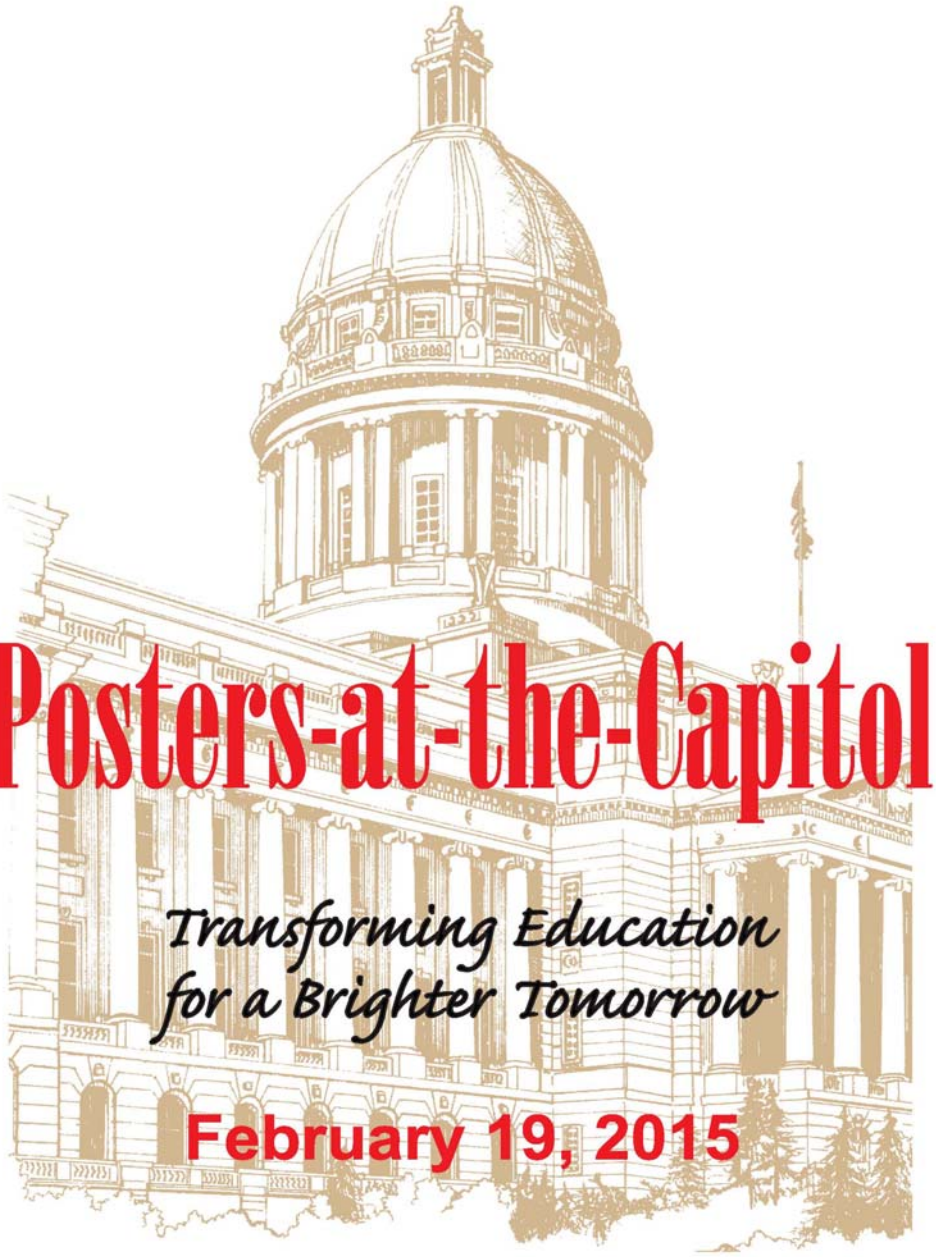
NORTHERN KENTUCKY UNIVERSITY • UNIVERSITY OF KENTUCKY • UNIVERSITY OF LOUISVILLE • WESTERN KENTUCKY UNIVERSITY • KENTUCKY COMMUNITY AND TECHNICAL COLLEGE SYSTEM • EASTERN KENTUCKY UNIVERSITY • KENTUCKY STATE UNIVERSITY • MOREHEAD STATE UNIVERSITY • MURRAY STATE UNIVERSITY •



Posters-at-the-Capitol

Transforming Education for a Brighter Tomorrow

February 19, 2015

Welcome from President Michael Benson of Eastern Kentucky University:

Eastern Kentucky University is proud to participate in the 14th annual ***Posters-at-the-Capitol*** program because we believe it exemplifies the high quality of EKU and our sister universities, the tremendous value of public higher education and, most of all, the scholarly and creative talents of our Commonwealth's best and brightest students.

These projects also reflect the collaborative process that distinguishes quality higher education – outstanding and dedicated faculty who model a passion for lifelong learning and who give freely of themselves to help their students reach deep within themselves and realize their full potential.

EKU has long been known as a "School of Opportunity," and an integral part of that is giving our undergraduates meaningful research opportunities that complement their classroom experiences and stoke their intellectual curiosity. The best and most inspiring examples of this are displayed annually at our Undergraduate Presentation Showcase, which unites our entire campus community in a celebration of scholarship and creativity.

I congratulate all the faculty mentors in the ***Posters-at-the-Capitol*** program for going the extra mile with their mentees. And to all the participating students, I say "job well done" and wish you all the best as you continue striving for excellence in every endeavor.

Welcome from President Jay Box 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.

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

Welcome from President Raymond M. Burse of Kentucky State University:

Kentucky State University has increased its focus on the sciences, particularly adding more of its resources to undergraduate research. This increased focus is in recognition of the valuable experience students gain from laboratory research outside the classroom. Undergraduate research helps students gain applicable knowledge, critical-thinking skills, and the ability to work collaboratively within teams.

Industry and government also benefit from an investment in undergraduate research programs at our colleges and universities. This is why it is so important that our elected officials see each year, at the ***Posters-at-the-Capitol*** event, the types of real, in-depth research in which our students and faculty are participating. This research has the potential for positive impact in many fields. An investment in undergraduate research means an investment in advancing our society.

Students who participate in research typically transfer their newly acquired skills to other areas. It's an edge that later contributes to innovation, creativity, and productivity. Research enables students to prepare to become future decision-makers and problem-solvers.

Posters-at-the-Capitol is a worthwhile occasion for showcasing our students' talents and best efforts. I send my best wishes for a successful event.

Welcome from President Wayne Andrews of Morehead State University:

We are delighted to continue our participation in the annual ***Posters-at-the-Capitol*** program. This event provides an unparalleled opportunity for our students to demonstrate their academic accomplishments and to meet and interact with members of the General Assembly.

We firmly believe that student research significantly enhances the already strong undergraduate experience at Morehead State University. These student projects, completed in collaboration with faculty members outside the traditional classroom setting, represent the personal, value-added educational opportunities available at MSU. One recent example of success stemming from ***Posters-at-the-Capitol*** is Morehead State University senior Yen Tran, who was the only student representing Kentucky to present at the national "Posters on the Hill" conference, a highly prestigious and competitive annual conference in Washington, D.C. Tran is double-majoring in economics and finance. Her poster presentation was the summary of a paper she wrote under the mentorship of Dr. S. Ali Ahmadi, associate professor of economics, regarding the impacts of economic reforms on middle class expansions in Southeast Asia.

President Andrews' Welcome Cont'd.

Clearly, the partnership of students with faculty in original scholarship provides the rich academic fabric needed to produce leaders who will possess the intellectual skills and vision required to guide the future social and economic development of our Commonwealth and the Nation.

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. We are excited about the continued expansion of these scholarly opportunities for students through initiatives such as our unique *Undergraduate Research Fellows* program and our *Celebration of Student Scholarship Week.*

I offer my sincere thanks to the faculty mentors who involve students as partners in their scholarship and my heartiest congratulations to these student scholars for their accomplishments.

Welcome from President Robert O. Davies of Murray State University:

Welcome to the fourteenth annual ***Posters-at-the-Capitol***. Murray State's leadership in this worthy event is both a testament to our students, who are seeking out these kinds of scholarly activities 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 Murray State 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 is meeting the objectives of the Kentucky General Assembly by ensuring that our graduates are well prepared for the workforce and life after college.

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 undergraduate students are contributing ideas that are impacting communities and changing lives. Also, Murray State University is honored to play a key role in organizing this event each year. Congratulations to all students and faculty whose hard work has made ***Posters-at-the-Capitol*** such a great success.

Welcome from President Geoffrey S. Mearns of Northern Kentucky University:

At Northern Kentucky University, we provide a special educational experience for our students. For many of them, this experience includes a significant research project. NKU's emphasis on undergraduate research empowers students to practice their classroom knowledge and skills on projects that make a difference throughout the region. This hands-on experience deepens their understanding of disciplinary content and allows them to form meaningful relationships with their advisors.

For our students, the research experience is transformative. It teaches students patience, discipline, and analytical skills. As students take ownership of their projects, they develop more confidence as they present their findings. They hone their writing and analytical skills as they conclude their results. Undergraduate research prepares students for the next phase of their life, regardless of their future career.

Undergraduate research also furthers NKU's emphasis on transdisciplinary learning. Across campus, NKU faculty members collaborate in class and on projects that show students how various disciplines intersect. Through undergraduate research, students work with faculty and students outside their major. The cooperative process leads to more innovative thinking and a better result. It also mirrors the world in which they will work, where people who collaborate with others have differing specialties.

NKU is proud to support undergraduate research and to participate in the 14th annual ***Posters-at-the-Capitol***. We commend all of the student presenters for their hard work, because we know that this event is the culmination of months of hard work by students and their faculty mentors. We look forward to hearing more from these talented students in the future and seeing how the subject of many of these posters and presentations change the way we live and think.

Welcome from President Eli Capilouto of the University of Kentucky:

Undergraduate research – the creation of knowledge – is a fundamental component of our multi-faceted mission as the state's flagship and land grant research institution. The interplay between research in the lab and academic preparation in the classroom provides a rich educational experience for our students.

Now in its 14th year, ***Posters-at-the-Capitol*** is an opportunity to recognize undergraduate research as an essential part of academia, one that benefits students, faculty and the Commonwealth. Now, more than ever, it is essential to understand and invest in the research and discovery that informs the education we provide, uplifts the communities we serve and fuels a global economy.

Our students work alongside world-class researchers – experts in their fields – enhancing what they learn in the classroom with practical applications in the lab. Through undergraduate research, students experience the intellectual inquiry that is the foundation of scholarship at the University of Kentucky.

For faculty, among the greatest rewards in academia is serving as a mentor for an eager young mind and watching a student passionately pursue new knowledge. They build unique connections with students that may inspire their scholar-protégé to commit a career to transformative research and discovery. Igniting curiosity in the next generation of leaders enriches our faculty's experience and is at the core of our noblest profession.

The University of Kentucky is deeply committed to a culture of undergraduate research because of the profound impact it has on learning and the inherent value it brings to the Commonwealth of Kentucky. By engaging in innovative research activities and inspiring a generation of thinkers, pioneers and inventors, we position ourselves to address our state's most intractable problems and create a better future for all Kentuckians.

Welcome from President James Ramsey of the University of Louisville:

The University of Louisville has a legislative mandate to be a "premier metropolitan research university." That means quality research is at the top of our agenda and involving students in that research is part of our mission. In many cases, undergraduate students, including sophomores and juniors, are participating in research at UofL. They're getting a chance to work on cures for cancer, heart disease and other health care dilemmas. They're also working on solving social and energy problems. Our students are working with some of the top researchers in the country, UofL faculty members who are mentoring them and exposing them to "real world" problems and solutions. Through the ***Posters-at-the-Capitol*** program, our undergraduate students share their experiences, ideas and discoveries with Kentucky's elected leaders. The ***Posters-at-the-Capitol*** program gives our students a chance to showcase their great work while validating UofL's commitment to their educational experience. It's proof to our government officials that the state's financial support of public universities and research and development is paying off.

The University of Louisville is proud to participate in the ***Posters-at-the-Capitol*** program. We're also proud of our students. We hope you will take a look at their work and ask them questions. We think you'll find they're smart, talented and ready to do their part to improve the quality of life for all Kentuckians.

Welcome from President Gary A. 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, many of whom are in WKU's independent Honors College or The Gatton Academy, along with their faculty mentors participating in this fourteenth 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

David Pizzo
Jody Cofer Randall
www.murraystate.edu

Jonathan Gore
www.eku.edu

George Antonious
www.kysu.edu

Michael Henson
www.moreheadstate.edu

John Farrar
www.nku.edu

Diane Snow
Evie Russell
www.uky.edu

Pamela Feldhoff
www.louisville.edu

Blaine Ferrell
www.wku.edu

Mary Janssen
www.kctcs.edu

Proclamation

by

Steven L. Beshear
Governor

of the

Commonwealth of Kentucky

To All To Whom These Presents Shall Come:

WHEREAS, Both the public universities of Kentucky and the Kentucky Community and Technical College System emphasize the importance of research in higher education for students and the pursuit of in-depth knowledge; and

WHEREAS, The Council on Postsecondary Education strongly encourages Kentucky universities to place emphasis on research initiatives, thereby increasing the opportunity for undergraduates to engage in research and scholarly work; and

WHEREAS, Undergraduates who participate in research and scholarly activity are more likely to pursue advanced degrees that better prepare them for future challenges; and

WHEREAS, The Commonwealth commends the undergraduate students participating in these life-changing educational opportunities and the 14th annual Posters-at-the-Capitol;

NOW, THEREFORE, I, STEVEN L. BESHEAR, Governor of the Commonwealth of Kentucky, do hereby proclaim February 19, 2015, as

UNDERGRADUATE RESEARCH DAY

in Kentucky.

DONE AT THE CAPITOL, in the City of Frankfort the 13th day of November, in the year of Our Lord Two Thousand Fourteen and in the 223rd year of the Commonwealth.

STEVEN L. BESHEAR
GOVERNOR

ALISON LUNDERGAN GRIMES
SECRETARY OF STATE

Schedule of Activities

9:00 a.m. …….……..…*Posters-at-the-Capitol* Registration Opens (House-side Mezzanine)

9:00 a.m. to 10:45 a.m. ……. Poster Setup, Participant Browsing, and Legislative Visit Time

10:00 a.m.…….....….Group Photograph (Senate Staircase)

10:15 a.m. ……...……Brief Organizational Meetings by Institution (Locations for these meetings will be announced during the group photograph)

10:45 a.m. …….…..……..……..Welcome and Invited Guests (Rotunda)

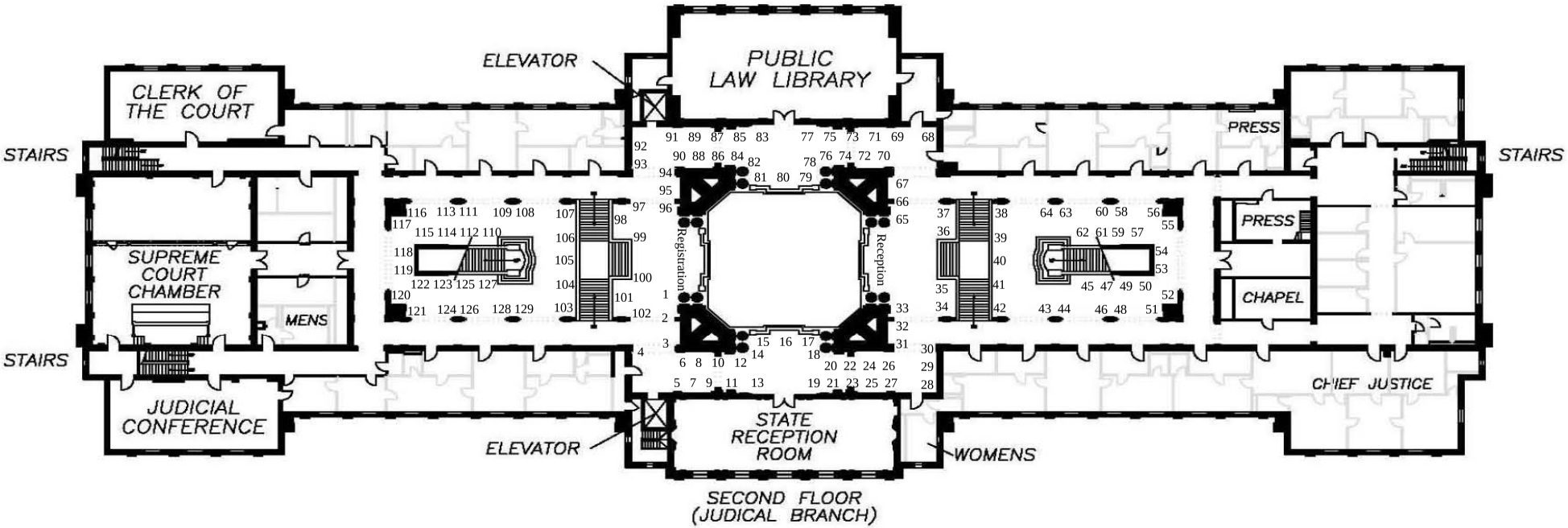
11:30 a.m. to 12:30 p.m. …….……...……Legislative Visit Time and Lunch Break

12:30 p.m. to 3:00 p.m. …….……...…..…..General Poster Display Time

1:30 p.m. to 2:30 p.m. …….……..….……....Reception (Senate-side Mezzanine)

3:00 p.m. ……..….Conclusion (return easels and boards to registration table)

All times listed are Eastern Standard Time.


CLERK OF THE COURT
ELEVATOR
PUBLIC LAW LIBRARY
PRESS
STAIRS
STAIRS
SUPREME COURT CHAMBER
MENS
Registration
Reception
PRESS
CHAPEL
STAIRS
JUDICIAL CONFERENCE
ELEVATOR
STATE RECEPTION ROOM
WOMENS
CHIEF JUSTICE
SECOND FLOOR
(JUDICAL BRANCH)

Eastern Kentucky University

Poster No.	Student		Faculty Mentor(s)	Page No.	House No.	Senate No.
3	**Arnold**	Nova	Lindsay Calderon	**18**	88	88
18	**Ball**	Jacy	Darrin Smith & Joseph Bequette	**27**	81	34
10	**Baxter**	Lee	Jeffrey Neugebauer	**22**	71	34
11	**Beasley**	Andrew	James Wells	**23**	13	13
18	**Bonta**	Jacob	Darrin Smith & Joseph Bequette	**27**	81	34
24	**Brooks**	Katie	Isaac Powell	**32**	50	14
26	**Cai**	Lingjie	Weiling Zhuang	**33**	6	6
121	**Dye**	Jared	Don Yow	**95**	80	15
39	**Eskridge**	Nora	Jon Endonino	**40**	81	34
49	**Graham**	Halle	Minh Nguyen	**46**	81	34
50	**Graves**	Candice	Jason Marion	**47**	53	16
57	**Hartch**	Kathline	Frank O'Connor	**50**	81	34
71	**Jones**	Stevy	Jonathan Gore	**60**	81	34
71	**Mahoney**	Lauren	Jonathan Gore	**60**	81	34
49	**March**	Hannah	Minh Nguyen	**46**	81	34
18	**McCollum**	Corwin	Darrin Smith & Joseph Bequette	**27**	81	34
90	**Mikulcik**	Simon	George Landon & Minh Nguyen	**74**	5	1
49	**Nguyen**	Vivian	Minh Nguyen	**46**	81	34
104	**Rollins**	Arielynn	Vigs Chandra	**83**	81	81
121	**Smart**	Samuel	Don Yow	**95**	80	15
71	**Thomas**	Jessica	Jonathan Gore	**60**	81	34
121	**Watkins**	Larissa	Don Yow	**95**	80	15
18	**York**	Joshua	Darrin Smith & Joseph Bequette	**27**	81	34
128	**Zielinski**	Edward	Michael Bradley	**100**	6	6

Kentucky Community and Technical College System

Poster No.	Student		Faculty Mentor(s)	Page No.	House No.	Senate No.
7	**Bailie**	John	Shen Liu	**21**	3	2
15	**Bell**	Cassandra	Timothy Dick, Kathy Hoffman, Chandra Emani & Connie Johnson	**26**	7	8
7	**Benningfield**	Jared	Shen Liu	**21**	3	2
7	**Birbasov**	Mykyta	Shen Liu	**21**	3	2
15	**Campbell**	Jennifer	Timothy Dick, Kathy Hoffman, Chandra Emani & Connie Johnson	**26**	7	8
27	**Carter**	Susan	Aseem Talukdar & G. Michael Shifflett	**34**	10	6
27	**Carr**	Brittany	Aseem Talukdar & G. Michael Shifflett	**34**	10	6
15	**Castlen**	Joshua	Timothy Dick, Kathy Hoffman, Chandra Emani & Connie Johnson	**26**	7	8
28	**Charles**	Celina	Joe Wolf	**34**	18	5
102	**Gordon**	Allison	Keith Gregory	**82**	10	6
15	**Hall**	Aaron	Timothy Dick, Kathy Hoffman, Chandra Emani & Connie Johnson	**26**	7	8
56	**Hamilton**	Derek	Norman Strobel	**50**	76	13
27	**Hines**	Jeanne	Aseem Talukdar & G. Michael Shifflett	**34**	10	6
27	**Hines**	Ralph	Aseem Talukdar & G. Michael Shifflett	**34**	10	6
15	**Hutto**	Tera	Timothy Dick, Kathy Hoffman, Chandra Emani & Connie Johnson	**26**	7	8
28	**Jorgens**	Anjalise	Joe Wolf	**34**	18	5
7	**Keen**	Ashley	Shen Liu	**21**	3	2
15	**Kelley**	Candace	Timothy Dick, Kathy Hoffman, Chandra Emani & Connie Johnson	**26**	7	8
102	**Menser**	Kaitlyn	Keith Gregory	**82**	10	6
15	**Oakes**	Bethany	Timothy Dick, Kathy Hoffman, Chandra Emani & Connie Johnson	**26**	7	8
15	**Oakes**	Molly	Timothy Dick, Kathy Hoffman, Chandra Emani & Connie Johnson	**26**	7	8
28	**Ohde**	Joshua	Joe Wolf	**34**	18	5
7	**Parker**	Lowell	Shen Liu	**21**	3	2

Kentucky Community and Technical College System Cont'd.

Poster No.	Student		Faculty Mentor(s)	Page No.	House No.	Senate No.
15	**Payne**	Courtney	Timothy Dick, Kathy Hoffman, Chandra Emani & Connie Johnson	**26**	7	8
97	**Potts**	Alexzandria	Mary Janssen	**78**	10	6
15	**Reynolds**	Jonah	Timothy Dick, Kathy Hoffman, Chandra Emani & Connie Johnson	**26**	7	8
102	**Riley**	Cameron	Keith Gregory	**82**	10	6
15	**Stewart**	Autumn	Timothy Dick, Kathy Hoffman, Chandra Emani & Connie Johnson	**26**	7	8
97	**Survant**	Steven	Mary Janssen	**78**	10	6
102	**Thomas**	Tracy	Keith Gregory	**82**	10	6

Kentucky State University

Poster No.	Student		Faculty Mentor(s)	Page No.	House No.	Senate No.
30	**Conrad**	Kristin	Li Lu, Thomas Webster, Alexander Lai & Farida Olden	**35**	57	7
34	**Croft**	Catherine	George Antonious & Regina Hill	**38**	57	7
30	**Davie**	Alexander	Li Lu, Thomas Webster, Alexander Lai & Farida Olden	**35**	57	7
45	**Frisby**	Monique	Avinash Tope	**44**	57	56
51	**Graves**	Rebecca	Jeremiah Lowe, Kirk Pomper & Sheri Crabtree	**47**	57	7
60	**Hill**	Kinita	Hideka Kobayashi, Sheri Crabree & Kirk Pomper	**53**	57	7
62	**Hoskins**	Deborah	Kirk Pomper, Sheri Crabtree, John Sedlacek, Jeremiah Lowe & Karen Friley	**54**	57	7
64	**Hulefeld**	Richard	Kenneth Thomas & James Tidwell	**55**	65	65
76	**Lafferty**	Jessicah	Tamara Sluss	**63**	57	7
77	**Lancaster**	Emily	Maifan Silitonga, George Antonious & Buddhi Gywali	**64**	57	7
92	**Morris**	Lindsey	John Sedlack & Karen Friley	**75**	57	7
30	**Pearl**	Andrew	Li Lu, Thomas Webster, Alexander Lai & Farida Olden	**35**	56	7
96	**Poe**	Donald	Maheteme Gebremedhin	**78**	47	20
30	**Rogers**	Kemper	Li Lu, Thomas Webster, Alexander Lai & Farida Olden	**35**	57	7
96	**Rogers**	Shelby	Maheteme Gebremedhin	**78**	47	20
96	**Sarr**	Sait	Maheteme Gebremedhin	**78**	47	20
105	**Sarr**	Sait	Buddhi Gyawali	**84**	32	11
76	**Smith**	Ja'Nice	Tamara Sluss	**63**	57	7
114	**Taylor**	Kamillah	Tamara Sluss	**90**	57	7
122	**Watts**	Chelsea	Shawn Coyle, Leigh Anne Brigh & James Tidwell	**95**	55	7

Morehead State University

Poster No.	Student		Faculty Mentor(s)	Page No.	House No.	Senate No.
1	**Abbott**	Zachary	Ilsun M. White	**17**	5	7
63	**Ashley**	Jerrica	Kim Nettleton	**54**	99	27
14	**Becknell**	Allison Leigh	Johnathan Nelson & Sam Stapleton	**25**	73	28
16	**Blevins**	Andrew	Steve Chen & Janet Ratliff	**26**	99	27
103	**Burns**	Donald James	April Haight	**83**	55	7
103	**Coleman**	Jonathan	April Haight	**83**	93	31
29	**Conn**	Chelise Lynn	Kristina DuRocher	**35**	99	5
31	**Cordle**	Erika	Tara Holaday	**36**	99	27
36	**DeMoss**	Anna Bethany	April Miller	**39**	99	5
103	**Estep**	Kelsey	April Haight	**83**	84	30
42	**Farrell**	Jessica	John Hennen	**42**	98	18
46	**Fugate**	Joshua	Wilson Gonzalez-Espada	**45**	98	18
129	**Garcia**	Cody	Nilesh Joshi	**100**	62	17
1	**Gibson**	Katherine	Ilsun M. White	**17**	5	27
63	**Howard**	Samantha	Kim Nettleton	**54**	99	27
67	**Jacques**	Demi	Elizabeth Perkins & Bernadette Barton	**58**	99	27
69	**Johnson**	Chase	Hans Chapman	**59**	99	99
46	**Knell**	Janie	Wilson Gonzalez-Espada	**45**	72	21
42	**Kuchenbrod**	Andrew	Joy Gritton	**42**	29	14
67	**Mabry**	Hannah	Bernadette Barton	**58**	71	71
85	**McClanahan**	Sarah	Michael Fultz	**71**	74	28
103	**Roof**	Randall	April Haight	**83**	99	27
69	**Rowlett**	Robbie	Hans Chapman	**59**	94	94
103	**Schwarber**	Eric	April Haight	**83**	68	24
103	**Setters**	Tinsley	April Haight	**83**	72	21
31	**Shifflett**	Alyssa	Tara Holaday	**36**	99	27
1	**Stark**	James	Ilsun M. White	**17**	99	31
103	**Strong**	Connor	April Haight	**83**	82	21
115	**Taylor**	Lucas	Johnathan Nelson	**90**	94	31
123	**Wells**	Holly	Sarah Hawkins-Lear	96	6	6

