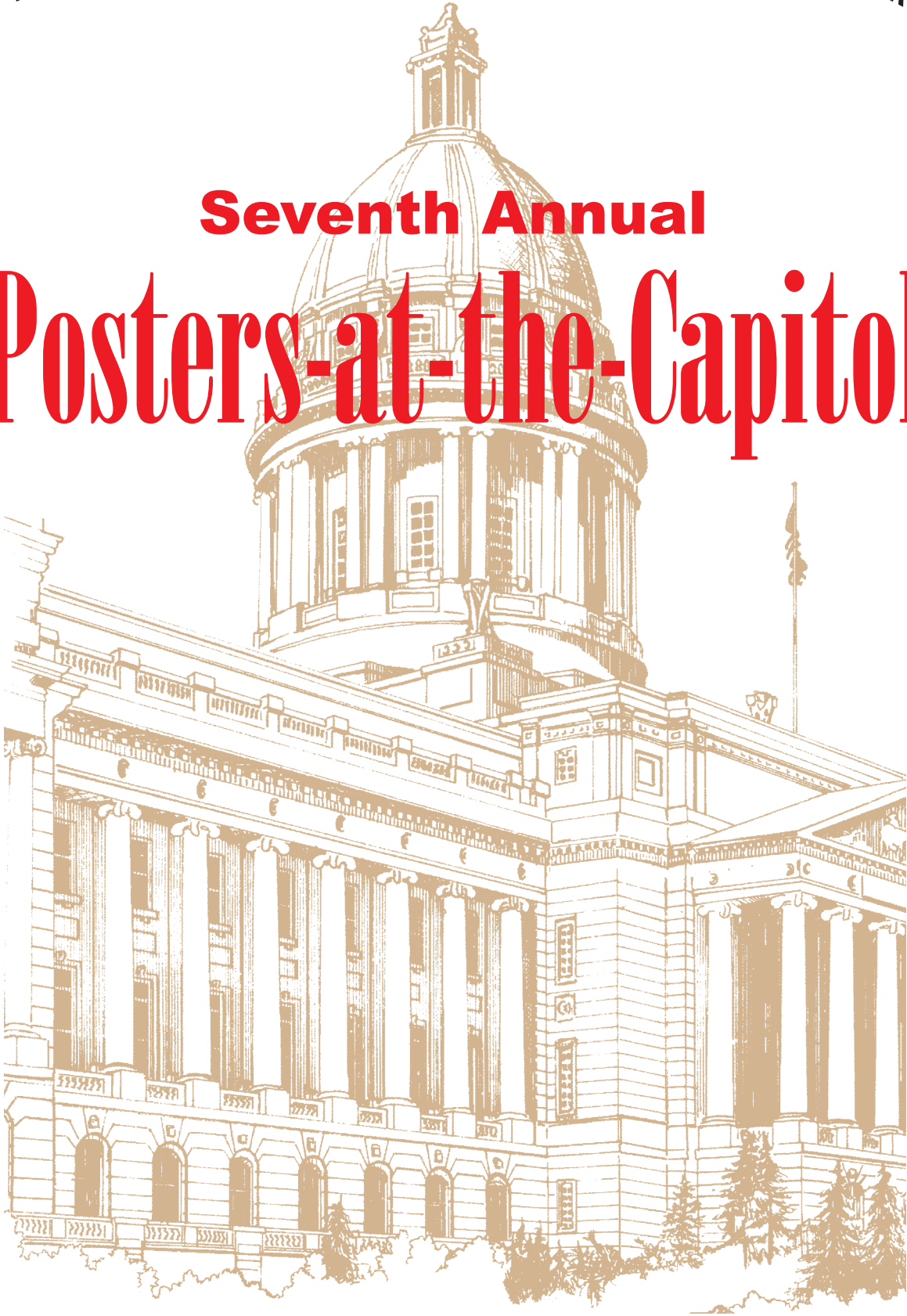


NORTHERN KENTUCKY UNIVERSITY • UNIVERSITY OF KENTUCKY

MURRAY STATE UNIVERSITY • MOREHEAD STATE UNIVERSITY • KENTUCKY STATE UNIVERSITY

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

Seventh Annual Posters-at-the-Capitol





Welcome from President Doug Whitlock of Eastern Kentucky University:

Eastern Kentucky University is proud to participate in the seventh annual *Posters-at-the-Capitol* program because we believe it clearly 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 our best and brightest students.

The projects represented in this exhibit reflect the collaborative efforts of students and dedicated members of our outstanding faculty – men and women who model a passion for excellence and lifelong learning. As they nurture our students to reach deep within themselves and realize their full potential, these faculty mentors bring great honor to themselves, our University and the teaching profession.

Undergraduate research is an integral component of the teaching-learning process at EKU, where students are encouraged to explore all the possibilities behind the question “What if?” As a “School of Opportunity,” we are committed to providing all our students with diverse educational opportunities that enhance their classroom experiences and develop their 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 exciting for the student participants and uplifting to our entire University community.

I applaud all the faculty mentors in the *Posters-at-the-Capitol* program for providing such quality learning experiences for their students. To all the students, I offer my heartfelt congratulations and this challenge: let this experience mark only the beginning of your educational journey and a life committed to personal excellence.

Writer A. Lou Vickery once said, “Four short words sum up what has lifted most successful individuals above the crowd: a little bit more.” Students, I am pleased to see that already you are living your life by that truth. Congratulations, and keep up the good work!



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

The Kentucky Community and Technical College System is delighted to take part in this 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 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 2008 ***Posters-at-the-Capitol*** and wishes you much success.



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

I am delighted that the members of the General Assembly will again have the opportunity to observe and interact with our undergraduate students participating in the ***7th Annual Posters-at-the-Capitol*** event. These student projects, completed in collaboration 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 high priority that we have placed on faculty-mentored student-engagement activities in basic and applied research, artistic and other creative endeavors, and

community and regional stewardship.

Active engagement of undergraduate students with faculty in research, scholarship, and other creative endeavors provides the type of rich, stimulating academic environment necessary for students to excel in the 21st century. Morehead State University is committed to the continued expansion of these scholarly opportunities for students in all academic programs through

President Andrew's Welcome Cont'd.

initiatives such as our Undergraduate Research Fellows program and our Celebration of Student Scholarship Week.

This annual student showcase clearly demonstrates the commitment of Kentucky's public institutions of higher education to faculty-mentored undergraduate research and the pursuit of academic excellence. I offer my sincere thanks to the faculty mentors who go the extra mile to meaningfully involve students in their scholarship, and my hearty congratulations to these student scholars for their outstanding research and creative accomplishments.



Welcome from President Randy Dunn of Murray State University:

This year marks the **seventh 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 seventh ***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 that 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 seventh 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 to offer our students the opportunity to experience creativity, innovation, and discovery from the moment they step foot on campus. That commitment is reflected by our recent efforts to expand support of undergraduate scholarship. We launched the Chellgren Center for Undergraduate Excellence, offering our students and faculty unique opportunities to enrich the undergraduate experience. The creation of Kaleidoscope (now in its 6th year) -- a University journal dedicated to scholarly accomplishments of our undergraduates -- and we continue to allow our students to compete with the best undergraduate scholars in the nation, thanks to our participation in the National Conference on Undergraduate Research. 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. At WKU, scholarly collaborations utilize the concepts learned in classrooms and laboratories to prepare 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 seventh 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.

Schedule of Activities

- 9:00 a.m. to 11:00 a.m. Poster Setup
- 9:00 a.m. to 1:30 p.m. Legislative Visits
- 11:00 a.m.Welcome (Rotunda)
Dr. John Mateja, Chair, *Posters-at-the-Capitol*
- 11:10 a.m. (invited).....Speaker Jody Richards
Kentucky House of Representatives
- 11:15 a.m. (invited).....President David Williams
Kentucky Senate
- 11:20 a.m. (invited).....Mr. Brad Cowgill, Interim President
Council on Postsecondary Education
- 11:25 a.m (invited).....Governor Steve Beshear
Commonwealth of Kentucky
- 11:35 a.m.Acknowledgements
Dr. John Mateja, Chair, *Posters-at-the-Capitol*
- 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
- 3:30 p.m. to 4:00 p.m. Conclusion

Locator Map



**Place Holder
Map Found in
Printer Version**

Eastern Kentucky University

| Poster No. | Student | Faculty Mentor(s) | Page No. |
|------------|-------------|---|----------|
| 2 | Alexander | Jeremiah Stephen Richter | 15 |
| 13 | Birch | Chad Kuang-Nan Chang | 21 |
| 16 | Blythe | Tyler Neil Pederson | 23 |
| 17 | Bonds | Lindsay Alice Jones and Reagan Weaver | 24 |
| 17 | Brosi | Glade Alice Jones and Reagan Weaver | 24 |
| 47 | Brown | Erica Mixon Ware and Gregory Gunderson | 42 |
| 115 | Bundenthal | Christine Marianne Ramsey | 82-83 |
| 27 | Clayton | Janice Kathryn Scarborough | 30 |
| 17 | Compton | Derick Alice Jones and Reagan Weaver | 24 |
| 80 | Courtney | Matthew Joyce Hall Wolf and Karin Sehmman | 63 |
| 36 | Denny | Jill Jonathan Gore | 35 |
| 47 | Feltner | Beth Mixon Ware and Gregory Gunderson | 42 |
| 52 | Frale | Stephanie David May | 44 |
| 115 | Grundhoefer | Denise Marianne Ramsey | 82-83 |
| 115 | Hammersmith | Megan Marianne Ramsey | 82-83 |
| 59 | Harris | Ann C. Dewayne Sims | 48 |
| 62 | Haynes | Angela Rose Perrine | 50 |
| 17 | Hodge | Jason Alice Jones and Reagan Weaver | 24 |
| 67 | Hoskins | Chasity Marco Ciocca | 52 |
| 80 | Marshall | Jessica Joyce Hall Wolf and Karin Sehmman | 63 |
| 62 | Nichols | Jessica Rose Perrine | 50 |
| 17 | Profitt | Mary Alice Jones and Reagan Weaver | 24 |
| 91 | Ratnamalala | Nirmalee Nicholas Santangelo | 69 |
| 47 | Sparks | Joshua Mixon Ware and Gregory Gunderson | 42 |
| 47 | Thompson | Renee Mixon Ware and Gregory Gunderson | 42 |
| 36 | Trew | Sharon Jonathan Gore | 35 |
| 106 | Watts | Hanna Alice Jones | 77 |
| 107 | West | Brooke Susan Godbey and Walter Borowski | 78 |
| 47 | Westbrook | Miranda Mixon Ware and Gregory Gunderson | 42 |
| 115 | Wrocklage | Ida Marianne Ramsey | 82-83 |

Kentucky Community and Technical College System

| Poster No. | Student | Faculty Mentor(s) | Page No. |
|------------|----------------|-----------------------|----------|
| 56 | Alderdice | Jennifer Ehab Marji | 46 |
| 15 | Blandford | Jonathan Timothy Dick | 23 |
| 15 | Cary | Rachel Timothy Dick | 23 |
| 30 | Cook | Nathan Micah Perkins | 32 |
| 44 | Farley | Autumn Norman Strobel | 40 |
| 15 | Garrett | Kim Timothy Dick | 23 |
| 56 | Green | Conal Ehab Marji | 46 |
| 15 | Krzton-Presson | John Timothy Dick | 23 |
| 15 | Morgan | Derek Timothy Dick | 23 |
| 87 | Ortt | Cody Dan Schultz | 67 |
| 116 | Shelby | Jacob Bobby Ann Lee | 84 |
| 113 | Wood | Laura Micah Perkins | 81 |
| 113 | Wood | Damon Micah Perkins | 81 |
| 116 | Wyatt | Zachary Bobby Ann Lee | 84 |

Kentucky State University

| Poster No. | Student | Faculty Mentor(s) | Page No. |
|------------|---------|--|----------|
| 8 | Banda | Yankuba Narayanan Rajendran | 19 |
| 21 | Brent | Leslye John Sedlacek and Karen Friley | 27 |
| 29 | Collins | Lauren Kirk Pomper, Li Lu, Jeremiah Lowe, and Sheri Crabtree | 32 |
| 68 | Hu | Yoon-Hyeon George Antonious | 53 |
| 111 | Wilson | Caroline George Antonious | 80 |

Morehead State University

| Poster No. | Student | Faculty Mentor(s) | | Page No. |
|------------|-----------------------|-------------------|---|----------|
| 1 | Ahadi-Akhlaghi | Danielle | Christine McMichael | 15 |
| 64 | Anteau | Michael | Stephen Lange | 51 |
| 11 | Belmont | Erica | Janet Ratliff | 21 |
| 65 | Carmella | Brad | Michael Hail | 51 |
| 105 | Dillow | Jared | Sean Reilley | 77 |
| 64 | Dourson | Aaron | Stephen Lange | 51 |
| 38 | Draughn | Mallory | June Grice | 36 |
| 43 | Everman | Melanie | Roma Prindle | 40 |
| 48 | Fiore | Michelle | Janet Rice McCoy | 42 |
| 50 | Fitzner | Michael | Ahmad Hassan | 43 |
| 51 | Fitzpatrick | Allen | Robert Frank | 43 |
| 117 | Flynn | Heather | Michelle Kunz | 85 |
| 60 | Harris | Michael | Glenn Ginn | 49 |
| 51 | Hausstein | Kristin | Robert Frank | 43 |
| 64 | Hawkins | Cody | Stephen Lange | 51 |
| 63 | Hazelrigg | Heather | Stephanie Johnson and Donna Corely | 51 |
| 64 & 65 | Hicks | Josh | Stephen Lange and Michael Hail | 51 |
| 69 | Hufford | Casey | Robin Blankenship, R. Doug Chatham, and R. Duane Skaggs | 54 |
| 70 | Hurley | Matthew | Kristina DuRocher Wilson | 55 |
| 1 | Huron | Britney | Christine McMichael | 15 |
| 64 | Jenkins | Seth | Stephen Lange | 51 |
| 77 | Jessie | Teara | John Ernst | 60 |
| 64 | Lambert | Ainsley | Stephen Lange | 51 |
| 77 | Leadingham | Christopher | John Ernst | 60 |
| 101 | Martin | Leslie | Cyndi Young Gibbs | 75 |
| 64 | Means | Joseph | Stephen Lange | 51 |
| 83 | Mills | Nathan | Fatma Mohamed | 65 |
| 65 | Nanny | Tara | Michael Hail | 51 |
| 64 | Richardson | James | Stephen Lange | 51 |
| 1 | Rose | Nick | Christine McMichael | 15 |
| 64 | Rose | Nicholas | Stephen Lange | 51 |
| 101 | Solloway | Brooke | Cyndi Young Gibbs | 75 |
| 64 | Stevens | Thomas | Stephen Lange | 51 |
| 69 | Wahle | Nicholas | Robin Blankenship, R. Doug Chatham, and R. Duane Skaggs | 54 |
| 105 | Watkins | Cassie | Sean Reilley | 77 |
| 64 | Westendorf | Christopher | Stephen Lange | 51 |
| 64 & 65 | York | Grant | Stephen Lange and Michael Hail | 51 |

Murray State University

| Poster No. | Student | Faculty Mentor(s) | | Page No. |
|------------|-------------------|-------------------|---|----------|
| 9 | Batts | Kevin | David Eaton | 20 |
| 14 | Blanchette | Stephen | Pat Williams and Kris-Ann Kaiser | 22 |
| 19 | Brannon | Kelly | Tony Brannon and David Ferguson | 26 |
| 22 | Brian | Zachary | Kate He | 27 |
| 14 | Bridges | Stacy | Pat Williams and Kris-Ann Kaiser | 22 |
| 40 | Craig | Bryan | Iin Handayani, David Ferguson, Andy Bailey, Bobby Hill, Whitney Peake, Tony Brannon and Tim Lax | 38 |
| 40 | Crouch | David | Iin Handayani, David Ferguson, Andy Bailey, Bobby Hill, Whitney Peake, Tony Brannon and Tim Lax | 38 |
| 35 | Dennis | Matt | Claire Fuller | 35 |
| 14 | Dick | David | Pat Williams and Kris-Ann Kaiser | 22 |
| 42 | Duley | Adam | Suguru Nakamura | 39 |
| 40 | Elliot | Carrie | Iin Handayani, David Ferguson, Andy Bailey, Bobby Hill, Whitney Peake, Tony Brannon and Tim Lax | 38 |
| 41 | Elliot | Jake | Whitney Peake, Tony Brannon and Tim Lax | 39 |
| 42 | Elmore | Zachary | Terry Derting | 39 |
| 46 | Feldhaus | Rebecca | Suguru Nakamura | 39 |
| | | | Sonya Baker | 41 |

Murray State University cont'd.

| Poster No. | Student | | Faculty Mentor(s) | Page No. |
|-------------------|----------------------|-------------|--|-----------------|
| 40 | Ferguson | Teresa | Iin Handayani, David Ferguson, Andy Bailey, Bobby Hill, Whitney Peake, Tony Brannon, and Tim Lax | 38 |
| 49 | Fiscus | Brittany | Terry Strieter | 43 |
| 95 | Hagan | Ashley | Howard Whiteman and Nicole Gerlanc | 72 |
| 22 | Harris | Kelly | Kate He | 27 |
| 22 | Harris | Courtney | Kate He | 27 |
| 40 | Hayden | David | Iin Handayani, David Ferguson, Andy Bailey, Bobby Hill, Whitney Peake, Tony Brannon, and Tim Lax | 38 |
| 42 | Headford | Mikel | Suguru Nakamura | 39 |
| 9 | Horton | Christopher | David Eaton | 20 |
| 112 | Manley | Derek | Timothy Johnston | 80 |
| 85 | Mattmiller | Andrew | Alexey Arkov | 66 |
| 42 | Muncie | Christopher | Suguru Nakamura | 39 |
| 85 | Nance | Derek | Alexey Arkov | 66 |
| 85 | Netz | Neely | Alexey Arkov | 66 |
| 40 | Parrish | Justin | Iin Handayani, David Ferguson, Andy Bailey, Bobby Hill, Whitney Peake, Tony Brannon, and Tim Lax | 38 |
| 93 | Robertson | Brian | David Eaton | 71 |
| 95 | Schoborg | Todd | Howard Whiteman and Nicole Gerlanc | 72 |
| 99 | Smith | Candace | Pat Williams and Kris-Ann Kaiser | 74 |
| 40 | Story | Isaiah | Iin Handayani, David Ferguson, Andy Bailey, Bobby Hill, Whitney Peake, Tony Brannon, and Tim Lax | 38 |
| 40 | Stuard | Robert | Iin Handayani, David Ferguson, Andy Bailey, Bobby Hill, Whitney Peake, Tony Brannon, and Tim Lax | 38 |
| 40 | Tapp | Kaleb | Iin Handayani, David Ferguson, Andy Bailey, Bobby Hill, Whitney Peake, Tony Brannon, and Tim Lax | 38 |
| 41 | Thomason | Courtney | Terry Derting | 39 |
| 40 | Thompson | Lauren | Iin Handayani, David Ferguson, Andy Bailey, Bobby Hill, Whitney Peake, Tony Brannon, and Tim Lax | 38 |
| 4 | Thornhill | Elizabeth | David Eaton | 17 |
| 4 | Van Ameringen | Heidi | David Eaton | 17 |
| 103 | Walker | Todd | Claire Fuller | 76 |
| 112 | Wilson | Serena | Timothy Johnston | 80 |

Northern Kentucky University

| Poster No. | Student | Faculty Mentor(s) | Page No. | |
|------------|---------------------------|-------------------|--|----|
| 6 | Armstrong | Callie | Willie Elliot | 18 |
| 7 | Austin | Sara | Belle Zembrodt | 19 |
| 12 | Bianco | Carla | Andrea Watkins | 21 |
| 24 | Burwinkel | Karen | David Thompson | 28 |
| 100 | Enzweiler | Sarah | Mark Wasicsko | 74 |
| 53 | Gabriel | Chrispin | Wayne Bresser, Chari Ramkumar, and Kisa Ranasinghe | 44 |
| 100 | Goodwin | Meagan | Mark Wasicsko | 74 |
| 55 | Gorlewski | Emily | Boni Li | 46 |
| 71 | Hernandez-Lamb | Jennifer | Gail Mackin, Charles Acosta, and Kevin Kirby | 55 |
| 66 | Hoppins | Kevin | Lisa Holden | 52 |
| 71 | Jaspers | Jamie | Gail Mackin, Charles Acosta, and Kevin Kirby | 55 |
| 82 | Miller | Chris | KC Russel | 64 |
| 88 | Patenaude-Schuster | Sara | Rebecca Bailey | 67 |
| 104 | Schmidt | Whitney | Heather Bullen | 76 |
| 98 | Sinclair | Ryan | David Hogan | 73 |
| 100 | Smith | Lisa | Mark Wasicsko | 74 |
| 104 | Wall | Stephen | Heather Bullen | 76 |

University of Kentucky

| Poster No. | Student | Faculty Mentor(s) | Page No. | |
|------------|-------------------|-------------------|---|----|
| 3 | Alexander | Joseph | Bruce Hinds and M. Pinar Menguc | 16 |
| 5 | Anderson | Ashley | Kimberly Anderson, J. Zach Hilt, and Samantha Meenach | 18 |
| 28 | Baldwin | Taylor | Susan Barron and Ana Hutton Kehrberg | 31 |
| 18 | Bozio | Catherine | Marius Sumandea, Mary Garcia-Cazarin, and Amelia Sumandea | 25 |
| 20 | Braun | Kathryn | Richard Smith, Caitlin Annie, and Jane Powell | 26 |
| 28 | Cohen | Matthew | Susan Barron and Ana Hutton Kehrberg | 31 |
| 32 | Craft | Patrick | Scott Bryson | 33 |
| 37 | Doepke | E. Brady | Kent Price and John Vranish | 36 |
| 39 | Early, IV. | Walter | James Wade, Jr. and Benjamin Withers | 37 |
| 57 | Faughn | Carley | Chana Akins and Thomas Zentall | 47 |
| 37 | Gilbertson | Matthew | Kent Price and John Vranish | 36 |
| 57 | Hancock | Andrew | Chana Akins and Thomas Zentall | 47 |
| 58 | Harik | Marc | Kozo Saito | 48 |
| 61 | Hawkins | Ashley | J.Z. Hilt | 49 |
| 58 | Kwan | Loretta | Kozo Saito | 48 |
| 78 | Lewis | Alysha | Hirota Fukushige, David Hildebrand, and David McNear | 61 |
| 78 | Lews | Ricky | Hirota Fukushige, David Hildebrand, and David McNear | 61 |
| 79 | Mann | Lesley | Christopher Schardl | 62 |
| 3 | Martin | Robert | Bruce Hinds and M. Pinar Menguc | 16 |
| 81 | McOwen | Katherine | Mike McKay and Liz Swanson | 64 |
| 3 | Nicaise | Sam | Bruce Hinds and M. Pinar Menguc | 16 |
| 81 | Richards | Jason | Mike McKay and Liz Swanson | 64 |
| 92 | Roberts | Maggie | Susan Frazier | 70 |
| 94 | Scheff | Nicole | Audra Stinchcomb | 71 |
| 96 | Sherman | Jes | John Anthony | 72 |
| 28 | Soloman | Amy | Susan Barron and Ana Hutton Kehrberg | 31 |
| 102 | Srinivasan | Vinay | Timothy McClintock | 75 |
| 28 | Vasquez | Pamela | Susan Barron and Ana Hutton Kehrberg | 31 |
| 18 | Vyas | Krishna | Marius Sumandea, Mary Garcia-Cazarin, and Amelia Sumandea | 25 |
| 92 | Wellman | Ashley | Susan Frazier | 70 |

