

NORTHERN KENTUCKY UNIVERSITY • UNIVERSITY OF KENTUCKY

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

# Posters-at-the-Capitol



February 5, 2009

KENTUCKY STATE UNIVERSITY • MOREHEAD STATE UNIVERSITY • MURRAY STATE UNIVERSITY

EASTERN KENTUCKY UNIVERSITY



**Welcome from President Doug Whitlock of Eastern Kentucky University:**

Eastern Kentucky University is proud to participate in the eighth 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 to the teaching profession.

Undergraduate research is an integral component of the teaching-learning process at ECU, 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.

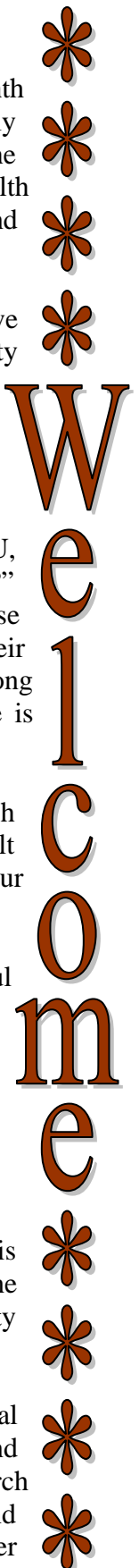
Writer A. Lou Vickery once said, “Four short words sum up what has lifted most successful individuals above the crowd: a little bit more.” Students, I am pleased to see that already you are living your life by that truth. Congratulations, and keep up the good work!



**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:**

Undergraduate research is an essential component of the university educational experience for many fields of study. Kentucky State University therefore welcomes the opportunity to showcase its students and their work through ***Posters-at-the-Capitol***.

We also welcome the opportunity the ***Posters-at-the-Capitol*** event presents to thank Kentucky's legislators and governor annually for their support of undergraduate research.

In today's complex world, the demand for talented researchers outpaces supply, a trend which worries policymakers, scientists, educators and politicians. Undergraduate research gives students a glimpse of what it's like to be researchers and an advantage in applying for graduate schools and jobs.

Students' exposure to and involvement in the discovery of new knowledge through research engages their curiosity and makes learning more relevant. Society benefits as well, as students learn to think independently and to solve problems. They learn communication and interpersonal skills as they meet peers with similar interests, collaborate with faculty members and make public presentations.

We all benefit from encouraging students to learn new skills, to discover new knowledge and later to apply those skills and knowledge within their fields and within their communities.

Kentucky State University thanks and congratulates you on the 2009 ***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 8<sup>th</sup> 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 21<sup>st</sup> century. Morehead State University is committed to the continued expansion of these scholarly opportunities for students in all academic programs through 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 J. Dunn of Murray State University:**

This year marks the eighth 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 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 eighth *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 eighth 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.

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

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. Our Chellgren Center for Undergraduate Excellence offers students and faculty unique opportunities to enrich the undergraduate experience. The creation of *Kaleidoscope* (now in its 7th year) -- a University journal dedicated to scholarly accomplishments of our undergraduates -- combined with our continued support for discovery at all levels of the University provides UK students the unique opportunity 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 Commonwealth’s elected leaders. 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 research and development.

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 eighth 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.

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



John Mateja  
Jody Cofer  
[www.murraystate.edu](http://www.murraystate.edu)



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



George Antonious  
[www.eku.edu](http://www.eku.edu)



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



Dan Curtin  
[www.nku.edu](http://www.nku.edu)



Robert Tannenbaum  
Evie Russell  
[www.uky.edu](http://www.uky.edu)



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



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



Mary Janssen  
[www.kctcs.edu](http://www.kctcs.edu)

# Schedule of Activities

9:00 a.m. to 11:00 a.m. .... Poster Setup

9:00 a.m. to 1:30 p.m. .... Legislative Visits

10:15 a.m. .... Group Photograph with Officials (Senate Staircase)

11:00 a.m. ....Welcome Remarks (Rotunda)

11:10 a.m. .... Remarks by Invited Guests

11:25 a.m. (invited) .....Governor Steve Beshear  
Commonwealth of Kentucky

11:35 a.m. ....Acknowledgements

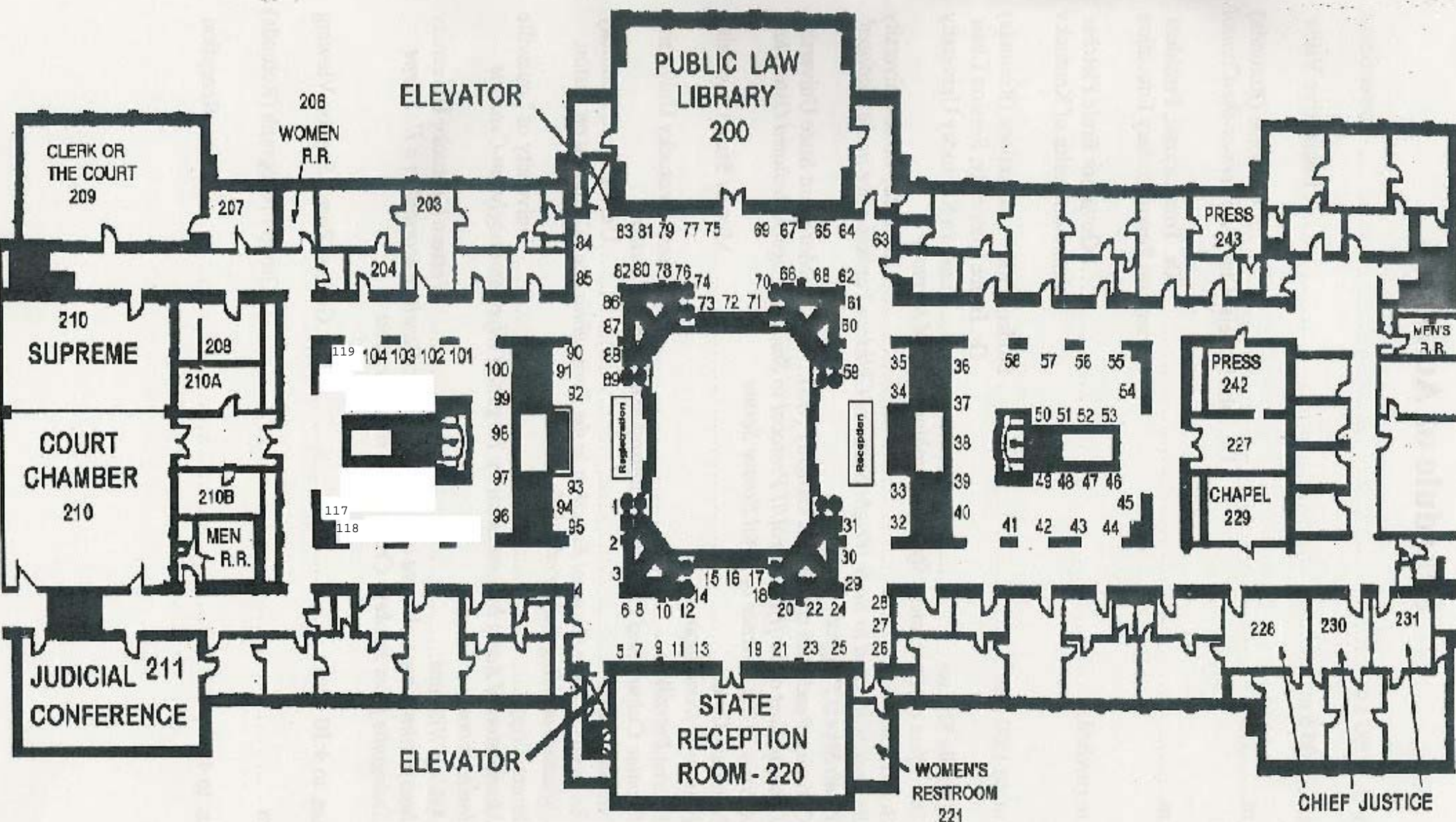
11:00 a.m. to 3:30 p.m. ....General Poster Session Viewing

1:30 p.m. to 3:00 p.m. .... Reception

3:00 p.m. to 3:30 p.m. .... Conclusion

All times listed are Eastern Standard Time.





**SECOND FLOOR  
(JUDICIAL BRANCH)**

<b>Eastern Kentucky University</b>						
<b>Poster No.</b>	<b>Student</b>	<b>Faculty Mentor(s)</b>		<b>Page No.</b>	<b>House No.</b>	<b>Senate No.</b>
3	<b>Al-Kabandi</b>	Tina	Thomas Reed	16	80	34
75	<b>Bartle</b>	Jessica	Gerald Nachtwey	56	88	12
9	<b>Bowling</b>	Bethany	Dan Florell	19	81	34
18	<b>Courtney</b>	Matthew	Nathan Jasinski	24	88	12
21	<b>Detroja</b>	Hemal	Sheila Patros	25	81	34
22	<b>Downey</b>	Chad	Stephen Richter	26	36	34
31	<b>Flanagan</b>	Matthew	David May	32	81	34
38	<b>Gilbreath</b>	Emily	Bruce Maclaren	36	81	34
48	<b>Henry</b>	Natochia	Stephen Richter	41	81	34
55	<b>Imel</b>	Jennifer	Daniel Tofan	45	98	18
31	<b>Jackson</b>	Courtney	David May	32	47	26
116	<b>Kerns</b>	Darnaby	Joyce Wolf	80	72	28
60	<b>Kiefner</b>	Allison	Jonathan Gore	48	33	36
61	<b>King</b>	Alyse	Jim Larkin	48	81	34
48	<b>Madeen</b>	Erin	Stephen Richter	41	81	34
75	<b>Marlow</b>	Savannah	Gerald Nachtwey	56	81	34
91	<b>Morris</b>	Ben	Stephanie McSpirit	64	81	34
91	<b>Pulliam</b>	Jessica	Stephanie McSpirit	64	88	12
92	<b>Richardson</b>	Roger	Todd Hartch	65	81	24
101	<b>Sanders</b>	Aumbrea	David May	70	17	10
75	<b>Thompson</b>	Daniel	Gerald Nachtwey	56	81	34
116	<b>Wilson</b>	Virginia	Joyce Wolf	80	74	28
75	<b>Wiersema</b>	Ted	Gerald Nachtwey	56	81	34

<b>Kentucky Community and Technical College System</b>						
<b>Poster No.</b>	<b>Student</b>	<b>Faculty Mentor(s)</b>		<b>Page No.</b>	<b>House No.</b>	<b>Senate No.</b>
13	<b>Buckley</b>	Wade	Shen Liu & Ehab Marji	21	1	1
14	<b>Carry</b>	Rachel	Timothy Dick	22	12	8
36	<b>Fuller</b>	Andrew	Dan Schultz	35	10	6
103	<b>Gailey</b>	Michael	Vincent Dinoto Jr. & James Lumpp	72	88	22
36	<b>Groves</b>	Brittany	Dan Schultz	35	10	6
13	<b>Hall</b>	Brad	Shen Liu & Ehab Marji	21	1	1
103	<b>Hutchison III</b>	William	Vincent Dinoto Jr. & James Lumpp	72	41	36
103	<b>Karam</b>	Anthony	Vincent Dinoto Jr. & James Lumpp	72	45	12
89	<b>Morris</b>	Jason	Micah Perkins	63	13	8
36 & 86	<b>Ortt</b>	Matthew Cody	Dan Schultz & Mary Janssen	35 & 62	4	4
89	<b>Pettibone</b>	Nancy	Micah Perkins	63	13	8
36	<b>Pruitt</b>	Joey	Dan Schultz	35	10	6
103	<b>Schulte</b>	Michael	Vincent Dinoto Jr. & James Lumpp	72	58	20
86	<b>Walters</b>	Linda	Mary Janssen	62	10	6
117	<b>Wood</b>	Laura	Micah Perkins	80	13	8
117	<b>Wood</b>	B. Damon	Micah Perkins	80	13	8

<b>Kentucky State University</b>						
<b>Poster No.</b>	<b>Student</b>	<b>Faculty Mentor(s)</b>		<b>Page No.</b>	<b>House No.</b>	<b>Senate No.</b>
12	<b>Brent</b>	Leslye	John Sedlacek & Karen Friley Kirk Pomper, Jeremiah Lowe,	21	62	17
19	<b>Craycroft</b>	De'Anna	& Sheri Crabtree Kirk Pomper, Li Lu, Jeremiah Lowe,	24	57	7
23	<b>Dutta</b>	Shandeep	& Kyle Schneider	27	57	7
26 & 71	<b>Embry</b>	Maleka	George Antonious & Tejinder Kochhar Kirk Pomper, Jeremiah Lowe,	29	56	7
37	<b>Gates</b>	Emerald	& Sheri Crabtree	35	57	7
43	<b>Hampton</b>	Marcel	Greg Graf & Charles Bennett	38	57	7

<b>Kentucky State University cont'd.</b>						
<b>Poster No.</b>	<b>Student</b>		<b>Faculty Mentor(s)</b>	<b>Page No.</b>	<b>House No.</b>	<b>Senate No.</b>
58	<b>Kakar</b>	Abdul	Michael Bomford, Paul Vincelli, Brian Geier, & George Antonious	47	62	17
26 & 71	<b>Lobel</b>	Lauren	George Antonious & Tejinder Kochhar	29	56	7
			John Sedlacek, Karen Friley, Jeremiah			
72	<b>Mack</b>	Ashley	Lowe, & Kirk Pomper	54	42	33
87	<b>Perkins</b>	Elizabeth	George Antonious	62	61	17
94	<b>Ripberger</b>	Rodney	Tamara Sluss	66	55	7
96	<b>Rodgers</b>	John	Michael Bomford & Brian Geier	67	57	7
			Changzhang Wang, Lingyu Huang,			
97	<b>Rodriguez</b>	Kiah	& Cecil Butler	67	57	7
			Narayan Rajendran & William			
106	<b>Smith</b>	Colby	Mazhawidza	74	57	7
			Narayan Rajendran & William			
108	<b>Somuah</b>	Michael	Mazhawidza	75	57	7
			Changzhang Wang, Lingyu Huang,			
110	<b>Strayer</b>	Jonathan	& Cecil Butler	76	56	7

<b>Morehead State University</b>						
<b>Poster No.</b>	<b>Student</b>		<b>Faculty Mentor(s)</b>	<b>Page No.</b>	<b>House No.</b>	<b>Senate No.</b>
2	<b>Adkins</b>	Ashley	Paul Steele	15	71	27
6	<b>Belmont</b>	Erica	Janet Ratliff	17	68	24
8	<b>Blankenship</b>	Michael	Dora Ahmadi & Sherif Rashad	18	93	31
			Philip Prater, Barb Lewis, Kimberly			
113	<b>Carson</b>	Elizabeth	Peterson, & Troy Wistuba	77	71	27
			Bernadette Barton , Eric Swank, Ann			
29 & 105	<b>Fiore</b>	Michelle	Andaloro, & Ritta Abell	31	99	27
41	<b>Fite</b>	Nathan	Thomas Pannuti	37	99	27
			Darrin DeMoss, Michael Fultz,			
32	<b>Forbis</b>	Courtney	& David Peyton	33	99	27
8	<b>Fugate</b>	Russell	Dora Ahmadi & Sherif Rashad	18	99	27
			Philip Prater, Barb Lewis, Kimberly			
113	<b>Galbreath</b>	Brad	Peterson, & Troy Wistuba	77	70	27
51	<b>Gibson</b>	Kimberly	Joy Gritton & John Hennen	42	95	29
119	<b>Gillum</b>	David	Michael Moore	82	99	27
41	<b>Graves</b>	Daniel	Thomas Pannuti	37	70	18
42	<b>Hale</b>	Erik	Adrian Mandzy	38	99	27
50	<b>Herrera</b>	Brittany	Kim Nettleton & Sara Lindsey	42	99	27
51	<b>Holbrook</b>	Kendrick	Joy Gritton & John Hennen	42	99	27
			Darrin DeMoss, Michael Fultz,			
32	<b>Howard</b>	Caleb	& David Peyton	33	97	31
53	<b>Huellemeier</b>	Megan	Donna Corley & Stephanie Johnson	44	24	14
62	<b>Knight</b>	Brian	Steve Chen	49	71	27
70	<b>Leishman</b>	Brandon	Lindsey Godwin	53	99	27
42	<b>Marin</b>	Joseph	Adrian Mandzy	38	99	27
99	<b>Maynard</b>	Briteney	Ilsun White & Wesley White	69	99	27
78	<b>Messer</b>	Rachel	Karen Taylor	58	99	27
99	<b>Osborne</b>	Steven	Ilsun White & Wesley White	69	99	27
51	<b>Rose</b>	Nick	Joy Gritton & John Hennen	42	99	27
99	<b>Ruffing</b>	Cory	Ilsun White & Wesley White	69	99	27
105	<b>Skaggs</b>	Misty	Ann Andaloro & Ritta Abell	73	99	27
			Darrin DeMoss, Michael Fultz,			
32	<b>Slone</b>	Savannah	& David Peyton	33	93	31
41	<b>Staggs</b>	Wayne	Thomas Pannuti	37	93	31
			Philip Prater, Barb Lewis, Kimberly			
113	<b>Touroo</b>	Shannon	Peterson, & Troy Wistuba	77	71	27
8	<b>Wellman</b>	John	Dora Ahmadi & Sherif Rashad	18	99	27

## Murray State University

Poster No.	Student		Faculty Mentor(s)	Page No.	House No.	Senate No.
7	<b>Biethman</b>	Michael	David Eaton Claire Fuller, Robert Volp, & Brittany Carpenter	18	5	1
11	<b>Brazelton</b>	Carrie		20	5	1
63	<b>Buford</b>	Glenna	Maeve McCarthy & Kate He In Handayani, W. Peake, A. Bailey,	50	2	1
25	<b>Coleman</b>	Scott	B. Hill, T. Lax, & D. Ferguson	28	5	1
34	<b>Combs</b>	James	Andy Kellie In Handayani, W. Peake, A. Bailey,	34	5	1
25	<b>Craig</b>	Bryan	B. Hill, T. Lax, & D. Ferguson In Handayani, W. Peake, A. Bailey,	28	1	1
25	<b>Crouch</b>	David	B. Hill, T. Lax, & D. Ferguson	28	1	1
24	<b>Edwards</b>	Wes	Chris Trzepacz In Handayani, W. Peake, A. Bailey,	27	6	2
25	<b>Elliott</b>	Carrie	B. Hill, T. Lax, & D. Ferguson	28	1	1
82	<b>Elmore</b>	Zachary	Suguru Nakamura	60	5	1
27	<b>Ethridge</b>	Chris	Edie Banner	30	5	1
30	<b>Fiscus</b>	Brittany	David Pizzo	31	5	1
33	<b>Fowler</b>	Annette	Bommanna Loganathan In Handayani, W. Peake, A. Bailey,	33	5	1
25	<b>Fridy</b>	William	B. Hill, T. Lax, & D. Ferguson	28	5	1
34	<b>Fries</b>	David	Andy Kellie	34	5	1
46	<b>Harris</b>	Kelly	Kate He	40	47	26
47	<b>Haugen</b>	Berlin	David Eaton In Handayani, W. Peake, A. Bailey,	40	5	1
25	<b>Hayden</b>	Daniel	B. Hill, T. Lax, & D. Ferguson	28	18	8
82	<b>Higashi</b>	Sakura	Suguru Nakamura	60	5	1
74	<b>Jackson</b>	Christina	Alexey Arkov	55	48	26
7	<b>Kilby</b>	Gretchen	David Eaton	18	5	1
63	<b>Kos</b>	Jona	Maeve McCarthy & Kate He	50	5	1
74	<b>Mattmiller</b>	Andrew	Alexey Arkov	55	76	12
77	<b>Mayes</b>	James	David White In Handayani, W. Peake, A. Bailey,	57	5	1
25	<b>Miller</b>	William	B. Hill, T. Lax, & D. Ferguson	28	5	1
82	<b>Muncie</b>	Christopher	Suguru Nakamura In Handayani, W. Peake, A. Bailey,	60	73	28
25	<b>Murdock</b>	Trent	B. Hill, T. Lax, & D. Ferguson	28	5	1
74	<b>Oliver</b>	Bradley	Alexey Arkov In Handayani, W. Peake, A. Bailey,	55	5	1
25	<b>Paschall</b>	Benjamin	B. Hill, T. Lax, & D. Ferguson In Handayani, W. Peake, A. Bailey,	28	5	1
25	<b>Parrish</b>	Justin	B. Hill, T. Lax, & D. Ferguson	28	5	1
95	<b>Roberts</b>	Evan	Edie Banner In Handayani, W. Peake, A. Bailey,	66	2	1
25	<b>Scott</b>	Joshua	B. Hill, T. Lax, & D. Ferguson	28	12	4
27	<b>Smith</b>	Leslie	Edie Banner In Handayani, W. Peake, A. Bailey,	30	5	1
25	<b>Stuard</b>	Robert	B. Hill, T. Lax, & D. Ferguson	28	16	3
112	<b>Thomason</b>	Sarah	Howard Whiteman	77	5	1
74	<b>Varonin</b>	Dan	Alexey Arkov	55	5	1
11	<b>Walker</b>	Todd	Claire Fuller & Robert Volp	20	6	1
74	<b>Witbrodt</b>	Kevin	Alexey Arkov	55	6	2

<b>Northern Kentucky University</b>						
<b>Poster No.</b>	<b>Student</b>	<b>Faculty Mentor(s)</b>		<b>Page No.</b>	<b>House No.</b>	<b>Senate No.</b>
4	<b>Allen</b>	Jacob	Judy Voelker	16	67	24
4	<b>Caldwell</b>	Laine	Judy Voelker	16	67	24
52	<b>Clark</b>	Lori	Mark Wasicsko	43	68	24
52	<b>Corbett</b>	Michelle	Mark Wasicsko	43	68	24
4	<b>Corder</b>	Kyle	Judy Voelker	16	68	24
52	<b>Dean</b>	Justin	Mark Wasicsko	43	68	24
52	<b>Enzweiler</b>	Sarah	Mark Wasicsko	43	68	24
52	<b>Finn</b>	Brittany	Mark Wasicsko	43	68	24
35	<b>Fuehner</b>	Michael	Wayne Bresser & Chari Ramkumar	34	61	11
39	<b>Girten</b>	Craig	Keith Walters	36	69	23
52	<b>Goodwin</b>	Meagan	Mark Wasicsko	43	68	24
52	<b>Hartfiel</b>	Justin	Mark Wasicsko	43	68	24
111	<b>Haskamp</b>	Anthony	Heather Bullen	76	63	23
52	<b>Holloway</b>	Kyle	Mark Wasicsko	43	65	23
66	<b>Kaeff</b>	Chris	John Metz	51	69	23
66	<b>Lantz</b>	Jennifer	John Metz	51	68	24
67	<b>Leach</b>	Remington	Rebecca Bailey & Lois Hammill	52	68	24
85	<b>Orndorff</b>	Jeremy	Rebecca Bailey	61	68	24
102	<b>Sartwell</b>	Melinda	Hamill, & Mike Lively	71	60	11
52	<b>Schlarman</b>	Heather	Mark Wasicsko	43	68	24
52	<b>Smith</b>	Lisa	Mark Wasicsko	43	68	24
111	<b>Syed</b>	Zineb	Heather Bullen	76	67	24
39	<b>Walsh</b>	Elizabeth	Keith Walters	36	69	24