Murray State University

Poster No.	Student		Faculty Mentor(s)	Page No.	House No.	Senate No.
66	**Bedron**	Marisa	Tony Brannon & Ted Thiede	**57**	5	1
19	**Brannon**	Caleb	Tony Brannon & Jason Robertson	**28**	5	1
33	**Crittendon**	David	Jana Hackathorn	**37**	5	1
40 & 41	**Ernst**	Morgan	Shea Porr & Michelle Santiago	**41**	5	1
43	**Ferris**	Jonathan	David Eaton	**43**	5	1
89	**Fike**	Landon	Maeve McCarthy, Marcia Edson & Donald Adongo	**74**	1	1
52	**Green**	Matthew	Eric Frederick	**48**	1	1
53	**Grissom**	Layne	Jana Hackathorn	**48**	35	19
40 & 41	**Hamm**	Lauren	Shea Porr & Michelle Santiago	**41**	5	1
58	**Hartman**	Bradley	Howard Whiteman	**51**	5	1
66	**Jablinski**	Anne	Tony Brannon & Ted Thiede	**57**	5	1
70	**Jones**	Matthew	David Eaton & Jim McCoy	**60**	22	9
66	**Lenoir**	William	Tony Brannon & Ted Thiede	**57**	5	1
80	**Lewis**	Robert	Stephen White & Joe Caudell	**67**	5	1
81	**Markley**	Liz	Jessica Naber	**68**	5	1
83	**Matthews**	Jason	Joe Caudell & Chris Trzepacz	**70**	31	19
89	**McTeague**	Alex	Maeve McCarthy, Marcia Edson & Donald Adongo	**74**	32	36
93	**Newport**	Tracey	David Pizzo	**76**	2	1
66	**Reed**	Vaughn	Tony Brannon & Ted Thiede	**57**	5	1
89	**Sautel**	Jesse	Maeve McCarthy, Marcia Edson & Donald Adongo	**74**	1	1
119	**Wallace**	Sara	Jana Hackathorn	**93**	5	1
89	**Walls**	Jalyn	Maeve McCarthy, Marcia Edson & Donald Adongo	**74**	1	1

Northern Kentucky University

Poster No.	Student		Faculty Mentor(s)	Page No.	House No.	Senate No.
55	**Barone**	Meredith	Chari Ramkumar & Wayne Bresser	**49**	67	24
13	**Beckerich**	Matthew	Maureen Doyle & James Walden	**24**	68	68
17	**Bolte**	Jessica	Monica Wakefield	**27**	4	4
32	**Crawford**	Robert	James Walden & Maureen Doyle	**37**	4	67
125	**Donnermeyer**	Jacob	Amy Gillingham & Holly Attar	**97**	61	11
44	**Field**	Clare	David Raska	**44**	35	19
44	**Foote**	Elizabeth	David Raska	**44**	64	65
47	**Gasper**	Andres	K.C. Russell	**46**	4	4
125	**Gasser**	Rachael	Amy Gillingham & Holly Attar	**97**	67	24
48	**Ghouse**	Lauren	Kajsa Larson	**46**	66	11
55	**Haines**	Thomas	Chari Ramkumar & Wayne Bresser	**49**	66	11
59	**Hertzenberg**	Heather	Cecile Marczinski	**52**	68	24
61	**Holt**	Jennifer	Ryan Salzman	**53**	65	23
65	**Hume**	Sarah	M. Mark Wasicsko	**56**	68	24
74	**Korth**	Jennifer	Ryan Salzman	**62**	68	24
65	**Kuschel**	Christine	M. Mark Wasicsko	**56**	67	24
59	**Maloney**	Sarah	Cecile Marczinski	**52**	60	11
74	**Roark**	Mikayla	Ryan Salzman	**62**	69	11
108	**Sabelhaus**	Andrew	Kebede Gemene	**86**	67	24
106	**Schuyler**	Travis	Isabelle Lagadic & Sebastien Gauthier	**84**	4	4
107	**Schwalback**	Sydney	David Raska	**85**	67	24
108	**Segal**	Simon	Kebede Gemene	**86**	70	27
125	**Tesla**	Katelyn	Amy Gillingham & Holly Attar	**97**	61	11
107	**Walters**	Christopher	David Raska	**85**	67	24
125	**Williams**	Elizabeth	Amy Gillingham & Holly Attar	**97**	61	11

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2	**Aboagye**	Bill	Gilson Capilouto, Michael Nonnemacher & Brian Wigdahl	**17**	76	76
6	**Auger**	Kyle	Matthew Gentry	**20**	75	13
22	**Brendamour**	Bryn	Frances Hardin	**31**	88	88
127	**Coggeshall**	Brandon	Christopher Sass	**99**	79	12
75	**Kucharski**	Amir	Peter Kekenes-Huskey	**63**	75	13
82	**Massey**	Malinda	Cynthia Ruder	**69**	88	12
84	**Mattmiller**	Macie	Alison Davis	**71**	6	6
86	**McConnell**	Elise	Buck Ryan & Megan Dickson	**72**	88	22
94	**Odom**	Jaye	Richard Milich & Elizabeth Lorch	**76**	5	5
95	**Pampati**	Sanjana	Phil Harling & Ernest Yanarella	**77**	75	13
116	**VanMeter**	Connor	Peter Nagy	**91**	45	12
117	**VanMeter**	Faith	Peggy Keller	**91**	53	9
118	**Vinas**	Mark	Steven Estus	**92**	75	13
124	**West**	Taylor	Sung Hee Kim & Richard Smith	**97**	45	12
126	**Winstead**	Ryan	Phil Harling	**98**	75	13
127	**Wright**	Nathaniel	Christopher Sass	**99**	97,94	93,31

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5	**Ashby**	Kathryn	Brent Stucker	**20**	10	6
12	**Beatty**	Madeline	Christopher Burns & Dania Fonseca	**23**	29	29
20	**Bratton**	Andrew	Kara Sedoris & Donald Miller	**29**	33	36
25	**Bushau**	Adrienne	Juliane Beier	**33**	29	32
37	**Dolin**	Christine	Gavin Arteel	**39**	47	26
38	**Edmisson**	Jacob	Silvia Uriarte	**40**	15	6
110	**Hussain**	Amber	Joseph Steffen	**88**	1	2
68	**James**	Erica	Mahendra Sunkara	**59**	38	37
73	**Knight**	Andrew	Richard Felhoff & Damien Wilburn	**62**	8	8
78	**Leist**	Brian	Lutz Haberzettl & Gerard Williger	**65**	3	3
87	**McKenzie**	Grant	Amanda Jo LeBlanc	**72**	4	4
101	**Renner**	Kayla	Judith Danovitch & Nicholaus Noles	**82**	37	35
110	**Seibert**	Christina	Joseph Steffen	**88**	68	24
110	**Sippel**	Jacqueline	Joseph Steffen	**88**	66	11
111	**Smart**	Conrad	David Brown	**88**	42	33
112	**Speller**	Amanda	Carlee Lehna, Carol Hanchette & Mary-Beth Coty	**89**	46	35
113	**Sterling**	Cody	Robert Lundy	**89**	64	17

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4	**Arnold**	Richard	Robert Choate	**19**	15	6
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9	**Baughn**	Cayla	Chris Groves	**22**	23	32
21	**Braun**	Anna	Hemali Rathnayake	**30**	60	11
23	**Brindley**	Hamilton Ryan	Shahnaz Aly	**32**	16	3
4	**Clark**	Caitlyn	Robert Choate	**19**	19	5
35	**Davis**	Trevor	William Mkanta	**38**	23	32
21	**Ferguson**	Jack	Hemali Rathnayake	**30**	23	32
23	**Gaiko**	Jennifer	Shahnaz Aly	**32**	21	32
54	**Guthrie**	Benjamin	Phillip Womble & Keith Andrew	**49**	20	32
21	**Huzyak**	Paige	Hemali Rathnayake	**30**	23	32
91	**King**	Allyson	Rajalingam Dakshinamurthy	**75**	60	11
72	**Kirk**	Cody	Leyla Zhuhadar	**61**	23	23
79	**Lewis**	Abigail	Amber Shroeder	**66**	20	32
21	**McKenna**	Kelly	Hemali Rathnayake	**30**	23	32
88	**McMullen**	Ryne	Jason Crandall	**73**	18	38
91	**Moolani**	Harsh	Rajalingam Dakshinamurthy	**75**	8	8
21	**Neesu**	Rachana	Hemali Rathnayake	**30**	23	32
72	**Nushart**	Jordan	Leyla Zhuhadar	**61**	23	23
21	**Patel**	Dharmesh	Hemali Rathnayake	**30**	23	32
98	**Price**	Carson	Sanju Gupta	**79**	1	1
99	**Primicias**	Jade	Clifton Brown	**80**	23	32
100	**Queen**	Katherine	Rose Korang-Okrah	**81**	39	39
91	**Ryumae**	Rena	Rajalingam Dakshinamurthy	**75**	60	11
109	**Shain**	Lindsey	Stephen O'Connor	**87**	50	14
21	**Sharpensteen**	Jeremiah	Hemali Rathnayake	**30**	23	32
8	**Walker**	Whitney	Michael Stokes	**21**	48	26
120	**Wassom**	Jack	Muhummad Jahan	**94**	23	32
88	**Weatherholt**	Wade	Jason Crandall	**73**	56	18
88	**Wells**	Samuel	Jason Crandall	**73**	56	18
23	**Whitaker**	Kendra	Shahnaz Aly	**32**	47	20
21	**Xu**	Lan	Hemali Rathnayake	**30**	23	32

Notes:

1. Zachary Abbott, Katherine Gibson & James Stark

Morehead State University
Mentor: Ilsun M. White

Does Stress Worsen Alzheimer's Symptoms?

Exposure to an extremely stressful situation impairs a range of behaviors, likely through multiple brain regions and the stress system, known as the hypothalamus-pituitary-adrenal (HPA) axis. Recent studies suggest that stressful events may worsen cognitive deficits in normal aging, dementia, and Alzheimer's disease (ALZ). Our study examined the impact of stress on memory using an animal model. Male Wistar rats were used in this study in accordance with federal and institutional guidelines. In Experiment 1, rats were shaped to lever-press for food and divided into two groups: One group was placed in a restraint for 30 minutes (physiological stress); while another group was gently held (control). Rats were then trained on a simple learning task which required five lever-presses for each food pellet. Stress impaired acquisition of learning without affecting food consumption. In Experiment 2, rats were trained on the same task, then received scopolamine, a drug commonly used in animal models of ALZ. Scopolamine impaired memory and also affected food consumption. In Experiment 3, rats were trained on the same task, then received both scopolamine and stress hormone (pharmacological stress). Coadministration of scopolamine and stress hormone severely impaired memory. Our data suggest that stress impairs learning and memory of simple tasks and also predict that stress would worsen impaired memory seen in ALZ patients and that reducing exposure to stress would reduce this memory loss. Currently, we are examining sex differences in the effects of stress on memory. Zachary Abbott is an undergraduate research fellow. Supported by NIH grant: R15DA015351.

2. Bill Aboagye

University of Kentucky
Mentors: Gilson Capilouto, Michael Nonnemacher & Brian Wigdahl

The Effects of Morphine on the Blood Brain Barrier: An In vitro Study

HIV-1 infects T-cells and monocytes of the immune system making it difficult for people to fight infections that are not usually problematic. Treatment of those with HIV-1 infections is difficult due to the error-prone nature of the viral reverse transcriptase, and due to the fact that the virus integrates into the host cell genome, creating a chronic infection. In this study,exploring the factors involved in immune cells transmigrating across the blood brain barrier and into the CNS from the periphery in the context of HIV-1 infection and how this relates to HAND(HIV-Associated Neurocognitive Disorders) incidence and severity was observed. This project reveals a mechanism by which morphine, through prolonged exposure, increases blood brain barrier leakiness leading to accelerated HAND. Morphine abuse by human immunodeficiency virus type 1 (HIV-1)-infected individuals leads to an increase in viral replication and peripheral viral load, rapid disease progression and increased incidence and severity of neurocognitive abnormalities compared to non-drug abusers. The blood-brain barrier (BBB) is an obstacle that must be overcome during neuroinvasion with eventual development of HIV-associated neurocognitive disorders (HAND). In thus study, an increase in PBMC transmigration and firm adhesion was observed following prolonged morphine exposure, in the absence of an increase in overall barrier leakiness. This project unravels a mechanism by which morphine disrupts periphery-CNS homeostasis leading to accelerated HAND.

3. Nova Arnold

Eastern Kentucky University
Mentor: Lindsay Calderon

Nicotine-induced Breast Cancer Cell Migration and Invasion Phenotype is Mediated by Ca2+-independent Phospholipase A2β

Ca2+-independent Phospholipase A2β (iPLA2β) is a member of the phospholipase A2 superfamily has been linked to the regulation of a variety of cellular signaling pathways and functions. This is in part due to the catalytic activity of iPLA2β, cleaving glycerophospholipids at the sn-2 position causing the release of free fatty acids including arachidonic acid and 2-lysophospholipid. However, the ability of iPLA2β to mediate breast cancer cellular functioning including proliferation and migration remains unknown. Our central hypothesis is that suppression of iPLA2β reduces nicotine-induced breast cancer metastasis through attenuating MMP-9 (Matrix Metalloprotease-9) secretion. Our in-vivo preliminary data shows that iPLA2β is overexpressed in 4TI stage four breast cancer tumors grown in-vivo for 2 weeks and nicotine (5mg/kg/day) significantly increased growth at 2weeks and 4 weeks. Additionally, we found Bromoenol lactone, 3uM (BEL) an inhibitor of iPLA2β significantly attenuated nicotine-induced breast cancer cell proliferation. Further, we found that BEL significantly decreased nicotine-induced breast cancer cell migration (gap closure) utilizing a scratch assay. Through the use of gel zymography we elucidated that BEL attenuates nicotine-induced matrix metallopreotease-9 secretion, which, is an important contributor to cancer cell metastasis and the initiation of angiogenesis. Taken together, our in-vivo and in-vitro results indicate that iPLA2β is an important regulator of nicotine-induced breast cancer tumor growth, cell migration, and proliferation. Much work is still to be done in future studies to fully elucidate the full capacity of iPLA2β in mediating breast cancer tumerogenicity, angiogenesis, and its invasive nature.

4. Richard Arnold & Caitlyn Clark

Western Kentucky University
Mentor: Robert Choate

Building Envelope Integrity Assessments

STUDY 1 (Arnold): ***IR Moisture Assessment of Common Construction Materials***

Mold is an increasing problem in the US. Housing and homeowners are starting to desire home inspections to determine if conditions conducive to mold growth are present. However, moisture tests can be expensive and are sometimes inconclusive. Thermal imaging offers a more efficient method to conduct such examinations. Establishing an understanding of the thermal images moisture creates in different materials is paramount to providing accurate analysis and preventing unwarranted repairs and mold remediation. Explicitly, it is necessary to establish a correlation between the material and the saturation content captured by a thermal image. To give home owners better understanding and comfort with the decision to analyze their home, we proposed creating reference images of the correlation between saturation levels and a given material. These images can be used by inspectors as a reference to determine the moisture levels in residential structures without invasive testing. A series of images have been taken at set concentration levels for a variety of materials commonly used in home construction. The saturation levels were verified by a digital moisture meter, and a correlation was established between the moisture content and the appearance of the thermal image. After analysis, a chart was developed which can be presented to a home owner to give them a better understanding of their current situation as it pertains to "mold friendly" environments. The fundamental goal of this experiment was to improve homeowner comfort and understanding in the need to perform preventative maintenance.

STUDY 2 (Clark): ***Effects of Leakage Area on Overall Building Efficiency***

When assessing some of the major concerns engineers face in today's society, energy efficiency and sustainability always migrate to the forefront. These issues are becoming ever more present as society begins to take into account the amount of energy they consume and the manner in which they consume it. People are striving to find new, innovative solutions to decrease the amount of energy they use. One of the most accessible changes people can make is the amount of energy they are consuming within their homes. However, to understand how to create solutions, research must be conducted to understand the underlying problems. When evaluating a building's overall efficiency, one of the first steps is to assess the amount of leakage area that is present in the buildings envelop. It is critical to understand the relationships between leakage areas, pressures, and flow rates and how these result in a greater amount of energy consumption. Therefore, the current research tried to identify these relationships so that they may be developed into a more useful tool for field work. During this project, a test bed was purchased and modified to simulate a building environment. This test bed allowed for the measurement of pressures and flow rates at various leakage geometries to be studied. Research was sponsored by WKU Offices of the VP for Research, Sponsored Programs and Ogden College Dean through a Faculty Undergraduate Student Engagement (FUSE) grant. Overall, this research provided new insight on how leakage areas affect building efficiency. This information will serve as a useful resource as more and more engineers concern themselves with these types of problems.

5. Kathryn Ashby

University of Louisville
Mentor: Brent Stucker

Simulation Applications for Additive Manufacturing

Compared to traditional manufacturing processes, Additive Manufacturing produces parts by adding material in layers. Each layer is a thin cross-section of the part derived from the original CAD data. Modeling and simulation of AM process can provide guidance to machine users to optimize their existing machines and build layouts, predict the part performance, and produce parts with desired quality. Validation of modeling and simulation tools makes standardized manufacturing processes possible. The development of simulation for predicting the effects of changes in process parameters on mechanical properties, residual stress/strain, crystal structure, and other micro & macro features of components made using metal-based AM techniques has been developed at the University of Louisville (UofL) and is being commercialized by 3DSIM, LLC. In order to test this structure, a series of benchmarking and validation experiments applicable to industry were designed. The outcomes of these studies will be discussed in this presentation.

6. Kyle Auger

University of Kentucky
Mentor: Matthew Gentry

Harnessing Enzymes to Improve Industrial Starch Processing

Starch is a vital energy molecule in plants and a key component of the human diet. It also has a wide variety of uses in industry, such as a feedstock for producing paper, textiles, adhesives, plastics, pharmaceuticals, and biomaterials for biofuel production. However, starch is difficult to manipulate during industrial processing because it is water-insoluble. To overcome this recalcitrant nature, industrial processers treat starch by milling and then heating and harsh chemicals, a process that is costly and environmentally unfriendly. Obviously, plants do not break down starch in this manner. In plants, starch is degraded in a cyclical nature that involves three main classes of enzymes: dikinases, amylases, and phosphatases. If the cyclic nature of plant degradation of starch can be applied to industrial manufacturing, then the cost to degrade starch would go down significantly and the use of harsh chemicals would not be needed. Our work has focused on testing this hypothesis. We set out to establish a functional assay to assess how efficiently these enzymes bind sugars. Before my work the Gentry lab, I performed laborious binding assays to measure the binding of the dikinases and phosphatases to starch. This assay only qualitatively assessed binding, but did not quantitatively measure binding. We established a protocol to quickly, reproducibly, and quantitatively measure the binding of the enzymes to starch. We found that the starch dikinases and phosphatases possess differing abilities to bind starch substrates. Additionally, we performed starch degradation assay to measure glucose release after treatment with a combination of different enzymes. The results of the degradation assay show that enzymes increased starch degradation.

7. John Bailie, Jared Benningfield, Mykyta Birbasov, Ashley Keen & Lowell Parker

West Kentucky Community and Technical College System
Mentor: Shen Liu

Using a Human Leg Model to Verify the Impulse-Momentum Theorem

The impulse-momentum theorem states that the impulse of the force acting on a particle equals the change in the momentum of the particle. A human leg model is built first and then a load cell is attached to the foot, which allows the measurement of the force exerted on a ball when the ball is kicked. The impulse of the force acting on the ball can be recorded using DataStudio. Once the change in velocity has been measured, the impulse-momentum theorem can be verified.

8. Brooke Barber & Whitney Walker

Western Kentucky University
Mentor: Michael Stokes

Influence of Rodents on Recruitment of Ecologically and Economically Important Tree Species in Decline in South Africa

We investigated the decline of the marula (*Sclerocarya birrea*), knob thorn acacia (*Acacia nigrescens*), and red bushwillow (*Combretum apiculatum*) tree species in South Africa due to rodent influence on the reproduction states of the trees. This was conducted through a live trapping process on the Balule Olifants West Nature Reserve in Hoedspruit, South Africa from June 12th to August 13th, 2014. Different sites for trapping were selected based upon bush density, canopy cover, and diverse habitat. Each site had a 5x5 grid of 25 traps that used long and short Sherman traps and 4 Tomahawk squirrel traps. Captured rodents were then used in feeding trials to determine seed preference over a period of two days, with an acclimating period of 24 hours and then a trial run of 24 hours. Two seeds from each tree species were put into a randomized feeding tray along with grain during the trial. Our results yielded a strong preference by the rodents for marula seed predation, with little preference for the red bushwillow or acacia seeds. The grain was provided as an alternative food source to ensure rodents had a known preferable feeding source. A total of 217 rodents were captured across 7 unique sites for a total of 6,370 trap nights. Trap preference trials were also set up at 4 of the 7 sites for two weeks and a total of 45 rodents were caught. These trials included one short Sherman trap, one long Sherman trap, and one squirrel trap facing each other in a triangle pattern. The long Sherman traps were preferred the most, while the short Sherman traps were preferred the least. Population densities were also conducted during this study. The predominant species caught was the Namaqua rock mouse (*Aethomys namaquensis*).

9. Cayla Baughn

Western Kentucky University
Mentor: Chris Groves

H_2SO_4 Contamination of Freeman Branch Creek, Alabama from Disturbance of Geologic Materials During Highway Construction

Pennsylvanian-aged clastic and coal-bearing rocks of the southeastern US often contain sulfide minerals, especially pyrite (FeS_2). When these rocks are disturbed through mining or other activities the pyrite can be exposed to weathering by water and oxygen, resulting in pyrite oxidation that in turn produces sulfuric acid and ferric iron in solution. Since iron and other metals that may also be present have strongly pH-dependent solubilities, such low pH H_2SO_4 solutions, called "acid mine drainage" (AMD), can have relatively high metal concentrations. As pH is buffered these metals can precipitate in various forms along streambeds. In 2012 residents along Freeman Branch Creek near Eldridge Alabama observed orange and black discoloration along the stream which had not previously been seen. Inspection of geological maps showed that the Pennsylvanian Pottsville Formation underlying the area contains coal and as surface mining has taken place nearby this appeared to be a likely source of the contamination, although it was not clear what might have changed. Subsequent field investigation to understand relations between landscape disturbance and water quality in the creek instead suggested that blasting of units within the Pottsville Formation associated with recent highway construction about one kilometer upstream from where the discoloration had been observed may have enhanced pyrite weathering, along with buffering by limestone bedrock used as fill material. This highlights how construction activities in sulfide-bearing geologic materials can influence local water quality. Understanding of association geochemical conditions and processes in such settings can be informed by the extensive existing literature on AMD.

10. Lee Baxter

Eastern Kentucky University
Mentor: Jeffrey Neugebauer

Derivatives of the Solution to a Dynamic Boundary Value Problem on a Discrete Time Scale

A time scale is an arbitrary nonempty closed subset of the real numbers. The field of time scales calculus was introduced by Stefan Hilger in order to unify discrete and continuous analysis. Some interesting examples of time scales calculus include calculus on the real line, discrete calculus, and q-difference equations. Time scales calculus has numerous applications dealing with biology, engineering, economics, physics, and other areas of science. We began by introducing some basics of time scales, including the forward jump operator, the backwards jump operator, the graininess function, and the delta derivative of a function. We then considered a second order nonlinear dynamic boundary value problem with conjugate boundary conditions on a discrete time scale. A solution of this time scale may be delta differentiated with respect to the boundary points. Here, the delta derivative of the solution solves the boundary value problem consisting of the dynamic analog of the variational equation along with interesting boundary conditions.

11. Andrew Beasley

Eastern Kentucky University
Mentor: James Wells

Differences in Perceptions of Sexual Assault between White and Nonwhite Female Inmates

Despite the fact that a number of studies have examined violence in women's correctional facilities, no study I am aware of has focused on how race influences inmate perceptions of sexual violence. The data utilized for this study were obtained as a result of a previously funded National Institute of Corrections cooperative agreement that developed the Women's Correctional Safety Scales (WCSS), an instrument designed to measure the climate of violence in female correctional institutions. Using data from 4040 female inmates housed in fifteen correctional facilities located in seven different states, the influence of race on inmate perceptions of sexual violence were examined in both jails and prisons. We discuss the implications of findings for future research and correctional practice.

12. Madeline R. Beatty

University of Louisville
Mentors: Christopher Burns & Dania A. Fonseca

Biorenewable/Biodegradable Synthesis of Polymeric Materials from C-5 Sugars

Most plastics are currently manufactured using petroleum products. As environmental concerns mount and fossil fuel reserves are being depleted, there is a clear need to develop alternative ways to produce the materials that are such an integral part of our lives: plastics. The aim of this research is to develop a polymerizable cyclic ester using dried distillers grain, a renewable resource obtained after bourbon production. This work describes the initial steps for synthesizing a seven membered cyclic ester capable of ring opening polymerization. The target molecules are derived from L-arabinose and D-xylose, two C-5 feedstocks extracted from dried distillers grain. The ultimate goal is to make this synthesis scalable and compatible with current manufacturing infrastructure. In doing so, our target esters have the potential to produce viable economic alternatives to petroleum derived plastics.

13. Matthew Beckerich

Northern Kentucky University
Mentors: Maureen Doyle & James Walden

Evaluating the Impact of Microsoft IIS Vulnerabilities

Microsoft's Internet Information Server (IIS) is deployed on over 20% of all web servers, including servers in the state of Kentucky. IIS has been used by large scale network providers like Insight Communications and by public institutions like the Wolfe County Public Library. Out of date versions of IIS exposed users to known vulnerabilities, including eight in version 5.0, seven in version 5.1, and nine in version 6.0 according to Microsoft Security Bulletins and the Common Vulnerabilities and Exposures (CVE) database. One vulnerability of particular note was CVE-2009-1535, which affected Microsoft-IIS server versions 5.0 to 6.0. By using this flaw, a hacker could have granted themselves administrative privileges over the device and stolen or destroyed its data. CVE-2009-1535 is ranked as the sixth worst vulnerability that Microsoft-IIS has seen in the last eleven years using the CVSS 2.0 severity ranking system. Through mining Internet-scale network port scan data, we identified versions and locations of IIS servers throughout the entire IPv4 space. We found that old versions of Microsoft-IIS were deployed on many servers, with 1.35% of IIS servers running version 5.0, 0.51% version 5.1, and 39% running version 6.0. We also mapped the location of these servers, 4% of which (over 70,000 in number) were still vulnerable to CVE-2009-1535.

