agar, and partially grow in Mannitol Salt Agar, and Kligler Iron Agar, but poorly grow in Eosin Methylene Blue Agar. Antibiotics such as Tetracycline, Kanamycin, Chloromphenicol, Neomycin, and Streptomycin exhibit variable growth inhibition against this bacterium after 24 hours. Novobicin showed higher growth inhibition than Erythromycin

### **37. Kelly Carter, Crystal Day (GS), Carrie Harris (GS), Leslie Jenkins, and Stephanie Unger**

**University of Louisville**

**Mentor: Barbara Burns**

#### ***A Longitudinal Examination of the Relation between Children's Spontaneous Verbalizations and the Development of Motivation***

Motivation is broadly defined as being either mastery or performance-oriented. Mastery-oriented individuals tend to view challenges with excitement, while performance-oriented individuals tend to avoid challenging situations. Understanding and identifying the origins of mastery-oriented motivation is particularly important, given that research has consistently shown this pattern to be related to academic achievement. It is difficult to examine these patterns in very young children who may otherwise be unable to communicate higher-level thought processes. Research has suggested that young children's speech may provide insight into their thought processes, a highly useful source for studying children's motivational processes. In the current study, 65 preschoolers' motivation, helplessness, and verbalizations were assessed during a puzzle-challenge task. Data were collected at the beginning and end of the children's school year to determine how motivation and helplessness change over time. At the beginning of the school year, performance-oriented children produced significantly more disengaged statements, task-appropriate strategies, and total verbalizations. Change in motivation orientation was significantly predicted by the number times children asked for help in the beginning of the school year. Specifically, fewer self-motivating expressions and more social prompts at the beginning of the school year characterized children who switched from mastery to performance. These results provide new evidence for the role of self-evaluative speech and social feedback for influencing motivation in children. The findings have important implications for designing interventions aimed at identifying and preventing helplessness at an early age.

### **38. Jonathan Lewzader**

**Murray State University**

**Mentor: Edie Banner**

***Development of New Synthetic Strategies for the Synthesis of N-heterocyclic Scaffolds***

An unexpected outcome of a reaction unveiled a new method to obtain N-Cbz-L-prolinol from N-Cbz-L-glutamic acid in one step with retention of stereochemistry. This reaction warrants further investigation as this compound is an important chiral N-heterocyclic substructure (pyrrolidine) found in numerous natural products that exhibit bioactivity. This compound and derivatives thereof can be quite costly to synthesize, thus optimization of this method would allow for the efficient and inexpensive production of prolinol derivatives from inexpensive amino acids. Investigations into the scope of this reaction have been undertaken to develop N-heterocyclic scaffolds which can be utilized in the synthesis of natural products.

### **39. Erin Jolly, David Deigert, and Jill Hunter**

**Eastern Kentucky University**

**Mentors: Walter Boroski, Alice Jones, and Danita LaSage**

***Dynamics of an Eutrophic Lake (Wilgreen Lake, Madison County, Kentucky): A First Step in Cleansing a Lake System Impaired by Nutrient Loading***

Wilgreen Lake (Madison County, Kentucky) is an eutrophic lake formed by damming Taylor Fork, part of the Silver Creek watershed. Two principal tributaries drain urban areas of the city of Richmond, agricultural land typified by cattle grazing, and a high-density residential area using septic systems. The lake is listed “nutrient impaired” by the Commonwealth and EPA, so it is likely that nutrient input from human activities is affecting water quality. Our study aims first to characterize the physical characteristics and water quality of the lake (2006), and then to determine the specific proportion of nutrient inputs (2007) to the lake with the aim of remediating its water quality. We will use nitrogen isotopes and microbial DNA templates to identify specific nutrient sources. Research started in May 2006 with work occurring throughout the 2006 field season with the intent of establishing a baseline for key lake parameters. We used an YSI probe to measure temperature, conductivity, oxygen concentration, and pH and assayed for total ammonia nitrogen using the sodium hypochlorite, colorimetric method. The lake was already strongly stratified in May with disoxic and anoxic water below about 4 meters. Stratification strengthened in the summer with the disoxic-oxic boundary moving upward to about 3 meters, showing a sharper gradient oxygen gradient. Ammonium concentrations are typically zero in the oxic zone, and increase in concentration with increasing water depth in anoxic waters to about 5 ppm. We anticipate that phosphate and nitrate concentrations will mirror ammonium concentration profiles in character.



## **40. Robert Wilson**

**Northern Kentucky University**

**Mentor: Heather Bullen**

### ***Surface Modification of Stainless Steel Medical Implants to Prevent Biofouling***

Self assembled monolayer (SAMs) have attracted significant attention due to their potential to form ordered films on various substrates. The research presented here evaluates the formation of SAMs on stainless steel (SS) and Au substrates as potential nobiofouling surfaces. Electrochemical and scanning probe microscopy (SPM) methods were utilized to characterize model SAMs: 16-mercaptohexadecanoic acid, 1-hexadecanethio, and 1-octadecanethiol. SAMs formed on 316L SS (a model surface for medical implants) are compared to SAMs on Au.

## **41. Dale McClure, Tyler Doring, and Daniel Urb**

**University of Kentucky**

**Mentors: James Lumpp, James Hereford, and Ben Malphrus**

### ***Development of an Off-the-Shelf Bus for Small Satellites***

KySat1, a 1 kilogram pico-class satellite, is currently being designed by a distributed group of collegiate-level students across the state of Kentucky. This first satellite has initiated the work in achieving the overarching goals of the KySat program and its associated consortium of public, private, and educational partners; to cultivate a high-tech knowledgebase in the state. Aside from the numerous lives that this device will touch and inspire, the significant technical contribution that will be made to future generations of KySats will be a reliable standardized system bus. The timeline for this project is very aggressive, resulting in a desire to use systems that are available off-the shelf whenever possible.

## **42. Montreal Dillard**

**Morehead State University**

**Mentors: April Miller and Morgan Smith**

### ***Variables Influencing Success of Minority Teacher Education Candidates***

Given that Caucasian students score higher on tests (ACT, Praxis I, Praxis II) and are admitted to teacher education programs at a higher rate than minority students, this study will examine possible variables contributing to success or failure to be admitted to teacher education programs such as grades, study habits, major selected, mentoring programs, MSUCorp, degrees of their parents, admission criteria, and perseverance. We will be using data collected via Tk20, student information systems, Praxis examination scores, teacher education program admission and exit data, and self report surveys.

### **43. Eva Renfro**

**Kentucky Community and Technical College System**

**Mentors: Roger Warren, Mary Janssen, and Dan Schultz**

***Preliminary Calculations for a Mathematical Model of the Behavior of a Dog "Fetching" a Ball in Water***

It can be shown that over time, a dog learns to retrieve an object in water in the minimum amount of time by using an optimal amount of running on land before it jumps into the water. In a field experiment, a ball was thrown into a pond at varying distances and angles from the edge, and a Labrador retriever, Hank, was commanded to "fetch" the ball. The behavior of running and swimming to retrieve the ball and bring it back to his master constituted a trial. Observers measured angles, distance running on land, and time running and swimming on each trial. Trigonometry was used to obtain the distance swimming on each trial. Calculus was used to obtain the minimum total time to reach the ball and optimal point of entry into the water, as a function of swimming and running rates. The percent differences in total time and the optimal time, and distance running and optimal distance running on each trial were graphed. The curve from preliminary trials looks like a curve of "trial and error" learning.

### **44. Amy Karbasi**

**Eastern Kentucky University**

**Mentor: Rosanne Lorden**

***Treatment Adherence and Psychological Issues***

Medical nonadherence is an extensive problem within the field of medicine in the United States today. The consequences of nonadherence can be grave, and the issue affects many people; thus, it is an important topic to address. There are many reasons to explain why patients often do not comply with their health care practitioner's advice, and many of these reasons are psychological in nature. This paper is a literature review that analyzes and critiques several studies and reviews written by medical and psychological researchers about this subject. The main topics of this paper include defining compliance/adherence, discussing its prevalence and incidence, methodological difficulties in assessing adherence, patient and relationship factors related to nonadherence, and models, theories and approaches that explain nonadherence. A general summary, analysis, critique and suggestions for future research conclude the review.

### **45. Ashley Reed and Kandess Thomas**

**Western Kentucky University**

**Mentor: Lynn Austin**

***CAVEities: Comparing the Effects of Carbonic Acid found in Caves and Soft Drinks***

A significant factor in the incidence of tooth decay in the United States is the consumption of sugar-containing soft drinks. Another component of the decay process is thought to be the carbonic acid contained in these drinks. This study compares the effects of carbonic acid on various structures including caves and teeth. Caves are formed as a result of continual exposure to acids. A person who consumes soft drinks throughout the day is exposing their teeth to the same substances. Dramatic before and after photos will exemplify the deleterious effects of these substances on an individual's teeth. Additionally, data will be provided that illustrate the progression of dental decay among children and young adults in the United States.

## **46. Peter Wulff**

**University of Kentucky**

**Mentor: Karyn Esser**

### ***Bmal1<sup>-/-</sup> Mice as a Model for Temporal Mandibular Joint and Muscle Disorder***

Temporal Mandibular Joint and Muscle Disorder (TMJMD) affects a significant portion of the population, being especially prevalent amongst women. It is a complex set of chronic diseases related to the temporal mandibular joint and surrounding tissues. These diseases can have comorbidities that include facial pain, irritable bowel syndrome, sleep disorders, migraines and many others. Currently, molecular understanding of the disease is not fully understood. The ultimate goal is to obtain a comprehensive understanding for the onset and prevention of the disease. *Bmal1* (Brain muscle ARNT like 1) is a core circadian rhythm gene that is necessary for maintenance of the molecular clock in all cell types. Previous studies have shown limb muscle in *Bmal1* knockout mice is phenotypically altered. They have decreased force capacity and large decreases in mitochondrial volume. The hypothesis for this study is that the masseter muscle in *Bmal1* knockout mice will also have decreased function leading to TMJMD. The masseter is the largest muscle of the masticatory system and is directly involved in articulation of the TMJ. This hypothesis would link the disease to circadian factors and begin to reveal the molecular mechanisms of the etiology and muscle pathology. Specifically, this study will compare function of single fibers from the masseter of *Bmal1* knockout mice and wild type mice. Histological aspects of the study will assess mitochondria volume and sarcomere structure and biochemical studies will determine quantities and isoforms of important structural proteins in muscle.

## **47. Melissa Seward**

**(Oral and Poster Presentation)**

**Kentucky State University**

**Mentors: Myna Panemangalore, Martha Marlette, and Susan Templeton**

### ***Physical Activity Levels of Preschool Children in a Random Survey***

Among all preschool children, 10.1% are overweight and 10.7% are at risk of becoming overweight; low physical activity could be a major contributing factor. In this study, data were collected on physical activity of preschool-aged children, attending preschool and/or at home. Children aged three to five (five females and eight males, mean age 3.9 years) were recruited from public preschool programs and at various community events. The heights and weights of each participant were measured and Body Mass Index (BMI) was computed; physical activity was recorded with an Actical accelerometer worn on the hip over seven days by each child. Weight status was classified according to CDC guidelines; 85% of the children had “Normal weight”; one was “At risk of overweight” and one was “Overweight”. Physical activity levels during the hours of 7 AM to 9 PM were analyzed; sedentary activities at preschool were 27 minutes per hour compared to 33 minutes per out of school hour ( $P \leq 0.001$ ). More time was spent in light activity in preschool, 21.1 minutes per hour versus 16.9 minutes per hour outside school ( $P \leq 0.001$ ). Time spent at the moderate activity level was similar in both situations and vigorous activity was minimal. These results suggest that physical activity in preschoolers is low and/or light, and detailed follow up surveys will be needed in a larger group of children to identify the risks of overweight.

## **48. Shelly Kakar**

**University of Louisville**

**Mentor: William G. McGregor**

### ***Mutagenic Proteins Detected in DNA Stalled by UV Radiation***

UV causes cancer by inducing damage in the DNA of skin cells. If the damage is not repaired it can induce alterations in the DNA sequence. A protein encoded by the rad18 gene is required for the maintenance of genomic integrity after DNA damage. To examine the role of RAD18 in the response of human cells to UV synchronized repair-proficient human skin fibroblasts. Cells were irradiated in mid-G1 phase or in S-phase and fixed. The cells were stained and examined with confocal microscopy for (PCNA), a protein required for repair of the UV damage for DNA replication, for RAD18, and for nuclear DNA. UV damage induced nuclear PCNA in cells in either G1 or S-phase. In contrast, RAD18 was present in the nucleus only in cells irradiated in S-phase, and co-localized with PCNA. The subcellular distribution of DNA polymerase  $\epsilon$  was examined. This enzyme was found in nuclear foci of S-phase cells, and co-localized with PCNA and RAD18. These results support the hypothesis that RAD18 is recruited to DNA replication forks stalled by UV damage, and the subsequent recruitment of newly discovered error-prone DNA polymerases that can complete the replication of DNA containing UV damage.

