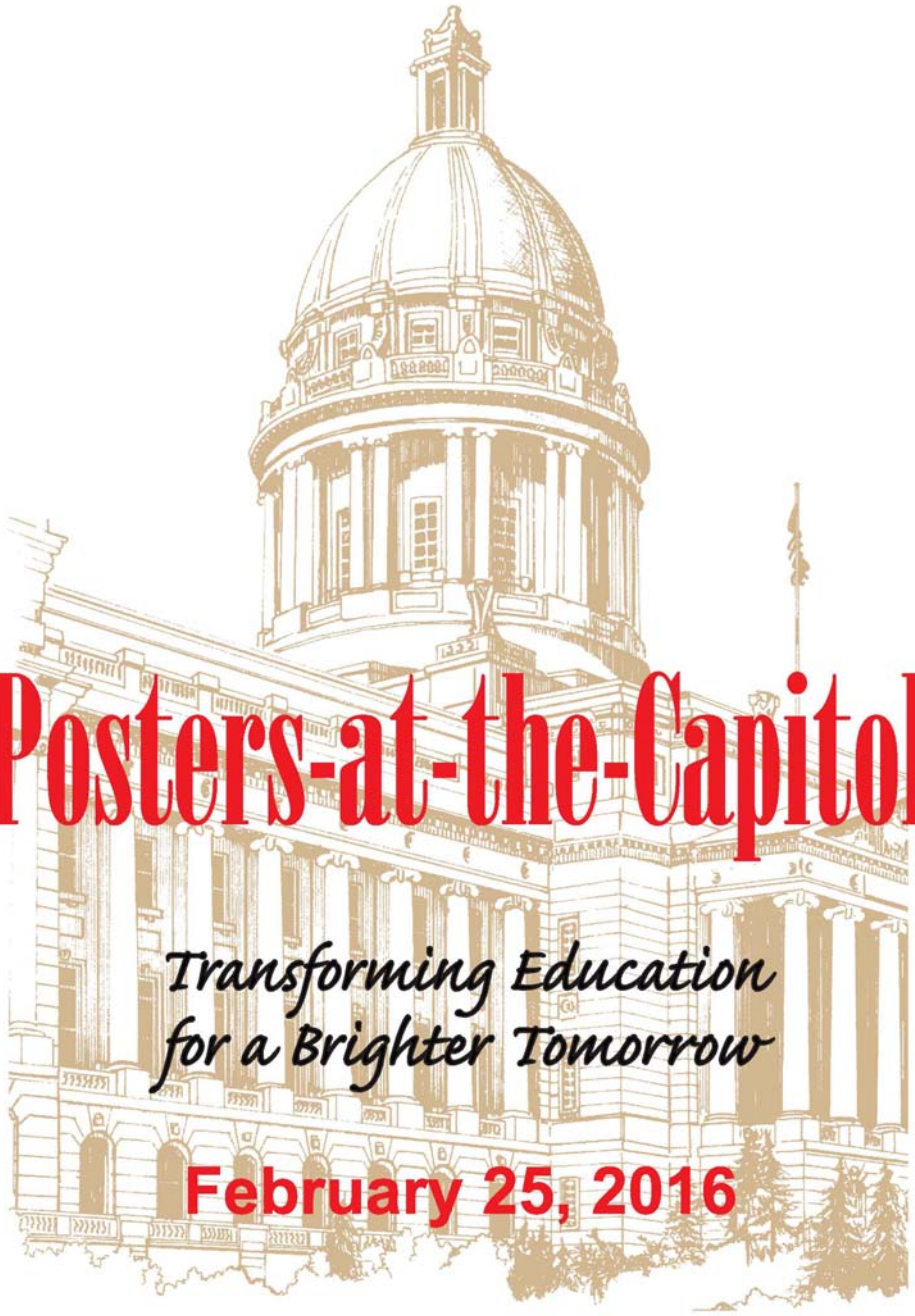
NORTHERN KENTUCKY UNIVERSITY • UNIVERSITY OF KENTUCKY • UNIVERSITY OF LOUISVILLE • WESTERN KENTUCKY UNIVERSITY • KENTUCKY COMMUNITY AND TECHNICAL COLLEGE SYSTEM • EASTERN KENTUCKY UNIVERSITY • KENTUCKY STATE UNIVERSITY • MOREHEAD STATE UNIVERSITY • MURRAY STATE UNIVERSITY •



Posters-at-the-Capitol

Transforming Education for a Brighter Tomorrow

February 25, 2016

Welcome from President Michael Benson of Eastern Kentucky University:

Eastern Kentucky University is proud to participate in the 15th 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:

It is with great pride that we at Kentucky State University participate in the annual ***Posters-at-the-Capitol***. As a comprehensive 1890's land-grant institution, Kentucky State University holds in high regard a commitment to research, service, and teaching, particularly in the food and agricultural sciences. With the University's increased focus on the sciences and the addition of more resources to undergraduate research, ***Posters-at-the-Capitol*** is significant in its mission, allowing our students and to showcase their talents on a stage that includes faculty, other researchers and members of the General Assembly.

Undergraduate research helps students gain applicable knowledge, critical thinking skills, and the ability to work collaboratively within teams. The University's increased focus on research is in recognition of the valuable experience that students gain from laboratory research outside the classroom and the discoveries they make that improve and change how we see the world around us. KSU is committed to promoting such research.

Society benefits greatly from the investment in undergraduate research programs at our University. The research done here has addressed issues that make an impact on our University, the Frankfort community, our state and beyond. 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 our students and faculty showcase.

I congratulate the students and faculty whose work graces these halls and commend them as they pursue in all things excellence.

Welcome from President Wayne D. 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. 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.

President Andrews' Continued

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 fifteenth annual ***Posters-at-the-Capitol***. Murray State University's leadership in this worthwhile 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 University continuously supports faculty-student interactions. 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 citizens of our Commonwealth 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 15th 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:

The University of Kentucky, as the state's flagship and land grant research institution, is truly the University *for* Kentucky. As such, a fundamental component of our commitment to the state and the people we serve lies in research– the creation of knowledge.

The world-class researchers at UK conduct this important work across an array of disciplines and in collaboration with communities. And, as part of our calling to prepare the next generation of scientists, artists, creators, mentors and givers, among the most precious of these collaborations are those with undergraduate students. Undergraduate research—the interplay between research in the lab and academic preparation in the classroom—provides a rich educational experience for our students.

Now in its 15th 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.

Through undergraduate research, students experience the intellectual inquiry that is the foundation of scholarship at the University of Kentucky. They have the precious opportunity to work alongside experts in their fields of study—receiving mentorship and guidance as they enhance what they learn in the classroom with practical applications in the field. For faculty, this represents one of the greatest rewards in academia—watching an eager young mind passionately pursue new knowledge. Igniting curiosity in the next generation of leaders enriches our faculty's experience and is at the core of our noblest profession.

Undergraduate research embodies a vital component of who we are and what we do at the University 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 stubborn challenges and create a better future for all those we touch and teach.

Welcome from President James Ramsey of the University of Louisville:

The University of Louisville embraces its legislative mandate to be a "premier metropolitan research university." That means that quality research sits at the top of our agenda, as does involving students in that research. In many cases, undergraduate students, including sophomores and juniors, participate in research at UofL. They get a chance to work on cures for cancer, heart disease and other health care dilemmas. They work on solving social and energy problems as well. UofL students learn side-by-side with some of the top researchers in the country, our faculty members, who mentor them and expose 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. This program gives our students a chance to showcase their great work while validating UofL's commitment to their educational experience. It serves as proof to our government officials that the state's financial support of public universities and research and development pays off.

The University of Louisville proudly participates in the ***Posters-at-the-Capitol*** program. We're also proud of our enterprising 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 fifteenth 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

Cheryl Davis
www.wku.edu

Mary Janssen
www.kctcs.edu

Kentucky Council on Postsecondary Education

Matthew G. Bevin
Governor

1024 Capital Center Drive, Suite 320
Frankfort, Kentucky 40601
Phone: 502-573-1555
Fax: 502-573-1535
http://www.cpe.ky.gov

Robert L. King
President

February 25, 2016

Dear Participants, Faculty Mentors, and Guests:

I welcome you to the 15th annual *Posters-at-the-Capitol* and wish to commend this program for its important mission. *Posters-at-the-Capitol* strives to help increase the understanding of the important role undergraduate research plays in the education of our students among those responsible for higher education funding in Kentucky.

We strive at the Council on Postsecondary Education to discover new strategies to expand research collaborations among Kentucky institutions of higher education and better communicate the return on investment that research endeavors make to the Commonwealth.

Faculty-mentored experiences such as those exhibited at *Posters-at-the-Capitol* are an excellent way for Kentucky to invest in its future. The challenges of tomorrow's world are complex and many, but our undergraduate students who participate in experiential learning opportunities are more likely to pursue advanced degrees and enter the workforce better equipped for success.

I encourage participants in today's program to use your time at the Capitol to share the results of your projects, outline next steps for your research, and to underscore the role research has played in your collegiate journey.

I appreciate the opportunity to share this day with you and see the diverse array of undergraduate research endeavors taking place across the Commonwealth of Kentucky.

Sincerely,

Robert L. King
President

Schedule of Activities
February 25, 2016

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)

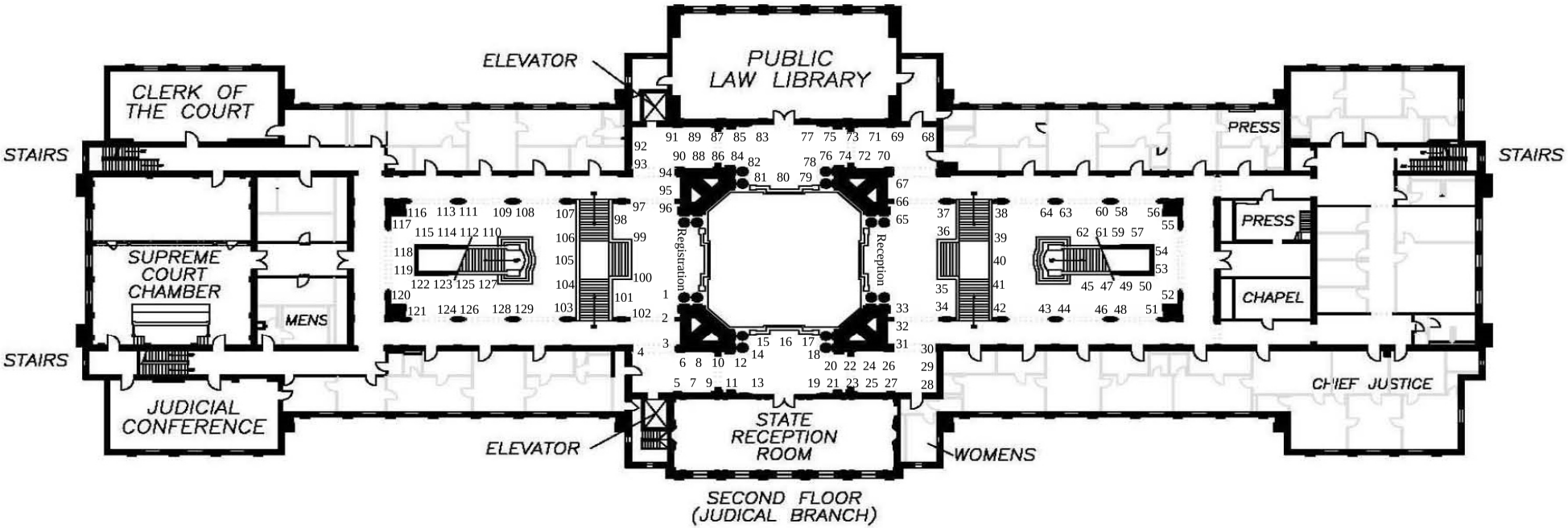
11:30 a.m. to 12:30 p.m. …….……...……Legislative Visit Time and Lunch Break

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.
11	**Arnold**	Nova	Lindsay Calderon	**23**	88	28
11	**Breakall**	Bethany	Lindsay Calderon	**23**	81	34
12	**Caldwell**	Tori	Laurie Larken	**23**	44	33
18	**Cook**	Samantha	Avi Brisman	**27**	53	14
25	**Donlan**	Heather	Stephanie Mcspirit	**31**	39	22
31	**Eisenberg**	Aaron J.	Atilla Sit	**35**	81	34
36	**Fields**	Reagan	Melinda Moore and Jerry Palmer	**37**	80	30
48	**Hartman**	Amelia	David Cunningham	**47**	61	17
54	**Hereford**	Chelsea	Michelle Gerken	**50**	81	34
72	**Maggard**	Rachel	Rebekah L. Waikel	**60**	71	34
48	**Masek**	Rachel L.	David Cunningham	**47**	81	34
73	**Mays**	Alisha	Jennifer Wies	**60**	81	34
77	**Mims**	Laura	William Staddon	**63**	57	7
82	**Niemann**	Julia	Elizabeth Underwood	**66**	33	26
25	**Oliver**	Sarah	Stephanie Mcspirit	**31**	92	29
25	**Parson**	Jade	Stephanie Mcspirit	**31**	81	34
11	**Rollins**	Joseph	Lindsay Calderon	**23**	81	34
96	**Ross**	Abigail E.	Rebekah L. Waikel	**75**	77	28
104	**Smith**	Dennis	Stephanie Mcspirit	**82**	81	34
106	**Smith**	Shelby J.	Lisa Day	**84**	81	34
114	**Thiem**	Rebecca	Michelle L. DePoy Smith	**90**	81	34
121	**Wagner**	Mary	Kristen Renee Causey-Upton	**95**	31	19
123	**Welch**	Katelyn	David Brown	**96**	53	7

Kentucky Community and Technical College System

Poster No.	Student		Faculty Mentor(s)	Page No.	House No.	Senate No.
43	**Adams**	Hanady	Timothy Dick, Chandrakanth Emani, and Connie Johnson	**42**	7	8
43	**Campbell**	Jennifer	Timothy Dick, Chandrakanth Emani, and Connie Johnson	**42**	**7**	**8**
16	**Coffman**	Amanda	Joe Wolf	**26**	18	5
78	**Copeland**	Courtney	Keith Gregory	**63**	10	6
78	**Cunningham**	Hailey	Keith Gregory	**63**	10	6
21	**Cupp**	Rickey	James Hunter and Scott Bain	**29**	6	3
22	**Davey**	Te'Ara	John Ward	**29**	35	35
32	**Elders**	Cynthia	John Ward	**35**	35	35
43	**Hall**	Aaron	Timothy Dick, Chandrakanth Emani, and Connie Johnson	**42**	7	8
21	**Langner**	David	James Hunter and Scott Bain	**29**	6	3
70	**Lee**	Ashley	John Ward	**59**	35	35
21	**McDonald**	Dawson	James Hunter and Scott Bain	**29**	6	3
78	**Moore**	Bailey	Keith Gregory	**63**	10	6
87	**Nichols**	Tamara	Mary Janssen	**69**	10	6
21	**Palowitch**	Erica	James Hunter and Scott Bain	**29**	6	3
87	**Potts**	Alexandria	Mary Janssen	**69**	10	6
16	**Rowland**	Jennifer	Joe Wolf	**26**	18	5
87	**Survant**	Steven	Mary Janssen	**69**	10	6
16	**Tackett**	Pamela	Joe Wolf	**26**	18	5
16	**Warren**	Matthew	Joe Wolf	**26**	18	5
78	**Workman**	Wade	Keith Gregory	**63**	16	6

Kentucky State University

Poster No.	Student		Faculty Mentor(s)	Page No.	House No.	Senate No.
47	**Amankona**	Boniface	Maheteme Gebremedhim, Buddhi Gyawali, and Kenneth Andries	**46**	57	7
1 and 2	**Antonious**	Alexander	Buddhi Gyawali and George Antonious	**17**	57	7
10	**Branttie**	Jean	George Antonious and Eric Turley	**22**	57	7
20	**Croft**	Catherine	George Antonious and Eric Turley	**28**	57	7
39	**Garrison**	D'Andre	Buddhi Gyawali and Jeremy Sandifer	**40**	57	7
47	**Hartell**	Amber	Maheteme Gebremedhim, Buddhi Gyawali, and Kenneth Andries	**46**	57	7
92	**Ries**	Ian	Buddhi Gyawali	**71**	57	7
47	**Sarr**	Sait	Maheteme Gebremedhim, Buddhi Gyawali, and Kenneth Andries	**46**	57	7
112	**Taylor**	Gidgett	Lingyu Huang, Cecil Butler, and Changzheng Wang	**89**	54	15
1 and 2	**Trivette**	Thomas	Buddhi Gyawali and George Antonious	**17**	57	7
129	**Yufeh**	Kelly	Lingyu Huang and Cecil Butler	**100**	57	7