University of Louisville

| Poster No. | Student | Faculty Mentor(s) | | Page No. |
|------------|-------------------|-------------------|--|----------|
| 72 | Bhavalkar | Ashley | Crystal Day and Barbara Burns | 56 |
| 23 | Brown | Lecia | Chet Tailor and Naveen Hussain | 28 |
| 25 | Carruba | Christopher | Todd William Vitaz | 29 |
| 72 | Carter | Kelly | Crystal Day and Barbara Burns | 56 |
| 72 | Jenkins | Leslie | Crystal Day and Barbara Burns | 56 |
| 73 | Klaphaak | Jessica | Mark Linder, Marjorie Bon Homme, and Sreelatha Channareddy | 57 |
| 74 | Kniffley | Steven | Kevin Chapman | 58 |
| 76 | Le | Huy | James Wittliff and John Trent | 60 |
| 86 | Oberst | Rachel | Fabian Crespo and Christopher Tilquist | 66 |
| 89 | Peterson | Alex | Barbara Wheeler | 68 |
| 90 | Raltson | Haylee | Margaret Carreiro | 68 |
| 72 | Unger | Stephanie | Crystal Day and Barbara Burns | 56 |
| 109 | Wilburn | Damien | Richard Feldhoff, Pamela Feldhoff, and Kathleen Bower | 79 |
| 110 | Williamson | Crystal | Pavel Zahorik | 79 |
| 114 | Woods | Jared | J. Christopher States | 81 |

Western Kentucky University

| Poster No. | Student | Faculty Mentor(s) | | Page No. |
|------------|---------------------|-------------------|---|----------|
| 33 | Ayer | Adam | Kevin Schmaltz | 34 |
| 10 | Beaty | Jonathan | Leisa Hutchison and Marty Boman | 20 |
| 31 | Birkhead | Jason | Chris Byrne | 33 |
| 54 | Boka | Kathy | Cecilia Watkins | 45 |
| 84 | Brunner | Chelsea | Andrew Wulff | 65 |
| 26 | Carter | Stephen | Chris Byrne | 29 |
| 45 | Cassity | Ross | Robert Choate | 41 |
| 10 | Conley | Holly | Leisa Hutchison and Marty Boman | 20 |
| 31 | Cook | Stuart | Chris Byrne | 33 |
| 33 | Curtsinger | Cody | Kevin Schmaltz | 34 |
| 34 | DeArmond | Josh | Joel Lenoir | 34 |
| 45 | Feese | Devin | Robert Choate | 41 |
| 54 | Gilson | Katherine | Cecilia Watkins | 45 |
| 33 | Hampton | Kyle | Kevin Schmaltz | 34 |
| 97 | Hinton | Lauren | Mary Lloyd Moore, Janice Carter Smith, and Frank Kersting | 73 |
| 26 | Holmes | Aaron | Chris Byrne | 29 |
| 34 | Hughes | Andrew | Joel Lenoir | 34 |
| 84 | Kramer | Samantha | Andrew Wulff | 65 |
| 75 | Lamb | Annesia | Nilesh Sharma | 59 |
| 97 | Lane | Katy | Mary Lloyd Moore, Janice Carter Smith, and Frank Kersting | 73 |
| 31 | McCombs | Josh | Chris Byrne | 33 |
| 26 | McDaris | Brent | Chris Byrne | 29 |
| 84 | Monohan | Heather | Andrew Wulff | 65 |
| 33 | Morris | Justin | Kevin Schmaltz | 34 |
| 97 | Overstreet | Stacy | Mary Lloyd Moore, Janice Carter Smith, and Frank Kersting | 73 |
| 45 | Pearl | Zachary | Robert Choate | 41 |
| 10 | Rasmussen | Kristina | Leisa Hutchison and Marty Boman | 20 |
| 97 | Short | Katie | Mary Lloyd Moore, Janice Carter Smith, and Frank Kersting | 73 |
| 97 | Shroyer | Lindsay | Mary Lloyd Moore, Janice Carter Smith, and Frank Kersting | 73 |
| 33 | Simpson | Ryan | Kevin Schmaltz | 34 |
| 10 | Skaggs | Lacey | Leisa Hutchison and Marty Boman | 20 |
| 97 | Skaggs | Lacey | Mary Lloyd Moore, Janice Carter Smith, and Frank Kersting | 73 |
| 75 | Starnes | Daniel | Nilesh Sharma | 59 |
| 26 | Stubblefield | Brent | Chris Byrne | 29 |
| 10 | Thomas | Mirinda | Leisa Hutchison and Marty Boman | 20 |
| 31 | Thompson | David | Chris Byrne | 33 |

| <i>Western Kentucky University cont'd.</i> | | | | |
|--|----------------|----------|---|-----------------|
| Poster No. | Student | | Faculty Mentor(s) | Page No. |
| 97 | Waiz | Brittany | Mary Lloyd Moore, Janice Carter Smith, and Frank Kersting | 73 |
| 108 | West | Chelsea | Daniel Carter | 78 |
| 108 | Wilder | Andrea | Daniel Carter | 78 |

1. Danielle Ahadi-Akhlghi, Britney Huron and Nick Rose

Morehead State University

Mentor: Christine McMichael

Spatial Analysis of the Influence of Climatic Factors on Incidence of Disease in Kentucky

The incidence of many diseases has not previously been examined spatially in Kentucky. Our research investigated long-term relationships between statewide patterns of disease incidence and key climatic factors which may substantially influence these patterns. Specific climate factors included long-term precipitation and maximum and minimum temperatures. While we primarily analyzed linkages between incidence of disease and climate, we also explored the potential influence of other factors. The results of our analysis aid in understanding the influence of precipitation and temperature regimes on disease incidence in Kentucky, and are expected to improve attempts to predict the patterns of disease incidence.

2. Jeremiah R. Alexander

Eastern Kentucky University

Mentor: Stephen Richter

Modernizing the Science Classroom: An Introduction to RNA Interference

A major goal of today's collegiate science instructors is creative modernization of the curriculum while maintaining fiscal responsibility. Cutting edge laboratory techniques such as RNA interference (RNAi) are possible given a little molecular ingenuity. This poster outlines the process of introducing RNAi in a molecular biology classroom. RNAi consists of exploiting evolved molecular machinery that degrades messenger RNA in a series of steps, reducing protein production by silencing genes of interest. The course module has two sections: a lecture section, in which the instructor teaches the underlying theory of RNAi, and a wet-lab section, where students gain hands-on experience with the technology. The wet-lab experiment consists of the application of RNAi so as to lyse fetal rhesus monkey kidney cells, which can be housed in any microbiology laboratory with a biosafety level of 1 or above. The RNAi primers were developed using bioinformatic resources. By lysing the cells, a student can visually see the effects of the procedure through a microscope, and avoid expensive and unnecessary tracking chemicals such as fluorescence. With this laboratory, students at any university will gain hands-on experience with RNAi, one of the most cutting edge and provocative new areas of molecular research with implications that span conservation, the furthering of the base of scientific knowledge, and perhaps the next groundbreaking treatment of disease. The RNAi laboratory presented here will make tomorrow's students more competitive after graduation, as well as modernize the science classroom.

3. Joseph Alexander, Robert Martin, and Sam Nicaise

University of Kentucky

Mentor(s): Bruce Hinds and M. Pinar Menguc

STUDY 1: *Control of Enzyme Bioactivity through Attachment to Charged Tether Anchored on Carbon Nanotube Membrane* - Carbon nanotube membranes are comprised of aligned carbon nanotubes extending through a thin layer of polystyrene. By using a charged molecule attached to one side of the carbon nanotube membrane, with an enzyme attached to the opposite end, the enzyme can be extended and retracted through the application of an electric field. Upon application of the electric field, the charged tether was pulled to the surface of the membrane and with it the attached enzyme. Upon removal of the electric field, the tether extended due to like charge interactions and pushed the enzyme away from the membrane's surface. Carbon nanotube membranes are able to transport selected fluid molecules quickly by permitting them to flow through the nanotube's interior. The use of a charged tether with accompanying enzyme would allow for successful metering of the membrane's flow rate. The flow through the membrane could be halted by applying an electric potential, which would obstruct the nanotubes with a bulky enzyme. Since many blood chemical detectors use enzymes for measurement, enzymes attached to carbon nanotube membranes could be used as indicating and drug delivery device in one compact unit in the form of a skin patch.

STUDY 2: *The Behavior of Metallic Nanoparticles on Nanoporous Anodized Alumina* With its promise to revolutionize the way in which we live, research in nanotechnology has grown quickly in the last decade. By engineering materials at the nanometer scale, we are able to utilize their unique properties. Because of these unique phenomena, we are able to direct our research towards a project which little work has been previously done. We obtained simulated and experimental results of the behavior of metallic nanoparticles on nanoporous anodized alumina on a silicon substrate. For the simulated results, COMSOL, a commercial finite element program was used. Experimental results were obtained by microscopy on an Atomic Force Microscope and a Scanning Electron Microscope. We prepared the silicon alumina substrates using deposition equipment, annealed the substrates, and incorporated the nanoparticles using various methods. Using transmission spectroscopy, we were able to determine the absorption peaks for the gold and porous alumina. Comparing the experimental results to the simulated results, we were able to see that the COMSOL model predicted the absorption peaks perfectly. This means that we will be able to classify the aspect ratios of the metallic nanostructures based on their reflection spectrum. The solutions provided by our simulations and experiments will be used in areas such as bio-sensing, nanoelectronic devices, and medicine. Possibly one of the most exciting aspects of this research is its use in advancing the technology of filtration devices. Our results will be used by many fields in future research.

4. Heidi van Ameringen and Elizabeth Thornhill

Murray State University

Mentor: David Eaton

STUDY 1: Closing the Gender Gap: A Focus on Women's Equality in Education -

This paper investigates the impact of female education on economic growth in developing countries and the importance of closing the gender gap by focusing on women and education. It examines how the promotion of gender equality in educational attainment has an effect on human capital and growth by comparing the impact of different policies regarding female schooling between countries of different levels of economic development. It investigates the economic and social returns of education on females are higher than the investment in education on males.

STUDY 2: Ability to Price Discriminate Given Information Gathered with Technology

This study examines price discrimination, charging different prices to different customers based on their willingness to pay in order to maximize profits. In particular, I have looked at how technological advances have made price discrimination more feasible for individual firms to implement. I have looked at ways firms gather information given today's technology, such as tracking purchase history with discount cards, collecting phone numbers at checkout, or tracking online purchases. The study then looked at how the companies are able to effectively use the information that they have gained in order to charge different prices to different buyers. Examples of this behavior would include sending coupons to customers given the information they have learned about the individuals purchases, or tracking mouse clicks to approximate a consumer's willingness to pay for an item.

5. Ashley Anderson

University of Kentucky

Mentor(s): Kimberly Anderson, J. Zach Hilt, and Samantha Meenach

In Vitro Biocompatibility Analysis of Temperature-Responsive Hydrogel Nanocomposites

Hydrogels are hydrophilic crosslinked polymer networks that are able to absorb up to a thousand times their dry weight in water while still maintaining their form. A newly explored area of polymers is that of hydrogel nanocomposites which are hydrogels that incorporate nanoparticulate materials into their matrix. This can give hydrogels improved properties such as increased strength due to the addition of nanoparticulate material or the ability to be heated remotely via an alternating current magnetic field when magnetic nanoparticles are present in the hydrogel. This project incorporates iron oxide magnetic particles into a poly(N-isopropylacrylamide) (PNIPAAm)-based crosslinked hydrogel nanocomposite. One important area of research that is necessary to determine the practical uses of hydrogels is biocompatibility. Biocompatibility is often difficult to define given that a number of mechanisms have been proposed to explain the compatibility of differing materials. Biocompatibility depends on the function of the biomaterial and is defined to be specific to a given application. One potential application for the temperature-responsive systems studied includes the implantation of a hydrogel nanocomposite that can be heated externally to provide both hyperthermia and drug release capabilities. This could then be used in drug delivery and/or cancer therapy applications within the body in which the biocompatibility of the composite would be of the utmost importance. This study focused on determining the biocompatibility of magnetic hydrogel nanocomposites at various crosslinking densities with and without magnetic nanoparticles through cytocompatibility studies. Specifically, it has been discovered that murine fibroblast respond favorably to PNIPAAm/iron oxide-based hydrogel nanocomposites.

6. Callie Armstrong

Northern Kentucky University

Mentor: Willie Elliott

Darfur: Indifference is Not an Option

This poster describes the current genocide that is going on in Africa, in the region of Darfur. It gives a brief synopsis of what facts encircle this genocide, what needs to be done to help, and how we, as Americans, can help end the mass murder of thousands of innocent people. The goal of the poster is not only to educate the American population, but to elicit a response from not only our constituents but our elected officials as well.

7. Sara Austin

Northern Kentucky University

Mentor: Belle Zembrodt

The Effect of Positive Psychology Interventions on Happiness of High School Students

High school students participated in a Positive Psychology workshop involving Seligman's signature strengths, flow and authentic happiness. Happiness was assessed with the Satisfaction with Life Scale, Subjective Happiness Index and the CES-D. Students in the treatment condition also completed a Work Shop Questionnaire assessing their enjoyment, acceptability, perceived increase in happiness, knowledge of concepts discussed and items learned during the workshop. Statistical analysis indicated that practicing positive psychology interventions marginally increased the high school students' satisfaction with life and marginally decreased symptoms of depression. Further analyses indicated that most students enjoyed the workshop, felt that it increased their happiness and planned on using positive psychology in the future.

8. Yankuba Banda

Kentucky State University

Mentor: Narayanan Rajendran

Growth Analysis of Newly Isolated Soil Bacterial Strain, *Arthrobacter nicotianae* Strain PR

Members of the genus *Arthrobacter* are prevalent in many soils and are found in extreme soil conditions. The genus is comprised of over 35 different species and many of them have been used in bioremediation. Some of them have industrial applications and have been used for their probiotics values in aquaculture and for the production of antimicrobial compounds. In the present study, a newly isolated strain of *A. nicotianae* was microbiologically characterized in order to exploit the strain for subsequent phylogenetic applications. The characterization includes colony count and analysis, Gram staining, microscopic and morphological analysis, viability and growth curve study, differential media study and antibiotic resistant analysis. *A. nicotianae* strain PR is a Gram positive bacterium isolated from the soil by the second author. Microscopically it is motile and morphologically it is a bright yellow-colored bacterium. The colony characters include round type configuration on petri plate and echinulate growth pattern on nutrient agar slant. This aerobic bacterium grows well in Luria Bertani (LB) medium and exhibited an average viable colony count of 4.5×10^9 . Differential media analysis shows significant growth on Tryptose Blood Agar (TBA) and Nutrient Broth (NB) Agar compared to Eosin Methylene Blue (EMB) agar. This strain exhibits a high sensitivity with a zone of growth inhibition by 25 mm when tested with Tetracycline after incubation at 30°C for 18 hrs.

9. Kevin Batts and Christopher Horton

Murray State University

Mentor: David Eaton

STUDY 1: *Costs of Alternative Fuel Production* - The future for alternative fuels looks bright. With international oil prices reaching record highs and prices at the pump soaring, the United States has turned to ethanol as a substitute for oil. However, is ethanol an economical solution to America's dependence on oil? This paper attempts to answer this question by analyzing the costs associated with producing ethanol and oil. My research begins by identifying the direct costs and externalities associated with each source of fuel. Then, regression analysis is used to compare the two sources of fuel. From the regression analysis, the more economical fuel source is identified.

STUDY 2: *Effects of Cigarette Taxes on Consumption* - This paper examines the effects of an increased state cigarette tax on consumption. In particular, the paper examines whether or not increased taxes leads to a drop in the consumption of cigarettes. The paper also examines the impact of increasing taxes in one state and its affect on revenue in bordering states. To answer this question, I used data regarding cigarette consumption per capita by state, cigarette tax revenue by state, and state tax changes.

10. Jonathan Beaty, Holly Conley, Lacey Skaggs, Kristina Rasmussen, and Mirinda Thomas

Western Kentucky University

Mentor: Leisa Hutchison and Marty Boman

Collaborative Service Delivery: The Impact on Kelly Autism Program Participants and Western Kentucky University Students.

The impact of collaborative service delivery on learning for Western Kentucky University students who represent various disciplines was investigated. Surveys were designed using a Leichert scale to determine learning benefits, job preparation, and other benefits from the service providers/staff, university-affiliated groups. At least eight different disciplines are providing collaborative service delivery for Kelly Autism Program participants at WKU. The study examined the unique benefits of collaborating within the disciplines of exceptional education, communication disorders, interdisciplinary early childhood education, public health, psychology, music, art, and business. Results of the study are reported according to discipline represented, status (current or former student), participant, and/or parent report.

11. Erica Belmont

Morehead State University

Mentor: Janet Ratliff

College Students' Knowledge of Basic Personal Finance

The issues that face adults in everyday life regardless of occupation in terms of finances are extremely important to the overall success of adults in everything that they ultimately do; therefore, preparing students with appropriate knowledge about personal finances is a core responsibility of a personal finance class when offered at a University. This study explored the personal finance knowledge of college students prior to and after completing a basic finance course. The questions given to students to ascertain knowledge were developed from practitioners including: bankers, insurance agents, investment brokers, and business executives. Common demographic factors influencing knowledge were examined and reported to determine what demographic factors most influence financial knowledge.

12. Carla Bianco

Northern Kentucky University

Mentor: Andrea Watkins

Wendell Berry, Kentucky's Author

My poster highlights the life and works of Kentucky native Wendell Berry. Mr. Berry is most noted for his writings which encourage the support of local agriculture. I have done a phone interview with Mr. Berry, quotations from which were incorporated into the poster. Mr. Berry has intertwined his philosophy into both his fictional and non-fictional works, and highlights from these works are presented.

13. Chad Birch

Eastern Kentucky University

Mentor: Kuang-Nan Chang

Sauron

Sauron is a monitoring program designed to keep watch over multiple networked objects and whether or not they are currently connected or disconnected to a network (intranet or internet). It communicates with devices using the ICMP protocol over any IPv4 or IPv6 based network using TCP/IP. The user specifies the objects it wishes to monitor, the users it wishes to notify about certain scenarios, and the interval it wishes the monitoring to take place. The system stores all this information in a local database, along with various statistics regarding the monitored computers. The system can use its own database or any other database method that supports SQL based. The system uses a separate thread to monitor the specified computers on some set interval, as assigned by the user. If the system cannot contact a computer, then it may execute any combination of scenarios including, but not limited to: shut a computer off, restart a computer, or log a user off of a computer. If the computer is off, the system can wake the computer up. The system can also be set to notify a user via email if a monitored object goes down. The system generates an html page that can be saved to an accessible directory. This facilitates server based monitoring and sharing via the World Wide Web. The system leverages the technologies of Graphical User Interface programming, multi threading, application-layer networking, network-layer networking, email creation, sending an email message, and file output/organization.

14. Stephen Blanchette, David Dick, and Stacy Bridges

Murray State University

Mentor(s): Pat Williams and Kris-Ann Kaiser

STUDY 1: *Evaluating Hard Pinch Timing of Dendranthema X Morifolium On Lateral Shoot Branching And Flowering Response* - Standard cultural practices on hardy chrysanthemums, *Dendranthema* x, becomes a labor issue when planting and pinching operations are done at ground level on 2,800 plants on separate dates. The study compared hard pinching at planting and then at the recommended 7-10 day interval. The research had four different cultivars of chrysanthemums. They were Foxy Marjorie, Marjorie, Bethany and Okra. Each row of 120 plants had three control/treatment groups which consisted of 40 plants each. These plants were grown on a regular production schedule. Just before being sold, the plants were measured for area index (width x width x height). Morifolium is to make a hard pinch 7-10 days after planting the rooted cutting. These Photographs were taken straight down on the plant's canopy where flower buds were counted. After data collection is finished, a summary will direct future hard pinching practices for the horticulture program's yearly chrysanthemum production.

STUDY 2: *Determining Biomass Variances In Hydroponic Harvests of Lactuca Cultivars Utilizing Different Fertilizer Application Rates* - Hydroponics is quickly becoming an alternative production system for leafy vegetables with both commercial and residential applications. Specialty fertilizers are becoming abundant as the popularity of hydroponics becomes available to the consumer. This study will compare the recommended application rates of General Hydroponics FloraGro and FloraMicro nutrient concentrations. The control is one 56-site ebb and flow chamber hydroponic grow system and a second treatment 56-site table is to be harvested simultaneously through a 50% reduction of nutrient concentration. Each table will be leached weekly to prevent mineral concentration buildup on root structures. Using existing elements of a previous hydroponics system, a modified structure will place the 4" PVC chambers, 47" in length with seven 3" container sites, on a table-type base. There are a total of eight chambers parallel to each other which will be piped with intake and drain manifolds totaling 58" in width. A 27-gallon reservoir will house a 525 GPH submersible pump with a pre-filter under each table. The pump will be controlled through a cycle timer programmed to 30 minutes on and one hour off. Growth rates and environmental measurements will be monitored daily, while nutrient solutions will be replaced and recalibrated on a weekly basis. All harvested crops are to be placed in a kiln for 72 hours to remove all moisture from cells, allowing for a precise measurement of biomass weight. Our data will be analyzed to determine whether a general reduction of fertilizer inputs without significant drops in crop yields can be established.