## **49. Joseph Cleinmark**

**Western Kentucky University**

**Mentors: Raymond Poff, Fred Gibson, and Tammie Stenger-Ramsey**

### ***Appalachian Trail Hikers and Self-Reported Outdoor Ethics Practices***

This research was conducted during a five-month southbound hike of the 2,175 mile Appalachian Trail (AT). The questionnaire included seven demographic items and 34 items related to the Leave No Trace (LNT) principles of outdoor ethics which are: 1) plan ahead and prepare, 2) travel and camp on durable surfaces, 3) dispose of waste properly, 4) leave what you find, 5) minimize campfire impacts, 6) respect wildlife, and 7) be considerate of other visitors. The 104 completed questionnaires were administered in the evening at trail shelters and campsites to avoid interference with hikers' progress. Respondents included 36 females and 68 males comprised of 41 overnight hikers, 33 section hikers, and 30 thru-hikers. The mean number of weeks on the trail was 4.98 with an SD of 7.075 and a Range of 0-32. The respondents' ages (N=101) ranged from 18-70 with the mean of 33 and SD of 15.53. The race of the hikers (N=102) included 94 white, 2 black, 2 Chinese, 1 Other/Asian, and 3 other. Results related to outdoor ethics skewed toward appropriate behavior as prescribed by LNT principles. The responses for all items related to principles 4, 5, and 6 appeared to more closely follow recommended LNT practices than the other four which received considerably dispersed responses. In considering the seven LNT principles, one finds differences in recommended practices and the behaviors of AT hikers. The Appalachian Trail with its mix of backcountry setting, front country access, culture, and established recommended practices provides an interesting study of outdoor ethics.

## **50. Tara Bonistall**

**University of Kentucky**

**Mentors: Kay Hoffman, Joanna Badagliacco, Joan Callahan, and Patricia Cooper**

### ***Reversing Complacency***

This project is a compilation of the complex issues surrounding abortion in today's society, especially in the lives of individuals younger than thirty years of age. This generation has demonstrated a general lack of interest and a position of apathy with regard to controversial political issues at the very time in their lives when these issues are most pertinent. In addition to investigating the sense of political complacency exhibited by young people today, this project also seeks to investigate the marketing techniques utilized by both the pro-choice and anti-choice movements. The urgent need for action from the pro-choice side is more critical than ever before, and it is essential that pro-choice activists mobilize the younger generations for multiple reasons; among them that these women need to carry the movement, as well as become involved with issues that affect their own bodies. I argue that by reframing abortion as healthcare, our society will be able to remove the religious and moral overtones shadowing abortion, and instead approach the issue from a rational, medical model. This approach also emphasizes the importance of responsibility within abortion decisions, both the responsibility of the mother to the child, and more importantly, the responsibility society has to the mother.

## **51. Sharon McIntosh**

**Eastern Kentucky University**

**Mentors: Lisa Cox and Stephen Haggerty**

### ***Memorable Moments in Mentoring: Learning Who You Are by Leading Others***

Mentoring has grown into a dependable method for introducing new students to the rigors of college life and experienced students to the rigors of professional life. Alongside the many advantages provided to mentees, peer mentors are gaining experience that carries into both their private and professional lives. This poster presentation showcases the benefits of peer mentoring on the mentor using current research and the personal experiences of various mentors working with the NOVA program. Research will be presented that showcases the professional attributes mentors take into their careers, whatever the field may be. Research also reveals the individual benefits gained by peer mentors that strengthen personal relationship and community/civic bonds. The poster will exhibit the duties and roles of individual mentors. It will also showcase the unique experiences and activities that emphasize the personal experiences of the mentors. Mentors will then explain how the position has impacted their lives, culminating in the private and professional development of mentors.

## **52. Laricia Longworth-Reed**

**University of Louisville**

**Mentor: Pavel Zahorik**

### ***Speech Recognition in Time-Forward and Time-Reverse Conditions***

Daily we are exposed to speech in varying settings and room conditions. All rooms that we listen in are not ideal for speech. Previous studies suggest that several characteristics contribute to listening within different environments, including familiarity with the listening environment. In the current study familiarity was examined through by comparing performance on a speech recognition task in two listening conditions; a normal time-forward condition and unfamiliar time-reverse condition. Using virtual auditory space speech was presented through headphones giving the perception of a realistic room environment that preserves reverberant conditions but allowed manipulation of stimulus characteristics. Current analyses indicate a decrease in word recognition for room reverse conditions. Results of percent correct word recognition yielded approximately 80% for room-forward, and less than 20% for room-reverse. This dramatic decrease may perhaps be attributed to a lack of familiarity with the environment or degradation of onset information. The current research may contribute to development of optimal listening environments and assisted listening technology.

## **53. Christopher Allen and Joseph Bowling**

**Western Kentucky University**

**Mentor: Dean May**

### ***As the Temperature Rises, the Need for Services Will Heat Up***

Scientific research indicates that sea levels will continue to rise in correlation with inconsistent weather patterns considered to be a reaction to global warming. Weather related catastrophes have risen over the last decade with the number of category 4 and 5 hurricanes increasing dramatically. Experts caution that if something is not done about warming sea surface temperatures major cities in California and New York could be forced to deal with flood waters similar to the quagmire in New Orleans. The Bush administration recognizes the phenomenon surrounding rising carbon dioxide and green house gases, but currently fails to provide proactive policy initiatives to ensure a reduction in fossil fuel usage. Hurricane Katrina claimed over 1600 lives and reports estimate that 500,000 people had to be evacuated. Hurricane Katrina devastated approximately 90,000 square miles of New Orleans and many people are still misplaced and in need of social services. As global warming looms over the horizon, we must formulate preventative measures to ensure aid for the next community evacuation. While it has been over a year since tragedy struck this region, reviews of the aftermath reveal that much needed services have not been put into practice. In order to ensure a return to normalcy, for present and future storm refugees, social services must become active advocates for responsible planning surrounding the evacuation and relocation of those affected.

## **54. Dusty Walker, Geri Remley, Lucas McCarrick, Michael Morrison, and Ryan Zike**

**Eastern Kentucky University**

**Mentor: Jon McChesney**

***The Good Life: Perspectives of Kentuckians***

This qualitative research focused on interviews with Kentuckians of all ages and socio-demographics in an attempt to ferret out what people deem the good life to be. Does the good life wait until retirement or sufficient economic prosperity? Interviews uncovered good life linkages with considerable leisure ("4:59 on a Friday"), recreation such as travel, religious faith and spirituality, citizenship and living where "a sense of community is valued," and financial issues ("Good life would be winning the lottery"). Philosophical views included finding balance, living with a sense of purpose, "a career you love doing," and connection to one's values. Some struggled, "I just don't know. Perhaps we are just too busy; it's almost like our heads get stuck in the sand." One perfunctory response from a 15 year old was, "I don't know. Just to sleep and a nice family I guess, and make the guy do all the work." A more considered response was, "The good life is whatever makes you happy. Not content, not ok, not rich, just happy." One individual said, "At my Mother's funeral, someone said, 'knowing your Mother made me a better person.' Mom modeled the good life in her service to others." One student researcher in assessing the data said, "Perhaps we are so busy in life that we fail to work towards a goal, and fail to realize that our future is dictated by what we do today."

## **55. Billy Colemire**

**Eastern Kentucky University**

**Mentors: Lisa Cox and Stephen Haggerty**

***Service Learning: Its Impact on Becoming a Leader***

Service learning is a powerful experiential pedagogy for introducing first-year students to leadership and team development. Through service learning and intense reflection, students discover how to access a variety of resources to promote significant change in their communities. The students utilize critical and creative thinking skills as they process, synthesize, and communicate information throughout the course of the semester. Multiple reflective activities reveal new perspectives that are likely to remain forever engrained in students' minds, thus promoting an informed community that is more likely to get involved. This poster presentation will illustrate the multiple steps of the service learning process and educate others on the effect of service learning on the understanding and development of leadership dynamics.

## **56. Wendy Creekmore**

**Northern Kentucky University**

**Mentor: Kenneth Tankersley**

*Native Americans: The Surviving Struggle*

In late-nineteenth century North America there was a great concern by the United States government that Native Americans were struggling to survive and would likely be extinct by the end of the twentieth century. Today, in spite of an enormous suite of hardships including genocide, ethnocide, and ecocide, they are not extinct. Native Americans, however, are considered an “invisible race,” unseen, unknown, mystic creatures of the past, identified on the movie screen in roles written by someone other than themselves, which continue to stereotype them. This poster addresses the questions of who are American Indians today, what do they look like, where do they live, what do they do, what is important to them, and what paths and directions of livelihood and Spirituality are theirs? One hundred twenty seven years after their predicted extinction, they are still struggling to survive.

## **57. Michael O. Somuah and Yoon-Hyeon Hu**

**Kentucky State University**

**Mentors: George F. Antonious and Tejinder S. Kochhar**

*Soil Management Practices for Mitigation of Herbicide Residues in Runoff and Infiltration Water*

Contamination of surface and groundwater by pesticides is of great concern. Application of pesticides to agricultural field may result in their transport into surface waters via runoff or into groundwater through infiltration. New soil management practices are needed to develop and expand our knowledge and technical means of agricultural production related to the fate and transport of pesticides. The objective of this study was to trace the mobility of two herbicides (trifluralin and napropamide), that are commonly used in crop protection, in runoff and infiltration water from soil treated with three management practices. A field study was conducted on a 10% land slope at Kentucky State University Research Farm. Eighteen plots of 22 × 3.7 m each were separated using metal borders and the soil in six plots was mixed with sewage sludge, six plots were mixed with yard waste compost, and six unamended plots were used for comparison. During a subsequent 3-year study, plots were planted with potato (year 1), pepper (year 2), and broccoli (year 3). Once the soil was sprayed with trifluralin and napropamide, runoff and infiltration water were collected following natural rainfalls and the herbicide residues were quantified. Addition of sewage sludge increased soil organic matter and retention of trifluralin and napropamide, lowering their concentration in runoff, and reducing their transport into streams and rivers.



## **58. Annette Fowler**

**Murray State University**

**Mentor: Bommanna Loganathan**

### ***Trace Level Analysis of Polybrominated Diphenyl Ethers in Fish Tissue Extracts using a Gas Chromatograph-Electron Capture Detector***

Polybrominated diphenyl ethers (PBDEs) are one of the additive flame retardants widely used in plastics, textiles, and in electronic appliances including computers and televisions. Widespread use of PBDEs has resulted in environmental contamination. Exposure to PBDEs can cause harmful effects in wildlife and humans. Limited data is available on the levels of these compounds in fish tissues and on human exposure via consumption of contaminated fish. In this study, a gas chromatograph equipped with electron capture detector was calibrated using known concentrations of PBDE standards. Response factors and method detection limits were determined for 12 PBDE congeners. Fish tissues (collected from the Atlantic coastal waters) were analyzed for PBDE congeners and the analytes were quantified using an Excel program. The individual and total PBDE concentration data for each fish species were tabulated and compared with literature PBDE data of fish from other regions in the United States. This study provides baseline data on PBDE levels in the fish from Atlantic coastal waters off Savannah, GA. Future monitoring studies on PBDEs is essential in order to determine bioaccumulation, biomagnification, and effects of these compounds in wildlife and humans. Results revealed that PBDEs 47, 99, 100 and 28/33 were frequently detected in fish samples. Inter-species and intra-species differences were noticed. Accumulation pattern of the PBDEs in fish tissues shown the following order 47>99>100>28/33>66.

## **59. Bill Atwood and Megan Ennis**

**Morehead State University**

**Mentor: Benjamin Malphrus**

### ***Defining Antenna Gain and System Temperature of the Morehead State University 21-Meter Space Tracking Antenna and Initial Observations of Microvariability in Active Galactic Nuclei at 1420 MHz***

The Morehead State University 21-Meter Space Tracking Antenna and Radio Telescope is a centimeter-wavelength radio telescope designed to permit the investigation of a wide variety of astronomical phenomena at different frequencies, (L-Band, S-Band, and Ku-Bands), and also to provide telemetry, tracking, and control services for space missions. The performance of this instrument is highly dependent upon the antenna's radio frequency (RF) performance characteristics. Primary among these are antenna gain and system temperature, both of which can be numerically derived from G/T. The value of G/T serves as a predictor of the instrument's ability to detect and measure characteristics of distant astronomical sources. Active Galactic Nuclei (AGNs) are some of the most distant objects known in the universe and, as such, require optimum instrumental sensitivity and gain. One of the interesting characteristics of AGNs is that they vary in brightness over a variety of time scales including long term (years or decades), intraday (days or weeks), and very short periods (hours or minutes). By monitoring the microvariability in the atomic hydrogen line at 1420 MHz, we may be able to determine if the variability is due the internal processes of these objects or due to the intervening medium, and to provide insight into the nature and process of the AGN central engines. Using the Morehead State University 21-Meter Space Tracking Antenna, we can measure short-term variations (microvariability) of the radio frequency radiation of these distant objects. Herein we report baseline measurements of G/T and initial observations of microvariability of a set of AGNs.