Morehead State University

Poster No.	Student		Faculty Mentor(s)	Page No.	House No.	Senate No.
8	**Blevins**	Tracy	Bernadette Barton	**21**	99	27
17	**Combs**	Tessa	C. Brent Rogers	**27**	61	17
24	**Davis**	Tyler	Steve Chen	**31**	99	27
26	**Dotson**	Elizabeth	Joy L. Gritton	**32**	46	35
34	**Farrell**	Jessica	Jordan Kislear and Jennifer J. Birriel	**36**	99	27
35	**Fields**	Logan W.	Wesley White	**37**	99	27
65	**Fugate**	Joshua Z.	Wilson J. Gonzalez-Espada	**55**	84	30
38	**Gardner**	Kelly	Christina Conroy	**39**	99	27
40	**Gebka**	Sydney	Johnathan K. Nelson	**41**	60	11
41	**Gill**	Brittany	Lori Baruth	**41**	100	18
105	**Guffey**	Sydney	Joy L. Gritton	**83**	36	20
50	**Helton**	Julieann	Joy L. Gritton	**48**	92	30
35	**Howard**	Hannah L.	Wesley White	**37**	99	27
58	**Huang**	Lin-hsiu	Ann Andaloro	**52**	99	27
62 and 63	**Kallas**	Maria	John H. Curry and April Miller	**54**	99	27
65	**Knell**	Janie	Wilson J. Gonzalez-Espada	**55**	72	21
35	**McClurg**	Jason T.	Wesley White	**37**	99	27
38	**Nunley**	Christopher J.	Christina Conroy	**39**	99	27
26	**Rogers**	Jamee	Joy L. Gritton	**32**	99	27
97	**Rowlett**	Robert	Hans Chapman	**75**	99	27
105	**Smith**	Kyle M.	Joy L. Gritton	**83**	99	27
116	**Thompson**	Cierra	Julie Harp Rutland	**91**	99	27
58	**Wilkerson**	Kathryn	Ann Andaloro	**52**	99	27
125	**Wilson**	Brittany	Kim Nettleton	**97**	74	28

Murray State University

Poster No.	Student		Faculty Mentor(s)	Page No.	House No.	Senate No.
4	**Beckert**	Helen	David Pizzo	**18**	11	4
6	**Best**	Daniel	Jessica Naber	**20**	13	8
7	**Biggs**	Lydia	David Pizzo	**20**	29	19
91	**Brannon**	Caleb	Tony Brannon and Jason Robertson	**71**	5	1
14	**Carroll**	Marie	Jana Hackathorn	**25**	5	1
19	**Crittendon**	David	Sean Rife and Jana Hackathorn	**28**	5	1
60	**Hughes**	Caleb	Joshua Ridley	**53**	10	5
91	**Ingram**	Daniel	Tony Brannon and Jason Robertson	**71**	5	1
80	**Nawa**	Maggie	Shea Porr	**65**	5	1
81	**Newport**	Tracey	David Pizzo	**65**	2	1
83	**Owens**	Morgan	Maria Vazquez Brown	**66**	59	26
86	**Pritchett**	Eryn	Aaron Irvin	**68**	5	1
90	**Raley**	Heather	Jessica Naber	**70**	5	1
91	**Reed**	Vaughn	Tony Brannon and Jason Robertson	**71**	15	6
93	**Robbins**	Jordan	Terry Derting	**72**	5	1
99	**Settler**	Kendrick	Patrick Cushen	**77**	5	1
100	**Sherman**	Christina	William DeWees	**78**	5	1
126	**Wilson**	Sierra	Terry Derting	**98**	5	1
128	**Wright**	Samantha	Eric Umstead	**99**	14	8

Northern Kentucky University

Poster No.	Student		Faculty Mentor(s)	Page No.	House No.	Senate No.
3	**Beckerick**	Matthew	Maureern Doyle and James Walden	**18**	68	24
9	**Bolte**	Jessica	Monica Wakefield	**21**	67	24
115	**Carr**	Jared	Chari Ramkumar	**91**	78	24
98	**Emery**	Samantha	Isabelle Lagadic, Sebastien Gauthier, Francoise Robin-Le Guen, Augustin Mot, and Radu Silaghi-Dumitrescu	**76**	68	24
88	**Proctor**	Jonathon	Michael Baranowski	**69**	62	17
89	**Rainford**	Alexander	Bridget Nichols	**70**	67	24
98	**Schuyler**	Travis	Isabelle Lagadic, Sebastien Gauthier, Francoise Robin-Le Guen, Augustin Mot, and Radu Silaghi-Dumitrescu	**76**	59	26
109	**Steffen**	Julia	Kajsa Larson	**87**	68	24
115	**Theis**	Robert	Chari Ramkumar	**91**	67	24

University of Kentucky						
Poster No.	**Student**		**Faculty Mentor(s)**	**Page No.**	**House No.**	**Senate No.**
117	**Baykal**	Annah	Buck Ryan	**92**	75	13
23	**Davis**	Cheyenne	Robert Lorch	**30**	88	12
27	**Donovan**	James	Steven Arthur, Andrea Friedrich, and Jacob Case	**33**	75	13
29	**Dumre**	Sabita	Luke H. Bradley	**34**	88	34
30	**Eastman**	Anna	Deborah Reed	**34**	75	13
27	**Gadbois**	Benjamin	Steven Arthur, Andrea Friedrich, and Jacob Case	**33**	75	13
42	**Gonzalez**	Elaisy	Susan Barron	**42**	75	13
46	**Harpole**	Charles Conyers	Emily Beaulieu	**45**	75	13
102	**Hedrick**	Sierra	Thomas E. Wallace	**80**	75	13
51	**Hempel**	Karl	Anne-Frances Miller and John Patrick Hoben	**48**	54	15
56	**Hoey**	Timothy	Pradeep Kachroo	**51**	75	13
64	**Kim**	Josephine M.	Sylvie Garneau-Tsodikova	**55**	48	26
102	**Krupilski**	Kylie	Thomas E. Wallace	**80**	75	13
68	**Kucharski**	Amir	Peter Kekenes-Huskey	**57**	88	12
71	**Maddox**	Hannah	Kevin J. Pearson	**59**	43	26
76	**McKelphin**	Courtney	Mark Crocker	**62**	75	13
79	**Mulliniks**	Kristin	Sundar Authimoolam, David Puleo, and Thomas Dziubla	**64**	75	13
27	**Neeley**	Robert	Steven Arthur, Andrea Friedrich, and Jacob Case	**33**	62	17
102	**Oates**	Hannah	Thomas E. Wallace	**80**	37	28
117	**Reams**	Scotty	Buck Ryan	**92**	86	21
102	**Schaller**	John	Thomas E. Wallace	**80**	59	26
117	**Shelton**	Abby	Buck Ryan	**92**	26	38
102	**Short**	Kaelyn M.	Thomas E. Wallace	**80**	75	13
111	**Stevens**	Ashley	Arthur Hunt and Daniel Howe	**89**	57	7
113	**Taylor**	Erin	Lindsey Fay	**90**	48	36
117	**Thornton**	Clay	Buck Ryan	**92**	88	12
27	**Vanegas**	Brenda	Steven Arthur, Andrea Friedrich, and Jacob Case	**33**	39	22
119	**Vargason**	Ava	Thomas D. Dziebla, J. Zach Hilt, Kimberly W. Anderson, and Carolyn Jordan	**93**	75	13
23	**Whaley**	Davis	Robert Lorch	**30**	75	13

University of Louisville

Poster No.	Student		Factulty Mentor(s)	Page No.	House No.	Senate No.
15	**Clemons**	Rachel	Margaret Carreiro	**26**	34	19
75	**Duan**	Xiaoxian	David Scott	**62**	40	35
44	**Hameed**	Zohair R.	James L. Wittliff and Michael W. Daniels	**43**	25	10
45	**Hannon**	Christopher	Said Abusalem	**44**	42	35
53	**Herde**	Zachary	Jagannadh Satyavolu	**49**	40	19
61	**Kaelin**	Brenna	Juliane Beier	**53**	40	35
66	**Knight**	Andrew	Richard Feldhoff and Pamela W. Feldhoff	**56**	13	8
67	**Krauser**	Laura	Andrea Gaughan	**56**	48	26
75	**Lamont**	Richard J.	David Scott	**62**	40	35
69	**Lauer**	Valerie	Keith R. Mountain	**58**	33	19
75	**McFrazier**	Maya	David Scott	**62**	57	7
85	**Packer**	Thomas	La Creis Kidd	**68**	41	35
69	**Platt**	Sarah	Keith R. Mountain	**58**	40	35
75	**Renaud**	Diane E.	David Scott	**62**	40	35
94	**Robertson**	Nicole	Gerald Hammond	**73**	64	24
95	**Rolfe**	Sheila	Cynthia Logsdon	**74**	30	35
44	**Sereff**	Seth	James L. Wittliff and Michael W. Daniels	**43**	25	10
107	**Stage**	Claire	Barbara Polivka	**85**	34	19
118	**Udoh**	Karen	J. Christopher States, Jouett Mason Hoffman, and John O. Trent	**93**	36	20
120	**Vuong**	Hung	Jill M. Steinbach	**94**	38	37
75	**Wang**	Huizhi	David Scott	**62**	40	35
124	**Wigginton**	Jasmine	Daniel Vivian	**97**	40	35

Western Kentucky University

Poster No.	Student		Faculty Mentor(s)	Page No.	House No.	Senate No.
74	**Aberg**	Bryce	Sanju Gupta	**61**	20	32
5	**Bertram**	John Robert	Matthew Nee and Hemali Rathnayake	**19**	83	16
49	**Billings**	Taylor G.	Michael E. Smith and J. David Monroe	**47**	11	4
13	**Calhoun**	Nolan	Julia Carter	**24**	62	7
28	**Duff**	Morgan	Michael Kallstrom and Stuart Burris	**33**	33	36
101	**Ellis**	Jenna	Uta Ziegler	**79**	47	7
33	**Eovino**	Juliana	Frederick Grieve and Daniel McBride	**36**	20	32
37	**Fussman**	Kelly	Mary Lloyd Moore	**38**	20	32
49	**Heine**	Madison K.	Michael E. Smith and J. David Monroe	**47**	20	32
52	**Henderson**	Nicholas David	Shahnaz Aly	**49**	10	8
55	**Hickey**	Hayden	Amber Schroeder	**50**	32	36
52	**Houck**	Zackary Ronnie	Shahnaz Aly	**49**	23	32
57	**Hoskinson**	Lillian	Nancy F. Hulan and J. Dusteen Knotts	**51**	62	17
59	**Hubbuch**	Jacob	Rajalingam Dukshinamurthy	**52**	17	32
74	**McDonald**	Benjamin	Sanju Gupta	**61**	86	21
84	**Pace**	Abbigail	Elizabeth Cash, Adam Seibert, Whitney Rebholz. Liz Wilson, and Jeffrey M. Bumpous	**67**	9	3
101	**Shin**	Eura	Uta Ziegler	**79**	99	27
103	**Sircy**	Megan	Christian Williams and Melanie Eaton	**81**	32	2
108	**Steenbergen**	Katryn I.	Jason Crandall	**86**	14	8
110	**Stepp**	Paula	Rajalingam Dukshinamurthy	**88**	9	3
74	**Walden**	Jared	Sanju Gupta	**61**	20	32
122	**Wallace**	Frankie	Matthew Nee	**96**	78	17
127	**Wright**	Alexandra	Kevin Williams	**98**	60	11

Notes:

1. Alexander Antonious (Primary) and Thomas Trivette

Kentucky State University
Mentors: Buddhi Gyawali and George Antonious

Growing Worldwide Genotypes of Hot Pepper in Kentucky

Seeds of twenty-nine (29) genotypes from *Capsicum* species (Family: Solanaceae) of hot pepper were planted in the greenhouse to represent four hot pepper species: *Capsicum annuum* L., *C. baccatum* L., *C. chinense* Jacq., and *C. pubescens* Ruiz & Pav. Seedlings of 60 days old were planted in the field under normal agricultural practices in a randomized complete block design. At harvest, fruits were screened for their antioxidants contents (vitamin C, β-carotene, and phenols), early maturity, color, fruit length, width, and fruit wall thickness. The main objective of this investigation was to test character stability of candidate genotypes for use in commercial pepper production and as parents in breeding for fruit early maturity and quality characteristics. Hot pepper producers look for plant varieties that yield large quantities of high-quality peppers. Characteristics of interest included yield, fruit nutritional composition and shape. Concentrations of β-carotene in pepper fruits were greatest in orange and red fruits (94 and 165 mg g-1fresh fruits, respectively), compared to green fruits (38 mg g-1 fresh fruits), indicating that concentration of β-carotene is a function of mature fruit color. β-carotene levels found in red peppers were about four orders of magnitude than that found in green peppers. The project could help KSU in meeting the objective of assisting limited-resource farmers in finding alternatives to tobacco production. This area of research could provide an entrepreneurial niche market for small farmers. Many farmers could be able to grow and produce new *Capsicum* cultivars for use as a cash crop.

2. Alexander Antonious and Thomas Trivette (Primary)

Kentucky State University
Mentors: George Antonious, Eric Turley, and Regina Hill

Glucosinolates for Sustainable Agriculture

Glucosinolates (GSLs) suppress soil-borne pests due to the biofumigant properties of the highly toxic isothiocyanates present in *Brassica* vegetables. The objectives of this investigation were to: (1) assess variation in GSLs concentrations among collard plants grown under three soil management practices: sewage sludge (SS) mixed with native soil, chicken manure (CM) mixed with native soil, and no-mulch (NM) native soil, (2) quantify GSLs concentrations in collard roots, leaves, and stems at harvest for potential use of their crude extracts in plant protection, and (3) assess myrosinase activity in soil amended with CM and SS mixed with native soil. Quantification of total GSLs was based on inactivation of collard endogenous myrosinase and liberation of the glucose moiety from the GSLs molecule by addition of standardized myrosinase and colorimetric determination of the liberated glucose after breakdown of the GSLs molecule. SS and CM increased soil organic matter content from 2.2% in native soil to 4.2 and 6.5%, respectively. GSLs concentrations were significantly greater in collard leaves (30.9 μmoles g-1 fresh weight) compared to roots and stems (7.8 and 1.2 μmoles g-1 fresh weight), respectively. Leaves of collard grown in soil amended with SS contained the greatest concentrations of GSLs compared to leaves of plants grown in CM and NM treatments. Collard plants grown in soil amended with SS could play a significant role in sustainable agriculture for soil-borne disease management in agricultural production.

3. Matthew Beckerich

Northern Kentucky University
Mentors: Maureen Doyle and James Walden

A Comparison of Security in PHP and Java Application Web Servers

There are millions of vulnerable web servers on the web that people connect to every day. In order to protect these people it is in our best interest to identify the safest development choices possible. The popular choices are PHP which is the language used for web-server side programming on over 80% of the world's websites, while Java tends to see high usage on websites with heavy traffic. As these are some of the most popular choices these are known to be high-profile targets for hackers to find vulnerabilities within. As such, it is desirable to learn which has a better reputation security-wise. When comparing security between servers there are several metrics available for usage, such as: number of vulnerabilities present, severity of the vulnerabilities, update rates for the server and frequency at which security patches are released. Thus through mining Internet-sale network port scan data, we were able to retrieve real world instances of these servers throughout the IPv4 space and used them to make these comparisons. Specifically our comparisons examine the rare PHP /3 to the thriving PHP /5 and Java based WebSphere, WebLogic, Jetty, Apache Tomcat, Apache Coyote, Resin, and GlassFish. Some of our findings show the difference between comparing the frameworks by what is released and what is in use in reality. For example despite the periodic patching offered by PHP, we see that millions of server owners will leave their machines running without being updated; this behavior is highly dangerous to the goal of having a secure internet.