14. Allison Leigh Becknell

Morehead State University

Mentors: Johnathan Nelson & Sam Stapleton

Leveraging Social Media to Support Management Education and Develop Social Media Self-efficacy

Social media is increasingly a part of everyday life for many students. This creates an opportunity for instructors to use social media to help students learn, engage in class activities, and collaborate with other students. Additionally, instructors can utilize social media, such as LinkedIn, to help students prepare to enter the workforce and achieve professional advancement. The increasing use of social media in business makes it important for students as current and future employees to be knowledgeable of how to use social media. By teaching students these concepts in the classroom, they are much more likely to enter the workforce with increased self-efficacy for using professional social media and awareness of the benefits and risks that go along with them. Because of the potential benefits of using social media for students, instructors are beginning to incorporate social media into their teaching practice. However, the great number of social media platforms with their inherent strengths and weaknesses can make it difficult to determine exactly how to incorporate social media into management instruction. Thus, research is needed to guide management instructors on how to best incorporate social media into courses. Exploratory data from students in two different management courses—Human Resource Management and Leadership Development—was collected on a two-part social media assignment using LinkedIn. Students were administered a survey before and after this social media based assignment to measure changes in student self-efficacy using social media as well as to collect student feedback on this social media assignment. We tested whether student social media self-efficacy increased during the time in which students completed this assignment; we report these results and student feedback on this assignment. These results can guide efforts to use social media to advance learning in the classroom and prepare students for productive careers in the business world.

15. Cassandra Bell, Jennifer Campbell, Joshua Castlen, Tera Hutto, Aaron Hall, Candace Kelley, Bethany Oakes, Molly Oakes, Courtney Payne, Jonah Reynolds & Autumn Stewart

Owensboro Community and Technical College System

Mentors: Timothy Dick, Kathy Hoffman, Chandra Emani & Connie Johnson

The Influence of Several Factors on Cystogenesis in Polycystic Kidney Disease and Potential Questions for a Survey Research Instrument

Autosomal dominant polycystic kidney disease affects nearly 12.5 million people world-wide. Patients with this genetic defect frequently develop kidney failure due to the inability of the nephron tubules to function properly. Development and maintenance of the nephron requires the expression of polycystin-1, the protein product of the PKD-1 gene found on chromosome 16. Heritable mutations of the PKD-1 gene may result in a conformation change in polycystin-1 leading to possible alterations of cell-cell and cell-matrix interactions and formation of cysts. As these cysts develop, kidney function decreases. Every individual in a family with polycystic kidney disease shares the same mutation, yet disease progression varies within the family. The current study is a systematic literature review of the effects of environmental factors of diet, caffeine, medications, and toxins on progression of the disease, and development of questions for a survey research instrument.

16. Andrew Blevins

Morehead State University

Mentors: Steve Chen & Janet Ratliff

Business Students' Perceptions of Expected Skills and Traits for Their Professional Success

Growing literature in Business reveals the concerns on quality and level of preparation for business students who are ready to enter the business industry. This study specifically delved business students' perception on self-perceived competencies, skills, and desired traits for being a successful employee. One hundred and seventeen student-participants from four business classes at a regional state university at Eastern Kentucky were randomly selected and recruited to complete a 60- item survey. In addition to the general demographic information, the survey solicited students' rating on importance of traits, qualities and functional and academic knowledge/subjects. The results indicated that participants further categorized various traits and qualities suggested by experts and scholars into eight groups. Although students valued personal principals such as work ethic, dependability, and willingness to learn highly (as scholars had suggested), they also failed to recognize the importance of having internship experience and strong writing skills. The latter phenomenon was considered the biggest discrepancy between the view of students and scholars. As for the ratings regarding importance of the functional and academic content, students tended to highlight the importance of "business ethics" as well as "marketing & entrepreneurship." This finding seemed to be synchronized with scholars' recommendations. In conclusion, the author addressed the practical implication on how to utilize findings to adjust the educational curriculum and improve the skills and knowledge of students.

17. Jessica Bolte

Northern Kentucky University
Mentor: Monica Wakefield

Effects of Visitor Group Size on Sifaka Behaviors in the Zoo Environment

The welfare of animals in the zoo environment is a leading area of research for animal behaviorists and zoologists. One area of study is the effect of constant interaction with humans on the zoo animals' welfare. Being in a captive environment can be a stressful situation for any wild animal, but increased contact with humans can further stress the animal. Animals that are stressed may shift their behavior, becoming more active or inactive than usual. If an animal is stressed by an environmental factor such as an increased number of visitors, it is expected that they will take advantage of any hiding locations in the exhibit to lessen the effect of that factor. In this study, a group of 4 sifakas (*Propithecus coquerelli*) at The Cincinnati Zoo and Botanical Gardens, were studied using Ad libetum, focal scanning, and instantaneous scanning data collection techniques for approximately 20 hours of data to determine the effect of number of visitors on the number of active, inactive, and hiding behaviors observed. A chi-square test was used to determine that the number of active, inactive, and hiding behaviors were dependent on the number of visitors present at the exhibit (X^2_{36}=253, n=1472). Linear regression of the behavior ratios showed a positive linear relationship (r^2=0.3319) between the ratio of hiding behaviors observed and the number of visitors. This supported the hypothesis that hiding behaviors increase as the number of visitors increase. The relationship between active behaviors and number of visitors had mixed results in the linear regression and could not be determined based on the evidence collected. Further research in this area of study should be completed for a fuller understanding of the effect of visitors on the behavior and welfare of captive sifakas.

18. Jacob Bonta, Corwin McCollum, Jacy Ball & Joshua York

Eastern Kentucky University
Mentors: Darrin Smith & Joseph Bequette

Intermediate Steps Towards the Total Synthesis of Ergovaline

Ergovaline is an ergot alkaloid isolated from tall fescue grasses infested with the fungus *Neotyphodium lolii*. It poses a significant threat to the health of forage animals (especially cattle and horses in Kentucky) since it can produce a toxicosis in these animals. Research with this biologically active molecule and its effect on forage animals is currently growing, but the availability of the molecules, as standard material, is limited and hinders research efforts. Generating a synthetic route towards ergovaline is a more economically attractive and time saving option when compared to recoveries after arduous extraction from plants. Research involved a subset of reactions to synthesize this natural product involved with the toxicosis. Specifically, synthesis of the key intermediates, cyclo(L-pro-L-val) and (S)-ethyl benzyloxy-methyl malonate acyl chloride, is described. The cyclo(L-pro-L-val) was derived from the conveniently available starting materials L-Valine and L-Proline with direct addition of valine ethyl ester to Cbz-proline, which proceeded under an inert atmosphere. For the other intermediate, a key feature of the synthesis is the chiral resolution of the (R)-enantiomer of ethyl benzyloxy-methyl malonate by crystallization using the resolving agent (S)-alpha-methyl-benzylamine. Structural analysis using infrared (IR) spectroscopy, nuclear magnetic resonance (NMR), and mass spectrometry (MS) was conducted.

19. Caleb Brannon

Murray State University

Mentors: Tony Brannon & Jason Robertson

The Effect of Row Spacing, Plant Population, and Maturity Levels on Tetrahydrocannabinol (THC) and Cannabidiol (CBD) Levels in Agricultural Hemp

In 2014, a very historic event took place that could have a dramatic effect on our state and national agricultural industry. The 2014 Farm Bill contained language that allowed institutions of higher education to perform research on agricultural hemp. This opened up the opportunity for states that had already legalized hemp research to immediately start trials. Kentucky was one of few states that had legalized agricultural hemp before passage of the bill. Therefore, we were able to begin the nation's first legal hemp research project at Murray State University when the first shipment of seeds was received and planted on May 12th. A second planting occurred on June 12th. Banned since the 1930's, no information is available on the effect of different planting scenarios. Therefore, our research was focused on the effects of row spacing, population, and planting dates on the important compounds Tetrahydrocannabinol (THC) and Cannabidiol (CBD) levels at different maturity stages. THC is the primary psychotropic cannabinoid and CBD is the non-psychotropic cannabinoid. A French variety, Futura 75, obtained from Cannavest was used across the entire test. We planted our trials in 7.5, 15, 20, and 30 inch rows. In each of the different row spacing trials, two plant population levels were used - 25 pounds of seed per acre and 40 pounds per acre. The research objective was to test the effect of row spacing, plant population, and maturity levels on the THC and CBD levels in the plants. Three different tissue samples were taken on regular intervals to compare maturity dates. The results indicated all THC levels of Futura 75 were lower than .3% and CBD levels of the first planting were significantly above the second planting. Upon completion and reporting of the research, all results on all variables will be presented and compared.

20. Andrew P. Bratton

University of Louisville

Mentors: Kara C. Sedoris & Donald M. Miller

KRAS Quadruplex-Forming Oligonucleotide: a Novel Therapeutic Option for Pancreatic Ductal Adenocarcinoma

Pancreatic cancer is a malignant neoplasm originating from transformed cells within the pancreas. It is the fourth most common cause of cancer-related deaths in the United States and, even when diagnosed early, has one of the worst prognoses of all human malignancies, with a median survival time of less than six months. Surgery is the best option for patients with localized disease; however, most patients experience local or metastatic recurrence. Therefore, there is a dire need for new therapeutic options. The KRAS oncogene, which is mutated and over-expressed in more than 95% of pancreatic ductal adenocarcinomas (PDACs), is essential to the initiation and maintenance of PDAC cell growth. Therefore, inhibition of KRAS expression may provide an effective treatment approach. The use of oligonucleotides (ODNs) for gene targeting of KRAS may be effective for promoting regression; however, problems with uptake, stability, and specificity prevent them from being used clinically. A guanine-rich, quadruplex-forming sequence upstream of the KRAS promoter has been implicated in the regulation of KRAS expression. It was hypothesized that treatment of PDAC with an ODN encoding the KRAS quadruplex-forming sequence (KRASq) may abrogate cell growth by inhibiting KRAS expression. The results demonstrate that the 32-bp KRAS quadruplex-forming ODN formed a parallel quadruplex in solution. Four PDAC cell lines treated with KRASq (ASPC1, Panc-1, S2PC9, and S2VP10) showed prominent cellular uptake, with cytoplasmic and nuclear localization, as well as a significant dose and time-dependent decrease in cell proliferation after 24-144 hours. Interestingly, the two most sensitive cell lines, ASPC1 and S2PC9, had the highest basal levels of KRAS protein expression. Inhibition of proliferation in these two cell lines corresponded with a decrease in KRAS expression after 72-144 hours of KRASq treatment, but no change in the cell cycle was noted. Preliminarily, an approximate two-fold decrease in KRAS mRNA expression has been observed in ASPC1 and S2PC9.For more than thirty years, NCI funded institutions have been studying KRAS; however, at the time of this study's inception, no therapeutic solutions to KRAS mutations had been developed. These results are the first of their kind and introduce a unique therapeutic method for significantly decreasing pancreatic cancer growth that abrogates KRAS expression while also addressing current concerns associated with conventional ODN therapy.

21. Anna Braun, Kelly McKenna, Dharmesh Patel, Rachana Neesu, Jack Ferguson, Paige Huzyak, Jeremiah Sharpensteen & Lan Xu

Western Kentucky University
Mentor: Hemali Rathnayake

Donor-Acceptor Nanostructures for Energy Harvesting

STUDY 1 (Braun & McKenna): ***Donor-Acceptor Core-Shell Nanoparticles for Organic-based Solar Cells***

Solar cells use an electron donor and acceptor system to capture energy from the sun. This system can be obtained by using films of electron donating and electron accepting materials; however, it is not a very stable process. The process can be improved by using core-shell nanoparticles that have a charged or hydrophilic shell and hydrophobic core. Here we described two synthetic approaches to make such nanoparticles using a covalent method and a non-covalent method. In the covalent method, we used a modified Stober method to make hydrophilic silsesquioxane nanoparticles to coat the outside of hydrophobic nanoparticles. The presence of the charged particles on the surface of the resulting particle improves the solubility of the particle and the ability for the particle to transfer an electric charge by acting as an electron acceptor and donor. In the second method, the core shells are formed by the hydrophobic hydrophilic interaction between the two substances. Core shells can be prepared by having a hydrophobic and hydrophilic solution start in a solution where they are both soluble, and slowly introducing this solution to an aqueous solution. This method is known as a solvent aggregation method. The hydrophilic solution formed a shell around the hydrophobic core. Cross -linking the solution allowed for the products to remain intact even when drying. We plan to use the particles in solar cells by functionalizing the core and shell in an electron donor and acceptor system. This was more stable and worked better than two layers of donor and acceptor films on the cell.

STUDY 2 (Patel, Neesu, Ferguson, Huzyak, Sharpensteen & Xu): ***Innovative Nanomaterials for Energy Harvesting Applications***

The application of green energy technologies has been the main focus over the last decade due to the increasing demand of the traditional energy resources. Dr. Rathnayake's research group goal is to make novel carbon-based nanoscale materials for energy harvesting from sunlight and waste heat. The use of organic based nanostructures make them promising for flexible panels as well as reducing the costs of manufacturing compared to traditional inorganic counter parts. Here, an innovative approach to make these novel materials using environmentally friendly synthesis for green energy applications has been explored.

22. Bryn Brendamour

University of Kentucky
Mentor: Frances D. Hardin

Food Accessibility Trends and Health in America's Counties

Geographical location of food outlets influences dietary habits. Having close access to supermarkets is inversely related to obesity, while close proximity to fast food restaurants and convenience stores correlates positively with obesity rates. Most analyses of these relationships have been cross-sectional. The purpose of this study was to analyze relationships between number/type/density of different food outlets and the health outcomes of the populations of United States rural (county > 70% rural) counties over a 4-year time period. A Freedom of Information Act (FOIA) request was completed to acquire data on types of food outlets (i.e., supermarkets, grocery stores, convenience stores, specialty food outlets, fast food restaurants and farmers markets) located in each United States county from 2010-2013. Relationships between county health ranking variables (i.e., premature death, poor health days and obesity rates) and changes in the number and type of food outlets from 2010-2013 were analyzed. Fast food and combination stores (convenience + grocery) have the highest mean number of outlets per 10,000. As the number of fast food outlets (per 10K) increased, the percent of the population in poor/fair health increased ($r=.16$; $p<.001$). There was no statistically significant association between fast food outlets and obesity rates ($p=.09$). In contrast, as the number of grocery stores increased, the percent of the population in poor/fair health decreased ($r=-0.12$; $p<.001$). An increase in number of grocery stores was also associated with a slight decrease in obesity (-0.08; $p=.007$). Over the past four years, an increase in the number of fast food and combination store outlets is positively correlated with an increase in fair/poor health and obesity. An increase in the number of grocery stores over the past four years is associated with a decrease in fair/poor health. As fast food restaurants continue to increase in low socioeconomic areas, health outcomes in these areas may continue to decline. In contrast, as the number of grocery stores increases health outcomes may improve. Additional research is needed to determine any correlation between the socioeconomic status of different counties and concentration of food outlets as well as research to determine all the barriers to access to beneficial food outlets versus fast food outlets.

23. Hamilton Ryan Brindley, Jennifer Gaiko & Kendra L. Whitaker

Western Kentucky University
Mentor: Shahnaz Aly

Architecture and its Societal Significance

Architecture has a significant impact on the quality of life of our society. From historic times structures have played a major role in the development of towns and cities. According to Andrea Palladio, one of the most influential western architects, for architecture to be worthy of praise, it must possess three distinct qualities: beauty, durability, and convenience. The research undertaken was to analyze the importance of three different types of structures: a contemporary villa, a pedestrian bridge and a community center. While all three structures are different in form and scale, they significantly impacted the society they were built into. The villa was designed based on Palladian principles to create a beautiful, logical and durable structure which showcased modernity and sustainability to meet the needs of the 21st century. Bridges impact the world, the countries they represent and the communities they dwell within. The design of the pedestrian bridge explored the iconography as well as the emotional and practical application in the community in which it resides. The design of a green sustainable community center impacted a community; not just through the building itself but also through the opportunities provided within. A community center provided opportunities for interaction, communication and expression of diversity to citizens of all age groups. The functionality of design stretches further than the structure. The three projects though different came together in incorporating and showcasing the qualities of beauty, durability and convenience once again emphasizing the significance of architecture to society.

24. Katie Brooks

Eastern Kentucky University
Mentor: Isaac Powell

Fine Art for the Generations: Designing Effective Art Museum Interactions for Children

Education of the fine arts has led to improvements in school by furthering problem solving development while also opening new avenues for creative investigation and expression. The goal of our project has been to increase the accessibility of fine art for children of all ages so as to establish an appreciation of fine art early in life. The methodology of this project involved analyzing and reevaluating existing educational programs in fine art museums so as to improve the effectiveness of these programs. Currently, museums have differing degrees of educational involvement, if at all. I have proposed several activities that will allow children of varying educational backgrounds a greater means of experiencing art, art history, and creative expression through creative practices.

25. Adrienne Bushau

University of Louisville
Mentor: Juliane Beier

Mechanistic Insight Into Vinyl Chloride-Induced Liver Injury

Vinyl chloride (VC), a ubiquitous environmental contaminant, ranks 4th on the ATSDR Hazardous Substances Priority List. It has been shown to cause liver cancer and other hepatic dysfunctions. This study aims to investigate hepatic injury in vivo and its mechanisms including the role of endoplasmic reticulum (ER) stress in vitro. Chow-fed C57Bl/6J mice received chloroethanol (ClEtOH), a VC metabolite, and lipopolysaccharide (LPS) after ClEtOH. High fat diet (HFD)-fed mice received a bolus dose of ClEtOH after 10 weeks, 24 hours prior to sacrifice. Liver damage, inflammation, ER stress and changes in carbohydrate and lipid metabolism were determined. HepG2 cells were treated with chloroacetaldehyde (CLA), VC metabolite. RNA was extracted for analysis of ER stress markers. In chow-fed mice, ClEtOH caused no liver damage but caused changes in carbohydrate and lipid regulating genes. LPS exposure caused oxidative stress, lipid accumulation and inflammation, which was exacerbated by ClEtOH preexposure. ClEtOH increased monocyte and neutrophil activation, transaminase levels, necroinflammatory foci and fatty acids. The combination of ClEtOH and LPS decreased TUNEL-positive cells, suggesting a switch to necrosis. In HFD-fed mice, ClEtOH increased HFD-induced injury, steatosis, infiltrating inflammatory cells, hepatic expression of proinflammatory cytokines and ER stress. CLA decreased oxygen consumption, ATP levels, and mitochondrial function. VC metabolites sensitize the liver to a "second hit." This serves as proof-of-concept that VC hepatotoxicity may be modified by underlying liver diseases, which commonly occurs in liver disease. These data implicate VC exposure as a risk factor in the development of liver disease in susceptible populations.

26. Lingjie Cai

Eastern Kentucky University
Mentor: Weiling Zhuang

The Impacts of Language Intensity on Email Open Rate

Intense language, under many conditions, has been shown to substantially increase attitude change (Andersen and Blackburn, 2004). However, the effect of language intensity on actual behavior has rarely been examined, and the effectiveness of the intense message has never been examined in online communication media, especially for email. Today email still is one of the most effective ways to virtually communicate between people. Improving email open rate (or response rate) would help businesses to be more productive and efficient. Thus, I conducted this study to test whether high or low language intensity level affects email's open rate. In my study, results supported the hypotheses that high levels of intense language had significantly higher open rate than low level intense language. Moreover, the evidence was constant across different population groups and areas, so the strategy of using intense language can be generally applied in America.

27. Susan Carter, Brittany Carr, Jeanne Hines & Ralph Hines

Madisonville Community and Technical College System
Mentors: Aseem Talukdar & G. Michael Shifflett

Finding Wavelengths of Laser Light Using a Diffraction Grating

Diffraction of light refers to the phenomenon of bending of light as it passes the edge of an object. As a result of this light can spread into the object's geometrical shadow. Diffraction of light demonstrates its wave-like nature and occurs as a consequence of the way in which waves propagate. It is described by the Hugens principle and the superposition principle of waves. When light encounters an obstacle, such as a single or double slit, it emits secondary wavelets. When monochromatic light passes through a diffraction grating, it produces a series of maxima at locations which can be predicted mathematically to determine graphically the wavelength of light from the measurements. In this experiment green and red lasers were used. The wavelength of red laser light was calculated as 648 nm and the wavelength of green laser light was calculated as 524 nm, both of which are within 3% of the tabulated values.

28. Celina Charles, Anjalise Jorgens & Joshua Ohde

Elizabethtown Community and Technical College System
Mentor: Joe Wolf

Isolation of* Bacillus thuringiensis *from Bess Beetles

Bacillus thuringiensis is a gram-positive soil bacterium that is used in the biological control of insects. *B. thuringiensis*is closely related phylogenetically to *Bacillus cereus*, an occasional cause of food poisoning. Previous work showed that food isolates of *B. cereus* were resistant to β-lactam antibiotics. In this study, *B. thuringiensis* was isolated from the homogenized intestines of the Bess beetle,*Odontotaenius disjunctus*. It was hypothesized that isolates would show a similar antibiotic resistance profile to *B. cereus*, based on their close genetic relationship. All isolates were found to express β-lactamase and proved resistant to penicillin. This may be the first report of this bacterium in the gut microbiome of this beetle.

29. Chelise Lynn Conn

Morehead State University
Mentor: Kristina DuRocher

Issues on Women's Reproductive Rights, 1980-1989

During the late 1970s and early 1980s, employers, such as General Motors, St. Joe's Minerals, Allied Chemicals, Olin, and B.F. Goodrich, adopted policies that banned women of childbearing potential from jobs that involved toxic chemicals. In some cases, women were told that in order to keep their jobs they had to be sterilized or risk being fired or demoted to lesser paying positions. These policies became known as "protective exclusion policies" and were debated into the late 1980s. They gave employer's incentives not to hire women, thus women opposed them as a form of sex discrimination. Additionally, the practice of coerced sterilization was secretly being performed by health departments and debated by government officials who were concerned about the reproduction of feeble-minded women and criminals. As well, the reproduction of teenagers and out-of-wedlock individuals became the center of political debate, even though teenage births were decreasing. Furthermore, scholars have failed to give significant focus to the sterilization and reproductive trends that occurred during the 1980s, such as teenage pregnancy and protective exclusion policies in the workplace, thus limiting the significance of these trends in the larger historical context. By examining 1980's culture, reproductive politics and employment policies in relation to women's rights, one could conclude that sterilization abuse was still a societal concern, the political debate over teenage pregnancy was a rhetorical surrogate for the larger issue of welfare and the "underclass" and exclusionary protective policies were a direct reaction to second wave feminism and gender equality.

30. Kristin Conrad, Alexander Davie, Kemper Rogers & Andrew Pearl

Kentucky State University
Mentors: Li Lu, Thomas Webster, Alexander Lai & Farida Olden

A Study of Nosema Pathogens in Honey Bees with Molecular Methods

Nosema ceranae and *Nosema apis* are microsporidian pathogens which infect honey bees. The spores embed themselves into the digestive tract of the bees and have been shown to weaken the bees and cause a decrease in colony size. The two pathogens are similar in many ways, however they have many differences as well. *N. apis* has been around for a long time, while *N. ceranae* pathogen is a newly emerging pathogen. It seems that *N. ceranae* spreads faster and has become more prevalent in the honeybee community. It is hard to identify these two pathogens simply with infecting symptoms and microscopic observation. Thus, we used molecular methods, more specifically, Polymerase Chain Reaction (PCR) to identify them in the digestive tract of bees. We tested the bee hives at Kentucky State University Research Farm to see if they are infected. We also analyzed how the pathogens were transferred throughout bee populations, and the effects of diet/nutrition in this process.

31. Erika Cordle & Alyssa Shifflet

Morehead State University

Mentor: Tara Holaday

Highlighting the Successes and Challenges of Developing a Campus Wellness Program with Two Illustrative Vignettes: MSU4U Social Media Campaign and MSU4U International Support Group

STUDY 1 (Cordle): ***Developing a Social Media Campaign for a University Suicide Prevention Program***

In an average year, only 3% of Morehead State University's student population utilizes counseling services. The academic and social success, as well as, the safety of MSU students is dependent on greater access to services that promote resiliency, teach coping skills, and provide crisis support. Websites and smart phone applications allow students to access vast amounts of information and utilize a diverse array of services at all times and at any location on the MSU campus. There is no other platform that has the capability of engaging a larger number or broader assortment of students. Therefore, the development of a social media campaign was a crucial component of our suicide prevention efforts. We first engaged in strategic planning. We held focus groups and researched other university efforts to ensure the effectiveness of our approach. We sponsored a student contest to create our program logo and project title. Student engagement was an essential component at all stages. The driving goals of the campaign were to ensure that students developed awareness of the issue of suicide and information on how to take action to prevent suicide deaths. Certain messages about suicide can increase the likelihood that at-risk individuals will engage in suicidal behavior so we consistently referenced guidelines from the Suicide Prevention Resource Center to avoid propagating unsafe messaging. Positive messaging was crucial to furthering our suicide prevention goals. We encouraged students to take our Here4U pledge. Pictures of students taking the pledge were posted throughout our social media platforms and on our program website. Students needed to realize that there were members of the MSU community committed and prepared to provide assistance to those in emotional distress. Contests, daily posting, and frequent evaluation of audience engagement with our various media outlets were also essential to the success of our project.

STUDY 2 (Shifflet): ***Fostering Feelings of Greater Belongingness and Lower Burdensomeness Through the Development of an International Student Support Group Curriculum***

Thomas Joiner's (2005) Interpersonal Theory of Suicide suggests that the two constructs of thwarted belongingness and perceived burdensomeness are necessary and sufficient causes of suicidal desire. An intervention that would increase feelings of connection and lower feelings of burdensomeness would directly contribute to the Morehead State University Garret Lee Smith (GLS) Campus Suicide Prevention grant aims of creating a more resilient and connected campus community. The international student community is especially in need of such an intervention. This student group faces the unique stressors that accompany adapting to a new educational system and language. The first step in developing the curriculum was to ensure that it was appropriate for the intended audience. Support group members were given a survey to assess their interests and what they hoped to get out of the group meetings. The next step in developing the curriculum was to determine a way to incorporate American students into the weekly meetings. We assigned each week a theme (American culture, fashion, adjusting to college life in America, etc.) and invited American students with particular expertise and/or interest to be guests at the meetings. We encouraged each visitor to give suggestions for how the international students could become more involved with university activities related to the week's topic. The incorporation of American students was a unique aspect of our support group curriculum. Focus group sessions with the international student attendees indicated that this was the most important contributor to increased feelings of connectedness. The issue of burdensomeness was directly addressed by incorporating volunteer activities into the curriculum. The international students spent time interacting with residents at a local nursing home and helping with community service projects. The theory driven approach to designing the support group curriculum produced large gains in perceptions of belongingness and significantly lowered feelings of burdensomeness.