## **60. Anthony Atchley**

**Western Kentucky University**

**Mentors: Sharon Mutter and Leslie Plumlee**

### ***Aging and the Revision of Causal Beliefs***

Differences in younger and older adults' ability to update causal beliefs were investigated using a food allergy prediction task. In the baseline phase of the task, individual food cues were presented and participants indicated whether they thought the food caused an allergic reaction. In the training phase, compound cues consisting of two food cues were presented and participants learned whether the foods together did or did not cause an allergic reaction. Next, cues consisting of one food from each compound cue were presented and participants learned whether this food alone did or did not cause an allergic reaction. Then participants re-rated the causal effectiveness of all food cues as was done during the baseline phase. Finally, participants' recognition of compound food cues was tested. Initial baseline causal ratings were the same across age and younger and older adults showed equal learning for the food allergy relationships in both compound and single cue training. However, single cue training with a food cue from the compound led younger adults to revise their beliefs about the causal effectiveness of the other food in the compound; this did not happen for older adults although they remembered the compound cues as well as young adults. These results suggest that older adults are able to learn associations between causal cues and outcomes, but are less able to discover or use a "reevaluation rule". This finding is consistent with research showing that reasoning capabilities decline with age.

## **61. Renee Whitis and Heather Short**

**Kentucky State University**

**Mentor: Avinash Tope**

### ***Protection against Pesticides Induced DNA Damage by Sinigrin, a Bio-Active Compound, in Human Lymphocyte: Comet Assay***

Chronic low level exposure to environmental pollutants such as synthetic pesticides has been implicated in many health conditions such as oxidative stress, leading to DNA damage, a cause behind many serious diseases such as cancer. The objectives of the present study were: (1) to evaluate if exposure to a mixture of carbaryl, endosulfan and esfenvalerate, the most widely used pesticides in KY, at low levels (5-20  $\mu$ M), has the potential to cause oxidative stress induced DNA damage and to compare the potential with exposure to hydrogen peroxide(100 mM), using human lymphocytes; and (2) to ascertain the DNA protective capacity of sinigrin, (10-30 mM), a bio-active compound found in vegetables such as broccoli, cabbage, Brussels sprouts, against the DNA damage caused due to exposure to pesticides. Two principal strategies were evaluated; pre-incubation and co-incubation. In pre-incubation, the lymphocytes were incubated for one hour with various concentrations of sinigrin, followed with incubation with various concentrations of pesticide mixture. In the other set, lymphocytes were simultaneously exposed to both sinigrin and the pesticide mixture. DNA damage was evaluated by Single Cell Gel Electrophoresis (Comet Assay). DNA protective efficiency of sinigrin was found at concentrations at and above 20 mM against pesticides with co-incubation strategy.

## **62. Jacquelyn Lile**

**University of Louisville**

**Mentor: Barbara Burns**

### ***The Relationship between Early Language Skills and the Ability to Make Causal Connections***

Understanding causal connections is imperative for skills such as writing, reading, and comprehension of television programs. It has also been shown to be related to school readiness and academic achievement. Multiple studies have shown that causal understanding begins to appear at age 4, but does not reach adult level until age 9. Previous research has also indicated that 3-year-olds show little evidence of causal understanding. The current study examined the relationship between children's ability to produce causal connections in a storytelling task and several standardized measures of language. Fifty-nine children, ages 3- to 4-years, were recruited and assessed at their private preschool during two storytelling sessions. For each session, three wordless picture books were randomly assigned to each child. Their elicited story was then coded for causal connections, causal distance, presence of a goal, outcome of presented goal, and prompting by the experimenter. Additionally, children completed standardized assessments of language, including the KBIT-Verbal, TERA, PPVT-III and NEPSY-Language. Data is currently being analyzed. Pearson correlations will be used to assess the relationship between storytelling variables and performance on standardized language measures. Standard scores will be used for each of the independent variables. Multiple regression analyses will be used to determine which language measures best predict performance in the storytelling task. Based on previous research, it is hypothesized that there will be a positive relationship between the children's ability to produce causal connections and their scores from the standardized language measures.

## **63. Erin Cathcart, William Criner, Justin Sparks and Lauren Thompson**

**Murray State University**

**Mentors: Pat Williams and Kris-Ann Kaiser**

### ***STUDY 1: Repellency Effects of Incorporated Worm Castings and Compost Tea Sprays on Whitefly Populations for Poinsettia Production.***

Every year the horticulture program produces poinsettias for holiday sales. Under normal conditions, fungicidal drenches and systemic insecticides are used to control soil-borne pathogens and whitefly populations. This one crop uses more chemicals than any other crop during the year and without some type of control, a saleable plant would not be possible. There are four treatments being currently used with four repetitions using a randomized block design. Treatment 1 is the control group which has no worm castings or sprays. Treatment 2 consists of 10% worm castings incorporated in the commercial growing substrate. Treatment 3 will have 10% worm castings and be sprayed with the worm casting tea. Treatment 4 will receive only worm casting tea sprays. Pinching, watering, and fertilization follows a normal recommended schedule for production. This line of research follows up on a master's research project where information from The Ohio State University saw reduction of whitefly populations when utilizing worm casting by-products.

### ***STUDY 2: Shortening Germination Periods for California Poppy Using Incubated Worm Casting Substrates***

One-year old worm castings were added to Pro Mix BX substrate at 20% and incubated at a soil temperature of 72° F to observe if germination rates of California poppy (*Eschscholzia californica*) would be affected. Three different treatments were studied to determine the shortest germination periods. Treatment 1 was a control and had no worm castings or incubation period. Treatment 2 contained 20% worm castings and was incubated on rubber heating pads set at 72° F for one week. Treatment 3 also contained 20% worm castings and was incubated for two weeks. All water used for hydrating the substrate was set out three days prior to use at room temperature in a sunny greenhouse to reduce chlorine content which has been shown to affect the microorganism populations in worm castings. Prior research has shown worm castings can accelerate germination periods in seeds by breaking down the seed coat and increasing the rate of germination. The shorter germination period would lead to quicker saleable plants thus increasing productivity of any greenhouse operation using seeds. Preliminary results from this study at day seven had a larger number of germinated seeds in Treatment 3 versus the other two treatments. Additional trials are underway and, when complete, a statistical analysis will be concluded.

## **64. Matthew Clarke**

**University of Kentucky**

**Mentors: Wallis Miller, Michael Crutcher, and Richard Schein**

***Voices of Home in Bluegrass-Aspendale: Constructing the Ideal***

This project looks at whose voice counts in a struggle over the history and redevelopment of a public housing project in Lexington, Kentucky. From its 1937 construction as a Works Progress Administration project to its destruction in 2006 by way of a HOPE VI grant, the site underwent continuous evolution. Throughout its contested existence, Bluegrass-Aspendale has competed with the normative standards of the ideal home. At times espoused as model housing and others as a collector of crime and destitution, the 571 units demonstrate the complexity of constructing this ideal. This project looks at four distinct voices that have impacted the housing project. Each group's representation of Home infers the ideology backing their position. The project looks at the media's formation of a normative American house type, the authorities creation of public housing policy, and the designer's motivations behind their schemes. The fourth voice comes from former residents of Bluegrass-Aspendale. Their stories relate a more personal representation of Home, one in which locates their own familial, economic and historical self. This sensitive relationship of personal narrative contrasts with the other three and serves to illustrate the challenges of this site and in public housing at large. The poster will be a designed object in itself, full of maps, images and text. Instead of displaying empirical information, it will serve as a medium of discussion, raising questions to problems that might otherwise be overlooked. If possible, through assistance from the Kentucky Oral History Commission, I will provide equipment to broadcast actual interviews of former residents.

## **65. Jeremy Goldsmith**

**Western Kentucky University**

**Mentor: John All**

***Stormwater Best Management Practices in Karst Regions of Kentucky***

By-Pass Cave is an insurgence cave with water flow that has been dye traced to the Lost River Cave system stream that eventually flows into the Barren River. The cave has a surveyed length of 378 meters (1247 feet) and runs directly under several businesses and highway US 31-W. The cave has a history of flood flows and poor water quality. As part of the Clean Water Act's Phase II implementation of stormwater programs, a structural water quality device was added to limit the stormwater pollution entering this stream. Water quality samples were taken prior to implementation in order to create a pollution baseline. Samples subsequent to the BMP installation reveal that in karst areas, structural BMP's at cave stream mouths are of limited utility in removing contaminants from cave systems and that other management strategies are needed. Bypass Cave is the first step in the water cycle as rainfall moves into the Barren River. If water quality is improved here, the impact will be felt throughout the system.

## **66. Celeste Morris and Sean Goins**

**Northern Kentucky University**

**Mentor: Keith Walters**

### ***The Molecular Wire Concept and Development***

The goal of our supramolecular research is to create a molecular wire subunit which will transfer electrons over a highly conjugated organic polymer. This unit will wrap around a metal center thus bringing the metal directly in line with the conjugated polymer backbone creating a macromolecule, a polymer incorporating metals for the purpose of transferring energy. This project first requires the synthesis of a series of ligands followed by the synthesis of the final molecular wire subunit. Currently, this project has been worked on from two ends. The first involves synthesizing the molecular wire ligands for the molecular wire subunit. The other project focuses on creating a “hub” molecule which will be incorporated into a fullerene complex. This highly conjugated system will be especially suited for transferring electrons over the conjugated surface. When these modular compounds are synthesized they will be attached to the fullerene and then combined in the organometallic complex.

## **67. Rollie Hatfield**

**Morehead State University**

**Mentor: Gary O'Dell**

### ***The Paradigm Shift at Carter Caves State Resort Park: From Exhibitors to Educators***

Carter Caves State Resort Park in Eastern Kentucky was established in 1946 and has since exhibited a number of caves to the public. This research project focuses on the occupation and culture of cave guides at the park and specifically addresses the paradigm shift at the park from an early emphasis upon folklore and exhibition of “wonders” to public education and interpretation of nature. This paradigm shift was revealed during the preliminary research process and provided a primary direction of investigation. The primary goal of this paper is to answer the following questions. What brought about this shift in emphasis? How was it implemented? How has the shift affected guide culture at Carter Caves State Resort Park? These questions were addressed using qualitative methods, involving interviews of present and former guides and participant observation conducted by the researcher when employed by the Park as a cave guide in 2005. The research provided insight upon both the institutional and informal culture of the occupation of cave guiding and the transition from an exhibitory to an educational style, using as a model the concept of paradigm shift presented by Thomas A. Kuhn in *The Structure of Scientific Revolutions*.

## **68. Lauren Collins**

**Kentucky State University**

**Mentors: Kirk Pomper and Jeremiah Lowe**

### ***A Comparison of Agarose, Metaphor Agarose, and Polyacrylamide Gel Electrophoresis Systems in Resolving Pawpaw Molecular Markers***

Pawpaw (*Asimina triloba*) is a tree fruit native to Kentucky with potential as a new crop for small farmers. The fruit pulp can be used to make an excellent ice cream. Since 1994, Kentucky State University (KSU) has served as the USDA National Clonal Germplasm Repository, or gene bank, for pawpaw; therefore, the assessment of genetic diversity with molecular markers in pawpaw is an important research priority at KSU. Using the polymerase chain reaction (PCR) with simple sequence repeat (SSR) primers and pawpaw template DNA, products between 150 to 500 bp are usually amplified and visualized via electrophoresis. The objective of this study was to determine if SSR-PCR products separated on agarose, metaphor agarose, and polyacrylamide gel electrophoresis systems display unique scoring patterns that result in different genetic separation upon analysis for nine pawpaw cultivars. Using a DNAmite kit, DNA was extracted from young leaves collected from the pawpaw cultivars: Cales Creek, Davis, Middletown, NC-1, Overleese, Rebecca's Gold, Taytwo, Wilson, and Zimmerman. SSR primers B129 and C104 were developed by Genetic Information Services (Chatsworth, CA) and were used to amplify the pawpaw template DNA. PCR products were separated by electrophoresis on 3% agarose, 3% metaphor agarose, and 5% polyacrylamide gels. Following electrophoresis, gels were stained with ethidium bromide and photographed. Gel analysis was carried out using Kodak 1D software. Dendrograms were produced from the marker scoring data using NTSYSpc v2.11T. Each electrophoresis system produced a unique separation of the pawpaw cultivars, although some groupings were similar using the different systems.