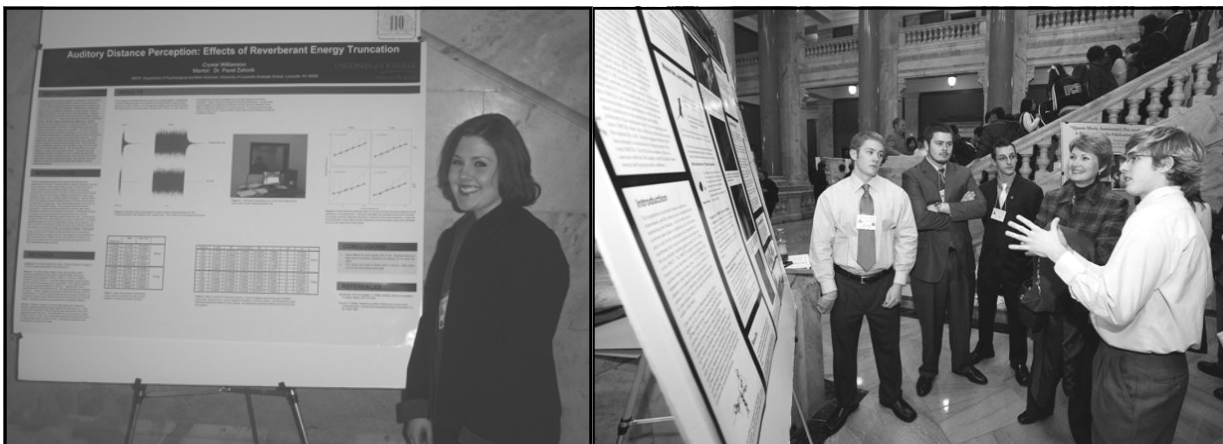
<b>University of Kentucky</b>						
<b>Poster No.</b>	<b>Student</b>	<b>Faculty Mentor(s)</b>		<b>Page No.</b>	<b>House No.</b>	<b>Senate No.</b>
1	<b>Adams</b>	Mark	James Harwood	15	100	27
5	<b>Amerman</b>	Taylor	Lori Garkovich	17	75	13
10	<b>Brashear</b>	Jenna	Robert Tannenbaum	19	14	6
15	<b>Chapman</b>	James	John Stempel	22	8	3
28	<b>Fields</b>	Alecia	Joanna Badagliacchio	30	79	12
40	<b>Grant</b>	Jason	Susan Carvalho	37	45	12
54	<b>Ighodaro</b>	Eseosa	Fitzgerald Bramwell	45	59	10
56	<b>Jawahir</b>	Nazeeha	Rebecca Dutch	46	79	12
59	<b>Keller</b>	Rachel	Kenneth Troske	47	55	14
65	<b>Kuchle</b>	Christina	Mary Arthur & Ryan McEwan	51	63	23
73	<b>Mann</b>	Lesley	Christopher Schardl	55	12	8
118	<b>McClanahan</b>	Jessica	David Puleo & Karen Novak	81	75	13
104	<b>McCoy</b>	Colleen	Buck Ryan & Chike Anyaegbunam	73	75	13
88	<b>Perry</b>	Susan	Deborah Reed & Deborah Claunch	63	75	13
90	<b>Pfendt</b>	Adrienne	Sonya Jones	64	75	13
93	<b>Riley</b>	Tim	Suzanne Smith, Raymond Lebeau, Keith Bezanson, Sarah Dennis, Dan Roettgen, & Alex Thompson	65	75	13
100	<b>Russell</b>	Rebecca	Jeffrey Bewley	70	78	28
104	<b>Seger</b>	Michelle	Buck Ryan & Chike Anyaegbunam	73	75	13
109	<b>Strange</b>	Jennifer	Joanna Badagliacchio	75	24	10

<b>University of Louisville</b>						
<b>Poster No.</b>	<b>Student</b>		<b>Faculty Mentor(s)</b>	<b>Page No.</b>	<b>House No.</b>	<b>Senate No.</b>
20	<b>Davis</b>	Katherine	Gerard Williger & Todd Dupont	25	34	19
45	<b>Harrington</b>	Patricia	Danielle Brown	39	42	35
57	<b>Jones</b>	Nicolette	Diane Orr Chlebowy	46	35	35
69	<b>Leichty</b>	Kari	Richard Feldhoff & Pamela Feldhoff	53	30	38
76	<b>Masters</b>	Joshua	Cyril Helm & Christopher State	56	98	18
80	<b>Miles</b>	Dillon	Danielle Brown	59	24	14
76	<b>Muenyl</b>	Clarisse	Cyril Helm & Christopher State	56	46	37
98	<b>Roy</b>	Eron	Awdhesh Kalia	68	47	26
76	<b>States</b>	Vanessa	Cyril Helm & Christopher State	56	59	26
114	<b>Wade</b>	Ashley	Patrick Shafto	78	74	28

<b>Western Kentucky University</b>						
<b>Poster No.</b>	<b>Student</b>		<b>Faculty Mentor(s)</b>	<b>Page No.</b>	<b>House No.</b>	<b>Senate No.</b>
49	<b>Bartlett</b>	Derrick	Kevin Schmaltz	41	21	32
16	<b>Clark</b>	Justin	Robert Choate	23	20	32
17	<b>Clark</b>	Lindsey	Cathleen Webb	23	35	35
83	<b>Gaddes</b>	Amanda	Barbara Bush	60	20	32
44	<b>Handzic</b>	Ismet	Kevin Schmaltz & Robert Choate	39	20	32
49	<b>Hayden</b>	Sam	Kevin Schmaltz	41	21	32
49	<b>Hernandez</b>	Robert	Kevin Schmaltz	41	20	32
115	<b>Holiday</b>	Tara	Cheryl Davis	79	21	32
64	<b>Kramer</b>	Samantha	Aaron Celestian	50	14	6
68	<b>Leftwich</b>	Kristin	Aaron Celestian	52	20	32
79	<b>Lindsey</b>	Bobby	Chris Byrne & Robert Choate	58	17	32
79	<b>Meyer</b>	Brett	Chris Byrne & Robert Choate	58	20	32
81	<b>Miller</b>	Sara	Marilyn Gardner	59	49	20
83	<b>Nejedly</b>	Annie	Barbara Bush	60	20	32
84	<b>Njoku</b>	Kalu	Douglas Smith	61	20	32
44	<b>Paocic</b>	Mensur	Kevin Schmaltz & Robert Choate	39	20	32
16	<b>Pike</b>	Lonnie	Robert Choate	23	27	5
64	<b>Rader</b>	Shelby	Aaron Celestian	50	21	32
84	<b>Ritson</b>	William	Douglas Smith	61	18	5
44	<b>Rutledge</b>	Jonathan	Kevin Schmaltz & Robert Choate	39	23	9
79	<b>Schroll</b>	Austin	Chris Byrne & Robert Choate	58	19	5
107	<b>Smith</b>	Dalene	Patricia Kambesis	74	20	32
16	<b>Turley</b>	Ben	Robert Choate	23	12	4
115	<b>Walker</b>	Crystal	Cheryl Davis	79	33	36



The *Posters-at-the-Capitol* Organizing Committee asks all participants to work with us and Cindi Cripps, our event photographer, to ensure we capture a diverse record of our 2009 event. A photo album will be posted on the program's website shortly following the event.



## **1. Mark Adams**

**University of Kentucky**

**Mentor: James Harwood**

### ***Molecular Elucidation of Carabid Beetle Foraging Behavior in Alfalfa***

Global trade facilitates the intercontinental movement of cargo and thus the potential introduction of exotic gastropods continues to increase. Hence, there is a growing need to understand ecological interactions of newly introduced species with the native fauna and exotic gastropods are of particular concern because they pose economic risks to many crops in Kentucky, including alfalfa, soybean, wheat and corn. Within these agroecosystems, generalist predators have been shown to feed on mollusks and, in some countries, regulate their populations. It is therefore essential to examine the mechanisms of predation, decipher the strength of interaction pathways and evaluate the role of predators in biological control. Molecular analysis of predation relies on the extraction of prey DNA from gut samples and, in Kentucky alfalfa, extensive sampling of carabid beetle populations was undertaken to elucidate the strength of these trophic pathways. In 2008, over 1,500 ground beetles (dominated by *Harpalus pennsylvanicus*) were collected and screened by polymerase chain reaction to identify the presence (or absence) of invasive slug DNA. The DNA of slugs was detectable in predator guts for approximately 12 h, indicating the suitability of this approach for food-web studies. The screening of field-collected specimens identified highly significant levels of trophic connection between ground beetles and invasive slugs in the field. Ultimately, this research has enhanced our understanding of the complex, and often coupled, dynamic interactions between predators and their invasive prey, and provides valuable information for the use of carabid beetles in the management of invasive pests in Kentucky.

## **2. Ashley Adkins**

**Morehead State University**

**Mentor: Paul Steele**

### ***Understanding Prison Populations in the Commonwealth of Kentucky***

State and federal prison populations have grown dramatically in the past thirty years. In 2007, the Commonwealth of Kentucky experienced the most rapid growth in prison population for any state in the entire country: an overwhelming rate of twelve percent (Pew Charitable Trust Center 2008). The purpose of the research presented here is to understand the relative influence of various social factors on trends in incarceration. Relying on data from the U.S. Department of Justice, Bureau of Justice Statistics and the Kentucky Department of Corrections, we examine the relative influence of changes in the State's (1) criminal incidents and arrests, (2) demographic and economic indicators, and (3) criminal justice statutes and operational policies on overall incarceration trends and those for various subpopulations of prisoners. After conducting both lagged interrupted time series and event history analyses, we conclude, as do others, that statutes and policies have had a relatively strong influence on prison populations, while demographic and economic effects have little direct effect, and crime rates are actually negatively associated with prison population trends in recent years. Particular attention has been given to persistent felony offender laws, mandatory sentencing, longer sentences, transfer of juveniles to adult courts, and alternative programs such as drug courts in the current study. Findings support the work of the State's Criminal Justice Statistical Analysis Center, and will be made available to the Department of Corrections and the Kentucky Justice and Public Safety Cabinet.



### **3. Tina Al-Kabandi**

**Eastern Kentucky University**

**Mentor: Thomas Reed**

***The Meaning and Function of Human Dignity within the Universal Human Rights Struggle for Freedom and Equality***

“Our dignity is more important than our lives” J. Steele (2008). The central goal of human rights has always been to respect and protect human dignity, equality and freedom for all human beings. Human dignity has not been fully defined in American policies, domestic laws or with respect to international law. A paradigm shift toward universal human rights in Europe, Germany, and Canada encourages international law with legal contributions toward human rights based on human rights convention. The purpose of this study was to examine the meaning and function of human dignity within the context of moral, political and legal realms and to trace the history of human dignity from the 18<sup>th</sup> century to the present day through various writings such as; The Bill of Rights, The Universal Declaration of Human Rights (1948); The European Convention for the protection of Human Rights (1950) and current scholarly articles. Analysis included the use of Immanuel Kant’s ideal of intrinsic worth, the African American struggle for human rights, the shift from civil to human rights and the concept of full person identity. Research suggests that Europe now leads the international community toward human rights. Goldhaber (2007) suggests that since the time of President Carter the United States has been engaged in a period of silence with respects to human rights. Under the Bush administration the Geneva conventions were voided leaving thousands of captives without legal recourse. Torture tactics such as water boarding and psychological torture were reinstated with little emphasis placed on the dignity of the human being. The international community needs a system of justice that incorporates human rights into their legislation, policies and courts.

### **4. Jacob Allen, Kyle Corder, & Laine Caldwell**

**Northern Kentucky University**

**Mentor: Judy Voelker**

***Examining the Prehistoric Record: Spatial Analysis of Small Finds at Non Mak La, Thailand***

The site of Non Mak La (excavated in 1994) is located in central Thailand and several hectares in size. Occupation at the site spans from the late third to the end of the first millennium BC. Preliminary stratigraphic and chronological analyses of the excavation at Non Mak La suggest two phases of occupation at the site. Analysis of the small finds dataset provides support for multiple on-site craft activities including stone bracelet and adze production as well as pottery manufacture. Several bracelet cores and adze performs were recovered in NML-Unit 5 while numerous ceramic anvils were located within NML-Unit 4 in what may be a pottery production workshop. By the late first millennium BC, evidence of iron smelting and artifacts associated with its production were recovered in NML-Unit 1 and NML Unit 2. Final analysis of small finds may determine the scale of these various craft activities and their association, if any, to metal production. Post excavation analysis of the small finds datasets was conducted at the King Narai National Museum in Lopburi, Thailand during the summer of 2008. We measured, described and photographed small finds including anvils, adzes, figurines, and clay pellets. In fall of 2008, we began spatial analysis of the small finds datasets.

## **5. Taylor Amerman**

**University of Kentucky**

**Mentor: Lori Garkovich**

### ***Student Community Involvement***

This study focuses on the issue: How and why do students in the College of Agriculture at the University of Kentucky participate in voluntary community service activities? These students were asked to complete an anonymous online survey. The results assessed the community impact of service projects by students in the college to identify ways to increase opportunities for community service, evaluate the relationship between community service and academic success, and expand the marketing of opportunities within the College. The survey was conducted online using Survey Monkey. An email was sent to all students in the College asking them to participate in the study. Participation was voluntary and responses were kept anonymous. The Associate Dean for Undergraduate Studies supported this effort by asking faculty to announce the survey process in their classes. The survey addressed the following topics: demographic background of the respondents (gender, age, and year in college); frequency and types of participation in on- and off-campus community service activities. Types of participation will include whether they personally donated money, goods, or services or solicited funds, goods, or services from others. Respondents were asked why they participated in community service activities and to rank the relative importance of different reasons. Through this survey, I hope to better understand the factors influencing the participation of college students in community service activities and to estimate the value of their work.

## **6. Erica Belmont**

**Morehead State University**

**Mentor: Janet Ratliff**

### ***Basic Personal Finance Knowledge: Who Knows What and What Do We Need to Know***

This paper tests the personal financial knowledge of students prior to and after taking a personal finance course in the spring semester of 2008 at a regional university in Kentucky. Overall knowledge of the subject matter improves with education; however, the effect of family background on personal financial knowledge was found to be statistically significant when compared to pre test and post test scores. In addition, practitioners and professionals contribute knowledge accumulated from years of experience in the field of finances to recommend that educators focus on teaching the most basic concepts of personal finance to achieve the most significant impact to improve students' lives.

## **7. Michael Biethman & Gretchen Kilby**

**Murray State University**

**Mentor: David Eaton**

**STUDY 1: *A Comparative Analysis of Land Prices in Illinois*** - As a person who has lived in southern Illinois my entire life, I have had the opportunity to watch agricultural, commercial, and residential land prices raise significantly in the past eight to ten years. This project seeks to understand why this happened. This project examines land-price changes in rural and urban areas throughout the state of Illinois to determine how changes in value of other uses of land impacts sale price. In urban areas primary alternative use of land is residential housing. In rural areas changing prices for agriculture products will change the value of the land as profits from agriculture change with price.

**STUDY 2: *Does Socio-Economic Status Impact the Choice of Religion or Denomination?*** - While economics and religion may seem to have little in common, a growing body of research attempts to both better understand the connection between economics and religion and to use the methods of economics to understand religious behavior and choices. This project had three primary goals: 1. To understand the socio-economic characteristics of various Christian denominations to determine if different denominations attract adherents of different socio-economic status. 2. To examine the behavior of those who switch denominational affiliation to determine if switching behavior is related to changes in socio-economic status. 3. To understand the impact of inter-faith marriage on women's labor and marriage choices.

## **8. Michael Blankenship, John Wellman, & Russell Fugate**

**Morehead State University**

**Mentor(s): Dora Ahmadi & Sherif Rashad**

***Radio Frequency Logging Software (RFLS)***

A computer based software system which is being developed to use the Radio Frequency Signature (RFS) of the MSU Eagle Student ID cards to electronically record when an individual signs in or out of a room, such as a computer lab for purpose of keeping accurate time sheets for tutors which can automatically be forwarded to the appropriate person(s) who need this information (most likely via e-mail). This system will be easily expandable to include other functionality. The initial plan calls for the use of a localized databases (unique to each location) to store the information of the individual RFS's. The system should be able to perform without the need of an active network, some additional functionality may require a network connection, and centralized database support is intended for a future update.

## **9. Bethany Bowling**

**Eastern Kentucky University**

**Mentor: Dan Florell**

### ***The Effects of Parent and Family Attachment on Adolescent Drug Use***

Adolescent drug use and its causes is something of high interest and concern. With the growing concern about adolescent drug use, it is important to investigate its root causes to encourage effective interventions and programming. This project investigates how the attachment adolescents have with their caregivers affects their frequency of drug use. Students filled out an in school survey in which they indicated who lives in their home with them, their attachment level to their caregivers, and their frequency of drug use. Adolescents were put into experimental groups depending on the number of "caregivers" they have living in their home with them. Caregivers were defined as mothers, fathers, stepmothers, and stepfathers. They answered questions concerning how close they felt to their caregivers, how clear the rules of their home are, and how supervised they feel they are by their caregivers. To indicate drug use frequency, they answered questions about how often they had used specific drugs during a specified time frame. Results indicated that with fewer caregivers in the home adolescents were less likely to feel a strong attachment to their caregivers and were more likely to engage in frequent drug use. A regression analysis revealed that the relationship between the number of caregivers in the home and drug use is mediated by attachment.

## **10. Jenna Brashear**

**University of Kentucky**

**Mentor: Robert Tannenbaum**

### ***Too Young to Die: The Execution of Minors and the Role of International Law in Constitutional Interpretation***

In light of the ongoing discussion of the role of courts and the process by which they interpret and apply the law, this paper examines issues of interpretation. The United States Supreme Court has decided cases using domestic and international law as sources of authority, and has made decisions in which those areas have clashed. These conflicting laws are especially evident in the Court's decisions on capital punishment. In *Stanford v. Kentucky* (1989), the Supreme Court decided that the death penalty for juveniles was Constitutional before overturning that decision in *Roper v. Simmons* (2005). The U.S. was the only country in the world to legally permit the execution of juveniles when *Roper* was decided, an indication of other nations' disapproval of capital punishment for minors and of the growing condemnation of the death penalty in general in the international community. *Roper* became the first case to significantly cite international norms as an argument against domestic law, specifically death penalty statutes. In this short period, the Supreme Court's approach shifted, and shifts such as this often bring up the question of judicial activism. This paper attempts to explain the complexities of these decisions and to examine the implications for the future of capital punishment deliberations by the Supreme Court.

## **11. Carrie Brazelton & Todd Walker**

**Murray State University**

**Mentor(s): Claire Fuller, Robert Volp, & Brittany Carpenter**

***Natural History and Immunity in a Caribbean Termite: a 10 Year Study***

Termites are highly important in recycling of woody debris into soils, particularly in tropical ecosystems. Termites are social organisms, living in colonies of up to 500,000 individuals. Living in social groups increases the risk of contracting infectious diseases. This, in conjunction with human-induced problems such as climate change and habitat degradation, could negatively affect the termites, and therefore, soil production. Previous short-term research showed that temperature and humidity affect reproduction, survival, aspects of immunity and susceptibility to fungal disease in the Caribbean termite, *Nasutitermes acajutlae*. To determine the magnitude of these affects, we conducted a 10-year study on the island of St. John, USVI. We measured the relationship between abiotic climate variables including light, soil moisture, soil temperature, relative humidity and temperature inside and out of selected nests, and biotic variables: survival, growth and reproduction of termite colonies. We are also further examining how their immune system is affected by their habitat. Previous research documented that one aspect of termite immunity (phenoloxidase activity) increases with temperature, as does susceptibility to fungal infections. To determine the affect of habitat on a second aspect of immunity, we are examining fat content of termite bodies taken from the multiple microclimates. We will present the relationship between environmental conditions and termite survival, growth, reproduction and immunity. This study provides insight into how climate change might affect soils and wood recycling in tropical ecosystems.

## **12. Leslye Brent**

**Kentucky State University**

**Mentor(s): John Sedlacek & Karen Friley**

***Lady Beetle and Green Lacewing Populations in Organic, Conventional and Genetically Engineered Sweet Corn***

In sweet corn, lady beetles and green lacewings, *Crysoperla carnea*, prey upon the eggs and small larvae of corn earworm, *Helicoverpa zea*; European corn borer, *Ostrinia nubilalis*; southwestern corn borer, *Diatraea grandiosella*; and fall armyworm, *Spodoptera frugiperda*. Concerns regarding negative impacts on beneficial insects and biodiversity in conventionally sprayed and genetically engineered (Bt) crops have been raised. Thus, the objective of this research was to determine lady beetle species composition and abundance and green lacewing abundance in sweet corn using these cropping methods. Sweet corn was grown in 2006 and 2007 using organic, conventional, and genetically engineered production practices. Yellow sticky traps 232 cm<sup>2</sup> in area were used to capture flying insects at tassel and silk height during anthesis. Eight sticky traps were placed within the middle row of the center subplot in each plot. Sticky traps were replaced weekly for three weeks. In both years, pink lady beetle, *Coleomegilla maculata*, was the most abundant lady beetle caught followed by the Asian multicolored lady beetle, *Harmonia axyridis*. 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*; convergent lady beetle, *Hippodamia convergens*; and green lacewing, were captured in low numbers. Greater numbers of pink lady beetle, Asian lady beetle, seven spotted lady beetle and spotless lady beetle were found in organic than conventional or Bt sweet corn plots.

## **13. Wade Buckley & Brad Hall**

**West Kentucky Community and Technical College**

**Mentor(s): Shen Liu & Ehab Marji**

***Free Energy with Magnets***

Simple electromagnetic motors were constructed using a battery, a magnet and a piece of wire. The electromagnetic force was able to rotate the wire which formed a simple electric motor. An electromagnet engine was constructed using an oscillating magnet in a varying magnetic field. The engine was employed to construct an inertia robot.

## **14. Rachel Cary**

**Owensboro Community and Technical College**

**Mentor: Timothy Dick**

***Immunohistochemical Analysis of the Temporal-Spatial Expression of Polycystin 1 in the Zebrafish (Danio rerio) Embryo***

Polycystic kidney disease (PKD) is a common genetic disorder which frequently results in kidney failure. This renal failure occurs because the nephron tubules develop large fluid-filled cysts and are unable to function properly. The development and maintenance of the tubules require the expression of polycystin 1, the protein product of the PKD 1 gene, which is responsible for cell-cell and cell-matrix interactions. Hereditary mutations in the PKD 1 gene produce conformational changes in polycystin 1 which leads to the development of PKD. Zebrafish (*Danio rerio*) serve as a model organism with which to study vertebrate organogenesis because of their transparent embryos and rapid development. This study used immunohistochemistry to examine the temporal-spatial of polycystin 1 in zebrafish embryos undergoing normal development. It is imperative that this expression in normal kidneys be studied so that abnormal development can be understood. Results of the investigation are presented.