32. Robert Crawford

Northern Kentucky University
Mentors: James Walden & Maureen Doyle

Rapid Discovery of Vulnerable Network Devices in the State of Kentucky

The Internet is used by billions of people; twenty-four hours a day, seven days a week, yet it harbors many potential vulnerabilities which could be exploited to disastrous effect. These vulnerabilities can be found using network port scanning tools with version identification technology. By mining rich, Internet scale network scan data, we mapped vulnerable network devices across the state of Kentucky by searching for vulnerable software versions and geolocating these devices using their IP addresses. We focused our study on Cisco network routing devices in the state of Kentucky running Cisco's Internet Operating System (IOS) versions 15.1 -15.4. While most users don't have such devices in their homes, there is a great chance that their data is being routed through one of these pieces of hardware, as most Internet Service Providers and corporations use Cisco managed network devices. We identified a large number of devices with firmware and/or operating system versions containing exploitable vulnerabilities that could be used to obtain unauthorized information, bypass access control, or deny service to users served by the device. Globally, our data mining found 19,141 devices running vulnerable versions of IOS, including 15,762 devices running IOS 15.1, 3,172 devices running IOS 15.2, 175 devices running IOS 15.3, and 32 devices running IOS 15.4. A total of 92 vulnerable devices were found within and near the borders of the state of Kentucky. Some of these devices handle network traffic for large organizations and media distributors. An attack on these devices could render large numbers of networks across the state inoperable.

33. David Crittendon

Murray State University
Mentor: Jana Hackathorn

Accentuate the Positive: Positivity Influences the Nation Greater than Negativity

The current study examined whether quotes heighten or lower patriotism and nationalism scores. It was hypothesized that positive quotes towards America would raise patriotism levels and military approval, whereas negative quotes would raise nationalism, xenophobia, and need for punishment scores. Participants (N = 73) were randomly assigned to read one of three types of quotes (Control, Positive and Negative) and then complete measures of various patriotism related constructs, including the patriotism and nationalism scale (Kosterman & Feshbach, 1989), the xenophobia scale (Van Der Veer et al., 2013) and the need for punishment scale (ipip.com) and a brief one-item military approval measure. A series of one-way ANOVAS was conducted, indicating the positive group (M = 80.3, SD = 11.1) had higher patriotism scores (F(2,63) = 6.26, p = .003, η_p^2 =.17), than both negative (M = 68.4, SD = 11.2), and control groups (M = 71.6, SD = 13). Additionally, the positive group (M =11.5 SD = 2.8) had higher military approval scores, F(2,63) = 3.28, p = .044, η_p^2 = .09, than negative (M = 9.6, SD = 3.2), and control groups (M = 9.3, SD = 3.5). In regards to the psychological weight of negative quotes, results indicated that the negative group did not have higher nationalism (F(2,63) = 1.42, p = .248, η_p^2 = .04.) or xenophobia (F(2, 76) = .19, p = .830, η_p^2 = .01) scores. However, contrary to the expectations, the positive group (M =80, SD = 14.3) reported higher scores on need for punishment (F(2,63)= 4.2, p = .019, η_p^2 = .118) than both the negative (M = 65.5, SD = 18), and control (M = 74.2, SD = 18.9). This suggests that an in-group mentality has a much larger impact on our attitudes than derogating an out-group. Implications will be discussed.

34. Catherine G. Croft

Kentucky State University
Mentors: George Antonious & Regina Hill

Detection of Herbicides in Runoff from Agricultural Fields

Soil amendments could be used to intercept pesticide-contaminated runoff from agricultural fields. This practice might provide a potential solution to pesticides contamination of surface and seepage water from farm lands. Agricultural use of pesticides has remained high for economic reasons. Metribuzin [4-amino-6-tert-butyl-4, 5-dihydro-3-methylthio-1, 2, 4-triazin-5-one] and DCPA [1, 4-Benzenedicarboxylic acid, 2, 3, 5, 6-tetrachloro-, dimethyl] ester, in runoff and seepage water from agricultural fields were investigated. The field study was conducted on a silty-loam soil of 10% slope at Kentucky State University Research Farm to monitor off-site movement of metribuzin and DCPA in runoff and seepage water. Eighteen plots of 22 × 3.7 m each were separated using metal borders and the soil in six plots was mixed with sewage sludge (SS) at 15 t $acre^{-1}$ on dry weight basis, six plots were mixed with chicken manure (CM) at 15 t $acre^{-1}$ on dry weight basis, and six unamended plots (NM) were used for comparison purposes. The objective of the study was to investigate the effect of this practice on the concentration of herbicide residues in runoff and seepage water. CM and SS treatments increased water infiltration into the soil column towards the vadose zone, reducing surface water runoff down the land slope. The leaching index (LI) values indicated the weak soil leaching of DCPA and the high leaching of metribuzin.

35. Trevor Davis

Western Kentucky University
Mentor: William Mkanta

Challenges of Living with HIV/AIDS: Photo Analysis of Patient Perception of Needs

Tanzania is one of the countries in Sub-Saharan Africa that is hardest hit by HIV/AIDS. Although community interventions have been prevalent in dealing with the challenges faced by persons living with HIV/AIDS (PLWHA), these efforts are of little value if they don't include PLWHA's opinion. This study used photographs taken and selected by PLWHA to identify the challenges they face while living with the disease. The research question addressed was: What are the perceptions of PLWHA in relation to challenges and service needs related to HIV care? The objectives of this study were to use the health care, social meanings and stories behind the pictures taken by PLWHA to raise awareness of the disease and improve the delivery of meaningful services that will benefit PLWHA according to their perceived needs. Factors impacting PLWHA included: inability to afford and access necessary nutrient rich foods that supplement antiretroviral medications; lack of access to medications used to treat opportunistic infections, and lack of education amongst local community providers. All participants in the study identified one or more of these challenges and shared their own unique experience of how the challenges they faced have negatively impacted their life. The results of this study are being used to not only increase awareness of HIV/AIDS in local and global communities, but also in improving design and delivery mechanisms of the current and more meaningful services to PLWHA. To meet this goal, the findings were disseminated to specific US agencies that have the potential of reaching out to the Tanzanian communities for international aid as well as other types of collaborations to benefit the lives of PLWHA.

36. Anna Bethany DeMoss

Morehead State University
Mentor: April D. Miller

Getting Attention: There is a Right Way and a Wrong Way

We examined the effects of several interventions on the classroom behavior of a first grade, male student. The purpose of this study is to determine the function of this child's behavior, link it to home situations, and to reverse the child's behavior to create a better classroom environment for this student and all other peers in this first grade classroom. To determine the function of inappropriate attention-seeking behaviors, it was important to link inappropriate behaviors occurring in the classroom to the weeks the student was in different home situations. Then by determining the function of the male student's inappropriate behaviors, we could work to replace those inappropriate behaviors with more appropriate attention and attention-seeking behaviors. The student behavior changes required several intervention strategies in order to reduce the inappropriate behavior. The results were analyzed and reported to the teacher, the parents, and in this case study.

37. Christine Dolin

University of Louisville
Mentor: Gavin Arteel

The Hepatic "Matrisome" Responds Dynamically to Stress: Novel Characterization of the ECM Proteome

Background. There are no therapies to halt or reverse chronic liver disease (e.g., ALD), which follows a common natural history leading to end-stage liver disease and hepatocellular carcinoma (HCC). Outside the context of fibrosis, the nature and impact of the dynamic responses of the hepatic ECM proteome (i.e., matrisome) to stress are poorly understood. The goal of this work was to develop a proteomic method to characterize the hepatic matrisome and compare the impact of ethanol and lipopolysaccharide (LPS) on this compartment. Methods. Mice were fed ethanol-containing or isocaloric control diet for 6 weeks and injected with LPS or a vehicle 24 hours prior to sacrifice. Liver sections were processed in a series of increasingly rigorous extraction buffers to separate proteins by age and crosslinking. Extracted proteins were identified using liquid chromatography-tandem mass spectrometry (LC-MS/MS). ECM proteins were mined, categorized by primary function and compared between experimental groups. Immunoblotting was performed for fibrin and osteopontin, proteins previously found to be significant in ALD-associated ECM remodeling. Results. The extraction yielded distinct pools of ECM proteins identifiable by LC-MS/MS. The matrisome responded dynamically to stress. Ethanol caused a dramatic ~30% increase in the number of matrisome proteins; LPS produced a similar response. The enhancement of LPS-induced liver damage by ethanol preexposure demonstrated unique protein changes. Conclusions. These results suggest that this approach can document qualitative changes to the ECM proteome (i.e., presence and absence). Future work will investigate quantitative matrisome changes. Supported by NIH/NCI (5R25CA134283-03) and NIH/NIAAA (1R01AA021978-01).

38. Jacob Edmisson

University of Louisville
Mentor: Silvia M. Uriarte

The Ability of Newly Discovered Oral Pathogen, Filifactor alocis, to Delay Neutrophil Killing Mechanisms is Dependent on the Viable Bacteria

Almost half of adult Americans are victims of periodontal disease or periodontitis which is the bacterially induced inflammation of the tissue that surround and support the tooth. To further address the seriousness of this disease, research studies found positive correlations between periodontitis and cardiovascular disease, diabetes and rheumatoid arthritis. The innate immune system's failure to control the proliferation of periopathogens permits the disease continuation. The accumulation of neutrophils, a critical part of the innate immune system, at the site also contributes to tissue damage. *Filifactor alocis* is a newly appreciated pathogen present in oral biofilms in periodontal disease patients. Studying the interactions between neutrophils and F. alocis will provide valuable information to understand the role of this bacterium in periodontal disease and enhance our understanding of bacterial strategies to subvert innate immunity. In order to learn how this bacterium modulates certain neutrophil functional responses, human neutrophils from healthy blood donors were challenged with both the viable and heat-killed bacteria. By using the heat-killed organism, we tested if the neutrophil functional responses are manipulated by activity of viable F. alocis or if the neutrophil is unable to properly recognize the bacteria to initiate its killing mechanisms. One of the several killing mechanisms employed by the neutrophil is the production of superoxide in bacteria-containing phagosomes. Previous studies in our lab show that F. alocis fails to induce superoxide. Neutrophils challenged with heat-killed bacteria produced significantly higher superoxide levels. To further investigate, the fusion of specific granules to bacteria-containing phagosomes was examined by confocal microscopy as 60% of the enzymatic complex responsible for superoxide production is on this granule's membrane. We concluded that the inability to generate oxidants and to recruit specific granules to bacteria-containing phagosomes relies on the capacity of viable F. alocis to modulate neutrophil functional responses.

39. Nora Eskridge

Eastern Kentucky University
Mentor: Jon Endonino

An Analysis of Alcohol Bottle Glass at White Hall

This research involved the analysis of alcoholic beverage bottle glass at White Hall State Historic Site in Madison County. This study is intended to offer insights into patterns that can be observed archaeologically related to alcohol consumption by the residents of White Hall from the late 18th century through the early 20th centuries. Data used in this study are the result of three years of work by EKU's Archaeological Field School. Specimens included in this analysis were chosen based on temporally specific bottle manufacturing techniques and bottle characteristics typical of alcoholic beverage containers. Distribution maps were produced in order to illustrate the spatial patterns of the data, revealing concentrations of alcohol beverage bottle glass. Based on the date ranges, types, and locations of the alcohol beverage bottle glass on the property, this study sheds light on alcohol consumption patterns of the historic era at White Hall.

40. Morgan Ernst & Lauren Hamm

Murray State University
Mentors: Shea Porr & Michelle Santiago

The Correlation of Rider Weight on Equine Stress

Stress has many causes and is known to have negative health consequences in animals and humans. One area of concern is the impact of rider weight on equine health. The average weight of Americans is rising, and concern for equine welfare is growing. The objective of this study was to evaluate the effect of rider weight on equine stress by measuring vital signs, salivary cortisol, and behavioral cues. Eight horses were weighed, and values for 15, 20, 25, and 30% of their body weight were calculated. Experienced riders and tack were also weighed, and additional weight added in saddlebags to reach treatment weight. On four different days, horses performed a riding test under each of the four treatments. Heart rate was collected during the ride using a wireless monitor. Behavior was also evaluated throughout the ride. Saliva samples for salivary cortisol testing, respiration rate and rectal temperature were collected before and after exercise. It was hypothesized that horses will show more signs of stress at higher treatment weights, including increased heart rate and salivary cortisol concentrations as well as behavioral changes. It was also expected that heart rate and respiration rate will take longer to recover after horses have carried higher treatment weights. Results from this project may assist riding programs in evaluating equine stress and may result in changes to programs, including putting weight limits on riders or limiting the frequency and length of time horses may have to carry heavier loads.

41. Lauren Hamm & Morgan Ernst

Murray State University
Mentors: Shea Porr & Michelle Santiago

Effects of Ivermectin and Moxidectin on Equine Parasites in Horses in Western Kentucky

Internal parasites are a common health concern in the equine species. Parasitism can have a negative effect horses' health, including weight loss, intestinal ulcers, a higher incidence of colic (abdominal pain), and even death. Unfortunately, overuse of dewormers has resulted in parasite resistance to some commonly used drugs in various areas of the United States. Because of this, some dewormers may not have the desired effect on parasites. The objective of this project was to evaluate the efficacy of ivermectin (IVE) and moxidectin (MOX), two common dewormers, on horses owned by Murray State University in order to test the resistance of parasites found in western Kentucky. Fecal samples from 41 horses were collected and evaluated for the presence of parasite eggs. Horses were classified as low, medium, or high shedders based on the number of eggs present. Horses were then blocked by classification and assigned to one of two treatment groups (IVE or MOX), or to a control group (untreated). Two weeks after treatment, fecal samples were again collected and evaluated for the presence of parasite eggs. The efficacy of the two dewormers was evaluated based on egg reappearance rates. Based on a review of the literature, it was hypothesized that MOX, which was released in 1997, would be more effective at controlling parasites than IVE, which was released in the early 1980's. Testing these dewormers is important because many horses are on a deworming schedule that utilizes both MOX and IVE. If either of them is ineffective at controlling parasites, it would be inappropriate to pay for or utilize dewormers that do not have the desired effect on improving equine health.

42. Jessica Farrell & Andrew Kuchenbrod

Morehead State University
Mentors: John Hennen & Joy Gritton

Strengthening Appalachia: How Active Communities Can Save Our Region

STUDY 1 (Farrell): ***A Historical Analysis of Worker Cooperative Networks and Their Implementation in Appalachia***

The Appalachian area of the United States, which includes sections of eastern Kentucky, West Virginia, and southern Ohio, is a culture-rich area, but several pervading issues continue to dub the Ashland, KY-Huntington, WV, area as one of the worst places to live in the United States (2013 Gallup-Healthways Well-Being Index). The survey discovered high levels of unemployment, poverty, unaffordable health care, and discontent among Appalachian citizens, with water pollution and coal mining accidents furthering concerns to the area. As a citizen of the Appalachian region, these issues inspired me to find solutions from elsewhere in the nation that struggled with similar issues in hopes to reproduce the solutions in the Appalachian area. Efficient, environmentally conscious, and applicable solutions were discovered through an examination of leading systems established in Boston, Massachusetts, Austin, Texas, and Cleveland, Ohio. Using the worker cooperative model introduced by leading political economist, Gar Alperovitz, a plan to improve the Appalachian area and its economy was devised through this research through the creation of worker-owned businesses, where workers have a politico-economic stake in the success of their company. In addition to creating a more democratic system, worker cooperatives in the Appalachian area would conduct themselves in a manner that is more respectful of the environment, more willing to create and follow safety regulations to prevent coal mining accidents and workplace injuries, and more effective in producing stable, well-paying, community-oriented jobs. All of these alterations are desperately needed in Appalachia, and through education, legislation, and activism, change will happen.

STUDY 2 (Kuchenbrod): ***Kids and Community History: Fostering Appalachian Pride in the Next Generation***

This presentation will examine the education of young children in the history of their own community, the presentation of that history at an elementary-school level, and how this may positively impact the attitudes of children concerning their hometown. It is common in small, struggling Appalachian communities, for low esteem and pride in the present to be balanced by fond memories of "the good ol' days." Whether in the form of storytelling, music, or simply conversation over a cup of coffee, this activity of recollection is often engaged in primarily by the older residents, who by their very nature have more memories to recall. Appalachian communities have, in general, a more vibrant history than their youth may be aware of. With only the present day to shape their opinions, many children lack the same opportunities to balance the present with the past. It is, therefore, the intent of this presentation to investigate how educating children in local history may be a workable solution with positive benefits both for the children and their community at large. These benefits may include an increase in the emotional attachment of youth to their community, an increase in pride in one's hometown and oneself, as well as possible growth in understanding of how the town – and Appalachia in general – came to be in the difficult situation of today. Existing literature on the importance of local history in education, as well as first-hand research at an after-school program in Eastern Kentucky, will support these conclusions.

43. Jonathan Ferris

Murray State University
Mentor: David Eaton

The Role of Host Cities and Regions in the Economic Success of Professional Sports Franchises

In each of the four major professional American sports leagues (NFL, MLB, NBA, NHL), franchise success/failure has been a daily dialogue. Franchises with large, loyal fan bases have often shown strong financial metrics regardless of the team's on-field performance (the Dallas Cowboys and New York Yankees of the world). Yet other teams historically struggle year-in and year-out to fill seats and have often faced ownership changes and threats of relocation. While a large base of literature looking at the impact of professional sports franchises on their host regions has been published, very little research looks at the ability of regions to support their franchises. On-field performance undoubtedly impacts a franchise's success, but what role has the host city/region played? What characteristics of a host region have traditionally led to an environment conducive to economic success for a pro-sports franchise? In examining these questions, I compared factors including overall population, mean income, population age distribution, the proximity of other professional and collegiate athletic teams and the overall demographic makeup of the region. I specifically focused on the idea of sports teams as complements and/or substitutes. The primary example I used is Louisville, KY. With no professional sports team in the state, and an NBA-ready venue recently opened in downtown Louisville, many have labeled the city an attractive destination for an expansion or relocating NBA franchise. Why the holdup? The University of Kentucky and University of Louisville have consistently boasted two of the most loyal and fervent basketball fan bases in the country. I looked into the question of how these affect potential professional sports teams. I hypothesized that the presence of these major college basketball programs inhibit the economic ability of Louisville to support a professional basketball franchise, as they act as substitutes to a potential franchise. In examining these characteristics on a large scale, I worked to determine the overall ability (or lack thereof) of regions to economically support current and/or potential franchises.

44. Clare Field & Elizabeth Foote

Northern Kentucky University
Mentor: David Raska

You're Kona Love It: How to Make an Internship Attractive to Millennial College Students

This marketing research project is focused on attracting millennial college students to the Kona Ice internship by appealing to their values such as healthy lifestyle, the community, the environment, and children's wellbeing. Kona Ice, a national shaved ice franchise company, had three marketing challenges: (1) Identify the ideal internship candidates; (2) determine how to make their brand more millennial friendly without compromising its appeal to children; and (3) determine how to increase awareness of their internship. These challenges were addressed using secondary data research, observations, experience surveys, and online sample survey of over 800 millennial college students. The results provided Kona Ice with data-driven marketing recommendations how to address all three challenges and are reflected in their recent updates of their internship presentation, product and company presentation on its corporate website, and its new social media campaign #CelebrateLife #KonaIce (http://kona-ice.com/instagram/), designed to reach Millennials, especially Millennial parents. Don't believe it? Explore Kona Ice corporate website and their social media!

45. Monique Frisby

Kentucky State University
Mentor: Avinash Tope

Evaluations of Practices from Kentucky Farmers: Assessing Microbial Quality of Produce and Antibiotic Resistance

In recent years the number of bacterial food-borne outbreaks associated with contaminated produce has increased substantially. *Escherichia coli* continued to contribute to the majority of foodborne illnesses. In addition to the conventional practices, and with more small farmers starting organic production, given a wide range of organic production practices, there is a vulnerable segment which demands continuous microbial safety assessments. In the current study, twenty small produce farms from fourteen counties in Kentucky participated in a survey outlining farmers' procedures during their routine operations. These farms were visited thrice, during the pre-growing, harvest, and post-harvesting seasons. A total of 59 produce samples were collected from 2 certified organic, 14 non-certified organic and 4 conventional farms, respectively. E. coli was isolated from 25% of all produce samples. Most of the contamination was correlated with fields that were fertilized with manure in the past 90 days or less. Only 2 farmers used conventional fertilizer exclusively, but had a significantly lower contamination of *E. coli* than farmers that eliminated the use of fertilizer and farmers that used non-conventional fertilizer techniques. All produce samples that were contaminated with *E. coli* were tested for antibiotic susceptibility and resistance using fourteen different antibiotics, and comparisons were made to determine correlations between manure types and antibiotic resistance levels of *E. coli* detected in produce.

46. Joshua Fugate & Janie Knell

Morehead State University
Mentor: Wilson J. González-Espada

Item Response Theory: Implications for the Assessment of Pre-Service Teachers' Scientific Knowledge

STUDY 1 (Fugate): ***How Much Science Pre-Service Teachers Retained After Completing a Science Methods Course? An Approach from Item Response Theory***

Educational assessment is a process for obtaining information that is used for making decisions about the extent to which students gained knowledge, skills, and attitudes after the implementation of an instructional experience. Unlike the process of measuring overt variables in science, measuring covert attributes, like learning, requires an indirect approach. A discipline called Item Response Theory (IRT) has emerged to improve tests as a cognitive measurement tool. Specifically, it can be used to improve the quality of locally-made assessments used to evaluate pre-service science educators enrolled in college courses. This study applied IRT strategies to measure test and item parameters for a diagnostic pre- and post-test that is completed by pre-service educators enrolled in SCI 490, Science Methods for Elementary Teachers, between 2008 and 2013. This test measured content knowledge acquired in three pre-requisite courses, BIO 110 (Inquiry Biology for Elementary Teachers), SCI 111 (Inquiry Physical Science for Elementary Teachers), and ESS 112 (Inquiry Earth and Space Sciences for Elementary Teachers). Using SPSS, test reliability, test scores, test averages and standard deviations, item difficulty, item discrimination, item discrimination index, item means and standard deviations, item characteristic curves, and item distractor analysis were calculated and analyzed. The findings of the study informed the identification of life, physical, earth, and space science topics that pre-service teachers learned the best and those topics that need remediation prior to graduation. In addition, test items that do not meet the minimum quality requirements were modified or removed, increasing the overall validity and reliability of the SCI 490 diagnostic assessment. The availability of powerful statistical software packages allows college faculty to use IRT strategies, normally seen only in the preparation of large-scale standardized tests, to create more valid and reliable diagnostic assessments, like the one used in SCI 490.

STUDY 2 (Knell): ***Using Item Response Theory to Analyze a Physical Science Content***

In the last few decades, results from the Program for International Student Assessment (PISA) suggest that, in the United States, school student performance in science and mathematics has moved from world-class to middle-of-the-pack. Teacher academic preparation and quality has been pointed out as one factor that must be improved for PISA scores to recover. With the implementation of recent education reforms, there has been a push to improve the assessment of educators using statistically sound, valid, and reliable standardized tests. The same set of theories that inform the construction and evaluation of large-scale standardized assessments, particularly Item Response Theory (IRT), can be now applied to locally-made tests, particularly diagnostic ones. This study applied IRT strategies to measure test and item parameters for a diagnostic pre- and post-test that assessed the content knowledge of pre-service teachers enrolled in SCI 111, Inquiry Physical Science for Elementary Teachers, from 1998 to 2012. Using SPSS, test reliability, test scores, test averages and standard deviations, item difficulty, item discrimination, item discrimination index, item means and standard deviations, item characteristic curves, and item distractor analysis, were calculated and analyzed. The findings of the study informed the identification of physical science topics that pre-service teachers learned the best and those topics that need additional instructional time. In addition, test items that do not meet the minimum quality requirements were modified or removed, increasing the overall validity and reliability of the SCI 111 diagnostic assessment. Teacher education programs across the state are working toward improving the quality of their graduates. Using IRT, the statistical analysis of diagnostic assessments used in pre-service teacher content courses is a step in the right direction.

47. Andres Gasper

Northern Kentucky University
Mentor: K.C. Russell

Novel Annulenes with Materials Applications

The Russell Research Group has merged the group's previous work on cyclic, conjugated compounds called annulenes with two collaborators whose work combines the theoretical aspects of these compounds with more practical applications. Hybrids of annulenes with cup-like oxacalixarenes allows for the study of specific aromatic and antiaromatic interactions at the molecular level. Annulenes are also of interest for their ability to be incorporated into covalent organic frameworks (COFs), which are recognized for their potential use in gas storage, energy and charge transport. This poster will communicate the synthesis of three new annulenes that have been prepared for inclusion into oxacalixarenes and COFs.

48. Lauren Ghouse

Northern Kentucky University
Mentor: Kajsa Larson

A Cultural Education Experience: Why Foreign Language Education in High Schools Is Beneficial

The purpose of this project is to understand why and how foreign language education in high schools is important. We felt it was beneficial to gain insight into why other students chose to study a foreign language. Through surveys, and a questionnaire, NKU foreign language majors and minors were asked questions such as how they thought studying another language would affect their future, if their education in high school had much of an influence on their decision, and if taking a foreign language had helped them prepare for college. The results of the study were in favor of the original hypothesis of "Foreign language education in high schools is beneficial to the furthering of one's education and future plans". The inspiration came from personal experiences with foreign languages in high school, and how it inspired the researcher to continue their education in college. The results of this study reinforce the importance of bilingualism and how it can be advantageous in today's job market. Having foreign language education in high schools can be a good preparation for college and the world beyond.

49. Halle Graham, Hannah March & Vivian Nguyen

Eastern Kentucky University
Mentor: Minh Nguyen

Climbing to Freedom: A Look at Modern-Day Abolitionists Efforts in America

The goal of this presentation is four-fold: first, to define and categorize human trafficking; second, to provide statistics about human trafficking in the United States and abroad; third, to identify current efforts being made to combat human trafficking; and fourth, to challenge students to join the abolitionist efforts in eradicating this evil. Our emphasis was on the fourth point. We focused on the specific action and awareness efforts of the Eastern Kentucky University student organization SHINE (Stop Human Injustice eNslavement and Exploitation) and the EKU-affiliated Model Laboratory School UNICEF Club.