## **69. Mitchell Martin**

**University of Kentucky**

**Mentor: Gary Ferland**

### ***Influence of Dielectronic Recombination upon the Ionization State of Interstellar and Intergalactic Clouds***

Dielectronic recombination is the dominant process by which free electrons recombine with ions in astrophysics. Upon the collision of a free electron with an atom, the energy of the electron is converted into internal energy of excitation of a bound electron, producing an intermediate ion that has more energy than the ionization potential of the element. Most such doubly-excited ions will then autoionize, a process in which one electron goes back into the continuum and the other returns to the ground state. However, in some small fraction of the cases one of the excited electrons will decay to a lower orbit and the ion will become stable. When this happens, energy is released in the form of electromagnetic radiation, which contributes to the observed emission spectrum of the photoionized gas. I will describe some typical photoionization calculations in which I have updated the rate coefficients to include this physics in Cloudy, a large scale numerical code used to predict the observed spectra of the ionized gasses present in interstellar and intergalactic clouds. Badnell and collaborators have recently recomputed a large number of the needed dielectronic recombination rates and provided fits to the rate coefficients. I will present results obtained for interstellar and intergalactic clouds that have been ionized by the background radiation field. Finally, I will discuss the changes caused by the improved dielectronic recombination data sets.

**70. Jimmy Sandusky, David Brown, David Kleinholter,  
Brian Hellinger, Juan Figueroa, Joshua Petrino,  
Adam Marshall, James Campbell, and Chris Kruckenburg**

**Western Kentucky University**

**Mentor: Kevin Schmaltz**

***WKU Mechanical Engineering Supporting Local Industry***

The Mechanical Engineering program at WKU actively participates with local engineering industries to support their efforts to better train the students to be capable engineering professionals when they graduate. For the 2006-2007 academic year, two teams of ME seniors are working on projects for large industrial partners. One team will design and build a system to automatically calibrate on-line infrared thickness measurement unit for Logan Aluminum in Russellville. A second team will redesign a washing machine transmission system for MTD of Leitchfield to allow higher spin speeds and a higher energy efficiency rating for the washer. Another group of students performed a reliability study for SCA in Bowling Green to improve the production line operation. The ME program seeks to be relevant to our region and to produce high quality graduates who can also impact the economic quality of Kentucky.

**71. Ryan Grey**

**Morehead State University**

**Mentors: Michael Fultz, Darrin Demoss, and David Peyton**

***Characterization of Osteoblastic Properties of 7F2 Cultures after Acclimation to Reduced Levels of Fetal Bovine Serum***

Estrogen plays an important role in skeletal physiology by maintaining a remodeling balance between the activity of osteoblasts and osteoclasts. In an attempt to decipher the mechanism through which estrogen elicits its action on osteoblasts, experimentation necessitated a culturing environment reduced in estrogenic compounds. The selected media (OPTI-MEM) is enriched to sustain cultures under reduced fetal bovine serum (FBS) conditions; this media is devoid of the pH indicator phenol red, (a suspected estrogenic agent). This protocol reduced the concentration of FBS to 0% through successive, 24-hour incubations with diminishing amounts of total FBS (1%, 0.1%, and 0%). The protocol does not appear to alter the viability, cell morphology, or osteoblast phenotype of the cell lines utilized (7F2) when compared to control cells grown in various concentrations of FBS. Though the rate of mitotic divisions apparently declined, the utilization of colorimetric assays, immunohistochemical techniques, and RT-PCR have verified that the cell line still express osteoblast cell-specific markers. Experimental results indicate that 7F2 cells remain viable at low and high doses (0.1nM to 1.9mM) of estrogen following a 24-hour incubation, but that prolonged exposure (48 hrs) to high concentrations results in cell death. These experimental findings suggest the culture protocol developed has not altered the osteoblast nature of the cell lines and provides a model system to study estrogen's antiresorptive role on skeletal turnover and the potential impact of calcium channel antagonists on estrogen's mechanism of action.



## **72. Noemi Lane**

**Eastern Kentucky University**

**Mentor: Ann Bland**

### ***Nursing Care of Patients Diagnosed with Borderline Personality Disorder***

This poster discusses an integrative review of nursing care for patients diagnosed with borderline personality disorder (BPD), and nursing responses and attitudes of the nurse and the patient within an inpatient setting. The purpose of this poster is to define BPD, the challenges of working with this patient population, discuss its significance, and the findings. The source that was used was a published article that was written by Dr. Ann Bland, "Clinical supervision of nurses working with patients diagnosed with borderline personality disorder". The conclusion discusses key issues, concerns, nursing responses and implications to patient care that may develop in take care of the emotional and physical needs of patients diagnosed with BPD in an inpatient setting. Establishing trust is necessary for a therapeutic working relationship between the nurse and the patient. However, before trust can begin, the negative nursing responses that can be inadvertently displayed such as anger or frustration towards the patient can cause a barrier between the nurse and the patient.

## **73. Andrea Harris**

**Western Kentucky University**

**Mentor: Darbi Haynes-Lawrence**

### ***Crisis Nurseries and Attachment: Perceptions of Early Care Providers and Educators***

The purpose of this study was to investigate the perceptions and experiences of Early Childhood Educators employed by 'Crisis Prevention Nurseries', childcare centers that provide emergency childcare to children and families facing extreme stress. This study included 10 crisis nurseries across the United States. Qualitative methodology was used to investigate the following two research questions. In what ways do crisis nurseries help facilitate the development of resilience in infants, toddlers and preschoolers? What are the perceived roles of crisis nurseries in improving stability of attachment during stressful times? The selection of respondents was conducted by means of purposeful sampling. In order to gather the perceptions of the respondents, interviews were conducted. Themes that emerged from the study will be presented.

## **74. Megan Marie Gillespie**

**University of Kentucky**

**Mentor: Leonidos Bachas**

### ***Effect of Chirality on the Selectivity of Ionophores for Anions***

The design and synthesis of new ionophores has been the focus of extended scientific effort in the field of membrane-based ion-selective electrodes. In this work the development and characterization of ion-selective electrodes that incorporate ionophores synthesized by combinatorial approach is presented. The ionophores that are studied employ an urea functionality attached to different hydrophobic structural elements as the basic building block component. The two nitrogens on the urea unit are available to form hydrogen bonds with the oxygens of oxoanions, such as phosphate, sulfate, and acetate. In addition, this building block contains two chiral centers, and by using different enantiomers, we can obtain different ionophore conformations, which play a significant role in the selectivity of the resultant ion-selective electrodes.

## **75. Paul Shively**

**Kentucky Community and Technical College System**

**Mentor: Micah Perkins**

***The Influence of Competition on Growth Characteristics of Sugar Maple, *Acer saccharum****

Growth and form of trees is determined by a combination of ecology and genetics. While similar genetics are shared within a certain tree species, ecological conditions such as competition from other trees can affect growth and form. Using sugar maple (*Acer saccharum* Marsh.) as the species of interest, sugar maples were predicted to have lower trunk width, narrower crowns, and taller heights in areas of greater competition (deep forests) than sugar maples in lower levels of competition (park-like areas). A variety of forestry techniques was used to measure individual sugar maple trees and also measure density and size of competing trees. Results indicated that sugar maples in the deep forest have lower trunk widths, narrower crowns, but shorter heights compared to sugar maple trees in parks. Such information supports the idea that competition is an important ecological factor affecting growth and form of sugar maple trees.

## **76. Travers Cody Hawkins, Aaron Jones, and Stephanie Webb**

**Morehead State University**

**Mentor: Michael Hail**

***Theoretical Foundations of Public Policy: Exploring the Dialectical Conversation from Aristotle to Leo Strauss***

Research on the "core" epistemological texts of the Western tradition is essential for understanding American constitutionalism and public policy. As such, the RAPP 490 senior seminar course conducted research on seminal texts in the social sciences as a venue for understanding policymaking and likewise, the Undergraduate Research Fellow program provided a research opportunity under which a Homeland Security policy study examining privacy rights was conducted from the same theoretical basis. These "core" works in each study examined institutions and society against the breadth of history and theory regarding human nature and governance. Leo Strauss, Theodore Lowi, Alexis de Tocqueville, John Stuart Mill and Aristotle are among the core political theorists whose works were examined in the research.

## **77. Jessica Lindley**

**Murray State University**

**Mentors: Dale Barnett and Teal Shultz**

### ***The In Vitro Binding Effectiveness of Selected Pathogens Using Phyllosilicate Clays***

This study tests a new product containing Hydrated Aluminosilicates which is comparable to an available product containing Phyllosilicate Clays. Tests are conducted determining the adsorption properties of these products and their ability to bind pathogens including salmonella, clostridium, and E.coli. These pathogens are associated with enterocolitis in horses, dogs, and humans. The Phyllosilicate Clays help decrease damage caused by pathogens by binding to the toxins they produce. It will be determined whether this new product is as effective as the currently available product or more effective at binding endotoxins associated with the Clostridium organism as well as Salmonella and E.coli. To test adsorption properties of these products bacterial testing against microbes, toxicology testing against toxins produced by the pathogens, virology testing in vitro using ELISA (Enzyme-Linked ImmunoSorbent Assay) and EAA (a chemiluminescent Endotoxin Activity Assay) tests are performed. Serial dilutions are made creating suspensions of the respective equine strain of bacteria. Specific portions of the products tested will then be weighed and added to the suspensions. These suspensions are plated and concentrations of bacteria read. Using the electron microscope each bacterium is observed to compare the products binding effectiveness. Each sample is tested for their toxin binding ability using the ELISA test kits. These tests will conclude whether the new product is comparable to the previous product containing Phyllosilicate Clays or if it surpasses the ability of the previous product to bind to the toxins that cause detrimental effects to the well being of the equine, canine, and human.

## **78. Lauren McCormick and Sarah Courtney**

**Eastern Kentucky University**

**Mentor: Eric Dueno**

### ***Synthesis of a Novel Nitrile Cavitand***

The synthesis of a nitrile cavitand was accomplished in four steps. The first step was an acid-catalyzed dehydration between acetaldehyde and 2-methyl resorcinol to form a resorcin(4)arene. The second step was a cavity forming reaction via etherification. The third step of the synthesis involved a radical benzylic bromation using NBS, with AIBN as a catalyst. The final step was an SN2 reaction with a cyano as the nucleophile. Future goals are to use the nitrile cavitand for metal coordination and further functionalization.

## **79. Evan Raff and Nichole Sonderman**

**University of Louisville**

**Mentor: Michael Perlin**

### ***Further Characterization of the Ammonium Transporters of Smut Fungi***

Fungal ammonium transporters (known variously as Amts, Meps, or Umps) are members of a family of proteins that is conserved from bacteria to humans. Indeed, some members of this family have been found to be functionally equivalent across distant taxa. Interestingly, fungal Amts include proteins that not only transport ammonium, but also sense its availability. They somehow signal low abundance to pathways that trigger a switch from yeast-like to filamentous growth, a switch associated with pathogenesis by some fungi. We have continued to characterize the structure and function of Amts from the plant pathogenic smut fungi, *Ustilago maydis* and *Microbotryum violaceum*. We have cloned the mepC gene, a *M. violaceum* homologue, whose product is predicted to have 46% similarity with that of MepA (*M. violaceum*), 53 % similarity with Ump1 and 40% similarity with Ump2 (*U. maydis*) and 41% similarity with Mep1 (*S. cerevisiae*). Ongoing experiments with this gene will examine its function in the yeast, *S. cerevisiae*, and in its smut cousin, *U. maydis*. In analogous experiments, we have introduced the MEP2 gene into an ump2- mutant and shown it to complement the filamentation defect of this mutant. Our major goal is to determine the proteins that interact directly with Umps in *U. maydis* to provide greater understanding of how such proteins “sense” ammonium availability and trigger the dimorphic switch. Towards this end, we have epitope-tagged the Ump2 protein and shown that the tagged protein functions in *U. maydis*. We have also used a yeast two-hybrid approach to identify possible interacting proteins. So far, three candidates of interest are a glutamate dehydrogenase, a membrane-bound acetyltransferase and a protein associated with trehalose metabolism that, in *S. cerevisiae*, also stimulates the switch to filamentous growth. The next step will be to confirm the interaction of these putative proteins with Ump2 by examining their co-localization in *U. maydis* cells.