4. Helen Beckert

Murray State University
Mentor: David Pizzo

Denazification and Its Effects on the Teaching Profession in West Germany

After the capitulation of the ruling Nazi Party, Germany fell into a state of disarray among the destruction caused by World War II. As the nation was partitioned into four zones of occupation, the Allies sought to rebuild Europe as a whole and rid Germany of Nazi influence. The process of denazification extended into every realm of life, including the education system. The classroom had been so infiltrated by Nazi ideas that the system that had been in place was no longer acceptable in a postwar age. The teaching profession in particular went through great upheavals in the years immediately following the end of World War II. Young and middle-aged men who had been effective teachers before the war had been called to serve in the German military; at the close of the war, many were dead or missing. Former teachers had to be called back from retirement, or new teachers had to be rapidly approved and trained. The material that teachers knew had to undergo changes as well. Programs that had formerly been at the center of the education system's attempts at indoctrination, such as the Hitler Youth, were abolished completely. Allied occupiers expected German teachers to adopt new styles of teaching and new pedagogies. The former, more authoritarian method of teaching fell out of favor, since it had become too synonymous with Nazi rule. Allied occupiers in West Germany, especially the United States, sought to introduce the concept of democracy in the classroom by overhauling the teaching profession. In this new era, the Allies expected German teachers to convey the ideals of democracy to the next generation of students in their ailing country. The overall effectiveness of denazification is debatable, but the process caused many changes in the teaching profession in Germany.

5. John Robert Bertram

Western Kentucky University
Mentors: Matthew Nee and Hemali Rathnayake

Marketable, Heat-Harvesting Devices for Greener Energy Solutions

In June 2015 Kentucky's total electricity generation was ~6,881 GWh, of which only 0.64% is from a renewable energy source. It is notable that Kentucky produces more energy than it consumes, taking advantage of the natural resources available like coal firing and hydroelectric power generation. However, our energy output could be further improved by coupling thermoelectric generators with current energy sources that are already in place, with no added impact to the environment. Thermoelectric generators (TEGs) harvest and convert waste heat into electricity. TEGs can be easily integrated with Kentucky's existing energy harvesting methods. Implementing a TEG could optimize any energy source that requires high temperatures, such as coal refining and firing, without any additional harm to the environment. These devices could grow Kentucky's technical industry by increasing the green energy output as a state. Polydimethylsiloxane (PDMS) is a polymer with many uses ranging from cleaning up crude oil spills, to human joint lubrication, to DNA extractions. In this project, the limits of this polymer's uses are pressed to next generation energy devices. PDMS possesses ideal qualities for low environmental impact, marketable versions of TEGs because of its physical properties, natural biocompatibility, and low synthetic cost. To increase the electrical conductivity of PDMS, two known conductive components were introduced to the polymer prior to solidifying into micro structured beads by using a fabrication technique developed in our lab. The beads were then adhered onto conductive glass, constructing a material whose conductivity was measured with adhesive electrodes. The electrical conductivity of PDMS by this production method was on the order of 1.8 Siemens per meter at room temperature. The successful transformation of PDMS into an efficient, waste-free thermoelectric device poses many great avenues to aid in energy conservation.

6. Daniel Best

Murray State University
Mentor: Jessica Naber

Is a Flipped Classroom an Effective Educational Method to Meet Nursing Students' Learning Needs?

Due to the constantly changing environment in healthcare, nurses must be able to adjust their techniques, mindset, and strategies to provide excellent care for their patients. Nurses have to be able to provide emergent care, assess critically ill patients, and identify both obvious and subtle changes in healthcare status; therefore nursing education must be unique. Nurses need to be educated using methods that improve critical thinking. A new method known as a "flipped classroom" has been introduced in general education. This study has been conducted to determine if this is an effective technique to educate future nurses. To determine if this strategy is effective at educating future nurses, multiple studies and articles were analyzed. There is a shortage of empirical research about flipped classrooms, however, and also a lack of information and congruency about this educational strategy. In this study, students were interviewed to determine their opinions about the flipped classroom technique. In addition, faculty members who have implemented this strategy were interviewed to ascertain their perspectives on the method. Many benefits and obstacles of flipped classrooms were identified through this study. This information will be valuable for nursing educators in determining if they want to implement flipped classrooms, how to best define a flipped classroom, how to incorporate the strategy, and what obstacles to be aware of.

7. Lydia Biggs

Murray State University
Mentor: David Pizzo

Transnational Influences of Early Jesuit Scholars and Explorers in the New World from 1560-1700

The Society of Jesus, as created during the Catholic Counter Reformation in the 1500s, has been studied repeatedly from a Eurocentric point of view, and this has had a lasting influence on how its impact is taught to young students. The order is rarely mentioned for its influence in the imperial court of the Ming Dynasty in China or their crucial interactions with indigenous peoples in the Americas, particularly Canada and Belize. The Society of Jesus is also seen as a solely religious institution, but the Jesuits were also responsible for mapmaking in China among other long-lasting non-faith based contributions. The role of the Jesuits in other countries are also controversial for the "un-Catholic" and, some would say, immoral methods used. I am planning on using various sources for information for this research, but the most critical sources for me are the Jesuit Archives in Xavier University in Cincinnati and The Jesuit Archives in St. Louis. These archives house important primary documents that will allow me access inside the Jesuit community and history. One of the most important collections is the Belize Collection in the archive in St. Louis which will give me the direct information I need for the Belize concentration of my research. It is through this research that I hope to demonstrate how the Society of Jesus was not just confined to specifically European nation-states, or Catholicism itself, but was in fact its own individual transnational phenomena loosely linked to the Vatican and wielding more influence than many other foreign entities could ever claim.

8. Tracy Blevins

Morehead State University
Mentor: Bernadette Barton

Organizing the South: Progressive Activism in America's Most Conservative Region

The American South is an area that has been predominantly influenced by religious fundamentalism and conservative politics. However, some Southerners challenge the nearly homogeneous culture in an attempt to upset the status quo. This research consists of interviews with young people (aged 18-30) in the South who are involved in activism or organizing in the region. It explores the elements of successful, and unsuccessful, progressive political and social organizing in Appalachia and the South.

9. Jessica Bolte

Northern Kentucky University
Mentor: Monica Wakefield

Effects of Visitor Group Size on the Number of Abnormal Behaviors in Captive Bonobos (*Pan paniscus*) Housed in Outdoor and Indoor Zoo Exhibits

The welfare of animals held in captivity is of increasing concern, particularly in zoo environments where animals have closer contact and constant interaction with humans. The effect of these interactions on the stress levels of captive zoo animals is not fully understood and difficult to quantify, but the observance of abnormal behaviors typically indicate higher stress levels. Most animals studied are negatively affected by constant interaction with visitors, but some species, like captive bonobos (*Pan paniscus*), actively instigate interactions indicating that these may be positive. We completed instantaneous group scans and focal scans to determine if the number of abnormal behaviors changed when the bonobos were in an indoor exhibit (where interactions occur frequently) or an outdoor exhibit (where interactions do not occur) at The Cincinnati Zoo and Botanical Gardens in 54 hours of observations. Mann-Whitney tests determined that there was not a significant difference in the number of abnormal behaviors exhibited at either exhibit ($Z=-0.205$, $p=0.837$). A Spearman's rank correlation test determined that there was not a significant correlation between the number of abnormal behaviors and the numbers of visitors ($\rho=0.03$, $N=167$, $p=0.699$). These results did not support the hypotheses, but suggest that visitor interactions do not cause higher levels of stress in *P. paniscus*. In many zoo animal exhibits, it is best for zookeepers and exhibit designers to inhibit interactions between guests and the animals. Based on the results of this study, it may be better for *P. paniscus* welfare if healthy interactions are not inhibited.

10. Jean Branttie

Kentucky State University
Mentors: George Antonious and Eric Turley

Monitoring the Kentucky River Nitrate and Ammonia Levels

The Kentucky River Basin extends over much of the central and eastern portions of the state and is home to approximately 710,000 Kentuckians. The watershed includes all or part of 42 counties and drains over 7,000 square miles with a tributary network of >15,000 miles. Concerns about soil erosion, nutrient runoff, loss of soil organic matter, and the impairment of environmental quality from sedimentation and pollution of natural water resources by agrochemicals, N, P, trace-elements, and other environmental contaminants have stimulated interest in proper management of natural water resources. Three locations along the Kentucky River were monitored for concentrations of ammonia-N, nitrate-N, dissolved oxygen (DO), pH, and water conductivity. Water samples collected from Franklin County contained 0.22 mg/L, 0.63 mg/L, 8.4 mg/L, 7.7, and 435 µS/cm. of ammonia-N, nitrate-N, dissolved oxygen (DO), pH, and water conductivity, respectively. Water samples collected from Henry County contained 0.18, 2.19, 7.6, 7.97, and 389 of ammonia-N, nitrate-N, dissolved oxygen (DO), pH, and water conductivity, respectively, whereas water samples collected from Woodford County contained 0.08, 0.96, 8.59, 8.12, and 498 of ammonia-N, nitrate-N, dissolved oxygen (DO), pH, and water conductivity, respectively. These levels (except for ammonia) are below the water quality standard levels for the Commonwealth of Kentucky. Our future objectives will be to monitor the water quality of the entire river basin.

11. Bethany Breakall, Nova Arnold and Joseph Rollins

Eastern Kentucky University
Mentor: Lindsay Calderon

Bromoenol Lactone Attenuates Nicotine-induced Breast Cancer Cell Proliferation and Migration

The effects of iPLA2β (Ca2+-independent Phospholipase A2β) and MMP-9 (Matrix Metalloproteinase-9) on the migration of cancer cells have been a recent focus for biomedical research and have been found to be over-expressed. However, their roles are not entirely known, especially concerning nicotine-induced breast cancer cell advancement, which has not been thoroughly investigated. The purpose of this study is to determine the involvement of iPLA2β in nicotine-induced breast cancer cell advancement. BEL (bromoenol lactone), a suicide inhibitor of iPLA2β, was hypothesized to decrease the intensity of the effects of nicotine-induced breast cancer. Following the BEL treatment, the in-vitro results exhibited a significant debilitation of 4T1 cell proliferation for both basal and nicotine-induced, as shown in the MTT proliferation assay. Scratch and transwell assays revealed migration was also negatively affected. The expression of MMP-9 was discovered to have behaved in an iPLA2β-dependent manner, which further supports the idea that iPLA2β plays a significant role, concerning the mediation of basal and nicotine-induced cancer cell progression. In-vivo results also supported this conclusion. In mice, basal and nicotine-induced tumor growth was significantly decreased, in comparison with the control group. BEL also reduced nicotine-induced HIF-1alpha, CD31, and MMP-9 tumor expression, as shown by the immunohistochemical analysis; the presence of nicotine-induced tumors in lung tissue was reduced significantly. In-vitro and in-vivo results suggest that MMP-9 behaves in an iPLA2β-dependent manner and consequently mediates nicotine-induced breast cancer cell migration and proliferation. Because BEL was found to reduce the effects of this, it may be a possible chemotherapeutic drug.

12. Tori Caldwell

Eastern Kentucky University
Mentor: Laurie Larkin

Knowledge, Attitudes, and Perceptions of HIV and Breastfeeding: A Study of HIV Positive Mothers in Tanzania

In our study, we attempt to explain how the human immunodeficiency virus (HIV) positive women's knowledge, attitudes, and perceptions of exclusively breastfeeding their children are influenced by the level of education obtained and socioeconomic status of their household. We hypothesized that HIV positive mothers will have low levels of breastfeeding knowledge and negative attitudes and perceptions of breastfeeding. In addition, we hypothesized that breast feeding knowledge, attitudes, and perception scores will be directly related to education level and socioeconomic status. Participants (n = 35) were women from communities in Dar es Saleem, Tanzania and they were given a questionnaire. Level of education plays a significant role in the women's knowledge about exclusively breastfeeding their children while being HIV positive. Women's attitudes were more positive towards breastfeeding when they felt financially secure. Implications for health promotion of maternal and child health are discussed.

13. Nolan Calhoun

Western Kentucky University
Mentor: Julia Carter

Incidences of the *6A Variant on Exon 1 and The Single Nucleotide Polymorphism on Exon 7 of the Transforming Growth Factor-Beta Receptor Type 1 Gene in Colorectal Cancer Patients With More Than One Tumor

Colorectal cancer (CRC) is a disease that affects the large intestine (colon) and the rectum. In Kentucky, there is estimated to be 2,090 new cases and 850 deaths in 2015 (mortality rate of 40.7%). Throughout cancer progression, genetic abnormalities can favor cancer development and growth. This study investigated the incidence of two genetic changes in patients with more than one cancer. These two variants occur on a gene that codes for transforming growth factor-beta receptor type one (TGFβRI). TGFβ regulates the area surrounding the cell, but has variant forms that can promote cancer development. One of these variants occurs on the exon (part of DNA sequence) 1 region of the gene. Here, nine base pairs (subunits that make up DNA) have been deleted. This is referred to as the 9A/6A variant. The second variant is located near the exon-intron (non-coding section of RNA) boundary of exon 7. Here, one base pair is altered to another (guanine to adenine shift). To extract the DNA, magnetic beads were used. The DNA then went through several cycles of polymerase chain reaction (PCR), in which the DNA is heated up and millions of copies are made. Lastly, the DNA was analyzed by capillary electrophoresis, where it moved through small tubes and was tagged by a laser. The results were then used to determine patients' genotypes. The incidence of the Exon 1 variant remained consistent when compared to patients with one cancer; the variant Exon 7 incidence was decreased. The study also found that patients with variants were slightly older, female, and survived for a shorter period of time. Detecting colorectal cancer in its early stages would provide for a better prognosis and help to alleviate growing healthcare costs in the US. Genetic screening is a promising option for determining probability of cancer development.

14. Marie Carroll

Murray State University

Mentor: Jana Hackathorn

Quick AND Satisfied? Effects of Positive Feedback on Task Completion - Data Collection is Complete

Previous researchers have focused on the availability and quality of feedback as a mediating factor for work performance (Kluger & DiNisi, 1996). Quality feedback is that which is consistent and provides direction towards specific goals and is a major directive factor of work performance (London, 1995). As individuals that receive quality feedback during the work process tend of show better work performance, the question remains regarding regular tasks and non-work related performance. That is, what are the effects of feedback for individuals that are engaged in benign or personally irrelevant tasks? Individuals that receive quality feedback during the work process tend of show better performance, however the effects of feedback for individuals that are engaged in benign tasks remain unknown. It was hypothesized that participants that receive positive feedback will complete a personally irrelevant task (i.e., a Sudoku puzzle) more efficiently than those that do not receive feedback. Additionally, it was hypothesized that those that receive positive feedback would report greater happiness after completing the task than those that received no feedback. Participants were recruited from undergraduates at a regional university and asked to come to a lab for an appointment. There was a total of 15 male and 54 female (N = 69) ranging in age from 18 to 34 years (M = 20.12, SD = 3.31) who participated. Some participants self-reported that they had previous experience with Sudoku puzzles (n = 21) or complete other types of puzzles often (n = 31). Participants completed a survey packet which measured a variety of factors including demographics, motivation (intrinsic or extrinsic), general life satisfaction and happiness, need for cognition, tolerance, entitlement and goal orientation. Upon completion of the measures, participants were given a Sudoku puzzle to complete. Prior to arrival, participants had been randomly assigned to the control or experimental condition. Individuals in the experimental condition received positive feedback from the researcher such as, “You are doing very well” while completing the puzzle. Individuals in the control condition did not receive any feedback during the puzzle task. Upon completion of the puzzle, participants completed another brief survey packet that measured many of the same factors. To test the hypotheses, a t-test of independence was conducted. The results indicated that the experimental condition which received positive feedback completed the puzzle in significantly less time (M = 10.03, SD = 4.48) than the control group (M = 15.91, SD = 6.73) which received no feedback, $t(67) = 4.29$, $p < .001$. These findings indicate that individuals may be working harder to complete a task if they receive positive feedback. Interestingly, a separate t-test of independence showed only a marginally significant difference ($t(67) = 1.42$, $p = .080$) between satisfaction ratings, in that the experimental group was happier after completing the puzzle (M = 4.29, SD = 1.23) than the control group (M = 3.85, SD = 1.31). These results have some important implications, in that positive feedback, even in an unrelated task can lead to increased productivity and satisfaction. However, there are potentially two different explanations. Primarily, participants may be working harder because they are presented with positive potentially self-affirming feedback as they first begin the puzzle. On the other hand, the results may also be a demonstration of the theory of social facilitation through cognition. This means that the participants are performing better in the presence of a researcher after the researcher affirms their abilities on cognitive tasks. This study is unable to differentiate between those two explanations, thus it remains unclear why participants were faster and (marginally) happier. Future studies may want to examine these ideas further. Additionally, as the findings regarding happiness were only trending, and did not actually make the significance criteria cutoff, one should be cautious of interpretation. However, it is the authors belief that this lack of significance is probably due to a small sample size. Future studies should attempt to replicate these findings with a larger sample.