## **15. James Chapman**

**University of Kentucky**

**Mentor: John Stempel**

***United States - Iran International Relations***

This research seeks to further the knowledge of the United States – Iran international relations through comprehensive analysis. With the advent of modern political institutions begun during the Constitutional Revolution and the country's revitalization under the modernization and nationalism proposed by Reza Shah, the people of Iran, particularly the elite among them, began to grasp an understanding of the potential, objectives, and capabilities of their country. Both events were inspired by fundamental aspirations of the people. The spark of the 1979 Islamic Revolution was also a unifying development for a people yearning to utilize the right of self-determination. With a population gradually taking interest in its own future and responsibility for its own initiatives, the faint beginnings of citizenship seemed to have developed in Iran. From servitude to open revolution, history has witnessed, in essence, the emergence of state with respect to Iran. In this research, I am investigating and presenting information on the internal politics of Iran, analyzing and commenting on the organization of the government of Iran, critically examining the historical scholarship on the affairs of state between the United States and Iran, and investigating the current state of affairs and prospects for the future. My research focuses on background information and the distinctive set of circumstances that lead to the establishment of an Islamic government in Iran, and it will subsequently address the structure of the current government. It is my intention to express an understanding of the Iranian situation by the means of an analysis of the past.

## **16. Justin Clark, Lonnie Pike, & Ben Turley**

**Western Kentucky University**

**Mentor: Robert Choate**

### ***TCP Engineering***

The purpose of this project is to design and build a Thermal Management System (TMS) for application in Military Vehicles. This design project is sponsored by an investor who will help coordinate design requirements and specifications. They will also support the purchase of all required materials, instrumentation, and external fabrication/testing costs. This project will affect any military vehicle in which this design could be incorporated; however, this design will have special focus and implementation requirements meeting that of the Stryker LAV. The Stryker is an eight-wheeled light armed vehicle which has primarily been used in Iraq and Afghanistan in the “War on Terror.” The Stryker has many different models however this project will focus on the infantry transportation vehicle which we feel will experience the greatest thermal loads. The military vehicle, personnel and electronics that the TMS is installed in will be the primary sources impacted from our design. This project’s intentions are to improve the attentiveness of military personnel and reduce environment related electronic equipment failure by conditioning the air. The major goals of this project are to construct a test bed which will recreate the thermal loads of six personnel and electrical equipment at high ambient temperatures. In addition we will install a TMS to compensate for the heat flux generated within our mock test bed. We must purchase instrumentation to monitor the temperature (dry and wet bulb), humidity, pressures, etc. In doing so, we can ensure that the conditions are similar to a combat application of the Stryker.

## **17. Lindsey Clark**

**Western Kentucky University**

**Mentor: Cathleen Webb**

### ***A Deeper Insight to Hg Bioaccumulation in the Bat Population in Kentucky and Tennessee***

Mercury (Hg) is a persistent neurotoxin that is readily transported through karst aquifer systems such as the South Central Kentucky Karst (SCKK) ecosystem, which includes Mammoth Cave National Park (MCNP). The largest source of mercury to MCNP is atmospheric deposition, largely produced by coal-fired power plants. Hg from the atmosphere deposits in rivers, sediments, and organisms through rain, wind, and bioaccumulation. Over 350 individual bat hair samples have been analyzed for Hg from MCNP with a wide variety of species diversity. Our project will expand throughout the year to three national parks in Kentucky and Tennessee including Abraham Lincoln, Cumberland Gap, and Big South Fork National Parks. Hg levels in hair of different bat species, including federally listed endangered species have been determined and found to range between 1-13 parts per million (ppm). Further analysis will be performed on insects to gain additional information regarding how bats bioaccumulate Hg through the food chain. Many insect species that we believe to be the primary food source for the bats have been collected at MCNP and Abraham Lincoln National Park. They are undergoing analysis at this time to determine the Hg concentrations present in the bats’ food supply. Quality analysis and quality control tests were done using human hair reference standards. This multiyear project began in late summer 2002 and will continue through the end of 2009.



## **18. Matthew B. Courtney**

**Eastern Kentucky University**

**Mentor: Nathan Jasinski**

### ***Mars and Venus Go to the Symphony: A Look at the Gender Stereotypes of Orchestral Instruments***

David Cronenberg once said, “All stereotypes turn out to be true.” While this idea might initially seem shocking, crude, and tasteless, with further inspection it might prove to be an extremely valuable philosophical idea. Might a further study of stereotypes enlighten us to concepts and ideas which have not yet been reached? Harold F. Abeles and Susan Yank Porter conducted the first major study to focus on the gender associations of musical instruments in 1978. This study looked at the gender stereotypes held by children, and how these stereotypes affected their instrument preference. Many researchers have expanded upon this work. They seek a plan (or perhaps a method) for placing students with instruments and preventing students from prematurely ending their musical careers. While this information might be incredibly valuable to young beginning musicians, could it also be useful to those at the professional level? After an eight month web-hosted survey, this research begins by identifying the gender associations of musical instruments found in the symphony orchestra. It continues on to identify trends within instrumental families, and analyze how these trends have been unknowingly utilized by musicians throughout time. This research will refer to the great master’s concepts of orchestration, composition, and performance to show gender related parallels and determine how professional musicians can use this information to generate a greater understanding of the music they write, study, and perform.

## **19. De’Anna Craycroft**

**Kentucky State University**

**Mentor(s): Kirk Pomper, Jeremiah Lowe, & Sheri Crabtree**

### ***Heat Stability of Annonaceous Acetogenin Activity in Pawpaw (*Asimina triloba*) Fruit Pulp***

The North American pawpaw [*Asimina triloba* (L.) Dunal] is a tree fruit that is native to Kentucky which contains Annonaceous acetogenins in the twigs and ripe fruit. Annonaceous acetogenins are a large class of unique structurally homogenous polyketide (C32 or C34 fatty acid) compounds found in plants in the Annonaceae family. They are potent inhibitors of mitochondrial (complex I) as well as cytoplasmic (anaerobic) production of adenosine triphosphate (ATP) and related nucleotides. Acetogenins have antitumor, pesticidal, antimalarial, antiviral, and antimicrobial activity, suggesting many potentially useful applications. There has been a concern that these acetogenin compounds may not be stable with heating above 50 C; heating of extracts with sugars from the fruit could also lead to problems of caramelization. Our working hypothesis was that heating pawpaw fruit extracts above 50 C would reduce acetogenin activity in the extracts. The objective of this study was to determine the heat stability of acetogenin compounds. Ripe pawpaw pulp was extracted with 95% ethanol or 95% ethanol followed by a long enrichment protocol to increase acetogenin concentration and reduce sugar content; thereby reducing caramelization. The extracts were heated to 30, 65, or 100 C for 16 hours. The Brine Shrimp Test (BST) bioassay was employed to assess acetogenin activity of the extracts. Brine shrimp mortality at 0, 0.5, 5, and 10 ppm of extract were determined after 48 hours and the LC50 for each treatment determined.

## **20. Katherine Davis**

**University of Louisville**

**Mentor(s): Gerard Williger & Todd Dupont**

### ***Ice Stream Basal Friction Fields Using Control Methods and Inversion Techniques***

Ice stream movement cannot be modeled using inland ice algorithms. There are additional stresses that work on these faster moving flows, and consequently they require a different approach. Given thickness, surface elevation, and basal friction, the MacAyeal-Morland equations calculate an ice stream's velocity. Unfortunately, basal friction is difficult to measure directly. Conversely, velocity data are more readily obtained. It follows that in order to gain useful data concerning fast moving ice flow, we must use inverse methods to solve for the basal friction field. In this project we adopt a control method approach to minimizing the data-to-model mismatch. This approach allows for an optimal solution given potential incompatibilities between the data and forward-model assumptions. Additionally, the control method provides a direct form of the cost (or objective) function's gradient, greatly reducing the computational load required in the minimization process. Using this reduced problem helps us establish a more complete body of code which incorporates the control method technique. With this algorithm, we develop a basal friction field for the Thwaites Glacier, located in the Amundsen Sea sector of West Antarctica.

## **21. Hemal Detroja**

**Eastern Kentucky University**

**Mentor: Sheila Patros**

### ***Is It Time To Control The Rising Health Care Cost?***

The United States spends more on health care than on Social Security and national defense combined. In 2007, the US spent \$6,714 per capita on health care while Canada spent \$3,678 per capita. In 2004, the amount spent on health care in the US was less than half of what it was in 2007. For Canada, health care costs rose by over one third from 2004 to 2007 (Organization for Economic Co-operation and Development, 2008). In Canada, health insurance consists of a single payer system, while the US uses a combination of private insurance and public insurance. Life expectancy in Canada is higher and infant mortality is lower than in the US (Bell, 2007). Medications are 35-40% cheaper in Canada compared to the cost in the US. In addition, the US has laws that extend the higher price of brand name medications by five years. In 2005, Schoen et al found that about 20% of Canadians and 40% of Americans did not fill a prescription because of the cost. There is a significant need to manage health care costs in both countries, especially in the US. Improving the access of primary preventive care, educating the public about healthy life style, reducing violent crime, and controlling illegal immigration may help reduce health care cost for both countries. Appropriate policy development for managing medication costs, especially in the US, would significantly reduce drug costs and health disparities for Americans.

## **22. Chad Downey**

**Eastern Kentucky University**

**Mentor: Stephen Richter**

### ***The Impact of Mining and Residential Pollutants on Stream Salamanders in Eastern Kentucky***

Amphibian species are experiencing population declines worldwide. One cause of these declines is habitat loss and degradation. In eastern Kentucky, mining and residential development have altered nearly all stream systems. Consequently, many aquatic species have been negatively impacted. In order to determine the effect that mining and residential development has had on amphibians in eastern Kentucky, we conducted a study to assess community structure and population status of stream salamanders. At each of nine study sites within a single stream system, we conducted time-constrained searches to determine the abundance and condition (measured as body length: body mass) of salamanders and collected environmental data to assess water and habitat characteristics and quality. The quality of habitat for each site was determined using an Environmental Protection Agency habitat assessment protocol. Our sites were dominated by northern dusky salamanders (*Desmognathus fuscus*) and southern two-lined salamanders (*Eurycea cirrigera*). We found that local abundance and body condition of salamanders were inversely related to conductivity and level of habitat degradation. Elevated conductivity could be a result of heavy metals liberated from mining or increased sedimentation and runoff due to human development. Sites accounting for few or no captures had multiple chemical and physical factors that detrimentally altered the aquatic system. We will discuss these data in the context of current land use surrounding this stream system and of watershed conservation.

## **23. Shandeep Dutta**

**Kentucky State University**

**Mentor(s): Kirk Pomper, Li Lu, Jeremiah Lowe, & Kyle Schneider**

***Determining the Utility of Simple Sequence Repeat Markers for Examining Genetic Relationships in Pawpaw Varieties***

The North American pawpaw [*Asimina triloba* (L.) Dunal] is a tree fruit native to areas in the eastern United States and is in the early stages of commercial production. Since 1994, Kentucky State University (KSU) has served as the USDA National Clonal Germplasm Repository, or gene bank, for pawpaw. Cultivar loss over the last 100 years may have contributed to an erosion of the genetic base of pawpaw varieties. The assessment of genetic diversity in pawpaw cultivars is therefore an important research priority for the KSU program. In an effort to further examine genetic relationships in pawpaw, simple sequence repeat (SSR) primers were developed by partially sequencing SSR regions in pawpaw. The objective of this study was to determine if recently developed SSR primers for pawpaw could be utilized to examine genetic relationships in pawpaw varieties. Leaf samples were collected from the pawpaw selections Taytwo, Sweet Alice, NC-1, 11-13, 1-23, and three progeny of 11-13 x 1-23. Leaf samples were also collected from a cherimoya (*Annona cherimola*) tree in the KSU greenhouse; cherimoya is in the same family as pawpaw. DNA was extracted from the leaves using the DNAMITE Plant Kit. Primers B103 and B129 were labeled with FAM and used to amplify SSR products. These products were then separated using a 3130 Applied Biosystems capillary electrophoresis system. Genetic relationships among the pawpaw and cherimoya genotypes were determined.

## **24. Wes Edwards**

**Murray State University**

**Mentor: Chris Trzepacz**

***Food, Sex, And Pam-1: A Novel Role for a Fertility-Regulating Aminopeptidase in Food Sensation of C. Elegans***

Homozygous mutations in a conserved aminopeptidase, pam-1, result in reduced adult fertility and a high incidence of embryonic lethality in the model nematode *C. elegans*. We have also casually observed that in contrast to wild-type N2 worms, which restrict their movements to the area occupied by their bacterial food source, pam-1 worms tend to wander from the bacterial lawn and occasionally leave their culture plates altogether and perish. The current investigation seeks to quantify this behavior. Populations of starved larval N2 and homozygous pam-1 worms were localized on plates at a position adjacent to the food source and assayed 24 hours later for 1) the total number of worms remaining on each plate; 2) the total number of worms localized to the food source; 3) the total number of worms not localized to the food source. An additional count was made on the fourth day following the initial placement. A pilot study confirms that when compared to N2 worms, mutant pam-1 worms show significantly reduced ability to remain localized not only to the food source but to the culture plate as well. This difference may be indicative of a compromised pam-1-dependent chemotaxis response. We are currently expanding the pilot study both in number and in scope to include additional mutants that are believed to genetically interact with pam-1.

**25. Carrie Elliott, David Crouch, Bryan Craig, William Fridy, Justin Parrish, William Miller, Joshua Scott, Daniel Hayden, Robert Stuard, Trent Murdock, Scott Coleman, & Benjamin Paschall**

**Murray State University**

**Mentor(s): Iin Handayani, Whitney Peake, Andy Bailey, Bobby Hill, Tim Lax & David Ferguson**

**STUDY 1: *The Effect of Various Nitrogen Fertilizer Sources on Dark Fired Tobacco Yields*** - 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: 32% UAN (N-P-K;32-0-0), Ammonium Nitrate (N-P-K; 34-0-0), Calcium Nitrate (N-P-K; 15.5-0-0), Yara Mila (N-P-K; 15-15-15), Yara Mila (N-P-K; 21-7-14) and Hydro Comp (N-P-K; 14-0-14). The results for this project will be discussed in our poster.

**STUDY 2: *The Effects of Fungicide Treatments on Dark Fired Tobacco*** - This experiment compared seven fungicide treatments with combinations applied at various times. The whole experiment received 0.5 lbs of mefenoxam per acre on June 5th as preplant incorporated. All plots were set on June 10th with the PD 7302LC variety. The plant population was 4900 plants per acre and was set with 40 inch row spacing and a 32 inch intrarow spacing. The 1st cultivation and four week treatments were applied on July 8th. Layby (last cultivation) and six week treatments were applied on July 22nd and July 23rd. The eighth week treatment was applied on August 12th. All mefenoxam (RidomilGold) treatments were applied to the soil at 0.5 lbs a.i. /acre. All azoxystrobin(Quadris) treatments were applied at 0.13 lbs a.i./acre as a foliar treatment. The seven treatments were: Treatment #1 was untreated; Treatment #2 was mefenoxam applied at first cultivation; Treatment #3 was mefenoxam applied at first cultivation and Layby; Treatment #4 was azoxystrobin applied at 4 weeks; Treatment #5 was azoxystrobin applied at 4 weeks and 6 weeks; Treatment #6 was azoxystrobin applied at 4, 6, and 8 weeks; Treatment #7 was a combination of two mefenoxam treatments and two azoxystrobin treatments; The first mefenoxam treatment was applied at first cultivation and Layby and then azoxystrobin treatments were applied at 4 and 6 weeks. The yields from the 2008-2009 growing season will be measured and analyzed statistically.

**STUDY 3: *Dark Tobacco Cured Leaf Response to Foliar Calcium Supplements*** - In collaboration with the University of Kentucky, Murray State University set 12 plots of dark tobacco in an attempt to determine if the leaf quality for cigar wrapper tobacco could be enhanced with the use of foliar calcium. Cigar wrapper leaves serve as a niche market for dark tobacco. Currently, the dark fire tobacco grown in Tennessee and Kentucky provide a secondary vein that is quite large, leading to an unappealing yellowish stripe in the leaf wrapper when the cured leaf is used. Calcium is known to interact with cell wall structure, and is believed to impact color and size of the secondary vein upon curing. Calcium chelate, a dry form calcium supplement, and Helena, a liquid form calcium supplement, were used throughout the treatments. The Narrowleaf Hybrid Madole variety was set on June 10, with 4,900 plants per acre. Spacing consisted of 40 inch rows and 32 inch plant spacing. There were three total treatments used for the experiment. Treatment 1 was an untreated control. Treatment 2 used calcium chelate at a rate of 1 lb/acre, with four different applications throughout the growing process. Treatment 3 used Helena calcium supplement at a rate of 1 quart/acre with the same four applications as treatment 3. A four nozzle boom with 15 gal/acre capacity was used for the applications. Once the tobacco has been cured, the results will demonstrate whether applying either one or both of these calcium sources is beneficial to producers in terms of enhancing uniformity in leaf appearance.

## **26. Maleka Embry & Lauren Lobel**

**Kentucky State University**

**Mentor(s): George Antonious & Tejinder Kochhar**

### ***Heavy Metals in Edible Portions of Plants Grown in Sewage Sludge Amended Soil***

The use of municipal sewage sludge as a source of nutrients in crop production is increasing in the U.S. and worldwide. Recycling this material as a soil amendment would reduce the impact of disposal on environmental quality. Sewage sludge may contain excessive concentrations of heavy metals. Elevated concentrations of heavy metals in plants could expose consumers to excessive levels of potentially hazardous chemicals. A field study was conducted at Kentucky State University Research Farm. Eighteen plots of 22 × 3.7 m each were separated using metal borders and the soil in six plots was mixed with sewage sludge, six plots were mixed with yard waste compost, and the native soil in six plots were used for comparison purposes. During a subsequent 5-year study, plots were planted with potato (year 1), sweet pepper (year 2), broccoli (year 3), squash (year 4), and eggplant (year 5). The objectives of this investigation were: 1) to determine the concentration of seven heavy metals (Cd, Cr, Ni, Pb, Zn, Cu, and Mo) in sewage sludge and yard waste compost and 2) monitor heavy metal concentration in edible portions of plants at harvest. Concentrations of heavy metals in sewage sludge were below the USEPA limits. Analysis of potato tubers, peppers, and broccoli grown in sludge-amended soil showed that Cd, Cr, Ni, and Pb were not significantly different from control plants. Concentrations of Zn, Cu, and Mo were significantly greater in tubers and peppers grown in sludge compared to their respective controls. Zinc and Mo in broccoli heads were higher than their control plants.

## **27. Chris Ethridge & Leslie Smith**

**Murray State University**

**Mentor: Edie Banner**

### ***Synthesis of Amidopyrroles as Probes of Type 3 Aminoglycoside Kinases***

Aminoglycosides are antibiotics that were first identified in the mid 1940's and have been widely used to treat bacterial infections. These antibiotic agents bind to important cellular components to disrupt bacterial growth and cause cell death. Because of overuse, bacteria have developed methods to destroy the effectiveness of these antibiotics. One common method involves the addition of a chemical group that modifies the antibiotic. To eliminate this particular mode of antibiotic resistance, the chemical modification site must be thoroughly investigated. To this end, groups of diverse compounds must be prepared to obtain data for use in Structure-Activity Relationship (SAR) studies. To obtain these groups, a common structure is identified as a scaffold from which a variety of new compounds can be made quickly, efficiently, and cost effectively. The resultant groups of compounds, or libraries, contain diverse structural components that can be used to systematically investigate the molecular interactions involved within a specific binding site. The synthesis of two series of amidopyrroles are presented.

## **28. Alecia Fields**

**University of Kentucky**

**Mentor: Joanna Badagliacco**

### ***Children in Housing Distress: Their Health and Well Being***

National research recognizes nutritional deficiencies, sleep disorders, and increased prevalence of health conditions among children in housing distress. However, throughout a semi-structured series of interviews with families living in homeless shelters, parents repeatedly report that their children are in good health and have an overall good quality of life. These inconsistencies may indicate disconnect between the realities facing children in housing distress and their parent's understanding of their health needs. Dr. Badagliacco conducted interviews with 86 families living in homeless shelters over a period of eight years from 1993 to 2001. Each of these families had at least one child and these children and their health are the focus of this research. While no children were interviewed, parents were asked questions regarding their children's health and well being. It is the discrepancies between parental opinion and nationally reported health statistics that are being examined in relation to these children's health, well being, and opportunity for success. The potential outcomes of such differences in parental opinions versus reality could put children at risk for more serious advancing conditions. If parents cannot recognize the early stages of health conditions children may miss the opportunity for preventative or early intervention care. Additionally, health factors such as sleep, nutrition, and mental well being can develop into behavior problems and problems in school. This cycle among children in housing distress places them at a greater disadvantage for success. Intervention through policy proposals must include a combination of educational programs for families and readily accessible primary care services.

## **29. Michelle Fiore**

**Morehead State University**

**Mentor(s): Bernadette Barton & Eric Swank**

### ***Lesbian and Gay Perceptions of Felt and Enacted Stigma: Religion and Homosexuality in the Bible Belt***

This quantitative study focuses on the extent, frequency and degree in which certain types of stigma happen to gay and lesbian persons in the Bible Belt. The region of the United States known as the "Bible Belt" covers most southern states and stretches north to Missouri, and west to Texas. Using results from an online survey, this poster explores the levels of enacted stigma (obvious, preformed acts of hate based on sexual preference) and felt stigma (internalized ideas that society dislikes and discriminates against homosexuals) that surveyed individuals reported. Responses to the survey show the levels of hate, sexual and violent crimes (Enacted). Respondents reported being evicted from their homes, and losing their jobs just because of their sexual orientation. Others reported being abused, or having their homes vandalized. Informants also answered questions about their perceptions of support from various institutions (Felt). Some reported that they were not supported by friends or family and felt unwelcome in places of worship. Over 70% of gays and lesbians grew up in a religion that criticizes homosexuality. The data shows that gay men experience more physical and sexual violence than lesbians do. The vast majority of participants believe that their sexual orientation matters to others in the Bible belt. This study examines gay and lesbian perceptions of the effects of felt and enacted stigma on homosexuals living in a staunchly conservative, religion-based environment.