## **80. Shalise Saylor**

**Eastern Kentucky University**

**Mentor: Stephanie McSpirit**

### ***Martin County Water Testing Project***

The Martin County Coal Waste Spill in 2000, delivering 300 million tons of slurry into local streams and rivers. 2001 survey results showed that more than 80% of residents thought that their drinking water was a “serious problem”. In June 2005, \$150,000 was awarded to the Martin County Project Team at Eastern Kentucky University (EKU). The purpose of the Memorandum of Agreement between EKU and the state of Kentucky was to conduct a systematic assessment of the public water system with full citizen participation to assess long-term impacts. This project placed special emphasis on citizen involvement, participation, and oversight. An assessment of the municipal water supply was done in collaboration with an outside evaluator and a team of university scientists. Though long-term environmental assessment identified strengths and opportunities for improvement in water quality for Martin County residents. A team of university scientists, university-trained field researchers, and trained martin county citizens conducted a water assessment at the highest scientific standards. This poster will summarize the participatory research design, sampling and testing methods used in this water assessment as well as our findings.

## **81. Amy Fambrough**

**Eastern Kentucky University**

**Mentor: Joyce Hall Wolf**

### ***Song Interpretation for the Undergraduate Singer***

Learning to interpret a song is one of the most important elements in the development of a young singer. The singer must understand that the composer began with a text that, in some way, inspired new music. For the singer, the text and the music must be considered individually and as a whole. The steps of critical thinking for song analysis begin with reading the poem as a piece of literature and then investigating the various musical elements. These elements include key, tempo, form, range, tessitura, and dynamics. The compositional use of these elements must be considered when examining the composer's interpretation of the poem. Only then can the singer apply his/her own creative thinking for a performance interpretation. Two songs will be considered specifically in this presentation. They are settings of the poem Agnes by Eduard Mörike. Agnes was set in the late 19th century, in the original German, by both Johannes Brahms and Hugo Wolf. The two composers' differing interpretations of the poem and the journey of the singer to expressive and creative performances of each lied will be presented in this poster presentation.

## **82. Evan Roberts and Cynthia Shaw**

**Murray State University**

**Mentor: Pablo Molina**

### ***The Low-Barrier Double-Well Potential in Bound HIV Protease Systems and Small Analogs***

The presence of a low-barrier hydrogen bond (LBHB) in HIV Protease and other aspartyl proteases as well as its implications in drug design has been the subject of intense study. In this research project, we utilize a Numerov procedure to characterize the Od1-H-Od1 hydrogen bond (HB) in HIV protease systems where the enzyme is bound to highly symmetric inhibitors. We also investigate small compounds that present an LBHB and serve as analogs. Our methodology fully traces the shape of the HB's potential energy curve. The potential is used to obtain numerical solutions to the wave functions and vibrational energies of hydrogen, deuterium, and tritium. The vibrational eigenfunctions are used to compute expectation values for interatomic distances and vibrationally and thermally averaged spectroscopic properties of the O-H-O HB. Our predictions of isotope effects on the chemical shift of small analogs are consistent with experimental measurements. The results support the predictive power of this method and its potential use in screening inhibitors of aspartyl proteases.

**83. Mary Elizabeth Baker, Elizabeth Schmale,  
Luis Villalpando, Russell Wimsatt, Aaron Dobbins,  
Ethan Holloway, Adam Tabor, Kyle Ketterman,  
Josh Nash and Brian Hellinger**

**Western Kentucky University**

**Mentors: Kevin Schmaltz, Joel Lenoir, and R. Choate**

***WKU Mechanical Engineering Supporting WKU***

The Mechanical Engineering (ME) program at WKU actively participates within the university community to support its strategic mission and our evolution as a leading American university with international reach. For the 2006 - 2007 academic year, four teams of ME seniors are working on projects in support of internal university partners and of an international agency. One team will design, build, and test a Centrifugal Pump Demonstration Bench for the Department of Engineering with external competitive funding provided by the American Society of Heating, Refrigeration and Air Conditioning Engineers through their undergraduate student research grant program. A second team will design, build, and test a Bio-Generated Greenhouse Heating System for the Department of Agriculture. The third will design, build, and test an Automated Water Filtration Test System for the Center for Water Resource Studies. After winning their district event hosted by the University of Missouri-Rolla last March, the final team recently competed with their "Sip and Puff" Controlled Fishing Rod for Quadriplegics at the ASME International Mechanical Engineering Congress and Exposition in Chicago. The ME program seeks to be relevant to our region and to produce high quality graduates who can also impact the economic quality of Kentucky within our global society.

**84. Zac Elmore, Tyler Downing, and Cole Phelps**

**Murray State University**

**Mentor: Suguru Nakamura**

***Enzymatic Activity of Renal H-K-ATPase in the Outer Medulla Collecting Duct (OMCD) Under Glucose Disease States***

It has been demonstrated that H-K-ATPase (HKA), a potassium dependent proton secretion transporter, plays an important role in acid-base homeostasis. Studies have shown that gastric isoform (gHKA) is dominant under normal conditions and colonic isoform (cHKA) is increased under low-k conditions. However, the enzymatic activity of HKA in the OMCD is incompletely understood. In order to understand the role that glucose plays in the activity of HKA, hyper and hypoglycemia were induced in animal models. Both wild type and transgenic mice were used, where the transgenic mice (HKA $\alpha_2$ ) have the cHKA isoform knocked out. Upon testing the enzymatic activity, wild type mice were found to produce a higher amount of ADP, which is produced through hydrolysis from ATP when activating H-KATPase. Transgenic HKA $\alpha_2$  production was significantly lower. Previous studies by S. Nakamura demonstrated the dependence of glucose on H-ATPase. Correlating data is expected with the H-K-ATPase glucose diseased states model. H-K-ATPase activity in hyperglycemic and hypoglycemic mice is yet to be tested.

## **85. Nina Hensley**

**Eastern Kentucky University**

**Mentor: Stephen Richter**

### ***Population Status and Genetic Variability of Two Remaining Populations of Endangered Dusky Gopher Frogs, *Rana sevosa****

As the human population increases in size, humans continue to encroach on the natural landscape. This reduction and fragmentation of available habitat leads to an overall decline of populations of non-human organisms. The most severe consequence of this is complete geographic isolation of populations. Isolation leads to genetically reduced populations with no ability to exchange genes or to be recolonized following local extinctions. The Dusky Gopher Frog, *Rana sevosa*, is an endangered species with only two populations remaining. These two populations in southern Mississippi are isolated by a distance of approximately 32 km. The population in Harrison County has had demographic and genetic data collected over the last two decades and is located on protected land in De Soto National Forest. Conversely, the population in Jackson County has unknown status because of its recent discovery and is located on unprotected land. The objectives of this research were 1) to assess the status of the Jackson County population by examining genetic variability and testing for historic population declines and 2) to determine genetic differences between the two populations. Genetic analyses were performed by genotyping individuals of each population for six microsatellite DNA loci. Genetic variability within and between each population was calculated and used to assess status of the species. The results of this research will aid in conservation efforts. One potential is to transfer eggs from the two populations to historic breeding sites. One application of the data obtained is to determine whether we should mix individuals from these populations.

## **86. Marques Hogan and Barbara Wilhelm**

**Kentucky State University**

**Mentors: Steven Mims and Richard Onders**

### ***Tolerance of Juvenile Paddlefish to Salt for Control of *Ichthyophthirius multifiliis****

Salt can be used to control parasites when the salinity tolerance limits of the culture fish exceed those of the parasite. *Ichthyophthirius multifiliis*, known as ICH, is a parasite that is known to infect paddlefish and can cause total mortality. ICH can be controlled with salt between 3 and 6 g/L. However, salinity tolerance of juvenile paddlefish is not well defined. The objective of this project was to evaluate the salinity tolerance of juvenile paddlefish at salinity levels ranging from 3 to 10 g salt per L over a 96-hour period. In Study 1 with salinities ranging from 3 to 7 g/L, there were no fish mortalities. Even though swimming behavior appeared normal, the fish lost 19% of its body weight in water containing 7 g salt/L. In Study 2 with salinities ranging from 6 to 10 g/L, fish also had increasing weight loss with increasing salinity. In water containing 9 and 10 g/L, fish lost balance in 24 hours and swam in a spiral motion. In addition, these fish became bloated and discolored. Fish mortality started at 8 g/L and increased with the salinity. Water quality parameters were within acceptable range for juvenile paddlefish in both studies. When the salt level was less than 7 g/L, juvenile paddlefish did not show body weight loss or other physical sign of stress over a 96-hour period. Therefore, salt levels between 3 and 6 g/L for 4 days should be adequate to eliminate the ICH parasite without adversely affecting the health of the fish.

## 87. Rebecca Cripps

Murray State University

Mentor: George Kipphut

### *The Comparison of Nitrogen Amounts and Levels of Lepomis Machrochirus from Kentucky Lake and Ledbetter Stream via Stable Isotope Analysis*

It may be possible to determine what habitat an animal is living in by examining the food it consumes. This study examines the nitrogen and carbon contents in the muscle tissue of Blue Gill fish in Kentucky Lake Reservoir and Ledbetter Creek in western Kentucky. Previous research has shown that the ratios of nitrogen and carbon isotopes in fish and other animals vary depending on their food source. The ratios I am studying are  $^{15}\text{N}/^{14}\text{N}$  and  $^{13}\text{C}/^{12}\text{C}$ . Tissue samples will be taken from Blue Gill in both the Reservoir and Creek environments and analyzed with a mass spectrometer to determine the isotopic ratios. Preliminary data suggests that the Blue Gill caught in Ledbetter Creek may be spending a large amount of their time feeding within the Reservoir, which suggests that the Reservoir may be the habitat most important for Blue Gill foraging. Such results may lead to a better understand of how Blue Gill utilize both the Creek and Reservoir environments. These results may also help in determining how the Blue Gill fit into the food web structure for the two communities and how they interact with other organisms.

## 88. Jesse Jacobsen

University of Louisville

Mentors: Gerald B. Hammond and Satoru Arimitsu

### *Synthesis of Gem-Difluoro Homopropargyl Alcohols via an Aqueous, Bimetallic (In-Zn) Barbier Reaction*

Indium is a useful metal for Barbier reactions in aqueous media, allowing for “green chemistry” C-C bond formation. This methodology has been applied to the reaction of  $\alpha,\alpha$ -difluoropropargyl bromide and several aldehydes to obtain gem-difluoro homopropargyl alcohols as the major product, in good yields, without the problem of  $\alpha$ -defluorination. However, the drawback of this method is the cost of Indium; thus finding a cheap metal with similar effects is key to enhancing the accessibility of this methodology. Eight metals were selected by price and electron potential and screened alongside two additives. A system of In (0.1 eq.), Zn (0.9 eq.), and  $\text{I}_2$  (0.1 eq.) was found to be most cost effective, producing alcohols in moderate yields and lowering the yield of dimer byproduct. The utility of this method was explored using various aldehydes. Furthermore, to show the synthetic utility, the iodine promoted cyclization of an analogous propargyl alcohol was studied.



## **89. Aaron Marcum and Meagan Pond**

**Western Kentucky University**

**Mentor: Anne Rim**

### ***ADD/ADHD and Self-Concept; the Link Between***

This research intends to provide empirical support for the negative correlation between self-reported Attention Deficit Disorder (ADD) and/or Attention Deficit Hyperactivity Disorder (ADHD) characteristics and self-reported academic and general self-concept in gifted adolescents. Participants included 116 adolescents enrolled in one of two summer programs for the gifted. Self-concept was measured using the Self Description Questionnaire II. Self-reported symptoms of ADD/ADHD were measured using the Conners' ADHD/DSM-IV Scales-Adolescent. Participants also filled out a demographic questionnaire. Results suggest a significant negative correlation between the adolescents' academic self-concept and the inattention symptom of ADHD, the DSM-IV symptoms subscale scores, and the potential for the development of ADD/ADHD. Results also suggest a negative correlation between the adolescents' general self-concept and the inattention symptom of ADHD, the hyperactivity symptom of ADHD, DSM-IV symptoms subscale scores, and the potential for the development of ADD/ADHD. Implications for educators and administrators are provided.

## **90. Amy Krzton-Presson and Jackie Doyle**

**Murray State University**

**Mentor: Howard Whiteman**

### ***The Effects of Plastics on Sexual Development in Axolotl Salamanders (*Ambystoma mexicanum*)***

Estrogen mimicking chemicals, known as xenoestrogens, are becoming more apparent as the science and health community earnestly searches for the effects they have on living organisms. The most common place to find xenoestrogens is in various types of plastics used on a daily basis. We tested for definite sex-altering effects that plastics containing xenoestrogens have on Axolotl salamanders (*Ambystoma mexicanum*) by hatching and raising experimental salamanders in three types of plastic containers used for food storage. Larva raised in glass fish tanks acted as controls. Research is ongoing, and will be completed in December 2006. The gender ratios at maturity will reveal the effects if any that the xenoestrogens that leached into the water had on developing salamanders. These results could cause many people to reevaluate the use of plastic products in their daily life, especially those associated with fluids.