15. Rachel Clemons

University of Louisville
Mentor: Margaret Carreiro

Examining Predictors of Biodiversity in the Community Gardens of Louisville, KY

Increasing human population, urbanization, and climate change have led to habitat fragmentation and loss of biodiversity worldwide. Unsustainable farming practices degrade available farmland and threaten biodiversity of crops and the surrounding ecosystems. Interest has increased in urban agriculture in order to combat food security, reduce habitat fragmentation of certain fauna, and augment urban biodiversity. Although the social importance of community gardens is well established, they are understudied biologically. Community gardens function as a patch type in an urban setting with the potential to increase green space and provide ecological benefits, but more quantitative information is warranted to determine the best predictors for biodiversity within these systems and to understand their conservation potential. The goals of this project were to determine the range of crop species in community gardens throughout Louisville, to determine the range of weedy species present in adjacent, uncultivated locations, to quantitatively describe each type of diversity, and to determine the effectiveness of area as a predictor for both crop and weed biodiversity. To this end, eight community gardens throughout Jefferson County were selected for study. Weedy species were documented, and for each individual sampled garden, plot area was measured and crop plants were counted and identified. Species and family area curves revealed that crop patches do not follow typical species area curve patterns observed in nature while the weedy patches do. Area did not predict crop species or family richness, Shannon diversity (H), or evenness (J). However, sites differed significantly in crop species and family level identity and crop patches added 14 plant families not seen in adjacent weedy patches, which could have ecological implications for higher trophic level organisms. Because crop diversity is not predicted by area, further work will be done to understand the socio-ecological dynamics of these human-influenced patch types.

16. Amanda Coffman, Jennifer Rowland, Pamela Tackett, and Matthew Warren

Elizabethtown Community and Technical College
Mentor: Joe Wolf

A Diversity of Yeasts Isolated from the Bess Beetle

The gastrointestinal tracts of animals house a large population of microorganisms, including bacteria and yeast. Among the best studied intestinal microbiomes are those found in insects. The microbes that make up these communities may play active roles in the health of their insect hosts. In this study, selective media were used to isolate yeasts from gut homogenates of commercially-raised Bess beetle, *Odontotaenius disjunctus*. Most isolates were identifiable by a phenotypic method, the Remel RapID test, which scores 18 sugar fermentations and other biochemical reactions. We hypothesized that only a few recurring species would be isolated, and found more than expected. Furthermore, two isolates were not identified by the limited data base of the test kit.

17. Tessa Combs

Morehead State University
Mentor: C. Brent Rogers

Improving Soil Health With a Multispecies Cover Cropping System: Preliminary Data

Cover cropping is a cultural practice that can be used for weed suppression, nutrient cycling enhancement, soil health improvement, and improved cost efficiency. Organic matter accumulation and high levels of microbial activity near the soil surface in reduced tillage systems can decrease the germination of weed seeds. Cover crops can provide increased levels of nitrogen though symbiotic fixation and can help recycle other nutrients thereby reducing producer cost. In the fall of 2012 a multi-species cover crop of Austrian winter pea (*Pisum sativum subsp. arvense*), crimson clover (*Trifolium incarnatum*), daikon radish (*Raphanus sativus*), and rye (*Secale cereale*) was established on part of a field that had been used for 15+ years to produce corn (*Zea mays*) silage under a conventional or reduced tillage. In the fall of 2014 soil health tests were conducted on the cover cropped portion of the field and on the non-cover cropped portion of the same field. In 2015 soil health tests were repeated. Soil health tests measure characteristics such as aggregate stability, porosity, and biological activity, for instance, the number of earthworms per cubic foot of soil. Two years of data appear to show a trend toward soil health improvement. Indicative of this improvement is the increase in earthworm numbers in the cover cropped areas compared to non-cover cropped areas. Research was supported by the MSU Undergraduate Fellowship Program, the MSU Department of Agricultural Sciences, and MCTCS.

18. Samantha Cook

Eastern Kentucky University
Mentor: Avi Brisman

A Newspaper Content Analysis of Flooding in Appalachian Mining Towns

This poster presents findings from a study conducted on newspaper reports of flooding events in Appalachian mining towns. Four Eastern Kentucky newspapers (Mountain Eagle, Appalachian News Express, Hazard Herald, and Pike County News) were examined for the years 1927-57, 1972-77 and 2010-12 to reflect periods where major flooding events occurred in the region of Appalachia. A content analysis revealed changes in the language, focus and framing of the events within and between each period. While "aid" appeared frequently in the 1927-57 period, floods were often referred to as "accidents," and the 1970s saw the introduction of "disaster" language with respect to both mining and flooding. The 1970s also demonstrated the first instances of reports concerning legislation and policy relating to mining and flooding, reflecting greater public awareness of and political response to environmental issues and concerns. All things considered public perceptions on past flooding events can play a role when preparing and dealing with future floods after all public safety is imperative.

19. David Crittendon

Murray State University
Mentors: Sean Rife and Jana Hackathorn

Whiskey Tango Foxtrot: Militaristic Video Games on Nationalistic Attitudes and Violence

From arcade rooms to individual gaming consoles, video gaming has gained in popularity over the past decade. As graphics have improved, the games have taken on life like characteristics, and have exposed the new age gamer into a world of virtual reality. Multiple studies have shown that priming (the exposure to a stimulus to activate attitudes/behaviors) using the media has been shown to increase feelings of National Identity, and priming in video games has been shown to increase violence in the individual. In addition to these priming studies, immersion into an avatar viewpoint tends to desensitizes individuals to real-life experiences in themselves and others. The purpose of this study was to examine how priming non-experienced gamers using an range of games with and without violence might influence aggressive attitudes, as well as nationalistic attitudes. Especially important is whether nationalistic attitudes such as patriotism (love for one's own country) can be primed without priming nationalism (derogation towards other nations). It was hypothesized that non-experienced gamers will have higher patriotic attitudes when playing video games that can be associated to America than games not are not directly related with America. The non-experienced gamers will have higher patriotic attitudes than experienced gamers will, and non-experienced gamers will have higher levels of aggression than experienced gamers when exposed to higher levels of violence. A series of one-way ANOVAS was conducted indicating that there was a significant difference in non-experienced gamers and patriotism than experienced gamers, in that the non-experienced gamers showed more patriotism. In addition, non-experienced gamers had a significant difference in level of military approval than experienced gamers.

20. Catherine Croft

Kentucky State University
Mentors: George Antonious and Eric Turley

Variation in Pungency among Hot Pepper Genotypes

The use of soil amendments in agricultural production is an affordable way for limited-resource farmers. Five accessions of hot pepper (PI 435916 and PI 438614 from *Capsicum chinense*, PI 370004 and Grif 9354 from *C. baccatum* and PI 438649 from *C. annuum*) were selected from the USDA Capsicum germplasm collection to assess fruit concentrations of two capsaicinoids (capsaicin and dihydrocapsaicin) and the impact of soil mixed with recycled waste (yard waste YW, sewage sludge SS, and chicken manure CM) on concentrations of capsaicin and dihydrocapsaicin in mature fruits. Great variability in pungency among the accessions tested were found. Pungency in hot pepper is identified by a sharp taste or sensation of heat caused by the fruit when consumed, and this sensation is a result of fruit capsaicinoids content. The PI 438614 and PI 435916 of *C. chinense* contained the greatest concentrations of total capsaicinoids compared to other accessions tested. There was a direct correlation between total capsaicinoids level and pungency. The use of SS as a soil amendment in land farming provided a constructive means of waste disposal, and a viable method for improving soil fertility. Fruits of plants grown in SS and CM contained the greatest fruit weight. The total marketable yield, expressed as weight of fruits, was significantly higher in soils mixed with SS and CM compared to those mixed with YW and no-mulch bare soil.

21. Rickey Cupp, David Langner, Dawson McDonald, and Erica Palowitch

Hopkinsville Community College
Mentors: James Hunter and Scott Bain

Hopkinsville Community College Balloon Satellite Project

In this project, experiments were conducted to test several hypotheses and observe results in a near-space environment. Experiments were set up to observe outcomes when a balloon satellite was launched into the stratosphere. The experiments included battery performance in a low-temperature and low-pressure environment, yeast efficacy after exposure to a near-space environment, and measurements of stratospheric radiation levels. To design the project, the team broke into smaller teams with specific experimental focuses. Each team was responsible for an individual payload dealing with its particular field of study. All of the sub-groups then had to combine to make sure the structure and payload could be launched in order to successfully complete each experiment. It was expected that the engineering of individual components and the overall frame would hold up in near-space, and that it would be possible to gather enough data using circuit boards and proper payload design to have effectively observed and confirmed the effect of a near-space environment on each of its experiments.

22. Te'Ara Davey

Jefferson Community and Technical College
Mentor: John Ward

A Survey about Factors Related to Autism Comparing Parents and Caregivers of Autistic Children

Autism is a mental condition, present from early childhood, characterized by difficulty in communicating and forming relationships with other people. This research examined attitudes of parents and caregivers of autistic children. Examples of variables were frequency of exercise, preference of water over diet soda, belief in vaccination, frequency of eating green vegetables, use of illegal drugs, and amount of meat consumption.

23. Cheyenne Davis and Davis Whaley

University of Kentucky
Mentor: Robert Lorch

Recognition of Dissonance in Simple Science Texts During Reading

One important component of reading comprehension is sensitivity to possible inconsistencies in a text because inconsistencies often signal to the reader that they have misunderstood something. The current study was designed to investigate the effect of inconsistencies in scientific texts on reading. Three experiments were conducted using the same basic procedure. College students read 20 texts a sentence at a time while their reading times were recorded for each sentence. Each text contained a single "target sentence" that was preceded by a "context sentence" whose relation to the target was manipulated. In Experiments 1 and 2 there were two conditions: The context sentence was either neutral or inconsistent with respect to the following target sentence. In Experiment 1, the context and target sentences in each text were adjacent in the text; in Experiment 2, a neutral filler sentence was inserted between the context and target sentences. It was hypothesized that inconsistences would increase reading time of the target sentence in both experiments. Results supported this. Experiment 3 replicated Experiment 1, but with the addition of another variable: A connective word was added to the target sentence to signal the inconsistent relation between the context and target sentence. It was hypothesized that the addition of a connective word would decrease the effect found in the first two experiments. The results supported this. Together, the results of the three experiments demonstrate that inconsistencies in scientific texts (a) cause increased reading time regardless of distance between the target sentence and inconsistency and (b) the presence of transition words reduces this effect even when inconsistencies are present. The current study helps in understanding the process of reading comprehension in scientific texts.

24. Tyler Davis

Morehead State University
Mentor: Steve Chen

The Impact of Campus Recreation and Wellness Facility on Student Enrollment and Retention

Traditionally, the studies on the benefits of a campus wellness center and recreation programs focus on the health benefits associated with students' academic performance, physical and mental well-being and social support (Guerra &Williams, 2003; Matteucci, Albohn, Stoppa, & Mercier, 2012). This study was conducted to identify the importance of the role that campus wellness center may play on students' preference in choosing their ideal institution. The respondents were 189 students (51.9% males and 47.6% females) randomly recruited in a cafeteria, classroom hallways, and quad of a regional state university in eastern Kentucky. About 32% of them actively utilize the center and provided service (at least three times per week). The results showed that students value the importance of the wellness center (M = 5.64 out of a 7-point scale) and provided programs (M = 4.74). No gender difference was found on the perceived importance of the recreation programs and the wellness facility. However, freshmen significantly rated a higher level of importance on the campus recreation program. Nearly three fourths of the respondents would recommend their friends to attend a school with a campus center as well. An overwhelmingly high level of satisfactory votes for the current facility and service seem to justify the spending for building the facility and achieve its expected role in supporting retention. Additional interview comments and suggestions were given to help the wellness staff plan activities and improve existing services and attract prospective students.

25. Heather Donlan, Sarah Oliver, and Jade Parson

Eastern Kentucky University
Mentor: Stephanie Mcspirit

Appalachian Equine Project

Eastern Kentucky University has implemented a two-tiered research project that focuses on the horses of the Appalachian region of Kentucky. The first component is an oral history project that will interview and collect the histories of key individuals who were involved with the Kentucky Mountain Horse breed that originated in the foothills of Appalachia Kentucky. Students involved with the Appalachian Equine Project are also reading and compiling their notes on the Rea Swan Papers, one of the founders of one of the official breed associations. One set of research questions focused on the relationship of the Rocky Mountain Horse to its owner and how that relationship has shaped the owners perspective towards their horse and the Rocky Mountain Horse breed in general. The relationship and bond between horse and owner as depicted in the oral histories is reported, in addition to a review of the Rea Swan papers the letters and writings that speak directly to the bond and relationship between people and their mountain horses. The other direction of the Appalachian Equine Project concentrates on the "wild" horse herds in the Appalachian region that cause serious havoc on the environment, industries, and communities of Eastern Kentucky. Unfortunately, these horse herds are not natural to this region and are a product of released domesticated pets that have reproduced and amplified in numbers. Our objective for this project is to begin research on these herds by conducting interviews with key stakeholders and local residents about this problem. Initial findings from interviews are reported. In the future, a larger assessment or census of these feral herds of Eastern Kentucky will be conducted and students will work with other stakeholders on devising a herd management plan.

26. Elizabeth Dotson and Jamee Rogers

Morehead State University
Mentor: Joy L. Gritton

The Haldeman After School Program: Connecting Past To Present Through Music and Gardening

STUDY 1 (Dotson): ***Connecting Past with Present Through Children's Music***

Throughout history, children have grown up listening to and performing music, from folk music on the front porch to radio and live performances. Songs pass from generation to generation and everyone has songs they remember from their youth. This presentation will report on an inter-generational project currently underway at the Haldeman Community Center in Rowan County Kentucky. Children participating in the center's after school program are being exposed to the musical experiences of seniors in their area through storytelling, guest performances, and learning songs. The children then share the music they are listening to with the seniors. In this way music serves to create dialogue, appreciation, and understanding between the generations.

STUDY 2 (Rogers): ***Creating Raised Gardens for Haldeman Community Center After-School Program: A Guide for Other After-School Programs***

Creating a raised garden for children can seem like a daunting task for small, community-based programs. In reality, a little bit of planning can result in a valuable experience. The goal of the Haldeman garden program was to get the children outside and moving, connect them with nature, and help them begin thinking about their food and its source. This presentation will address key steps to a successful gardening program for children, including determining the type of beds according to labor requirements and permanency of the structures; identifying community partners such as non-profits and local businesses; recruiting volunteers to help; and making plant selections based on availability, climate, and season. Time spent in the garden helps teach children valuable lessons about healthy eating, and opens their minds to many different food choices. Following these simple guidelines, even small community centers can manage fulfilling, successful gardening programs.

27. James Donovan, Brenda Vanegas, Robert Neeley, and Benjamin Gadbois

University of Kentucky

Mentors: Steven Arthur, Andrea Friedrich, and Jacob Case

I Didn't Know This Was Cheating: Differences in Perceptions Between Students and Instructors About Academic Dishonesty

College instructors are oftentimes concerned with the potential for academic dishonesty both in and out of the classroom. However, academic dishonesty is not always clearly defined, leading to differences in perceptions between students and faculty members about whether or not a specific behavior violates academic rules and warrants consequences. These discrepancies may be exacerbated by new technologies that allow students to collect information from a variety of online sources (e.g. Wikipedia, online test banks, etc.) or social media outlets (e.g. Facebook) that may not be explicitly mentioned or prohibited by instructors. In order to explore said differing perceptions of academic cheating, specifically in regards to the digital world's emerging classroom presence, we asked undergraduate students, teaching assistants, and faculty at the University of Kentucky to evaluate a variety of online behaviors that could be interpreted as academic dishonesty. Via survey, we asked participants to inspect the fine line between using and abusing digital resources at hand. We observed discrepancies between students and faculty members' perceptions of what behaviors constitute academically dishonest behavior. Additional moderating factors will be discussed.