## **30. Brittany Fiscus**

**Murray State University**

**Mentor: David Pizzo**

### ***Oda Nobunaga's Response to Militant Buddhism Turns Genocidal***

This project studies a very important figure in Japanese history: Oda Nobunaga (1530s-1580s). Nobunaga was a military genius and powerful member of the land owning class, who succeeded in unifying one third of Japan under his power. Aspects of Nobunaga's career that are usually discussed are his military exploits, and his consolidation of power through the loyalty oaths of other land owners. However, I am studying a seldom explored topic: Nobunaga's relationship with Buddhists in Japan. I am concentrating particularly on Nobunaga's devastating campaigns against militant Buddhist groups such as the Ikko-Ikki. Nobunaga saw these Buddhists as detrimental to consolidation of power, and on several occasions called for their complete destruction or genocide. Though Nobunaga's persecutions are seldom referred to as genocide, the actions he took against this religious sect may well fit within the borders of the United Nations' definition. A big part of what determines if something is considered genocide depends on the intentions of those involved. By looking at sources from the time period, I want to figure out what Nobunaga's actual aims were. My research primarily focused mostly on primary documents on Buddhism, the Ikko-Ikki, the Sengoku Period (1500s) and Nobunaga, in an attempt to shed some light on why Nobunaga felt the need to take action against Buddhists in his domains, and whether or not these actions are truly considered genocidal.



## **31. Matthew Flanagan & Courtney Jackson**

**Eastern Kentucky University**

**Mentor: David May**

**STUDY 1: *A Look at the Deaths of Career and Volunteer Firefighters in America: Who Has the Higher Risk of Death?*** - Firefighting is one of the more dangerous professions in the United States. Each year, about 100 firefighters lose their lives while on-duty. Nevertheless, little scientific research exists that examines the causes of deaths among firefighters or the types of activities firefighters are performing at the time of their death. In this project, I used data from the National Fire Incident Reporting System and the National Fire Protection Association to examine which category of firefighters are most at risk of death while on the job: volunteer or career firefighters. Volunteer firefighters are those firefighters who work in an unpaid status with fire departments, while career firefighters are those who are full-time, uniformed firefighters, regardless of assignment. The results from this study suggest that although the number of volunteer firefighters in the United States is almost three times greater than the number of career firefighters, the number of fatalities among volunteer firefighters is generally twice that of career firefighters each year. The explanations and consequences of this finding are also discussed.

**STUDY 2: *An Examination of Trends in Mining Safety in the United States*** - Mining is one of the more dangerous professions in the United States. Each year, about 1,000 people die in mines throughout the United States. Nevertheless, little scientific research exists that examines the causes and trends of deaths in mining accidents or the demographic differences among miners in those accidents. In this project, I use data from the United States Bureau of Labor Statistics to examine trends in mining fatalities and demographic differences in those trends. The results from this study suggest that the number of fatalities due to mining accidents has slightly decreased over time and males are much more likely to have died in mines than females. The explanations and consequences of these findings are also discussed.

### **32. Courtney Forbis, Caleb Howard, & Savannah Slone**

**Morehead State University**

**Mentor(s): Darrin DeMoss, Michael Fultz, & David Peyton**

#### ***Characterization of Osteoblastic Properties of 7F2 and UMR-106 Cultures after Acclimation to Reduced Levels of Fetal Bovine Serum***

Estrogen plays an important role in skeletal physiology by maintaining a remodeling balance between the activity of osteoblasts and osteoclasts. In an attempt to decipher the mechanism through which estrogen elicits its action on osteoblasts, experimentation necessitated the development of a culturing environment reduced in estrogenic compounds. The selected media (OPTI-MEM) is enriched to sustain cultures under reduced fetal bovine serum (FBS) conditions and is devoid of the pH indicator phenol red. This protocol reduced the concentration of FBS supplementation to 0% through successive, 24-hour incubations with diminishing amounts of total FBS (1%, 0.1%, and 0%) and incorporated the use of charcoal filtered FBS. Although the rate of mitotic divisions declined, the protocol does not appear to alter the viability, cell morphology or osteoblast-like phenotype of 7F2 and UMR-106 cultures when compared to control cells grown in various concentrations of FBS. Utilizing a variety of techniques, cultures exposed to media devoid of FBS maintained the ability to express numerous osteoblast specific markers and some markers exhibited  $\beta$ -estradiol responsiveness. Hence, the cell culture protocol developed allowed cultures to proliferate while maintaining their osteoblastic phenotype and provides an alternative avenue to study the anti-resorptive role of estrogen on skeletal turnover. The use of calcium channel antagonists (diltiazem and nifedipine), to block voltage-regulated L-type calcium channels, were also investigated. This avenue of study was initially designed to observe the viability of osteoblast-like cells exposed to the antagonists and ultimately the flow of calcium across their membranes in a significantly reduced estrogen environment.

### **33. Annette Fowler**

**Murray State University**

**Mentor: Bommanna Loganathan**

#### ***Trace Level Analysis of Polybrominated Diphenyl Ethers in Samples From the Murray Water Treatment Plant Using a Gas Chromatograph-Electron Capture Detector***

Polybrominated diphenyl ethers (PBDEs) are one of the additives in flame retardants. These compounds are used in industrial and domestic applications such as plastics, textiles, and in electronic appliances including computers and televisions. Widespread use of PBDEs have resulted in environmental contamination. Exposure to PBDEs can cause harmful effects in wildlife and humans. Due to widespread use of this chemical, environmental media such as air, water, and biota (plants and animals) are contaminated with PBDEs. PBDEs discharged from waste water treatment plants (WWTP) are considered to be one of the important sources of PBDE contamination of rivers and lakes. In this study, an assessment was made on the quantity of PBDEs that are being discharged from the Murray Waste Water Treatment Plant (MWWTP). Influent, effluent water, suspended sediment, and sludge samples from MWWTP were collected and analyzed for PBDEs. A gas chromatograph equipped with electron capture detector (GC-EDC) was calibrated using known concentrations of PBDE standards.

## **34. David Fries & James Combs**

**Murray State University**

**Mentor: Andy Kellie**

### ***Gravity Modeling in the New Madrid Seismic Zone***

The objective of this study was to model the Bouguer gravity of the New Madrid Seismic Zone (NMSZ). This work was intended to investigate the relationship (if any) between modeled gravity and earthquake foci in the NMSZ. Previous gravity work in the NMSZ has been done by Langenheim (1995) and Hildenbrand (1985, 1977). Bouguer gravity within the NMSZ has been modeled by Keller, et al. for Kentucky (1978) and by Johnson and Stearns (1967) for Tennessee. Kellie and MacKay (2002) modeled the geoid-ellipsoid separation in western Kentucky. Structural investigations in the NMSZ are reported by Crone et al. (1985, 1982, 1979), Grohskopf (1955), and Rabat et al. (1987). Based on this work, it seemed appropriate to use an independent gravity data model and classical terrain corrections over the NMSZ in an attempt to investigate the relationship (if any) between earthquake foci and Bouguer gravity. Modeled gravity for this research was determined for a grid of 600 points using the Surface Gravity Prediction Model of the National Geodetic Survey. Bouguer gravity was then computed using standard correction formulae as provided by Sharma (1986) and Telford (1967). The location of earthquake foci in the NMSZ for  $M = 2$  to  $M = 5$  were obtained from the U.S. Geological Survey. Earthquake foci and Bouguer gravity then were plotted in Surfer (Golden Software, 2003) as a series of isoline maps and surface models. The results of this work show little, if any, correlation between Bouguer gravity, earthquake foci, or the location of the NMSZ as evident from foci plot. The location of a suspected pluton in the northwest quadrant of the NMSZ, as reported by Langenheim (1995) was confirmed, but no other structural features are apparent directly from Bouguer gravity. Work with second derivative analysis was inconclusive. The second derivative plot does correlate with the northwest pluton previously mentioned, but it is otherwise unremarkable. Additional work suggested by this research includes development of a denser gravity grid on which to base Bouguer anomalies. In addition, the second derivative analysis should be refined and apparent isotropy in the plot examined.

## **35. Michael Fuehner**

**Northern Kentucky University**

**Mentor(s): Wayne Bresser & Chari Ramkumar**

### ***Structural and Magnetic Studies of Cobalt-Ferrite for Potential Pressure Sensor***

#### ***Applications***

We have successfully synthesized  $\text{Co}_x\text{Fe}_{3-x}\text{O}_4$  ( $x = 1$ ) and have performed Fe-Mössbauer, x-ray diffraction and magnetization measurements. In order to explore the potential applications of this ferrite, it is important to investigate the systematic compositional changes in structural and magnetic properties by employing the above techniques along with Raman spectroscopy and scanning electron microscopy. This will help in understanding their magneto-mechanical properties and in tuning the ferrite's properties for magnetoelastic pressure sensors. Our interest in these materials is due to the exciting possibilities for this electrical sensor to be small, rugged, corrosion-resistant and energy efficient, unlike a mechanical pressure sensor.

### **36. Andrew Fuller, Brittany Groves, Matthew Cody Ortt, & Joey Pruitt**

**Madisonville Community College**

**Mentor: Dan Schultz**

#### ***Performance Characterization of a Stirling Engine/Fresnel Mirror Solar Energy System that Uses a Novel Receiver/Heat Exchanger***

A Stirling engine is a type of heat engine that does not require any specific fuel; only a source of heat. Stirling engines work by shuffling a working fluid (in this case air) between a hot and cold space using one piston, and extracting some of the energy of the expanding gas using a second piston. The two pistons are ideally 90° out of phase with each other. This ability to run on virtually any heat source has led to use of the Stirling engine as the power conversion unit of a solar energy system. Most Stirling engines used for solar energy applications use the same type of receiver (burner) and heat exchanger that would be used if they were powered by solid, liquid, or gaseous fuel. The unique properties of concentrated sunlight as the heat source have not been fully exploited in most engine designs to date. This particular engine uses a novel receiver-heater made from a coil of stainless steel foil. The absorber-heater serves as both the absorber of solar radiation and the hot-end exchanger for the working fluid. The coil is heated by direct absorption of concentrated sunlight admitted through a quartz glass window. Sunlight is concentrated by a Fresnel mirror. The goal of this work was to characterize the performance of the Fresnel-Stirling-alternator system for various piston phase angles, alternator loads, and sun conditions. Performance data were compared to similar-sized engines that have run successfully. Additionally, data to estimate the time between failures for various components of the system were collected.

### **37. Emerald Gates**

**Kentucky State University**

**Mentor(s): Kirk Pomper, Jeremiah Lowe, & Sheri Crabtree**

#### ***The Influence of Light Level on Annonaceous Acetogenin Activity in Pawpaw (Asimina triloba) Stem Tissue***

The pawpaw [*Asimina triloba* (L.) Dunal] is a native Kentucky tree fruit which contains Annonaceous acetogenins in the twigs and fruit which display antitumor and pesticidal effects. This tree is usually found in the forest understory and prefers growing in low light conditions. Our working hypothesis was that high light levels stress the pawpaw plant and induce high acetogenin activity in the stem tissue. Higher extractable acetogenin levels would be desirable for future product development. The objective of this study was to determine if there was a positive correlation between increased light level and acetogenin activity in the stems of pawpaw seedlings. Three month old greenhouse grown seedlings were subjected to three light treatments using no shade cloth (100% ambient light), 35% shade cloth (65% ambient light), and 80% shade cloth (20% ambient light). A randomized block design was used in the experiment with three replicate seedlings in each treatment in three replicate blocks (3 plants x 3 treatments x 3 blocks) for a total of 27 plants. The plants were destructively harvested after 6 weeks; stems were dried at 50°C, ground, and extracted with 95% ethanol. The Brine Shrimp Test (BST) was employed to assess acetogenin activity of the pawpaw extracts at 0, 5, 10, 50, and 100 ppm of extract after 48 hours exposure and the LC<sub>50</sub> for each treatment was determined.

### **38. Emily Gilbreath**

**Eastern Kentucky University**

**Mentor: Bruce Maclaren**

#### ***Dresden Firestorm: History and Reconciliation***

Ultimately, the end of historical analysis is to understand where we come from and how to avoid the mistakes of our ancestors. The former is pleasant and healthy, but in the modern age, the latter is vital. It has become apparent in the post-World War II era that the human race has the capacity to destroy itself, and in order to avoid this termination, we must learn to change. War crimes must be avoided, not only those borne of fascism, such as the Holocaust, but those borne of democracy, such as the Dresden fire bombings. My work encompasses the immediate reactions of the Allies, the Nazis, the survivors, as well as the work of contemporary historians and the lives of modern Dresdeners. I inspect past and present reactions to the Dresden attacks for evidence that our society is making a moral progression away from war crimes. With this search, I analyze not only the opinions of survivors, war officials of both sides, and historians, but the shifting paradox of remembrance that modern Dresdeners face. The complex web of ethics of the past and present, of citizen and official, forms a lesson regarding the path toward a world without war crimes.

### **39. Craig Girten & Elizabeth Walsh**

**Northern Kentucky University**

**Mentor: Keith Walters**

#### ***Synthesis and Spectroscopic Studies of Fullerene-Bipyridine and Corannulene-Bipyridine Organometallic Supramolecular Systems***

The objective of this research is to functionalize fullerenes and incorporate them into a novel supramolecular system where they can be coordinated to various transition metals. The resulting complexes will have novel photophysical and charge-transfer properties. Corannulenes (e.g., "buckybowls") are also functionalized to produce systems with improved solubility of their fullerene analogues. A variety of spectroscopic studies will be performed on these systems, including NMR, absorption, emission, variable temperature emission, and laser-induced transient absorption. Evidence of charge transfer between the fullerene and transition metal moieties are presented.

## **40. Jason Grant**

**University of Kentucky**

**Mentor: Susan Carvalho**

*A Panic of Uproarious Joy: Magic Realism and the Writings of Gabriel Garcia Marquez*

In 1982, Gabriel García Márquez was awarded the Nobel Prize in Literature for his use of “the fantastic and the realistic ... in a richly composed world of imagination.” Throughout his career, García Márquez has invoked and provoked the magic realism movement of Central America, which scholars have struggled to properly define since the name was adopted in 1927. As a style of fiction, what is magic realism? Common among many magic realist novels are the themes of isolation and troubled communication. Magic realism often relies on secluded villages untouched by civilization to add credibility to the premise of a magic reality and to introduce the idea of otherness in society. A sense of magic is also achieved by making concrete the abstractions of reality—the love of a mother for her son, the dissolution of filial communication, and so on. This research is intended to consider how magic realism is relevant to contemporary literature. Primarily, the issue of isolation in modern society provides a provocative chance to apply the literary style. One might consider the counter-intuitive example of New York City, one of the world’s most populous cities, which has a reputation of people who feel alienated or who alienate themselves. The focused frenzy of the modern world also allows an author insert aspects of magic, with the suggestion that people are not seeing the whole picture. This research acts as a preliminary background to the writing of an original, novella-length work of fiction by the student.

## **41. Daniel Graves, Wayne Staggs, and Nathan Fite**

**Morehead State University**

**Mentor: Thomas Pannuti**

*An Archival X-ray Study of Supernova Remnants in Nearby Spiral and Irregular Galaxies with the Chandra X-ray Observatory*

Supernova remnants (SNRs) are intimately involved with the evolution of the interstellar medium of a galaxy. While the number of known Galactic SNRs is large, significant obstacles exist when studying these sources (such as considerable distance uncertainties and extensive absorption along Galactic lines of sight), thereby limiting the insights which may be revealed about both SNRs and SNR-related phenomena. To help address this limitation, we are conducting a survey of SNRs located in a sample of nearby (within 8 Mpc) spiral and irregular galaxies. This survey draws primarily on archival data from observations made with the *Chandra* X-ray Observatory: the high angular resolution capabilities of *Chandra* are essential for identifying SNRs located in regions of high confusion. Our approach is to identify X-ray counterparts to SNRs previously identified by observations made at other wavelengths (mainly optical and radio) and to seek out new candidate X-ray SNRs as soft-spectra sources coincident with regions of optical emission in the host galaxies. Initial results and tentative conclusions will be presented and discussed.

## **42. Erik Hale & Joseph Marin**

**Morehead State University**

**Mentor: Adrian Mandzy**

***Finding "The Last Battle of the American Revolution"***

In the spring of 2008 history students from Morehead State University took part in a public history project at the Blue Licks Battlefield State Resort Park. Lead by Associate Professor of History, Dr. Adrian Mandzy, the team consisted of six students from the history junior seminar class and a team of specialists from the Battlefield Restoration and Archaeological Volunteer Organization (BRAVO). The goal of this project was to locate any remaining evidence from "The Last Battle of the American Revolution". Fought in northeastern Kentucky, a group of Native Americans and their British allies defeated a group of American settlers. Among the legendary figures that fought at the battle were Daniel Boone, who lost his son in the battle, and Levi Todd, the grandfather of Mary Todd Lincoln. During the course of this research project, students learned how to conduct an archaeological survey and write a report for a state agency. By working with professionals in the field, students were provided with a hands-on experience that went beyond the traditional classroom environment. As a result of the survey, we were able to establish the actual location on the battlefield and provide the park with the evidence to lobby for placement of the battlefield on the National Register of Historic Places.

## **43. Marcel Hampton**

**Kentucky State University**

**Mentor: Greg Graf & Charles Bennett**

***Expression and Purification of Peptide Antigens Containing Genetic Adjuvants for the Generation of Antibodies Used in Protein Analysis***

The novel strategy to be employed was the use of a genetic adjuvant to increase the antigenicity of peptides. We designed an antigen with three major components: a 6 histamine tag; P2/P30 T epitopes of tetanus toxin; and amino acids 1-79 of ABCG1 or 1-86 of ABCG5. A pET28a bacterial protein expression vector was used which contained a 6-His tag and T7 promoter. Cloning oligos were designed for insertion of the plasmid. We selected the restriction sites and added them to the 5' and 3' oligonucleotides, then cloned the G1 and G5 cDNAs encoding the peptide fragment into the EcoRI and HindIII sites of pET28a. The cloned plasmids were transformed into BL21 (DE3) of E.Coli cells, cultured the bacteria, and induced with IPTG to increase protein expression. A western blot was performed and lysed the cells to see whether the protein was in the cells or secreted into the medium. The results indicated that the expressed protein was present in the cells. The purified peptides were shipped to ProSci for rabbit immunization. After eight weeks the immunized rabbits gave raise to antibodies which were sent back for testing. We used immunofluorescence and immunoblot analyses to test the antibodies. The native antigen was recognized in the immune system of the rabbits and useful antibodies were produced.

#### **44. Ismet Handzic, Mensur Paocic, & Jonathan Rutledge**

**Western Kentucky University**

**Mentor(s): Kevin Schmaltz & Robert Choate**

##### ***Passive Residential Cooling System***

For this project, a team of three Mechanical Engineering seniors designed a passive cooling system for a model house roof top with the intention of decreasing the energy consumption to cool the building. The team also investigated a design for a full-scale residential cooling system. The design project was sponsored by the American Society of Heating, Refrigerating and Air-Conditioning Engineers. Building roofs have the greatest exposure to heat and are a major contributor to heat gain inside houses. The project team focused on lowering the heat gain. The team investigated the use of evaporating water on the roof to shield incoming solar energy and to decrease the temperature on the roof and inside the house. The team performed analytical analysis of heat transfer through the roof, and has ultimately built a lab demonstration system to simulate the heating of a building using heat lamps. The team designed, built and tested a system that applied water to the roof, measuring the performance of the system. In order to maximize the results the design was automated and the temperature and water applied were controlled. After the building and testing of the lab system, the team concluded the project by providing a statement of feasibility and looked at possible full design proposals for a residential scale building.

#### **45. Patricia Harrington**

**University of Louisville**

**Mentor: Danielle Brown**

##### ***The Use of Causal Connections by Parents and Preschoolers during Storytelling***

This poster represents preliminary results of an ongoing study. This study aims to gain an understanding of parent-child interactions in relation to children's early narrative causal understanding. Previous research has found that the use of causal connections by young children strongly predicts reading comprehension in later years (White, van den Broek, & Kebndeuou, 2007). Statements with more causal connections are generally rated as more important to the story and more likely to be remembered than irrelevant statements (van den Broek & Trabasso, 1986; van den Broek, 1989). In this study, the primary caregiver was asked to tell their child a story using a wordless picture book called "Frog Where Are You?" Later the child was asked to tell a story by themselves with the same book. These stories were coded for the types of connections made and the distance between each connection. While the study only included seven subjects, some significant correlations were found. As children get older, they tend to use more complex types of connections and rely less on more simple connections. Parent stories tended to have patterns similar to children's stories; however, these patterns were not significant.



## **46. Kelly Harris**

**Murray State University**

**Mentor: Kate He**

### ***Testing the Roles of Family Membership and Species Native Origin in Intentional Plant Introductions using Nursery Data in Kentucky***

Biological invasions frequently bring about negative impacts on natural ecosystems, including changing their structure and function and causing loss of biodiversity. A large percentage of invasive species are introduced intentionally as horticulture plants by the green industry. Currently, there is a lack of specific information on non-native and invasive plants in the state of Kentucky, especially concerning species origin, taxonomic affinity, and the pathway of species introduction. This study is designed to gather information about plant species found in nurseries across the state of Kentucky to test the hypothesis that species belonging to certain families and coming from particular geographical regions may have a higher possibility to be introduced into new locations as horticulture plants. By identifying and recording 462 species in 101 families and 258 genera from twenty-two nurseries statewide, we discovered that the possibility for a species to be introduced as horticulture plant significantly relates to its native origin and family membership; non-native plant species, especially those with eastern Asian origins, are carried most by nurseries in general. Our results suggest that native origin and family membership of plant species could be used as an effective indicator in identifying the pool of potentially invasive species in the future. Our findings confirm that nurseries have been a major pathway of non-native plants introductions. Most importantly, our study points out the critical needs for having informed and educated personnel in the green industry, so that invasive exotic species will not be introduced in the first place.

## **47. Berlin Haugen**

**Murray State University**

**Mentor: David Eaton**

### ***Acquiring America: The Dismantling of a Dynasty***

American business has witnessed international direct investment grow at a staggering rate; and its management replaced by former competitors all too often. A wide array of influential factors have fueled the rising tide of foreign investment through acquisition in the United States. The mere image of American business and the brand equity within our company's names alone, have global reach and have amassed tremendous envy abroad for decades. Iconic companies, many with over a century of American family ownership have been forced to surrender their fortresses to foreign invaders as globalization has grown teeth. Anheuser Busch towers as an example of this phenomenon and its acquisition presents a unique set of welfare consequences. This project addresses the history of the Anheuser Busch beer empire and how its disassembling by Belgium brewer Inbev may compromise one of its greatest assets, the St. Louis people. The reasons such a monolithic acquisition was made possible and what direct effects may result once it is completed will be studied. Historical acquisitions will be examined in an effort to forecast potential implications for AB's future. Shareholder wealth will be reviewed, however, general welfare for all of AB's stakeholders will be of prime focus. The overarching goal will be to identify a correlation between foreign investment in American companies and shifting corporate values. The St. Louis people grew up around this red brick brewery and now must wonder how they will fare as management moves an ocean away.