**91. Mirissa Harmon, Ashley Sargent, Katherine Manning,  
Andrew Auxier, and Gregory Howard**

**Morehead State University**

**Mentor: Darrin DeMoss**

***The Effect of Calcium Channel Antagonists on Bone Metabolism in Male Brown Norway Rats***

Bone metabolism is invariably correlated with calcium transport indicating that calcium channels are a potential point of regulation for skeletal remodeling. Calcium channel antagonists are utilized therapeutically and experimentally to decrease the influx of calcium into cells by blocking voltage-regulated L-type calcium channels. Previous experimental evidence has suggested that calcium channel antagonists decrease osteoblastic activity, thus decreasing the activity of the bone forming cells at a time when bone formation is already exceeded by bone resorption, exacerbating the situation. Therefore, the established principle that bone formation decreases following the attainment of peak bone mass, illustrates the need for a more comprehensive understanding of the action calcium channel antagonists have on bone turnover. Experimentation utilized male and female Brown Norway Rats six months of age to compare the effects of the antagonists on blood pressure and bone turnover from both the amorphous and calcified compartments. In order to evaluate the positive or negative impact of various calcium channel antagonists on bone loss, bone resorption parameters were compared between normal males and females, and animals receiving calcium channel antagonists (diltiazem, nifedipine, verapamil). The models utilized to study bone turnover were the pharmacokinetic loss of the tracer <sup>3</sup>H-tetracycline, a compound deposited in the active mineralization front and freely released in urine and the measurement of various bone degradation markers (deoxypyridinoline, pyridinoline, and helical peptide) in urine collected throughout the experimental period. Data obtained suggest that calcium channel antagonists potentially elicit their actions through alternative mechanisms in each of these highly regulated calcium pools.

## **92. Jeremiah Alexander**

**Eastern Kentucky University**

**Mentor: Stephen Richter**

### ***The Genetic Effects of Urbanization and Habitat Fragmentation on Spotted Salamander *Ambystoma maculatu* Populations***

With the U.S. population now over 300 million and growing at a record rate, the natural landscape is being reduced and fragmented. Reductions in habitable land threaten the genetic health of native wildlife. Such a loss in genetic diversity can negatively affect a population's ability to keep pace with long-term environmental changes, as well as short-term changes induced by humans. Genetic diversity can be measured in terms of differences in DNA composition. Microsatellites are short sequences of highly variable DNA, which makes them ideal markers for investigating overall genomic diversity within and among populations. Microsatellites, thus, can serve as molecular indicators of genetic health, connectivity, and reproductive potential of populations. We chose five microsatellite loci to determine the effects of habitat fragmentation on a network of spotted salamander (*Ambystoma maculatum*) populations in the greater Charlotte, North Carolina area. We addressed two primary hypotheses: (1) degree of connectedness among populations across the fragmented landscape is inversely related to distances between populations and intensity of urbanization and (2) genetic variation within populations is inversely related to level of degradation of surrounding habitat. To address these hypotheses, we studied five populations of salamanders that varied in distance from nearest neighboring population and in quality of surrounding habitat. We used GIS to quantify habitat and distance variables. Results will be discussed in the context of habitat management, specifically the need for establishment of metapopulations such that multiple populations and breeding ponds are interconnected by contiguous habitat.

## **93. Mirna Bajramovic, Michael Giurgevich, Kesha Rhodes, Alison Wheatley, and Jared Woods**

**University of Louisville**

**Mentors: Cynthia Corbitt and Monica Unseld**

### ***Neuroprotective Effects of Dietary Phytoestrogens in an Aging Rodent Model***

Many women approaching menopause are likely to consider using phytoestrogen (plant-made estrogen) supplements for relief of menopausal symptoms such as hot flashes because these products are viewed as being 'natural'. Because they are not regulated by the FDA, little research has investigated effects of these supplements, especially on the brain. Studies on estrogens have found them to be potentially neuroprotective against age-related deficits in cognition and in cases of ischemic stroke. We are testing the hypothesis that phytoestrogens are neuroprotective for memory using an aging rodent model. Estrous cycles of young adult and middle-aged retired breeder rats were assessed so that only regularly cycling young rats and irregularly cycling middle-aged rats (i.e., those exhibiting evidence of brain aging) were used in the study. These rats (n=48) were ovariectomized to eliminate ovarian estrogen, then were fed a diet either with or without soy phytoestrogens for 3 weeks before being tested in object and placement memory trials over the course of 3 weeks. These tests take advantage of a rodent's attraction to novelty, so if a rat remembers an object it should spend less time investigating it than it will a novel object. We also tracked food intake and body weight over the course of the experiment. We predict that the middle-aged rats will exhibit deficits in memory compared to the young adult rats, but that soy phytoestrogens in the diet will attenuate these deficits.

## **94. Ryan Miller**

**Morehead State University**

**Mentor: Jeanie Lee**

### ***The Programmatic Use of Trombone in Gustav Mahler's Symphonies and its Impact on Related Performance Practice***

The symphonic music of Gustav Mahler is programmatic; the music tells a story through the use and manipulation of motivic material. Numerous concert-goers and musicians alike have been enthralled, inspired, and confused as to the programmatic meaning of Mahler's symphonies. Once the musician's role in the program is understood, the performer can interpret and express the music more effectively, which can be more clearly appreciated by listeners. The purpose of this study is to examine eight of Mahler's symphonies to offer an interpretation of the trombone's programmatic role. The scope of the project will include Mahler's nine complete symphonies, with the exception of Symphony No. 4, which does not call for trombone. Initially, the project will include research of existing programmatic interpretations, study of full scores, and analytical listening of commercial recordings. After completion of these studies, the project will include practice and performance of excerpts from these symphonies with the applied knowledge culminating in a presentation at Posters-at-the-Capitol 2007.

## **95. Marcus Hundley**

**Morehead State University**

**Mentors: Wesely White and Luke Sherrill**

### ***The Time-Dependent Effects of Amphetamine Administration on Feeding***

Amphetamine (AMPH) produces a series of time-dependent effects on behaviors such as activity and feeding. Following a moderate dose of AMPH, animals display a transient period of excitation and reduced food intake followed by an acute withdrawal marked by a hypoactivity and hypophagia around hour 20 post-administration. The purpose of the present study was to further characterize the time-dependent effects of AMPH on feeding. Specifically, we were interested in demarcating the effects of administration time on AMPH-induced acute withdrawal. Rats were housed individually in chambers where their activity could be monitored 24 hrs a day. Feeding, under a fixed ratio 1 (FR1) schedule, was restricted to eight interspersed hours of the day. One group (N=8) received AMPH (2.0 mg/kg) at lights off and a separate group (n=8) received AMPH at lights on. Administering AMPH at lights on, just before the inactive period in the rat, more closely models the schedule of human drug-users who typically self-administer at night. Independent of administration time, AMPH produced a series of time-dependent effects on feeding that were consistent with those previously reported for activity. Rats displayed acute reduced intake, a period of acute withdrawal occurring around hour 20 post-administration, and recovery. Further research on AMPH-induced acute withdrawal is warranted in order to better understand the physiological and psychological factors that underlie the motivation to continue using drugs of abuse.

## **96. Courtney Brown, Rick Cates, and Bernard Voss**

**Morehead State University**

**Mentor: Sean Reilley**

### ***Influence of Test Anxiety and Symptoms of DSM-IV Anxiety and Mood Disorders on AD/HD Self Report Scale Scores***

Attention Deficit Hyperactive Disorder (AD/HD) is a lifespan disorder frequently misdiagnosed in adults. Attention rating scales are currently used in the diagnostic process. At present, little data are available to clinicians for using these measures to discriminate between attention problems due to AD/HD and those that are secondary to psychiatric disorders. This is especially problematic when the clinical picture is clouded by a history of periodic childhood attention problems. Prior work with the Adult Self-Report Scale (ASRS), a freely available screening instrument for AD/HD developed by the World Health Organization, has shown that subclinical symptoms of anxiety and depression are sufficient to yield ASRS scores in the probable AD/HD range in the absence of AD/HD. The present correlational study attempted to extend these findings by examining the unique influence of multiple clinical symptoms of specific DSM-IV related depression and anxiety disorders as well as test anxiety on ASRS scores. Two hundred college adults without positive histories of AD/HD completed the ASRS, the Psychiatric Disorders Screening Questionnaire, and the Test Anxiety Scale. As predicted, symptoms of Major Depressive Disorder ( $r > .30$ ) afforded the strongest unique relationship with attention problems on the ASRS. Partially consistent with predictions, the contribution of specific DSM-IV anxiety symptoms to ASRS scores was substantially less than for MDD. Finally, test anxiety which shares a strong dyphoria component yielded significant relations with ASRS after controlling for other psychiatric symptoms.

## **97. Kelly Houston**

**University of Louisville**

**Mentor: Prasanna Sahoo**

### ***On Two Functional Equations and Their Solutions***

This poster will discuss the solutions of two functional equations that arise in connection with the characterizations of the determinant and permanent of symmetric two-by-two matrices. The general solutions  $f: \mathbb{R} \rightarrow \mathbb{R}$  of the two functional equations  $f(ux-vy, uy-vx) = f(x,y) + f(u,v) + f(x,y)f(u,v)$  and  $f(ux+vy, uy-vx) = f(x,y) + f(u,v) + f(x,y)f(u,v)$  for all  $x, y, u, v$  in  $\mathbb{R}$  are determined. Also, the solutions of a more generalized functional equation are discussed.

**98. Brittany Collins, Brian Craig, David Crouch, Carrie Elliott, Grant Fridy, Justin Parrish, Magan Roberts, Whitney Shirley, Robert Stuard, and Kaleb Tapp**

**Murray State University**

**Mentor(s): Andy Bailey, David Ferguson, Iin Handayani, and Chris Rodgers**

***STUDY 1: Comparison of De-topping Methods for Dark-fired Tobacco with Three Different Bloom Stages and Two Different Heights***

This research experiment was designed to help farmers increase net profits by measuring yield differences that occur when tobacco is de-topped at different heights and times. Each plot was 40 feet long and 13.3 feet wide. The cultivar used for this experiment was Narrow Leaf Madole at a population of 4,900 plants per acre. The experiment was arranged in a randomized, complete block design with four replications. The plants were transplanted into the field on June 1, 2006. Treatments included all combinations of two factors: plant stage at de-topping and the de-topping height. The stages of de-topping were: elongated bud, 50% bloom, and 100% bloom. De-topping heights were 12 leaves and 16 leaves. The plants were de-topped in late July and early August. Suckers were controlled by applying butralin and a fatty alcohol mix to each plant. The plants were harvested and housed through the dates of September 15- September 19. The tobacco leaves from each plot were stripped and separated into three quality categories: lugs, seconds, and leaf. The weights were determined for each category within each plot. The data was analyzed using an analysis of variance. Differences between the treatment means were evaluated using the least significant differences.

***STUDY 2: Comparing Nitrogen Rates in Dark Tobacco***

During the spring of every year, Murray State University sets out a test crop of dark tobacco. This tobacco has numerous tests conducted to collect data for enhancing next year's crop. This year a nitrogen test is in the process of being completed. After the tobacco was set, 125 units of the following types of nitrogen were side dressed on the tobacco. Hydro Plex, K Nitrate, Ca Nitrate, Triple 15, 21-7-14, and Am Nitrate were all applied to the crop in different test areas. Once the fertilizer had been applied, the tobacco then grown and harvested. The tobacco is now in the process of being dried and soon stripped. When the tobacco is stripped and weighed, it will be analyzed to determine the effect of the nitrogen applications.

***STUDY 3: The Comparison of Residual Herbicide Programs for Dark-Fired Tobacco***

This research experiment was structured to compare different weed control methods and crop responses to current commercially available herbicides. Using a randomized complete block design with four replications, the dark tobacco was set in four rows that were 40 feet long. The eight experimental treatments were applied at a rate of 15 gal/acre. One control plot was used. All treatments were pre-plant incorporated. The dark tobacco variety, NL Madole, was planted in mid March. Comparisons will be made between the eight experimental treatments for the current season's data and the previous year's data.

**99. Cynthia Hagenbuch, Jonathan Whitehouse,  
Derek Rhoades, and Clint Merritt**

**Western Kentucky University**

**Mentors: Robert Choate and Stacy Wilson**

***WKU Electrical Engineering Student Projects***

Project based education is the mission of the Department of Engineering at WKU. In order to support that mission, electrical engineering students participate in a variety of projects throughout their academic career. This poster presents a sample of projects by electrical engineering seniors. The first project is a discussion of proportional-integral-derivative control. The second project presents the topic of thermal runaway in lithium ion batteries. The third project on the poster is dynamic thermal control of data centers.