**15. Jonathan L. Blandford, Rachel L. Cary, Kim B. Garrett,
Derek W. Morgan, and John H. Krzton-Presson**

Kentucky Community and Technical College System – Owensboro

Mentor: Timothy Dick

Immunohistochemical Analysis of Polycystin 1 and Polycystin 2 in a Normal Human Kidney

Polycystic kidney disease (PKD) occurs when either the PKD 1 gene on Chromosome 16 or the PKD 2 gene on Chromosome 4 is mutated, and the individual develops kidney cysts. Polycystin 1 is a transmembrane protein in kidney cells that functions in cell-cell and cell-matrix interactions. This project evaluated the presence of polycystin 1 and polycystin 2 in normal human kidney using immunohistochemical visualization procedures in an attempt to reproduce earlier findings of Yoder (2006) in Expert Reviews in Molecular Medicine.

16. Tyler A. Blythe

Eastern Kentucky University

Mentor: Neil Pederson

Changes In Water Use Efficiency and Xylem Production of Two Pinus Strobus Plantations

Pinus strobus (eastern white pine) is a valuable timber species common throughout eastern North American forests. Understanding the relationship between climate and water use efficiency (WUE) and annual aboveground biomass production (ANPP) in this species will help us understand how it may respond to future climatic conditions. Randomly stratified permanent plots were established in the Coweeta basin in north- and south-facing watersheds planted with *P. strobus* ca. 50 years ago. From each plot, we randomly-selected two trees and extracted one increment core from each tree. Annual growth was measured on each core and regressed against climate data to determine climatic sensitivity. Cores were then separated into annual rings, which were digested to α -cellulose for stable carbon isotope analysis (^{13}C). ANPP was estimated using reconstructed annual tree diameters and allometric equations. We found that trees on the north-facing watershed were more productive compared to trees in the south-facing watershed during the first 30 years. After this time, however, the difference between the two watersheds began decreasing, and in the early 1990s, trees in the south-facing watershed became more productive. This change in radial growth trend coincided with a change in estimated watershed evapotranspiration. The south-facing watershed appears to be using water more conservatively while out-producing the north-facing watershed, indicating that WUE has been increasing over time. These results could imply that trees in the south-facing watershed have acclimated to the higher levels of water stress and are able to maintain productivity without requiring as much water. If evaporative demand continues to increase as a result of climate change, the south-facing watershed might continue to out produce the north-facing water.

17. Lindsay Bonds, Glade Brosi, Derick Compton, Jason Hodge, and Mary Profitt

Eastern Kentucky University

Mentor(s): Alice Jones and Reagan Weaver

Right Fork Beaver Creek Monitoring Project: Undergraduate Research Experiences in an Applied Setting

The Eastern Kentucky Environmental Research Institute is conducting a year-long assessment of the Right Fork of Beaver Creek in Floyd and Knott Counties under contract with the Kentucky Division of Water. The year-long study began in March 2007 and consists of one- to two days of monthly water sampling at 33 sites throughout the watershed. Beaver Creek and its tributaries are on the state's 2006 303(d) List of Impaired Waters for not meeting the designated-use standard for primary contact recreation (swimming) and/or warm water aquatic habitat for conditions including: nutrients, organic enrichment (sewage), pathogens, pH, and sedimentation/siltation. Data from this study will help the Kentucky Division of Water develop a "total maximum daily load" or TMDL report for the watershed that will incorporate details of the impairment(s), watershed characteristics and a general implementation plan to address the impairments and improve conditions in the watershed. To date, twenty undergraduates from disciplines including environmental health sciences, agriculture, geography, mathematics, anthropology, sociology and biology have been trained and employed as field research assistants. We will overview the Institute's efforts to provide a diversity of students with real-world experience in proper scientific practices, methods in watershed assessment and evaluation, as well as a genuine understanding of the changing ecosystem in the Appalachian area. We will summarize the preliminary findings of the project, and highlight the experiences of several undergraduate participants and how the project has influenced their academic and professional plans.

18. Catherine Bozio and Krishna Vyas

University of Kentucky

Mentor(s): Marius Sumandea, Mary García-Cazarín, and Amelia Sumandea

STUDY 1: *A Novel Interaction of PKA Regulatory Subunit I-A With Cardiac Troponin T* - Congestive heart failure is the leading cause of death in the United States and the western world. Heart failure develops when the heart muscle becomes too weak to pump enough blood to meet the body's demands. Intriguingly, very little is known about the mechanisms that underline the decline in heart function. My research efforts, therefore, were focused on increasing understanding of the mechanisms that govern the regulation of the heart. The ability of the heart to pump blood is largely determined by the association of two proteins, myosin and actin, which are regulated by the protein complex troponin. My research efforts focused on elucidating what cellular molecules interact with troponin and modify its function. I used the yeast two-hybrid system to prove the interaction between two proteins. First, I engineered yeast cells to carry the human troponin T (TnT) gene. I screened a human heart library for genes that associate with TnT; ten gene products were identified. This screen showed, for the first time, that protein kinase A (PKA) associates with TnT. TnT serves as an anchor for PKA that essentially switches troponin I (TnI) "on." This activation of TnI leads to improved relaxation of the cardiac muscle. Because there are two different PKA proteins in the cell (PKA-RI and PKA-RII), I wanted to differentiate them in terms of association with TnT and to identify what portion of TnT interacts with each PKA. I produced four different fragments that cover the full length of TnT and tested for their association with PKA-RI and PKA-RII. My data showed that PKA-RII binds tighter than PKA-RI, and they seem to associate with the same fragment of TnT.

STUDY 2: *PKC-Dependent Phosphorylation of Cardiac Troponin T* - Heart failure is the leading cause of death in the United States. According to the Heart Failure Society of America, an estimated 400,000 to 700,000 new cases of heart failure are diagnosed each year. Heart disease is the number one killer in Kentucky; over 12,000 people in Kentucky died of heart disease in 2000. Hypertension, diabetes, and missense mutations often lead to heart failure. When heart performance is affected by such conditions, the heart responds by increasing myocyte (heart cell) size and cause a greater volume of blood to go through the heart (chamber dilation). This compensatory mechanism is collectively termed, "remodeling"; the remodeling process works to preserve pump function in disease state. Although cardiac remodeling can initially be beneficial to heart function, it can eventually become maladaptive, and ultimately lead to heart failure. Mounting evidence supports the overall hypothesis that troponin phosphorylation is a key mechanism involved in the contractile dysfunction associated with heart failure. Phosphorylation of thin-filament regulatory proteins cardiac troponin I (cTnI) and troponin T (cTnT) is known to depress muscle fiber ATP consumption rate and force generation. Our long-term goal is to elucidate signal transduction and cellular and molecular mechanisms by which phosphorylation of troponin leads to alterations in cardiac muscle function and ultimately to heart failure and to identify new therapeutical targets.

19. Kelly Brannon

Murray State University

Mentor(s): Tony Brannon and David Ferguson

Ethanol: Fueling America's Future

Switchgrass will soon be fueling America by producing cellulosic ethanol with its high content of cellulose and adaptability to many different climates and soil conditions. The production of this grass is in its infancy and research for maximum yields is needed. Upwards of 10,000 acres of switchgrass will be needed in Kentucky and surrounding states in the next 5 years. With a seeding rate of 8 pounds per acre at a cost of \$12-\$16 per pound this will be a major cost of establishment. Seed production of the highly acclaimed Alamo variety is the main focus of this research. The research project, a joint project with the University of Tennessee, consists of determining the seed production capabilities of a three year old field of switchgrass, a comparison of seed production from a one-cut forage system verses a two-cut system, and a test of the efficiency of direct harvesting by a specially prepared combine using manually harvested and threshed test plots as a control. There will be 3 replications of combine harvesting in both the one-cut and two-cut systems along with 4 replications of 3 different treatments in the manually harvested and threshed test. Results will be disseminated to the agricultural community to provide needed data in this new crop usage.

20. Kathryn Braun

University of Kentucky

Mentor(s): Richard Smith, Caitlin Annie, and Jane Powell

The Neural Connection Between Envy and Schadenfreude- A fMRI Study

The present study examines the connection between the social emotions of envy and schadenfreude, pleasure over another's misfortune, within the brain. In a recent study by Singer, et al. (2006), activation of the areas of the brain known for the generation of emotions such as empathy was captured; empathy was provoked by a physical misfortune, shock. The present study attempted to capture the emotions provoked by a social misfortune. Consisting of four phases, this study holds the manipulation of envy consistent through all phases in order to generate the feeling of schadenfreude within participants. Envy is manipulated in Phase I through 24 fictional applications. Participants react via paper and pencil measures to these applications; applicants' descriptions and pictures contain high or low envy characteristics. In Phase II, participants revisited the fictional students while in a 3 Tesla MRI machine. In Phase III, participants found new information while in the MRI machine; they were told whether or not the students had been accepted or denied the position for which they were applying. In Phase IV, participants were asked to recall details about the applications and to state their feelings toward each fictional student. The researchers expected with increased status that there would be increased envy. There should be expression of schadenfreude if the person of higher status is rejected. In a pilot study of 11 participants, activation areas of the emotion and pleasure centers suggested that these predictions may lead to significant findings at the conclusion of the study.

21. Leslye S. Brent

Kentucky State University

Mentor(s): John Sedlacek and Karen Friley

Populations of Lady Beetles and Green Lacewings in Sweet Corn Grown With Organic, Conventional or Biotechnology Enhanced Cropping Methods

Important insect pests in sweet corn fields include corn earworm, *Helicoverpa zea*; European corn borer, *Ostrinia nubilalis*; southwestern corn borer, *Diatraea grandiosella*; and fall armyworm, *Spodoptera frugiperda*. Lady beetles and green lacewings, *Crysoperla carnea*, are predators of the eggs and small larvae of these insect pests. Sweet corn was grown using organic, conventional, and genetically engineered production practices. Concerns regarding negative impacts on biodiversity and non target beneficial insects in genetically engineered crops have been raised. Therefore, the objective of this research is to determine lady beetle species composition and abundance and green lacewing abundance in the three cropping methods of sweet corn. Yellow sticky traps 232 cm² in area were used to capture flying insects at tassel and silk height during anthesis. Four sticky traps were placed within the middle row of the center subplot in each replicated plot. Sticky traps were serviced weekly for three weeks. Pink lady beetle, *Coleomegilla maculata*, was the most abundant lady beetle caught followed by the Asian multicolored lady beetle, *Harmonia axyridis*. The spotless lady beetle, *Cycloneda munda*; mildew eating lady beetle, *Psyllobora vigintimaculata*; seven-spotted lady beetle, *Coccinella septempunctata*; parenthesis lady beetle, *Hippodamia parenthesis*; variegated lady beetle, *Hippodamia variegata* and green lacewings, were captured but were not abundant. Significantly greater numbers of pink lady beetles, Asian lady beetles and seven spotted lady beetles were found in organic than conventional or BT sweet corn plots. Results will be discussed within the context of vegetation and treatment differences among the three cropping systems.

22. Zachary Brian, Kelly Harris, and Courtney Harris

Murray State University

Mentor: Kate He

Uncovering the Mechanism of Plant Invasion by Employing a Comparative Biophysical Traits Study of Exotic (*Lonicera japonica*) and Native (*Lonicera sempervirens*) Honeysuckle Species

Biological invasion, one of the major processes of global change, is continuously rising in its intensity in the biota. With an estimated \$137 billion annual deficit in the U.S. alone, an urgent need to understand this change and the factors influencing its severity are essential. In this study, we worked to understand what makes exotic invasive species superior to their native counterpart by targeting morphological, physiological, and reproductive traits of invasive (*Lonicera japonica*) and native (*Lonicera sempervirens*) honeysuckle species. By examining and comparing multiple traits of both species, we were able to test the hypothesis that invasive species outperform native species owing to their possession of suites of advantageous biophysical traits. Our preliminary results indicated that significant differences exist in both leaf morphological/physiological traits and reproductive characters. We concluded that combination of advantageous traits enable the invader to perform successfully in the invaded ecosystems. By identifying traits associated with invaders, further conservation methods can employ steps in saving native species from extinction.

23. Lecia Brown

University of Louisville

Mentor: Chet Tailor and Naveen Hussain

Understanding the Evolution of Pathogenic Feline Leukemia Virus C

FeLV is a member of the retrovirus family characterized by transcribing RNA into DNA using the enzyme reverse transcriptase. In a retrovirus the env domain of the 3 part retrovirus genome codes for the Surface Glycoprotein, composed of RBD, PRR, and C domain, and the Transmembrane Protein. My experiments focus on the role of the RBD, which determines the receptor specificity and the PRR which forms a hinge between RBD and the c-domain. Past research on FeLV have shown that these viruses could be more efficient vectors for gene therapy than the presently used MLV due to better infectivity they have on human hematopoietic stem cells. There are 4 subgroups of FeLV: A, B, C and T with key focus is on subgroup A, which can be transmitted from cat to cat and C is formed by mutations. FeLV-A, the most common type of the virus, uses the receptor THTR1 a thiamine transporter and FeLV-C uses FLVCR1 a heme exporter receptor. To study the evolution of pathogenic FeLV-C from FeLV-A our lab obtained a variant of FeLV-A FA27-53 with expanded host range to pigs. This project is to find whether FA27-54 uses an alternate receptor by determining the receptor(s) to infect pig cells. Using PCR the envelopes of FeLV-A 61E, FA27-53 and FeLV-A CL-29 were isolated and inserted successfully into a pFBNeo vector. These plasmids were then used to transfect CCC feline and StIowa pig cell lines and treated with G418.

24. Karen Burwinkel

Northern Kentucky University

Mentor: David Thompson

Cytochrome P4501A1 and Arsenic in Benzo(A)Pyrene-Induced Carcinogenesis

The environmental pollutants arsenic and benzo(a)pyrene (BaP) are well-known human carcinogens commonly found together in substances such as cigarette smoke. Arsenic is usually addressed as a non-mutagenic co-carcinogen, with the potential to enhance the effects of mutagens such as BaP, although the mechanisms remain unclear. BaP exerts its carcinogenic effects by forming DNA adducts, leading to DNA replication errors and mutations. The detoxification of BaP in the liver is a multi-step process requiring several enzymes, notably cytochrome P4501A1 (CYP1A1). Furthermore BaP is a potent inducer of transcription of the CYP1A1 gene. Interestingly, depending upon the pathway of action by CYP1A1, BaP may undergo chemical activation into its ultimate carcinogenic metabolite, benzo(a)pyrene-7,8-dihydrodiol-9,10-epoxide (BPDE). In this study we examined the impact of arsenic on CYP1A1 activity during BaP exposure, utilizing zebrafish (*Danio rerio*) as a model species. Co-exposure of zebrafish to arsenic and BaP led to decreased CYP1A1 activity when compared to BaP alone, as measured by the EROD assay. The effect is likely transcriptional, as quantitative PCR detection indicated a decrease of CYP1A1 transcript in zebrafish exposed to both arsenic and BaP when compared to BaP alone. This observed impact of arsenic on CYP1A1 activity may alter cellular levels of BPDE, thus potentially influencing BaP-induced carcinogenesis.

25. Christopher Joseph Carrubba

University of Louisville

Mentor: Todd William Vitaz

Treatment of Metastatic Melanoma to the Brain

Melanoma is the sixth most common form of cancer in the United States. Moreover, it is the third most common type of tumor to metastasize into the brain. Clinical studies have shown that 10-40% of patients with melanoma will eventually develop metastatic disease within the brain. In addition, the number of patients afflicted with brain metastases continues to rise as advances in chemotherapy provide increased survival time for patients with other forms of systemic disease. Still, the prognosis for patients with brain metastases remains poor. Melanoma is largely radioresistant, thus limiting treatment options. Studies have shown that as many as 90% of patients will die as a result of their intracranial disease. Left untreated, most patients show rapid deterioration and subsequent death. Even with treatment, the median survival time is two to three months. The goal of therapy for the treatment of metastatic melanoma is to provide palliation of symptoms and prolongation of survival. Current methods of treatment consist of Whole Brain Radiation Therapy, Stereotaxic Radiosurgery, chemotherapy, immunotherapy, and surgical resection of the intracranial lesion. Recent clinical trials have examined the effects of combined treatments. Evidence has indicated better results when two or more treatment options are used together. In this retrospective study, we attempted to evaluate the effects of planned radiosurgery or radiation treatment following surgical resection of the primary lesion in 38 patients. We compared these results against treatment with surgery or radiosurgery alone. Results indicated that surgery was most effective when followed by planned radiation or radiosurgery. This minimized the risk of remaining tumor foci and provided treatment to other, smaller lesions. Patients receiving these combined treatments had greater survival rates, fewer postoperative symptoms, and a lower incidence of disease recurrence when compared with patients treated only with surgery or radiosurgery.

26. Stephen Carter, Aaron Holmes, Brent McDaris, and Brent Stubblefield

Western Kentucky University

Mentor: Chris Byrne

WKU Autoloader Project

The purpose of this project was to design, build, and test a device that would automatically load test samples into an aluminum sheet testing machine. The device was used by lab technicians to automatically load a testing machine that monitored the grain texture of aluminum samples to maintain an acceptable level of quality. This design project was sponsored by a local industrial manufacturer, who coordinated design requirements and specifications. Major goals of the design include the ability for the device to grab an aluminum sample, scan a barcode, lubricate that sample, and place the sample in the correct location for the aluminum sheet tester. Additional design requirements were for the device to have its own support structure, include a storage rack for samples, and be effective in handling a range of thicknesses from 0.005" to 0.015". Some other desired constraints were to keep the footprint of the device to a minimum and provide mechanical and electrical drawings of the completed system.

27. Janice C. Clayton

Eastern Kentucky University

Mentor: Kathryn Scarborough

The Portrayal of Women in Prime-Time Crime Dramas: A Content Analysis of Law and Order Special Victims Unit

There is little research on the portrayal of women and the evolution of their roles in crime dramas on prime-time television. This research explores the current portrayal of women in speaking roles in the prime-time crime drama Law and Order: Special Victims Unit. This research explores the evolution of women's roles using episodes from the first, fifth and seventh seasons spanning from 1999 - 2006. All women with speaking roles were coded for multiple characteristics including occupation, marital status, and personality traits. Initial findings show that, although progress has been made regarding the portrayal of women on prime-time television, many trends that were present in research conducted over a decade ago are still present in the portrayal of women today. Males still outnumber females by 20%. There has been only a minimal change in the number of Hispanic and Asian women in prime-time television which shows that there is still a lack of diverse representation of women in prime-time television.

28. Matthew Cohen, Taylor Baldwin, Amy Soloman, and Pamela Vasquez

University of Kentucky

Mentor(s): Susan Barron and Ana Hutton Kehrberg

STUDY 1: Learning and Memory Deficits Are Attenuated by the Nmda Receptor Antagonist, Cp-101,606, in a Rodent Model of Third-Trimester Alcohol Exposure

Fetal Alcohol Syndrome (FAS) is the leading preventable cause of mental retardation in the U.S., with estimated costs exceeding eleven billion dollars annually. Hence, there is a great need for interventions capable of lessening the impact of fetal alcohol exposure. Long-term behavioral impairments displayed by children with FAS include a variety of learning and memory deficits. This study used a rodent model of 3rd trimester alcohol exposure to evaluate a pharmacologic intervention designed to reduce such deficits. One mechanism that may be responsible for some of alcohol's damaging effects occurs during alcohol withdrawal when the n-methyl-d-aspartate receptor displays overexcitation resulting in cell death. It was hypothesized that blocking this overexcitation (using CP-101,606 obtained from Pfizer) could reduce excitotoxicity and improve behavioral outcomes. For this 3rd trimester model, rat pups were given alcohol added to a milk solution during the first week after birth. On postnatal day (PND) 8, CP was administered during alcohol withdrawal, producing 5 treatment groups: ALC (6g/kg/day), CP (15mg/kg), ALC+CP and two control groups. Animals were tested on two consecutive days (PND 40-41) in a water maze test assessing spatial learning and memory. While the alcohol-exposed offspring showed deficits on this task, those receiving alcohol + CP performed better than the alcohol-exposed offspring, suggesting that CP-101,606 may be a useful treatment for reducing some damaging effects of fetal alcohol. Although CP appears promising, further investigation is needed to determine its clinical relevance and efficacy in other behavioral deficits.

STUDY 2: Lobeline Dose-Dependently Reduces Hyperactivity in a Rodent Model of Third Trimester Alcohol Exposure

Children diagnosed with Fetal Alcohol Syndrome (FAS) often display hyperactivity and are diagnosed with attention deficit hyperactivity disorder (ADHD). The available data suggest that the traditional stimulant drug therapies for treating ADHD (e.g Ritalin) may be only moderately effective in children with FAS. This has lead researchers to look for possible nonstimulant or alternative medications for this unique population. Lobeline, derived from the native plant *Lobelia inflata*, can inhibit both nicotine- and cocaine-induced hyperactivity in adult rats. This study examined whether lobeline could reduce hyperactivity following prenatal alcohol (ALC) exposure. For this 3rd trimester model, Sprague-Dawley rat pups were given ALC (6 g/kg/day) or a control diet twice daily during the first week after birth. A non treated control group was also included. On PND 21 & 22 (~weaning age), rats received an injection of either saline or lobeline (.3 mg/kg or 1.0 mg.kg) and activity was measured for 30 min in a round open field chamber. ALC exposed pups displayed hyperactivity on the first day of testing and lobeline dose-dependently reduced this. Lobeline treatment alone had no effect on activity. These data suggest that lobeline may be a viable treatment for fetal ALC-induced hyperactivity in our rodent model. Further work will determine if this is a potential alternative treatment for other FAS related deficits or of clinical use with fetal alcohol exposed children.