## **48. Natchia Henry & Erin Madeen**

**Eastern Kentucky University**

**Mentor: Stephen Richter**

***Evolutionary and Conservation Genetics of Gopher Frogs, Rana capito and Rana sevosa***

Unprecedented growth in the human population has had an indelible impact on the natural landscape. This growth has had serious consequences for many organisms as habitats have been lost and fragmented. Two species of gopher frogs indigenous to the southeastern coastal plain have lost populations throughout much of their natural range. One species, *Rana capito*, has scattered populations across its fairly wide range and is listed as a species of concern in several states. Another species, *Rana sevosa*, has been reduced to two small natural populations found only in Mississippi and 4 captive populations in zoos. *R. sevosa* is listed as federally endangered. Both species require intervention to conserve their numbers. The objectives of this research were 1) to assess the degree of genetic variability and similarity across the range of *R. capito* and 2) to determine and compare the genetic variability of the two remaining natural populations to the captive populations of *R. sevosa*. Genetic analyses were performed by genotyping individuals of each population for six microsatellite DNA loci for *R. sevosa* and one mitochondrial DNA region for *R. capito*. Genetic variability was analyzed to determine the amount and similarity of genetic variation among populations of *R. capito* and to determine the interrelatedness of the natural populations of *R. sevosa* populations as compared to the captive populations. These data will be utilized to understand the current genetic variation of these species with the goal of preserving and enhancing natural population genetic variation.

## **49. Robert Hernandez, Derrick Bartlett, & Sam Hayden**

**Western Kentucky University**

**Mentor: Kevin Schmaltz**

***Innovative Bio-Diesel***

Due to concerns of energy cost and supply, as well as the environmental issues, Western Kentucky University (WKU) Mechanical Engineering and the WKU Agriculture Farm have collaborated together to construct a bio-diesel processing plant. The ME Senior project will provide an opportunity to benefit the campus and community, as well as provide great experience operating a small facility for WKU ME students. The bio-diesel facility being installed is a 500 gallon per month batch bio-diesel processing facility which will process waste cooking oil from WKU Food Services and convert it into bio-diesel for use by the WKU agriculture farm vehicles. The design project is sponsored by Ogden College through the Applied Research and Technology Program and the Department of Agriculture. The Department of Agriculture will coordinate design requirements and specifications along with engineering, health and safety, and environment. Major goals of the project include facility construction, waste vegetable collection, processing and testing of bio-diesel fuel. Facility construction consists of chemical spill basins, walkways and platforms, and bio-diesel storage. The waste vegetable oil collection is comprised of filtration and transferring from WKU dining facilities to the bio-diesel plant. Testing of the bio-diesel will target the ASTM 6751 standard which will ensure the quality of the fuel.

## **50. Brittany Herrera**

**Morehead State University**

**Mentor(s): Kim Nettleton & Sara Lindsey**

### ***A Chance to Read: A Solution to Reading Fluency Problems***

Every day, millions of children go to school just to sit in their chairs overwhelmed with a sense of confusion. These are the children who suffer from dyslexia. An official definition for this disorder has not yet been given because there is believed to be many different types of dyslexia. However, it has been shown that this disorder revolves around brain abnormalities. This research focuses on dyslexia and reading fluency. Schools participating in the study identified students whose reading fluency was below grade level. Identified students were examined to determine if the RAD Prism could provide positive intervention. The effect of RAD Prisms on reading fluency is the main focus of this project. A new assistive device, created in Kentucky, the RAD Prism has been used by over 1300 people, who claim significant improvement in reading fluency. The quantitative study was designed to determine if the RAD Prism is an effective assistive device for struggling readers. Students participating in the study were fitted and provided with a RAD Prism. Students were asked to wear them during reading instruction. After several months after receiving thread prism, pre and post study data will be evaluated to measure and document improvement in reading fluency that may occur during the study. The results will be analyzed and used to attract new participants and gain a deeper understanding of this facet of dyslexia and the possible relief of one of its damaging aspects.

## **51. Kendrick Holbrook, Kimberly Gibson, & Nick Rose**

**Morehead State University**

**Mentor(s): Joy Gritton & John Hennen**

### ***Eastern Kentucky Arts Project (EKAP)***

This poster introduces the Eastern Kentucky Arts Project (EKAP), which draws on the participatory research of 17 Morehead State University students. Each student has worked to identify and document artists and arts related programs, facilities, and websites originating in and/or serving the Appalachian counties of eastern Kentucky. These include public school instruction and projects, courses and exhibition programs offered at regional institutions of higher learning, private and non-profit arts and craft education programs (including extension service programs), cultural heritage and arts centers and museums, cultural heritage tourism initiatives, galleries and other exhibition and sales venues, historic architecture, murals, public art, and special grant-funded projects. EKAP has circulated surveys to artists and other community members and is beginning an oral history component. A website has been constructed to provide access to these resources and serve as a clearinghouse for information on the region's arts. This project is being conducted with two outcomes in mind: (1) Providing an essential resource for students of Appalachian art as well as regional artists, educators, and community members (2) Identifying arts related needs in the region and thus potential venues for student service learning projects. As the P.A.C.T. program in Harlan County has demonstrated, the arts can be used to help a region recover its history, address serious challenges such as substance abuse, bring people of diverse races, ethnicities, and class together, and foster a sense of cooperation within community. EKAP hopes to play a vital role in this work.

**52. Kyle Holloway, Sarah Enzweiler, Justin Hartfiel, Meagan Goodwin, Lisa Smith, Brittany Finn, Michelle Corbett, Justin Dean, Lori Clark, & Heather Schlarman**

**Northern Kentucky University**

**Mentor: Mark Wasicsko**

***What Favorite Teacher Research Says: Implement Dispositional Growth Plans!***

In an effort to further evaluate the effect of educator dispositions, favoriteteachers.org asks people to recall memories of their favorite teacher and list the first characteristic that comes to mind about them. Ongoing research shows that between knowledge, skills, and dispositions of former teachers the greatest factor in determining what makes a teacher someone's favorite is that the teacher they chose possessed certain dispositional traits. Identifying teacher disposition as the most important factor in favorite teachers, we can examine ways to increase these traits in new, current, and even experienced educators. The benefits of implementing dispositional growth plans may translate into an increase in achievement while saving time and money for the schools. With more teachers demonstrating the desired dispositional traits of favorite teachers, student interest, attendance, and motivation could translate into increased student performance and success. Promoting these desired traits with the development of dispositional growth plans may also increase teacher satisfaction and help to meet the personal and professional needs that many teachers cite as areas of neglect and reasons for quitting the profession. With more than forty percent of new teachers leaving the profession in the first five years, the cost savings to districts and states in reducing attrition could be a real cost savings while promoting an environment more conducive to academic and personal growth for students and teachers alike.

## **53. Megan Huellemeier**

**Morehead State University**

**Mentor(s): Donna Corley & Stephanie Johnson**

### ***External Factors Influencing College Students' Food Choices When Eating Out***

The effects of diet on health status are well documented. College students represent a population vulnerable to poor eating habits. Adjustment to college life introduces difficult food choices. Economic strains, convenience, and individual preferences influence students' meal decisions. This study assessed external factors that influence college students' food choices when eating out. Forty-four junior and senior students completed a computer based food frequency questionnaire and survey specific to food choice. This sample was assumed to have a basic level of nutritional knowledge based on the required curriculum courses and content completed by each student. The sample included 68 percent of students living at or below poverty level. Nutritional intake was below USDA daily recommendations for all food groups and half of the sample consumed more than twice the USDA recommendations for sodium. When asked to prioritize five reasons for selecting where to eat out, the participants selected cost as first priority, taste second, sociality and healthy options almost equal in priority. On average, students ate out three to four times a week with a mean expenditure of \$6.00 per meal. When eating out the overwhelming majority of students selected fast food restaurants. Most of the restaurants available on or close to campus were fast food restaurants with combination meals priced under \$6.00. Fast food combination meals were high in calories, fat, sodium, and sugar. Data from this study will be used to guide preventative health interventions targeted towards this population.

## **54. Eseosa Ighodaro**

**University of Kentucky**

**Mentor: Fitzgerald Bramwell**

### ***Enhancing the Understanding of Chemistry with 21st Century Technology***

General chemistry is a difficult subject for high school and undergraduate students. The difficulty of this subject lies in the comprehension of the abstract concepts of atoms, molecules, and chemical reactions. In-class demonstrations are a useful pedagogic tool to resolve ambiguities of general chemistry. Unfortunately, a certain percent of high schools and universities lack the necessary resources and training needed for faculty to perform these demonstrations for their students. To address this problem, I assisted Dr. Fitzgerald B. Bramwell of the University of Kentucky Chemistry Department in this traditional scholarly effort, by helping to produce a source book that uses the power of 21st century technology to present useful chemical demonstrations for university and high school level chemistry instructors. My efforts were directed toward filming and editing demonstrations that result in the production of a comprehensive series in a DVD format. This DVD contains real-time chemical demonstrations supplemented by contributions from various Chemistry Department faculty and staff members. The purpose of this scholarly project is to provide chemistry instructors with a powerful, innovative and unique tool to aid in the teaching and comprehension of chemical concepts. In order to evaluate the effectiveness of the DVD format, we will use focus groups consisting of regional high school teachers and chemistry professors. We will use their meaningful criticisms to strengthen the practicality of this effort. After this process, I hope to see this product disseminated in Kentucky high schools and universities with a special emphasis on Fayette County. I hope that this source book will enhance the comprehension of chemistry students and improve the teaching effectiveness by chemistry professors.

## **55. Jennifer Imel**

**Eastern Kentucky University**

**Mentor: Daniel Tofan**

### ***Study on Attrition Rates in Chemistry at Eastern Kentucky University***

Attrition rates in chemistry courses for science majors were investigated at Eastern Kentucky University (EKU). The study was conducted using a Microsoft Access database provided by ECU Institutional Research, as well as student surveys. SQL and Java programming were utilized to construct queries that extracted the data needed for this study. Performance in chemistry courses was correlated to ACT scores and grades obtained in college algebra and other mathematics courses. A chemistry aptitude exam was given to all entering students in the last two years and the performance on that test was correlated with success rates in General Chemistry I. Possible ways of lowering attrition rates are presented based on this study. A Kentucky-wide study on how to lower attrition rates in chemistry is proposed.

## **56. Nazeeha Jawahir**

**University of Kentucky**

**Mentor: Rebecca Dutch**

### ***The Effects of Hendra Virus Fusion Protein Charged Residues on Viral Fusion***

The Hendra and Nipah viruses are two recently identified members of the Paramyxovirus family with no known vaccines yet. They can be transmitted from animals to humans (zoonotic) and have high fatality rates among humans, with a 1998 Nipah outbreak claiming over 100 lives. Therefore, it is of utmost importance that we learn more about them. I am working with Dr. Rebecca Dutch in the University of Kentucky's Department of Biochemistry. One focus of the Dutch lab is to study the specific proteins in these viruses that promote fusion between the viral membranes and the host cell membranes. In most viruses, these fusion (F) proteins have a positively charged plasmid DNA residue that interacts with the negatively charged membrane of the host cell. Interestingly, however, in Hendra and Nipah it is a negatively charged residue on the F protein that interacts with the negatively charged membrane of the host cell in the fusion process. Normally, the two charges would repel one another. My specific project involves altering the plasmid DNA residue to see if this has an effect on viral fusion. Using a site-directed mutagenesis procedure, I changed the negatively charged amino acid residue, glutamic acid, to neutrally charged amino acid alanine. I am continuing my research to study the effects of this on the viral fusion process by transfecting the mutated plasmid DNA onto animal cells. The overall goals are to learn more about these new, potent viruses as well as to identify potential targets for antiviral drugs.

## **57. Nicolette Jones**

**University of Louisville**

**Mentor: Diane Orr Chlebowy**

### ***Facilitators and Barriers to Self-Management of Type 2 Diabetes Among Urban African American Adults: Focus Group Findings***

Despite medical advances and available health care, African Americans in Kentucky continue to experience preventable life-threatening diabetes-related complications. The purpose of this qualitative pilot study was to identify facilitators and barriers to self-management of type 2 diabetes among African American adults living in an urban community. Seven African American women with type 2 diabetes were recruited from an urban health care agency. Each participant was asked to complete a Demographic Survey and then participated in a focus group session. The focus group session was audio-recorded and field notes were taken by a member of the research team. Data were interpreted and codes and patterns of themes emerging from the data were analyzed. Participants identified peer advising and their understanding of the importance of diet and exercise as facilitators to self-management. Common barriers to self-management identified were lack of trust of professional recommendations, lack of education regarding diabetes management, and loss of self-control of diabetes. Future research efforts should be directed to better understand the lack of trust, lack of education, and loss of self-control issues expressed by the participants. In addition, further research is necessary to explore the common facilitators and barriers to self-management of type 2 diabetes among African Americans.

## **58. Abdul Kakar**

**Kentucky State University**

**Mentor(s): Michael Bomford, Paul Vincelli, Brian Geier, & George Antonious**

***Effectiveness of a Blend of Beneficial Microorganisms Combined with Brassica Green Manures in Reducing Damage by Phytophthora capsici to Yellow Squash (Curbita pepo) Seedlings***

We evaluated effects of two green manures and an organic fertilizer on yellow squash (*Curbita pepo*) growth following inoculation with *Phytophthora capsici* (0.5% v/v). Green manures were Indian mustard (*Brassica juncea* c.v. 'Pacific gold') and a rye (*Secale cereale*) vetch (*Vicia villosa*) mixture applied at 0, 1, 2, 4 and 16 kg/m<sup>2</sup> and irrigated with treated or untreated water. The water treatment was an organic fertilizer containing hydrolyzed soy meal, humic acid, and a range of beneficial bacteria. The green manures did not have any significant impact on growth of the yellow squash. Plants that were treated with the fertilizer had longer shoots after 5 days.

## **59. Rachel Keller**

**University of Kentucky**

**Mentor: Kenneth Troske**

***Kentucky and NAFTA***

Since the implementation of NAFTA in 1994, extensive research has been conducted to analyze the effects of NAFTA on the U.S. economy. Most of this research has focused on aggregate gains and losses of the U.S. economy as a whole, but regional and state-level assessments prove more accurate in describing specific impacts across the United States, as resources and industrial performance differ with even small movements in geographical location. This study seeks to analyze the effects of NAFTA on Kentucky's economy, as the state has been largely overlooked in terms of extensive evaluation. We used data obtained from WISERTrade, the World Institute for Strategic Economic Research, to begin a regression analysis specifying the effects of NAFTA on Kentucky exports. Total dollar values of exports to the top 25 countries that import Kentucky goods from 1988 to 2000, including Canada and Mexico, gave us a good idea of possible trends affected by NAFTA. We also looked at Gross Domestic Product and Real Gross Domestic Income for all of those countries for specified years so that we could determine any noticeable differences that could be attributable to the trade agreement. We expected to find that NAFTA has had a modestly positive effect on Kentucky's economy, specifically on export growth and diversity, a common finding for other regional and state-level assessments. We anticipated varied effects of NAFTA on the Gross Domestic Product and Real Gross Domestic Income of those countries labeled as primary recipients of Kentucky exports.



## **60. Allison Kiefner**

**Eastern Kentucky University**

**Mentor: Jonathan Gore**

### ***The Effect of Personality on Academic Organizational Citizenship Behaviors***

Organizational citizenship behaviors (OCBs) are behaviors that are helpful for an organization, are performed through the altruistic good will of an individual, and that are carried out without suggestion by a job description or coercion from an authority figure (DiPaola, 2005). In the present study, an OCB evaluation test for the workplace was modified into an academic OCB test by altering the context and wording of the questions. It was hypothesized that The Big Five personality traits, especially agreeableness, conscientiousness, and neuroticism, would predict academic OCBs. Participants in this study included 270 undergraduate college students who completed online assessments of their personality and their levels of OCBs. Agreeableness, conscientiousness, and neuroticism were all found to be significant influences on academic OCBs. Students possessing higher levels of agreeableness demonstrated higher levels of organizational citizenship behavior. The same was also shown for students with higher levels of conscientiousness. Neuroticism was also found to have been a significant predictor of academic OCBs as people with higher levels of neuroticism displayed lower levels of OCBs. Just as workplace and general OCBs are used frequently to assess employees' capabilities and potential, academic OCBs could be used to assess the potential of students as tutors or other employees in the academic field. Implications for future work, as well as limitations of the current study, are discussed.

## **61. Alyse King**

**Eastern Kentucky University**

**Mentor: Jim Larkin**

### ***Strength and Conditioning Training Program***

The primary purpose of this creative endeavor was to educate coaches, physical education students, fitness enthusiasts, and athletes about proper weight training techniques. Visual illustrations (modeled by the student) are included to assist in learning important details about each exercise. Specifically, the following exercise-related information was presented: (1) major "target muscles" that should be emphasized in designing a comprehensive strength training program; (2) joint motions that take place during each weight training movement; (3) specific tips that are pertinent to each unique exercise; and (4) proper body mechanics. These techniques are shown visually by demonstrating correct posture, beginning position, and ending position for each exercise. The popularity of strength training is growing in the United States. Sport-related benefits include enhanced power, strength, endurance, speed, and overall improved performance. Health-related benefits of strength training include enhanced bone mineralization, improved body composition, balance, and reduced risk of falls especially in older adults. It is anticipated that participation rates in strength training will continue to climb in the future.

## **62. Brian Knight**

**Morehead State University**

**Mentor: Steve Chen**

### ***Drive for Diversity: An Overview of the Contents and Impact of NASCAR Diversity Programs***

This presentation focuses on the diversity programs that the National Association for Stock Car Auto Racing (NASCAR) has promoted and introduced in the last seven years. Since building a diversified working group and environment is a popular and vital trend in today's business world, the adopted diversity programs developed by NASCAR has changed the auto racing culture in a positive manner. Statistics show that more female and minority fans are interested in the stock car racing. The composition of NASCAR participants (drivers and crew members) is also more diverse today than it was 10 years ago. It is anticipated that the change of diversity and culture of NASCAR should bring in more sponsorship revenues, a greater diverse fan base, and inspiration and encouragement to minority race drivers. This presentation will highlight and detail the NASCAR diversity programs, such as Drive for Diversity, the NASCAR Diversity Internship Program (NDIP), and Diversity Scholarships, etc. In addition, the results and impacts of these programs will be further explained and critiqued along with the future marketing strategies and direction of the NASCAR.

### **63. Jona Kos & Glenna Buford**

**Murray State University**

**Mentor(s): Maeve McCarthy & Kate He**

***Using Population Dynamic Models to Assess the Spread of an Invasive Species, Alligator Weed (Alternanthera philoxeroides)***

Alligator Weed (*Alternanthera philoxeroides*) is an invasive perennial plant of the Amaranthaceae family that is found in multiple climates. It was originally discovered in the Parana River region of South America, but has been studied the most in China. The concern for the invasion of alligator weed is due to the economic and environmental threats it poses. Our hypothesis is that the adaptability of populations affects the spread of the aquatic species. We looked at the population dynamics of alligator weed in three states: Mississippi, Kentucky, and Tennessee. The population dynamics were compared to see if there is a significant difference between the growth rates, suggesting adaptation. A population that has greater adaptation will be more invasive. We expected to find that Mississippi has greater adaptability to different climates, because its population has been in the United States longer.

### **64. Samantha Kramer & Shelby Rader**

**Western Kentucky University**

**Mentor: Aaron Celestian**

***Engineering Materials for Radioactive Waste Sequestration***

Radioactive waste production in the United States will reach new heights as legislators strive to solve the energy crisis by implementing use of nuclear power sources. Our state is currently home to the only uranium enrichment facility in the country, at the Paducah Gaseous Diffusion Plant. Radioactive waste is currently being stored at the facility until a long-term solution can be determined. Mention of lifting the state ban on the building of nuclear power plants was reported in early 2008. There is a significant need to develop efficient long term storage methods to protect the environment and ourselves from such hazardous materials worldwide. Proposed long term storage sites such as the one at Yucca Mountain, Nevada will not be capable of storing all the radioactive waste already produced from governmental defense research and industrial and medical applications. If separation of the highly radioactive components from the bulk waste can be sufficiently achieved this could drastically reduce the volume of contaminated materials to be stored and alleviate some of the hazards involved in transportation. Studies are currently being conducted in the Crystal Kinetics Lab at Western Kentucky University to better understand the selective sequestration capabilities of a porous titanosilicate in the removal of strontium and cesium ions, both hazardous uranium fission byproducts, from aqueous solutions. The project describes the exchange mechanism and structural properties of the titanosilicate. This information will provide the knowledge necessary for engineering future materials for targeted applications in industrial and environmental sciences.

## **65. Christina Kuchle**

**University of Kentucky**

**Mentor(s): Mary Arthur & Ryan McEwan**

### ***Effects of an Invasive Species, Bush Honeysuckle, on Leaf Decomposition in Central Kentucky***

The forests of central Kentucky are dynamic ecosystems in which leaf litter decomposition is an important pathway of nutrient recycling. The presence of invasive bush honeysuckle (*Lonicera maackii*) in the forest understory may alter decomposition in leaf litters of native species. This study was designed to examine the influence of bush honeysuckle on leaf litter decomposition in a forested site at Griffith Woods, located in the Inner Bluegrass Physiographic Region. Using leaf litter of bush honeysuckle and two dominant tree species, white ash (*Fraxinus americana*), and hickory (*Carya spp.*), we tested the hypotheses that honeysuckle litter will have the fastest rate of decomposition followed by ash and hickory, and that the presence of bush honeysuckle will increase decomposition rate of all three species. To test these hypotheses, 10 plots were established within a forested area, 5 dominated by bush honeysuckle, 5 without honeysuckle. Eight grams of leaf litter of each of the three species were sealed in mesh bags and placed at the plots and then collected in 0, 1, 3, 6, and 12 month intervals to measure decomposition over time. Results thus far (through 6 months) suggest that honeysuckle litter decomposes much more rapidly than the other species. Contrary to our second hypothesis, bush honeysuckle decreased the decomposition rate of all leaf litters in months 1 and 3, but not at 6 months. Rapid decomposition of honeysuckle litter is likely driven by litter quality, whereas slower decomposition under bush honeysuckle is likely the result of changes to microclimate and soil processes.