28. Morgan Duff

Western Kentucky University

Mentors: Michael Kallstrom and Stuart Burris

A Study of Chemistry: for Wind Ensemble

Many musicians have a limited understanding of chemistry, while many chemists aren't familiar with details of music theory or composition. Through the composition of a four part musical work based entirely on several broad areas of chemistry, certain relationships have been shown between music and chemistry. Because of the overlap between certain scientific concepts and many aspects of music theory, it is possible for members of both fields to use what they already know in order to gain a deeper understanding of the other, very different, subject. Because everyone has learning strengths in differing areas, we believed the use of disciplinary overlap allows for individuals to learn and remember new information more easily, and also allows educators to teach more information in a shorter period of time. The purpose of this composition was to depict how different disciplines can be used in teaching to express knowledge or concepts in new ways. In this composition, the integrity of a typical symphony was maintained through the use of an Allegro introduction based on inorganic chemistry, a ballad based on nonreactive elements, a scherzo based on organic chemistry, and a Vivace finale based on elements of biochemistry. This composition addressed a range of basic music theory fundamentals including musical motifs, varying scale types, half and whole steps, tonality, and even postmodern music and twelve tone rows. In examining inorganic chemistry, chemical reactivity, organic chemistry, and biochemistry, the focus was placed on a number of concepts including basic atomic structure, ions, bonds, valence electrons, stereoisomers, enantiomers, and metabolic pathways. Though unable to cover every aspect of both music theory and chemistry, A Study of Chemistry: For Wind Ensemble provided an example of the abundant and still untouched ways in which interdisciplinary methods can be used throughout education in the future.

29. Sabita Dumre

University of Kentucky
Mentor: Luke H. Bradley

Screening of a Peptide Library for a Neuroprotective Binding Target

Emerging evidence has shown that the well-known glycolytic enzyme, glyceraldehyde-3-phosphate dehydrogenase (GAPDH), interacts with numerous binding partners in the cell to perform a wide range of functions, including the mediation of cell apoptosis. The subsequent identification of small molecules that inhibit apoptosis and provide neuroprotection in cell culture and animal models, through their binding interaction with GAPDH, suggests that this protein may be a potential target for the treatment of neurodegenerative disorders. With the emergence of combinatorial library design and screening strategies, peptides provide an attractive scaffold to select individual sequences in the laboratory with desired interactions with a defined target, from a large collection of candidate sequences. In this project, we utilized phage display to screen trillions of unique peptide sequences for interactions to GAPDH. Multiple rounds of biopanning and amplification enriched the library over 10 billion-fold for binders to GAPDH. Preliminary analysis of selected peptide sequences has identified members known to interact with GAPDH, as well as novel sequences which could elucidate other cellular interactions as well as possibly be considered candidates for future cellular neuroprotective studies.

30. Anna Eastman

University of Kentucky
Mentor: Deborah Reed

Health Status of Kentucky's Senior Farmers

Introduction: Kentucky is home to 76,064 farms that exceed five billion dollars in sales per year. For farmers, health is the ability to work and the culture of farming regards this work as a lifestyle. Farming is a hazardous occupation and farmers age 55 and over suffer the highest fatality rates. The average age of a Kentucky farmer is 58. The bulk of past research has focused on farm injuries while less is known about the health status of senior farmers. Our purpose was to better understand the health risks that Kentucky farmers age 50 and over face so healthcare needs can be better met. Our objective was to present a portrait of senior Kentucky farm couples' health. The methods used were a Secondary analysis of a telephone based survey to a cohort of 1,216 farmers and their spouses in Kentucky. Descriptive statistics and chi-square analysis was used. The results showed the average age of participants was 65. The average number of reported health conditions was 3.2. Overall, the leading health conditions were arthritis (44%), hypertension (44%), back problems (27%), hearing problems (20%), vision problems (19%), cataracts (17%), and heart conditions (17%). Of these health conditions, females reported higher prevalence of arthritis and cataracts; males reported higher prevalence of hearing problems and heart conditions ($p<.05$). Twenty-two percent of males reported prostate problems. Our conclusion was that Farmers continue to work despite age and chronic health conditions. These findings can support health care tailored to the Kentucky farm population.

31. Aaron J. Eisenberg

Eastern Kentucky University
Mentor: Atilla Sit

Representing Protein NMR Structures as a Single Model: A Bioinformatics Approach

The basis of all biological material is proteins. Therefore, a better understanding of the actual confirmation of a given protein is key to understanding its biological function. Protein structures are represented in experimental data from either X-ray crystallography or nuclear magnetic resonance (NMR) spectroscopy. The data from NMR analysis, which was the focus of this study, gives a number of unique three-dimensional models, which represent the possible conformations of the protein, but does not take into account all of the dynamics of a constantly moving protein. The data collected from the analysis of each protein is stored in the Protein Data Bank (PDB) for easy access by anybody in a specially formatted text file. All the PDB files from X-ray crystallography consist of coordinates corresponding to the location of each atom in the protein as well as a B-factor value showing the variation of the position of each atom due to temperature changes. However, PDB files from NMR spectroscopy contain a series of models with coordinates only. The problem that this project addresses is representing all the models from the NMR data in a single model that show the dynamics of the protein where it is implied from the original models. A single structure with associated radii of variation for each atom is computed from data given in all models. This single structure is optimized to find the best fit to one of the original structures with the dynamics of the protein. Results from several proteins of varying structures are shown.

32. Cynthia Elders

Jefferson Community and Technical College
Mentor: John Ward

A Survey about Associations between Attitudes, Preferences, and Socio-economic Status

In a survey, attempts were made to find links between the preference for natural food and natural medicines, or between vegetarians and support for marijuana legalization, or between support for legalization of marijuana and smoking in public places such as restaurants and bars. The possible link between socio-economic status and willingness to give money to an individual or between level of education and belief in unidentified flying objects (UFOs) and extraterrestrials were also examined.

33. Juliana Eovino

Western Kentucky University
Mentors: Frederick Grieve and Daniel McBride

Women's Perceptions of Muscular Body Image and Its Impact on Eating Disorders

According to the ANAD (2015), the largest majority of people with an Eating Disorder (ED) are female college aged students. The current study along with Bonneau-Kaya and Grieve (2007) suggests this, in part, is due to the differences in society's portrayal of gender. Research suggests mass media is the source of today's gender and sex roles (Pritchard & Cramblitt, 2014; Serdar, n.d.). Media suggests women should strive to have a drive for thinness (Pritchard & Cramblitt (2014). This thin-ideal body is unrealistic and unattainable for most women (Pritchard & Cramblitt, 2014; Serdar, n.d.). Numerous studies have found a correlation between media's drive for thinness in women and their body dissatisfaction and ED behaviors (ANAD, 2015; DeBraganza & Hausenblas, 2010; Pritchard & Cramblitt, 2014;& Serdar, n.d.). The current study aims to examine whether society's portrayal of women is a causal factor of these high rates in EDs for females. Participants for the current study took two surveys at separate times to measure how media affects eating disorders. The surveys were made up of either a media influence stressing the importance of muscularity or a thinness influence portraying the thin ideal body that media currently expresses. There was a short questionnaire and a visual representation asking participants to rank themselves on an actual scale and a desired scale for each survey. The Eating Attitudes Test (Garner et al., 1982) was used to measure ED symptoms directly after viewing one of the scales. Data was collected for each scale. Participants' data who completed both scales wereranalyzed for a within-subjects design. Data from only one scale was used as a between-subject. This study hypothesized that results will show ED symptoms are lower after the muscular survey than the thin survey.

34. Jessica Farrell

Morehead State University
Mentors: Jordan Kislear and Jennifer J. Birriel

Analysis of State's Potentials for CCS Retrofits

Coal-fired power plants across the United States, though affordable and reliable providers of a large percentage of the nation's power, are some of the largest emitters of greenhouse gases in the country. Therefore, in moving forward with legislation to reduce the amount of emissions, coal-fired power plants are among the first emitters to be targeted. This research examined individual power plants and states across the country, and after determining the energy profile and amount of coal emissions for each state, and analyzing the unique characteristics of each power plant, an analysis was conducted to determine which power plants would benefit most from a Carbon Capture and Storage (CCS) retrofit. CCS, which captures carbon and prevents it from being released into the atmosphere, provides a unique solution for coal power plants in that it allows them to continue their use while reducing emissions. In the framework of the Environmental Protection Agency's regulations for coal power plants through the Clean Power Plan, several states were ranked based on their energy profiles, emission amounts, and CCS retrofit value. With this research, a quantitative outreach strategy was designed for the Department of Energy to implement CCS technology in a select group of states, focusing on effectiveness and efficiency of CCS in each state.

35. Logan W. Fields, Hannah L. Howard, and Jason T. McClurg

Morehead State University

Mentor: Wesley White

Acute Withdrawal from Drugs of Abuse in an Animal Model: Biomarkers and Mechanisms

Amphetamine and morphine are commonly abused. Animal models help us understand how drugs of abuse affect behavior and the brain, as well as enable us to identify biomarkers for abuse liability and develop more effective treatments for drug abuse. Amphetamine and morphine produce activation and positive affect in the short-term, that is, for several hours after administration. The current study examined whether they also produced acute withdrawal later in the day, and whether the acute withdrawal could be prevented by co-administration of a dopamine D1 receptor antagonist. The latter result would suggest that acute withdrawal was a longer-term effect of activating the pathway that produces the short-term reinforcing effects of drugs. Different groups of rats were given amphetamine, morphine, amphetamine co-administered with a D1 antagonist, or morphine co-administered with a D1 antagonist. Activity was monitored in open fields for 24 hours after treatments. Amphetamine and morphine were followed by reduced activity approximately 16 to 21 hours after treatment, an indicator of an acute withdrawal. A couple of animals had a negligible reduction in activity during this time, suggesting a different susceptibility to drugs of abuse. D1 antagonist prevented the reduction in activity. An animal accomplishes most functional behaviors (eating, drinking, exploration, etc.) via activity, and so blockade of the reduction in activity suggested blockade of acute withdrawal generally. The study identified new biomarkers that could be relevant for susceptibility to drugs of abuse. The study also suggested a novel and simple conceptualization of acute withdrawal: The cascade of events by which different drugs of abuse produce withdrawal symptoms may be initiated through the mesolimbic dopamine system, the same pathway responsible for the short-term reinforcing effects of drugs. Supported by NIH grant DA015351.

36. Reagan Fields

Eastern Kentucky University

Mentors: Melinda Moore and Jerry Palmer

The Relationship Between Stress Levels and Suicidal Ideations in Health Science Majors

Previous studies have found that medical students have increased suicidal ideations, and stress is thought to play a factor. However, very little research has been conducted with health science majors, who undergo just as much stress. We hypothesized that the more stress a health science student was under, the more likely they would be to have to have suicidal ideations. We surveyed 156 students, using surveymonkey.com. The measures we used were the College Student Stressful Event Checklist and the Suicide Behaviors Questionnaire-Revised (SBQ-R). We found a strong correlation between number of stressful events and the likelihood that someone has thought of or even attempted suicide. We can conclude the higher stress level a health science major is under, the more likely a person is to have suicidal ideations.

37. Kelly Fussman

Western Kentucky University
Mentor: Mary Lloyd Moore

Outcomes of a Speech & Language Pilot Program for International Students

Universities in the United States, including those in Kentucky, host a substantial number of international students every academic year. Western Kentucky University alone hosts over 1,000 international students each year. These students often face a number of challenges upon arrival in the United States, especially when it comes to language and cultural differences. A considerable body of research strongly indicates that international students' educational performance and outcomes are significantly impacted by the learners' cultural identities, psychological and sociocultural experiences, and attitudes in relation to English-speaking societies. Many international students attribute academic and social difficulties to a lack of proficiency in the English language and unfamiliarity with the local culture. To address these concerns, a five-day English language skills seminar was conducted for a group of international students, focusing on pronunciation, grammar, vocabulary, social language, and acculturation. According to pre- and post-assessment and survey results, the seminar was very effective in improving both the students' speech and language skills and cultural awareness, as well as increasing learners' confidence needed to interact with English-speaking peers. These results highlight the need for quality language and cultural education programs for international students in order for them to be more successful while studying abroad.

38. Kelly Gardner and Christopher J. Nunley

Morehead State University
Mentor: Christina Conroy
Philosophical Investigations of Sex

STUDY 1 (Gardner): ***Are You Still a Virgin?***

Virginity— a concept society has that classifies the time before a person has sex for the very first time. Everyone has a different experience when they lose their virginity. On television, a person losing their virginity is romanticized and exaggerated, portraying to viewers that their first time promises and delivers so much. This study examined what "losing virginity" is really defined as. I make the claim that the concept of virginity is vague insofar as it fails to define a particular moment where it is lost and that it varies upon personal experience. People tend to either praise or persecute those who are virgins in this society so it is crucial to understand the ambiguity of virginity loss. This is true in a man's world especially, where women are often sexualized. It is a common mindset that it is praiseworthy for an eighteen year old to be a virgin, but a thirty year old virgin ought to be shamed. My intention is for the readers to understand that society does this [judge one another] based on one sexual, biological moment in life. If it was believed that virginity was a vague term, these situations would not occur.

STUDY 2 (Nunley): ***Safe Sex***

It seems to be the case that all forms of sex, even marital sex, involves objectification. If it's the case that all forms of objectification are morally wrong then it would have to be the case that marital sex is morally wrong. The former is argued by philosopher Alan Soble, and I provide evidence to support his claims and defend his position. The latter can be found in Immanuel Kant's Second Formulation of the Categorical Imperative. As a whole, I assume that we don't want to say that marital sex is a morally wrong thing to do. So, I ultimately argue against Kant's position citing other modern day philosophers, such as Martha Nussbaum, to show that Kant's moral theory is outdated and his views of objectification, especially in the sexual realm, are wrong. Thusly, I demonstrate that not all forms of objectification are morally wrong, saving sex for the virtuous person.

39. D'Andre Garrison

Kentucky State University
Mentors: Buddhi Gyawali and Jeremy Sandifer

Assessing Water Quality of the Kentucky River Watershed: A GIS-Based Approach

The Kentucky River has played an important role in the lives, history and culture of many people for thousands of years, providing irrigation, potable water, fish stocks and transportation. The purpose of this study was to assess the overall water quality within the Kentucky River watershed and to determine the degree to which changes in areal land cover corresponded to changes in water quality indicators for the years 2001 to 2006. Various data was collected from the United States Geologic Survey (USGS), assembled within a geographic information system (GIS), and summarized to describe the temporal variability of common water quality indicators including dissolved oxygen count, measure of suspended sediment, and water temperature for the years 2001 to 2006. In addition, we quantified the change in land cover distributions for the corresponding timeframe using multispectral land cover information derived using satellite remote sensing data from the MODIS and Landsat sensors. It was hypothesized that temporal variability in water quality would be significantly correlated with changes in land cover conditions. Preliminary results indicated significant temporal relationships between measures of water quality and changes in the physical condition of land cover as well as precipitation within the watershed basin, confirming the initial hypothesis statement. We concluded that changes in land cover conditions contributed to variability in measurements of water quality within the Kentucky River watershed basin.

40. Sydney Gebka

Morehead State University
Mentor: Johnathan K. Nelson

Changing Aspects of the Nature of Work

Given the significant time that people spend over the course of their lives at work, it is important for us to understand the nature of work. Jobs are increasingly changing in regards to how they are structured and work is accomplished, affecting worker job satisfaction, employee-employer relationships, and the sense of job security experienced by employees. Only by understanding the effects of these changes can we begin to understand their influence on our economy. While America's workforce is in a constant state of change, the speed and types of changes occurring in the workplace today are significantly different than previously experienced. Today's organizations are characterized by increased workplace flexibility, an increase in employee diversity, and unique employee-employer work arrangements. To identify significant changes in work today, we conducted a literature review in which we examined the changing nature of jobs and the effects that have occurred and will occur as a result. We highlight four important trends in how work is accomplished today. Two of these trends are freelancing and telecommuting. Freelancers are individuals who manage their own careers by working a series of temporary jobs, while telecommuters are individuals who use technology to complete work from any location. Each of these allows for increased flexibility in how and when work is accomplished. We also discuss the increase in individuals holding multiple jobs at one time. Lastly, we discuss increased employee diversity, including the growing representation of multiple generations, minorities, and a growing number of women represented in our current workforce. We then discuss the implications of these trends not only for organizations, but also for individual workers and to our broader economy. By better understanding the current and changing nature of work, individuals and organizations can better respond to and benefit from these changes.