**100. Wendy Forehan, William Hester, and Daniel Robinette**

**Northern Kentucky University**

**Mentor: Judy Voelker**

***Ceramic Analysis at Prehistoric Phu Lon, Thailand***

Our project is the analysis of the domestic ceramic debris at the ore crushing site at Bon Noi, which is situated within the larger site known as Phu Lon in northeast Thailand. Bon Noi is part of a pre-historic mining complex, where people were mining and processing copper as early as 1100B.C.E. Our research incorporates ceramic analysis for the purpose of examining the artifacts located along the Mekong River at the site of Bon Noi. Preliminary observations from our research indicates Bon Noi was occupied at a later date than the other two ore crushing sites within Phu Lon, known as Pottery Flats and Bunker Hill. Within the context of our analysis we compare not only stylistic changes of ceramics within the region but we also address issues of contemporaneity and variability within the data group. Our findings incorporate form, surface treatment and temper analysis.

## **101. Christina Nicole**

**University of Kentucky**

**Mentor: Brett Spear**

### ***The Fusion of Luciferase and Green Fluorescent Proteins in Transgenic Mouse Models***

Our understanding of gene regulation in living organisms has been greatly facilitated by the use of reporter genes. Two of the most commonly used reporter genes are the jellyfish gene coding for green fluorescent protein (GFP) and the firefly gene coding for luciferase (LUC). Future mouse experiments that our lab would like to pursue require the expression of both GFP and LUC in the same mouse. Therefore, my project has been to generate a fusion reporter protein that contains both GFP and LUC activity. Using PCR and recombinant DNA technologies, I have linked GFP and LUC in the same reading frame, and cloned this hybrid gene downstream of the cytomegalovirus promoter. Testing of this new fusion protein was conducted by transient transfections into Hela cells. Results indicated that LUC levels were very high; however, GFP expression was lower than expected. To increase GFP expression, we added a viral sequence leading to ribosome skipping. The new sequence was amplified by PCR, sequenced, and inserted between GFP and LUC. This construct was again tested. The positive control vectors for GFP and LUC were EGFP-C1 and pGL3, respectively. LUC levels are still high in the new vector, and we observed a substantial improvement in GFP levels. This data shows that the viral ribosome-skipping element leads to increased GFP protein levels. We are currently generating transgenic mice containing the GFP-LUC gene. Analysis of GFP and LUC expression will be performed to determine whether these mice will be useful for subsequent experiments in the lab.

## **102. Carmen Haynes**

**Kentucky State University**

**Mentors: John Sedlacek and Karen Friley**

### ***Impact of Benallure® Beneficial Insect Attractant on Populations of Predatory Insects in Sweet Corn***

Sweet corn is among the major vegetables grown in Kentucky during summer months. Unfortunately, several insect pest species cause damage to sweet corn ears. These pests have been controlled primarily with chemical spray programs. However, excessive spraying may negatively impact non target organisms, contaminate ground water, and farmers, consumers, and homeowners may be exposed to unacceptable levels of insecticides. An alternative method of pest control involves beneficial insect introduction or biological control. Sometimes attractants are used to lure predaceous insects to prey upon pest insects. A commercially available attractant called Benallure® is claimed to be attractive to lady beetles, green lacewings, and syrphid flies. Benallure is composed of two corn plant volatiles that have been shown to be attractive to these insects in laboratory studies. However, no field studies have yet been performed examining efficacy of Benallure in the field. Thus, the objective of this study was to evaluate the effect of Benallure as a predaceous insect attractant in organically grown sweet corn. Yellow sticky traps were used to quantify beneficial insects in Benallure and control plots. Pink or 12 Spotted Lady Beetle, *Coleomegilla maculata*, was the most abundant predator caught. Asian multicolored Lady Beetles, *Harmonia axyridis*, and Green Lacewings, *Crysoperla carnea*, were captured but were not abundant. Few syrphid flies were caught. Populations of lady beetles and lace wings in control vs. Benallure treated plots did not differ. Thus, this rather expensive beneficial insect attractant could not be recommended for use in late planted central Kentucky sweet corn.



### **103. Todd Broker**

**Murray State University**

**Mentor: David Eaton**

***Risky Business: A Look at Individual Behavior under Conditions of Risk and Uncertainty***

People make decisions everyday where there are risks and where the outcomes are unknown. People gamble at casinos, drive recklessly and take riskier jobs at the prospect of higher wages. In economics, there is a Theory of Expected Utility which seeks to answer how economic agents forecast uncertain future events. At its foundation, this theory asserts that people will make consistently rational decisions based on probabilities and expected utility. What this paper seeks to answer is if people actually do make their decisions under risk and uncertainty in a consistent, predictable way given an array of possible risky situations. To test this question, a group of university students at a medium sized public university (Murray State University) will be given a risk and uncertainty survey. Their responses will be analyzed statistically for consistency patterns.

### **104. Heather Flynn**

**Morehead State University**

**Mentor: Michelle B. Kunz**

***Readability and Comprehension of Privacy Policies***

Building upon research conducted by Osbourne & Kunz, this project will analyze the comprehension of information contained in online privacy policies, based upon Flesch-Kincaid Readability Scores. This project will manipulate the reading level and score of privacy policies from major online retailers. Student subjects (from various Morehead State University business courses) will be asked to read the privacy policies and then answer questions regarding the content and information contained in each policy. The data will be analyzed to determine what affect, if any, ease or difficulty of reading level and scores plays in the comprehension of the content. We will also have the students review the materials in one of two formats: at a computer screen, simulating the typical online environment, or through printed paper format. The data will be analyzed to determine if the format in which the materials presented affects comprehension level of the content.

### **105. Erin Bunting**

**Eastern Kentucky University**

**Mentor: Shirley O'Brien**

***Ability Awareness***

I have chosen to design a research project focusing on the awareness of disability on college campuses. Through my experience as a college student, I have witnessed the lack of communication students have about the subject of disability. Through research, discussions, and an original program, I plan to provide an opportunity for college students to discuss disability. Also using these venues, I plan to collect my own information to compile a research project with the hypothesis of seeing attitude changes in students about their view of disability. After the program is done, I will collect questionnaires to assess, and evaluate if my hypothesis is confirmed.

## **106. Donna Propes, Larry Frost, and Beau Spencer**

**Western Kentucky University**

**Mentor: Marilyn Gardner**

***Healthcare Ethics: A Contradiction in Terms?***

One of the four basic principles of biomedical ethics is justice. This principle states that the benefits and burdens of medicine and healthcare should be equally distributed among all people. The way our nation's healthcare system is structured restricts access to much of the public and creates other opportunities for injustices at the national, institutional and patient-provider levels. This presentation provides an overview of the ethical strains related to justice created by our healthcare system at each of these levels and contrasts our healthcare system to other countries' systems.

## **107. Carrie Grimes**

**University of Kentucky**

**Mentor: Suzanne Segerstrom**

***Personality, Skills, and Goals***

The present study examines the impact of negative words on a person's goal accessibility. This means that a person's goals may be brought to the forefront of his or her attention by using or seeing words negatively associated with his or her goal. In this study, 83 people enrolled in an introductory psychology course completed word searches followed by questionnaires in a group setting. There were 3 types of word searches that contained words with negative connotations pertaining to either 1) health, 2) finance, or 3) social aspects of life; for example, fat, debt, and lonely, respectively. Each participant completed only one type of word search. After completing one of these word searches each participant listed goals they were currently working on and completed a questionnaire about the importance of each goal. It is predicted that the negative words found in the word searches will make the participants readily access goals that pertain to these words. For example, if a person completed the word search pertaining to finance he or she would list a goal such as 'save money for a new car' as very important. Using negative words should form a discrepancy between the participant and their goal, thus drawing more attention. If this hypothesis is supported, then people can stay more attuned to their goals by using negative connotations. If people stay aware of, rather than forgetting, their goals, they may be more likely to achieve them.

## **108. Julia Sokolova**

**Kentucky Community and Technical College System**

**Mentors: Felix Akojie and Samineni V. Suryanarayana**

***Variance in the Hardness of Lake and River Waters in Western Kentucky***

Water samples were collected from several areas of rivers and lakes in Western Kentucky and the hardness of the water sample determined. Data obtained were compared with data collected in previous years. Information obtained was analyzed with respect to a possible correlation of water hardness and changes in demographics and time in the area of Western Kentucky.

## **109. Jennifer L. Baumgardner and Ashleigh B. Ohlmann**

**University of Kentucky**

**Mentor: Patricia V. Burkhart**

### ***Factors Related to Asthma Quality of Life for U.S. and Icelandic Adolescents***

Purpose: Asthma affects 12% of American children and 9% of Icelandic children. The purpose of this pilot study was to determine the demographic, personal, interpersonal, and illness factors that affect asthma quality of life for adolescents in the United States and Iceland. Methods: This descriptive, cross-sectional study included adolescents with asthma (N = 30; n = 15 U.S. adolescents; n = 15 Icelandic adolescents), ages 13-17 years, primarily recruited from pediatric practices in central Kentucky and Reykjavik, Iceland. The majority of the sample was Caucasian. U.S. adolescents (47% male; 53% female) had a mean age of 14.6 years (SD = 1.5); Icelandic adolescents (73% male; 27% female) had a mean age of 15.1 years (SD = 1.5). Seven pencil-and-paper questionnaires that measured variables including demographics, depressive symptoms, an asthma questionnaire, degree of asthma limitations, and quality of life were administered to the adolescents. Multiple regressions were used to determine predictors of asthma quality of life. Results: Higher depressive symptoms, a greater degree of social disruption due to asthma, and more frequent limitations of physical activity were predictive of a lower asthma quality of life. Although location (U.S. vs. Iceland) and gender were included in the regression model as controls, they were not significantly related to asthma quality of life. Discussion: Interventions designed to decrease depression, social disruption, and physical activity limitations may improve asthma quality of life for adolescents.

## **110. Pamela Jayne**

**University of Louisville**

**Mentor: Lora Haynes**

### ***Understanding the Impact of FAR (Family Adventures In Reading/Family Activities For Readiness) Workshops on the Home Literacy Environment***

The home literacy environment, which involves both parent-child reading and language activities, has been found to play a key role in a child's literacy skills. More specifically, children's literacy skills at kindergarten predict their literacy skills and ability to decode words in the first grade. However, some home literacy activities are more helpful than others. Reese and Cox found that a describer reading style promoted the best literacy skills with younger children. The describer style of reading is similar to the dialogic style of reading. Dialogic reading involves encouraging the child to actively participate in telling the story, interacting with the child and using feedback to expand on their ideas, correcting and praising the child, and selecting readings to stay at/above the child's level of development. The FAR (Family Adventures in Reading/Family Activities for Readiness) parenting and reading workshops model dialogic reading in an effort to improve reading and school readiness in children and their families, and is being presented in the community. Through a series of parent questionnaires, I will focus on the parent-child literacy activities that occur in the homes of 3- to 4-year-old preschoolers. I will be exploring the effectiveness of the workshops by looking at the pre- and post-workshop home literacy activities, and comparing those result with that of families who did not attend the workshops. Home literacy activities should increase and/or become more effective as a result of participation in the workshops.

## **111. Kataun Boka**

**Western Kentucky University**

**Mentor: Cecilia Watkins**

*An Internship that Improves the Lives of Employees at Western Kentucky University*

As a student in the Department of Public Health at Western Kentucky University, my internship is at WKU's Health and Fitness Lab. Working directly under the Employee Wellness Manager for WKU, I am responsible for helping gather the needs assessment of employees, planning programs to improve the lives of employees, implement those programs to employees, as well as evaluate the effectiveness of the programs conducted. Currently, I am assisting in the implementation of four different programs. Those programs include the Cooper Clayton Method to Stop Smoking, Weight Watchers at the Worksite, Stress Management Series, and 10K-a-Day Stepping Up to Better Health. As I assist with the implementation of these programs I not only gain experience in my field of interest, but I also have the opportunity to engage with individuals that participate in these programs. This gives me direct insight into the best methods of planning and implementing programs that meet the needs of the workforce at WKU, while obtaining skills and abilities that will allow me real world experience in my chosen profession of public health educator.

## **112. Sam Nicaise and Nicholas Jackson**

**University of Kentucky**

**Mentors: Vijay Singh and Suresh Rajaputra**

*Fabrication and Characterization of Porous Alumina Based Devices*

The progression of nanostructures and nanodevices from the R&D lab to manufacturing environments is the next great challenge that must be met if these devices are to become commercially viable. This project deals with fabricating nanoporous metal oxide templates whose pores are controllable in size, separation and spatial uniformity over large areas and filling the pores to fabricate devices inside them. These templates can be filled with (i) semiconductors to fabricate heterojunction devices, (ii) magnetic materials for nanowire based recording applications, and (iii) carbon nanotubes for nanoelectronic devices and sensor applications. These membranes can also be used in fluid flow and filtration applications, DNA separation and drug delivery. We have been successful in fabricating nanowire/nanotube based devices using alumina templates.