## **66. Jennifer Lantz & Chris Kaeff**

**Northern Kentucky University**

**Mentor: John Metz**

### ***Northern Kentucky University's Greenhouse Gas Emissions Inventory and Analysis***

In 2007 Northern Kentucky University's (NKU) President James Votruba agreed to join the American College and University Presidents Climate Commitment (ACUPCC) to reduce the university's greenhouse gas (GHG) emissions. To implement the commitment a Climate Taskforce began a comprehensive assessment of NKU's carbon footprint. The ACUPCC had adopted the Clean Air-Cool Planet Carbon Calculator (CACPCC) to guide the university assessments. Throughout 2008, students collected NKU's 1990 to 2007 data and entered it into the calculator. The data is divided into 4 categories: Institutional Data, Scope 1 - Direct GHG, Scope 2 - Indirect emissions and Scope 3 - other emission sources. Scope 1 and 2 were relatively easy to collect, with the help of university administrators, but Scope 3 consisting of transportation and study abroad, was a more challenging endeavor. After entering the data, the calculator uses the relative warming impacts of the major GHGs (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, etc.) to transform them into a standard unit known as eCO<sub>2</sub>, or carbon dioxide equivalent. NKU's total for FY2007 was 72,482 tons of eCO<sub>2</sub>. The largest source was commuting (46%) and purchased electricity was a close second (38%). Given our physical size and population NKU is about average among the other participating universities across the nation. This informational analysis acts as a precursor to the university's planning for growth, as it seeks to reduce its impact on the environment. The goal of the ACUPCC and NKU are to be leaders in becoming a sustainable society. This project was the first step.

## **67. Remington Leach**

**Northern Kentucky University**

**Mentor(s): Rebecca Bailey & Lois Hamill**

### ***Chasing Benefits: Widows of Miners and the Black Lung Benefits Act***

The significance of our research is to help explain the Black Lung Benefits Act, its aid to mining families and the migration of those mining families in Kentucky. The Congressional Records of former Representative Marion “Gene” Snyder are being processed in the Archives of Northern Kentucky University, where they have been stagnate for 20 years. Within these boxes are sporadic folders of black lung cases which surface around the early 1970s. Research revealed that there are no coal mines in Kentucky’s 4th Congressional District, Snyder’s district. In fact, the nearest mine is miles away to the south. This led us to question the reasons for the black lung cases to appear in Representative Snyder’s papers and why these cases appeared in the early 1970s. Our research involved a multi-faceted approach to understanding the appearance of black lung cases in a district in which there were no coal mines. We researched why these people were writing, who was writing and the migration of those people from mining towns to Kentucky’s 4th Congressional District. Also, our project discusses the Black Lung Benefits Act and the speed at which the government acted on those cases. This research is beneficial in understanding the relationship between the miner, his family and the government in the western edge of Appalachia. It also helps identify the human migration of miners and their families and the government’s aid to miners who contracted pneumoconiosis, otherwise known as black lung.

## **68. Kristin Leftwich**

**Western Kentucky University**

**Mentor: Aaron Celestian**

### ***Nanoporous Natrolite and Sequestration of Radioactive Waste***

Nuclear energy production generates hazardous waste byproducts that emit very high amounts of radiation. These radioactive byproducts must be stored in a secure and chemically sophisticated form so they can neither be leaked to the environment, nor be easily extracted, which could present a national security risk. Current waste storage systems include placement of radioactive material in temporary cooling pools, vitrification in glass, or emplacement in concrete or ceramic ingots. These methods are not sufficiently stable, permanent waste forms as they decompose and could contaminate water sources of surrounding communities. Specific nanocrystalline materials are ideally suited for safe, long-term storage since they are ion selective and target the high radiation emitters, are likely stable for millions of years, and have been shown to resist the deteriorative effects of high radiation and corrosive environments. Our research is concentrating on the engineered nanoporous natrolite structure, which poses remarkably high ion selectivity for the highly toxic element cesium, even in very low concentrations (~10 parts per million cesium) in concentrated alkaline solutions typical of spent nuclear fuel. Briefly, upon ion exchange the natrolite material locks in the cesium into its nanoporous crystalline framework, which in turn distorts, and does not allow the release of the ion back to the environment; thus effectively sequestering cesium from solution. The remaining waste could then be stored using more conventional systems. This project details the structure of the engineered natrolite material, ion sequestration and selectivity mechanisms, and future directions for material synthesis tailored for specific ions.

## **69. Kari Leichty**

**University of Louisville**

**Mentor(s): Richard Feldhoff & Pamela Feldhoff**

### ***Systematic Analysis of a 7kda Vertebrate Pheromone From D. Ocoee***

*D. ocoee* is a species of terrestrial salamander native to the mountainous regions of western North Carolina. This salamander uses pheromones during courtship to increase female receptivity. The male scratches the female's skin with his premaxillary teeth to deliver the courtship pheromones from his submandibular mental gland to the female. The pheromone mixture contains sodefrin precursor-like factor, a 20 kDa protein, and other unidentified proteins. A related species *P. shermani* uses Plethodontid Modulating Factor (PMF), a 7-kDa protein related to snake cytotoxins and xenoxins, as a major component of its pheromone mixture. This pheromone is unusual in its highly conserved untranslated region (UTR). Over 50 different isoforms of PMF have been discovered in *P. shermani*. cDNA suggests that this protein may also be present in *D. ocoee*. Total RNA was extracted from the *D. ocoee* mental gland, amplified using specialized primers designed to anneal to the conserved UTR. The sequences were cloned, re-amplified, then sequenced, resulting in only one PMF sequence. This sequence matched the previously discovered PMF in *D. ocoee* 100%. Proteinaceous pheromones from *D. ocoee* were separated and characterized using size exclusion chromatography, strong anion exchange chromatography and reverse phase chromatography. Proteins collected were analyzed by ESI and MALDI-TOF analyses. Observed masses were in a range from 6090-20248 Da. Mass spectral data for one of the proteins matched a *D. ocoee* cDNA sequence with coverage of 64%.

## **70. Brandon Leishman**

**Morehead State University**

**Mentor: Lindsey Godwin**

### ***Exploring the Impact of Codes of Ethics on Personal Actions in Business***

In the aftermath of recent business ethics scandals, there has been a surge of corporate interest in creating and promoting internal codes of ethics. In this rush of ethical awareness, one question still looms in the minds of corporation, "Do these codes actually affect employee behavior?" Prior research has provided mixed results in exploring this topic, with some empirical work suggesting that codes of ethics actually have no impact on employee behavior. Building on and extending prior studies done by Cleek and Leonard (1998) and Ford, Gray and Landrum (1982), this project seeks to further explore the impact of codes of ethics on employee behavior. Using an experiential design, this project involves manipulating the attribution particular behaviors as to being within or outside the scope of an organization's code of ethics to determine the impact such attribution has on the respondent's reported behavior. Our research also includes looking at the impact of other variables, such as perceived organizational support and ethical climate, to determine how these forces may also impact reported compliance or defiance of ethical codes at work.

## **71. Lauren Lobel & Maleka Embry**

**Kentucky State University**

**Mentor(s): George Antonious & Tejinder Kochhar**

### ***Antioxidants in Hot Pepper Fruits: Variation among Countries of Origin***

*Capsicum chinense* has been referred to as the most cultivated pepper in South America. The United States Department of Agriculture pepper (*Capsicum spp.*) germplasm collection contains several thousand members or accessions. Many of these species and cultivars have not been analyzed for their concentrations of antioxidant compounds. The main objective of this investigation was to select candidate accessions of hot pepper having high concentrations of capsaicin, ascorbic acid, and phenolic content among countries of hot pepper origin for use as parents in breeding for these compounds to produce fruits with value-added traits. Seeds of 63 hot pepper accessions of *C. chinense* accessions were collected from Belize, Brazil, Colombia, Ecuador, Mexico, Peru, Puerto Rico, and United States. Seeds were field grown in a silty-loam soil and their mature fruits were analyzed for capsaicin, ascorbic acid, and phenols content. Fruits of *C. chinense* accession PI-640900 (USA) contained the greatest concentration ( $P < 0.05$ ) of capsaicin (1.52 mg g<sup>-1</sup> fresh fruit) and dihydrocapsaicin (1.16 mg g<sup>-1</sup> fresh fruit), while total major capsaicinoids in the fruits of PI-438648 (Mexico) averaged 2 mg g<sup>-1</sup> fresh fruit. PI-152452 (Brazil) and PI-360726 (Ecuador) contained the greatest concentrations of ascorbic acid (1.2 and 1.1 mg g<sup>-1</sup> fresh fruit, respectively), while PI-438648 (Mexico) contained the greatest concentration of total phenols content (349 µg g<sup>-1</sup> fresh fruit) among the other 63 accessions tested. These accessions were identified as potential candidates for mass production of major antioxidants that have health-promoting properties.

## **72. Ashley Mack**

**Kentucky State University**

**Mentor(s): John Sedlacek, Karen Friley, Jeremiah Lowe, & Kirk Pomper**

### ***Potential of Ripe Pawpaw Fruit Extract as a Feeding Deterrent for Striped Cucumber Beetle on Squash***

Laboratory experiments were performed to study the effects of pawpaw (*Asimina triloba*) fruit extract on mortality and feeding deterrence of striped cucumber beetle (*Acalymma vittatum*). Acetogenins were extracted from ripe pawpaw fruit pulp using a simple ethyl alcohol extraction procedure. Concentrations of 0, 10, 100, 1,000, 10,000 and 50,000 ppm were used. Buttercup squash leaf disks 3.5 cm in diameter were treated individually with each concentration and placed on water moistened filter paper in 9 cm plastic Petri dishes. Five striped cucumber beetles were placed on each treated or control leaf disk. All Petri dishes were then placed in an environmental growth chamber set at 27 °C and a 16:8 hr light:dark photo period. Feeding activity was recorded in each Petri dish 1 and 4 h after beetle introduction. After 24 hr the cucumber beetles were removed. Amount of leaf tissue eaten was determined by tracing damaged leaves onto graph paper using a light table. Beetles did not feed on treated squash leaves at either 1 or 4 hours of exposure. However, significant feeding occurred between 4 and 24 hr after beetle introduction. Striped cucumber beetle feeding was lowest and feeding damage least on 50,000 ppm pawpaw treated leaf disks. Additional experiments need to be performed to determine the LD<sub>50</sub> of ripe pawpaw fruit extracts for striped cucumber beetle. The duration of treatment effectiveness and susceptibility of other pest and beneficial insect pest species to the extracts also need to be determined.

### **73. Lesley Mann**

**University of Kentucky**

**Mentor: Christopher Schardl**

#### ***In situ Protein Localization in Endophytic Fungi during Benign Plant Colonization and Stromata Development***

*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. *Neotyphodium coenophialum*, an endophytic fungus that lives in symbiosis with the plant and is transmitted through the seeds, plays a key roll in these growth advantages. However, this fungus also causes fescue toxicosis in livestock. Consequent loss in weight gain in cattle costs the livestock industry one billion dollars annually (Oliver, 1997). Thus, much interest lies with better understanding of this plant-fungal symbiosis. *Epichloë festucae* is a close relative of *N. coenophialum*, and serves as a model endophyte. It is rich in bioprotective alkaloids and grows, similar to *N. coenophialum*, systemically and intercellularly throughout its host plant. On each reproductive tiller the fungus either infects benignly and transmits clonally in seeds, or produces its sexual state (stroma) and chokes inflorescence development. The mechanisms underlying these developmental pathways (either seed transmission or stroma formation) remain to be known and are the subject of my study. It seems a very likely hypothesis that these stages are characterized by expression of specific gene sets in both host and fungus. Thus, we have identified genes that are differentially expressed in these two tissues using quantitative Real-Time PCR. My current interest lies specifically with localizing differentially expressed secreted proteins that may be involved in some of these signaling pathways leading to either stromata development or seed transmission.

### **74. Andrew Mattmiller, Christina Jackson, Bradley Oliver, Kevin Witbrodt, & Dan Varonin**

**Murray State University**

**Mentor: Alexey Arkov**

#### ***Using the Fruit Fly as a Model System to Understand Human Genetics of Early Embryogenesis***

Many human genes associated with diseases have their counterparts in the fruit fly *Drosophila*. Therefore, studying genetics of *Drosophila* is likely to provide insights into the genetic causes of human disorders. Our study focuses on the identification and analysis of novel genes governing early events of *Drosophila* embryo development. These events include synchronous divisions and migration of the nuclei inside the embryos and formation of primordial germline cells. During development these cells give rise to sperm and egg and therefore ensure continuity of the life cycle. We have isolated new mutants that affect germline development and are in the process of detailed characterization of the mutant genes. In addition, our data indicate that germline development has a unique metabolic profile and we study genes and genes' products that are responsible for the unusual metabolism in the germline. Results of our study are likely to be medically relevant and may help to better understand human genetics and development.



## **75. Savannah Marlow, Ted Wiersema, Daniel Thompson, & Jessica Bartle**

**Eastern Kentucky University**

**Mentor: Gerald Nachtwey**

*War Crimes in Late Medieval Literature*

Our project took as its starting point the assertion that there was not yet a notion of "war crimes" in the chivalric literature of the late Middle Ages--texts like Chaucer's *Knight's Tale* and Malory's *La Morte D'Arthur*. Rather, chivalric communities--and the aristocracy--judged inappropriate behavior in wartime according to hierarchies that ranked such behavior as more or less "worthy." However, by the sixteenth century, there was the notion that a soldier--even a "knight"--could behave not just badly, but criminally during wartime. Each student in our group worked through a selection of primary texts--both historical and literary--that provided evidence for when the transition from a hierarchical to a legal categorization of wartime behavior took place. They reported their findings in the form of a combined annotated bibliography, and a set of cross-indexed position papers which interpreted their collective research.

## **76. Joshua Masters, Vanessa States, & Clarisse Muenyl**

**University of Louisville**

**Mentor(s): Cyril Helm & Christopher States**

*Cisplatin Uptake Analysis in a Murine Xenograft of Ovarian Carcinoma Cells with Arsenic Trioxide*

Ovarian cancer affects over 200,000 women worldwide yearly and leads to the death of 125,000 of them, making it the 4th leading cause of cancer death in women in the United States. Due to the fact that there are no early warning signs, the disease has often spread within the peritoneal cavity by the time it is detected. Currently, standard treatment for the disease is combined cytoreductive surgery and intraperitoneal chemotherapy with a platinum-based drug (cisplatin) and a taxane. Frontline treatment will produce a complete response in 67% of patients but, of these, the disease will return in 65% of patients. Therefore, there is need for improved treatment. Cisplatin (CDDP) is the most administered chemotherapy drug for humans. Arsenic trioxide has been shown in vitro to augment the efficacy of the CDDP in combination with hyperthermia. We have developed a mouse xenograft model for metastatic, platinum resistant human ovarian cancer to test the efficacy of combined treatment modalities. Preliminary data suggest that platinum is readily accumulated and retained in the tumors exposed to cisplatin either alone or in combination with arsenic and/or hyperthermia. The results suggest that the model will be useful for evaluating intraperitoneal delivery of new combination chemotherapies and for determining modulation of tumor responses related to cisplatin resistance.

## **77. James Mayes**

**Murray State University**

**Mentor: David White**

### ***Interspecific Competition of Hexagenia bilineata and Chironomus major in Kentucky Lake, Kentucky***

Benthic (bottom dwelling) organisms are a major component of the food web in lakes. They not only act as food for higher levels (e.g., for fish), but also recycle carbon and nutrients back into the water column (Edsall 2001). These organisms are important in trophic dynamics and can be reliable indicators of ecosystem health using biomass and production estimates. *Hexagenia bilineata* (the burrowing mayfly) is a dominant and conspicuous component of the benthos in Kentucky Lake and other Midwestern reservoirs (Wetzel 2001, Ramsey et al. submitted). Over the past 20 years, a second species, *Chironomus major* (burrowing midge) has become very abundant in Kentucky Lake but not in other Midwestern reservoirs (Balci et al. 2005). Ramsey et al. (submitted) have shown that *Hexagenia bilineata* contributes less to overall benthic energy flow in Kentucky Lake ( $185 \text{ mg}^{-2} \text{ yr}^{-1}$ ) than would be expected compared with previously studied reservoirs and lakes. They attributed this low production to possible interspecific interference competition with the large-bodied *Chironomus major*. *Hexagenia* build residential “U” shaped burrows. The burrows may extend 10-15 cm deep into the bottom muds. *Hexagenia* gills are in constant motion bringing water and food through the burrow. The similar sized *Chironomus major* (up to 6 cm long) does not build a residential burrow, but instead is constantly moving through the sediments creating 8-20 cm long vertically oriented burrows. Ramsey et al. (submitted) have speculated that of *Chironomus major* may interfere with the hydraulic functioning of *Hexagenia* burrows if they happened to intersect, limiting the distribution of *Hexagenia* to less productive habitats along the margins of the lake shore where *Chironomus major* does not occur. Further, *Chironomus major* larvae may consume the eggs and young naiads in a situation similar to what Plant et al (2003) observed occurring between tube-dwelling chironomids and *Hexagenia* in Lake Erie. My research involves field and laboratory studies of the burrowing behavior of the two species to determine if interspecific competition is indeed occurring or if there are other factors contributing to lowered production of *Hexagenia*.

## **78. Rachel Messer**

**Morehead State University**

**Mentor: Karen Taylor**

### ***Archetypal Women: Representations of the Feminine in French Medieval Literature***

The purpose of this study is to examine some of the different feminine archetypes of the French Middle Ages through three critical lenses; intertextuality, psychology, and feminism. First, a comparison of the Biblical Eve with that of her character in the medieval drama *Le Jeu d'Adam* (anonymous) will reveal specific rhetorical practices applied to the reading and development of Eve's character that are used to portray her in an increasingly negative light. Second, the study will focus upon Mary as she is portrayed as Violent Virgin in the 13th century dramatic text *Le Miracle de Théophile* by Rutebeuf. Her role in the play will be examined in terms of the psychology of parenting, as well as in terms of language, action, and dramatic reproduction of certain visual and architectural portrayals of the Theophilus legend extant in church carvings and windows from the same period in Northern France. Third and finally, the role of the quest in *Le Chevalier au Lion* by Chrétien de Troyes will be re-examined using feminist criticism to extrapolate a personal feminine quest from the more typically studied masculine quest for redemption.

## **79. Brett Meyer, Austin Schroll, & Bobby Lindsey**

**Western Kentucky University**

**Mentor(s): Chris Byrne & Robert Choate**

### ***Vision System for Drum Assessment***

The purpose of this project is to design, test, and build a system to inspect the dimensions and positions of bolt holes and the pilot hole of brake drums for a manufacturing facility located in Kentucky. The design project is sponsored by the manufacturer and Western Kentucky University (WKU), who will coordinate design requirements and specifications. Other stake holders who will be interested in or impacted by the design include the Mechanical Engineering Department at WKU, operators at the manufacturing facility, as well as manufacturing and quality engineers looking to install a similar system. Major goals of the design include developing a system that is robust and capable of measuring bolt-hole dimensions within specified tolerances. Driving forces of the design will include environmental conditions, space limitations, and equipment capabilities.

## **80. Dillon Miles**

**University of Louisville**

**Mentor: Danielle Brown**

### ***Parents' Perception of Stress and Their Racial Socialization of African American Children Attending Head Start***

Parenting stress can have adverse effects on parent-child interactions, which can later impact a child's school readiness. High stress in the parent-child relationship can cause detachment issues as well as feelings of rejection that hinder the child's development. Past studies have also shown that racial socialization affects young African American children's attitudes and interaction with the world. Racial socialization is the process by which families teach children about the social meanings and consequences of ethnicity and race (Brown et. al 2007). Racial socialization impacts how the child interacts with both their educational and social environment, affecting how they perform in certain tasks. This study hypothesizes a relation among African American mothers' racial socialization practices and stress. African American children between the ages of 3 and 5 and their mothers were recruited from a local Head Start program in Louisville, KY. The mothers of the children completed the Parenting Stress Index, which assessed levels of stress and dysfunction in the family environment, specifically in the parent-child relationship. The Parent Experience of Racial Socialization asked parents how often they relay specific racial socialization messages to their children. This study is part of a larger study identifying the family environment factors that impact early development in African American children.

## **81. Sara Miller**

**Western Kentucky University**

**Mentor: Marilyn Gardner**

### ***Chasms in Care: Implications of a Disparate System on Childhood Overweight***

According to the Institute of Medicine, "improving health is a shared responsibility of health care providers, public health officials, and a variety of other actors in the community who can contribute to the well-being of individuals and populations." To be most effective, the roles of each actor should come from the same script. This is often not the case, as illustrated by the chasm that exists between public health and personal health care in addressing childhood overweight. Public health efforts to reduce or flatten the rising prevalence of childhood overweight have focused on preventive strategies modifying behavioral and environmental risk and protective factors. For children who are already overweight, these strategies are not enough. At present, there isn't a coordinated system of health care to address the treatment of overweight in children. What programs do exist are typically fee-for-service and is disconnected from the child's medical home. Using childhood overweight as the platform, this study examined the ethics and implications of the chasm that exists between the actors who share responsibility for improving the health of our nation, including widening health disparities.

## **82. Christopher Muncie, Sakura Higashi, & Zachary Elmore**

**Murray State University**

**Mentor: Suguru Nakamura**

### ***Immunoprecipitation of Gastric H<sup>+</sup>K<sup>+</sup>ATPase Beta Subunit in Hyperglycemic Mice***

Our studies currently focus on renal H<sup>+</sup>K<sup>+</sup>ATPase in the outer medullary collecting ducts (OMCD) of the mouse kidney. The OMCD is the last place in the kidney where acid-base balance, homeostasis, takes place. In this experiment we created a hyperglycemic mouse model by means of an intraperitoneal injection of streptozocin and measured the amount of H<sup>+</sup>-K<sup>+</sup>-ATPase beta subunit protein and compared that amount to the amount of H<sup>+</sup>-K<sup>+</sup>-ATPase beta subunit protein in a normal wildtype mouse. Our means of measuring the amount of H<sup>+</sup>K<sup>+</sup>ATPase beta subunit protein is by Immunoprecipitation. We demonstrated that hyperglycemic mice have increased amounts of gastric H<sup>+</sup>-K<sup>+</sup>-ATPase beta subunit levels in the intercalated cells of the OMCD when compared to normal wildtype mice.

## **83. Annie Nejedly & Amanda Gaddes**

**Western Kentucky University**

**Mentor: Barbara Bush**

### ***A Sweeter Look at Caries Control***

The dental hygienist has the role of being a clinician, a health educator, and a health advocate. It is the clinician's duty to find ways to implement mechanisms to improve the patient's health. Xylitol is relatively new in the dental field and is extremely advantageous as well as easy to recommend to patients. Xylitol is a five-carbon sugar alcohol used as an alternative to sucrose in some aspects of our diets. It can be found as an additive in chewing gums, mints, lozenges, mouthwashes, etc. It can be found naturally in raspberries, strawberries, and plums. It reduces plaque formation and bacterial adherence, inhibits enamel demineralization, and aids in remineralization, thus preventing dental caries. Specific populations that can be helped by the addition of xylitol into their daily routines are new mothers, children, soldiers, and diabetics. This project introduces the audience to xylitol, covering what it is, where it can be found, its advantages, its disadvantages and how it can be incorporated into anyone's daily routine.