29. Lauren A. Collins

Kentucky State University

Mentor(s): Kirk Pomper, Li Lu, Jeremiah Lowe, and Sheri Crabtree

Assessment of Clonality in Native Kentucky Pawpaw Patches Using DNA Markers

Pawpaw [*Asimina triloba* (L.) Dunal] is a fruit tree native to the Southeastern area of the United States and could possibly be a new potential crop for farmers in Kentucky. Kentucky State University serves as the USDA National Clonal Germplasm Repository, or gene bank, for pawpaw. Assessing genetic diversity and evaluating pawpaw germplasm for the repository collection is a top priority. Pawpaw is usually found in the understory of hardwood forests, often in large patches. Pawpaw forms rootsuckers and therefore it has been suggested that most pawpaw patches are clonal in nature. Clonality of patches would affect sampling strategies in assessing genetic diversity. The objective of this study was to use intersimple sequence repeat (ISSR) markers to determine if DNA fingerprint patterns indicate that all trees in a patch are clones. Leaf samples were collected from trees in three native patches in central Kentucky. DNA was extracted from leaves using a Dnamite plant kit. The DNA concentration was quantified, and diluted to 1ng/ul. The diluted DNA was amplified by the polymerase chain reaction (PCR) using the ISSR primers UBC841T or UBC841C and then run on a 2% agarose gel overnight to separate PCR products. The gel was stained with ethidium bromide, photographed and scored. DNA finger prints identified at least two genotypes in each patch, indicating the patches were not entirely clonal. This information will impact future sampling strategies in assessing genetic diversity in pawpaw.

30. Nathan W. Cook

Kentucky Community and Technical College System – Owensboro

Mentor: Micah Perkins

Bat Research Techniques and Bat Diversity of Jenny Hole Wildlife Management Unit

Bats are important predators of insect pests, and bat presence and populations can indicate the health of an ecosystem. Fourteen bat species are found in Kentucky, including three endangered species. A research technique and bat diversity study was implemented at Jenny Hole Wildlife Management Unit in Henderson County, Kentucky. Bat species were captured from July to September 2007 at dusk using mist nets placed over streams and open areas. Individual weight, forearm length, hind foot length, and gender were determined, and species were identified by using physical trait inspections. Thirty-two bat captures were made, consisting of the eastern red bat (*Lasiurus borealis*), northern long-eared bat (*Myotis septentrionalis*), and evening bat (*Nycticeius humeralis*).

31. Stuart Cook, Jason Birkhead, Josh McCombs, and David Thompson

Western Kentucky University

Mentor: Chris Byrne

Robotic Arm Positioning

The purpose of this project was to design, build, and verify the performance of a system that would improve production efficiency in the production of brake drums. This system was operated by a designated employee, and allowed for the rapid replacement and accurate orientation of a robotic arm during the manufacturing process. This project was sponsored by a regional industry, which issued specific design requirements and provided information pertaining to the existing system. The main goal of our design was to save our customer both time and money by improving an already functional production process. The current procedure for accurate positioning is slightly more tedious than our customer would like. Decreasing down time would potentially increase production, which would reduce production cost. In addition, precise positioning would ensure the quality of the finished product. Our team accomplished our design goals by paying special attention to our customer's specifications, the current system in place at the factory, and any input provided by our customer.

32. Patrick Craft

University of Kentucky

Mentor: Scott Bryson

Role of Interleukin-17 in Intestinal Inflammation

Graft-versus-host-disease (GVHD) is a common complication of a genetically different or allogeneic bone marrow transplantation (BMT) in which graft cells elicit an immunological response that destroys host tissue. To inhibit the development of GVHD following allogeneic BMT, immunosuppressive agents such as cyclosporine A (CsA) were administered. Interestingly, CsA was also used to induce a GVHD-like disease in mice that had received a syngeneic or genetically identical bone marrow transplant. Syngeneic GVHD (SGVHD) was induced following lethal irradiation, reconstitution with syngeneic bone marrow, and treatment with a 21-day course of CsA. The clinical symptoms of SGVHD were characterized by weight loss, runting, hunched posture, and severe diarrhea with target organs being the liver and colon. This model was utilized to study immune regulation and intestinal inflammation. Syngeneic GVHD is thought to be driven by the enhanced expression of specific pro-inflammatory cytokines. Cytokines are a group of proteins and peptides that are used in organisms as signaling compounds, allowing one cell to communicate with another. The complex differentiation pathway of the naïve CD4+ T-helper cells involved a number of cytokine interactions. Until recently, it was thought that only two subsets of effector T-helper cells existed. However, recent studies have demonstrated the discovery of a third helper T-cell population, TH17, that produces the cytokine interleukin 17 (IL-17). IL-17 producing T-cells can drive various pathologies including intestinal inflammation. Preliminary studies in Dr. Scott Bryson's laboratory have suggested involvement of TH17 T-cells in the pathology associated with SGVHD. Molecular, proteomic, and immunoblockade studies will be utilized to determine if TH17 immunity is involved in the development of SGVHD.

33. Cody Curtsinger, Ryan Simpson, Kyle Hampton, Justin Morris and Adam Ayer

Western Kentucky University

Mentor: Kevin Schmaltz

Green Energy Consulting

Green Energy Consulting, a senior design team from Western Kentucky University, was given the task of completing a project which included designing and building a system to produce bio-diesel that meets ASTM specifications (ASTM D6751-07a) from waste vegetable oil from dining facilities on Western's campus for use by the Western Kentucky University Agriculture Department. The dining facilities at Western Kentucky University produce approximately 1000 gallons of waste vegetable oil each month while school is in session, and the consumption rate of the Agriculture Department is expected to be around 9000 gallons per year. Major goals of the design included having enough bio-diesel production to satisfy the consumption needs of the agriculture department as well as having the capability to consume all of the used vegetable oil from Western Kentucky Universities dining services. By using waste vegetable oil to produce bio-diesel, there would be a reduction in the operating cost of the Agriculture department's diesel fleet, while at the same time the cost associated with disposal of used vegetable oil would be eliminated or greatly reduced. However, the major long-term outcome of this project was initiation of the transition at Western Kentucky University from fossil fuels to renewable sources for its energy needs.

34. Josh DeArmond and Andrew Hughes

Western Kentucky University

Mentor: Joel Lenoir

Bio-Generated Greenhouse Heating System Phase II

The project goal was to construct a greenhouse that uses thermal energy from an active compost heap to heat beds of sand within the greenhouse that potted plants will set upon. This design should reduce the amount of electricity that is required to keep the greenhouse warm in the winter while using energy that otherwise would be lost to the atmosphere. The design project was sponsored by the Western Kentucky University Agricultural Department and funded by the USDA/ARS. Major goals of the project included: construction of the greenhouse and the plant beds which occupied it, construct an external concrete pad to capture the waste heat from the compost, construct and test a functioning flow control system, and design a control system to monitor flow and temperature of the working fluid.

35. Matt Dennis

Murray State University

Mentor: Claire Fuller

The Effects of Water Quality on the Immune Function of Plathemis Lydia

Immune suppression of an individual may be an early indicator of environmental stress that could lead to the disappearance of a species. Many invertebrates cover foreign objects in their bodies with a layer of immune cells in a process known as encapsulation. The amount of encapsulation of the parasite can be used as a measure of the immune status of the animal. We are researching the correlation between immune status of *Plathemis lydia* larvae and organic and inorganic pollutants levels obtained from thirteen ponds in western Kentucky. A piece of monofilament was inserted into the body cavity of each larva collected and removed 24 hrs later. Once dissected out of the dragonfly, the monofilament was photographed under a bright-field microscope. The photograph was then analyzed using UTHSCSA Image tool for Windows which measures the area of encapsulation in number of pixels. The degree of encapsulation of each individual was measured taking into account the effects of body size on immune function. The results are currently under analysis. We predict that there will be a negative correlation between encapsulation and water quality, suggesting that dragonflies undergo immune suppression in condition of poor water quality. The results of this research will establish data that will be used in laboratory testing of pollutant effects. This research is part of a larger project to determine whether immune status and developmental symmetry can be used to provide an early warning system of habitat degradation via pollution.

36. Jill Denny and Sharon Trew

Eastern Kentucky University

Mentor: Jonathan Gore

The Relationship of Personality Traits and Motivation behind Study Habits

This study examined whether or a positive relationship exists between personality traits and motivation behind study habits. Participants were psychology students enrolled in summer courses at Eastern Kentucky University in 2007. Students received credit from the professors of the summer courses in which they were enrolled. Participants completed a compiled survey that assessed demographic information, attachment style, self-construal, social isolation, locus of control, school connectedness and the style and reasoning behind their study habits. It was predicted that self-definitions based on social connections would be positively associated with studying for relational reasons, and self-definitions based on being independent from others would show a positive association with studying for individualized reasons. Results yielded positive associations between relational self-definition and relational reasons for studying, high school connectedness and personal reasons for studying, and internal locus of control was positively associated with both personal and relational reasons for studying, but more so for relational reasons. Also, relational self-definition, internal locus of control, and school connectedness were positively associated with studying. Finally, results yielded an Attachment Style X Relational Reason interaction effect on studying.

37. E. Brady Doepke and Matthew Gilbertson

University of Kentucky

Mentor(s): Kent Price and John Vranish

Magneto Rheological Fluid-Based Conformal Gripper

The Magneto-Rheological Fluid (MRF) based Conformal Gripper is a new mechanical system designed to manipulate objects of varying sizes and shapes in an unstructured environment. The system resembles a vice with a pad or bladder of MRF contained by a frame on five sides on each side of the vice. The MRF has the special ability to change states from a liquid to a solid when a magnetic field is applied across it. In the Conformal Gripper the two bladders in the liquid state come together forming around the object, at this point a magnetic field is applied and the MRF changes to a solid. This allowed the gripper to move, pull, or torque the object. Once desired manipulation was completed the magnetic field was turned off and the two sides of the gripper open released the object. The Conformal Gripper system can be thought of in three fundamental parts: the vice and frame, magnet and controls, and the bladder and fluid. These three subsystems when combined form a unique innovative solution to object manipulation in unstructured environments.

38. Mallory Draughn

Morehead State University

Mentor: June Grice

The Correlation of Howard Gardner's Theory of Multiple Intelligences and the Intelligences Exhibited by College Musicians

The cognitive framework of musicians' brains may utilize unique intelligences as compared with the general population. This research evaluated Morehead State University music students' intelligences as defined in Howard Gardner's Theory of Multiple Intelligences. Gardner theorizes that people excel in various intelligences, such as musical or kinesthetic areas. He also states that each person may excel in more than one area; these intelligences are not exclusive. In order to determine if musicians have a stronger aptitude for musical and interpersonal intelligence, this research used the MIREsearch (Multiple Intelligence Research Consulting) National Basic Research Package. The subjects were college age musicians (twenty-years-old and above) at Morehead State University in Morehead, Kentucky. The research provided data to show relationships between musicians, musical intelligence and interpersonal intelligence. Data were assessed to determine if there is indeed a relationship between these two intelligences and students' musical pursuits.

39. Walter Blaine Early, IV.

University of Kentucky

Mentor(s): James Wade, Jr. and Benjamin Withers

Cast Iron Sculpture Workshops at the Ironbridge Open Air Museum of Steel Sculpture and related "Iron Works" Exhibition

For the past four summers I have helped lead the Cast Iron Sculpture Workshop Series at the Ironbridge Open Air Museum of Steel Sculpture in Coalbrookdale, England as Crewmember and Workshop Advisor. The Workshops consist of 4 weeklong courses that are attended by international artists of all levels. Artists produce new works of sculpture while simultaneously learning the process of casing iron through hands-on instruction. Many of the participants have almost no foundry experience, so my role is to assist and guide them as they explore the process and medium of cast iron. My recent research at the Museum has focused on the product - the cast, sculptural object - rather than the casting process. As part of this focus, I have organized an Exhibition of sculpture produced by 10 artists (5 from the United States and 5 from the United Kingdom) that have been repeat Workshop participants and/or crewmembers. The British contingent consists of established, professional sculptors while the United States representatives are in the beginning stages of their careers. My hope is that this mix will display not only the quality of sculpture produced by the Workshops, but also the many different approaches to creating work using the process. The Exhibition will travel to 4 different venues (including the Museum of Iron, as part of the 300th anniversary of Abraham Darby's historical innovation, and the Royal Society of British Sculptors) around England over the next two years. My presentation will include images of all phases of the production of cast iron sculpture and will focus on the pieces produced for the Exhibition. Images will include the range of activities from initial concept, through pattern building and mold construction, casting and final preparation.

40. Carrie Elliott, David Crouch, David Hayden, Teresa Ferguson, Justin Parrish, Robert Stuard, Isaiah Story, Kaleb Tapp, Lauren Thompson, and Bryan Craig

Murray State University

Mentor(s): Iin Handayani, David Ferguson, Andy Bailey, Bobby Hill, Whitney Peake, Tim Lax, and Tony Brannon

STUDY 1: *Dark Fired Tobacco Responses to Different Nitrogen Fertilizers* - Nitrogen plays an important role for tobacco production. Different fertilizers with various ratios of nitrogen, phosphorus, and potassium were used to improve dark fired tobacco yields. The fertilizers used were: Hydro Plex (N-P-K;14-0-14), K Nitrate(N-P-K;13.5-0-45), Ca Nitrate(N-P-K;15.5-0-0), Triple 15(N-P-K;15-15-15)and Am Nitrate(N-P-K;34-0-0). The fertilizer rates were: 13.1, 13.6,11.8,12.2, and 5.4 lbs/plot, respectively. The objective of this research was to determine the effect of different N-P-K commercial fertilizers on tobacco's yield and vigor. Our presentation will describe how important the role of N-P-K commercial fertilizer is for the tobacco's growth and yield. Complete data will be provided.

STUDY 2: *Comparison of Residual Herbicide Programs for Dark Tobacco 2007* - This experiment compares different weed control methods for dark-fired tobacco by herbicide use for the years 2006-2007. Similar experiments were conducted in both years. There were nine treatments that were replicated four times. Each plot was four rows wide and forty feet in length. Every treatment was applied at rates according to their label in 15 gallons of water per acre. The nine herbicide treatments were applied just prior to setting the tobacco transplants. Treatment No.1 was a 0.375 lb. per acre of sulfentrazone (Spartan 4F) application. Treatment No. 2 was a 1.0 lb. per acre of clomazone (Command 3ME) application. Treatment No. 3 was a combined application of 0.375 lb. per acre of sulfentrazone and 1.0 lb. per acre of clomazone. Treatment No. 4 was a 1.485 lbs. per acre of pendimethalin (Prowl 3.3EC) application. Treatment No. 5 was a combined application of 0.375 lb. per acre of sulfentrazone and 1.485 lbs. per acre of pendimethalin. Treatment No. 6 was a 4.0 lbs. per acre of pebulate (Tillam 6E) application. Treatment No. 7 was a 2.0 lbs. per acre of napropamide (Devrinol 50DF) application. Treatment No. 8 was a combined application of 4.0 lbs. per acre of pebulate and 2.0 lbs. per acre of napropamide. Treatment No. 9 was an untreated control plot. The plots were harvested October 2. Weed control ratings and yields for 2006 and 2007 will be analyzed statistically.

STUDY 3: *Ridomil and Quadris Applications in Dark Tobacco* - In collaboration with the University of Kentucky, Murray State University set twenty test lots of dark tobacco to determine if the yield and quality of tobacco could be enhanced with the use of a fungicide. Both Ridomil Gold 480SL, a fungicide designed for the control of specific diseases spurred by the Oomycete class of fungi, and Quadris, a reduced-risk fungicide for broad spectrum disease control, were tested in various capacities throughout the treatments. A blanket application of Ridomil Gold was applied to each test plot preplant on June 1, 2007. The Narrowleaf Madole variety was set in the test plots on June 6, 2007, using 40-inch rows and 32-inch plant spacing. The first treatment incorporated only the Ridomil Gold preplant; however, treatments two through five also applied either Ridomil Gold or Quadris during cultivation. Treatments two and three incorporated Ridomil Gold at a rate of one pint per acre during cultivation. Treatment three further applied one pint per acre of Ridomil Gold during the last cultivation on July 17, 2007. Treatments four and five incorporated Quadris at a rate of 18.6 oz. per acre during cultivation, with treatment five further including an 18.6 oz. per acre application during the last cultivation on July 17. Once the tobacco has been stripped and weighed, the results will demonstrate whether applying either or both of these fungicide chemicals is beneficial to producers in terms of enhanced production.

41. Jake Elliott and Courtney Thomason

Murray State University

Mentor: Terry Derting

GIS Analysis of Lyme Risk in Kentucky

Lyme disease affects many people every year, but data on the impact of Lyme disease in Kentucky are limited. Our objective was to create a GIS (Geographic Information System) model predicting risk of Lyme borreliosis throughout Kentucky. This model is based on presence of *Peromyscus leucopus*, the primary reservoir species of the Lyme spirochete, in addition to their immunocompetence, conditions of the surrounding landscape (i.e. disturbance, etc.), and a dilution effect. Previous research suggests that disturbance and habitat fragmentation, affect immunocompetence of *P. leucopus*, thereby increasing their vulnerability to Lyme disease. Using a GIS and Kentucky Gap Analysis Project data, we identified disturbed and undisturbed habitat patches found within the geographic range of *P. leucopus*. Disturbed and undisturbed habitat was classified using Kentucky stewardship data. Patches were then ranked based on area, with small patches carrying a higher Lyme disease risk. Weighted averages of patch sizes were calculated by area in each EcoRegion to determine a relative risk for Lyme disease. Our results suggest there is a moderate risk of Lyme disease throughout the state of Kentucky based on presence of *Peromyscus leucopus* and their immunocompetence, habitat disturbance, habitat fragmentation, and habitat patch size. Future analysis will incorporate a dilution effect by examining the impacts of the presence of the gray squirrel, *Sciurus carolinensis*, and the short-tailed shrews, *Blarina brevicauda* and *Blarina carolinensis*, on our model of Lyme disease risk.

42. Zachary Elmore, Adam Duley, Mikel Headford, and Christopher Muncie

Murray State University

Mentor: Suguru Nakamura

The Distribution of Gastric Renal H⁺-K⁺-ATPase in the Outer Medullary Collecting Duct of Hyperglycemic Wild Type Mice as Shown by Immunocytochemical Staining

The regulation of acid-base balance is known as homeostasis, and the kidneys play an important role in maintaining this balance. Acid secretion (proton secretion) takes place in epithelial cells of the kidney and is vital for the reabsorption and regeneration of bicarbonate that is used in metabolic acid production. We are currently studying renal H⁺-K⁺-ATPase in the OMCD. The OMCD is very important because it is the last place in which the regulation of the acid-base balance can take place. H⁺-K⁺-ATPase is a transporter which requires ATP in order to function. Its purpose is to reabsorb potassium (K) and secrete protons (H⁺), so it therefore, provides a mechanism for K conservation, while at the same time decreasing the acidity of the body. Two luminal proton ATPases, H⁺-ATPase and H⁺-K⁺-ATPase (HKA) both of which are in the intercalated cells of the OMCD, play an important role in acid-base homeostasis. It has been shown by Nakamura that HKA alpha 1 (gastric H⁺-K⁺-ATPase) is the essential H⁺-K⁺-ATPase under normal conditions, and that HKA alpha 2 (colonic H⁺-K⁺-ATPase) is induced and mediates increased proton secretion under K-depleted conditions. We are analyzing the density and distribution of the active, functioning gastric H⁺-K⁺-ATPase in the OMCD via the method of immunocytochemical staining under hyper and hypoglycemic conditions. Our data has shown that under normal conditions, the gastric H⁺-K⁺-ATPase is scattered along the cytoplasmic side of the plasma membrane in a ring shape and it is also slightly polarized to the apical membrane of the intercalated cells of the OMCD.

43. Melanie Everman

Morehead State University

Mentor: Roma Prindle

Modern Vocal Pedagogues

There have been a variety of different approaches to vocal performance and pedagogy from the very beginning of singing. The different functions and stylistic demands of singing, from sacred, to classical concert repertoire, to "background noise," have challenged all singers as to how to best produce a sound. There are several leading pedagogues that serve as guides for today's modern singers of art literature. This research specifically looked into the work of pedagogies of Richard Miller, Clifton Ware, and others. The objective of this research was to determine how different pedagogues contribute to the variety of styles of singing apparent in today's leading opera houses and schools of singing.

44. Autumn Farley

Kentucky Community and Technical College System – Bluegrass

Mentor: Norman Strobel

UV-C-induced Mutants of a Fluorescent Pseudomonad Bacterium that are Impaired in their Ability to Suppress the Fungus Rhizoctonia solani in Vitro

Antifungal activity of fluorescent Pseudomonad bacteria (FPBs) has been theorized to result from their production of UV-fluorescent siderophores and a variety of other diffusible antifungal substances. Vegh and Strobel (2006) reported that fluorescent siderophore production was not sufficient for antifungal activity of various FPB strains. In this work, mutagenesis of one FPB strain (X2) was undertaken to aid the detection and ultimate identification of metabolites responsible for its antimicrobial activity. All of the 48 mutants generated produced UV-fluorescent siderophores, but 10 exhibited moderate to severe loss of antifungal activity in a qualitative assay. In a quantitative assay, non-impaired mutants reduced fungal growth by 94-97%, whereas impaired mutants reduced growth by only 55-63%, relative to no-bacteria control plates. Addition of Fe(III) eliminated siderophore production, but resulted in only a minor decrease in antifungal activity of mutants.

45. Devin Feese, Zachary Pearl, and Ross Cassity

Western Kentucky University

Mentor: Robert Choate

Power Switch Reliability Tester

This project was to design a power switch test apparatus for the Lexington-based printer company Lexmark. This tester enabled the company to assess the resilience of the electrical system of a printer when subjected to the everyday occurrence of switching the power on. The transitional period immediately after the power switch is activated is significant to the reliability of a printer's electronic systems. The reaction of the printer's electrical system during this transitional period can be significantly altered by changes to the switch. This project offered a solution that enables Lexmark to test a printer's electrical system without modifying the switch or any other component of the electrical system.

46. Rebecca Feldhaus

Murray State University

Mentor: Sonya Baker

Marian Anderson: A Voice for the Seemingly Silent

In 1955, the classical singer Marian Anderson was the first African-American to sing a lead role with the Metropolitan Opera. She was not only a pioneer for African-American singers, but also an advocate for composers of her time. During her performances, Anderson often sang contemporary works, particularly those of African-American composers, thus allowing the literature to become more mainstream. This poster, based on research completed at the Marian Anderson Collection in Philadelphia, explores those works inspired by and written for Anderson.