41. Brittany Gill

Morehead State University
Mentor: Lori Baruth

What Can Dalcroze Do for You? An Exploration of the Benefits of Dalcroze Methods and Techniques

This study examined the different methods and techniques of Dalcroze Eurhythmics and how they can be employed to serve us in our daily lives. Eurhythmics was created by Emile Jaques-Dalcroze (1865-1950) after he noticed that his students could write harmonies and rhythms, but could not actually hear them. This method of music education utilizes movement, aural training, and improvisation to better develop students' hearing, performance, and connection to music. Dalcroze's new methods and approaches were avant-garde at their time and were met with some resistance, however, this methodology's prominence and importance has grown greatly since its development in the 1890s. Today, Eurhythmics instructors receive specialized training and certification and are located around the globe. Eurhythmics is important for both music education and performance; it provides music teachers with a method to educate their students more fully in music, and those performers that learn the methods are better able to connect with and interpret the music that they play. Dalcroze Eurhythmics also has theraputic applications as well and thus has benefits for those outside the study of music. A couple of examples of such benefits include building confidence and increasing spatial and body awareness.

42. Elaisy Gonzalez

University of Kentucky
Mentor: Susan Barron

A Novel Approach to Study Fetal Alcohol Syndrome: A 3-Trimester Model

Estimates from the CDC suggest that the incidence of Fetal Alcohol Spectrum Disorders (FASD's) can be as high as 2 - 5 per 100 school children. One of the most frequently reported behavioral effects with FASD is ADHD (attention deficit hyperactivity disorder) with estimates as high as 50 – 90% of children with heavy prenatal ethanol (ETOH) exposure having ADHD. Rodent models have been very useful in studying the behavior, neuroanatomy, mechanisms and possible interventions following prenatal ETOH exposure. Until recently, the majority of rodent models have used either a prenatal exposure model (which in terms of brain development is equivalent to the first and 2nd trimester of human pregnancy) or a neonatal exposure model (which overlaps the human third trimester "brain growth spurt"). However, in clinical populations, ETOH consumption may continue throughout the pregnancy and so this project was designed to assess a mouse model of ETOH consumption that included all three trimesters. Female C57Bl/6J mice voluntarily were given ETOH to drink daily prior to and throughout pregnancy (1st and 2nd trimester exposure) and after birth, a subset of pups also received ETOH (3rd trimester exposure). Appropriate controls were included. Offspring were tested for hyperactivity prior to adolescence for 30 min on two consecutive days. Offspring exposed to ETOH pre and postnatally (i.e. all 3 trimesters) were hyperactive relative to controls. Those exposed only neonatally were also hyperactive. These data provide support for the sensitivity of the CNS to ETOH during the "3rd trimester brain growth spurt".

43. Aaron Hall, Jennifer Campbell, and Hanady Adams

Owensboro Community and Technical College
Mentors: Timothy Dick, Chandrakanth Emani, and Connie Johnson

The Use of Bioinformatics to Explore the Evolution of Polycystin1 and Polycystin 2

Polycystic kidney disease (PKD) is an autosomal dominant genetic disease which can result from a mutation in the PKD 1 gene on chromosome 16 or the PKD 2 gene on chromosome 4. The PKD 1 gene codes for a 4302-amino acid residue transmembrane protein Polycystin 1 which may be involved in cell-cell and cell-matrix interactions. The PKD 2 gene codes for a transmembrane protein Polycystin 2 which may serve as a calcium channel in conjunction with Polycystin 1. Mutations in the PKD 1 or PKD 2 gene cause cysts to form in the nephron and eventually lead to kidney failure. Bioinformatics analysis of PKD 1/Polycystin 1 and PKD 2/Polycystin 2 to decipher the mmolecular evolution of the proteins was conducted using the Psi-BLAST program of the National Center for Biotechnology Information (NCBI). The goal is to collect ancestral sequences and use the bioinformatics MEGA6 (Molecular Evolutionary Genetic Analysis) software to construct a phylogenetic tree to determine universal ancestors for the PKD 1 and PKD 2 genes. The molecular evolution pattern will be used to analyze conserved domains across life forms that will enable the suggestion of therapeutic strategies involving molecular medical approaches to combat PKD.

44. Zohair R. Hameed and Seth Sereff

University of Louisville
Mentors: James L. Wittliff and Michael W. Daniels

Deciphering the Molecular Basis of Breast Cancer Behavior using Proteomics and Genomics

STUDY 1 (Hameed): *Quantification of Estrogen and Progestin Receptor Proteins as well as HER2/neu Oncoprotein Improves Discrimination of Breast Carcinoma Behavior*

Immunohistochemical (IHC) analyses of ER, PR and HER2 proteins are used as clinical biomarkers for breast cancer management. However, IHC only gives semi-quantitative results due to variation in methods and interpretation which often complicate their use. We examined ER and PR in 1059 breast carcinomas quantified by radio-ligand binding and/or enzyme immunoassay (EIA) and measured HER2 oncoprotein by EIA to assess relationships between biomarker profiles. Disease-free (DFS) and overall survival (OS) were assessed for 123 patients. ER and PR were expressed as fmol/mg cytosol protein while HER-2 was expressed as HNU/mg membrane protein. Generalized pairs plots of biomarkers only indicated a relationship between ER and PR. Of 8 possible combinations of the three biomarkers, 46% of 123 cancers expressed ER+/PR+/HER2+ and exhibited good prognosis and survival by Cox regression and Kaplan-Meier plots using R software. Biopsies with profiles of ER+/PR-/HER2+ (11%) or ER+/PR+/HER2- (11%) exhibited poor prognosis and survival. Also biopsies exhibiting ER-/PR-/HER2- (Triple negative breast cancer, TNBC) were associated with decreased DFS and OS, as reported using IHC. When comparing biopsies expressing ER+/PR-/HER2+ (n=13) against the 7 other combinations (n=106), hazard ratios >1 were observed, predicting poor prognosis and survival. Pre-menopausal patients (n=643) exhibited ER+/PR+/HER2- in 13% of cancers compared to 27% in post-menopausal patients (n=404). TNBC were observed in 10% of pre-menopausal patients and 3% of post-menopausal patients suggesting influence of endocrine status on biomarker profiles. Boxplots comparing the 8 biomarker profiles indicted two combinations with elevated ER/PR exhibited the best prognosis. Cox regressions determined that patients with similar ER status, gave significant hazard ratios of 0.30 (DFS) & 0.18 (OS) also indicating much better prognosis. Results reinforce the importance of assessing levels of the three biomarkers in a quantified fashion to enhance their use in breast cancer management and prediction of risk of recurrence.

STUDY 2 (Sereff): *Novel Relationships of Methylxanthine Alkaloid Receptor Genes and Risk of Breast Carcinoma Recurrence*

Consumption of methylxanthine alkaloids such as caffeine, theophylline and theobromine may induce breast pain. Caffeine may have induced its biological activities by antagonizing adenosine receptors, which have been implicated in breast cancer cell behavior in vitro. Our goal was to evaluate relationships between genes for methylxanthine receptors and metabolizing enzymes in relationship to risk of recurrence. Expression of 8 xanthine receptors, 8 metabolizing enzymes and various phosphodiesterases were measured by microarray analyses of RNA isolated from LCM-procured carcinoma cells from 247 breast biopsies. Using statistical software R, univariate and multivariate Cox regressions with interaction were determined for each candidate gene. Gene expression was examined in relationship to estrogen (ER) or progestin receptor (PR) status. Kaplan-Meier plots of receptor genes ADORA2B and RYR1 indicated that over-expression was related to diminished over-survival (OS). ER+ or PR+ carcinomas exhibited lower ADORA2B and RYR1 expression. Of enzymes involved in methylxanthine metabolism, elevated CYP2E1 gene expression was associated with increased disease-free survival (DFS) and OS of breast cancer patients. CYP2E1 gene expression was significantly higher in ER+ and PR+ breast cancers compared to ER- and PR- lesions. Of molecular targets, PDE4A gene over-expression was significant for predicting improved DFS and OS, particularly in ER+ breast cancers. In contrast, PDE1A gene over expression was significant for predicting decreased DFS and OS of breast cancer patients regardless of ER/PR status. Collectively, these results suggest that expression of several genes involved in methylxanthine action and metabolism may be used as a molecular signature for predicting breast carcinoma behavior.

45. Christopher Hannon

University of Louisville
Mentor: Said Abusalem

Assessing Elements of the Person-Centered Culture of Safety in Long-Term Nursing Care Facilities

Maintaining a working culture and structure that sets reasonable expectations for staff members and maintains open lines of communication is paramount to establishing a Person-Centered Culture of Safety (PCCS) in Long-Term Care Facilities (LTCF). The purpose of this study was to describe characteristics of the person-centered culture of safety in LTCF from employees' perspective. This study was guided by the Agency for Healthcare Research and Quality (AHRQ) PCCS framework. Cross-sectional survey data were collected from 211 (response rate 70%). LTCF employees were [(licensed nurses (27%), nursing assistants (35%), administrators/managers (8%), administrative support (3%), and rehabilitation staff (13%)] on all shifts at five LTCF. A survey packet containing a consent letter, the AHRQ Nursing Home Survey on Patient Safety Culture, and a return envelope was distributed to each employee. Thirty percent of the participants reported strongly agreeing with "not having adequate staff to handle the workload"; 29% "used shortcuts to get work done faster"; and 38% "having to hurry because of having too much work to do". Seventy percent strongly agreed that "they helped when a fellow staff member was overwhelmed"; 21% strongly agreed that they "were afraid to report their mistakes"; and only 53% strongly agreed "feeling safe reporting their mistakes". Thirteen percent strongly agreed that "they were treated unfairly by management when they made mistakes"; 19% strongly agreed that "staff opinions were ignored". There is a need for interventions that would assure a non-blaming culture when mistakes are made or reported. Additionally, further research on communication pathways, particularly between staff and management, is needed.

46. Charles Conyers Harpole

University of Kentucky
Mentor: Emily Beaulieu

The Mountain Divide: Education Quality Discrepancies Between Kentucky and Central Appalachia

The Kentucky Education Reform Act (KERA) was a momentous piece of legislation, not just for Kentucky, but the entire nation. The ambitious policy was a reaction to the Kentucky Supreme Court's declaration of the unconstitutionality of the Kentucky public education system, and the policy sought to reduce inequality in school funding, and reduce the gap in student achievement across the disparate regions of Kentucky. Twenty years later, KERA successfully reduced school financing inequality, but analysis projects KERA's attempts to reduce gaps in student achievement as inconclusive at best (i.e. not by a significant amount). Now, with the Kentucky General Assembly enacting new policies that aim to increase education attainment, and improve overall education quality, it is more important than ever to understand where KERA fell short in converging achievement. Understanding this is integral in projecting the future success of the recently enacted Kentucky Senate Bill 1 and Kentucky Senate Bill 97 that are promising to raise education outcomes in a way that KERA lacked. This research used a fixed-effect model to understand what factors created the differences between the Appalachia region and the rest of Kentucky in student achievement. Using testing and school data from the Kentucky Department of Education, Economic Data from the Bureau for Economic, and Health Data from County Health Rankings, teacher experience and expertise, and low birth weights helped to explain the significant differences in student achievement between Kentucky and the rest of Kentucky. Addressing these issues in policy is integral to the long-term growth of Eastern Kentucky.

47. Amber Hartell, Boniface Amankona, and Sait Sarr

Kentucky State University

Mentors: Maheteme Gebremedhin, Buddhi Gyawali, and Kenneth Andries

Methane Flux Measurements over a Rotational Grazed Pasture in Northern Kentucky

Minimizing excessive losses of protein and reducing nitrogen wasting bacteria in ruminants has long been noted as the main determinants of methane (CH4) produced by ruminants. Enteric fermentation from ruminating animals is the second largest global source of CH4 thus has received a great deal of attention in recent decades. These concerns highlight the importance of accurate CH4 quantification for determining the CH4 source or sink status managed with intensively rotational grazed pasture. We measured CH4 flux over a small paddock rotationally grazed with 40-70 goats managed in a rotational grazing system. We used the eddy covariance (EC) technique, at Kentucky State University (380 6'56.42 N, 840 53' 22.81W). To investigate the grazing pattern of the animals relative to the tower location and to properly attribute the contribution of the goats to the measured flux, the position of 12 goats were tracked with GPS recorder both in the upwind and downwind areas (footprint). Diurnal CH4 analysis indicate much of the flux occurring during the night (5.9 μmol m-2 s-1), nearly 1.5x of the day time average (3.7 μmol m-2 s-1). Consistently, the cumulative CH4 flux was the highest (9.6 μmol m-2 s-1) when the animals were grazed in the upwind compared to downwind (3.9 μmol m-2) (positive sign indicate the pasture was CH4 source). The average of CH4 flux from the early summer short grazing period (June to July) was relatively lower than the early grazing season (August 27 to September). Averaged over a short (May 5 - June2) and an extended mid-summer (July 15-Aug 26) non-grazing periods, the pasture was a net CH4 sink (-0.01 μmol m-2) and neutral (0.01 μmol m-2), respectively. This study underscores the importance of livestock methane emission contribution to the total greenhouse gas budget of intensely managed pasture. The contrasting results might also provide information to inform management strategies towards i) increasing the pasture's diet quality for animals and ii) improving the digestibility and thereby reducing the nitrogen wasting bacteria. Both have shown to ameliorate CH4 emissions from ruminants.

48. Amelia Hartman and Rachel L. Masek

Eastern Kentucky University
Mentor: David Cunningham

Forensic Analysis of Drug Traces from Fabric

Forensic analysis of drugs is well established for many types of samples commonly encountered during investigation of criminal behavior. However, the unfortunate increase in synthesis and use of methamphetamine and other abused drugs has increased exposure of both perpetrators and innocents to these harmful substances. Analysis of drug traces from clothing or other fabric is of great importance in establishing a link between physical evidence and case scenarios in the pursuit of justice. The present work focuses on the design and testing of new collection devices for measurement of drug traces by Direct Analysis in Real Time (DART) mass spectroscopy. Preliminary studies identified solvents and absorbent materials capable of quickly, efficiently extracting small amounts of drug from a variety of fabrics. A variety of patterns were made in absorbent materials to allow heated, ionized gasses from the DART source to interact with the absorbed sample and subsequently flow unimpeded into the mass spectrometer. Then, sample holders were fabricated to mount the absorbent materials for rapid introduction into the DART instrument. Preliminary results demonstrated detection of only 3 μg of methamphetamine in one minute. Optimization of the system is targeted towards development of a sample collection kit capable of rapid collection of trace drugs from all types of fabric. Results from DART analysis of these kits would likely be useful in supporting criminal charges such as drug manufacturing and child endangerment.

49. Madison K. Heine and Taylor G. Billings

Western Kentucky University
Mentors: Michael E. Smith and J. David Monroe

New Platinum Compounds May Kill Cancer Without Causing Hearing Side-Effects

Platinum-based chemotherapy treatments such as cisplatin often produce the unfortunate side effect of hearing loss. This is due to their ototoxic effect of destroying the sensory hair cells of the inner ear that transduce sound vibrations into neural auditory signals. We first investigated whether hair cell loss occurs in the zebrafish inner ear after exposure to cisplatin. This data was then used as a positive control in a study of several novel platinum (II) compounds which exhibit anticancer activity, with the goal of finding novel compounds that kill cancer cells without damaging auditory hair cells. Zebrafish were microinjected with cisplatin at a concentration of 3.75 mg/kg of body weight and then 24 hours later had their hearing tested by recording auditory evoked potentials. Afterwards, their inner ears were dissected and their auditory end organs, the saccule and utricle, were removed. These tissues were then fluorescently stained with phalloidin, viewed under a microscope, and hair cell densities were determined in each end organ to assess hair cell loss. Cisplatin-injected zebrafish exhibited significant hearing loss between 250 and 1,000 Hz when compared to buffer-injected controls. In addition, cisplatin-injected fish had reduced saccular hair cell densities compared to controls, while no significant differences were exhibited in the utricle. We are currently testing the ototoxicity of phenanthriplatin in the zebrafish inner ear to see if it has reduced side effects relative to cisplatin. This project is the first step in using zebrafish as a model for evaluating whether novel platinum (II) compounds may be less ototoxic than cisplatin, and could lead to the development of less harmful forms of chemotherapy.

50. Julieann Helton

Morehead State University
Mentor: Joy L. Gritton

Designing on a Dime: Creating a Virtual Presence for Non-Profit Organizations

This study examined lessons learned from a two-year project to create a virtual presence for the Haldeman Community Center in Rowan County, Kentucky. It offers one example of the many ways public institutions of higher learning can use their resources to support community initiatives, while allowing students to gain valuable real world experience through service learning. The Haldeman website is student designed and built, and allows the center to promote upcoming events, share oral histories, feature profiles of community leaders, and provide information for potential volunteers, all in a cost-effective manner without the assistance of a third-party. Tips for design, implementation, and community training will be addressed, in an effort to inspire others to consider similar collaborative projects.