## **84. Kalu Njoku & William Ritson**

**Western Kentucky University**

**Mentor: Douglas Smith**

### ***Pwned! A Sociological Study of Leadership in Video Games***

Psychological research and popular media often vilify video games as creating a deviant subculture of less intelligent, violent, game-obsessed addicts. However, Herbert Blumer's work would suggest that the effects of technology on society would have both positive and negative aspects. We can see some of the positive aspects in online video game playing. Since the advent of online gaming in the 90's, individuals can cooperatively play games over the Internet. Peña and Hancock, using Bales' Interaction Process Analysis, have shown that task and socio-emotional leaders develop in online multiplayer video games. In this research we explore whether task and socio-emotional leadership varies by type of video game played using a sample of 219 video game players. Results show that individuals playing MMORPG-type games report more socio-emotional leadership than individuals that play real-time strategy games and sports games. The usefulness of online multiplayer team games as leadership building opportunities will be discussed.

## **85. Jeremy Orndorff**

**Northern Kentucky University**

**Mentor: Rebecca Bailey**

### ***Through the Voice of One: War through the Eyes of Oral History***

This project investigated and documented, through audio and video recording, one man's experiences throughout his life while focusing on his service during the Second World War. The purpose of this research was to preserve the interview with the Library of Congress' Veterans History Project and to create a short celebratory video of the veteran's life. As part of the preparation for the interview background research was conducted using secondary and primary resources. The video from his interview was also used to create an accompanying presentation to explain the processes involved in creating, researching, and conducting an oral history project. The interview was conducted by a Northern Kentucky University Senior History Student and was a part of his senior honors research project. The project was also to demonstrate the value of an individual's story in the broad context of historical research. The veteran who gave the interview served aboard an American troop transport during World War II and took part in the invasions of Peleliu and the Philippines. During his interview the story of World War II unfolds through his unique perspective and experiences, explaining his training, combat experiences, trips home, and the monotony of everyday routine on ship during the War.

## **86. Matthew Cody Ortt & Linda Walters**

**Madisonville Community College**

**Mentor: Mary Janssen**

### ***Reaction Time Studies: Simple RT and Visual Search for the Presence or Absence of a Target Letter***

Preliminary studies using the dependent variable reaction time (RT), a measure of elapsed time between the onset of a stimulus and a response, were carried out. In one experiment subjects pressed a button in response to a light or sound. Results replicated the finding that reaction time to a sound is slower than to a light. A second experiment was a visual search task for the presence or absence of a target letter within a letter string, the target item. Variables were the presence or absence of the target letter, and position of the target item in a list. Subjects scanned down a column of letter strings and pressed a button that stopped a timer when they found the target item. RT was faster for the presence than for the absence of the target item, and depended on the position of the target item in the list. Results replicated findings of studies in attention and cognitive processing in a community college setting.

## **87. Elizabeth Perkins**

**Kentucky State University**

**Mentor: George Antonious**

### ***Chicken Manure Increased Concentration of Two Organic Sulfur Compounds in Field-Grown Onions***

There is growing interest in optimizing crop production to produce fresh or processed products with defined flavor and health characteristics. Onions are valued as food and medicine primarily for the flavor and medicinal properties of their sulfur compounds. A field study was conducted on 12 plots. The soil in three plots was mixed with sewage sludge, three plots were mixed with yard waste compost, three plots were mixed with chicken manure each at 15 t/acre, and three unamended plots that never received soil amendments were used for comparison purposes. Plots were planted with onion, *Allium cepa* L. var. Super Star-F1 as the test plant. The objectives of this investigation were to: 1) develop and validate a method for quantification of organic sulfur compounds, and 2) investigate the effect of soil amendments on the concentration of dipropyl disulfide and dipropyl trisulfide in onion bulbs. Gas chromatographic/ mass spectrometric (GC/MS) analysis of onion extracts prepared in chloroform revealed the presence of two major fragment ions that correspond to dipropyl disulfide and -trisulfide. Concentration of these two organic sulfur compounds was greatest (1.5 and 0.8 mg/ 100 g onion, respectively) in plants grown in chicken manure and lowest (0.4 and 0.07 mg/ 100 g onion, respectively) in onion plants grown in yard waste compost treatments. Chicken manure is among the most commonly used soil amendments in the U.S. Because of the rapid growth in the poultry industry, significant chicken manure generation will become available in increasing quantities. Chicken manure can be explored in growing onions with health-promoting properties.

## **88. Susan Perry**

**University of Kentucky**

**Mentor(s): Deborah Reed & Deborah Claunch**

***Burning the Candle at Both Ends: Kentucky's Aging Farmers***

The average age of the American worker is 39; the average age of American farmers is 55.8 and climbing. Farmers over age 50 are the principal operators on 64% of KY's 86,541 farms. In addition, 22,408 persons in this age cohort report farming as a secondary occupation, thus nearly 56,000 Kentucky citizens are engaged in agricultural production. This report is based on two waves of a five-year study, funded by CDC/NIOSH, on the work and health of farmers ages 50 and over in Kentucky. Of the 1,189 participants, 44.1% reported holding an off-farm job in addition to their farm work. They averaged 34 hours per week on the off-farm job, with those above age 74 working 23 hours compared to 37 hours for the 50-64 year age group. Across all ages farm income accounted for about 1/3 of total household income. Off farm income was considered essential to support farm operations, acquire health insurance, and to provide for future expenses. Leading health conditions across all age groups included arthritis (47%), hypertension (37%), back problems (25%), and hearing problems (24%). In spite of potentially debilitating health conditions, Kentucky's aging farmers continue to work at least two jobs in order to sustain their farming and to afford health insurance. Attention should be given to alternative ways for farmers to obtain affordable health insurance and to sustain their agricultural operations without the stress of multi-jobholding.

## **89. Nancy Pettibone & Jason Morris**

**Owensboro Community and Technical College**

**Mentor: Micah Perkins**

***Eastern Bluebird (*Sialia sialis*) Conservation at Owensboro Community and Technical College (OCTC) Nature Area***

The eastern bluebird (*Sialia sialis*), a native species of thrush found throughout Kentucky, is of conservation concern. A cavity-nesting bird, the eastern bluebird is losing critical nesting habitat. Existing nesting habitat is often in competition by nonnative bird species such as the house sparrow (*Passer domesticus*) and European starling (*Sturnus vulgaris*). The present question was whether providing additional nesting habitat, bluebird boxes, would enhance the nature area of OCTC for bluebird nesting. Ten bluebird houses were placed throughout the nature area (18.5 acres). House sparrow competition was severe but European starling competition was not recorded. Results indicated that eastern bluebirds attempted to nest at different times and locations but did not successfully produce offspring. However, house wrens (*Troglodytes aedon*) and tree sparrows (*Tachycineta bicolor*), native Kentucky birds, produced successful nests. It is believed that the nature area can be viable eastern bluebird habitat. Future efforts may involve putting up boxes earlier in the spring and use of aggressive house sparrow control measures.



## **90. Adrienne Pfendt**

**University of Kentucky**

**Mentor: Sonya Jones**

### ***An Evaluation of Feminist Authors and Their Critics***

The expansion of the feminist movement in literature has significantly impacted society. My interest in the lives and literature of women authors and the resulting opinions of feminist literary critics stems from the struggles endured by these women. Sallie Bingham is an accomplished writer who has not been regularly reviewed by the national media. My research allowed me to formulate a conclusion as to why this remarkable author has received such inconsistent reviews. I am in the process of reading and analyzing several of Ms. Bingham's works including *Winter Term*, *After Such Knowledge*, *Passion and Prejudice*, and *Red Car* and will continue with a search of corresponding commentaries in order to learn more about this incredible woman and her impact on feminist literature. My mentor, Dr. Sonya Jones, has been engaged in an ongoing correspondence with Ms. Bingham and has had several interviews with her in person, and I anticipate the possibility of conducting an exclusive personal interview with her as well. The second part of my project entailed a systematic documentation of women authors mentioned and critiqued within the *New York Review of Books*. I cataloged the reviews, documented the number of women authors, and summarized the content and opinion indicated within each review. The results included a comparison between the number of female and male authors and an analysis describing the nature of the reviews for each gender.

## **91. Jessica Pulliam & Ben Morris**

**Eastern Kentucky University**

**Mentor: Stephanie McSpirit**

### ***Eastern Kentucky University Students' Involved in Kentucky's Streams and Wetlands Plan***

During the 2008/ 2009 academic year, students at Eastern Kentucky University have worked with state regulators from Kentucky's Division of Water and the Department of Fish and Wildlife Resources. Their job has been to help with the development of Kentucky's Comprehensive Streams and Wetlands Plan and they have been charged with interviewing and surveying regulators, various stakeholders (developers, farmers, watershed groups, etc) as well as university scientists. Through this process of surveying and interviewing, students have collected and compiled regulator, stakeholder and scientific input towards the development of the state's comprehensive plan. One other method that university students have used to facilitate statewide participation is through an interactive website. This website will be on display and online at the Poster Session for those that want to maneuver through the various interactive portals. Along with the website, students plan to share some of their initial findings from their first interviews with key stakeholders, past regulators and former taskforce members. Specifically, students will share various expert perspectives on how best to regulate, protect and manage our state's streams and wetland areas. This expert guidance is serving as the framework for the initial draft plan and this draft framework will be shared and available at the poster session.

## **92. Roger Richardson**

**Eastern Kentucky University**

**Mentor: Todd Hartch**

***On Eagles Wings: The Training and Effectiveness of the 201st Mexican Fighter Squadron in World War II***

This paper examined the recorded events and personalities of the 201<sup>st</sup> Fighter Squadron, the only Mexican military unit of any kind to serve outside the Republic of Mexico. It was the intent of the author to shed new light on a virtually unknown unit of WWII, and to add to the discipline of History by revealing the trials and triumphs of a relatively unrecorded unit. Since these men were and still are the only veterans of foreign war in Mexico, it was the hope of the author to chronicle the lives and exploits of these men as they served in the Pacific, and to attest to the significance of that service. It was also the aim of the author to record some of the limitations and prejudices facing a non-American unit deployed with American counterparts. The paper focused on the insufficient training of the unit as a token response to the Mexican Government. The author contended that most, if not all of the losses of the unit while in the Pacific could be attributed to the lack of adequate training in the initial phase of the unit's formation. The author found that the unit was, to the American military, merely a token to appease both the American and Mexican governments. In view of today's coalition efforts in the Persian Gulf, This paper is especially significant in that it exposes some of the discrepancies facing a Non-American unit serving under American military command.

## **93. Tim Riley**

**University of Kentucky**

**Mentor(s): Suzanne Smith, Raymond Lebeau, Keith Bezanson, Sarah Dennis, Dan Roettgen, & Alex Thompson**

***AIAA Student Design/Build/Fly (DBF) Competition***

The Student Design/Build/Fly (DBF) Competition is a competition in which students from AIAA chapters at universities all over the world are invited to design and compete with an unmanned aircraft. The competition requires students to design, manufacture, and demonstrate the aircraft flight performance that meets the specifications of the requirements. Our group has taken a special interest in aviation, several of us having worked within the field. This will be the first time the University of Kentucky participates in this competition with the hope that it becomes a yearly competitor to offer all students pursuing the aerospace certificate a senior design option. The DBF committee creates a new set of rules for the competition each year. This year's requirements call for an unmanned aircraft specifying allowable aircraft types, weight limitations, propulsion specifications, flight requirements, as well as safety stops. The competition in Tucson, AZ involves a timed aircraft assembly (pre-mission) as well as three different missions. The first is 2 laps on a designated track (approximately 2500 ft), with an empty payload. The second is 4 laps with a specified liquid payload. The third is a series of 4 laps where the aircraft is required to land and drop its ballast rocket payload individually and then return to flight between each lap. The goal of this project is to successfully qualify and competitively finish in the AIAA Design, Build, Fly competition, in hopes that this will lay the foundations for future years.

## **94. Rodney Ripberger**

**Kentucky State University**

**Mentor: Tamara Sluss**

### ***Edge Effect on Native and Invasive Plant Communities in Areas of Differing Land Use***

Habitat fragmentation and proximity to an edge affects native plants by altering the chemical and physical environment and typically aids in the establishment of invasive plant species. This study investigated the edge effect on soil and air temperature, wind velocity, canopy opening, light, and native and invasive plants using transects into remnant forest patches in urban, agricultural, and post-agricultural sites. Soil and air temperature, light, canopy opening, and wind speed essentially decreased along the transect at all sites. The invasive plant, bush honeysuckle (*Lonicera mackii*) decreased along the transect and the abundance rapidly declined at 6-9 meters from the edge while garlic mustard (*Aralia petiolata*) abundance increased along the transect. Urban sites had the highest number of invasive plants followed by active agricultural sites and the post-agricultural site. The results of this study may be used in management decisions to create a buffer zone for bush honeysuckle in remnant forest patches.

## **95. Evan Roberts**

**Murray State University**

**Mentor: Edie Banner**

### ***Development of Functionalized N-Heterocyclic Scaffolds for Application in the Synthesis of Amphibian Alkaloids***

Natural products continue to be a source of lead compounds that can be developed for use as medicinal therapeutic agents or as probes for studying biological functions. Due to difficulties in isolation and low yields, natural products are often scarce, thus full characterization and evaluation of novel compounds cannot be achieved. Synthesis of natural products results in useful quantities of these scarce materials to facilitate structural and biological evaluation. Hundreds of alkaloid compounds have been isolated from poison dart frogs. These compounds are grouped according to structural classes, thus the identification of molecular scaffolds based on common core structures found in these classes of compounds would provide a basis for the rapid construction of target compounds for structural and biological evaluation. With a strategically functionalized scaffold, substituents and stereochemical variability can be introduced along the synthetic route. This work utilizes readily available amino acids that will be derivatized and cyclized to form various functionalized scaffolds. These structural scaffolds will be utilized in the synthesis of amphibian alkaloid targets for structural and biological evaluation.

## **96. John Rodgers**

**Kentucky State University**

**Mentor(s): Michael Bomford & Brian Geier**

### ***Effect of Planting Date on Biomass and Glucosinolate Production by Brassica Juncea Cover Crops***

Indian mustard, *Brassica juncea* (L.) Czern., can be used as a cover crop in agricultural systems to reduce emerging weed populations and build soil organic matter content. It contains glucosinolates, which have attracted some attention for their potential to suppress certain pests and soil-borne diseases, including white mold, *Sclerotinia sclerotiorum* (Lib.) de Bary. We conducted a study to gauge the effect of planting date on *B. juncea* biomass and glucosinolate production in Kentucky. Weather permitting, *B. juncea* var. 'Pacific Gold' was direct seeded weekly between 24 April and 3 July, 2008 in three replicated 10 m<sup>2</sup> plots. Aboveground biomass was collected for measurements of fresh weight, dry weight, and glucosinolate content. Biomass production (y in g m<sup>-2</sup>) declined with planting date (x, where 24 Apr = 0) according to the equation  $y = -38.7x + 1916$ . The final two plantings failed to establish. We conclude that *B. juncea* var. 'Pacific Gold' is best planted in early spring, and is not a suitable summer cover crop for Kentucky.

## **97. Kiah Rodriguez**

**Kentucky State University**

**Mentor(s): Changzheng Wang, Lingyu Huang, & Cecil Butler**

### ***Sugar Modifies the Water Activity and Water Phase Salt Content of Smoked Paddlefish Meat***

The Food and Drug Administration requires that smoked fish contains a minimum of 3.5% water phase salt to ensure the water activity of the product is low enough to inhibit the growth of *C. botulinum*. The objective was to determine the effects of sugar added to the brining solution on the water activity and water phase salt content of smoked whole paddlefish. Three paddlefish each were brined in a 15% salt solution with 92.5g, 185g or 370g of sugar per gallon of brine in a vacuum tumbler for 1hr. At the end of the brining, fish were rinsed in tap water and left to dry at 4° C overnight. They were hot smoked until the internal temperature reached 145oC for 30 min. After cooling down in a refrigerator, the smoked fish were vacuum-packed and stored at -20C before analysis. The water activity of fish brined with 92.5g sugar was above the safe range. Added sugar tended to reduce the salt content of the smoked fish meat, but kept the water activity below 0.95. The results indicate that adding sugar into the brining solution may help to reduce water activity and avoid extreme saltiness without compromising safety of smoked fish products.

## **98. Eron Roy**

**University of Louisville**

**Mentor: Awdhesh Kalia**

### ***Adaptations for an Obligate Intracellular Lifestyle: Molecular Evolution of Legionella pneumophila Ankyrin-Repeat Proteins***

Legionella pneumophila serogroup 1 (Lpn sg1) isolates are responsible for most human Lpn infections. In silico analyses show that Lpn genomes harbour an expanded family of proteins containing a variable number of ankyrin-repeats, which themselves were acquired from eukaryotes. We showed that three of the Ank proteins, AnkB, AnkH, and AnkJ, contribute importantly to Lpn virulence. Here, we elucidated the molecular evolutionary dynamics of Ank proteins, in the context of Lpn's population genetic structure in order to develop better insights into the emergence of Lpn sg1 isolates as the predominant cause of human infections. We implemented the Sequence-Based Typing (SBT) scheme established by the European Working Group on Legionella Infections, whereby nucleotide sequences of seven genes were determined from environmental (N=29) and clinical (N=20) origin. Three of these genes (asd, proA, and neuA) perform housekeeping functions, while (pilE, proA, mip, and mompS) are virulence associated. Analyses of mip and asd alleles revealed that environmental and clinical isolates are not phylogenetically distinct. In contrast, preliminary analyses of ankJ, ankH, and ankB revealed striking differences among environmental and clinical isolates. For example, we discovered an ankB variant, from mostly environmental Lpn isolates that contained a frameshift mutation causing deletion of the C-terminal signal sequence required for translocation via the Dot/Icm Type IV secretion system. Further population genetic and phylogenetic analyses of the completed allelic profiles is likely to provide greater insights in to the evolutionary origins of Lpn sg1 isolates and elucidate factors involved in adaptation to the human host.

## **99. Cory Ruffing, Briteney Maynard, & Steven Osborne**

**Morehead State University**

**Mentor(s): Ilsun White & Wesley White**

### ***Excitation of the Amygdala Augments the Effects of Amphetamine on Behavior***

The amygdala is an important brain structure, which is involved in emotion, memory, and drug addiction. Dysfunctional amygdala has been implicated in post-traumatic stress disorder (PTSD) in humans. Animal studies indicated that inhibition of the amygdala potentiates behavioral excitation induced by psychostimulants, such as amphetamine and cocaine. In the present study we tested a hypothesis that excitation of the amygdala would produce an opposite effect, the suppression of amphetamine-induced behavior. We compared locomotor activity of rats following stimulation or inhibition of the amygdala, using direct microinfusions of NMDA and lidocaine, respectively. We also examined the effects of permanent damage to the amygdala on behavior. Male Wistar rats were implanted with bilateral cannulae in the amygdala. Another group received excitotoxic or sham lesions. Following recovery, rats were habituated and tested in the open-field. The animal's activity was measured by distance traveled for a 60-min period. Amphetamine markedly enhanced locomotor activity (hyperlocomotion). Stimulation of the amygdala further enhanced hyperlocomotion induced by amphetamine. This effect required for activation of D1 receptors. In contrast to the previous reports, however, neither inhibition nor permanent lesions affected amphetamine-induced hyperlocomotion. Our data suggest that an over-excited amygdala may enhance addictive property of amphetamine, whereas a normal or under-activated amygdala may not. Further investigation of the involvement of amygdala in drug addiction and reward will advance our understanding of the relationship between drug abuse and PTSD.

## **100. Rebecca Russell**

**University of Kentucky**

**Mentor: Jeffrey Bewley**

### ***A Survey of the Management Practices, Educational Needs, and Decision-making Behavior of Kentucky Dairy Producers***

The Kentucky dairy industry is challenged by a shrinking number of dairy farms, an aging farmer population, per cow milk production levels well below the national average, and competition from more progressive dairy industries in neighboring states. To assess the opportunities to address these issues through educational programming, a survey was distributed to all licensed milk producers in Kentucky (N=1074). Responses from 230 dairy producers were used to characterize management practices, extension programming needs, information sources, and decision making behavior. Mean 2008 herd size was 83.4 ( $\pm 101.7$ ) with a projected mean herd size of 91.7 ( $\pm 112.4$ ) in 2013. Cows were housed outside year round by 39.9% of producers, while 22.1 % housed cows in new or modern freestall barn(s), 17.8% in existing building(s) converted to freestall housing, 8.7% in tie stall or stanchion barns, 7.2% in compost bedded pack (sawdust) housing, and 4.3% in bedded pack (straw) housing. Survey respondents indicated that they preferred to receive new information from printed farm magazines (81.1%), agriculture newspapers (77.5%), and printed newsletters from county agriculture agents (75.8%). The primary factors used to evaluate dairy operation success were ability to pay operating expenses without incurring unnecessary debt (91.7%), well-being of animals in the herd (82.5%), and producing superior quality milk (75.4%). Among 46 dairy management areas, dairymen placed the highest priority (by percentage of producers selecting "very important") on mastitis/milk quality (70.6%), animal well-being (55.9%), and disease prevention/vaccinations (52.4%). These results provide invaluable insight for future dairy-related Cooperative Extension Service programming efforts.

## **101. Aumbrea Sanders**

**Eastern Kentucky University**

**Mentor: David May**

### ***Attitudes Towards and Perceptions of Human Papillomavirus and the Gardasil Vaccination***

Over 10,000 women in the United States are diagnosed with cervical cancer with nearly 4,000 dying each year. Human Papillomavirus (HPV) is considered one of the most serious diseases associated with cervical cancer. The purpose of this research was to determine college students' knowledge and perceptions of HPV and legislative and educational factors associated with HPV. Using data from a representative sample of 400 Eastern Kentucky University students collected in the summer 2008, I determined that there were important gender, racial, and contextual differences in levels of knowledge about HPV and Gardasil vaccinations and support for mandatory Gardasil vaccinations. Whites, females, sexually active students, parents, respondents with health insurance, and those who practiced safe sex were more knowledgeable about Gardasil while Blacks and students without children were more supportive of the mandatory Gardasil vaccination. Policy implications from this research are also discussed.

## **102. Melinda Sartwell**

**Northern Kentucky University**

**Mentor(s): Rebecca Bailey, Bridget Striker, Lois Hamill, & Mike Lively**

***The Walton Ghost Walk and Mystery Tour***

Boone County Public Library and Boone County Parks and Recreation co-sponsored a Burlington Ghost Walk and Mystery Tour in 2007 as an experiment in "fun" ways to promote local history. The public response far exceeded expectations and as a result, the Library and Parks Department planned a tour for the City of Walton, one of the oldest settlements in Boone County. The project focused on eight to ten properties within walking distance to one another that have rumors of haunting or mysterious events or people surrounding the properties. Research included census, deed and newspaper searches; and interviews with Walton residents. The final result is a written script of the tour route, detailing the history of the property, families involved and the event that occurred. The tour includes a visit to the Walton Cemetery and the historic Abner Gaines Tavern. The second phase of the project is to develop an online version of the tour to be posted on the Boone County Public Library site. In addition to the completed historical research, an interactive website that will include photographs, audio, and 3D modeling is being developed in conjunction with the Northern Kentucky University College of Arts and Sciences Instructional Design Department.