47. Beth Feltner, Joshua H. Sparks, Erica L. Brown, Miranda Westbrook, and Renee Thompson

Eastern Kentucky University

Mentor(s): Mixon Ware and Gregory Gunderson

Film Forums and Global Diversity Issues: Changing the World through Student Engagement and Advocacy

Recent films like *Amazing Grace* and *Blood Diamond* put a human face on complex global tensions. Rather than abstract concepts, genocide, war crimes against women and children, and human rights become real to students when they encounter them through such human characters as Solomon Vandy (*Blood Diamond*). The role of economics and policy in global tensions transcends the textbook to become a personal experience when seen from a seat on Parliament with William Wilberforce (*Amazing Grace*). Students experience the power of the individual and heroism through individuals like Paul Rusesabagina (*Hotel Rwanda*). But can movies do more? Based on research in cinemeducation, this study explored the effects of a student-sponsored film forum on student awareness, engagement, and commitment to advocacy. A student team reviewed films with implications in human rights and global justice. They collaborated in hosting a film forum where diverse student groups from multiple disciplines viewed one of the films, while a comparison group attended a presentation. Pre- and post-tests of both groups were compared. The results of the study include an evaluation of the effectiveness of both treatments, the project, and recommendations for student programs to promote student engagement and advocacy as a way to change the world ... one voice at a time.

48. Michelle Fiore

Morehead State University

Mentor: Janet Rice McCoy

What They Said About Her: Images of Womanhood in the 19th Century Press

Using the case study method, this project explored images of women in the 19th century press. The focus of this study was Miss Martha Butman who was scheduled to marry Dr. R. C. Rutherford in Milan, Ohio, on March 4, 1851. Instead of saying "I do" at the appropriate moment, Miss Butman left a jilted groom standing at the altar in a pre-meditated plan where she was escorted out of the church by another gentleman. This incident was debated in the local and regional press for one month as newspaper editors became stage managers in an unfolding drama. We know about this incident today because of what other people wrote about the bride in the press and because a small collection of letters written to Miss Butman by her fiancé, other suitors and family members have survived. This study examined what other people said about and to Miss Butman in an attempt to understand why this incident drew so much social outcry and media attention. In addition, the study examined how state laws relating to marriage and divorce may have impacted the bride's decision to avoid matrimony in order to protect her upper-class financial status. Customs relating to dress attire are also explored since one wedding guest observed that Miss Butman's "bridal gown" with feathers and a plunging neckline looked more like a "party dress." The challenge of this project was to understand the subject even though no records in her own words have survived.

49. Brittany Fiscus

Murray State University

Mentor: Terry Strieter

"Queen Marie Antoinette's Pre-Revolutionary Image: A Product of Media Fabrication or Personal Flaws"

This project looks at the relationship between Queen Marie Antoinette and the press in the years leading up to the French Revolution. The study explores whether or not much of her negative image was brought on by her own bad habits and personal flaws, and how much of it was exaggerated or even completely fabricated by the press. Primary sources from the period (including drawings, printings, cartoons, caricatures, manuscripts, pamphlets, and newspapers) as well as secondary sources, both in English and French, have been used. The effect of the Queen's negative image on the entire monarchy will be presented.

50. Michael Fitzner

Morehead State University

Mentor: Ahmad Hassan

Who's Shopping on the Internet? Examining the societal values of Online Shoppers

Societal values have long been used as important tool in predicating consumer behavior in a variety of contexts. This paper describes the results of a study that identifies the societal values of online shoppers. Results suggest that strongest predictors of potential online shopping are security, social, and achievement values.

51. Allen J. Fitzpatrick and Kristin Hausstein

Morehead State University

Mentor: Robert Frank

Comparison of German and American Political Cartoons Focusing on China

Political cartoons are powerful messages found in newspapers and magazines. These iconic images have long histories in the United States and in Europe. People believe that political cartoons are effective means of swaying public opinion. In reference to Thomas Nast's political cartoons about Tammy Hall in the 1870's, "Boss" Tweed demanded, "Stop them damned pictures!" in response to the fact that his supporters were largely illiterates who could not read, but could understand the cartoons. Outright public indignation occurs when an idea or individual one agrees with is lampooned in a political cartoon on the editorial page. Of late there has been no shortage of political images focusing attention on China in American and German presses. This study examined how German and American political cartoons during the past three years portrayed China. The study also compared the issues in each nation that warrant a political statement. As China's economic power threatens to replace Germany as the third largest economy in the world and progresses toward superpower status as a potential global rival to the United States, it is important that we understand how the world's most populous nation is being portrayed and how the images of China in these two western democracies is being crafted through the medium of political cartoons.

52. Stephanie Fraley

Eastern Kentucky University

Mentor: David May

Social Disorganization and Gun Access and Use: Correlates, Causes, and Consequences among Incarcerated Juveniles

Previous research has revealed a strong relationship between residence in a socially disorganized neighborhood and delinquency among adolescents. In this paper, I extend this research by using data collected via a self-report survey from 828 incarcerated juveniles in the state of Indiana. Preliminary results suggest that adolescents who reside in socially disorganized neighborhoods are more likely to be involved in illegal behaviors than their counterparts who do not. Further, these results suggest that a number of factors interact with the socially disorganized nature of the neighborhood to cause both easy gun access and gun use, including socioeconomic status and race. The implications for policy and future research are also discussed.

53. Chrispin Gabriel

Northern Kentucky University

Mentor(s): Wayne Bresser, Chari Ramkumar, and Kisa Ranasinghe

Search for the Rigidity Transition in Lithium Oxide Silicate Glass System Using Modulated Differential Scanning Calorimetry

The objective of this project was to determine the existence of the rigidity transition in glass compositional system, $x\text{Li}_2\text{O}*(1-x)\text{SiO}_2$ where $0 < x < 1$, using Modulated Differential Scanning Calorimetry (MDSC). Accurate values of T_g were deduced using MDSC, a more sensitive variant of the traditional differential scanning Calorimetry. MDSC permits deconvoluting the total heat flow (H_t) into a reversing component, $\hat{i}H_r$, and a non-reversing component, $\hat{i}H_{nr}$. The ΔH_{nr} tracked the temperature-modulations and provided a true measure of change in the heat capacity, ΔC_p and T_g , while the ΔH_r captured the kinetic effects associated with changes in network configurations as a precursor to softening of the glass at T_g . Therefore the ΔH_{nr} term provided a measure of internal stress in the network glass. As the amount of lithium oxide increased, the results showed a local minimum in the ΔH_{nr} , between $x = 0.31$ and $x = 0.33$. The T_g showed a local maximum in the same compositional range. In conclusion, the rigidity transition in this $x\text{Li}_2\text{O}*(1-x)\text{SiO}_2$ glass system was observed in the compositional window $0.31 < x < 0.33$.

54. Katherine Gilson and Kathy Boka

Western Kentucky University

Mentor: Cecilia Watkins

Issues of Implementing a No-Smoking Policy in a Tobacco State: The Art of Diplomacy

The issues of implementing a no-smoking policy in a small city in south-central Kentucky involve many different factors. One issue includes the emotions tied to a cultural heritage of tobacco-growing farmers, not to mention the economics of losing a financially successful profession. Another issue is the influence the lobbyists from not only the tobacco companies, but other industries that chance to lose an extremely profitable business, have on the policy-makers. The perceptions of loss of rights and the take over of "big government" also blur the true costs of tobacco, which are loss of life and disability. A time-line demonstrated the progress made in some parts of the state as compared to the stalemate that has prevented the implementation of a smoke-free policy in this small Kentucky city. Politics, economics and other perceptions of this community are described as health professionals and other supportive parties dare to bend traditions that are costing community members, not only their health, but many times their life. The issues and a list of the benefits of a smoke-free policy in a small city in the south-central region of Kentucky are described. The impact politics and cultures have on implementation of a no-smoking policy in a tobacco-state are also described.

55. Emily Gorlewski

Northern Kentucky University

Mentor: Boni Li

The Impact of Technological Development on the Current Attitudes of Baby Boomers: An Assessment Study of Willingness to Learn After Retirement

American society is currently considered to be aging, with 12.25% of the total population comprised of elderly people, and because the baby boomers are growing older this percentage will increase to 20% by the year 2030. Due to America's rapid high-tech growth, the impact of technological development on the lives of baby boomers has become a crucial social issue. This age group was not born into high technology, but later in life had to learn how to use it. Because of this, it is necessary that educational opportunities to learn new technology be continuously given to this age group, especially after their retirement. These learning opportunities will enable them to be more integrated into society and will also improve their quality of life. The model used for this study tested whether the level of familiarity with technological knowledge influenced attitudes towards technology and adaptability to it. Furthermore, the model tested if willingness to learn new technology helped to keep individuals integrated in society. This study included 170 respondents from the Greater Cincinnati area, aged 50 to 60. The questionnaire, designed by Dr. Li and the applicant, was approved by the NKU human subjects committee, and the data was collected.

56. Conal Green and Jennifer Alderdice

Kentucky Community and Technical College System – West Kentucky

Mentor: Ehab Marji

The Effects of a Parachute's Characteristics on its Time of Flight

A set of experiments was done to study the different characteristics of the parachute and their effects on the parachute's time of flight. The parachutes were dropped from a fixed distance, keeping the wind and temperature constant. The characteristics considered were size, shape, load, string length, string width, and construction material.

57. Andrew Hancock and Carley Faughn

University of Kentucky

Mentor(s): Chana Akins and Thomas Zentall

STUDY 1: *Prenatal Effects of Cocaine on Japanese Quail* - Recent trends of cocaine use have been reported in pregnant women across the United States. The National Pregnancy and Health Survey reported that more than 40,000 infants born each year are exposed to cocaine prenatally. Clinical studies have reported that exposure to cocaine in the womb may impair prenatal and postnatal brain growth, and adversely affect motor function, reactivity, language development, and attentional mechanisms. Despite unresolved questions about cocaine's effects on early central nervous system development in humans, the literature with animal models continues to demonstrate a variety of neurobehavioral and neurodevelopmental abnormalities that result from prenatal cocaine exposure. This study investigated the effects of prenatal exposure of cocaine on Japanese quail embryos (N=160) and sought to understand the adverse effects it has on embryonic development. The design of this experiment was and still is a longitudinal study aimed to investigate the effects of cocaine over the course of the Japanese quail's life from birth to adulthood. This study will seek to understand cocaine's implications on hatching, development, learning, and behavior. Research on prenatal exposure to cocaine is very important and prevalent in today's modern society where drug abuse is on the rise. Japanese quail serve as the perfect model for studying prenatal effects of cocaine because of their short developmental rate into adulthood which is ideal when studying long-lasting effects of drugs. By studying avian species, we are able to get a better understanding of how prenatal cocaine affects development, learning, and behavior within a human model.

STUDY 2: *Cognitive Mapping in Rats* - Cognitive mapping implies the development of an internal representation of the spatial relationships among objects in the environment. Evidence for the development of a cognitive map in an animal would be demonstrated if it could be shown that an animal is capable of selecting a novel path to reach a goal when a familiar route is blocked and other strategies such as landmark use and path integration can be ruled out. However, landmarks may aid in the formation of the cognitive map. We trained rats to obtain a reward in two of three goal boxes in a three-arm maze. The experimental group had distinctive cues present during training whereas the control group did not. In testing, no distinguishable landmarks were available for either group. When they were given a choice between two novel paths; one path leading to the goal box that had always been baited during training, the other path leading to the goal box which had never been baited during training rats in the experimental group showed a significant preference for the appropriate novel path whereas those in the control group did not. These results suggest that rats are able to form simple cognitive maps.

58. Marc Harik and Loretta Kwan

University of Kentucky

Mentor: Kozo Saito

Ancient Japanese Art: Karakuri Ningyo

The purpose of this research was to preserve the art of making Karakuri Ningyo. Ancient Japanese automata, the Karakuri Ningyo of the 18th century, are said to be the fore-runner of modern robots. Often seen adorning festival floats, they were used mainly as toys for the wealthy; the most popular variation was (and still is) the tea serving Karakuri. To help preserve this art form Tamaya Shobei, the 9th Karakuri Master, Aichi Institute of Technology (AIT) hosted an intensive two week International Karakuri Workshop on the AIT's campus in Toyota City, Japan. The first two authors were two of the twenty-five international students selected to participate in this research experience. To ensure the preservation of this ancient art form, Master Tamaya Shobei instructed participants on the use of tools and materials. The poster chronicles the workshop, materials and ancient tools used in the making of Karakuri Ningyo. At the end of the two week workshop, each participant created a personal Karakuri as well as a larger, more elaborate version of the same doll in groups of five. These dolls, while simple, demonstrate the basic methodology behind the making and design of Karakuri ningyo.

59. Ann Harris

Eastern Kentucky University

Mentor: C. Dewayne Sims

GIS Approach to Growth Potential in Jackson County, Kentucky

Jackson County is located in the beautiful hills of southeastern Kentucky. It lies just outside of the Bluegrass Region and it is located within the rim of the Cumberland Plateau. Approximately 90 square miles of the county lies within the Daniel Boone National Forest. The county has a population of approximately 13,500 residents. Recently the Appalachian Regional Commission in conjunction with the Cumberland Valley Area Development District funded a grant to complete a comprehensive GIS database for the entire county. The GIS database consists of things such as: bridges, hydrants, cemeteries, and manholes. The GIS database is very important for current projects and it is vital for future economic growth of the county. This poster focuses on sewer data collected in the field for the city of McKee. The city of McKee is home to approximately 850 residents. Inventory of manholes and accessible sewer lines is essential to the city's economic development and growth potential.

60. Michael Tyler Harris

Morehead State University

Mentor: Glenn Ginn

The Language of Kenny Burrell: A Transcription Comparison and Analysis

Kenny Burrell is one of the living legends of jazz guitar. His prolific and influential career has spanned over five decades. He has produced hundreds of recordings as a solo artist and as a sideman for such notable jazz musicians as Dizzy Gillespie, Duke Ellington, John Coltrane, Charlie Parker, and Miles Davis, to name a few. Burrell's cool, laid back approach to the guitar, combined with his lush and deep tone, has personified his career, making him "America's guitar laureate" according to the Detroit Free Press. He has been a powerful inspiration for generations of young guitarists, and will likely be for many more. In order to fully grasp, understand, and codify Burrell's distinctive style, it is necessary to examine his playing through harmonic, melodic, rhythmic, and motivic considerations. To this end, Burrell's improvised solos have been analyzed and compared on the following three recordings: "Chitlins Con Carne", "The Breeze And I", and "I Never Knew". Through a brief biographic study and the analysis/comparison of three transcribed solos, Burrell's musical language is decoded and translated in order to offer a better understanding of his contribution to jazz guitar history.

61. Ashley Hawkins

University of Kentucky

Mentor: J. Z. Hilt

Nanocomposite Biodegradable Polymers: Preparation and the Analysis of Heating, Degradation, and Drug Release

Biodegradable polymers are extremely versatile materials that can be used in many drug delivery applications, but current materials exhibit degradation profiles that are pre-programmed. Thus, there is limited or no ability to modulate the degradation once it is applied (e.g., implant, subcutaneous injection, etc.). In this research, nanocomposite biodegradable polymers have been designed and developed that exhibit degradation profiles that can be remotely controlled by an alternating magnetic field. In particular, poly(lactide-co-glycolide) films and biodegradable hydrogel films have been prepared that contain iron oxide nanoparticles as well as several model drugs. The magnetic nanoparticles allow heating of the films, which can therefore affect many of the other properties of the polymer (e.g., degradation rate). Thus, the degradation driven drug release can be controlled by altering the degradation rate through remotely heating the nanoparticles, therefore allowing external control over the properties and drug release of an implanted device. PLGA films with and without nanoparticles (and drugs) were successfully prepared. The heating due to the particles was then studied, degradation rates of the films were analyzed, and finally several drug release studies were conducted using UV-Vis analysis. Further studies were conducted using biodegradable hydrogel networks. Once polymerized, it was shown that these systems had degradation rates dependent on temperature. Nanocomposite films containing iron oxide nanoparticles were synthesized, and their heating properties and degradation were studied. As with the PLGA, different drug molecules were incorporated into these hydrogel systems, and the release was studied using the same methods as described above.

62. Angela Haynes and Jessica P. Nichols

Eastern Kentucky University

Mentor: Rose Perrine

STUDY 1: *Adults Negatively Perceive Overweight Children* - In this experimental research project, I explored adults' perceptions of overweight children. College students were randomly assigned to view a photograph of either an average-weight or an overweight child. The two children were similar in age, attractiveness, clothing, and pose. Participants then gave their perceptions of the child's peer and parent relationships, success in school, physical attractiveness, personality style, and self-esteem. My prediction that the overweight child would be perceived more negatively than the average-weight child was supported. For example, participants perceived the overweight child to be less attractive, confident, clean and fun to be around, as well as less liked by the child's peers and teachers, and less likely to have parents who hold high expectations of the child than the average-weight child. Participants also perceived the overweight child as more lazy, lonely and likely to make lower grades than the average-weight child. The results of this study have significant implications for how the adult world perceives, acts towards, and judges overweight children. This study shows how adults perceive overweight children as less desirable than children who are not overweight. Therefore because of these negative adult perceptions, overweight children are probably facing several obstacles when being stigmatized such as negative biases, prejudices, and discrimination from the adult figures in their life.

STUDY 2: *Talk the Talk: Appalachian Accent and Interview Evaluations* - In this experimental study, I explored how a job applicant's accent can impact how she is evaluated. An undergraduate student, with the ability to speak both with and without an Appalachian accent acted the part of a candidate in a job interview. Two job interviews were recorded on DVDs. One version was the candidate answering interview questions with an Appalachian accent, and the other version was the same candidate answering the questions without an Appalachian accent. Only the job candidate could be viewed in the DVD; the interviewer's voice and questions were audible. The candidate's verbal responses to the questions, and her non-verbal body language, were constant. Participants consisted of undergraduate students and employers in various companies in the Southeast. Participants each viewed the same resume, which depicted the candidate as a recent college graduate, with job experiences that were appropriate for the job for which she was interviewing. Participants were randomly assigned to view one of the interviews on the DVD, and then rated their perceptions of the job candidate. Perceptions included perceived suitability for job, ease of understanding the candidate's speech, the degree to which the candidate fit the organizational culture, and likelihood of hiring the candidate. I predicted that when the job candidate spoke with an Appalachian accent she would be rated more negatively, and as less qualified for a job as a human resources associate, than when she spoke without an Appalachian accent.

63. Heather Hazelrigg

Morehead State University

Mentor(s): Stephanie Johnson and Donna Corley

Identification of Nutrient Dense Lower Sodium Food Choices from Local Fast Food Menus

Obesity is recognized as a national health care issue. The Center for Disease Control reports 60% of adolescence consume too much fat and only about one-third of young adults meet the recommended intake for fruits and vegetables. Eating out contributes to high fat, high sodium and decreased nutrient intake. Purpose: This study investigated fast food menus for low sodium, nutrient dense food choices meeting USADA recommendations for young adults. Methods: Local restaurant menus were analyzed for macronutrient and sodium content. "Healthier" selections were placed in daily menus. Findings: A daily food plan meeting USADA recommendations was not easily identified but was available in most restaurants. Conclusions: Careful selection from restaurant menus can provide healthier choices for eating out.

64. Josh Hicks, Thomas Stevens, Christopher Westendorf, Michael Anteau, Aaron Dourson, Cody Hawkins, Nicholas Rose, Ainsley Lambert, Joseph Scott Means, Jr., Seth Jenkins, Grant York, and James Channing Richardson

Morehead State University

Mentor: Stephen Lange

Assessing Civic Engagement and Community Development through the Kentucky League of Cities' NewCities Institute

The Institute for Regional Analysis and Public Policy (IRAPP) at Morehead State University has partnered with the NewCities Institute and the NewCity Morehead Project to develop an assessment instrument to evaluate the progress that Morehead is making toward its NewCity goals. While this assessment instrument is being piloted in Morehead, IRAPP and the NewCities Institute seek to generalize it to be applicable to all cities that undertake the NewCities initiative. This poster presents the preliminary findings of this research and discusses those findings in light of the overall NewCities' objectives of civic engagement and community development.

65. Josh Hicks, Tara Nanny, Grant York, and Brad Carmella

Morehead State University

Mentor: Michael Hail

Theoretical Foundations of Public Policy

Research on the "core" theoretical texts of the Western tradition is essential for understanding American constitutionalism and public policy. As such, the research on epistemology, conducted as part of the IRAPP capstone senior seminar course RAPP 490, included a survey of political philosophy from Plato to Post-Modernism and analysis of the epistemology of the social sciences and the impact of epistemology on public policy.

66. Kevin Hoppins

Northern Kentucky University

Mentor: Lisa Holden

Dynamics of Molecular Clouds

Star formation is a complex process and constitutes one of the basic problems of astrophysics. Most stars in our galaxy form within large cloud-like structures of molecular gas. Through the fragmentation of these large clouds, dense cores of gas form that ultimately collapse into single stars. We concentrated on analyzing the gravitational collapse that occurs in molecular cloud cores just prior to star formation. It had been shown that the collapse of the core is characterized by the rate at which mass falls onto the central object which in turn related observationally to the total luminosity of the system. Previous studies had focused on calculating the mass infall rate for spherically-shaped cores under a variety of conditions. Motivated by observations, we sought to extend this body of literature by considering the gravitational collapse of cylindrically-shaped cores. The gravitational collapse of the cores we considered is described by a set of partial differential equations for self-gravitating fluids. These equations allowed for a self-similar analysis, enabling us to reduce the system to a set of ordinary differential equations. Initial conditions were obtained through an asymptotic analysis of the system and the ordinary differential equations were then solved using standard numerical techniques. We present the results of our analysis and compare our results to those obtained previously for spherically-shaped cores.

67. Chasity Hoskins

Eastern Kentucky University

Mentor: Marco Ciocca

Photo-acoustic Effect with a Pulsed Laser: Detection of Water Contaminants

First discovered by Alexander Graham Bell, the photo-acoustic effect is the creation of a sound wave due to the absorption of modulated light by a sample. By measuring the sound of a sample at different wavelengths, a photo-acoustic spectrum can be recorded and used to identify the absorbing components in the sample. This method of analysis is being used to analyze and identify pollutants in solids, liquids, and gases. Due to its high sensitivity, this method has the potential to detect pollutants on the scale of parts per billion and it is ideal for environmental chemistry. We have performed measurement of absorption in liquids using a pulsed nitrogen laser and we detected the presence of dyes of organic origin in water. The theoretical background of the photo-acoustic effect will be introduced, followed by our data and by our future research plans, in which we will attempt detection of a known pollutant, benzene, in a water solution.