51. Karl Hempel

University of Kentucky
Mentors: Anne-Frances Miller and John Patrick Hoben

Producing Reactive Intermediates via Photodriven Electron Transfer

Flavoenzymes are essential to all forms of life and make up a large portion of genomes, e.g. 0.25% Homo sapiens and 1.8% Escherichia coli. Flavoproteins are proteins that contain a flavin that may be covalently or non-covalently bound. Flavins are redox-active prosthetic groups; flavin adenine dinucleotide (FAD) or flavin mononucleotide (FMN), which are Vitamin B2 derivatives. The flavoprotein name reflects the fact that flavoenzymes are an intense yellow color because the flavin absorbs blue light. Understanding the mechanism by which flavin cofactors are photoexcited and transfer electrons is essential in harnessing flavoproteins for organic electronic applications, e.g. functionalized electrodes. After the initial photoexcitation of flavin, the fluorescence lifetime can be anywhere from 1 femtosecond to 100 nanoseconds until the excited state is quenched by electron transfer. Therefore, femtosecond transient absorption spectroscopy (TAS) was needed to study these extremely short lived excited states. To optimize the yield of electron transfer intermediates, a donor was needed to supply an electron to the vacancy that was formed by exciting the initial flavin group. With this electron hole filled, the flavin adopted an excited semiquinone state. We used fluorescence quenching to measure the efficiency of electron transfer to photoexcited flavins and screened an array of candidate electron donors to identify those with optimal efficiency and favourable dissociation constants. We learned temperature has a significant effect on fluorescence emission intensity in our systems of study. With a reliable way to produce flavin semiquinone, TAS can be utilized to understand the formation and decay of the semiquinone state.

52. Nicholas David Henderson and Zackary Ronnie Houck

Western Kentucky University
Mentor: Shahnaz Aly

Architecture Providing a Sustainable Community

Architecture is more than creating a unique design or an attractive building. Architecture is about creating spaces that will endure time. With the building industry being one of the largest energy resource users on this planet, architects have the responsibility to reduce its reliance on these precious resources. A renowned architect, Richard Rogers, once said, "I believe we - architects - can affect the quality of life of the people." Missionaries in Costa Rica approached us to design a community that is a safe haven for local orphans and refugees. The architecture we created focused on making a space for people to heal, and emotionally rehabilitate. Architecture has the ability to create emotion, to influence the thoughts and ideas a person has. The significance of our architecture was to produce a space where interaction, opportunity and healing encourage a community to grow and function as one. It became essential to design a community that was sustainable and self-sufficient. Bringing together sustainable design and our ideas of a community go together harmoniously. Sustainability philosophy focuses on creating prosperity and hope in our communities. It is through careful investigation and awareness that we achieved a design that had a positive environmental impact, and one that also is socially and emotionally responsive to the community.

53. Zachary Herde

University of Louisville
Mentor: Jagannadh Satyavolu

Towards Integrated Bio-refinery: Production of Activated Carbons from Sustainable Agricultural Biomass

Non-food source biomass byproducts from agricultural processing industries such as distilleries and industrial agriculture can be a sustainable raw material source for battery manufacturing in automotive and many other industries. Light-weight and high performing activated carbon fibers (ACF) for energy storage applications such as Li-S batteries, supercapacitors, photo-voltaic cells, and hydrogen storage can be produced from agricultural biomasses such as grains from distilleries and soy hulls. As a part of their Integrated C5-based Bio-refinery, the Conn Center for Renewable Energy Research at the University of Louisville has developed a route to produce light-weight ACF. The biomass is first put through an acid hydrolysis that removes sugars such as xylose and arabinose, which are useful for biofuel production. The remaining fibers are then used to create ACF using a low-cost and simple activation method. As opposed to lignin based carbon fibers for composites applications, these light-weight cellulose-based carbon fibers are better suited for energy storage applications due to their unique pore structure and high surface area. This work has shown that the hydrolysis process and resulting morphology of the biomass fibers is what allows the carbons to be produced with such high surface area. This need for sugar removal allows for a holistic process that uses all of the biomass' potential for chemical products and energy applications.

54. Chelsea Hereford

Eastern Kentucky University
Mentor: Michelle Gerken

Can Recreation Therapy Benefit Comprehensive Care?

Can Certified Therapeutic Recreation Specialist (CTRS) benefit Comprehensive Care? Kentucky is ranked 49th in mental health. Kentucky has 120 counties with comprehensive care services however, none have recreation therapy using a Certified Therapeutic Recreation Specialist. According to American Therapeutic Recreation Association, recreation therapy is a systematic process that utilizes recreation and other activity-based interventions to address the assessed needs of individuals with illnesses and/or disabling condition, as a means to psychological and physical health, recovery and well-being. Recreation therapy can decrease depression, elevate emotional well-being by creating a sense of accomplishment, increase independence, increase self-esteem and build confidence, increase motivation, improve quality of life, promote community integration, reduce anxiety and stress, reduce isolation, and strengthen mental well-being (Carter & Van Andel, 2011). A Certified Therapeutic Recreation Specialist can use various interventions whether in rural or metropolitan areas to produce change in a comprehensive care clients. The question remains, how can comprehensive care facilities benefit from CTRSs assisting in the improvement of the health of the citizens of Kentucky?

55. Hayden Hickey

Western Kentucky University
Mentor: Amber Schroeder

Is Workplace Justice Blind? Social Media Use in Employee Selection

In the past decade, social networking websites (SNSs), such as Facebook, have invaded most aspects of modern life. One aspect where we have seen this invasion is the work environment, and, in particular, the pre-employment process, where hiring managers use SNSs as a means to learn information about potential employees. Social media screening may not only make potential employees cautious of what they post online, but is also likely invoking feelings of workplace injustice. Perceptions of workplace justice have been linked to job engagement and organizational attraction. The focus of this study was on two facets of organizational justice: procedural justice (i.e., fairness of a process) and interactional justice (i.e., fairness regarding interpersonal treatment). This study investigated social media's role in employee selection and how it relates to potential employee attitudes toward a company. By measuring participants' attitudes when told that their Facebook profiles would be taken into consideration in determining their job ability, their feelings of procedural justice were assessed and compared to a control group. To measure interactional justice, participants were divided into two conditions: participants in condition A (i.e., the high justice condition) were given clear explanation of the rationale behind using social media as an evaluation tool and shown empathy, whereas participants in condition B (i.e., the low justice condition) were provided with no information and shown no empathy. Our objectives included determining participant attitudes toward a company that uses SNS evaluations in hiring, measuring applicants' perceptions of workplace injustice when going through this type of selection process, and determining to what extent sensitivity and explanation can affect these feelings of justice. Our hypotheses were as follows: 1) Social media screening will lower perceptions of procedural justice, and 2) empathy and increased communication of the basis for SNS evaluation use will raise perceptions of interactional justice.

56. Timothy Hoey

University of Kentucky
Mentor: Pradeep Kachroo

Role of Circadian Rhythm in Plant-Virus Interaction

Recently it has been shown that light patterns play some role in the signaling of host defense mechanisms. Plants have two types of photoreceptors that, in general, are classified based on whether they absorb red/far-red or blue light spectrums. The red/far-red and blue light absorbing photoreceptors are called phytochromes and cryptochromoes/phototropins, respectively. Interestingly, besides development, these photoreceptors are also known to participate in circadian rhythms, as well as defense against microbial pathogens. Plants use a variety of mechanisms to defend themselves against microbial pathogens. One of these involves recognition of pathogens via specialized plant proteins known as resistance (R) proteins. These R proteins act via recognizing one of the pathogen-encoded proteins. Recent results showed that blue-light photoreceptors cryptochromes and phototropins are required for the stability of R protein HRT, which allow the model plant Arabidopsis (Arabidopsis thaliana) to recognize and mount immune response turnip crinkle virus (TCV). Induction of HRT-mediated defense restricts TCV to localized point of entry and thereby prevents its spread. However, mutations in either cryptochrome (CRY2) and phototropin (PHOT2) causes degradation of HRT, which resulted in increased viral replication and spread. Since CRY2 and PHOT2 also play a role in circadian rhythms it is possible that circadian rhythm might also play a role in plant defense against viral pathogens. We have shown that circadian rhythms have specific impacts on plant viral interactions in the Arabidopsis- TCV pathosystem.

57. Lillian Hoskinson

Western Kentucky University
Mentors: Nancy F. Hulan and J. Dusteen Knotts

Tutor in a Bag: Reaching Struggling Readers

This project introduces an evidenced-based reading tutoring system that could be used by minimally trained volunteers to improve at-risk Kindergarten students' reading skills. The presentation is a description of the ongoing project. Kindergarten students were selected as high-risk for reading weaknesses in a metro school with high diversity. High risk was defined as weak skills in letter recognition, word recognition, letter sounds, phonological segmenting skills, low scores on kindergarten screening, and teacher recommendation. Four children were selected for this pilot study to receive a structured tutoring program created on evidenced-based reading instructional methods and delivered weekly by volunteers. Four volunteers completed a two-hour tutor training session demonstrating the components of four reading activities created for 30 minute, after-school tutoring sessions. Volunteers also completed district training in confidentiality and obtained background clearance. The four types of activities selected were phonemic awareness games for manipulation of sounds skills; letter identification and sound relationships; sight words; and reading a book. Resources and materials were chosen, labeled, and given to the tutors in a backpack for each set of activities. During each session tutors selected a variety of activities to address each of the four components using a brief lesson plan format and student feedback system. Students and volunteers evaluated each activity as very good, okay, or not happy with this one. This pilot study is in early stages. Plans for new volunteers in the spring 2016 are in place.

58. Lin-hsiu Huang and Kathryn Wilkerson

Morehead State University
Mentor: Ann Andaloro

Hear Me Roar: Morehead State Television

Hear Me Roar is a Morehead State University TV production. The shows provided the audience an opportunity to gain a broader understanding of issues important to women as well as minorities. Hear me Roar is available to unlimited potential viewers online through MSU's website. The producers researched and wrote segments for the show. The job involved booking guests, conducting research, developing interview questions, and creating, writing and producing content for video segments. One segment focused on the Arts. The first program featured Lin-hsiu Huang, who discussed the role of women in Taiwan and the cultural differences she felt. She also performed Chinese yo-yo/ Diabolo as the closing of the show after a short interview. Another Art segment focused on gendercide of girls. Huang was a commissioned artist for Give Her Life, a non-profit raising awareness for this gender-selection issue. The art piece she created was displayed in a public venue in Pasadena, California. Another segment focused on Home Remedies. In the premier episode, Kathryn Wilkerson demonstrated a home remedy for brighter, healthier skin. She researched different home remedies and how they can improve women's appearance, self-image, and health. These features became part of larger projects documenting The Arts and Home Remedies to be proposed for airing on KET."

59. Jacob Hubbuch

Western Kentucky University
Mentor: Rajalingam Dakshinamurthy

Novel Self-Patented Gold Nanoparticles for Antineoplastic Activity

Phloridzin, a natural hydoxychalcone constituent obtained from fruit trees is an antidiabetic and antineoplastic agent. Phloridzin was first isolated, for clinical pharmaceutical usage from the pear tree bark *of Pyrus communis* in 1838 as the first sodium-glucose linked transport 2 (SGLT2) inhibitor. Additionally, phloridzin is also reported to have antineoplastic activity. Phloridzin had to take an exit from the pharmaceutical market due to its side effects and poor bioavailability when compared to other antidiabetic drug competitors. This limit of phloridzin's bioavailability is primarily attributed to the degradation of the glyosidic bond of the drug to result in the formation of phloretin, the aglycone of phloridzin. Phloretin displays a reduced capacity of SGLT2 inhibition, however this nutraceutical displays enhanced antineoplastic activity in comparison to phloridzin. Gold nanoparticles (AuNPs) have been studied for drug delivery applications for less bioavailable drugs. Hence, in order to tackle the bioavailability of these hydroxychalcones and study the unknown anticancer mechanism, we synthesized phloridzin and phloretin conjugated gold nanoparticles (Phl-AuNP and Pht-AuNP) in single step, rapid, biofriendly processes. The synthesized AuNPs morphology was characterized via transmission electron microscopy and UV-Vis spectroscopy. The presence of phloridzin or phloretin was confirmed using SEM-EDS. The percentage of organic component (phloridzin/phloretin) onto GNPs surface was characterized using TGA. Assessments of the antineoplastic potency of the hydroxylchalcone conjugated AuNPs against cancerous cell lines was accomplished through monitoring via flow cytometry. We hypothesize that functionalization of these chalcones onto the gold nanoparticles' surface may improve the pharmacokinetic profile of phloridzin and phloretin.

60. Caleb Hughes

Murray State University
Mentor: Joshua Ridley

Glow Discharge Production of Oxygen from the Martian Atmosphere

One of the most crucial aspects of any planned mission to Mars is a continual supply of oxygen for both astronaut respiration on site, and possibly, for use as a propellant for the return trip. The most popular approach to this problem favors in-situ oxygen production on Mars, utilizing available resources such as the 95% carbon dioxide Martian atmosphere. However, this requires a large energy budget. NASA's current plans include sending a system called MOXIE (Mars Oxygen ISRU Experiment), which utilizes ceramic stacks to produce oxygen at around 800◦ C. Our alternative approach utilizes the 6 Torr carbon dioxide Martian atmosphere to provide a continual source of oxygen by breaking down the molecule into carbon monoxide and atomic oxygen using a glow-discharge technique. After breaking apart the carbon dioxide molecule, a thin film of silver uniquely allows the atomic oxygen to permeate through and recombine to form molecular oxygen on the downstream side of the thin film, where it is subsequently compressed and stored for later use. Initial experiments confirmed, as theoretically predicted, the oxygen flow rate is inversely dependent on the membrane thickness. By taking advantage of recent advances in thin film technology to reduce the thickness of the film to many orders of magnitude less than used in initial studies, a corresponding increase in oxygen flux can be realized. The thin film must be pinhole free and requires the mechanical support of a porous ceramic substructure, whose qualities were determined analytically. With this system, it is shown that this method presented produces a viable energy efficient alternative to MOXIE.

61. Brenna Kaelin

University of Louisville
Mentor: Juliane Beier

Mechanistic Insight Into Vinyl Chloride-Induced Liver Injury: Role of Dietary Fatty Acids

Vinyl chloride (VC) is a relevant chemical toxicant and an important occupational/environmental pollutant. Most studies on the risk of VC exposure to human health have focused on the effect of VC alone (high doses) and not taken into consideration VC interactions (low doses) with risk-modifying factors. It has been shown that certain dietary fats such as polyunsaturated fatty acids (PUFA), linoleic acid (LA) in particular, exacerbate fatty liver diseases. The purpose of the current study was to determine the role of LA metabolites in sensitizing the liver to VC via molecular, organelle, and cellular effects.Mice were administered a bolus dose of chloroethanol (or vehicle) 10 wks after being fed a linoleic acid rich high fat diet (HPUFA; 42% corn oil)-fed or low fat control diet (LPUFA; 13% corn oil). Animals were sacrificed 0-24 hours after ClEtOH exposure. Samples were harvested for determination of liver damage, inflammation, oxidative and ER stress.In LFD-fed control mice, chloroethanol caused no detectable liver damage or inflammation. In HPUFA-fed mice, chloroethanol increased HPUFA-induced liver damage, steatosis, infiltrating inflammatory cells and hepatic expression of proinflammatory cytokines and genes affected in ER stress. Furthermore, chloroethanol altered protein expression of genes involved in ER stress.Together, VC and HPUFA cause liver damage, inflammation and ER stress markers. This serves as proof-of-concept that VC hepatotoxicity may be modified by a linoleic acid rich diet. These data implicate exposure to VC as a risk factor in the development of liver disease in susceptible populations. National Cancer Institute grant R25-CA134283

62. Maria Kallas

Morehead State University
Mentor: John H. Curry

Trends in Stakeholders' Perceptions of Mason County's 1:1 iPad Implementation

In 2012, Mason County High School, in Maysville, Kentucky, embarked on a 1:1 iPad implementation. All faculty, staff, and students were given iPads to use for both school and personal use. Currently, this implementation is ranked the 89th largest in the world (Forbes). This presentation discusses trends in stakeholder perceptions of this implementation and test score correlations. Data points included: trends in student perceptions, the effect on student motivation and student-teacher engagement, trends in faculty perceptions on the implementation, trends in students' perceptions on the implementation, cheating methods, best practices, and trends in test scores. This IRB-approved study began during the 2012-2013 school year and is set to end at the close of the 2015-2016 school year. In previous presentations at Morehead State's Annual Celebration of Student Scholarship, it won an Award of Merit for research on students' perceptions (2014) and the People's Choice Award for research on stakeholders' perceptions (2016). In addition, it was selected to be presented at the 2015 KATE conference.