50. Candice Graves

Eastern Kentucky University
Mentor: Jason Marion

Evaluating a Water Purification System in Haiti

Clean water access is essential for public health. In underdeveloped countries where clean water access is lacking, many non-profit organizations strive to find ways to purify water at the household and community levels. This past summer a chlorination system located in a small village in Haiti, was tested for the first time since installation over a year ago. Using ColiPlates (Bluewater Biosciences, Mississauga, Ontario), we quantified the density of total coliforms and Escherichia coli in 83 water samples collected from the distribution system and adjacent surface water. Of these samples, 37 were from a single tap, 11 from surface water, and the remainder were from other locations within the system. The single tap tested was one of the most used taps in the compound, and had easy access for collection. Nearly all samples (81%) exceeded U.S. drinking water criteria of zero most probable number (MPN)/100 mL. When comparing drinking water samples to U.S. recreational water, the EPA recommends E. coli should not exceed 235 MPN/100, and 23 of 83 samples (28%) for drinking water were above single-day recreational water advisory conditions for U.S. waters. From the tap samples, 7 of 37 (19%) were above the recreational recommendations for the United States. With the information collected, recommendations were made to improve the system. Regular maintenance coupled with the addition of UV treatment are expected to eliminate or reduce the fecal contamination problem facing the village as evidenced in the observed E. coli levels.

51. Rebecca Graves

Kentucky State University
Mentors: Jeremiah Lowe, Kirk Pomper & Sheri Crabtree

Acetogenin Activity Levels in the Ripe Fruit of Seven Pawpaw [*Asimina triloba *(L.) Dunal] Varieties as Determined by the Brine Shrimp Test

Pawpaw [*Asimina triloba* (L.) Dunal] is a native tree fruit in eastern North America. Annonaceous acetogenins are molecules that contain long chain fatty acids and are present in pawpaw fruit and vegetative tissues. These compounds display pesticidal activity, possibly representing a new botanical pesticide for agronomic pest control. Kentucky State University is the site of the USDA Repository for Asimina species, and germplasm evaluation and collection are program priorities. Fruit is a major biomass source for acetogenin extraction, and identification of selections with high and low levels of fruit annonaceous acetogenin activity would allow for breeding programs to focus on breeding for a desired level of acetogenin activity in pawpaw trees. The objectives of this study were to compare annonaceous acetogenin activity in ripe fruit tissues and identify high activity genotypes. Five pawpaw fruits were collected from individual trees of each pawpaw variety and advanced selection (Sunflower, Hi 7-5, Hi 1-4, Hi 1-14, Haz 1, Haz 1.9, and Haz 2) with known and unknown fruit acetogenin activity. Ten g of fruit pulp were extracted with 70% ethanol and the brine shrimp test was employed to assess acetogenin activity in pulp extracts. Each concentrated extract was transferred to vials at 5, 10, 20, and 50 ppm concentrations of pulp with three replicate vials per concentration. Fruit pulp LC_{50s} were compared to evaluate fruit acetogenin activity.

52. Matthew Green

Murray State University
Mentor: Eric Frederick

Obturator Externa Injury: An Uncommon Occurrence

There are thousands of athletic injuries every year in sports ranging from sprained ankles, concussions, muscle strains, and joint dislocations. One of the least common injuries seen is an obturator extera tear. The obturator externa is one of the six external rotators of the hip. The muscle originates at the rim of the pubis and ischium and attaches at the trochanteric fossa on the greater trochanter of the femur. The muscle is responsible for assisting the femur with external rotation and adduction. The purpose of this study was to realize the uncommon phenomenon of this kind of injury and understand how this uncommon injury could happen to young, healthy athletes. Most research shows this kind of injury happens in elderly women who have had hip replacement surgery or with total hip dislocations in athletes and in the elderly population, but none of which in a young, healthy athlete that only tears this one muscle. Results showed that the mechanism of injury was inconclusive and that further research needs to be done for an accurate understanding to why this injury occurred. Rehabilitation for this injury is also a trial and error due to the fact that there is very little to no research showing any rehabilitation techniques of a torn obturator externus. Hopefully with further testing and research, this injury will be better understood so uncommon injuries such as this one can be prevented and treated appropriately as necessary.

53. Layne Grissom

Murray State University
Mentor: Jana Hackathorn

The Hegemonic Masculinity Scale

A hegemonic male is in popular culture referred to as a "metrosexual" male. The research created a scale to measure hegemonic masculinity which has not yet been published before. The scale created seeks to identify metrosexual/hegemonic behaviors in males to be used as a tool to further other research regarding Gender Theory, male role norms, and other society based research. Analyses showed an adequate reliability (Cronbachs alpha = .78) as well as validity through correlations with associated scales such as the MRNI-R (Male Role Norm Inventory-Revised) subscales of Avoidance of Femininity and Fear and Hatred of Homosexuals, and fashion scales. This research also hopes to increase scholarly understanding of societal changes as the social norms that used to differentiate males and females adapts to a more equality based culture.

54. Benjamin Guthrie

Western Kentucky University
Mentors: Phillip C. Womble & Keith Andrew

Monte Carlo Simulation of a Micro-Nuclear Battery

Betavoltaics are beta decay-powered batteries that could potentially last for decades, but direct radiation damages the semiconductors of a battery long before its potential lifetime is over. Photon Assisted Radioisotopic Energy Source (PARES) batteries use a phosphorescent scintillator to convert radiation to photons which then impinge on a photovoltaic, which, in essence, shields the photovoltaic from the ionizing radiation. As part of an on-going research project, we plan to perform a survey of optimal fuel/scintillator/photovoltaic combinations. A Monte Carlo simulation code was developed to simulate the radioactive decay of the fuel, its subsequent interaction with the scintillator, the emission and absorption of photons from scintillation and the resulting potential differences in the photovoltaic. Two radioisotopes, Ni-63 and Sm-151, were selected as potential fuels and subsequently modeled. The calculations indicated that Ni-63 would deposit 1.23 +/- 0.2 times as much energy in the scintillator as Sm-151 did. The simulation was then benchmarked against the Monte Carlo N-Particle (MCNP) transport code. Our initial results indicated that our code can serve as a reliable platform for simulating the photovoltaic cells of the PARES battery in future research.

55. Thomas Haines & Meredith Barone

Northern Kentucky University
Mentors: Chari Ramkumar & Wayne Bresser

Enhancing the Structural Integrity of Ferrite Magnets for Magneto-Elastic Pressure Applications by Improving Various Sample Preparation Methods

The goal of this research was to investigate ways to increase the structural integrity of ferrite compounds for magneto-elastic pressure applications. We successfully synthesized ferrite composite materials of $Mn_xFe_{3-x}O_4$ using thermal decomposition of metal oxides. These ferrite materials have been observed to change their inductance due to external pressure. This property can be exploited for potential pressure sensor application. We have tested various sample preparation methods to increase structural integrity of these materials. The SEM results show that the frequent grinding of the sample powder reduced the porosity. Additionally double calcination also reduced the porosity, thus allowing the crystals to compact better. We will compare our results to previously obtained results and discuss the improvements.

56. Derek Hamilton

Bluegrass Community and Technical College System
Mentor: Norman Strobel

Effect of Culture Medium Composition on Agar Degradation by Microbes from a Cyanobacterial Mat

Agar extracted from macrophytic marine algae is added as a gelling agent to media used for cultivation of fungi and bacteria. Degradation of agar is more commonly reported for marine as compared with terrestrial bacteria. Five cultures that degraded agar were isolated from a cyanobacterial soil mat rich in *Oscillatoria*, and maintained on an agar-mineral salts medium (B) with NH_4NO_3 as N source. Four cultures appeared to contain only bacteria, while a fifth also appeared to contain a yeast. Cultures were inoculated to nine different media and observed after a 5-day incubation period. Agar degradation on B was seen as a shiny wet appearance with clearing of the moderate haze normally present in the agar, followed by pit formation. Addition of 2% glucose to B enhanced microbial growth but largely prevented agar degradation. Omission of N yielded reduced growth and moderate degradation apparently due to nutrient and/or enzyme carryover in the inoculum. Organic N (tryptone plus peptone 1% each; TP) supported lush growth and agar degradation. Although microbes grew on Potato Dextrose Agar (PDA) alone or with NH_4NO_3 or TP, little or no agar degradation was observed. Tryptic Soy Agar alone or with NH_4NO_3 supported abundant growth but little or no agar degradation. Results suggest that these agar-degrading cultures can utilize both inorganic and organic nitrogen and that agar degradation is inhibited by glucose. Results of additional tests (Gram-staining reaction; utilization of other sugars and their effects on agar degradation; utilization of other polysaccharides) are reported.

57. Kathline Hartch

Eastern Kentucky University
Mentor: Frank O'Connor

The Dodd-Frank Act: Policy Analysis

During 2007-2009 the United States experienced a financial crisis that plunged the country into a deep recession where 8.8 million jobs were lost and $19.2 trillion in household wealth disappeared. Studies estimate the losses of the financial crisis based on lost output are as high as $14 trillion, a whole year's worth of gross domestic product. In the wake of this crisis it became apparent that the framework of the financial regulatory system needed significant restructuring. The government responded with the "The Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010" in order to restore market and consumer confidence. The purpose of this paper is to provide an analysis and explanation of the sweeping regulatory reform legislation known as the Dodd-Frank Act in order to determine whether the act can accomplish its goals to deliver financial stability to the overall economy. Examining past market and government failures that contributed to the financial crisis, and those that remain as a hindrance to future economic stability suggests that the act may well fail—mainly due to its slow and arduous implementation process. As of October 1, 2014 only 220 (55.3%) of the 398 required rule-making has been finalized. Delays in the implementation of the act continue to expose the economy to the very dangers the Dodd-Frank Act is supposed to prevent.

58. Bradley Hartman

Murray State University
Mentor: Howard Whiteman

Effects of Predator Size Variation on Future Generations of Predators

Size variation is an ubiquitous, fundamental aspect of most populations that has broad implications for the ecology and evolution of numerous species. Recently, research on size variation of top predators has promoted an integrated understanding of population, community, and ecosystem-level processes. Although many studies of size-structured interactions focus on shifts in diet as predators grow via theoretical modeling approaches, there is a need for empirical work, particularly in understanding how size structure, predator density, and cannibalism interact, the community dynamics that result from interactions between predator size classes, and the mechanisms that create variation in size structure. Size-structured salamander populations provide a model system for such empirical studies. During the summer of 2014, I collected photographs of multiple size classes of Mole Salamanders (*Ambystoma talpoideum*) across 32 ponds in Land Between the Lakes Recreational Area in Western Kentucky that can be used to evaluate body size and developmental status, as well as general data on each pond and its surrounding environment. I propose to process the photographs and analyze the resulting data to evaluate how size-structure of predatory paedomorphic and larval predators affects future generations of A. talpoideum. Multi-variate analysis will be conducted of all field data collected from each pond, and will use that analysis to determine the degree to which size structure of Mole Salamander predators affects the growth and development of new larval cohorts when compared to the effects of other biotic and abiotic variables, and for interactions between size structure and such variables.

59. Heather Hertzenberg & Sarah Maloney

Northern Kentucky University
Mentor: Cecile Marczinski

Facebook and Alcohol Consumption in College Students

Facebook is a popular social networking website that a large majority of college students use. Psychologists have become interested in understanding the nature of these online profiles. A recent study revealed that numerous references to alcohol intake on Facebook profiles may be indicative of an alcohol abuse problem. However, this initial study was conducted online and did not provide much detail about the nature of the alcohol use. Given that college students are prone to binge drinking, further investigation into the utility of using Facebook to identify drinking problems is warranted. Therefore, the purpose of this laboratory-based study was to examine the Facebook profiles as a means to identify college student problem drinking. Undergraduate students (n = 73 of approximately equal gender) were recruited for this study. While in the lab, participants logged into personal Facebook accounts and privately answered questions about their activity on Facebook. These included questions about wall and photo postings regarding alcohol use and drunkenness. Then, participants were given the Alcohol Use Disorders Identification Test (AUDIT) and the Personal Drinking Habits Questionnaire, which are measures that assess drinking problems. A linear regression was used to determine if the Facebook data would predict drinking problems. The results indicated that both Facebook postings pertaining to alcohol use and gender predicted AUDIT scores. Individuals who reported posting more photos and wall comments related to alcohol use or drunkenness scored higher on the AUDIT. Males also had higher AUDIT scores. Thus, examining Facebook profiles has the potential to identify young adults who may be at risk for developing drinking problems. Given that brief interventions are available to college students for moderate drinking, the ease of identifying which students might benefit from these interventions may be as simple as asking them about their Facebook pages.

60. Kinita Hill

Kentucky State University
Mentors: Hideka Kobayashi, Sheri Crabtree & Kirk. W. Pomper

Establishing Sustainable Demonstration Gardens and Cataloguing Plant Species at Kentucky State University

The College of Agriculture, Food Science, and Sustainable Systems of the Kentucky State University (KSU) has undertaken a responsibility of establishing demonstration gardens on its main campus. The first step was a site selection. Three sites were selected for accessibility and aesthetic reasons. The second step was plant selection, and plants that would sustain with a minimal labor and resource input were selected. Seeds and plants have been purchased and they are in cultivation at campus site, in the field and the greenhouse at the KSU Research and Demonstration Farm. Our special focus was on daylily cultivars (*Hemerocallis* hybrids). Daylilies can tolerate a wide range of growing conditions, but still perform well. Our collection consisted of approximately 70 cultivars bred by two of the premiere daylily breeders in the nation. Spring blooming bulbs were planted and those include *Anemone blanda*, *Crocus chrysanthus*, *Hyacinthoides hispanica*, and *Narcissus jonquilla*. In addition, seeds of Kentucky native species have been started, and performance of seedlings at campus site were evaluated. A database has been developed as a part of a class project with additional information to catalogue species present on KSU campus. Approximately 40 tree species have been identified, including sweetbay magnolia (*Magnolia virginiana*), Chinese chestnut (*Castanea mollissima*), Japanese zelkova (*Zelkova serrata*), and willow oak (*Quercus phellos*), to name a few. Creation of demonstration gardens provided valuable hands-on experience and opportunities for our students, Master Gardeners and residents of neighboring communities.

61. Jennifer Holt

Northern Kentucky University
Mentor: Ryan Salzman

Neoliberalism in Mexico

The twentieth century saw Latin American countries undergoing political and economic transitions. One of the most notable paradigm shifts involved the adoption of structural adjustment policies in the wake of the region-wide debt crisis. Mexico's implementation of neoliberal policies has allowed for integration into a global market-oriented economy, with increased foreign investment and technology. However, Mexico has also endured many social and political consequences as a result of neoliberalism: a lack of sustainable development and an uneven distribution of growth benefits that has widened the gap between the rich and poor. This poster seeks to illuminate the process and outcomes of neoliberalization. Mexico is important to study for academics and policymakers because the country experiences a unique geographical location, as well as having a close economic relationship with the United States, through the adoption of the North American Free Trade Agreement (NAFTA).

62. Deborah R. Hoskins

Kentucky State University
Mentors: Kirk W. Pomper, Sheri B. Crabtree, John D. Sedlacek, Jeremiah D. Lowe & Karen L. Friley

Optimizing a Trapping System to Monitor Spotted Wing Drosophila in Organic Primocane Fruiting Blackberries

Spotted wing drosophila (SWD), *Drosophila suzukii*, is a new pest to small fruit and tree fruit crops in Kentucky. This fruit fly is native to Asia and can be very destructive to soft-skinned fruits including blueberries, blackberries and raspberries. Later-ripening small fruit crops such as primocane fruiting blackberries are at the highest risk. This pest is a serious challenge for organic growers. Unlike other fruit flies, SWD lay eggs inside fresh fruit, often before harvest. Aside from superficial scars left by the female's ovipositor, most damage is done by maggots feeding inside the fruit. The objective of this study was to determine the attractiveness of three different lure baits for monitoring SWD presence and numbers. Traps were placed in an existing primocane fruiting blackberry variety trial consisting of the cultivars Prime Jan® and Prime-Ark® 45 at the Kentucky State University Research and Demonstration Farm in Frankfort, KY. Traps made from red drink cups were baited with a 150 ml per cup solution of either yeast, sugar and water (control), 1 part pawpaw extract: 4 parts yeast, sugar and water, or 1 part blackberry extract: 4 parts yeast, sugar and water, with four replicates of each bait. Traps were collected after three days, brought back to the lab and transferred to containers with 70% ETOH. SWD males, females, and other *Drosophila sp.* were identified and enumerated. Numbers of SWD and other *Drosophila sp*. captured by the different trap baits were compared.

63. Samantha Howard & Jerrica Ashley

Morehead State University
Mentor: Kim Nettleton

Does Positive Reinforcement Support Behavior Change in the Classroom?

Students sometimes arrive at school with behaviors that need to be changed. After identifying students in four elementary classrooms, an action research case study focused on targeted behavior intervention was initiated. Using positive reinforcement and fixed interval monitoring, the effect of the intervention was recorded. The data gathered during the action research project provides insight into the effect of a positive reinforcement program on student classroom behaviors.

64. Richard Hulefeld

Kentucky State University

Mentors: Kenneth Thompson & James Tidwell

Evaluation of Brewers' Grains at Different Percentages in Combination with Soybean Meal as Partial Replacement of Fish Meal in Diets for Juvenile Nile Tilapia (*Oreochromis niloticus*)

Diet costs constitute the largest variable expense incurred during intensive aquaculture production (up to 80% of the operating expenses). Hence, it is essential to evaluate low-cost, nutritionally efficacious diets for further industry expansion and increased profitability for producers. A major trend nationwide has been an increase in the local production of beer. There are now over 2,800 microbreweries in the U.S. After fermentation a significant volume of the by-product Brewers Grains (BG) is generated. If the brewery were in close proximity to fish production, onsite production of fish feeds would not only save transportation costs, but also a significant amount of energy by using the wet grains rather than drying. Such an opportunity exist in Lexington, KY with Food Chain (Aquaponics) being directly adjacent to West Sixth Brewery. To evaluate suitable levels of BG inclusion, an experiment was conducted with diets containing increasing levels (0%, 24%, 41%, or 66%) of BG. A fifth diet also contained 66% BG plus 1% added lysine to test if that amino acid was limiting. The feeding trial was conducted in 15 (110-L) glass aquaria. Fifteen (15) juvenile tilapia (average weight of 28 g) were randomly stocked into each aquarium with three replicate tanks per treatment (i.e., 5 diets, 3 replicate tanks/diet; 15 tanks total). All diets were formulated to be isonitrogenous (30% protein; as fed basis) and isoenergetic (available energy [AE] = 4.0 kcal/g of diet). After 58 days of feeding, no significant differences ($P > 0.05$) were found among dietary treatments in terms of average final weight (g), feed conversion ratio (FCR), or percentage survival, with overall means of 89 g, 1.8, and 90%, respectively. In summary, it appears that wet BG might be a suitable ingredient for onsite production of diets for Nile tilapia.

65. Sarah Hume & Christine Kuschel

Northern Kentucky University
Mentor: M. Mark Wasicsko

Can Authentic, Anonymous Feedback on Eight Personality Factors Provide Useful Information Regarding "Fit" for Undergraduates Exploring Careers in the Helping Professions?

This study investigated the differences between self-perceptions of undergraduate students exploring careers in teaching and the perception of others (critical friends) as means to assist them in determining career "fit." An individual's dispositions influence how effective that individual is in a helping profession. Individuals who wish to change their dispositions to become more effective have to first be able to have insight into their strengths and challenges. This is very difficult to accomplish through self-reflection alone. One needs to know how people in his or her life perceive her or him and come to grips with what might cause any differences. We created a website (www.howoldisyoursoul.org) to provide a neutral space in which people can provide private, anonymous and authentic feedback regarding their perception of the participant. A web-based survey was created to collect self and critical friends' perceptions on eight dispositional characteristics associated with effective helping professionals—dependable, good friend, sense of humor, considerate, hardworking, role model, caring, and patient. Participants filled out the survey. Critical friends then anonymously answered the same questions about the participant. When 10 or more critical friends filled out the survey, a graph was generated that compared the participant's answers to those of the aggregate of critical friends' for each of the personal attributes. A short time after receiving the results, participants were asked to fill out a survey on which they indicated if it was helpful in making a decision regarding a career in teaching and what they learned from the experience. These data were analyzed to determine the effectiveness of the approach to providing feedback.

66. Anne Jablinski, Vaughn Reed, William Lenoir & Marisa Bedron

Murray State University

Mentors: Tony Brannon & Ted Thiede

Bioenergy Crop Production and Combustion in Agriculture

Biomass, vegetative waste from energy crops such as switch grass and sorghum, is a key input for transforming the face of energy and agriculture for the future of Kentucky, the nation, and the world. The purpose of this experiment at Murray State University using the Bio-Burner 100 unit—BB-100— from L.E.I products in Madisonville, KY, was to evaluate the efficiency of a combustion-based energy converter and boiler using various biomass materials, and as a preliminary trial for burns utilizing burner units attached to a drier with higher heating capacity. Loose forms of switch grass, energy sorghum, miscanthus, corn stalks, and wood shavings were burned over five-hour periods in outdoor temperatures below 67°F. Factors including burn and ash weight, ash clinkers, fan and fuel speed, moisture levels and absorbency of material, BTU measurements, water flow, propane usage per burn, and some emissions data were recorded to assist in determining the success of each burn trial and overall energy balance of the system. Upon analysis of the data, the biomass with the most productive burn proved to be the wood shavings. The least productive burn proved to be the cellulosic biomass, which included miscanthus, switch grass, corn stalks, and sorghum. Grasses burn with more difficulty in comparison to woody materials due to their high hydrocarbon content, heavy ash production, and need for a high volume of dry matter. The application of this experiment with biomass used as energy is vital for improving sustainability in equine and farm-level operations.

67. Demi Jacques & Hannah Mabry

Morehead State University
Mentors: Bernadette Barton & Elizabeth Perkins

Implications and Student Perceptions of Contemporary Pornography

STUDY 1 (Jacques): ***Contemporary Pornography in America***

Pornography is a rapidly evolving sector of the sex industry. As technology changes and pornography becomes more accessible, new levels are pursued by its creators to draw in audiences who seek to push the limit to more extreme content. Pornography affects more than just its traditional consumers, however. The media has become increasingly filled with sexualized content, much of which can easily be considered soft-core pornography. A look into mainstream pornography itself shows common themes which are not only degrading and violent—typically towards women—but also promoting unsafe health standards by which to express sexuality both physically and mentally. As trends in mainstream pornography move to commercials, movies, television and more, these unsafe and unhealthy sexual behaviors are normalized and woven in to everyday life. Implications of such normalization of unhealthy behavior are vast for both men and women; however the topic of pornography is stigmatized by a complex cultural veil and is rarely openly discussed. The discussion must begin for these issues to be addressed.

STUDY 2 (Mabry): ***Young People's Attitudes on Contemporary Pornography***

With the increased use of free internet pornography, a majority of today's youth are able to access pornographic content that would have been difficult to find just a couple of decades ago. The rise of raunch culture has also increased the likelihood for young people to stumble upon pornographic material at an earlier age, estimated to be an average of 10 to 12 years old. Other unique differences to be explored with this generation include the increasingly common experiences with "sexting", exchanging mature adult content through social media, and soft-core pornography that can be viewed on daytime television programs or in other forms of mainstream media. The content of pornography is often critiqued for its violence, sexism, and racism which may arguably desensitize its viewers. Since most young people are not exposed to sex education programs besides those of abstinence only curriculum, it is reasonable to assume that pornography is a major source of their knowledge about sex. We present some insight into what young people are experiencing with today's mainstreaming of pornography and explore their attitudes toward its content.

68. Erica James

University of Louisville
Mentor: Mahendra Sunkara

Electrocatalyst Decorated Hematite Nanowire Arrays for Photoelectrochemical Water Splitting

One of the greatest issues facing society today is finding a renewable energy source to power our world. Solar power is a leading option. However, storing solar power is one of the leading pitfalls in this field, and one viable option is to store solar power in chemical bonds. For example, hydrogen production using sunlight to split water offers one such possibility. In order to accomplish solar energy conversion to fuels requires the use of semiconductors with appropriate solar light absorption band gap (the amount energy required for conducting electrons) and electrical properties for enabling hydrogen and oxygen evolution reactions from water. Hematite, α-Fe2O3, is a semiconductor that has attracted considerable interest due to its favorable band gap for solar light absorption and low cost. However, hematite suffers from two main disadvantages: the electron diffusion is limited to a few nanometers, when larger diffusion is desired; and the hematite surfaces are not highly catalytic towards electrolysis of water. In this project, we investigated the use of catalysts on the hematite nanowire array to address both challenges. Specifically, nickel particles were created on the hematite nanowire surfaces by applying a solution of nickel (II) nitrate in varying concentrations then exposing the nanowires to atmospheric oxygen plasma. The results have shown that nickel nanoparticles were adhered to the hematite nanowire arrays. In addition, the samples were placed in an oven at high temperatures over long periods of time to enable formation of nickel iron oxide alloy. The hematite nanowire arrays decorated with nickel particles and the iron nickel oxide nanowire samples were characterized for electrocatalysis and photocatalysis using cyclic voltammetry. The physical properties were tested using scanning electron microscopy (SEM), transmission electron microscopy (TEM), and energy dispersive x-ray spectroscopy (EDX).

69. Chase Johnson & Robbie Rowlett

Morehead State University
Mentor: Hans Chapman

Assessment of Recent Trends in Renewable Energy Production in the US

Recent issues with energy supplies and cost have heightened the need for more access to alternative renewable energy sources, such as solar, wind, biomass, geothermal, and hydroelectric. The US consumes about 20% of the world's total energy supply, even though its population is only 5% of the world's population. Today, the US depends substantially on fossil fuels, mostly imported petroleum. This poses concerns for energy systems security. According to the World Energy Council (WEC), the U.S placed 12th among 90 countries in its Energy Sustainability Index in 2012. Many countries are adopting efficient energy technologies and practices. While the US is making progress in the development of renewable energy sources, particularly wind and biomass, other countries, notably Germany and Japan have outpaced the US in the production and use of photovoltaic (PV) solar technology. This work is an assessment of the current state of Renewable Energy and a view of how the US competes on the world energy systems map. Investing in renewable energy systems is critical to meeting future energy demand and to lessen the effects of climate change.

70. Matthew Jones

Murray State University
Mentors: David Eaton & Jim McCoy

Examining Low Wage Jobs in Kentucky and Exploring Change

Kentucky is one of many states that set the minimum wage the same as the federally mandated minimum. This is in contrast to multiple other states that have set the minimum at a higher level. Rather than looking at the country as a whole, I examined the job trends here in Kentucky. Gathering data from other states and other sources, I looked to not only examine minimum wage jobs but also those near it. Going further, I explored the effects that the proposed Federal Minimum Wage increase would have on Kentucky as well as any other increases.