68. Yoon-Hyeon Hu

Kentucky State University

Mentor: George Antonious

Pungency in Hot Pepper: Variation Among Countries of Origin

The USDA Capsicum germplasm collection contains many thousands of accessions of Capsicum spp., although only limited information is currently available on the capsaicinoid content of the fruit of these accessions. The objectives of the present investigation were 1) to quantify the major capsaicinoids (capsaicin and dihydrocapsaicin) in fruits of Capsicum chinense and 2) to identify accessions containing greatest levels of capsaicinoids. A survey was conducted to screen fruits of 307 hot pepper accessions of Capsicum chinense selected from the USDA germplasm collection for their major capsaicinoids content (capsaicin and dihydrocapsaicin). Seeds of C. chinense from fruits originated from Belize, Brazil, Colombia, Costa Rica, Ecuador, Mexico, Peru, Puerto Rico, Surinam, United States, and Venezuela were planted and their fruits were screened for their major capsaicinoids content. Capsaicin concentrations were generally greater than dihydrocapsaicin. Concentrations of capsaicin and dihydrocapsaicin varied between origins and between accessions (genotypes) of the same origin. Accession PI-438644 (Mexico) contained 2.4 mg/g fruit, PI-441619 (Brazil) contained 2.9 mg/g fruit, PI-281429 (Surinam) contained 1.9 mg/g fruit, and PI-640900 (United States) contained 2.7 mg/g fruit. These four accessions were identified as potential candidates for mass production of capsaicinoids.

69. Casey J. Hufford and B. Nicholas Wahle

Morehead State University

Mentors: Robin Blankenship, R. Doug Chatham, and R. Duane Skaggs

STUDY 1: *Chessboard Problems with Obstructions* - Represent each square on a chessboard of arbitrary size by a point ("vertex") and then, for every pair of squares, connect their points with an edge if a chess queen could move from one square to the other in a single move. These vertices and edges constitute the "queens graph" for that chessboard. In two separate but related mathematics projects, we study what happens to the queens graph and related graphs if the board has one or more obstacles ("pawns") placed to restrict the movement of the queens. Project 1: (Hufford & Blankenship, *Book Embeddings of Chessboard Graphs*) To embed a graph in a book, linearly order the vertices in the spine (line) and place the edges in pages (half-planes) so that no two edges cross in a page. Book thickness is the minimum number of pages needed over all possible vertex and edge assignments. Upper and lower bounds on book thickness are provided for the $n \times n$ queens graph and for the subgraph of the $n \times n$ queens graph resulting from a single pawn placed anywhere on the $n \times n$ board.

STUDY 2: *The Equivalence Number and Transit Graphs for Chessboard Graphs* - The queens graph can be considered as a system of routes called a "transit graph", where two vertices are connected by an edge if and only if there is a path from one vertex to the other in at least one of the routes. The "equivalence number" is the smallest number of routes needed to form a given transit graph. The study of transit graphs provides a new perspective to the analysis of chessboard graphs with obstacles, and the approach extends to other chess pieces and other types of boards.

70. Matthew Hurley

Morehead State University

Mentor: Kristina DuRocher Wilson

The American Savage: The Demonizing of African American Male Masculinity in the Early 1900's

After the American Civil War ended in 1865 and the Emancipation Proclamation gave blacks their "freedom," whites needed new ways to maintain their racial superiority. Out of white's need to preserve the racial line, Jim Crow laws arose along with new ideas of African American Masculinity. As advertisements became part of national culture, images that supported and promoted stereotypes of black men became classified into two categories, the "bad nigger" who was a cannibal and savage that raped white women and was the scourge of the white race, or the "good nigger" who was a bumbling idiot with over exaggerated features but maintained his rightful submissive place in society. As advertising grew in popularity, stereotypes changed from representing and reflecting regional distinctions to demonstrating new ideas and stereotypes for the nation. When images of "good and bad" blacks became standardized, social problems like the American Savage were introduced to the nation. To represent the transition of stereotypes to a national stage, advertisements, this poster examines the multiple sites that created imagery of black men including the Ku Klux Klan (and its subsidiaries the Women's Klan, the Junior K-Club, and Tri-K-Club), the rise of lynching, the introduction of films such as Birth of a Nation, to provide insight into the white mind of a nation, as they attempted to redefine their social power after the Civil War.

71. Jamie Jaspers and Jennifer Hernandez-Lamb

Northern Kentucky University

Mentor(s): Gail Mackin, Charles Acosta, and Kevin Kirby

Correlation Between Queen Conch Diffusion Coefficients and Conservation Efforts

Overexploitation of the Queen Conch is a major problem throughout the Caribbean. We have explored the different factors effecting population both within a reserve and outside of it, in an attempt to allow not only the conch population to flourish but also for fishermen to maintain satisfactory fishing yields. Our research primarily explored the effect that the diffusion coefficient had on conservation efforts.

72. Leslie Jenkins, Kelly Carter, Ashley Bhavalkar, and Stephanie Unger

University of Louisville

Mentor(s): Crystal Day and Barbara Burns

Characterizing Achievement Motivation in Young Children in Head Start

Children's motivation has been described by researchers as 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. While having an adaptive motivation pattern is important for all children, it may be especially important for children living in poverty. Given the multiple stressors in their social environment, these children may be particularly at-risk of developing a maladaptive performance orientation and are more likely to be low in persistence, high in negativity, and respond in a helpless manner when faced with a challenge. Such maladaptive characteristics are likely to place children from low-income families at risk for failure in future academic situations. The current study examines and characterizes motivation and helplessness in preschool-aged children from low-SES backgrounds. The study is part of a larger classroom-based intervention that supports adaptive motivation patterns in children attending Head Start. Data were collected for 73 children to assess their cognitive ability, as well as their motivation and helplessness. The current study examines the relations among motivation, helplessness, cognitive ability, and various demographic variables in an attempt to better characterize motivation in a low-income, preschool-aged population. The findings have important implications for designing interventions aimed at identifying and preventing maladaptive motivation patterns at an early age.

73. Jessica Klaphaak

University of Louisville

Mentor(s): Mark Linder, Marjorie Bon Homme, and Sreelatha Channareddy

Down Regulation of CYP1A2 Expression Following Acetaminophen Exposure: Potential Implications on Adaptive Tolerance

As of 2003, acetaminophen (APAP)-induced hepatotoxicity became the leading cause of acute liver failure in the United States. When the major APAP metabolism route becomes saturated, hepatotoxicity results from a harmful metabolite called N-acetyl-p-benzoquinone imine (NAPQI). Cytochrome P450 1A2 (CYP1A2) and 2E1 (CYP2E1) are known to catalyze the production of NAPQI. The mechanisms leading to accidental overdose and death are not fully understood, however adaptive tolerance in mice has proven to protect them against a lethal dose. We hypothesize it is the down regulation of CYP2E1 during the period of toleration that accounts for the mice not succumbing to hepatotoxic effects of APAP. Because CYP1A2 is also involved in APAP metabolism, we reason that pattern of CYP1A2 expression will follow that of CYP2E1. To protect against the hepatotoxic effects of APAP, we hypothesize that CYP1A2 expression is down regulated during adaptive tolerance, mimicking the expression of CYP2E1. To test this hypothesis, we used real time RT-PCR and western blot analysis to compare the expression of CYP1A2 in an animal model that received a lethal dose of APAP to an animal model that received a lethal dose without the benefit of adaptive tolerance. Further, we compared the regulatory regions of the genetic sequence of CYP1A2 and CYP2E1. Software programs, Multalin version 5.4.1 and DiAlign version 3.1.2, were used to align and compare the two sequences.

74. Steven Kniffley

University of Louisville

Mentor: Kevin Chapman

An Analysis of Parental Behaviors and Anxiety in Black and White Young Adults

The literature indicates that anxiety is highly familial. However, studies have indicated that genetics only accounts for a portion of the transmission factors involved in the development of anxiety. The recent literature has indicated that psychosocial variables have received increased attention. One psychosocial variable that has received a substantial amount of attention in the literature related to anxiety is the construct of parental control. Although the literature consistently supports this notion, the samples have been predominantly Caucasian in nature with little information about ethnic minority populations, particularly African Americans. The parenting literature delineates psychosocial variables that may be related to negative outcomes in offspring. Specifically, the parenting literature indicates that there are two forms of parental control: psychological and behavioral control. Psychological control refers to a parent's attempts to control the child's psychological development and is related to internalizing disorders such as anxiety and depression. Behavioral control refers to the rules, regulations, and restrictions that parents have for their children and this has been implicated in externalizing disorders, such as conduct disorder. Given that African American parents have been shown to display more behavioral control than Caucasian parents it is important to determine if these parenting behaviors have a negative impact on their children. As such, the current study sought to investigate differences in anxiety symptoms and parenting behaviors in a sample of African American and Caucasian adults. First, it was hypothesized that Blacks and Whites will significantly differ in anxiety symptoms. Specifically, Whites will endorse more anxiety symptoms than Blacks. Secondly Blacks and Whites will significantly differ in reported parental firm control. Specifically, Blacks will report significantly more firm control from both parents than Whites. Third Blacks and Whites will significantly differ in reported parental psychological control. Specifically, Whites will report significantly more psychological control from both parents than Blacks. Our exploratory hypothesis was that psychological control will predict current anxiety symptoms in the White sample, but not in the Black sample.

75. Annesia Lamb and Daniel Starnes

Western Kentucky University

Mentor: Nilesh Sharma

Genetic Modification of a Wild Shrub, Sesbania Drummondii for Environmental Clean Up

A leguminous shrub, *Sesbania drummondii*, naturally distributed in coastal areas of the southeast USA, has the ability to grow in heavy metal contaminated areas removing significant amounts of Pb and Hg from soil. The phytoremediation efficiency of this species can be enhanced if it over expresses a natural chelating agent, citrate. As development of a cell regeneration system is a prerequisite for gene transfer, leaf and stem segments were cultured on different basal media fortified with different concentrations and combinations of auxins and cytokinins. Callus proliferation was achieved on several combinations of NAA/Picolinic acid and BAP/ Zeatin or TDZ with the development of a range of callus morphologies and textures. Leaf explants when cultured in MS suspension medium containing Picolinic acid 0.1+ BAP 0.5+ NaCl 30+ Ascorbic Acid 100 mg/L or NAA 1.0+ BAP 1.5+ Ascorbic Acid 100 mg/L proliferated in embryogenic callus. Successive stages of embryogenesis e.g., globular, heart shaped, torpedo and cotyledonary embryos were observed under a Scanning Electron Microscope. These somatic embryos are being cultivated on a range of maturation media for further development including their germination into plantlets. A model for the transfer and expression of a foreign gene was developed in this study using *Agrobacterium tumefaciens* (pCAMBIA 1305.1 plasmid). Expression of the GUSPlus™ gene in regenerants and callus cells was confirmed by GUSPlus™ assay. Genetic modification of regenerative somatic embryos may serve as an excellent system for over expression of a citrate synthase gene in this species.

76. Huy Le

University of Louisville

Mentor(s): James Wittliff and John Trent

Quantitative Structure-Activity Relationships of the Molecular Diversity of the Estrogen Response Mechanism by Human Estrogen Receptor-alpha (hER α)

Diverse chemical features of estrogens and their mimics are illustrated by the promiscuous nature of their interactions with the ligand binding domain (LBD) of the human estrogen receptor alpha (hER α). In order to better understand structure characteristics of interactions between ligand and LBD, the biological activities of ligands are modeled using alignment software DISCOtechT. Pharmacophores generated are also subjected to Comparative Molecular Field Analysis and Partial Least Square Analysis to determine quantitatively the relationship between three-dimensional ligand structures and corresponding activities. The dataset utilized consisted of biological activities of 25 compounds from extensive titration arrays performed with yeast-derived recombinant hER α . Collectively, these mimics competed with estradiol-17 β over a broad spectrum of relative binding affinities ranging from 0-150%. Six initial models were generated illustrating binding affinities of mimics at different levels of receptor occupancy. A seventh model was generated to look at the average affinity of mimics for hER α . The models displayed good predictive ability ($q^2 > 0.6$). When the average of the first six models were compared to the values calculated from seventh model, these two datasets displayed strong correlation ($r^2 = 0.75$) indicating internal consistency. Future studies will incorporate extensive data from other experiments such as Electrophoretic Mobility Shift Assay and cell-based bioassays. A broad range of ligand binding affinities from chemically diverse molecules, biological data and enhanced three-dimensional structures for the LBD will provide a comprehensive model of ligand-receptor interactions of hER α .

77. Chris Leadingham and Teara Jessie

Morehead State University

Mentor: John Ernst

Buses Go East, Buses Go West

During the sixties, colleges changed. Enrollments grew and new buildings shot up as state legislators increased funding. Students began to take a more active role in the political and social climate of the campuses. The Vietnam War contributed to the transformations that were already underway. Power struggles emerged between conservative administrators and increasingly liberal students. Morehead State University in eastern Kentucky mirrored the rest of the nation. The school's president, Adron Doran, did not willingly accept the cultural shifts, and perceived them as threat to his authority. Ironically, he embraced the educational changes and built new facilities and programs, but naively could not grasp that students also were ready for a change, and regularly declared that if you are not happy with the way things are done at Morehead, there are "buses going East, and buses going West."

78. Alysha Lewis and Ricky Lewis

University of Kentucky

Mentor(s): Hirotada Fukushige, David Hildebrand, and David McNear

STUDY 1: *Converting Plant Oil into Lubricants for Combustion Engines* - In a nation dependent on petroleum, what can be done to reduce our dependence on this non-renewable resource? Currently, motor oils used to lubricate automobile engines are derived from petroleum. Much of our nation's oil must be imported. Moreover, petroleum-derived lubricants can cause pollution when leaked or spilled or not disposed properly. Innovative techniques show that plant oils can be genetically improved to function as engine lubricants. Plant oils in their current state do not have sufficient oxidative stability to maintain lubricant capabilities over periods of time as long as current petroleum-derived lubricant oils. This could be solved by converting double bonds in plant oils into cyclopropyl groups as some plants in nature already do. Cyclopropyl groups tend to have the needed low temperature fluidity and lubrication, as well as high oxidative stabilities. Plants have the capability to accumulate around 90% of specific fatty acids in seed oil. The goal of this project was to engineer plants to convert unsaturated fatty acids that accumulate in seed oils into cyclopropyl groups and selectively transfer the moieties from membrane lipids to seed oil triacylglyceride. This process should produce a performance enhancing motor oil with high oxidative stability and good flow properties over a wide range of temperatures. The success of this project would bring recognition and support to the State of Kentucky and improve the state's and nation's economy by curbing the dependence on imported oil by producing the oil here.

STUDY 2: *The Influence of Soil Metal Concentrations on Root Nodule Formation and Function* - Nitrogen fixing legume species have been implemented as integral components of various farming regimes worldwide. Such plants perform the feat of fixing atmospheric nitrogen by developing a root nodule and facilitating a symbiotic relationship with specialized nitrogen fixing soil bacteria collectively known as Rhizobia. Among the nutrients necessary for proper nodule function are metals such as Mg, Fe, Mn, and Zn, which are essential cofactors in various bacterial enzymes. Little is known about how these metals are delivered to the bacteria, the concentrations required for proper nodule function, or how their supply affects nodule development. Therefore, this study examined the influence of bioavailable rhizosphere zinc on root nodule formation and functions using a mutant of the model legume *Medicago truncatula* known as *raz*, for "requires additional zinc". Confocal microscopy in conjunction with nucleic acid specific dyes was used to monitor the development of *raz* and wild type (WT) *M. truncatula* plants through a 28 day developmental time course. Suboptimal levels of Zn (0.7M) for *raz* growth impede proper nodule function as is indicated by the retardation of nodule development compared to the *M. truncatula* WT plants. Using a mutant strain of the plant to explore the role of metals in nodule formation and function will help create a foundation for comprehending the genetic basis of the mechanisms involved. The biotechnological application of this knowledge could lead to the production of Zn fortified crops that require less N based fertilizer, which implies reduced input costs and the reduction of nitrogenous pollution.

79. Lesley Mann

University of Kentucky

Mentor: Christopher Schardl

Gene Expression Profile in a Grass-Endophyte Symbiosis

Festuca arundinacea, better known as tall fescue, is a major grazing grass in Kentucky fields. Kentucky-31, a popular cultivar of fescue, is used in much of the country because of its high drought, erosion, and insect resistance that is a product of its symbiosis with *accremonium coenophialum*, an endophytic fungus that lives within the plant. However, this fungus also causes fescue toxicosis in livestock. Consequent loss in weight gain in cattle costs the livestock industry a billion dollars annually. Thus much interest lies with better understanding this plant-fungal symbiosis, with the goal of developing the advantages of this symbiosis while negating the detrimental effects that livestock experience. This study has been aimed at finding key genes that trigger the switch between healthy plant (inflorescences) tissue to diseased plant tissue (stromata), which “choke” the plant thus preventing an inflorescence formation. Real time PCR (Polymerase Chain Reaction) has been utilized to compare gene expression. Samples of inflorescences and stromata were collected from several genotypes of *lolium pretense* and *agrostis*, another cool season grass. The *tefl* gene was shown to be abundant and steady throughout all tissue, therefore it will be used as a control gene for comparison. Various fungal genes, primarily from secondary metabolite clusters, will be tested for up regulation or down regulation with respect to tissue type. Resulting correlations will be used to trace the genetic triggers that facilitate the switch from a healthy plant in symbioses to plant “choke” by the present fungi.

80. Jessica Marshall and Matthew B. Courtney

Eastern Kentucky University

Mentor: Joyce Hall Wolf and Karin Sehmam

STUDY 1: *William Schuman and The Mighty Casey* - William Schumann wrote his opera "The Mighty Casey," based on Jeremy Gury's poem "Casey at Bat," in 1953. This poem, one of Schuman's childhood favorites, provided inspiration for Schumann's operatic setting. The poem, although only fifty - two lines long, was expanded into an hour and twenty minute, three scene production, including seven baritones, two sopranos, two tenors, an SATB chorus, and an optional ballet. The story is about a baseball team, Mudville, who is playing in the State Championship. Their greatest player, Casey, comes up to bat at the bottom of ninth. Surprisingly, he strikes out and his team loses. I have prepared and performed the pleading aria "Kiss Me Not Goodbye" which is sung by the character Merry. Neither Merry nor the aria text appear in the poem. This research explored how Schumann expanded the original text and plot and created new characters through the libretto and the music. Special attention was given to Merry.

STUDY 2: *Stephen Foster: Kentucky's Not-So Hometown Hero* - It is often said that in Kentucky, people only know three composers; Mozart, Beethoven, and Stephen Foster. Stephen Foster was one of the most influential musicians in American popular music. Throughout his short career, he wrote 286 melodies that have lingered in the minds of many Kentuckians and earned himself a secure place in American musical history. Nowhere is Foster more beloved than in the rolling hills of Kentucky, due to his song "My Old Kentucky Home, Good Night." This tune, that has been adapted as Kentucky's state song, is shrouded in mystery and folklore. Some stories suggested that this song was written by Foster on a trip to the Federal Hill estate in Bardstown, Kentucky; others believed that this song was written in response to Harriet Beecher Stowe's "Uncle Tom's Cabin" essays. This project explored a variety of common myths surrounding the background of this popular American song and – utilizing historical facts as well as pages from Stephen Foster's original sketch book - distinguished fact from fiction in the history behind "My Old Kentucky Home, Good Night."

81. Katherine McOwen and Jason Richards

University of Kentucky

Mentor(s): Mike McKay and Liz Swanson

Rebuilding New Orleans: Dunbar's Restaurant

Dunbar's Restaurant was a small, yet widely known soul food restaurant located in the center of New Orleans. The eclectic spirit of the restaurant developed as a direct response to the dynamic attitudes of the surrounding community and the close-knit values of family. Tina Dunbar and her famous restaurant have been featured in many national and international magazines and brochures. Everyone from politicians to movie stars to your local person went there not only for the delicious cuisine, but also because the warm, spirited atmosphere created by Mrs. Dunbar and her family. When Hurricane Katrina hit and the levees broke, Dunbar's was submerged in six feet of water. The family's only source of revenue was destroyed, and to make matters worse, the roof was heavily damaged and never received the proper preventative measures to keep out the ongoing elements; so, for over two years it has been closed up and weathering beyond its years. As a result, the condemned building must be demolished. Our goal was to design a new restaurant to replace the current building. It needed to be a place that will be relaxed and fun, but also gives a new direction for the surrounding neighborhood. Since it is the only restaurant in its vicinity, we wanted it to be a place that created the idea of community where neighbors and friends could come together. Therefore, we proposed an architectural form that will aide Mrs. Dunbar in reestablishing the characteristics and values that made the restaurant an iconic destination.

82. Chris Miller

Northern Kentucky University

Mentor: KC Russell

Synthesis of Dehydrobenzoannulenes for Incorporation into Multi-Component Devices

Annulenes possess properties that may play an important role in the development of electronic devices. The goal of this research was to synthesize annulenes that contained either electron-donating or -withdrawing groups as well as a site for the attachment of the annulene to other compounds. Thus, the annulene could be linked to a plethora of electronically complementary species. These larger systems could exhibit changes in their spectroscopic or electrochemical properties in the presence of various ions which may make them useful as sensors or in other materials applications. Progress toward the synthesis of these functionalized annulenes is presented.

83. Nathan Mills

Morehead State University

Mentor: Fatma Mohamed

The Impact of a Firm's Alliance Portfolio Diversity on Its Innovation and Performance in the 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's entry into strategic alliances is about leveraging the value of its internal resources with the external resources of its partners. In this study, the diversity of the industries in which a firm constructs its strategic alliances is considered firm's alliance portfolio. From this portfolio, a firm may draw upon the resources those alliances generate to introduce new technologies or products to the market. Using a sample of 49 firms in the software industry, this study proposes that a more diverse alliance portfolio enhances a firm's innovation and performance. For the measurement of industry diversity, this study uses the Standard Industrial Classification codes of the allying firms. Using multiple linear regression, controlling for firm's age and size, the results show that alliance portfolio diversity has positive effects on both firm's innovation and performance.