### **113. Maurisha Jenkins**

**Kentucky State University**

**Mentors: Changzheng Wang, Cecil Butler, Lingyu Huang, and Kirk Pomper**

#### ***Effects of Heat Treatment on the Color Stability of Pawpaw Pulp***

Polyphenol oxidase has been found to be involved in the brown discoloration of pawpaw pulp. Its activity is the greatest at pH 6.5–7.0 and at 5–20°C. Exposure to 40–80°C caused the crude extract of the enzyme to lose its enzyme activity rapidly. The objective of this study was to determine whether brief heat treatment could prevent discoloration of pawpaw pulp. Pawpaw fruits were harvested from the research farm of Kentucky State University in the fall of 2006. Freshly prepared pulp homogenate consisting of about 10 fruits was divided into 16 individual, equal-sized portions, placed in vacuum packed plastic bags. The bags were heated by being placed in boiling water for 0, 1, 3 or 5 minutes. Immediately after heating, they were cooled in ice cold water. The pulp was removed from each of the bags and placed evenly in a flat plastic container covered with plastic film. Air was allowed into the container through holes on the film. The color of the pulp in the containers was measured with a colorimeter at 0, 1, 2, 10 and 20 hours after the end of the heat treatment. With no heat treatment, the pulp changed color rapidly, turning completely brown by 10 hours. Heating for 1 or 3 minutes slowed down the color change but heating for 5 minutes essentially prevented significant color changes in the pulp. Our results indicate that a brief heat treatment can be used to prevent discoloration of pawpaw pulp.

### **114. Margaret Gulley**

**Morehead State University**

**Mentor: Kathryn Mincey**

#### ***Curriculum Alignment: What's Being Taught to Secondary English Students?***

Based on data collected from a survey of Kentucky secondary English teachers, this project will analyze data that describes typical local curricular decisions and their relationship to Program of Studies and Core Content. In an effort to determine educators' perceptions of literacy, the survey will collect responses from English departments in school systems statewide to discover what Kentucky students are typically asked to read at various levels. Likewise, it may investigate the degree of alignment in teacher education programs that prepare future English teachers to teach those texts.

## **115. Alyssa Rowland**

**Northern Kentucky University**

**Mentor: David Hogan**

### ***A Comparison of Well-being in Republicans, Democrats and Independents***

This research compared college student Democrats, Republicans, and independents on five temperamental characteristics (openness, conscientiousness, extraversion, agreeableness and neuroticism) and on one measure of well-being (happiness). Statistical analyses indicated that independents were significantly higher in neuroticism than either Republicans or Democrats, but the groups were indistinguishable on the other temperamental measures. We also found that Republicans were happier than either Democrats or independents, which is consistent with public opinion surveys that have consistently shown over the years that Republicans enjoy a greater sense of well-being than Democrats or independents, even when income is controlled. Our research is perhaps the first to show that the higher level of well-being of Republicans can be observed as early as the first few years of college.

## **116. Jennifer Powell**

**Eastern Kentucky University**

**Mentor: Christopher Kulp**

### ***Nonlinear Time Series Analysis of Beethoven's Music***

The field of nonlinear time series analysis provides a set of tools to analyze data taken from a nonlinear system. In this poster, discuss how the methods of nonlinear time series analysis can be applied to musical compositions. Further, we discuss what information about the composition can be revealed using nonlinear time series analysis. Ultimately, we would like to be able to find a way to identify when a particular piece was composed during its composer's lifetime. In particular, we are interested in studying several pieces of music composed by Beethoven. We show how a time series can be generated from a piece of music. We also demonstrate how the techniques of nonlinear time series analysis can be used to produce visualizations of a composition; and discuss what useful information can be obtained from such visualizations. Finally, we discuss other calculations that can be performed on the time series, such as transfer entropy, and their usefulness in extracting information about the composition.

## **117. Kena Lanham**

**University of Kentucky**

**Mentor: Doug Steinke**

### ***Trends in Oral Antidiabetic Medication Initiation and Use in a HMO Population***

The ADA (American Diabetic Association) and NICE (National Institute for Clinical Evidence) in the United Kingdom have established evidence based guidelines for the initiation and maintenance of oral antidiabetic and insulin therapy in patients with type 2 diabetes. We hypothesize that not all patients with type 2 diabetes at the University of Kentucky Health Maintenance Organization (UK-HMO) are initiated on oral antidiabetic medication according to guidelines and that many combinations of medication are used. To describe trends and combinations of prescription antidiabetic drugs and insulin usage among patients with type 2 diabetic at the UK-HMO. A retrospective medication utilization evaluation of prescription records at the UK-HMO identified all patients with an oral antidiabetic medicine or insulin in the file for the study period 7/1/2000 to 12/31/2005. A six-month screening period at the beginning of the data collection was used to assure only incident cases of type 2 diabetes were analyzed. Records were sorted by date medication was prescribed and aggregated into various medication combinations used by patients over time. Temporal changes in medication therapy were observed and results were compared with ADA and NICE guidelines. Patients were initially prescribed many different combinations of oral antidiabetic therapy and including monotherapy, double combination, triple combination, and insulin-only therapy. Over time, many different combinations of medication were used to control type 2 diabetes; however some patients did not have any change in initial regimen over the study period. Initial medications for type 2 diabetes in this study are not similar to those recommended by several worldwide guidelines, including the ADA and NICE. Combination therapy may be required for appropriate management of type 2 diabetes; however evidence base guidelines have been established for best clinical results. Further research into the rationale for many different combinations, especially on initiation, and the rationale for their use is being developed.

## **Ashley Pinkham**

**(Oral Presentation Only)**

**Eastern Kentucky University**

**Mentor: K. Anderson Crooks**

### ***PR Campaign to Preserve Eastern Kentucky's Water***

This is a multi-year project, supported by a grant from the Commonwealth of Kentucky, to engage the residents of Eastern Kentucky in preserving their own water supply. Research by the environmental protection agencies of the Commonwealth have indicated the significant and on-going adverse impact of humans and domesticated/livestock animals on the water resources of Eastern/Southern Kentucky. The campaign to help reverse this trend is being waged by the public relations students in Dr. K. Crooks' class in stages, with the first stage (identifying media and local environmental organizations, potential supporting associations and clubs, and preliminary testing of messages) already accomplished. The second stage of the campaign, to be overseen by Ms. Pinkham as class coordinator, will be to place and evaluate messages. As the target Upper Cumberland River basin is extensive, this effort will require the execution of various strategies based upon solid communication theories, including the two-step and uses and gratification theories.

**Amanda Omohundro, Bradley Carmella, Sarah Kinney, and  
Katherine Tapp** (Oral Presentation Only)

Morehead State University

Mentor: Zachary Bortolot

***Legalizing Casino Gambling in Kentucky's Appalachian Counties: An Analysis of Potential Socioeconomic Impacts and the Attitudes of Elected Officials towards Legalized Gambling***

This project is a study on the legalization of casino gambling in Kentucky's Appalachian counties. The issue has received considerable interest lately due to Attorney General Stumbo's proposal that casino gambling be legalized in Kentucky. The focus of this research is on developing an understanding of the potential socioeconomic impacts of legalizing casino gambling in Kentucky's Appalachian counties and to assess the attitudes of elected local officials in Appalachian counties towards the legalization of casino gambling. These objectives were addressed by soliciting opinions and information from: 1) county judge executives in the Kentucky's Appalachian counties; 2) a representative of Kentucky Citizens Against Gambling Expansion (CAGE); 3) a representative of Harrah's Cherokee Casino and Hotel, which is located in an Appalachian county in North Carolina; and 4) representatives of three types of businesses (a pawn shop, and convenience store, and a bar) located near Harrah's Cherokee Casino and Hotel.

**Patrick Howell, Tiffany Hedrick, and Courtney Thomason** (Oral Presentation Only)

Murray State University

Mentor: Terry Derting

***Fluctuating Asymmetry as a Measure of Stress from Habitat Disturbance***

Because human activities impact wildlife populations, it is increasingly important to understand the relationships between habitat disturbance and stress. Prior research indicated that white-footed mice (*Peromyscus leucopus*) in undisturbed patches of habitat experienced greater moderate-term stress, associated with reduced food quality, than mice from disturbed patches. Our objective was to determine whether long-term stress was also associated with disturbance. One useful tool for examining effects of prolonged stress on free-living animals is fluctuating asymmetry (FA). We tested the hypothesis that FA differs between mice from disturbed and undisturbed habitats and between seasons. Adult male mice were trapped from disturbed and undisturbed habitats during the summer and winter of 2003. Disturbed patches were located in either residential or agricultural areas. Undisturbed patches were located in the Land Between the Lakes National Recreation Area. We measured eight bilateral characters of the dental, cranial, and post-cranial skeleton using digital photographs. We found that *P. leucopus* exhibited significantly greater levels of FA in undisturbed habitats and during the winter season, with mice from the winter-undisturbed group exhibiting significantly more FA than mice in any other group. Prior research indicated that mice in undisturbed patches may experience greater nutritional stress during winter. As hypothesized, these mice also exhibited greater FA in winter, indicating that mice in disturbed habitats are indeed experiencing long-term stress.



## **Megan Culler**

**(Oral Presentation Only)**

**University of Kentucky**

**Mentor: Becky Dutch**

### ***Cellular Protein Interactions with the Cytoplasmic Tail of Paramyxovirus Fusion Proteins***

Paramyxoviridae, a family of negative-strand, enveloped, RNA viruses, includes several important human pathogens, including measles virus, mumps virus, and the newly emerged Hendra and Nipah viruses, making the study of these viruses pertinent to human health. Membrane fusion is necessary for the survival of enveloped viruses, allowing entry into the host cell and the release of the viral genome. The fusion of these viruses to the cell membrane is promoted by two surface glycoproteins, an attachment protein for primary binding and a fusion protein that promotes fusion between the virus and the cell. This membrane fusion event can be broken down into stages: mixing of outer leaflets, fusion pore formation, subsequent enlargement, and the mixing of aqueous contents between the cells. A mutant of the simian virus 5 (SV5) fusion protein lacking its cytoplasmic tail domain promoted mixing of lipids and small aqueous dye transfer, but was defective in pore enlargement. I hypothesize the SV5 fusion protein cytoplasmic tail interacts directly with cellular components that regulate the expansion of the fusion pore and that the Hendra virus F protein cytoplasmic tail behaves similarly. This project seeks to identify interactions between cellular proteins and the fusion protein cytoplasmic tail regions from SV5 and Hendra virus. Interacting proteins will be identified and their role in viral glycoprotein-mediated membrane fusion will be examined. A panel of truncation mutants will be used to study specific region binding and modified levels of identified protein will be studied for effects on fusion events.

## **Meagan Martin**

**(Oral Presentation Only)**

**University of Louisville**

**Mentor: Lora Haynes**

### ***The Impact of Family Reading and Parenting Workshops on School Readiness in Preschool Children***

Previous research has explored the importance of reading, and more specifically, “high quality” reading, to preschool age children. Such research has focused on the benefits of reading aloud, parent-child reading, interactive reading, and Dialogic reading. Developing and implementing high quality reading skills in parents and teachers of preschoolers is an effective tool in better preparing a child for school. High quality, interactive reading is related to a variety of short and long term academic outcomes. Based on these findings, the FAR (Family Adventures in Reading/Family Activities for Readiness) reading and parenting workshop programs were developed to model “high quality” reading to parents in an effort to improve school readiness and parent-child relations. More specifically, project objectives include improved attention regulation, emotional/social skills (e.g., manners, following instructions), reading, memory and language skills, caregiver sensitivity and parent-child bonding. Workshops and language/reading readiness assessments are currently taking place at a local preschool. The child assessments (TERA, PPVT, KBIT, and narrative task) and teacher ratings (PLBS) are designed to measure language/reading abilities and social skills, that are good indicators of school readiness and academic success. The assessments are scheduled for October 2006, January 2007, and May 2007. It is hypothesized that children will obtain higher scores on these assessments after they have been exposed to the workshops presented by the FAR group as compared to pretest measures. We also expect to find that outcome measures indicate greater school readiness for children and families who attended the workshops as compared to those who did not.

**The *Posters-at-the-Capitol* Organizing Committee  
would like to thank the following for  
their contributions to this year's event!**

**Dr. Tom Layzell, President**  
Council on Postsecondary Education

**Ms. Mary Morse, Executive Secretary**  
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