71. Stevy L. Jones, Lauren Mahoney & Jessica Thomas

Eastern Kentucky University
Mentor: Jonathan Gore

Social Factors that Predict Fear of Academic Success

Fear of academic success is ultimately a fear of social exclusion. Therefore, various forms of social inclusion may alleviate this fear. Three studies tested the hypothesis that social inclusion variables negatively predict fear of success. In Study 1, middle and high school students from Kentucky (n = 129) completed surveys of parental involvement, parental support, and fear of success. Only parental support negatively predicted fear of success. In Study 2, college students from Kentucky (n = 184) completed surveys of school connectedness, social isolation, and fear of success. Only school connectedness negatively predicted fear of success. In Study 3, college students from Kentucky and Georgia (n = 605) completed surveys of family support, school connectedness, and fear of success. Both family support and school connectedness negatively predicted fear of success. To solve the problems of fear of success, school resources should focus on enhancing family support and school connectedness.

72. Cody Kirk & Jordan Nushart

Western Kentucky University
Mentor: Leyla Zhuhadar

Who Wants My Product? Affinity-Based Marketing

The main objective of this research was to develop an intelligent banking application using Data Mining algorithms. Our approach utilized simulated banking data. In this research we developed an intelligent marketing application. This application applied Data Mining algorithms. For instance, if a bank decided to introduce a new financial product—a new type of current (checking) account—the marketing team would like not to waste efforts on customers who are unlikely to buy, the bank would like to address only those customers with the highest affinity for the new product. Accordingly, the bank's marketing department would push sales of the new account by sending direct mail to these specific customers. Predicting those customers is not an easy task. We used a binary classification to predict for each customer, whether they would buy the product, along with a confidence value indicating how likely each of them was to buy the new product. Customers were then ranked by this confidence value and the 20% with the highest expected probability to buy the product were chosen for the mailing campaign. Covering all steps from business understanding and data understanding via data pre-processing and modeling to performance evaluation and deployment, this research investigated the available data (simulated data) to generate the best model. In addition we evaluated the predictive accuracy of the model and visualized the performance of the model using Lift charts and ROC charts, and finally customers were ranked by the predicted confidence for a purchase to select the best candidates for the campaign. One of the primary goals of the project was to work in future with the WKU Small Business Accelerator to patent it. A second goal was to provide us as students in Business Informatics with the opportunity to work with industry (US Bank).

73. Andrew Knight

University of Louisville
Mentors: Richard Feldhoff & Damien Wilburn

Characterization of Plethodontid TIMP-like Protein (PTP) and its Role in Tissue Remodeling During Pheromone Gland Development

The red-legged salamander, Plethodon shermani, is a terrestrial, lungless salamander indigenous to the mountains of western North Carolina, and is a valuable model for studying reproductive behavior and pheromone signaling. During a specialized courtship behavior, male salamanders deliver pheromones to a female using a submandibular gland known as the mental gland. The proteinaceous secretion from the mental gland is primarily composed of two pheromone proteins (~85% of the total protein), and a third protein (~10%) termed Plethodontid TIMP-like Protein (PTP). PTP is named based on its similarity to inhibitors of Matrix MetalloProteinases (MMPs), the Tissue Inhibitors of MetalloProteinases (TIMPs). MMPs digest structural proteins in the extracellular matrix, and MMP-TIMP interactions can regulate tissue remodeling. Because of its similarity to the TIMPs, PTP is hypothesized to have TIMP- like activity and possibly facilitate mental gland development. Consequently, regular secretion of PTP during tail straddling walk may serve as a unique chemical signal that the courtship season is ongoing, and its absence may alert surrounding cells and proteases that the tissue is no longer needed. Therefore, the general aims of this study were to characterize the biology and function of PTP. To better characterize the function of PTP, the activity of six different recombinant MMPs were assayed using a fluorescent substrate with different concentrations of PTP. MMP-1, MMP-8, and MMP-13 were the only MMPs to be partially inhibited with PTP. The results were confirmed for MMP-1 using a broader range of PTP concentrations. In order to observe the expression and localization of PTP at different stages of mental gland development, immunofluorescence confocal microscopy was used to visualize PTP and Collagen II, one substrate for MMP-1. Low PTP levels during an early stage of mental gland development may drive collagen proteolysis and permit mental gland expansion. Finally, the PTP gene was cloned into E. coli to allow expression of a recombinant PTP (rPTP). rPTP was fused to Maltose Binding Protein, which has previously been demonstrated to increase TIMP solubility in E. coli. Expression of rPTP will permit future NMR studies to determine the 3D structure of this novel TIMP-like protein.

74. Jennifer Korth & Mikayla Roark

Northern Kentucky University
Mentor: Ryan Salzman

Women in Latin America

Throughout history women in Latin America have been socially subjugated, being traditionally seen as domestic servants. This project seeks further insights about the role of women in Latin America by looking at two disparate contexts. One will be to try to understand the evolution of women's rights in Colombia. According to the Colombian Constitution, established in 1991, gives that women of Colombia many rights. These rights have been gradually progressing since the beginning of the 20th century. Today in Columbia, women are often the victims of violence and mistreatment. This project seeks to illuminate the evolution of women's rights in Colombia. The other context considers the role of women in revolutionary movements throughout the region. During these revolutions, women participated in various roles in hopes of bringing about reform. This poster identifies the roles of women who participated in the revolutions. Taken together, these two approaches will help us understand the roles of women in Latin America.

75. Amir Kucharski

University of Kentucky
Mentor: Peter Kekenes-Huskey

Molecular Dynamics Studies of Calcium Binding to Beta Parvalbumin

Parvalbumin (PV) is a globular calcium-binding protein expressed primarily in skeletal muscle and secondarily in neuronal tissue. While defects in PV function have been correlated with a variety of severe pathological conditions, including epileptic seizures, engineered sequences have been shown to mitigate cardiac dysfunction in animal models, which could potentially benefit heart patients in Kentucky and the United States. Our computational studies of the beta PV isoform seek to understand calcium binding at the protein's pseudo and canonical "EF" hand secondary structures. Specifically, we have employed molecular dynamics (MD) simulations to understand why calcium binds tightly in wild-type PV and even more tightly upon mutating an amino acid (Leucine-85-Phenylalanine) far from the calcium binding sites. Our MD simulations were analyzed to reveal changes in PV's three dimensional structure, including alpha helical angles and interhelical distances, as well as their influence on the density of protein oxygens that directly bind calcium. These data may provide a thermodynamic basis for how mutations vary calcium affinity and more importantly, could guide re-engineering of PV to mitigate defective calcium signaling in heart cells. Broadly speaking, since the EF hand is common to a large class of proteins, we anticipate that our findings could shed light on related calcium-dependent proteins that modulate a wide range of physiological functions.

76. Jessicah Lafferty & Ja'nice Smith

Kentucky State University
Mentor: Tamara Sluss

Avian Species and Nest Presence in Ash Trees Infected by the Emerald Ash Borer on Kentucky State University's Campus

Since the arrival of the invasive Emerald Ash Borer (EAB) in the Commonwealth of Kentucky in 2009, EAB has negatively impacted the Ash tree (*Fraxinus spp*.) and has the potential to negatively affect the economy and wildlife that utilize the tree for habitat. The EAB larvae feed under the bark by tunneling through the cambium of the tree reducing the flow of nutrients in the tree and leading to a reduction in foliage and mortality within a few years of infestation. Some birds, such as woodpeckers, are known to feed upon the larvae, while other birds may prefer the visibility offered by the dead branches. In this study, a crown densitometer was used to measure the percent canopy cover of affected Ashes and the presence of perching birds were assessed on the campus of Kentucky State University in Frankfort, KY during the morning hours from 9/16-10/15 prior to abscission and leaf fall. Of the 65 Ash trees studied, the mean number of perched birds was 0.1 individuals per tree and on the mean canopy cover was 19.5% which could have included vines, neighboring trees, and dead branches. There was a weak positive relationship between percent canopy cover and perched birds (R^2=0.04). During the observed study times, the birds that were present were not apex predators and no woodpeckers were observed. Nest remnants were not present in infected ash trees, but there were no significant differences between the number of nest remnants between Ash trees and adjacent trees (p=0.128). Perhaps visiting the tree multiple times and before daybreak would have revealed a greater number and diversity of avian species that utilize the tree. Based on the results of the study, we recommend replanting native tree species that are not affected by the EAB to provide habitat and reduce erosion.

77. Emily Lancaster

Kentucky State University
Mentors: Maifan Silitonga, George Antonious & Buddhi Gywali

The Occurrence of Target Pharmaceuticals in Watersheds

As medicinal technology has advanced in the treatment of newfound facets of diseases, many pharmaceuticals have become more advanced in targeting the specificity of such disorders. However, it has come to national even global attention that these advanced pharmaceuticals, such as the antibiotic family fluoroquinolones and the hormone estradiol (estrogen), have found a way into the water systems. An objective of this study was to determine the physical and chemical quality of water samples from various watersheds spanning several states in the South Eastern region of the United States, including but not limited to Kentucky, Arkansas, Mississippi, and Alabama. By analyzing the occurrence of these pharmaceuticals in watersheds, we found levels of estradiol to fluctuate by watershed within the respective state. The average value found for detectable estradiol was 4.74 ppt with a presence as high as 110 ppt. The levels of the fluoroquinolones were majorly undetectable across the states; however, the average value of detectable fluoroquinolones was 0.035 ppb with a presence as high as 0.68 ppb. This data has been investigated to examine the potential relationship between these pharmaceuticals and relative statistical data, such as demographics, income, and factors related to human health. Should a correlation be found between the presence of the targeted pharmaceuticals and statistics of interest, public awareness could be raised with the potential to lead to more progressive movements in the manufacturing and management of these pharmaceuticals?

78. Brian Leist

University of Louisville
Mentors: Lutz Haberzettl & Gerard Williger

Multi-frequency Studies of Star Forming Galaxies or the Power of Public Databases

Galaxies represent important building blocks in the Universe. Understanding their formation and evolution processes enables us to understand the evolution of the Universe as a whole. We have many questions to ask. How did star formation processes evolve? What are the properties of the galaxies hosting the majority of the star formation? In order to address these questions, we must use publicly available, multi-frequency data ranging covering extended portions of the sky from the ultraviolet (UV) to the far infrared (FIR). To access these data we utilized large public databases which play a crucial role in modern astronomy. The databases allowed us to construct and analyze samples of actively star forming galaxies at an epoch where the Universe was only 2.5-6 billion years old. This was also the time when the global star formation rate in the Universe was at its peak. For this project, we constructed automated selection procedures correlating large data sets recorded at different frequencies. These procedures allowed us to efficiently correlate multi-frequency us to efficiently correlate multi-frequency information for several hundred thousand galaxies which resulted in master object catalogs useful for analysis. As a next step we applied well tested color selection criteria to the master catalogs to separate the star forming galaxies from other galaxy populations. These selection criteria are based on model predictions for actively star forming galaxies at this epoch. The data allowed us to estimate the distances of the sample galaxies by correlating them with extended libraries of galaxy models. The data will also form the basis for future investigations which will include correlation with galaxy models to estimate further properties of these actively star forming galaxies including masses, ages, and star formation rates.

79. Abigail Lewis

Western Kentucky University
Mentor: Amber Schroeder

Impacts of Integrity and Professionalism in Social Networking Profiles on Employer Judgments

As social networking websites (SNWs) become increasingly common with the general population, more and more organizations are beginning to include a viewing of these online profiles in their hiring and performance appraisal processes. This study examined how various components of a social networking website (SNW) as well as rater characteristics can impact employee evaluations. Participants recruited through the website Mechanical Turk were placed in the role of an employer rating a potential employee. Participants were presented with a job description, a simulated applicant résumé, a simulated applicant SNW profile, and a survey to measure rater characteristics. Findings indicated that professionally oriented Facebook profiles received higher evaluation ratings than unprofessional profiles for applicant quality, interview likelihood, job offer likelihood, and predicted job performance. Likewise, applicants depicted in high integrity Facebook profiles were rated as more qualified than those with low integrity profiles. Evaluation ratings given by extraverted raters, males, highly individualistic raters, and highly collectivistic raters were significantly higher in several areas. In examining how résumés and Facebook profiles compared in terms of influencing rater evaluations, males, individuals more experienced in applicant evaluation, and highly collectivistic raters tended to place more weight on résumés, while highly neurotic individuals tended to rely more heavily on Facebook profiles. Overall, results demonstrated that 58.0% of raters indicated that they relied more on the Facebook profile than the applicant's résumé when completing their applicant evaluation. As these findings demonstrated that SNW profiles influenced participant employer judgments to varying degrees based on rater characteristics and perceptions, organizations should use caution when viewing SNW profiles until more research is available to demonstrate the reliability and validity of this practice.

80. Robert J. Lewis

Murray State University

Mentors: Stephen White & Joe Caudell

The Consumption of Metallic Lead and its Effects on Tissue Lead Levels of Urban and Rural Eastern Gray Squirrels

Eastern gray squirrels (*Sciurus carolinensis*) are known to routinely consume or be exposed to lead from many anthropogenic sources, including ingesting bullet fragments, gnawing on flashing, and, historically, inhaling (or ingesting) organic lead compounds aerosolized from burning leaded fuels. However, there is little research on consumption of metallic lead in squirrels. While we know that squirrels commonly ingest metallic lead, we do not know if they are ingesting it incidentally when foraging; if they gnaw, but do not ingest the lead, or if they intentionally gnaw and ingest metallic lead. It is also unclear if squirrels metabolize this ingested metallic lead or if it is simply passed through the digestive system without being metabolized. To determine this, we supplied lead in the form of ingots to determine if squirrels are primarily gnawing lead, but not ingesting any, or incidentally ingesting relatively small amounts. If squirrels do ingest lead we examined if they metabolize the lead or pass it through the digestive tract without significant absorption. We collected 30 squirrels from the city of Murray, KY before supplying lead, 30 after supplying lead, and 30 from the Land Between the Lakes National Recreation Area, as a control. The area under the lead ingots was examined for shavings to determine the approximate amount of lead consumed and digestive tracts were examined for the presence of lead fragments. Liver and muscle tissues from these squirrels will be analyzed for lead concentrations.

81. Liz Markley

Murray State University
Mentor: Jessica Naber

A Guide to Nursing Students' Written Reflections for Students and Educators: Why and How Do We Use Them?

Experiences from the clinical setting are ideal for building critical thinking skills if reflection is used as a teaching tool. Reflecting on clinical experiences develops critical thinking ability, fosters self-understanding, facilitates coping, and leads to improvement in clinical practice (Craft, 2005; Kennison, 2006). Reflective writing as a pedagogical strategy allows students to integrate their thoughts and experiences with didactic material to more adequately understand both the experiences and the didactic material (McGuire, Lay, & Peters, 2009). Reflective writing is defined as an assignment that is focused on an activity that students have experienced, such as class readings, clinical rotations, or group activities, that highlights what the student learned from the activity (McGuire et al., 2009). Reflection is the purposeful and recursive contemplation of thoughts, feelings, and happenings that pertain to significant practice experiences (Judd, 2013). Reflective journaling helps students progressively develop their critical thinking, self-reflection skills, and cultural humility (Schuessler, Wilder, & Byrd, 2012). This study will explore reflective writing from the perspective of the nursing student and the nurse educator. The following questions will be answered: What are the benefits of reflective writing for the nursing student and the nurse educator? Why is reflective writing critical in nursing education? How can reflective writing develop critical thinking skills of nursing students? Why would nurse educators want to use reflective writing in their nursing courses, both clinical and didactic? What are the barriers to using reflective writing for students and educators? What is the role of the nurse educator in student reflection? What are the essential components of reflective writing assignments?

82. Malinda Massey

University of Kentucky
Mentor: Cynthia Ruder

What Motifs and Style Components Shaped Mikhail Bulgakov's "The Master and Margarita"?

Mikhail Bulgakov (1899-1940) was an educated Russian who had grown up in Kiev, in a time before Stalinism permeated everything in Soviet Russian culture. Having been raised in pre-revolutionary Russia, Bulgakov was able to compare life before and after the Bolshevik Revolution in the USSR. In response to the chaotically changing nation around him, Bulgakov wrote novels, short stories, and plays that satirized and criticized the changing society. Throughout these various literary outlets Bulgakov wove distinct themes and used an immersive type of narration. These various elements of his narratives and plays allowed him to insert his own ideas about the changing Russian state, as well as the Communist Revolution. His woven-in commentary on Russia throughout his works revealed Bulgakov to be a man who did not support the Socialist Revolution and looked to the impact that it would have on the future of his country. To better understand Mikhail Bulgakov's works and narrative style, this literary project studying Bulgakov's works until his last novel relies on various methods, such as: literary analysis that examines the theme, narrative approach, and composition of the works; cross-referencing distinct motifs and themes among Bulgakov's novels; consulting literary criticism Bulgakov's novels; an examination of the texts within their historical context; consultations with the mentor regarding readings of the novel and the historical and literary significance of the works. Each method contributed both information and analytical models that helped to shape the reading and analysis of Bulgakov's novels. This narrative study has proved that Bulgakov was determined to speak his mind, even though he was constantly threatened by retribution from the authorities. As his novels reveal, Bulgakov constructed an intricate web of thematic and narrative elements that recur throughout his novels, and the stylistic choices that he made throughout his writing career helped shape how his final novel—The Master and Margarita—was written so effectively.

83. Jason A. Matthews

Murray State University
Mentors: Joe N. Caudell & Chris Trzepacz

Distinguishing between Eurasian Wild Boar Hybrids and Feral Swine Using Molecular Analyses

Wild hogs (*Sus scrofa*) are a serious threat that impact natural areas, farmland, and even urban landscapes. They destroy personal property, predate on wildlife, displace native species, and destroy the diversity of native wetlands. Previous research has shown that examining the differences in the gene MC1R using molecular methods and the examination of the hair coat of wild hogs has the potential to identify wild hogs and hybrids from domestic species; however, this technique has not been evaluated in such a manner that would make it useful for conservation officers and prosecutors in a court of law. Therefore, we evaluated both the morphological and genetic methods as a tool for identifying wild hogs using the model of disease testing where the morphological methods are applied by field personnel as a screening test and the genetic methods are used in a confirmatory manner. The objective was to determine the accuracy and precision of each of these methods for identifying wild hogs in the US. We compared the MC1R gene between samples of DNA from known Eurasian wild boar, domestic hogs, wild hogs exhibiting the white-tipped guard hair phenotype, and feral swine that do not exhibit the white-tipped guard hair. We used gel electrophoresis to differentiate between the various wild and domestic hogs breeds. We also enlisted biologists, students, and other wildlife professionals assess photos and patches of hair from each type of hog to determine the accuracy of morphological assessment for identifying wild hybrids and recently released feral hogs. We believe these methods will be instrumental for law enforcement to identify and prosecute individuals involved in the anthropogenic spread of wild hogs in Kentucky and throughout the US.

84. Macie Mattmiller

University of Kentucky
Mentor: Alison Davis

Analysis of Community Health Needs Assessment from Rural Kentucky

Rural Kentucky is widely known for its lack of accessible healthcare to its citizens. The Affordable Care Act (ACA) was signed into law in 2010 with the intent to provide better quality and more affordable healthcare to U.S. citizens, especially in places like rural Kentucky. The ACA has mandated non-profit hospitals use a tool, called the Community Health Needs Assessment (CHNA), to fulfill their annual community benefit obligations required under section 501(r) in the ACA. To complete a CHNA we often use surveys or other assessment measures. By using CHNAs, the hospitals and other organizations gain feedback directly from patients to address the biggest problems from their patients' views. The results of the CHNAs are required by law to be posted online at each hospital organization's website. However, the ACA does not require any organization to compile results from CHNA surveys though there could be value in aggregating results across different hospitals. In Kentucky, the Community and Economic Development Initiative of Kentucky (CEDIK) helped implement CHNAs in about 30 non-profit hospitals. While each hospital was able to customize their CHNA survey, many of the surveys contained similar or identical measures. The questions on the CHNA surveys used ranged from insurance coverage, to patient satisfaction, to family doctors used, and to coverage programs. For this study, data from each of the CHNA surveys were combined and analyzed to provide a more collective look at the subject of rural Kentucky healthcare. For example, this dataset allowed us to observe the overall hospital satisfaction rate for dozens of rural non-profit hospitals. Of the total respondents, the average satisfaction rate was between 'satisfied' and 'very satisfied.' As for assistance eligibility, about 33% of respondents were eligible for Medicare, 16% for Medicaid, 6% for Public Housing Assistance, and 14% for SNAP. Also, approximately 30% of respondents had, at one point, delayed healthcare due to lack of money and/or insurance. My poster will include both visual representations and numerical findings of the data. This will enable legislators of Kentucky, who are interested in rural healthcare, to view combined results of patient feedback and see their citizens' overall viewpoints about their region's healthcare.

85. Sarah McClanahan

Morehead State University
Mentor: Michael E. Fultz

The Effects of Rho-kinase Inhibition on Alpha-Actin and Beta-Actin Cytoskeletal Remodeling in Resting and Contracting Aortic Smooth Muscle Cells

Evidence suggests that differential remodeling of alpha- and beta-actin may explain the unique properties of smooth muscle. It appears that redistribution of alpha-actin to podosomes is sensitive to phorbol-induced stimulation while beta-actin does not remodel into podosomes, but instead remodels to hold cells in a shortened configuration. The mechanisms for regulating this differential remodeling is poorly understood. The effect of Rho-kinase inhibition on both actin domains was examined before and after phorbol (PDBu) stimulation in A7r5 smooth muscle cells. Data suggests that Rho-kinase inhibition blocks the alpha-actin remodeling to the podosomes and stimulates dissolution of the remaining alpha-actin stress cables. Beta-actin remodeling appears to be unaffected. This suggests that Rho-kinase may selectivity regulate alpha-actin remodeling, with little effect on beta-actin. This supports the hypothesis of differential remodeling.

86. Elise McConnell

University of Kentucky
Mentors: Buck Ryan& Megan Dickson

Creativity Meets Politics: Pushing Originality, Emotion and Intrigue to Attract Young Voters

According to the Pew Research Center, young voters swung the 2012 presidential election. Can young voters swing the U.S. Senate race in Kentucky, considered to be among the nation's most important races (Taylor, 2014)? As changes sweep through the political world, creativity is essential for survival. This test of creativity in the form of short public service announcements revealed that the key to getting young voters' attention was a combination of originality, emotion, and intrigue. This research was based on in-depth exploration of creativity across the fields of photography, advertising, music, theater, and poetry. In April 2014, 49 subjects, whose ages range from 18 to 29, viewed six public service videos with different combinations of originality, emotion, and intrigue, and both quantitative and qualitative data was collected. The hypothesis that emotion would be a stronger factor than either originality or intrigue was upheld. Using bivariate tests and running a logistic regression on the significant variables suggested that the determining factor of a successful PSA (ie. one that respondents would hypothetically choose to fund) was a combination of originality and emotion. However, due to the low sample size, caution must be taken in drawing conclusions. The study of creativity in the political arena is a promising area of study, and larger-scale research must be done. These and future findings can benefit campaign managers looking to attract young voters and scholars studying the impact of creativity on the millennial generation.

87. Grant McKenzie

University of Louisville
Mentor: Amanda Jo LeBlanc

Thrombospondin-1 Decreases NO-mediated Vasodilation in Coronary Arterioles in Advancing Age

In rat stromal vascular fraction (SVF), matricellular protein thrombospondin-1 (Thbs-1) has been shown to be upregulated with advancing age as compared to young rat SVF cells isolated from adipose tissue. Thbs-1 has been previously linked to decreased NO-mediated vasodilation in large arterial vessels, especially in diseased state. We wanted to assess this finding in smaller vessels like the coronary arterioles to determine whether there are age-related detriments of Thbs-1, as well as quantitatively asses the amount of oxygen radical production by the vessels.

88. Ryne McMullen, Wade Weatherholt & Samuel Wells

Western Kentucky University

Mentor: Jason Crandall

Effects of Static and Dynamic Stretching on Vertical Jump Performance

The purpose of the study was to determine which type of stretching, static or dynamic, was most effective for improving an individual's power by assessing a vertical jump test. The stretching program consisted of four weeks of stretching three times a week for each participant. The participants were 17 college age males (18-22 years). The participants were split into two groups, static (n=10) and dynamic (n = 7). Participants' vertical jump was measured at baseline, two weeks, and at four weeks. Pre-measurements were taken for both YMCA sit-and-reach as well as vertical jump. Measurements were then take two weeks later, and again after four weeks. Using an ANOVA statistical analysis, we found that there was little to no difference in the change in the vertical jumps heights of the two separate groups with a p=0.688. F-statistic for the vertical jump was: Vertical Jump Trial-1: .029, Vertical Jump Trial-2: .167, Vertical Jump Trial-3: .103. The vertical jump test r = 0.974 There was no significant change from any trial of the YMCA Sit-and-Reach test. The greatest change came between trial one and trial two again when the sig.= 0.523. The F-statistic for the YMCA was: YMCA Trial-1: .245, YMCA Trial 2: .427, YMCA Trial-3: .217. The YMCA Sit-and-Reach was r=0.985. Although no statistically significant changes were found, improvements were seen in all participants. No statistically significant changes were found between either stretching groups. However, we believe given a more controlled environment significant changes may have been found over a longer period of time.

89. Alex McTeague, Jesse Sautel, Landon Fike & Jalyn Walls

Murray State University

Mentors: Maeve McCarthy, Marcia Edson & Donald Adongo

Hypokalemic Periodic Paralysis Variable Modification Mission

Hypokalemic periodic paralysis—or HOKPP—is a rare genetic disorder of ion channels that result in a decrease of potassium cations in the blood. This decrease in blood potassium can lead to temporary paralysis or muscle weakness that often lasts from three to 24 hours. According to nlm.nih.gov, HOKPP affects an estimated 1 in 100,000 people of which symptoms are more manifested in men than in women. Hypokalemic periodic paralysis is inherited in an autosomal dominant fashion which means that the disease is not sex-linked. Mutations occur in various ion channels; these channels are dependent on one another and a mutation in one type of channel can result in an irregular amount of a different type of ion. The long term objective is to determine a threshold of carbohydrates—which may be related because of their effect on insulin levels—that triggers the onset of an episode of HOKPP. The Hodgkin-Huxley model, established in 1952 will be a massive help in our research of Hypokalemia Periodic Paralysis. The model establishes an equation for total current through the membrane of a muscle cell. To complete this model, we will use a combination of our research and our varying backgrounds. This includes knowledge of differential equations, numerical analysis approximation techniques, Euler's method, and the circuitry of the cell. MATLAB, being a program relied on heavily in the professional field, will be used to complete the model, and perform experimentation vital to the research. We wish to improve upon the Hodgkin and Huxley model in its application to HOKPP, which would improve the treatment and preventability of the disease. More accurately predicting the occurrence of episodes (based on levels of a few variables in the blood) would improve treatment and work towards the prevention of attacks.