84. Heather Monohan, Chelsea Brunner, and Samantha Kramer

Western Kentucky University

Mentor: Andrew Wulff

Physical-Chemical Characterization of Karst Waters Involved in the Vadose Zone of Diamond Caverns, Kentucky

This project was a preliminary investigation at Diamond Caverns, a private show cave located near Mammoth Cave National Park, Kentucky. The purposes of this research included establishing baseline compositional data for cave dripwaters, and examining the possible compositional influence of neighboring agriculture and pavement runoff. Objectives in this project were to obtain physical-chemistry characterization of karst waters and analysis in time and space of parameters such as pH, temperature, and electrical conductivity (EC). With this data, the relationship between the external atmosphere and soil cover, composition of drip waters, and the processes of precipitation/dissolution of carbonate minerals and the transfer of CO₂ were extrapolated. A network of fifteen sampling sites, primarily along passageways throughout Diamond Caverns, was designed in order to incorporate various speleothem forms and to allow the assessment of spatial variations in drip rates throughout the cave. Samples were collected approximately every three weeks, and initial drip water volumes recorded in order to determine variations in rates of infiltration (temperature and CO₂ also taken initially). Continuous flow was collected in calibrated vessels and the volume per unit time recorded (1 min drip rate). The pH and EC of freshly collected water samples were measured and all samples were titrated for bicarbonate and alkalinity. Preliminary analyses from five previous collections in the fall of 2006 and spring 2007 have been analyzed by OES-ICP at the ERTL Facility at the University of Kentucky. Variations in both element concentrations and element ratios (e.g. Ca/Sr, Mg/Sr, etc.) demonstrated anticipated spatial and temporal variation.

85. Derek Nance, Andrew Mattmiller, and Neely Netz

Murray State University

Mentor: Alexey Arkov

Genetic and Biochemical Analyses of Germ Cell Formation and Nuclear Division in Early Drosophila Embryos

Many genes in the fruit fly *Drosophila* show striking similarity to human genes. It is thus likely that understanding the cellular mechanisms in *Drosophila* will help to understand cellular processes in humans and may provide critical insight into the biological cause of human diseases. Our study focuses on the mechanisms of germ cell formation. In most organisms, germ cells are set aside from somatic cells early during development. Eventually primordial germ cells differentiate, form gonads, and become egg and sperm and thereby produce the next generation. Therefore, germ cells are the stem cells that give rise to a whole organism. To search for new genes directly involved in germ cell formation, we conducted a large mutant screen of the second chromosome's right arm. As a result, we identified two alleles of a new gene involved in germline development. In addition, we isolated five alleles of another gene and showed that it acts in germ cell formation by properly distributing germ cell nuclei during their division and migration in early *Drosophila* embryos. Characterization of these new genes is underway and will be reported. Finally, we are in process of identifying metabolic energy-producing pathways that are mainly used for formation of germ cells. Understanding the mechanisms governing germ cell specification in *Drosophila* should contribute to our understanding of germline development in humans and may explain the origin of human germline disorders, namely germline cancers and infertility.

86. Rachel Oberst

University of Louisville

Mentor(s): Fabian Crespo and Christopher Tilquist

A Survey of Cytokine Expression Polymorphism in Human European Populations

Cytokines are soluble immunomodulatory glycoproteins involved in the regulation of processes associated with inflammation, immune response, and hemopoiesis. Changes in cytokine expression or activity can lead to alterations in these responses. Cytokines and their receptors are often encoded by highly polymorphic genes. In recent years, surveys using general continental-based samples have suggested differences in the distribution of cytokine genetic polymorphisms. Some genotypes are responsible for the observed inter-individual differences in levels of cytokine production, and thereby constitute a mechanism for adaptive modulation of the immune response. Here, we report results of a survey of common polymorphisms giving differential expression in anti-inflammatory (TGF β 1 and IL-10) and pro-inflammatory (TNF α , IFN γ , and IL-6) cytokines in eighteen geographically distinct populations from Europe. Our preliminary analyses show that certain genotypes for specific cytokines document a non-random distribution suggesting significant regional variation. When the data are viewed from an evolutionary perspective focusing on the interplay between pro-inflammatory and anti-inflammatory cytokines constituting the inflammation phenotype, there appears to be a trend of decreased inflammation driven by selection.

87. Cody Ortt

Kentucky Community and Technical College System – Madisonville

Mentor: Dan Schultz

Calculations for a Sundial: A Mathematical Model of the Sun's Altitude Angle

Given a rudimentary knowledge of the geometry of the Earth-Sun system, it is possible to construct a mathematical model of the sun's altitude angle in the sky for any time of day, any day of the year, and any latitude on Earth. Knowing this angle allows the calculation of the length of a shadow cast by any object at successive times of the day. The mathematical model was created by modifying a basic cosine function until it best matched observations. Empirical data gathered at Madisonville Community College (latitude 37° N) on several days in June and September 2007 verified the model's predictions.

88. Sara Patenaude-Schuster

Northern Kentucky University

Mentor: Rebecca Bailey

Military Culture During World War II and the Vietnam Conflict

This research project undertook the question of whether or not a culture shift occurred in the United States Armed Forces in the years between World War II and the Vietnam Conflict. Firsthand veteran experiences were used along with After Action Reports to give a more complete picture of military life than was otherwise available. The firsthand veteran experiences came in the form of written correspondence, memoirs, and personal interviews done in conjunction with the Veterans History Project and the Library of Congress. All interviews included in this study were performed by students at Northern Kentucky University and highlight local veterans of World War II and the Vietnam Conflict from several branches of the United States Armed Forces including the Army, Navy, Marines, and Air Force. The project did not attempt to favor the culture of one time period over the other, but rather highlighted the similarities and differences between the two.

89. Alex Petersen

University of Louisville

Mentor: Barbara Wheeler

The Relationship Between Musical Preference and Amount of Exposure Tested over Different Musical Genres

Many studies have supported Berlyne's (1971) theory of musical preference, which suggests two inverted-U relationships. First, there is an inverted-U relationship between preference and complexity, where individuals prefer moderate complexity levels and dislike music that is either too simple or too complex based on their musical intelligence. And second, there is an inverted-U relationship between preference and amount of exposure, where an increase found by Zajonc (1968) is followed by a subsequent decrease. The genres of music included in studies on musical preference are limited. No study has explored these inverted-U relationships across a variety of different genres. Nine participants listened to the same cycle of 10 musical excerpts three times a day for 5 consecutive days. Each excerpt belonged to a different musical genre. After each song, participants rated their present preference for the excerpt on a scale of 1 to 7. Five musicians were asked to evaluate the complexity of the excerpts in comparison to each other by categorizing them into one of five complexity levels. Overall, a general inverted-U shaped curve, followed by a successive inverted-U shaped curve was found between preference and exposure. No relationship was found between preference and complexity.

90. Haylee Raltson

University of Louisville

Mentor: Margaret Carreiro

Leaf Litter Decomposition of Native vs. Invasive Plant Species along an Urban to Rural Highway Gradient

Relatively unmanaged forests growing along interstate highways provide ecosystem services such as nutrient cycling, and removal and filtration of roadside pollutants. They also provide wildlife habitat and corridors that facilitate plant and animal movement. Since chemical quality of dead leaves controls their decay rates, invasion of highways by *Lonicera maackii* (Amur Honeysuckle) may alter nutrient cycling and leaf litter layer thickness in these forests with implications for future forest regeneration, use by wildlife, air quality and human health. This study compares the leaf litter decomposition of the native tree, *Acer saccharum* (Sugar Maple) and invasive shrub, *L. maackii*, along Interstates 71 and 64 in Louisville, Kentucky. The experiment occurred from January 25th to July 9th, 2007. Fourteen 10 x 10 m plots were established at varying distances (up to 22 km) from the city center along both highways. The Honeysuckle litter decay rate (-0.695% per day) was ten times faster than that of the reference litter, Sugar Maple (-0.0743% per day). This study detected an urban-to-rural gradient effect on litter decomposition rates along highways for Sugar Maple, but not Honeysuckle. Honeysuckle litter contained about twice the initial N content of Sugar Maple (x% vs. y%, respectively). Leaf litter nitrogen concentration increases during the first stages of decomposition (90 days) for both litter species, but Honeysuckle litter gained nitrogen 2.4 times faster than the Sugar Maple. Knowledge of decomposition dynamics along forested interstates and effects of invasive Honeysuckle on this process can inform management plans for these habitats.

91. Nirmalee Ratnamalala

Eastern Kentucky University

Mentor: Nicholas Santangelo

Angry Dads: Male Parental Aggression as a Measure of Parental Care and its Modulation Via the Neuropeptide Arginine Vasotocin (AVT)

Arginine vasotocin (AVT), as well as its mammalian homologue arginine vasopressin (AVP), has been shown to modulate a variety of behaviors such as aggression and parental care in monogamous animals, however monogamous fish have yet to be explored. Here, we investigated the effects of arginine vasotocin (AVT) and its specific antagonist (i.e. specifically binds to, but not activates, AVT receptors) Manning compound on parental aggression in males of the biparental monogamous convict cichlid *Archocentrus nigrofasciatus*. Saline and isotocin (IT; the teleost fish homologue of mammalian oxytocin) were used as controls. Because IT only differs from AVT by one amino acid, it is an ideal control to test the specificity of AVT to modulate a specific behavior. Data was collected and analyzed on the number of bites a parental male exhibited towards a strange male (i.e. an "intruder" fish). This intruder was set behind a clear partition while the parental male was caring for offspring. AVT and isotocin increased male parental aggression while Manning compound had the inverse effect (i.e. it decreased aggression). The effect of isotocin in this monogamous fish system was surprising as previous studies have shown that in polygynous systems, AVT increased aggression while isotocin had no effect. This perhaps suggests that in more "complex" biparental societies where AVT has additional functions (i.e. modulating pair bond behavior and parental care), isotocin has evolved as an added modulator of some of these behaviors such as aggression.

92. Maggie Roberts & Ashley Wellman

University of Kentucky

Mentor: Susan Frazier

STUDY 1: *The Effect of Nutritional Support on Weaning Outcome in Adult Patients Receiving Mechanical Ventilation* - Nutritional support is a major issue for critically ill ventilated patients because as many as 40% of intensive care patients are malnourished. Nutritional support for patients who require mechanical ventilation improves patient outcome by enhancing immune function, respiratory muscle function and ventilatory drive. There are no recent studies that evaluate nutritional support and weaning outcome. Purpose: To describe the nutritional support practices and determine the effect of nutritional support on weaning outcome in patients supported by mechanical ventilation. Methods: This is a retrospective medical records review being conducted at an academic medical center. A random sample of 225 patients was chosen from a list of all patients who received mechanical ventilation (n = 613) from January 1 through June 30, 2007. Nutritional support, defined as enteral or parenteral solutions administered, will be evaluated by calories prescribed and administered, route administered, biomarkers of nutritional state and cumulative fluid balance. Nutritional state will be evaluated during the time the patient received ventilation and weaning outcome will be determined. Descriptive statistics will characterize nutritional support practices. T tests and chi square analysis will be used to compare nutritional support between patients who were successfully weaned and those who were not. Results: Data collection is anticipated to be completed by January 1, 2008. Conclusions: These data will provide information about the current practices related to nutritional support for patients who require mechanical ventilation and determine the effect of nutritional support on weaning outcome.

STUDY 2: *Safety Practices Used by Critical Care Nurses in the Care of Patients Receiving Mechanical Ventilation* - Daily around 12,000 patients receive mechanical ventilation in US hospitals. Since January 2002, there have been 23 reports of injury due to mechanical ventilator adverse events; death was the ultimate consequence in 83% of these cases. The appropriate use of ventilator safety protocols may reduce patient risk for injury or death. There are no studies that describe ventilator safety practices used by critical care nurses. Purpose: To describe critical care nurses' safety practices in the care of patients who require mechanical ventilation. Methods A random sample of critical care nurses (n = 793) from the American Association of Critical Care Nurses completed the Mechanical Ventilation Survey. Most respondents were Caucasian (78%) females (88%) aged 46 ± 9 years, employed in a community hospital (74%) with 17 ± 9 years of critical care experience. Results: A majority of respondents reported a lack of attention to ventilator safety that included absence of a policy to identify alarm ranges and nursing response to alarms, absence of criteria to establish ventilator alarms and criteria for alarm range changes with changing patient condition. Respondents reported that they consider that one third of ventilator alarms are false alarms. Although a majority reported use of a sedation protocol, restraints were used more than half the time with ventilated patients. Conclusions: Critical care nurses frequently employ sedation and physical restraint to increase patient safety; however, there is little attention to the use of ventilator alarms as a means to improve patient safety.

93. Brian Robertson

Murray State University

Mentor: David Eaton

Diagnosing Retirement

It is day one of retirement and over the course of your working life you have accumulated a sum of money for your retirement. Perhaps this money is tied up in several investments or within a company retirement fund. The question becomes, what should be done with the money now that you have retired? Most would agree that your investment strategy in retirement should be different than it was in your working career, but how so? How will you guard this money against inflation, low investment returns, and unexpected illnesses? These, among others, are very pertinent questions that must be evaluated in the journey toward financial security in retirement. In retirement, your first concern is to preserve the capital you spent years working for and to keep this principle safe. This means that you need to be well diversified among many different asset classes-- herein lies the difference of opinion among the investing community in which there is no real consensus about the optimal strategy for your retirement funds. This paper addresses how your assets should best be allocated to preserve capital, maximize income, and minimize depletion. It investigates the major strategies from the media, academic and professional communities. In particular the research addresses questions such as: Once in retirement, what is the best investing strategy for the retirement money? What asset allocation should be used? What are the tax effects of certain strategies? How is the withdrawal rate a function of beginning principle?

94. Nicole Scheff

University of Kentucky

Mentor: Audra Stinchcomb

Transdermal Capabilities of Clonidine for Opiate Withdrawal

Opiate is used to describe drugs derived from opium such as morphine, heroin, and codeine. The discontinuation of opiates from the human body can cause an excess in excited locus coeruleus neurons (located in the brainstem), the reason for physical symptoms of withdrawal. Clonidine, a direct acting alpha-2 noradrenergic agonist, is able to lessen withdrawal distress for addicts and therefore improve the withdrawal process. The opiate withdrawal dosing regimen is complex in which it requires multiple oral doses multiple times a day and then gradually tapering over at least a five day period. Transdermal delivery over oral dosing is preferred because it is easier to follow with such a complex schedule. This drug could be delivered transdermally varying the amounts of drug released into the blood thus eliminating the withdrawal symptoms of an opiate addict. In order to use clonidine via a transdermal delivery route, the therapeutic feasibility needed to be determined. Desired flux rates were reached and profiles of concentrations are linear. Therefore, clonidine can be tested in a patch system involving a carbon nanotube membrane. This membrane system, in the future, will include an electrical bias to allow the transdermal delivery system to be programmable, dispensing clonidine in set concentrations as required in the dosing regimen.

95. Todd Schoborg and Ashley Hagan

Murray State University

Mentor(s): Howard Whiteman and Nicole Gerlanc

Microsatellite Analysis of a Polymorphic Population of Tiger Salamanders, Ambystoma tigrinum

The ultimate goal of this study is to assess fitness trade-offs in a polymorphic population of Tiger Salamanders, *Ambystoma tigrinum*, using six microsatellite sequences as genetic markers to assign parentage. Using known parent/offspring combinations, we hope to gain an understanding of why a polymorphism is maintained in a particular population and not others. Once an understanding of why a polymorphism is maintained, it may be possible to predict under which environmental conditions each morphology is favored. Sexually mature male and female salamanders were placed in mesh "clutch bags" during the breeding seasons of 2005 and 2006 at the Mexican Cut Nature Preserve in Colorado and allowed to breed. Tissue samples from the known mother and presumed father, and a portion of the eggs laid in the "clutch bags" were then collected. Twenty-five clutches from both metamorphic and paedomorphic individuals were used in the analysis. To date, we have extracted DNA from 99 individuals and assessed the allelic variation for 6 primers.

96. Jes Sherman

University of Kentucky

Mentor: John Anthony

Toward Soluble, Air-Stable N-Type Organic Semiconductors

Organic bulk heterojunction solar cells, readily fabricated from blended solutions of donor and acceptor materials, offer lower-cost alternatives to traditional silicon-based solar cells. Despite widespread interest in the contribution of carbon-based photovoltaics to renewable energy efforts, a major deficiency in the general area of organic electronics is the relative scarcity of suitable n-type (acceptor) semiconductors. The functionalized perylene diimides we report are highly soluble, photostable and unreactive towards donor materials such as solubilized pentacene and conjugated polymers. We have used these new materials as acceptor materials in bulk heterojunction solar cells, where initial studies have shown measurable photovoltaic power conversion. Another series of n-type semiconductors, functionalized anthradithiazoles, have been synthesized; their crystal packing and performance in organic thin-film transistors will also be discussed.

97. Lindsay Shroyer, Lauren Hinton, Katie Short, Katy Lane, Brittany Waiz, Lacey Skaggs, and Stacy Overstreet

Western Kentucky University

Mentor(s): Mary Lloyd Moore, Janice Carter Smith, and Frank Kersting

Service Provision to Individuals and Families in Western Kentucky University's Clinical Education Complex

Communication Disorders' students were assigned to provide services to families or individuals regardless of ethnicity, religion or national origin. Consequently, Communication Disorders students learned to interact with people of diverse ideas, culture and national origin. The specific populations identified to meet this outcome are individuals enrolled in the department's clinical programs for Acquired Brain Injury Resource Program, the Kelly Autism Program and other related programs. Student clinicians assigned to provide evaluation and intervention services provided an in-service to undergraduate students. During the in-service, the clinicians administered a pre-post test to assess the student's knowledge of diverse populations and appropriate intervention strategies and thereby assessed the impact of these programs on training students to provide appropriate services.

98. Ryan Sinclair

Northern Kentucky University

Mentor: David Hogan

Causal Decision Making in College Students

In the present study, college students were required to press a computer key and observe whether a light bulb icon on the monitor changed in brightness. Under one experimental condition, the response-outcome contingency was random, but there was a high frequency of coincidence between pressing the switch and illuminating the light bulb (i.e. the probability of the outcome was .75). Under another experimental condition, the response-outcome contingency was random, but there was a relatively low frequency of coincidence (i.e., the probability of the outcome was .25). The purpose of the experiment was to see if a stronger illusion of control developed when the coincidence rate was high than when it was low. The results will shed light on the nature of experience, which leads people to believe that they have control over important consequences in their life when they really do not.

99. Candace Smith

Murray State University

Mentor: Pat Williams and Kris-Ann Kaiser

Stabilizing Greenhouse Temperature Fluctuations with the Implementation of a Below-Bench Baffle System

To produce maximum growth results in crops, certain temperatures are desired in a greenhouse. Desired temperatures can be achieved with an active air cooling system. However, airflow properties will draw the cool air downward in the center of the greenhouse. This causes inconsistent plant growth from the ends of the greenhouse to the center, with warmer bench temperatures in the middle. For this project, data will be collected over a three-month period. Temperature at each of the 32 benches will be taken at the bench and ground levels. The data will be analyzed to determine where the temperatures in the greenhouse are highest and lowest, when the temperatures are noticed to have changed and by what margins, and whether or not there is a set pattern to the temperature fluctuations. To manage the cool airflow, baffles will be constructed out of VC, plastic painter's drop cloth, and secured with duct tape. First, the temperature readings will need to be analyzed and a calculated placement of the baffles determined. Second, new readings will be taken to determine the effect of these placements, as well as make any needed adjustments in the placements. The process will be refined until the desired bench-top temperatures are achieved. Depending on the results of the study, a permanent baffle system will be constructed in the Pullen Farm Greenhouse Complex at Murray State University and further research will be conducted.

100. Lisa Smith, Meagan Goodwin, and Sarah Enzweiler

Northern Kentucky University

Mentor: Mark Wasicsko

Great Teachers, Great Me

Who was your favorite teacher? What characteristic do you remember first about her/him? In a nation-wide survey, these questions were asked of over 3000 people in order to determine the characteristics of favorite teachers. This poster presents the results and provides valuable insights into what should be included in teacher preparation programs. Preliminary results indicated that people remember the human characteristics of their favorite teachers before the knowledge they imparted or teaching skills they employed. This information would be useful for improving the learning impact of future and in-service teachers. Most recent efforts to improve student learning have focused almost exclusively on increasing teachers' knowledge rather than on the human elements such as helping teachers interact more positively with students or improving teaching skills. While content is obviously important, the survey results indicated that the teachers who can facilitate significant and meaningful learning are those who can create and maintain positive learning "relationship" with their students. Over the past year, the survey data has been analyzed and grouped into three general categories: disposition, teaching skills, and knowledge. Based upon the data, people tended to remember the dispositional characteristics as being most important. Our poster displays results and asks observers to participate in a brief self-scoring exercise about their favorite teacher.

101. Brooke Solloway and Leslie Martin

Morehead State University

Mentor: Cyndi Young Gibbs

Sports Concussions and Depressions: A Correlational Study Utilizing Functional Magnetic Resonance Imaging (fMRI) in Assessment and Diagnosis

A concussion is the most unrecognized injury in the world of sports. Every concussion, no matter how mild, injures the brain. This type of injury is prevalent in athletes at all levels; however, the diagnosis of such injuries is often overlooked by even the most experienced coach. A study conducted by the University of North Carolina's Center for the Study of Retired Athletes found that clinical depression was strongly related with the number of sustained concussions. Over twenty percent of the 595 players who recalled having three or more concussions said they experienced depression. The objective of this study was to correlate the number of concussions with the likelihood of developing depression among athletes. An extensive literature review and an informal survey of two world renowned neurosurgeons and a neuropathologist were conducted by the researchers. While computed tomography and magnetic resonance imaging modalities are currently the tool of choice when a concussion is suspected, a definitive diagnosis cannot be provided. The application of fMRI is in the infancy stage; however it may prove useful in the correlation of concussions and depression. Based upon this research, a pilot study is in progress to determine whether there is a significant relationship between concussions and indicators of depression among high school and collegiate athletes.