### **103. Michael Schulte, Michael Gailey, Anthony Karam, & William Hutchison III.**

**Jefferson Community and Technical College, University of Louisville,  
& University of Kentucky**

**Mentor(s): Vincent DiNoto Jr. & James Lumpp**

#### ***Developing a Liquid Nitrogen Cooling System as Sub-System to a Cubesat-Scale Thermal-Vacuum Space Environmental Testing Chamber***

Documentation for development of Kentucky Space's Environmental Testing Chamber for CubeSats, a facility of Kentucky Space, Kentucky Science and Technology Corporation, is intended to assist its developers to greater understanding of the dynamics of this facility. Substitute systematic configurations are many; therefore, an optimized system will be designed, built with hardware that is cryogenically rated, tested with thermocouples, quantitatively analyzed, and redesigned. CubeSats, intended for low Earth orbit, may be subjected to the Kentucky Space Environmental Testing Chamber in preparation for orbital missions. It is known that the near-Earth space environment consists of temperature variation ranging from  $-30^{\circ}$  to  $60^{\circ}$  C. Additionally, atmospheric pressure is absent. The focus of this research involves developing the liquid nitrogen (LN<sub>2</sub>) cooling system to cooperate with the fixed heating and vacuum systems. The heat-transfer rate from CubeSat to coolant represents the test-chamber's unknown variable, while orifice area, Dewar pressure, and flow-rate constitute the known variables. The hypothesis rests on the idea that the quantity of liquid nitrogen required to cool the satellite from  $60^{\circ}$  to  $-30^{\circ}$  C can be quantitatively predetermined. Knowledge of both satellite mass and composition will yield specific heat capacity. The cooling medium has quantifiable physical properties. Any deviation found between the nitrogen's predicted consumption and its experimentally determined consumption may then be reviewed as impetus for further inquiry into related areas such as emissivity and fluid dynamics. It follows that analysis serves to identify the means to enhanced accounting and predictability.

## **104. Michelle Seger & Colleen McCoy**

**University of Kentucky**

**Mentor(s): Buck Ryan & Chike Anyaegbunam**

***Putnam Meets Rosen: A Story of the 2007 Kentucky Governor's Race***

This exploratory study uses content analysis of newspaper headlines in the 2007 Kentucky governor's race to test whether findings by national scholars on civic life and journalism have relevance for citizens, particularly college students, in the Lexington area. As many scholars have pointed out, civic participation among American citizens has fallen. Many doubt the benefit of traditional-elite journalism, which focuses on societal conflict, and prefer public journalism, which focuses on societal problem-solving. This research sought to determine whether traditional-elite journalism is the most common form used by journalists. Results (from *the Kentucky Kernel* and the *Herald-Leader*) show that journalists from both newspapers used the traditional-elite style in over 75 percent of their headlines and used public journalism style in less than 25 percent. Voter turnout for the governor's election has declined in the past two decades, falling to 37.2 percent of registered voters in 2007. The results of this study would not surprise scholars Robert D. Putnam and Jay Rosen. Putnam holds the idea that the influence of the loss of the long civic generation may explain the low number of articles about the 2007 governor's race in the *Kentucky Kernel*, a college-based newspaper. The findings raise questions about whether traditional-elite journalism is a turnoff to citizens, especially college students.

## **105. Misty Skaggs & Michelle Fiore**

**Morehead State University**

**Mentor(s): Ann Andaloro & Ritta Abell**

***Roaring at MSU: Womens Issues and Television***

Issues like domestic violence, eating disorders and feminism are difficult topics to tackle. With the MSU TV show "Hear Me Roar", our cast and crew are spreading awareness of these hard to broach subjects. The show is broadcast on a biweekly basis live from the Breckenridge Hall facilities at Morehead State University. Our program takes on a friendly, familiar half hour format. With this talk show type format, we strive to involve MSU students, faculty and members of the Eastern Kentucky community to express their views and opinions on Womens Issues around us and across the globe. We mix entertainment in the form of local musicians, authors and actors with educated opinions, statistics and feminist theory. "Hear Me Roar" also encourages guests to bring their friends and watch the show unfold live from our green room. This aspect of student participation has brought attention to local events on campus and across the region. Most importantly, the mixture of television and serious subjects brings the attention of the students to our half hour experiment in entertainment.

## **106. Colby Smith**

**Kentucky State University**

**Mentor(s): Narayan Rajendran & William Mazhawidza**

***Molecular Probing Of Soil Bacterium Exiguobacterium Acetylicum Strain SN Using Degenerated Primers***

Many soil bacteria and filamentous fungi produce some valuable peptides such as cyclosporine, penicillin etc non-ribosomally. A multienzyme complex, known as non-ribosomal peptide synthetase (NRPS), is involved in this process. The objective of this study was to find out the presence of such non-ribosomal system from newly isolated soil bacterium *Exiguobacterium acetylicum* strain SN and to get hands-on training in various molecular and microbiology techniques used in this research. As expected, this study could also give us a clue for the presence of a peptide product such as an antibiotic in this soil bacterium. In order to achieve these objectives, initially a pure Nutrient Broth culture of *E. acetylicum* was grown at 30° C, by picking a single colony from a Nutrient Agar culture plate prepared earlier by streak-plate technique. Genomic DNA was isolated using DNA bactozol kit and confirmed with 1 % agarose gel. Different sets degenerated probes of NRPS were used to amplify the DNA using Polymerase Chain Reaction (PCR) technique. The employed PCR reactions were depended upon the PCR cycles we standardized earlier. The PCR amplicons of the genomic DNA were studied using similar electrophoresis method. By using UVP documentation unit, we examined the targeted amplicons with control primer products. Our results confirmed the presence of non-ribosomal system in *E. acetylicum* as proved by the targeted-primer set against the genomic DNA along with the control of 16S primer. Further analysis, cloning of the amplicon and the DNA sequence studies are underway.

## **107. Dalene Smith**

**Western Kentucky University**

**Mentor: Patricia Kambesis**

***Water Chemistry of a Small Karst Aquifer, Hart County, Kentucky***

The purpose of this research was to determine if there were seasonal variations in the water chemistry of a small, local karst aquifer. The study site is a shallow karst sub-basin located adjacent to Mammoth Cave National Park. Weekly water sampling was conducted at a perennial waterfall located within Dogwood Cave, Hart County, Kentucky during wet and dry periods in the summer and fall of 2008. In addition to water sampling, physical parameters (temperature, pH and conductivity) were measured during each sampling event. Samples were also titrated in order to determine alkalinity. The data from sample results were used to calculate saturation index with respect to calcite. Saturation index is a measure of whether groundwater is dissolving or depositing carbonate. Based on the water chemistry results and from observations of the total lack of speleothem development in the waterfall area, it was determined that the waterfall was undersaturated with respect to carbonate and was thus dissolving the limestone unit in which it flowed. Despite variations in rainfall during the sampling period, the waterfall maintained a steady discharge. This along with the saturation index values may indicate that the aquifer, though developed in limestone, displays predominantly diffuse flow, rather than turbulent flow which in turn may be a reflection of the stratigraphic composition of the limestone in which the aquifer has formed.

## **108. Michael Somuah**

**Kentucky State University**

**Mentor(s): Narayan Rajendran & William Mazhawidza**

***Targeted Amplification of a Matching Non-Ribosomal Peptide Synthetase Gene in Soil Bacterium *Arthrobacter Nicotianae* Strain PR***

Large numbers of biologically significant compounds are synthesized non-ribosomally by microorganisms. Non-ribosomal peptide synthetase (NRPS) is involved in this process to produce such peptide products. In order to find out the occurrence of such non-ribosomal biosynthetic system in *Arthrobacter nicotianae* strain PR, we used a degenerated set of NRPS primers. Along with basic microbial techniques such as spread plate, streak plate, broth culture, and centrifugation, we also used molecular techniques such as DNA isolation, Gel electrophoresis, and polymerase chain reaction (PCR). The genomic DNA was isolated using DNA bactoazol kit. It was amplified with NRPS primer using our PCR protocols that are standardized earlier. PCR amplicons of the target strain obtained by using a specific set of forward and reverse primers was checked in a 1 % electrophoresis gel. Along with the amplicon of a control 16S primer, the target amplicons were photographed using UVP documentation unit. This targeted amplification approach revealed that the tested primer set of NRPS against the genomic DNA of *A. nicotianae* is matching with our newly isolated soil bacterium. Further cloning and sequence analysis are underway.

## **109. Jennifer Strange**

**University of Kentucky**

**Mentor: Joanna Badagliacco**

***Children in Housing Distress: An Examination of Education***

The number of homeless children has risen significantly in recent years. For many children, homelessness is neither a singular nor brief experience and can cause emotional and educational setbacks that can permanently put them off-track for success. Adequate education is needed in order to end the cycle of poverty. The project, which is part of an ethnographic study involving 86 homeless families in Kentucky, examines the lives of homeless children and the effects of homelessness on children's education. Eighty-six (86) mothers and eighteen (18) fathers were interviewed using a semi-structured format making the total number of interviews 102. In addition to answering questions about their lives growing up and what contributed to their homelessness, the parents were asked about the well-being of their respective child(ren), for example, the effects of moving on their education. Current research regarding the effects of homelessness on children and educational challenges was also reviewed in an effort to place these findings within a natural setting. This work discusses the educational setbacks faced by homeless children, the causes of such problems (e.g. residency requirements, guardianship requirements, lack of immunization records), and implications for policy reform. The McKinney Act was established in order to provide homeless children with rights to an education equal to their permanently housed peers. However, many barriers to the success of homeless children in school still exist. The results of this study, in the form of anecdotal accounts and data tables, provide evidence for addressing these reforms.

## **110. Jonathan Strayer**

**Kentucky State University**

**Mentor(s): Changzheng Wang, Lingyu Huang, & Cecil Butler**

***Knowledge and Attitudes About Vegetable Consumption Affects Body Weight Status of Kentucky Adults***

A diet rich in vegetables have higher contents of key nutrients, such as folate, potassium, and vitamins A and C and fewer calories per serving than other foods. Thus, vegetable consumption can play an important part in reducing incidence of overweight and obesity. The objective of this study was to assess the critical knowledge, attitudes and behaviors related to vegetable consumption and body weight status of adults in Kentucky. A total of 280 visitors to the 2008 Kentucky State Fair were recruited to fill out a questionnaire before they were given a free analysis of their body composition (body fat %) with a Tanita TBF -521 body composition analyzer. Frequency of vegetable consumption was negatively correlated with current body mass index and body fat percent of the subjects. The proportion of people within the normal weight range was higher among people who grew up eating vegetables, who considered vegetables taste good and knew the current recommendations for vegetable consumption. People who have low consumption of vegetables or only eat lettuce raw with dressings were more likely to be overweight or obese. Our results suggested that effective educational programs are needed to improve people's knowledge of and attitudes toward vegetables so they may increase their vegetable consumption to reduce the risk of obesity.

## **111. Zineb Syed & Anthony Haskamp**

**Northern Kentucky University**

**Mentor: Heather Bullen**

***Improving the Biocompatibility and Bacterial Resistance of Stainless Steel Medical Implants***

Medical grade stainless steel (316L SS) is used in throughout the medical industry in a variety of applications including medical devices and orthopedic implants. Although 316L SS possesses strong corrosion resistance and superior mechanical properties the biocompatibility and resistance to biofouling needs to be improved. This research is aimed at modifying 316L SS and other metals using self assembled monolayers (SAMs) to reduce nonspecific adsorption. The capability of these surface modified substrates to resist bacterial adhesion of an opportunistic human pathogen *Pseudomonas aeruginosa* will be presented.

## **112. Sarah Thomason**

**Murray State University**

**Mentor: Howard Whiteman**

### ***Evaluation of Microsatellites in Ambystoma maculatum***

Phenotypic plasticity is the ability of a trait to change in response to an environmental cue. Salamanders are known to exhibit phenotypic plasticity in the form of facultative paedomorphosis, producing a paedomorphic (aquatic) or a metamorphic (terrestrial) body morphology, which provides a unique vertebrate model for understanding the evolution of phenotypic plasticity. Previous research has revealed the mechanisms that produce this polymorphism; however, little is known about the evolutionary mechanisms that maintain it. By studying the fitness consequences of facultative paedomorphosis, we can better understand the evolution of this polymorphism. We have proposed using nuclear markers to assign parentage and to create a pedigree within a closed population of tiger salamanders as a way of measuring fitness differences among morphs. As a first step, we evaluated polymorphism using previously designed *Ambystoma* microsatellite markers in spotted salamanders (*Ambystoma maculatum*). Tissue samples of 55 salamanders were collected from a local population and DNA was amplified using PCR to assess microsatellite variability. In this ongoing study, nine loci have been successfully amplified, six of which are polymorphic and will be used to determine relatedness in this population. The results of this study will eventually be applied to a population of facultatively paedomorphic tiger salamanders to better understand the evolution of phenotypic plasticity.

## **113. Shannon Touroo, Elizabeth Carson, & Brad Galbreath**

**Morehead State University**

**Mentor(s): Philip Prater, Barb Lewis, Kimberly Peterson, & Troy Wistuba**

### ***The Effect of Bovine Leukosis Virus Infection on the Proportion Among Bovine Leukocyte Populations in the Hemogram of Cows***

The effects of Bovine Leukosis Virus (BLV) infection on the proportion among bovine leukocyte populations in blood (WBC) was investigated using differential staining and a CBC profile. Previous research has indicated that total WBC count and total lymphocyte are impacted by BLV infection. However, few studies have included neutrophils, basophils, and monocytes. Eighty Angus cows (51 positive and 29 negative) were bled by jugular venipuncture into 7 ml EDTA treated vacutainer tubes on October 2, 2007. Cows had previously tested positive for the presence of BLV and were retested by ELISA on the day blood samples were taken. The analysis of variance was generated using PROC GLM (SAS Inst., Inc. Cary, NC), the model included presence or absence of BLV infection and sex. Least-squares means were calculated and separated using pair-wise t-tests (PDIF option). There was no impact of sex on any of the parameters used in this study and thus the bulls were eliminated from the data set. Total white blood cell count and total eosinophils were greater ( $P < 0.09$  and  $0.005$ ) in the cows that tested positive for BLV. Proportions of lymphocytes were greater ( $P = 0.11$ ) for uninfected cows compared to infected cows. However, there were no differences in total counts or proportions of neutrophils, basophils, or monocytes and there was no difference detected for the neutrophil:lymphocyte ratio. This study supported previous research in its findings that BLV infection has an impact on total white blood cell counts and lymphocytes.

## **114. Ashley Wade**

**University of Louisville**

**Mentor: Patrick Shafto**

### ***Reasoning About Mental Illness: a Study of the Influence of Causal Knowledge on Categorization***

Kim & Ahn's (2002) study sought to explore reasoning about mental illness by asking participants to draw arrows indicating causal relationships between symptoms of common mental disorders, and then assign numeric strengths to those relationships, and rate the importance of each symptom in diagnosis. These processes were intended to determine causal and conceptual centrality. The authors found a positive correlation between the causal and conceptual centrality ratings, suggesting that features are "conceptually central to the extent that they cause other features." We propose that Kim & Ahn's methodology is insufficient to explicitly link participants' responses to their beliefs about causal relationships among symptoms of each mental disorder. An additional measure will be incorporated into the study's replication of Kim & Ahn's experiment, in which participants will be asked to judge the likelihood of each symptom in the presence or absence of the other two. This study aims to determine whether or not causal theories are the source of participant's responses concerning relationships between symptoms of common mental disorders, or whether a prototype account is more consistent with people's judgments. A third possibility is that judgments are consistent with both, in which case an amalgamated model including aspects of both approaches will be proposed. If either of the initial cases are found to be true, our current methods of diagnosis, including the diagnostic methods currently condoned by the current edition of the Diagnostic and Statistical Manual, may have to be seriously reviewed and possibly augmented in order to better accommodate the way people actually reason.

## **115. Crystal Walker & Tara Holaday**

**Western Kentucky University**

**Mentor: Cheryl Davis**

### ***High Prevalence of Raccoon Roundworm (Baylisascaris procyonis) in SouthCentral Kentucky***

The large raccoon roundworm, *Baylisascaris procyonis*, has recently emerged as a potential zoonotic pathogen of humans. The incidence of human infection with this dangerous parasite is expected to increase as raccoon populations continue to expand into peridomestic habitats. The purpose of our study was to determine the prevalence of *B. procyonis* infection in raccoons trapped from Warren and Barren counties of Kentucky. Raccoons were live-trapped between June 2007 and January 2008. Following inhalant anesthesia with isoflurane, fresh fecal samples were removed and placed into specimen bags. An overdose of isoflurane was then given to ensure death, and intestines were removed and examined for the presence of intestinal parasites. Helminths were removed with forceps and placed into vials containing 70% ethanol. In the laboratory, parasite eggs were separated from fecal matter using a sodium nitrate fecal flotation method. Parasite eggs were observed, identified, and photographed using an Olympus BX51 microscope. The overall prevalence of *B. procyonis* infection in raccoons was 36%. Prevalence was highest in Barren County, with nearly 50% of raccoons positive for the parasite.



## **116. Virginia Wilson & Darnaby Kerns**

**Eastern Kentucky University**

**Mentor: Joyce Wolf**

### ***American Women: Twentieth Century Compositional Pioneers***

Throughout the ages, women have been restricted in many areas – socially, educationally, politically and occupationally. The latter includes the field of music in Twentieth Century United States. This poster will examine two representative and successful women composers of the century. Amy Marcy Cheney Beach was a musical child prodigy. Her blossoming career as a concert pianist was temporarily halted when she married Dr. H. H. A. Beach, who allowed her to compose, but preferred that she not perform in public. After his death in 1910, she returned to performing, pursuing her dreams until her death in 1944. Beach's Symphony in E Minor (Gaelic) was a landmark in her life and in the history of women everywhere. It was the first symphony composed by an American woman to be performed by any orchestra. She successfully crossed a new frontier! Elinor Remick Warren (1900-1991) was also a musical child prodigy. Painfully shy but intellectually precocious, Warren's career remains one of the longest and most prolific in American musical history. She had over 200 published compositions including works for orchestra, chorus and orchestra, chamber ensemble, piano, solo voice, and chorus. Usually supportive, Elinor's parents were reluctant to allow her to move to New York City to study but relented in the face of her fierce determination. Determination and devotion to excellence were characteristic of Warren's life and career! Art Songs are particularly important in her extensive output and this poster examines two songs by Warren.

## **117. Laura Wood & B. Damon Wood**

**Owensboro Community and Technical College**

**Mentor: Micah Perkins**

### ***The Effect of Increased Carbon Dioxide Level on an Invasive Aquatic Plant, Brazilian Waterweed (Egeria densa Planch.)***

Brazilian waterweed (*Egeria densa* Planch.), also known as Brazilian elodea, is a submerged aquatic plant native to South America. Commonly used in aquaria and the laboratory classroom to study photosynthesis, Brazilian waterweed is an exotic, invasive plant found throughout the United States. The question of interest was how this robust, noxious plant, which often competes with native flora, would respond to human-imposed environmental increases in carbon dioxide. To address the question, waterweed fragments were placed into 600-ml beakers, with inverted funnels covering the fragments, and a test tube was placed on each funnel. Plant fragments were exposed to varying levels of carbon with 10 plants for each carbon level. This setup allowed determination of the response variable, photosynthetic productivity, by measuring the amount of oxygen gas at the top of each test tube produced from each plant fragment. Productivity increased with slight increases in carbon dioxide. However, additional carbon increases caused decreased productivity and eventually killed some plants. Using waterweed as an indicator, exotic invasive aquatic plants may benefit from climate change. Such information will help in understanding how regional and global impacts can affect local invasive species.

## **118. Jessica McClanahan**

**University of Kentucky**

**Mentor(s): David Puleo & Karen Novak**

### ***Preparation of Devices for Release of Antimicrobial Peptides***

Bacteria and bacterially derived products stimulate inflammation and lead to the destruction of structural tissues in conditions such as periodontitis and peri-implantitis. To enable tissue regeneration, the first step is to eliminate the microbial burden. In this project, the polymer blend system of cellulose acetate phthalate (CAP) and Pluronic F-127 is being explored for use in killing bacteria. Intrinsic antimicrobial activity of the polymer is being assessed first, followed by its use for controlled release of antimicrobial peptides. Drug-loaded CAP-Pluronic microspheres were made by a water-acetone-oil-water triple emulsion process. Release devices were made by alternately layering and pressure-sintering microspheres to enable modulation of the drug concentration profiles. Six-layer devices gave three peaks of increased peptide concentration. Under simulated physiological conditions, the total duration of release was nine to eleven days. Intermittent release of peptide was achieved. The release profiles can be controlled by varying polymer layers, coating method, and release conditions. Initial bioactivity studies used *E. coli* as a test bacterium for determining antibacterial effects of the polymer and peptide. CAP-Pluronic alone resulted in a concentration-dependent inhibition of bacterial growth, indicating it has intrinsic bacteriostatic properties. In conjunction with the antimicrobial peptide WLBU2, the number of viable bacteria was further reduced, although complete killing has not yet been achieved. Ongoing experiments are focused on enhancing the bactericidal activity against additional species of bacteria, including those responsible for gum diseases, such as periodontitis and peri-implantitis.

## **119. David Gillum**

**Morehead State University**

**Mentor: Michael Moore**

### ***Assessment of Oral Communication: A Review and Explication of Principles and Practices***

The communication discipline generally and the National Communication Association (NCA) particularly have been at the forefront of the assessment movement within education. The consistent level of activity since the early 1970s has generated a wealth of theoretical and applied scholarship concerning all aspects of communication assessment, from the assessment of individual student outcomes to the assessment of academic programs, including the oral communication component of general education. In an effort to document this scholarship, NCA's editor of Communication Education has commissioned the preparation of a comprehensive review of scholarship on the assessment of oral communication. This study is a component of the comprehensive review and is focused specifically on establishing a database of scholarly papers on communication assessment presented at National Communication Association conferences since 1973. The study requires a review of both online and hard copy convention programs, identifying conference papers that meet specific keyword criteria and entering the relevant information into a bibliographic management system (RefWorks). This will be merged with bibliographic data gathered from national and regional journals and other relevant publications and subjected to a thematic content analysis. The final product will be in the form of a monograph published by NCA that will provide a description of how assessment in the communication discipline has evolved over the years, the current status of assessment within the discipline and comparisons to both the national assessment movement and assessment within other disciplines.

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Council on Postsecondary Education

**Dr. Mike Seelig, Interim Vice-President for Academic Affairs**  
Council on Postsecondary Education

**Ms. Jean Burgin, House Clerk**  
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**Mr. Bruce Phillips, Assistant Public Information Officer**  
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**Ms. Paula Weglarz, Event Coordinator**  
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**Mr. Erik Abbott, Mr. Thomas Krones, & Mr. Robert Song,**  
**Graduate & Student Assistants**  
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