90. Simon Mikulcik

Eastern Kentucky University

Mentors: George Landon & Minh Nguyen

Overcoming Daily Challenges with Embedded Scripting Languages

Over the past 20 years, there has been a shift in the target audience of software applications. Previously, many software applications were designed for specialists who have technical knowledge. Nowadays, many software applications are rather designed for the general public. Likewise, the gap between software users and software developers has increased as the users have less of a technical knowledge. Recently, software developers have included embedded programming languages inside of applications. These languages give the user a more direct way to use the logical resources of the computer, but also, being embedded, the user may easily extend the functionality of existing software. Embedded languages such as Python make using powerful programming features available to the general public. The integration of Python, a scripting language, into large applications is one form of using embedded languages to enhance user productivity. We surveyed the features, and usability of the 3d modeling system, Blender3D, and the computer algebra system, Sage to examine the effectiveness of embedded languages. We found that these embedded languages work seamlessly with current workflows and they may simplify complicated tasks by allowing users to write custom scripts within applications.

91. Harsh Moolani, Allyson King & Rena Ryumae

Western Kentucky University
Mentor: Rajalingam Dakshinamurthy

Gold Nanoparticles with Potent Antibacterial and Anticancer Activity & Novel Experimental Procedure for Expression and Purification of Human Fibroblast Growth Factor-1 and Its Receptor - Relevance in Cancer Research

Need for novel, innovative strategies for developing new drugs is becoming a necessity due to an increasing number of rapidly evolving medical threats. Drug encapsulated gold nanoparticles are one such strategy showing promise. In this study we report development of kanamycin coated gold nanoparticles that has dose dependent antibacterial activity. Kan-GNPs was found to be multiple-fold more potent than pure kanamycin. Supportive results from this study will lead to the development for other antibiotics to be capped onto GNPs in order to fight against bacterial resistance. Phloridzin, a natural constituent obtained from green apples is an anticancer agent. In order to tackle the side effects of phloridzin and study the unknown anticancer mechanism, we synthesized phloridzin-capped gold nanoparticle in a single step via a biofriendly process. We are currently testing the prospect Phl-GNPs for its anticancer activity. The fibroblast growth factors are a family of 23 heparin-binding proteins with a range of biological functions such as mitosis, cell proliferation, and cell differentiation. In this context we expressed FGF-1 and FGFR from a bacterial expression system. The proteins were purified to homogeneity and characterized by different analytical methods. The findings of the present study pave the way for in depth structural-functional investigations.

92. Lindsey Morris

Kentucky State University
Mentors: John Sedlacek & Karen L. Friley

Beneficial Insect Populations in Late Planted Sweet Corn Bordered by Native Perennial Plants and Pasture in Central Kentucky

Prior to European settlement, native perennial plants indigenous to the United States were abundant covering entire regions of Kentucky and bordering states. Native perennials are important for ecosystem and environmental health. These plants provide habitat for wildlife including beneficial insects, also known as natural enemies. It has been demonstrated that non-crop plants such as some weeds and native perennial grasses and flowering plants planted near crop borders can enhance populations of natural enemies. The objective of this research was to identify and quantify beneficial insects in sweet corn and native perennial and pasture border rows and compare their numbers in each habitat. Research was conducted on the Kentucky State University Research and Demonstration Farm in Franklin County, Ky. Sticky traps 15 cm x 15 cm were set in sweet corn and native perennial and pasture border rows to compare diversity and abundance of insects. Native perennial border rows contained 16 species of plants. There were five grasses and eleven species of flowering plants. Pasture borders were a mixture of grasses and broad leaf weeds. Traps were collected and analyzed for 9 weeks. Insects were identified to family and species when possible. Big eyed bugs (*Geocoris sp*.), syrphid flies (Syrphidae), lady beetles (Coccinellidae), green lacewings (*Chrysoperla sp*.), and minute pirate bugs (*Orius insidiosus*) were the most abundant insects caught. Results indicated that this research should continue for several more growing seasons to determine if age and maturity of the border plots influence beneficial insect numbers.

93. Tracey Newport

Murray State University
Mentor: David Pizzo

Central African Republic: Peace-less Independence

With the Central African Republic (CAR) imploding on itself and becoming a failed state, the French Government has decided to step in and help reestablish order amongst the chaos. The CAR has been ruled by many tyrants and dictators with many coming to power through undemocratic means. The country's stability is rocked often times as organizations and people try to become the leader of the CAR. With each change of power, however democratic the means are, it is typically followed by authoritative regimes and leadership. That often times repress the citizens of the nation.

94. Jaye Odom

University of Kentucky
Mentors: Richard Milich & Elizabeth Lorch

The Moderating Effect of Anxiety on the Social Outcomes of Children with Attention-Deficit/Hyperactivity Disorder

Anxiety disorder and attention-deficit/hyperactivity disorder have a high level of co-morbidity. This study investigated the moderating effect of anxiety on the social functioning of children with ADHD. Same-sex groups of children ages 8-11 years old were observed by trained lab assistants in order to assess social behavior. They coded for prosocial, contributive, negative, aggressive, on task and off task behaviors because these behaviors have been demonstrated to effect peer standing. They were assessed using a numerical and alphabetical system demonstrated strong inter-rater reliability (>.80) Data thus far has indicated that comorbid anxiety may be a protective factor for children with ADHD in regards to their social functioning.

95. Sanjana Pampati

University of Kentucky

Mentors: Phil Harling & Ernest Yanarella

A Case Study of the Undocumented Latina/o Immigrant Community in Kentucky

The Pew Hispanic Center estimates that the number of undocumented immigrants in Kentucky is approximately 50,000. Due to the job opportunities available through the horse industry, there exists a prominent undocumented immigrant workforce in Kentucky. The passage of Deferred Action for Childhood Arrivals (DACA) in 2012 allowed for the temporary suspension of deportation of undocumented immigrant youth and the authorization to legally work. Our research examines the impact of recent immigration legislation on undocumented immigrants living in Kentucky through participant observation and in-depth semi-structured interviews of Latina/o immigrants in Kentucky. Though there have been some quantitative studies that address the lives of undocumented immigrants, there exists very little qualitative data, as undocumented immigrants are often reluctant to speak to officials for fear of deportation. Our research findings indicate that though DACA has provided some temporary relief to many of these undocumented immigrants, there are still several outstanding issues. DACA recipients lack a path to citizenship and their family members receive few benefits. Undocumented immigrants are vulnerable to a range of human rights abuses that are largely unreported, including trafficking, sexual violence, and wage theft. The severe economic, political, and social constraints on undocumented immigrants merit special attention because immigration reform is a highly debated topic with clear policy implications, given the rapid increase in the population of undocumented immigrants in Kentucky.

96. Donald Poe, Shelby Rodgers & Sait Sarr

Kentucky State University
Mentor: Maheteme Gebremedhin

Training of Undergraduate and Graduate Students in Ecosystem Scale Measurements of Greenhouse Gases at Kentucky State University

Ecosystems respond to directional changes in physical, biological, and social drivers and quantifying these changes require a unique set of instrumentation and monitoring techniques to: *i)* reliably predict the interaction between ecosystem and climate, *ii)* offer better insights and predictive power on a larger scale, and *iii)* be able to link mechanistic understanding of the ecosystem, atmosphere, soil linkage, drivers and processes. We measured the exchange of carbon dioxide (CO_2), methane (CH_4) and energy (sensible and latent heat) using the eddy covariance method over a year round grazed pasture land, vegetated with a mix of Johnson grass, fescue, white clover and wild carrot. The flux station (38˚6ˈ56.42N, 84˚53ˈ22.81 W) at the Research and Demonstration Farm, Kentucky State University, is equipped with the closed path infrared Li-7200 CO_2/H_2O) and Li-7700 open path CH_4 analyzer along with sonic anemometer (WindMaster Pro R3-50). This study presents instrumentation setup along with data processing methodology applied and a preliminary result. Diurnal flux measurements showed that the pasture ecosystem CO_2 uptake and release (ecosystem respiration, R_e) were strongly coupled with diurnal pattern of photosynthetic photon flux density (*PPFD*) and air temperature (T_a), respectively. Lowest midday CH_4 concentration occurred around the noon time hours (local time) and gradually increased and reached maximum in the evening. This nocturnal peak in CH_4 emission could be explained, in part by, the presence of elongated footprint around the tower resulted from absence of turbulence at night. In addition, the rate of CH_4 efflux was tightly linked with soil moisture levels, with higher levels of CH_4 exchange observed from moist soil. The measuring station not only was the essential infrastructure to provide a holistic understanding of the biophysical drivers of ecosystem fluxes of processes the but also served as the backbone for scaling up flux measurements to broader spatial scales.

97. Alexzandria Potts & Steven Survant

Madisonville Community and Technical College System
Mentor: Mary Janssen

Effects of Trial Spacing on Learning in a T-maze by Larvae of the Grain Beetle Tenebrio molitor

Differences in time between trials were studied in conditioning of larvae of *Tenebrio molitor*. Larvae were put individually into a T-maze and allowed to traverse the start arm. At the choice point, a correct turn resulted in the larva dropping into its food cup. An incorrect turn was followed by turning on a white light at the end of the incorrect arm and allowing the larva to self-correct. The learning criterion was 5 correct turns on successive trials after a turn in the opposite direction. Larvae in two conditions were given daily trials or two trials each day for the first 10 trials. Results showed more larvae given a single trial each day reached the learning criterion and made more successive correct choices, but larvae with two trials each day reached the learning criterion in fewer trials.

98. Carson Price

Western Kentucky University
Mentor: Sanju Gupta

Hybrid Multilayer Thin Film Supercapacitors of Electrochemically Processed Graphene Nanosheets with Conducting Polymers for Alternative Energy Storage Applications

A hybrid multilayer electrode consisting of graphene nanosheets (supercapacitive) and conducting polymers *i.e.* polypyrrole (PPy) and polyaniline (PANi) [pseudocapacitive] processed electrochemically for intimate electronic contact and covalent interface exhibiting synergistic effect that yield excellent electrochemical performance for enhanced energy storage application. These multilayered supercapacitors are constructed layer-by-layer (LbL) in-situ via electrochemical anodic polymerization of polymers followed by electrochemical reduction of graphene oxide (ErGO) namely, $(PPy/ErGO)_n$ and $(PANi/ErGO)_n$, where n = 1-5. These hybrid electrodes not only elucidated electronic conductivity through intimate contact, but also enhanced chemical/mechanical stability during the charge/discharge cycling processes. We investigated the electrochemical performance in terms of various parameters of LbL assembly including the number of bilayers (n) and chemical treatments that may affect the degree of reduction of GO on conducting polymers. The LbL-assembled hybrid multilayer electrodes exhibited excellent cyclic voltammogram behavior with gravimetric capacitance (C) exceeding > 200 F g^{-1} and at a discharge current density of 0.15 A g^{-1} that outperformed other hybrid supercapacitors based on conducting polymers and GO alone, especially if they were not electrochemically synthesized. The hybrid supercapacitors maintained 90% capacity over 500 cycles at a current density of 1.5 A g^{-1}. We have also conducted ac electrochemical impedance spectroscopy to determine interfacial capacitance (C_D) at the hybrid bilayer/aqueous electrolyte interface besides charge transfer resistance (R_{ct}). This study certainly opened up the possibility for large-scale production of graphene-based multilayered hybrid composites, promising for aerospace applications as well.

99. Jade Primicias

Western Kentucky University
Mentor: Clifton Brown

Fusion of Art Forms Across the World: Exploring Contemporary Dance in the United States and Great Britain

What began as a ballet- and modern-based dance world has gradually come to include styles such as jazz, tap, hip-hop, and now contemporary dance. This amorphous genre holds a place in modern British culture and society in a much different way than is seen in the United States, though the USA produced contemporary dance at a much earlier time. International artists have influenced dance companies throughout the USA and Britain with new choreographic ideas, artistic visions, and cultural insight; companies have taken this inspiration and begun to create new works of art and consequently, new styles of performance. Though British contemporary dance began in response to the work of American dancers in the 1960's, it has evolved to a level of artistry that is not seen as widely across America. This project sought not only to discover the reasons for these differences, but also to work towards eliminating them. In this part of the nation, dancers and audiences alike have less opportunity to be exposed to the dance innovation taking place on the coasts and in other countries. Following examples from both British and American dance companies, structured contemporary dance improvisation and original poetry were crafted and performed for audiences of both nationalities in order to discover how this fusion of art forms was received in different countries. Inspiration for the content of the piece was drawn from the history and aesthetics of St. Paul's Cathedral in London, making it more relatable to British audiences, though it was created by an American dance student. The nature of this project allowed for hands-on research to take place while simultaneously raising awareness of the disconnect between dance in different cultures. The project has resulted in fostering a better understanding of contemporary dance in different cultures for audiences around the world.

100. Katherine Queen

Western Kentucky University
Mentor: Rose Korang-Okrah

Ghanaian (Akan) Widows' Oral History: Identity Narratives

The world is aging at a rapid speed. Factors such as culture, gender, and status have a large impact on one's aging process. In many developing countries, such as Ghana, gender greatly interacts with the social, economic, and cultural issues to create very different outcomes for the male and female's transition into older adulthood. This project consisted of a 2-week stay in Ghana, Africa, and an in depth interview process was used to explore the lives of the Akan, an ethnic group of Ghana. This project focused specifically on Ghanaian (Akan) women who were widowed and over the age of 50. It was hoped that we would learn more about the effects that culture, gender, and status have on the elderly of a developing country, especially with regards to elderly women. Methods included observations of 4 village meetings, which consisted of the widows, elders, and the chief or nana. Additionally, there were 4 Akan widows interviewed, with the help of a translator, who were given the opportunity to construct their narrative identities or an evolving story of their life history. From these interviews factors such as gender, illiteracy, unsustainable livelihood, caring for multiple children/grandchildren, and a lack of support from the community were found to greatly impact the elderly of a developing country. Understanding the challenges that confront a developing country is critical in relation to the acceleration of the aging population. This study identified a lack of basic needs, such as education and financial support, which must be tackled as a potential solution to enhance the lives of the aging population in a developing country.

101. Kayla Renner

University of Louisville
Mentors: Judith Danovitch & Nicholaus Noles

The Development of Children's Trust in Computers and People

Historically, children have consulted other people (e.g., parents, teachers) for information about the world around them. Today, children are being raised in a technological age, meaning that they have other information sources available (Druin, 2002). These sources include computers, phones, and tablets that access the internet. Most children have been exposed to these types of devices by 8-years old (Goessl, 2013). Because this is the first generation to grow up surrounded by technology, there is a question as to the effect technology is having on children's thinking about information. This study focuses on whether children trust computers or people more as information sources. The participants were 4- and 5-year-old children and adults. Participants were told that they would be learning about animals from two different sources, represented by windows on a computer screen. One source was a chat window (similar to Skype) where questions could be entered and a person in another city would answer them. The second window was a search engine where one could input questions and the program would answer them. First, in four trials, the researchers established that the two sources were equally reliable. Then, in three trials, participants indicated whether they would rather ask the search engine or the person to answer a question about animals. Finally, in three trials, children's trust was measured when the sources gave conflicting information about an unfamiliar animal. Parents also completed a survey about their child's exposure to technology. When the sources presented conflicting answers, 4-year-olds endorsed the person's answer more often while 5-year-olds and adults endorsed the search engine's answer more often. These findings have important implications for education. Traditional teaching methods involve a person giving information, yet these results suggest that older children may place more trust in – and therefore learn more from – technological sources.

102. Cameron Riley, Kaitlyn Menser, Tracy Thomas & Allison Gordon

Madisonville Community and Technical College System
Mentor: Keith Gregory

Habituation of Tenebrio molitor Larvae Using Tactile Stimulation

Habituation, a decrease in responding over time to an external stimulus, has been shown in pupae of the grain beetle *Tenebrio molitor*. In the present study, habituation was obtained using tactile stimulation of the mealworm, or the larval stage of *T. molitor*. The study used 42 mealworms. Forty trials were conducted in which each mealworm was stroked with a small paint brush once per trial at a 5-second inter-stimulus interval (ISI) and its movement recorded. Results showed that on Trial 35, 31% of the mealworms responded, compared to Trial 1, when 79% of the mealworms responded.

103. Randall Roof, Eric Schwarber, Donald James Burns, Kelsey Estep, Tinsley Setters, Connor Strong, & Jonathan Coleman

Morehead State University
Mentor: April Haight

Bike Friendly Morehead

Morehead State University's Regional Analysis and Public Policy students are working to create a comprehensive plan in partnership with the Morehead Tourism to educate local citizens and college students about the outdoor recreation opportunities within Rowan County. The plan will focus on the benefits of a Trail Town economy for the citizens living within the community, as well as provide marketing ideas to attract tourists to the area. Morehead Tourism met with the students to discuss needs to promote the Trail Town initiative. As a result of this meeting the students developed a research plan to address the needs. The research areas included bicycle safety, policy, marketing, and health and economic benefits. The students focused on best practices from other comparable small rural communities within these research areas. Best practices were researched to promote the assets of Trail Towns to encourage involvement and awareness throughout the community. The results demonstrate that bicycle tourism provides viable economic and health benefits to the community. The implementation of a more bicycle friendly community is possible through the best practices in marketing, planning, amenities, and targeted investment. The research will result in a comprehensive plan, which includes economic and health benefits, marketing strategies, and safety practices that increase awareness and use of Morehead's Trail Town assets. This plan will provide Morehead Tourism with campaign ideas to promote Trail Town tourism.

104. Arielynn Rollins

Eastern Kentucky University
Mentor: Vigs Chandra

Gender Disparity in the Field of Technology

For the past three decades, the number of females involved in technology-related educational and career opportunities has steadily declined, to the point where women now represent only a small fraction of the tech industry. While this downward trend has been thoroughly researched and publicized, why the technology gender gap exists is less well-understood. In an effort to better understand why women are underrepresented in the tech field, original data was collected from nearly 150 undergraduate students at Eastern Kentucky University via an anonymous survey and the results were analyzed and discussed in this project. Also included in the project is a discussion of the facts surrounding gender disparity in the field of technology, possible reasons for the gender gap, consequences that result from a lack of gender parity in the tech industry, and actionable solutions that can be applied by educators and society to help increase female involvement in the field of technology. Relying heavily upon empirical evidence as opposed to conjecture, this study aimed to present the research conducted in an accessible and compelling manner. While the original data used for this project provides insight into students' perceptions of gender disparity within the tech field, it is not conclusive and could be enriched through further research. This issue of gender disparity within the field of technology is of great importance, and as technology becomes increasingly prevalent in today's world, a lack of gender parity within the tech industry affects all people whose lives are influenced by technology.

105. Sait Sarr

Kentucky State University
Mentor: Buddhi Gyawali

The Causes and Effects of Global Warming

Global warming is the most popular topic among modern scholars. Various studies have shown environmental changes on an unprecedented scale in human activity. Rising sea levels and mass extinction are typical examples. We conducted the research mainly focusing on the elements, causes, and solutions to the risk of global warming in our lives and environment. The recent and historical data for last 50 years was collected and analyzed from different regions of the world-Africa, Europe, The Americas, Australia and Asia and descriptive statistics were compared and contrasted at the continent level. The causes and damages caused by global warming in each of these regions on our planet was also explored and compared among different continents. The results indicated significant variations in the effects of global warming caused by deforestation, industrialization, urban development, and land use change. The results suggested the needs for minimizing burning fossil fuel and developing more renewable energy sources (solar or wind), climate mitigation and adaptation strategies, reduction in the emission of greenhouse gases especially carbon dioxide (CO_2).

106. Travis Schuyler

Northern Kentucky University
Mentors: Isabelle Lagadic & Sebastien Gauthier

Building Chemistry Abroad

Preparing undergraduate students to succeed in a society and work platforms rapidly moving toward globalization is becoming increasingly important in all academic disciplines. For the STEM (Science, Technology, Engineering and Mathematics) disciplines with sequential and tight curricula, providing undergraduates with study abroad experiences may be very challenging. Yet, most of the future jobs awaiting current undergraduates will involve one or more STEM disciplines and will require a sense of global skills and ability to work effectively across cultures and languages. Over the past four years, the department of chemistry at Northern Kentucky University (NKU) has established an international summer research program that hosted a total of 19 students coming from China (Nanjing University), Ecuador (Universidad San Francisco de Quito, USFQ), France (Institut Universitaire de Technologie (IUT, Lannion) - Université de Rennes 1) and Romania (Universitatae Babes-Bolyai, Cluj-Napoca) to conduct research alongside NKU chemistry faculty and students during the summer. Since last year, this program has been evolving into an exchange program with the creation of research abroad opportunities for NKU chemistry students, such as a nine-week internship for chemistry major Travis Schuyler to conduct research on dye molecules for solar-cell applications at our French partner institution (IUT, Lannion). This poster will highlight the key features of this program as well as Travis Schuyler's internship results and outcomes.

107. Sydney Schwalbach & Christopher Walters

Northern Kentucky University
Mentor: David Raska

Rubicoin: Changing the World of Investing

How do we get millennials to invest in a stock market they don't understand and more importantly, don't trust? This secondary data research report analyzes information to provide branding and marketing recommendations to an international investment startup company, Rubicoin (Dublin, Ireland), trying to answer that very question by introducing a new iPhone app. Specifically, the goal of this client-based project is determining how to make investing more appealing to millennial college students that have little disposable income and are largely financially illiterate yet need to gain better control over their financial future. Through secondary data research (e.g., Nielsen, U.S. Census, HDI, United Nations, OECD, CIA World Factbook, Bloomberg Businessweek, New York Times, and Wall Street Journal) and experience surveys with Rubicoin's CEO, COO and potential target users (e.g., college students), we provide the client with clearly defined target market, including how to appeal to their values, curb the anxiety of investing, and better understand how they can use it to live debt-free life. We also provide a set of clear branding and marketing recommendations, such as focusing on educating target customers about investments through jargon-free, easy to understand fun lessons. It is also recommended that the process has an easy to use scoring system to reveal a company's corporate responsibility and financial stability as well as feature group investments and "Coined Rubi" as a concept to lower perceived risk while making it a social experience. The client has used the insights from our projects to finish the design of its first 100% free app launched in the Apple App Store around the world in October 2014 and its subsequent versions scheduled for 2015 releases. Don't believe it? Download Rubicoin at Apple App Store!

108. Simon Segal & Andrew Sabelhaus

Northern Kentucky University
Mentor: Kebede Gemene

Simultaneous Measurement of Potassium in Plasma and Red Blood Cells by Pulsed Chronopotentiometric Ion-Selective Electrodes

The purpose of this research was to develop an effective method to measure potassium ion concentration in plasma and red blood cells (RBC's) simultaneously. Potassium concentration is vital for health due to its role in the nervous system, cardiovascular system, and in maintaining osmotic balance between cells and interstitial fluid. A concentration outside of the normal range can lead to muscle weakness, decreased reflex response, and even respiratory paralysis and cardiac arrhythmia. Recent research has suggested that simultaneous measurement of extracellular and intracellular potassium concentrations is important for diagnosis of hypertension. The most common methods for potassium measurement used today are Classical Potentiometry and Flame Photometry. These techniques are effective to measure potassium in plasma and/or RBC's after separation and subsequent sample preparations, but inadequate for simultaneous measurement. Classical Potentiometry is time-consuming as it requires calibration prior to every analysis. Atomic Photometry requires intensive sample preparation and can only find overall potassium concentration. Pulsed Chronopotentiometry using potassium ion selective electrodes was fast, reusable, and able to measure both extracellular and intracellular potassium concentrations simultaneously. Here, current pulse of varying magnitudes was applied to extract ions from the sample into the membrane. Depletion of ions at the membrane's surface occurred at the limiting current when the concentration of ions in the solution could no longer sustain the flux (movement) of potassium across the membrane. Our electrochemical measurement detected the break in potential in the form of a potential drop on the potential-current response curve. This limiting-current was proportional to the potassium ion concentration, according to the Sand Equation. After measuring potassium concentration in unlysed blood, lysing agents were added and continual measurements were performed. These gave the total concentration of potassium after lysing was complete. Simple arithmetic allowed for intracellular concentration to be calculated.

109. Lindsey Shain

Western Kentucky University
Mentor: Stephen O'Connor

Cell Phone Use and History of Motor Vehicle Crash

Motor vehicle crashes are the leading cause of death and injury for adolescents and young adults, and can often be traced to distracting behaviors such as in-vehicle cell phone use. Previous research suggests a compulsive mechanism underlying problematic cell phone use that may help explain why young adults are at increased risk for motor vehicle crashes. The current study utilized a sample of 307 undergraduate students recruited from the WKU Study Board. Qualtrics survey software was used to develop an online survey that included questionnaires to measure properties of compulsive cell phone use, motor vehicle crash, interpersonal relationship style and several behaviors associated with driving risk such as impulsivity and alcohol use. Study results suggested that cell phone overuse is comprised of three separate factors that pertain to Emotion, Recognizing Problematic Use, and Anticipation, all of which are significantly positively associated with elevated cell phone use. The Emotion ($\beta = 0.16$, Std. Err. = 0.08, $p = 0.04$) and Anticipation ($\beta = 0.23$, Std. Err. = 0.09, $p = 0.01$) factors were also significantly positively associated with an anxious interpersonal relationship style, while the Recognizing Problematic Use factor was significantly positively associated with female gender ($\beta = 0.53$, Std. Err. = 0.017, $p < 0.01$) and problematic alcohol use ($\beta = 0.56$, Std. Err. = 0.24, $p = 0.02$). We intend further to analyze the data using a structural equation modeling method that will test a conceptual model of risk for motor vehicle crash. Compulsive cell phone use may be associated with clinical and personality mechanisms that ultimately impact risk of motor vehicle crashes in young adults.

110. Jacqueline Sippel, Amber Hussain & Christina Seibert

University of Louisville
Mentor: Joseph M. Steffen

Tissue and Gender Differences in Rat Adiponectin Receptor Levels

Obesity and diabetes are both local and international health problems. Adiponectin is a protein secreted from adipocytes and other tissues such as muscle which influences carbohydrate and lipid metabolism. Adiponectin interacts with receptors termed AdipoR1 and AdipoR2, which are similar to G protein-coupled receptors except with a reverse membrane topology. The aim of this study is to determine the levels of AdipoR1 and AdipoR2 within cardiac, skeletal, and liver tissue samples of non-obese rats, with the objective of determining potential differences in the tissue levels of these receptors and determining any gender differences. Samples of tissue were homogenized, the lysate centrifuged to produce a supernatant, and the protein content analyzed. AdipoR1 and AdipoR2 levels were determined by ELISA (NeoBiolab, Boston, MA). The data supports a difference ($P \leq 0.02$) in AdipoR1 levels between the liver and muscle tissue (gastrocnemius, soleus, and heart), as well as between the genders for the gastrocnemius and liver. The levels of AdipoR2 in the liver were also significantly lower than in muscles (heart and gastrocnemius), with significant differences ($P \leq 0.01$) between the genders for liver. The data from the current study supports previous work on the relative levels of AdipoR1 between muscles and liver, but does not identify any difference between muscle types. In addition, gender differences in the levels of AdipoR1 in gastrocnemius and liver are novel observations. However, the data from the current study contradicts that of previous reports, which had suggested that liver had a higher level of AdipoR2 than muscle tissue, indicating that further investigation and confirmation is necessary.