102. Vinay Srinivasan

University of Kentucky

Mentor: Timothy McClintock

CBR 2- Transgenic Mouse

Sustentacular cells, which support nasal neurons, play a key role in the detoxification of odorants. However, these cells have been neglected by olfactory biologists and it is likely that they perform important roles which the scientific community is yet to discover. One particular gene, *Cbr2* (Carbonyl Reductase II), is only expressed in these sustentacular cells. During the early stages of this project, we studied the DNA regions within and surrounding this gene in order to predict the region that controls the expression of this gene. This region is known as the promoter element. Currently, we are designing a DNA construct in which the predicted promoter element will drive the expression of a protein that is labeled with GFP (Green Fluorescent Protein). The construct allows us to verify that we have identified the correct promoter element and that this promoter element can be used in a genetically modified mouse. After this construct is created and shown to be successful, the promoter element of the *Cbr2* gene can then be transfected into a genetically modified mouse. Using this genetically modified mouse, we can purify the sustentacular cells so that we can discover nearly all the genes that the cell expresses. Once these genes are identified, we can understand what functions the cell is capable of performing in addition to its role as an odorant detoxifier.

103. Todd Walker

Murray State University

Mentor: Claire Fuller

Control of Termites by the Fungal Exposure

Termites are an important structural pest in North America and worldwide. They are also highly important in recycling of woody debris in natural habitats to make nutrients available for plants. Because of these attributes, the studies of pathogens that affect termites are of great interest to ecologists and pest managers. We have discovered a novel fungus associated with corpses of Caribbean termites. We are testing this fungus to determine whether it is a pathogen. We hypothesized that this new fungus will affect survivorship of individual termites. To test this hypothesis, we exposed local *Reticulitermes flavipes* 4 groups of termites to a control (5% Tween 80 solution) or one of 3 fungal spore concentrations: 103 cells/mL, 105 cells/mL, or 107 cells/mL. Fungal spores were dissolved in Tween 80 (5%). The termites were observed till their death and plated on fungal growth medium to assure that the exposed termites were infected by our exposed fungus. We expect that the termite's death rate will increase with exposure to the concentrated fungus. These results could lead to new methods of termite control. In addition, the novel fungus will allow us to conduct controlled experiments on the affect of termite pathogens on their contribution to forest ecology.

104. Stephen Wall and Whitney Schmidt

Northern Kentucky University

Mentor: Heather Bullen

Implication of Siderophores in Bacterial Adhesion onto Metal Oxide Surfaces

Biofilms are problematic in industrial, agricultural, and medical settings leading to corrosion and contamination. This research focused on the role of siderophores (organic ligands produced by many bacteria that have a high affinity for iron) in biofilm formation. The affinity of siderophores for metal ions could have the potential to influence the initial stages of biofilm formation (bacterial adhesion) on metal oxide surfaces. Siderophore/metal oxide interactions were modeled with various metal oxides using attenuated total reflectance infrared spectroscopy (ATR-FTIR) and dissolution analysis as a function of pH and ionic strength. These results were correlated with the catecholate siderophore, pyoverdine produced by *Pseudomonas aeruginosa*, an opportunistic human pathogen. The effect of siderophore production on *P. aeruginosa* biofilm formation was monitored using scanning probe microscopy and ATR-FTIR.

105. Cassie Watkins and Jared Dillow

Morehead State University

Mentor: Sean Reilley

High Levels of Test Anxiety May Bias Scores on Popular Narrow Band AD/HD Rating Scales

Attention Deficit Hyperactive Disorder (AD/HD) is a common, but frequently misdiagnosed psychiatric disorder in adults. Attention rating scales are commonly used in the diagnostic process for determining AD/HD. Few of these measures, however, have comparable clinical data which aid the clinician in discriminating between attention problems due to AD/HD and those which are secondary to other related psychiatric disorders, such as forms of depression and anxiety. Prior work in our lab has shown that subclinical levels of depression and anxiety are sufficient to yield a false positive AD/HD score in individuals without any history of AD/HD. The present study extends current knowledge in this area by demonstrating the impact of test anxiety on scores from popular narrow band AD/HD rating scales in college students. Three hundred college adults completed extensive psychosocial and academic history gathering questionnaires, the Test Anxiety Inventory, and several narrow band AD/HD Rating Scales (e.g., Adult AD/HD Self Report Scale-v1.1., Connors Adult AD/HD Rating Scales). As predicted, individuals' reporting high levels of test anxiety (1.5 standard deviations above norm), yielded significantly higher attention rating scores on narrow band AD/HD rating scales in contrast to those with normal levels of test anxiety. In addition, the level of reported test anxiety among test anxious individuals was sufficient to yield false positive scores on narrow band AD/HD rating scales in the absence of any history of AD/HD.

106. Hanna Watts

Eastern Kentucky University

Mentor: Alice Jones

Mapping Mine Reclamation Areas to Introduce Beekeeping Programs

The purpose of the project is to develop a set of site selection criteria that can be used to identify good candidate mine reclamation areas that could be used for beekeeping by (a) using a geographic information system to analyze the physical and environmental characteristics of three mine reclamation areas and their suitability for beekeeping; and (b) establishing three case study hives to compare the relative success of bee colonies under different physical and environmental conditions; and (c) identifying the physical and environmental characteristics that are associated with success in the case study hives. Through a combination of remote geographic analysis and site visits, several potential study sites will be identified. Ideally, sites will be chosen to represent differing degrees of vegetation, and soil compaction. The data collected from the visits, in conjunction with satellite images and recent topographic maps, will then be digitized into a Geographic Information System database. From these field and remotely obtained data, a detailed map of each site will be generated. Hives will be placed at three different locations. The bees will then be monitored to determine how well they survive-or thrive-in each environment. In addition to mapping suitable locations to install apiaries, a document will be created that will explain how and why certain sites were chosen, information about the hives introduced at the Big Elk site, as well information about other beekeeping for rural development programs, and possibilities for obtaining funding for regional beekeeping programs.

107. Brook E. West

Eastern Kentucky University

Mentors: Susan Godbey and Walter Borowski

Pesticides Screening of Wilgreen Lake in Madison County Kentucky

Wilgreen Lake in Madison County has displayed characteristics indicative of severe nutrient loading. Agricultural runoff, livestock production, runoff from developed areas, and septic systems are present in the areas surrounding the lake and may be factors contributing to the nutrient loading. These factors have the potential for contributing to the presence of heavy metals and pesticides in the lake waters as well. In order to more clearly assess the environmental health of the lake, a multifaceted study was initiated by scientists from the fields of biology, chemistry, and earth science at Eastern Kentucky University (EKU) with the support of the Madison County government. The portion of the study reported here is the initial screening of the lake and its tributaries for the presence of herbicides. To accomplish this, immunological laboratory tests for two common herbicides 2,4-D and metolachlor, were conducted on water samples collected in October, 2007. For each test, about two dozen water samples were collected at various locations and water depths from the lake and its tributaries. The levels of 2,4-D were found to be lower than the limit of detection for the method (2ppb). Tests for the herbicide metolachlor also indicated levels less than the limit of detection for that method (0.05ppb). These results provided a snapshot of the levels of these herbicides in the lake at the time of the study and will be useful for comparison in follow-up studies that have been planned to screen for these and other pesticides in the lake during the active growing season when the application of pesticides in the region surrounding the lake is expected to be higher than pesticide usage in the fall.

108. Chelsea West and Andrea Wilder

Western Kentucky University

Mentor: Daniel Carter

Forensic Dentistry: Taking a Bite Out of Crime

Forensic dentistry, also referred to as forensic odontology, is the aspect of dentistry dealing with securing, managing, and presenting dental evidence in legal proceedings. Today, by just flipping on the television, you can see forensic dentistry at work. With mass disasters like Hurricane Katrina and 9/11 occurring around us, it's evident that we need a way to identify victims of these horrible traumas. Dental records also show restorations, extractions, surface structure/root configuration, adjacent teeth, and any other unique landmarks in a person's mouth. The key role of dental records and accurately recording findings during a dental exam by the dental hygienist in the forensic dental team are presented. Forensic dentistry is an ever expanding field with lots of interesting techniques and data.

109. Damien Wilburn

University of Louisville

Mentor(s): Richard Feldhoff, Pamela Feldhoff, and Kathleen Bowen

Sequence Analyses of a Large Multigene Family of 7 kDa Pheromones from Plethodon shermani

Plethodon shermani salamanders, indigenous to the mountains of western North Carolina, have been of great interest to evolutionary scientists due to their unique courtship behavior. The mating ritual involves the male turning back and slapping his mental gland to the female's nares whilst having his tail straddled. The function of the slap is the delivery of non-volatile, proteinaceous pheromones designed to increase the female's receptivity. In behavioral tests, the 7-kDa family of pheromones known as Plethodontid Modulating Factor (PMF) decreases receptivity, yet increases it when part of the whole extract. An oddity of these PMFs is their highly conserved untranslated region (UTR) within the mRNA. RT-PCR first produced a cDNA library followed by a novel PCR amplification with primers designed to anneal to the UTR of only PMFs; those sequences were selectively amplified, cloned, and sequenced, yielding 48 PMF isoforms. Shotgun sequencing of previous library constructs yielded 32 unique PMF isoforms, resulting in a total of 80 isoforms. These sequences show both commonality and distinctions in the coding region, and based upon the signal peptide were separated into three major subfamilies. Despite significant homology to xenoxins and snake cytotoxins - particularly in their quadruple disulfide bonding motif - the majority of PMFs constitute two of the subfamilies, and in contrast to other three-finger proteins, carry a negative charge. Having a direct influence on female receptivity and exhibiting such large variability, these pheromones are likely to serve as a powerful model of not only gene regulation but also evolution and speciation.

110. Crystal Williamson

University of Louisville

Mentor: Pavel Zahorik

Auditory Distance Perception: Effects of Reverberant Energy Truncation

Studying auditory distance perception is essential in order to add to the description of perceived auditory space in three dimensions. Auditory distance perception plays an exceptionally important role when visual information is obscured. While previous studies have shown that visual distance perception is quite accurate, auditory distance perception has been shown to be less precise. Previous studies have also shown that four cues are used to judge distance from a sound source. These include the ratio of direct-to-reverberant energy, intensity, spectrum and binaural differences. Listeners encounter environments with sound reflecting surfaces most often. Distances are easier to estimate in enclosed spaces because the direct-to-reverberant energy cue is available. The ratio of direct-to-reverberant energy decreases as distance to the source increases. The present study focuses on altering the ratio of direct-to-reverberant energy by truncating the decaying reverberant energy tail. In this experiment, listeners, inside a sound attenuating room, listened to auditory signals presented through headphones. Following each signal, participants reported their estimates in feet of how far away the source of the signals seemed. The signals differed in source distance, duration and reverberant energy. Although there was substantial individual variability, overall, a statistically significant decrease in distance estimate accuracy was observed for the short signal with truncated reverberant energy - the condition that most altered the direct-to-reverberant energy ratio relative to natural listening conditions.

111. Caroline Wilson

Kentucky State University

Mentor: George Antonious

Mitigation of Environmental Pollution by Pesticides using Soil Management Practices

Information is needed to quantify both horizontal movement of pesticides into surface waters and vertical movement into groundwater. The Kentucky Agriculture Water Quality Act was implemented in 1994 to protect surface and groundwater resources from pollution by agriculture and silviculture activities. This act specifically affects land used for the production of livestock, poultry products, growing crops and/or harvesting of trees. Under this Act farmers with 10 or more acres of land are required to develop a water quality plan of "best management practices." Some of these practices include the use of buffer strips or cropping systems to protect the water quality by filtering sediments, nutrition and agricultural chemicals before they runoff and reach surface water. The boundaries of a pesticide are the bottom of the root zone and the edge of the field. A pesticide movement is assumed to have occurred if the pesticide is leached below the root zone, or leaves the field boundary into surface waters. Recent changes were made to the Water Quality Act, which affect livestock and nutrient management, as well as guidelines for timber harvesting operations. In this investigation, we provide an overview of managing ecosystem sustainability and summarize research results of our research in different soil management practices implemented at Kentucky State University Research Farm to mitigate environmental pollution by pesticides and protect Kentucky's environment.

112. Serena Wilson and Derek Manley

Murray State University

Mentor: Timothy Johnston

Satisfaction of Degree-Seeking International Students With University-Provided Services

The purpose of this research is to measure the satisfaction of degree-seeking international students with University-provided services. The University directly provides support to international students to help make their transition easier. The results will be used by Student Affairs to increase international student retention. The findings are the results of a survey of over 70 international students. The study examined the effects of satisfaction with advice and information given by the University, participation in University-sponsored programs, interaction with American students, availability of transportation, participation in orientation activities, membership in student organizations, and other variables on international student satisfaction. Results will be used to help better serve international students and increased retention will contribute toward the University attaining its enrollment goals.

113. Laura E. Wood and B. Damon Wood

Kentucky Community and Technical College System – Owensboro

Mentor: Micah Perkins

Photosynthetic Productivity Responses of an Invasive Aquatic Plant, Brazilian Waterweed (Egeria densa Planch)

Brazilian waterweed (*Egeria densa* Planch) is a submerged aquatic plant native to South America. Of interest was understanding how this robust, invasive, and noxious plant, which often competes with native flora, would respond to human-imposed environmental effects such as increases in carbon dioxide, acid rain, and water pollution. Waterweed fragments were placed into 600-ml beakers, with inverted funnels covering the fragments, and test tubes placed on each funnel to determine photosynthetic productivity by measuring the amount of oxygen gas at the top of each test tube produced from each plant fragment. To simulate environmental effects, ten plant fragments were used, each in a beaker, for the experimental treatments and the control. Results indicated that short-term exposure to increased carbon dioxide levels increased waterweed productivity, while increases in acidity and pollution decreased productivity.

114. Jared Woods

University of Louisville

Mentor: J. Christopher States

Resveratrol Induces G1-Arrest in Response to Low-Level DNA Damage in Lung Cancer Cells

(+)-7R,8S-dihydroxy-9S,10R-epoxy-7,8,9,10-tetrahydrobenzo[a]pyrene (BPDE) is a metabolized, carcinogenic polycyclic aromatic hydrocarbon that is a major cause of lung cancer. BPDE covalently binds to guanine in DNA and can cause mutations. At low levels of DNA damage that are still carcinogenic, a DNA repair response is weak or not activated. Studies show that resveratrol, a chemopreventive antioxidant, can reduce cancer induction by chemical carcinogens. Possible mechanisms include alteration of G1 arrest by enhanced induction of p53, which has been called the guardian of the genome, and p21, a protein responsible for G1 arrest. Dephosphorylation of retinoblastoma (RB) proteins could also cause the lung cancer cells to arrest in G1. Our hypothesis is that resveratrol will enhance the G1 arrest in response to DNA damage induced by BPDE. Western blot protein assays were used to test this hypothesis. The results showed that resveratrol did not alter the induction of p53 and p21 by BPDE. However, the BPDE dose-dependent dephosphorylation of RB was shifted to lower BPDE concentrations by resveratrol pre-treatments. These results suggest that resveratrol enhances G1 arrest in response to DNA damage thus allowing more time for DNA repair.

115. Ida Wrocklage, Megan Hammersmith, Denise Grundhoefer, and Christine Bundenthal

Eastern Kentucky University

Mentor: Marianne Ramsey

STUDY 1: *Moving at the Speed of Sound* - In order to inform other inquisitive interior designers about the proper use and application of universal design techniques and products, the poster, "Moving at the Speed of Sound", effectively addresses case specific issues involving low vision and blindness by listing various methods and solutions needed to enhance the quality of life for those with such impairments. The poster is primarily intended to provide members of the trade (designers, architects, and contractors) with direct information about ADA (American's with Disabilities Act) regulations involving the visually impaired population at a glance while demonstrating the affects of particular colors and fonts preferred by individuals with low vision. Research plays a key role in determining the appropriate typeface, shade of color, and arrangement of text and graphics utilized in the poster to appeal to both the designer and visually impaired viewer. The overall color selection and layout consists of viewer-friendly hues of violet and white which according to studies conducted by the American Foundation for the Blind produce high levels of contrast and luminance which enhance legibility for individuals with vision impairments. Color psychology also plays a significant role in determining the dominate color of the poster, which allows violet to be used as a symbol for both vision and contemplation. Information provided on the poster is a collaboration of various tips and facts about the visually impaired population and the influence sound has on such individuals when navigating a space. The poster highlights a variety of design techniques which will greatly improve the function and navigability of a building that accommodates the needs of visually impaired individuals.

STUDY 2: *Design Considerations for Special Populations* - In the Interior Design field, taking in the consideration of special populations gives new and unexpected challenges. Providing specific informational sets of data directed towards the designers themselves allows for quick and easy reference when dealing with these special populations, such as dementia. Dementia patients have the presence of or resulting disabilities from cognitive or mental impairments. By understanding that cognitive and mental impairments can change how a person thinks, acts and/or feels only briefly gives you a picture of how people with Dementia live their everyday lives. Being able to understand completely is having all the knowledge to do so. As a traveler in new terrain, as many designers have and will continue doing in the future, educating yourself as best as you can is the way to develop a well rounded plan to accommodate special populations. Being aware of the individuals and the world that surrounds them will only continue to give you the pieces you need to design a space and a life for those in need. As interior designers, it is our job to make the quality of life for people with special needs, or people without them, more meaningful and capable. Knowledge gives you the confidence to build and better lives of not only one person, but the entire world. That is why my statement, "Knowledge is having all the pieces", only helps to reiterate the importance of designers in the world of humans, regardless of their population.

STUDY 3: *Designing for Autism* - Autism is a neurological disorder that is still a mystery to many medical professionals. The symptoms and triggers of each person with autism vary greatly. In a recent project, my interior design professor had our class create a poster that focused on the special needs of a particular group of people. In interior design it is important that the needs of the client are met in the most efficient way possible. The poster design allows design professionals to see what issues must be considered to create a peaceful ambiance for those with autism. The five senses are at the center of the design considerations that would need to be executed for their particular interior environments. For example, those with autism often find solace and comfort in listening to soothing music, neutral and simplistic color schemes, and soft and interesting textures. Along with these issues come environmental problems that not only affect those with autism but many people around the world. Certain lighting and chemicals should not be used around people with autism. Fluorescent lighting and toxins from cleaning products or fabrics can cause triggers in those with autism, leading to a meltdown and potential loss of control. In a world where the special needs of others are not always addressed, posters and design ideas such as these could truly improve the quality of life for many suffering from autism and cannot be heard.

STUDY 4: *Five Principles for Designing for The Hearing Impaired* - As an interior designer, it is important to address the needs of everyone, including special populations. Through research, interviews, and simulations, I have accumulated information on how to better design for those with special needs; specifically the hearing impaired. Acquiring research skills and learning how to present that information in a creative and interesting way is a vital component of my education as an aspiring interior designer. My poster is intended as a quick reference for practicing interior designers; however it can also be used by the general public. The information gathered is presented in a creative and engaging way that attracts the viewer's attention and encourages them to continue reading the poster. Designing for the hearing impaired involves addressing issues such as acoustics, lighting, and technology. My poster "5 Principles For Designing For The Hearing Impaired" features products, graphs, and other visual information, including an interior that caters to those with hearing impairments, to better clarify how to design for special populations.

116. Zachary Wyatt and Jacob Shelby

Kentucky Community and Technical College System – West Kentucky

Mentor: Bobby Ann Lee

STUDY 1: *Stream Habitat Assessments in western Kentucky – Low Verses High Gradient* - The EPA uses Habitat Assessment methods to categorize stream habitats into four categories based on parameters such as riparian zones, pools, aquatic vegetation, substrate and sedimentation. There are two forms of the EPA sheets, low gradient and high gradient, each with ten parameters to quantify, with three of the parameters differing between forms (i.e. frequency of riffles on high gradient form, pool variability on low gradient form). This field research collected stream data using both low and high gradient Habitat Assessment sheets, average sampled particle size, and measured gradient over a 50-100 meter reach for each of 20-30 streams in western Kentucky. It is hypothesized that the low gradient form will best fit the geography and topography of western Kentucky; however, there may be some streams in the area which could utilize the high gradient form effectively.

STUDY 2: *Stream Habitat Assessment and Frog Distribution* - Amphibian monitoring has been an ongoing process to help scientists find out why populations vary from habitat to habitat. The survey data help explain why certain frogs like one habitat over another, or why a species population has decreased in an area. The U.S. Geological Survey has a program, the Amphibian Research and Monitoring Initiative (ARMI), which catalogs field research and other data to help a number of research projects involving invasive species, climate change, habitat loss or change, chemical stressors, and aspects of hydrology as possible causes to decreasing frog populations. Students used ARMI protocols in Introduction to Conservation Biology at West Kentucky Community and Technical College to collect frog distributions in western Kentucky. From this data, 20-30 sites were selected and were evaluated using EPA Stream Habitat Assessments. If a correlation exists, the Environmental Protection Agency (EPA) measures for habitat assessment may be useful as indicators for frog distributions.

117. Heather Flynn

Morehead State University

Mentor: Michelle Kunz

Readability and Comprehension of Privacy Policies

This project analyzed the comprehension of information in online privacy policies of web retailers, based upon different Flesh-Kincaid Readability Scores. This project manipulated the reading level and score of privacy policies of major online retailers. The study involved manipulating the writing style/format of existing privacy policies, downloaded from the respective websites. The procedure consisted of the students being randomly assigned to review two privacy policies of selected companies. Student subjects were asked to read the privacy policies, and then answer questions regarding the content and information presented in the policies. Students were given time to read and review the policies. They were then asked to complete a survey asking them about the content of the policies they read. Half of the students read and completed the survey on the computer and half of the students read and completed the survey via pencil and paper to determine if there was a difference in reading comprehension in reading on the computer and on paper. Questions on the survey covered information on data collection, storage and retrieval of data, sharing data, and individual options regarding personal information. The data were then analyzed to determine what effect, if any, ease or difficulty of reading level plays in comprehension of content.

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

Mr. Brad Cowgill, Interim President
Council on Postsecondary Education

Ms. Mary Morse, Executive Secretary
Council on Postsecondary Education

Ms. Jean Burgin, House Clerk
Kentucky House of Representatives

Mr. Bruce Phillips, Assistant Public Information Officer
Legislative Research Commission

Ms. Paula Wexlarz, Event Coordinator
Kentucky Division of Historic Properties

Mr. Andy Howerton, Mr. Jacob Johnston, Mr. Zachary McCoy,
Student Assistants
Murray State University

Ms. Sally Mateja, IRB Administrator
Murray State University

Ms. Sachiko Brown, Program Volunteer
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