111. Conrad Smart

University of Louisville
Mentor: David Brown

Study of D^0 Meson Production in Electron-Positron Annihilation Near 10 GeV Center of Mass Energy

We measure the per-event production rate and momentum spectrum of D^0 mesons created in electron-positron annihilations via the process e^+e^- annihilation goes to quark-antiquark hadrons at 10.54 GeV center-of-mass energy. The data was collected over a period of stable running by the BABAR Experiment at the Stanford Linear Accelerator Center (now SLAC National Accelerator Laboratory). In this study, we reconstruct the D^0 meson through its decay $D^0 \rightarrow K^- \pi^+ \pi^0$. Using the known branching ratio for this mode, and efficiencies estimated from Monte Carlo simulation studies, we find that on average 0.092 D^0 mesons are produced per e^+e^- annihilation. This information improves the current knowledge of hadron production from electron-positron annihilation and helps gain a better understanding of Quantum Chromodynamics and hadronic matter production.

112. Amanda Speller

University of Louisville
Mentors: Carlee Lehna, Carol Hanchette & Mary-Beth Coty

Development of a Fire Incidence Model to Identify Areas of High Community Risk

The primary purpose of this study was to use geographic information systems (GIS) to create a cartographic risk model to predict areas of increased potential for fire occurrences. A secondary purpose was to obtain actual fire incident data to validate the model. Census variables associated with seven risk factors for burn injury identified in the literature (categories: age, race, education level, socioeconomic status, home value, home ownership, and age of home) and GIS software were used to develop the model. Residential county fire dispatch data and statistical analysis were used to validate the model. The geographic areas identified as high and severe risk were located in the northwestern and central areas of the county. There was a strong correlation ($r= 0.655$) between risk model scores and actual fire incident rates. There were significant differences in mean fire rates by risk category ($F = 87.58$ 187,3 , $p < 0.001$), with the exception of the low and medium risk categories. Fire incident rates among census tracts showed positive spatial autocorrelation (Moran's $I=0.542$, $p<0.001$) and produced a map showing a significant cluster of high fire incidence in the northwestern region of the county. The fire risk model has potential to lead to more effective fire prevention and education programs. Having a model like this would allow fire departments and local governments to focus their limited resources of money, equipment, and manpower to the geographic areas that are at highest risk for fires.

113. Cody Sterling

University of Louisville
Mentor: Robert F. Lundy, Jr.

Localization of GABA within CRH- or SST-expressing Axon Terminals in the PBN

Corticotrophin-releasing hormone (CRH) is a hormone that increases short-term appetite, and somatostatin (SST) is a hormone that conflictingly increases or decreases short-term appetite based on dose and application site. Previous work has shown that these hormones project into the taste-sensitive area of the parabrachial nucleus (PBN); this project aimed to investigate synapses in the PBN that contain these hormones and determine if there is a correlation with expression of the inhibitory neurotransmitter GABA. SST or CRH terminals in the PBN were labeled by crossing SST-cre or CRH-cre mice with Ai9 TdTomato fluorescent reporter mice. In SST/TdTomato mouse tissue, seventy-five percent of SST synaptic terminals (27 of 36) in the PBN contained GABA. In contrast, only 8 of 28 (28%) CRH/TdTomato synaptic terminals in the PBN contained GABA. Additional experiments using viral delivery of fluorescent reporter identified SST cell types in the central nucleus of the amygdala (CeA) as a major source of GABAergic input to the PBN. In all cases, the majority of postsynaptic targets did not contain GABA, which likely reflects direct synaptic contacts on PBN projection neurons. These results indicate a mechanism whereby activation of SST CeA cell types can monosynaptically inhibit PBN neurons and gate the relay of taste signals through the PBN.

114. Kamillah Taylor

Kentucky State University
Mentor: Tamara Sluss

Location and Percent Canopy Cover of Ash Trees Infected by the Emerald Ash Borer (EAB) on the Campus of Kentucky State University

The Emerald Ash Borer (EAB) has led to the mortality of many Ash trees (*Fraxinus americanus)* in the Commonwealth of Kentucky. The EAB has the potential to cause a devastating effect on the lumber industry and wildlife that use the tree as their habitat. The EAB larvae harm the Ash tree by consuming the cambium of the tree, which reduces the nutrient flow in the tree and leads to a reduction of the foliage within a few years after infestation. For this study, the percent canopy cover of the affected Ash trees was evaluated with a crown densiometer on the campus of Kentucky State University in Frankfort, KY from late summer to abscission and leaf fall. Ash trees within walking distance of paved surfaces (e.g. parking lots and sidewalks) were assessed for this study. The GPS coordinates were collected with a Garmin eTREX GPS receiver and a map was created. There were approximately 65 trees assessed for this study. The mean percent canopy cover of the sampled trees was 19.5% while the median percent canopy cover of the sampled trees was 7.28%. Fifty-five percent of the sampled trees had less than 10% cover, which could have included dead branches and vines. Based on the results of this study, we suggest the removal of the trees that could cause potential damage to property and replant with native species not parasitized by the EAB.

115. Lucas Taylor

Morehead State University
Mentor: Johnathan Nelson

Moral Indignation: A Model of Anger Expressions in Response to Unethical Behavior

Ethics scandals in organizations have brought attention to the need for ethical leadership—leaders who exhibit integrity and promote ethical behavior in those around them—to foster the ethical behavior of organizational members. While ethical leadership has been identified as one important influence on ethical behavior, we do not fully understand the role of emotional displays by ethical leaders in promoting ethical behavior. Recent research indicates that emotional expressions and emotion management are critical elements of effective leadership, making it important to understand their role in ethical leadership. Understanding the role of emotional displays in ethical leadership may help leaders respond more effectively to and prevent unethical behavior. One powerful emotional display is anger. Typically anger is viewed as a negative emotion, but recent research suggests that anger expressions can have positive benefits in some situations. To better understand outcomes of anger expressions and their implications for managing ethical behavior, we conducted a literature review examining anger in organizations, including outcomes associated with anger expressions, both positive and negative. Based on this literature review, we have developed a conceptual model explaining the role of moral indignation in responses to unethical behavior. Specifically, our model identifies when anger expressions are most likely to contribute to positive outcomes in the management of ethical behavior. Based on this model we describe implications for future research on anger expressions and behavioral ethics. We also present organizational implications and make recommendations for how anger expressions can be used to manage ethical behavior in organizations to help prevent ethics scandals in the future.

116. Connor VanMeter

University of Kentucky
Mentor: Peter D. Nagy

Effective Inhibition of TBSV Replication by Cellular TPR-domain Proteins

Viruses are a continuing threat to our society. Tomato bushy stunt tombusvirus (TBSV) is a (+)RNA virus that causes tomato to produce stunted fruit. This virus is used as a model to study virus replication and virus-host interactions based on yeast as a model host. TBSV utilizes two proteins to form a viral replicase complex: a RNA chaperone (p33) and a RNA-dependent RNA polymerase (p92pol). This complex is common to all (+)RNA viruses. This research has allowed for the screening of numerous cellular proteins for TBSV-host interaction. The above screens led to the identification of a new group of virus inhibitory factors, called cell-intrinsic restriction factors (CIRFs). Among the most potent CIRFs are the tetratricopeptide repeat (TPR, a 34 amino acid sequence) containing host proteins that greatly inhibit TBSV replication and assembly. The TPR motif interacts with TBSV when p92 binds to the co-opted cellular heat shock protein 70 (Hsp70). Our work has led to the identification of a series of TPR-containing proteins that inhibit tombusvirus replication and assembly. These proteins can be split into two groups: Hsp70/90 binding and non-Hsp70/90 binding. These TPR sequences have been tested in vitro and using a yeast two-hybrid system to measure protein-protein interaction between TPR and TBSV p92. The TPR sequences have also been tested for association and disassociation with viral factors using surface plasmon resonance. These findings give insight into the inhibitory role of TPR in TBSV replication. Future research may show how the TPR motif influences replication in other (+)RNA viruses.

117. Faith VanMeter

University of Kentucky
Mentor: Peggy Keller

Changes in Child Maltreatment Rates Over Time: Correspondence with Substance Use Rates and Changes in Socioeconomic Status

Child maltreatment (abuse and neglect) is a social problem across the US. More information about the potential causes of child abuse is therefore needed. This study takes a new approach to the problem through secondary analysis of state-level data. Based on prior research showing the increased risk of child maltreatment in the context of parent substance use or poverty (Cancian, Slack, & Yang, 2010; Bushman & Cooper, 1990), we predicted changes in socioeconomic status (SES) and drug and alcohol use rates would influence child maltreatment. Data stemmed from 50 states and Washington, DC (N = 51), and were public data provided by the Administration for Children and Families, the Substance Abuse and Mental Health Services Administration, and the US Census. Overall victimization rates, age-specific victimization rates, and fatality rates were examined. Substance use rates for alcohol, marijuana, and other illicit drugs were examined. Poverty rate, percent high school completion, and unemployment rate were combined to provide a single measure of SES. We focused on changes from 1999/2000 to 2001/2002, and from 2009/2010 to 2011/2012. From 1999 to 2002, most measures of child victimization increased over time ($p < .05$). Relations between substance use and child maltreatment depended on SES. For example, increases in marijuana use predicted increases in child fatality rates, but only for states that also saw decreases in SES. From 2009 to 2012, rates of victimization only for 0-3 year olds increased, and fewer relations between substance use, SES, and child maltreatment were observed.

118. Mark Vinas

University of Kentucky
Mentor: Steven Estus

The Effects of TRPM8 Gene Variants on Migraine

TRPM8 is a member of the transient receptor potential cation channel family. TRPM8 is a ligand-gated ion channel protein that is activated by cold or menthol. When activated, the TRPM8 protein lets Na+ and Ca2+ ions enter the cell, which generate depolarization and action potentials. The somatosensory cortex in the brain perceives the incoming signal as the sensation of cold pain. Markus Schurks' research found that heredity is an important aspect in susceptibility to migraines. About 50% of effected individuals have a first-degree relative who suffers from migraine which supports the idea that migraine risk is modulated by polymorphisms in the human genome [4]. A single nucleotide polymorphism (SNP), rs10166942, was recently found to be related to migraine risk in three large genome-wide association studies [1-3]. The minor allele of the SNP has reduced risk of migraines. More recently, the minor SNP allele was also associated with less intense cold pain. Two SNPs, rs13004520 and rs17868387, were found that are co-inherited with one another 100% and 33% of the time with the migraine SNP. Both of these SNPs change TRPM8 amino acids (missense mutations). These mutations are predicted by poly-Phen to alter TRPM8 function. The minor and major alleles of the TRPM8 gene are being cloned and transfected into HEK293 cells. Using menthol or cold stimulus, the response of the two forms of the TRPM8 cells will be tested. When stimulated by cold or menthol, the minor allele of the two forms should have less Na+ and Ca2+ ions in the cells. This is because people with the minor allele reported less intense cold pain. Elucidating the function of these two SNPs will thus show how we may be able to alter TRPM8 function to reduce the risk of migraine.

119. Sara Wallace

Murray State University
Mentor: Jana Hackathorn

I Just Can't Help Myself: Hoarding Tendencies and Personality Traits

Although many studies have been conducted regarding the subject of hoarding, treatments and obsessive compulsive disorders, there is little known research regarding how various personality traits not commonly associated with obsessive compulsive disorder (OCD) are related to hoarding. Hoarding is associated with substantial functional impairment, as clutter prevents the normal use of space for basic activities such as cooking, cleaning, moving through the house, and even sleeping. The current correlational study examined the relationship between hoarding tendencies and other personality traits including anxiety, sociability, impulse control, orderliness, reclusiveness, neuroticism, cautiousness. A total of 175 participants (males = 81, females = 93, gender-queer = 1), with ages varying from 18-79 (M = 25, SD = 10.98), were recruited from both undergraduate psychology courses and MTURK. The results indicated that difficulty discarding objects was significantly correlated (all ps < .001) with anxiety (r = .34), impulse control (r = -.36), orderliness (r = -.40), neuroticism (r = .35), and cautiousness (r = -.27). Also, the amount of clutter in the home was significantly correlated (all ps < .001) with anxiety (r = .26), impulse control (r = -.43), orderliness (r = -.38), neuroticism (r = .31), and cautiousness (r = -.35). Finally, over acquisition of objects was also significantly correlated (all ps < .001) with anxiety (r = .35), impulse control (r = -.45), orderliness (r = -.29), neuroticism (r = .37), and cautiousness (r = -.45). Sociability and reclusiveness were not significantly correlated with any of the hoarding tendencies (all ps > .05). These results can serve as valuable information for further research and development of hoarding treatments. By understanding which personality traits are significantly correlated with hoarding behaviors, treatment methods can be altered in the presence of these specific traits to be most beneficial to each hoarder's individual treatment.

120. Jack Wassom

Western Kentucky University
Mentor: Muhammad Jahan

An Experimental Investigation Into the Micro-electro-discharge Machining of Aerospace Material Ti-6Al-4V

Ti-6Al-4V is extensively used in aerospace, biomedical and automotive industries due to its high specific strength (strength-to-weight ratio), superior mechanical and thermal properties, and excellent corrosion resistance. The present study intended to investigate the machinability of Ti-6Al-4V under the micro scale electro-discharge machining (micro-EDM) process. The machinability was investigated by machining a number of micro features using different parameters settings and evaluating the quality of micro features in terms of surface finish and dimensional accuracy. The surface quality and dimensional accuracy of the micro features were evaluated by scanning electron microscopy (SEM), energy dispersive X-ray spectroscopy (EDS) and X-ray diffraction (XRD) analysis. The machining time and tool electrode wear during the fabrication of micro features were also studied. It was found that the micro-EDM process was capable of successfully fabricating single and arrays of micro features with any desired shape or pattern. However, one of the biggest challenges during the micro-EDM of Ti-6Al-4V was the re-solidification of removed debris on the machined surface. This may have been due to the strong alloying tendency of Ti-6Al-4V at higher temperature. The surface modification as a result of re-solidification of debris and migration of materials was confirmed by the EDS and XRD analysis. Higher tool electrode wear was found to be another obstacle to the machinability of Ti-6Al-4V, which causes poor dimensional accuracy of the micro features. The surface finish of the micro features was found to be better at lower settings of voltage and capacitance. This was due to the fact that lower settings of voltage and capacitance generated lower discharge energy during machining, resulting in smaller craters. Smaller and uniform craters were the primary requirement for obtaining smooth surface finish during the micro-EDM of Ti-6Al-4V.

121. Larissa Watkins, Jared Dye, & Samuel Smart

Eastern Kentucky University
Mentor: Don Yow

Collaborating With the City of Richmond to Conduct An "As Built Survey" of Irvine-McDowell Park

The city of Richmond has proposed installing stormwater storage structures in Irvine-McDowell Park to alleviate urban flooding issues in downtown Richmond. City officials asked undergraduate seniors in Eastern Kentucky University's Department of Geography and Geology to conduct an "as built survey" of the park to aid their efforts. We used the minimum standard detail requirements for ALTA/ACSM (American Land Title Association / American Congress on Surveying and Mapping) land title surveys as a guide, although we ultimately created our own list of features and pertinent attributes in consultation with the city. Field work was conducted using Global Positioning System receivers capable of achieving desired accuracy levels. The resulting geospatial database allows all data to be queried and mapped using Geographic Information System software. Richmond's planning and zoning office will ultimately use these data in future planning decisions. Based on our work, we feel that Irvine-McDowell Park is not a suitable location for the proposed stromwater storage features. The park is situated on relatively high ground and very little stormwater would flow into the park under the influence of gravity. We have identified another location nearby that we believe would be a more optimal location for stormwater storage.

122. Chelsea Watts

Kentucky State University
Mentors: Shawn Coyle, Leigh Anne Bright & James Tidwell

Evaluation of Stocking Density During Second Year Growth of Largemouth Bass,* Micropterus salmoides*, Raised Indoors in a Recirculating Aquaculture System

Largemouth bass*, Micropterus salmoides*, (LMB) are a highly desirable food fish among ethnic Asian populations in large cities throughout North America. The primary production method for LMB has been in outdoor ponds, requiring two growing seasons (18-24 months). Indoor controlled environment production using recirculating aquaculture system (RAS) technologies could potentially reduce the growout period to 12 months by maintaining ideal temperatures year around. We conducted a 26 week study with second-year LMB in indoor recirculating tanks to evaluate optimal stocking densities for growout to food-fish size. Largemouth bass fingerlings (101 ± 10 g average weight) were randomly stocked into nine 900-L tanks to achieve densities of 30, 60, or 120 fish/m^3, with three replicate tanks per density treatment. A shared recirculating system consisted of a 3,000-L sump, a ¼ hp pump, a bead filter for solids removal, a mixed-moving-bed biofilter for nitrification and 400 watt ultraviolet light for sterilization. All fish were fed a commercially available floating diet (45% protein and 16% lipid) once daily to apparent satiation. At harvest all fish were counted, individually weighed, and measured (total length). Total biomass densities significantly increased ($P \leq 0.05$) with stocking rate achieving 6.2 kg/m^3 at 20 fish/m^3, 13.2 kg/m^3 at 60 fish/m^3, and 22.9 kg/m^3 at 120 fish/m^3. However, the stocking densities evaluated here had no significant impact ($P > 0.05$) on survival, average harvest weight, or feed conversion ratio (FCR) which averaged 93%, 29 4g, and 1.8, respectively.

123. Holly Wells

Morehead State University
Mentor: Sarah Hawkins-Lear

Using Blackboard Collaborate to Teach Students across the State of Kentucky

Holly Wells, under the advisement of Dr. Sarah Hawkins-Lear from the department of Special Education at Morehead State University, conducted a research study to examine the effects of using Blackboard Collaborate to teach special education college courses to both undergraduate and graduate students across the state of Kentucky. Blackboard Collaborate is a seemingly new way to teach students using technology. Many colleges and universities use distant education where there is not any face to face interaction with students. With Blackboard Collaborate, the students participate in the class session during a synchronous meeting time, while on-line. With this type of instruction, students have the opportunity to participate in the course within their home or familiar setting. This poster presentation has implications for rural special education due to the delivery of content the professor is using to teach students in rural eastern Kentucky. Now, instead of students driving over 2 hours each way to take a course, they can participate in the course from the convenience of their homes. This also will be a positive factor when there are hazardous winter weather conditions and many students can't make it to class. A survey was administered at midterm and will again be administered at the end of the semester to three undergraduate/graduate courses. The results from the midterm survey were positive. The majority of students like this type of instruction and ask for more courses to be offered in this format. This research study also will provide results from an end of the semester survey and data will be compiled across the semester. Not only can Blackboard Collaborate be used to deliver special education content material, but other disciplines can use the same delivery method to teach their specific content area.

124. Taylor West

University of Kentucky
Mentors: Sung Hee Kim & Richard Smith

Effect of Awe on Future Self

Research shows that awe, compared to other positive emotions, leads to greater patience, higher helping behavior, and greater life satisfaction (Rudd et al., 2012). Research on temporal discounting shows that the greater self-continuity between our current and future selves we feel, the more likely we delay gratifications. The present research aimed at synthesizing these two lines of research by examining whether awe would enhance self-continuity between the two selves. We hypothesized that awe, relative to another positive emotion, would increase similarity between two selves, a measure for self-continuity. 116 participants were randomly assigned to either majestic nature or baby animal images condition. Research shows that nature images elicit awe, while animal ones elicit affection (Shiota et al., 2007). Afterwards, they completed mood items and an assessment of their current and future selves. We analyzed the data using an independent t-test. In both conditions, participants reported a similar, high level of happiness, indicating the emotions generated by images were positive. However, participants in the awe condition reported stronger feelings of being inspired, calm, grateful, humble and insignificant than did those in the affection condition. As expected, participants in the awe condition reported significantly greater similarity between their current and future selves ($M = 4.54$, $SD = 1.32$) than those in the affection condition ($M = 4.05$, $SD = 1.42$), $t(109) = 1.85$, $p < .03$, $r = .17$. In sum, adding to benefits shown by previous research, the present study suggests another potential benefit of awe: Enhancing positivity toward future self.

125. Elizabeth Williams, Jacob Donnermeyer, Katelyn Tesla & Rachael Gasser

Northern Kentucky University
Mentors: Amy Gillingham & Holly Attar

Project EMBRACE: Exploring Musical Boundaries, Relationships, and Artistry in Composition and the Environment

Cultivating young, holistic musicians requires fostering both technique and ingenuity. The NKU String Project engaged in a composition project wherein undergraduates taught children the art of composition through an environmental lens. Students were guided to write and perform original works of music inspired by nature and environmental concepts. The results consisted of original works of music (composed by youth students) that demonstrated comprehension of musical language through the use of good practices in melodic, harmonic, and formal norms of western music. A performance and demonstration was presented at the American String Teacher's Association National Conference in Louisville, KY on March 5, 2014.

126. Ryan Winstead

University of Kentucky
Mentor: Phil Harling

Queer Spaces in Kentucky: Understanding LGBTQ Migration

Situated as a geographical fusion of the Bible Belt and the rural south, Kentucky - specifically Appalachia, KY - has been popularly known as a breeding ground of intolerance and bigotry toward the LGBTQ community. Consequently, there exists the notion that a large portion of the LGBTQ community members migrate out of the region in favor of more secular, urban residences to escape social alienation and become immersed in a more expansive queer community. Our research sought to explore the validity of this notion and gain a more complete understanding of the ways in which rural and urban spaces are conceptualized by the LGBTQ Kentucky community through migration. We hypothesized that while there are both positive and negative elements to living in either urban or rural spaces, the general migratory trend is from rural to urban. We tested this hypothesis by conducting ten semi-structured interviews with LGBTQ Kentuckians at both colleges and universities across the state. Individuals were asked questions regarding the motives behind their migration, the discrimination they faced at their former and current residences and the satisfaction and the impact moving has had on their lives. Two majors themes appeared among a majority of the participants: first, discrimination, particularly stemming from religious ideologies, played a large role in pushing the LGBTQ individuals away from rural areas; secondly, while new social technology has permitted rural LGBTQ Kentuckians greater access to local queer communities, the migratory trend is still one of rural individuals moving to more urban areas. The results of this study make clear the progress and resilience rural LGBTQ communities maintain in the face of widespread discrimination, and illuminate the diverse ways in which oppression can be subverted over time. Simultaneously, however, it is a call to action to provide more support to rural locales for LGBTQ folks.

127. Nathaniel Wright & Brandon Coggeshall

University of Kentucky
Mentor: Christopher Sass

Geomorphic Changes in Inner-Bluegrass Streams, Lexington, KY

Stream effects resulting from urbanization can be difficult to assess, especially without quantifiable measures. Agencies have spent billions of dollars rehabilitating streams to decrease these effects through Best Management Practice usage. This study's goal was to establish monitored sites of urban effected streams, measuring their morphology and hydrology long term within Kentucky's Inner-Bluegrass Region. Four initial stream reaches representing different riparian variables and flow regime in the same watershed were chosen and established over the summer of 2014. Reach selection was based on riparian vegetation and stream flow. Establishment of reaches included longitudinal profiles, pool and riffle cross-sections, and pebble counts. Rosgen classification was used to establish baseline conditions. As a part of the historical monitoring, documentation of urbanization, how urbanization influences streams' geomorphic characteristics, and how those characteristics have changed. Once establishment was complete, a process of analyzing data, researching past stream movement through the landscape and classification, and comparing past and present geomorphic characteristics began. We assessed lateral stream movement using historical aerial photographs, along with measured erosion and changes to the stream channels. Stream reaches were more entrenched, straighter, and wider than historically, encouraging higher flow velocities and increasing the rate stream channels carve the landscape through erosional processes. As our research continues, we expect results to illustrate streams in the urban Inner-Bluegrass region function much differently than in the past. This knowledge will aid us in creating systems that work for the new hydrologic regime being delivered to urban stream sites.

128. Edward Zielinski

Eastern Kentucky University
Mentor: Michael Bradley

Visitation & Place Attachment at Kentucky State Parks

Visitation to state parks is important for social and economic growth for communities. State parks often play a role or are the driving force for local economies (Smith, Anderson, Davenport & Leahy, 2013; White & Gooding, 2013). Therefore, increased total visitation and revisit likeliness are important for local communities close to state parks. Research has shown that clean and maintained natural areas (Fletcher & Flecther, 2003) and removal of experience participation barriers increase visitation and likeliness to revisit (Scott & Munson, 1994; Walker & Crompton, 2013). Further, visitors that feel connected to the natural area are also likely to revisit the resource and local community (Lee, Kyle, & Scott, 2012). Thus, it is critical to identify place attachment, and barriers to access perspectives from visitors to state parks. Such information can aid managers as they sustain the natural resource in a way that promote initial and additional visitation. Place attachment, barriers to access, and demographic information was collected at three state resort parks in Kentucky in 2014. The researcher found that visitors did not perceive any barriers to access, yet also did not show elevated levels of place attachment. Thus, further inquiry is necessary to identify variables to increase place attachment and overall visitation to the state parks included in this study. In that barriers to access were not found, increasing place attachment is a likely way to increase overall visitation and thus improve the local economies, but further research should include other variables related to increasing state park visitation.

129. Cody Garcia

Morehead State University
Mentor: Nilesh Joshi

Human Simulation and Ergonomics Analysis

Factory workers spend a significant amount of time on their assigned workstations performing tasks that are repetitive in nature. These tasks are not only physically exhausting, but also impose bio-mechanical stresses on workers. Various ergonomic risk factors such as repetitive movements, awkward postures, static postures, excessive noise and vibrations, and extreme hot or cold temperatures can add to workers' fatigue. Poorly designed workstations exacerbate these factors and can lead to various musculoskeletal disorders (MSDs) among workers such as muscle strains, carpal tunnel syndrome, tendonitis, lower back pain, etc. In this research, human modeling and simulation was used to recreate real life factory workers and their workstations in a virtual environment. Using the simulation software, the virtual workers were designated to perform similar tasks as in real life situations. The purpose of this study was to analyze ergonomic risk factors that can lead to musculoskeletal diseases and complications among workers. Using various ergonomics risk analysis tools in simulated environments, we collected data on a multitude of health hazards caused by the tasks performed and gained information that allowed us to adjust the workers' positions and/or the positions of the work stations. The results led to better quality of work, while at the same time reducing the risk for joint and muscle strain. Strengths and weaknesses of human modeling and simulation in ergonomics risk analysis are also explored.

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