63. Maria Kallas

Morehead State University
Mentor: April Miller

SOS! My Inattentive Students are Disrupting the Classroom!

During the spring 2015 semester, I worked intensively with one student to dramatically change his behavior using applied behavior analysis. Instead of taking away recess and finding ways to punish my student, I rewarded his on-task behaviors with something that intrigued and motivated him, pieces to a model dirt bike. For *Roman to be successful in the classroom and on state tests, he could not continue distracting himself and others. At some point in his academic career, Roman's inattention would catch up to him and prevent him from understanding the content, which would lead to him missing benchmarks and potentially being retained. His off-task behaviors needed to change in all settings, but especially during whole group instruction, when working in small groups, and when working individually on assignments. After identifying the target behavior, I conducted baseline data using the duration recording system. I field tested an operational definition of on-task behavior and used it to collect one data point. After collecting baseline data, I staged an intervention and then collected intervention data using the duration recording system. The results of my behavior change plan were incredible. Roman went from being identified as at-risk for failure to having 100% engagement and becoming a model student. My presentation will cover the systematic implementation of my behavior plan. It will challenge teachers to use other methods of classroom management than taking away recess for misbehavior. This presentation was presented at the KATE conference. **Roman=pseudonym*

64. Josephine M. Kim

University of Kentucky
Mentor: Sylvie Garneau-Tsodikova

Enzymatic Evidence for a Revised Congocidine Biosynthetic Pathway

Nonribosomal peptides are proteins that are assembled through a chain of other proteins called nonribosomal peptide synthetases, many of which are composed of adenylation (A), thiolation (T), and condensation (C) units corresponding to function. Naturally produced pyrrolamides, such as congocidine, are nonribosomal peptides that bind to the minor groove of DNA in a sequence-specific manner, which confers anticancer activity. Considerable efforts have been made to increase this ability and overcome toxicity of pyrrolamide analogues. The majority of attempts to delineate the biosynthetic machinery, the order and method of protein function, during pyrrolamide assembly have been genetic methods. We discussed biochemical characterization of four essential proteins in congocidine formation: the adenylation-thiolation (A-T) di-domain Cgc18(1-610) and its MbtH-like partner SAMR0548, the AMP-binding enzyme Cgc3*, and the T domain Cgc19. A substrate is a molecule that an enzyme specifically binds and alters to catalyze substrate formation into a product. AMP stands for adenosine monophosphate, a molecule involved in energy transfer. We reported revised substrate specificities of Cgc18(1-610) and Cgc3*, biochemical evidence of the AMP-binding activity of Cgc3*, and loading of 4-acetamidopyrrole-2-carboxylic acid onto Cgc19. Based on these biochemical studies, we suggest a revised congocidine biosynthetic pathway.

65. Janie Knell and Joshua Z. Fugate

Morehead State University
Mentor: Wilson J. Gonzalez-Espada

Using Mesoscale Meteorological Data to Identify Possible Local Effects of Global Climate Change

The most recent consensus of the scientific community regarding global climate change is straightforward: “Human influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history. Recent climate changes have had widespread impacts on human and natural systems.” Interestingly, the predicted effects at the global scale are probably not going to be observed uniformly across all latitudes and longitudes. This highlights the importance of observing and analyzing meteorological data at the mesoscale level, that is, weather events that range in size from about one mile to about 150 miles and that might go undetected without densely spaced weather observations. In our state, we are fortunate to have the Kentucky Mesoscale Network (KY Mesonet), a network of over fifty automated weather and climate monitoring stations developed by the Kentucky Climate Center at Western Kentucky University. The purpose of this study was to apply statistical approaches to data from about 50 KY Mesonet stations to test the predictions of global climate change caused by increased temperature and energy in the atmosphere. Variables that were investigated included maximum, minimum, and average temperature; minimum humidity; precipitation; average wind speed; and cloudiness (using insolation as proxy). Even though climate trends occur over many years, it was hypothesized that statistically significant changes will be identified within the data. Understanding the local effects of climate change is important in order to plan ahead and make any necessary changes to minimize its economic and social impact.

66. Andrew Knight

University of Louisville
Mentors: Richard Feldhoff and Pamela W. Feldhoff

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.

67. Laura Krauser

University of Louisville
Mentor: Andrea Gaughan

The State of Tobacco: Kentucky Farmer's Response to the Buyout and Analysis of Tobacco Crop Production

In order to explore and understand how large-scale agricultural policies impact local land-use farming decisions. This study examines out whether the growing patterns of tobacco in light of the TTPP is detectable on the landscape by a change in crop extent measured by remote sensing classification techniques. Qualitative data in the form of surveys were used to inform land change analysis using remote sensing and land classification via a time series analysis. Training data from various farms for tobacco, corn, and other agricultural products were used to inform Landsat data (multispectral resolution and thirty meter spatial resolution) to accurately identify tobacco. Preliminary results suggest that tobacco farms have shifted west, and scaled up in terms of size, which is congruent with census data. The study will demonstrate the ability to visualize and quantify change caused by the TTPP policy implementation.

68. Amir Kucharski

University of Kentucky

Mentor: Peter Kekenes-Huskey

Understanding Ion Binding Affinity and Selectivity in Beta Parvalbumin Using Molecular Dynamics and Mean Sphere Approximation Theory

Parvalbumin (PV) is a globular calcium-binding protein expressed primarily in skeletal muscle and secondarily in neuronal tissue. Defects in PV function have been correlated with a variety of severe pathological conditions, including epileptic seizures, while engineered sequences have been shown to mitigate cardiac dysfunction in animal models. Our computational studies of the beta PV isoform seek to quantify thermodynamic drivers of high affinity and selective calcium (Ca2+) binding at the pseudo and canonical EF structural motifs. Specifically, we employed molecular dynamics (MD) simulations and Mean Sphere Approximation (MSA) theory to quantify the structural and thermodynamic factors favoring Ca2+-binding relative to other common intracellular electrolytes in both EF-hands. Our MD simulations provided the coordination geometry and the density of metal-chelating oxygens within the EF-hand scaolds for both calcium and magnesium. These structural data inform the MSA model, from which the free energy and chemical potential within the metal binding site are predicted. This approach provided a thermodynamic basis for ion affinity and selectivity in beta-PV over a broad range of electrolyte compositions and concentrations that would be difficult to ascertain by MD alone. The minimal computational cost of MSA theory relative to MD further offers the potential to predict key thermodynamics quantities across a wide range of PV sequence homologs and Ca2+-binding proteins.

69. Valerie Lauer and Sarah Platt

University of Louisville
Mentor: Keith R. Mountain

Domestic Alternative Energy Initiatives for Louisville Kentucky

STUDY 1 (Lauer): ***Integrating a Low Output Wind Turbine into an Alternative Energy Supply Network for Domestic Use, in Louisville, Kentucky***

Over the past decade much attention has been directed toward the implementation of alternative energy sources to that produced by fossil fuels. While solar voltaics have a demonstrated capacity to provide useful levels of power, generation of electricity by wind turbines has been less studied except within large wind farms with turbines capable of producing power in the 6-9 Megawatt range. A great variety of smaller wind turbines are now on the commercial market and have the potential to produce power for small-scale domestic consumption. This study presents the results of the potential for wind generated power within the urban environment of Louisville, Kentucky. The capacity of the system to produce power is tested against measured wind speeds and direction at the study site in conjunction with winds speeds recorded at three Kentucky Mesonet sites surrounding the City (Bullitt, Meade and Oldham Counties). The wind turbine is an ALEKO, three blade generator capable of producing up to 450 Watts at peak wind speeds. Results indicate that the system is capable of producing useful power as a supplement to a solar voltaic array and is particularly critical at times when solar input levels are low and when inclement weather typically brings higher winds.

STUDY 2 (Platt): ***Investigating the Potential for Domestic Solar Power Generation for Louisville, Kentucky***

This study investigated the potential for the implementation of solar photovoltaics as a domestic power source for Louisville, Kentucky. Designed to quantify the relationships between the input of solar radiation and the production capacity of a solar panel array, the system was constructed and tested in a small residential house in Louisville. The experiment was conducted over a 34 day period from February 27 to April 2 with solar radiation measured using a standard Eppley pyranometer, air temperature by a Campbell Scientific 207 coupled temperature humidity sensor, and solar panel output measured through either voltage or amperage. All sensors were interrogated every 10 seconds with results time averaged for five minute intervals. Over the late Fall, Winter and early Spring, Louisville experiences relatively low levels of solar input leading critics to suggest that that there is an inadequate input of solar radiation to make solar power viable for the city. Despite periods of inclement weather, the system output was such that useful loads of power were generated and recovered by the storage system over the 34 day observation period. Based on the assumption that the wintertime climate conditions for the region are the least favorable for solar power generation, results from this study indicate that the potential for the expanded use of solar energy in Louisville is feasible on an annual basis.

70. Ashley Lee

Jefferson Community and Technical College
Mentor: John Ward

A Survey of Factors Related to Healthy Dental Hygiene Behavior

Dental hygiene is more important than many people recognize. Oral health is vital to overall health. The present survey addressed whether age, gender, income, education, or health insurance affects an individual's oral health. The relationship between attitude toward the importance of dental hygiene and whether an individual has dental insurance was examined.

71. Hannah Maddox

University of Kentucky
Mentor: Kevin J. Pearson

Maternal Smoking and Offspring Risk for Developing Obesity

Research demonstrates that maternal tobacco smoke exposure during fetal development increases the offspring's risk for developing obesity and type II diabetes in adulthood. Many pregnant women continue to smoke throughout pregnancy and nursing, and this project aimed to identify mechanisms that play a role in this increased risk of disease. We hypothesized that primary fibroblasts from offspring exposed to tobacco smoke in utero will have increased susceptibility to differentiate into adipocytes compared to cells from offspring born to nonsmokers. Human neonatal tissue was collected from babies born to smoking and nonsmoking mothers (n=9/group). Cells from babies born to smoking mothers displayed significantly increased levels of mRNA markers of adipocyte differentiation (fatty acid binding protein 4, forkhead box protein O1, and fatty acid transport protein 4) compared to cells collected from babies of non-smoking mothers ($p < 0.05$). Thus, we demonstrate for the first time in neonatal tissue that maternal smoke exposure increases adipocyte differentiation in primary fibroblasts of offspring.

72. Rachel Maggard

Eastern Kentucky University
Mentor: Rebekah L. Waikel

Characterization of Gene Expression During Lipid Induction in the Microalga Chlorella Protothecoides

Microalgae are a promising source for sustainable biofuel production, but large-scale production is cost-prohibitive. In order to implement biotechnology and make production more cost-effective, we must first understand the genome and metabolic pathways of relevant microalgae. Our purpose was to advance the understanding of how gene expression influences lipid production in Chlorella protothecoides. This information can be used to develop biotechnology to improve algal biofuel production. Our primary objectives were: 1.) to identify 10 gene expression markers for lipid production and define their patterns of temporal expression, and 2.) to use these markers to determine how lipid production is affected by changes in: pH, light, and micronutrients. We determined that algae grown in nitrogen deficient conditions have a 33% higher lipid content than algae grown in nitrogen sufficient conditions. By comparing genetic information from algae grown in nitrogen sufficient (low lipid production) and nitrogen deficient (high lipid production) conditions, we identified 10 candidate genes for involvement in lipid production. We used cDNA from algae grown in low and high lipid producing conditions to quantitate the expression patterns of our candidate genes and established a "lipid production profile" from this data. We then altered pH, light, and micronutrients and compared gene expression patterns under these conditions to those in our established profile to predict whether the algae was in a state of high lipid production. In order to test our hypotheses, we directly measured the amount of lipids using fluorescent dyes. Once experiments are finished and data is compiled, we will have a more complete understanding of the genetic mechanisms underlying lipid production in Chlorella protothecoides. Researchers can use this information to develop biotechnology to improve algal biofuel production and make it a cost-effective alternative to traditional fossil fuels.

73. Alisha Mays

Eastern Kentucky University
Mentor: Jennifer Wies

The Faces of the Fortuneless: The Feminization of Poverty in Eastern Kentucky

As an institution dedicated to an educational and stewardship mission, EKU is committed to addressing the most pressing community needs in eastern Kentucky, including issues of social stratification and inequalities that arise in a market-based economy. Through action-based pedagogies, including service-learning and collaborative faculty-student research, this poster presents data from Clay County to examine the feminization of poverty and resilience. The data reveal the strength and resilience of women of eastern Kentucky that live marginalized economic existences. These data illustrate the strength that is required when women in Appalachia, whether voluntary or not, reject various aspects of our current monetary economy. This research sheds light on issues of poverty in Eastern Kentucky in the context of feminism and resilience.

74. Benjamin McDonald, Jared Walden, and Bryce Aberg

Western Kentucky University

Mentor: Sanju Gupta

Graphene-based Hybrid Nanocomposites for Aerospace and Renewable Energy Applications: Interfaces and Nanoscale Morphology-Promoted Synergistic Effects

Hybrid nanocomposites are an interesting class of nanomaterials offering multifunctionality tailored at the interface of the individual component materials. Graphene is a one-atom thick sheet with honeycomb lattice and much-pursued worldwide attributed to their extraordinary multitude of physical properties. While limited by themselves due to aggregation and local topological imperfections, it lends an opportunity to combine with other nanoscale organic (intrinsically conducting polymers) and inorganic (mesoporous silicon and transition metal oxides) materials. Their interactions allow for emergent novel materials and architectures with tunable properties (higher specific surface area, mechanical strength, and higher electron mobility and conductivity permitting facile electron and ion transport for electrochemical electrodes) for a gamut of industries. It also promotes nanoscale morphology, interfacial bonding and polymeric chain ordering, creates tailored interfaces, and correspondingly enhances mechanical and electrochemical energy conversion and storage functions synergistically for aerospace, defense and renewable energy sector. This work was comprised of three distinct parts: (1) development of 'smart' hybrid composites combining graphene oxide; GO and electrochemically reduced GO; ErGO and electrochemically polymerized polypyrrole; PPy and polyaniline; PAni using layer-by-layer approach resulting in PPy/GO, PPy/ErGO, PAni/GO and PAni/ErGO; (2) graphene-encapsulated mesoporous silicon anodes for Li-ion batteries accommodating large volume changes during charging/discharging; and (3) synthesizing graphene-decorated vanadium pentaoxide (V_2O_5) nanobelts (GVNBs) composites via hydrothermal method in one-step approach as hybrid supercapacitive cathodes. The knowledge gained from each of these research projects can tap into 3D printable graphene composites toward advanced manufacturing, next-generation high energy and power density electrodes for portable electronics, automotive and aerospace technologies. We gratefully acknowledge the financial support in parts by NSF KY EPSCoR, Ogden College and WKU Research Foundation.

75. Maya McFrazier, Xiaoxian Duan, Diane E. Renaud, Richard J. Lamont, and Huizhi Wang

University of Louisville
Mentor: David Scott

***Nucleoside diphosphate Kinase-Dependent Suppression of Apoptosis in Esophageal Cancer Cells by the Oral Pathogen* Porphyromonas Gingivalis**

Esophageal cancer is the eighth most frequent tumor and sixth leading cause of cancer death globally. Recent evidence suggests that a Gram negative, anaerobic bacterium that is a causative agent of periodontitis, *Porphyromonas gingivalis*, is strongly associated with esophageal cancer. Indeed, P. gingivalis infection strongly correlates with disease stage and survival time. However, the potential mechanisms by which this important oral pathogen may predispose to the development of esophageal cancer are entirely unknown. It has previously been established that P. gingivalis produces a nucleoside diphosphate kinase (NDK) that can promote epithelial cell survival by hydrolyzing extracellular ATP and preventing apoptosis initiated by the purinergenic receptor, P2X7. Therefore, we set out to determine if P. gingivalis was able to inhibit drug-induced apoptosis in esophageal cancer (KYSE-30) cells, hypothesizing that this phenomenon may be dependent upon a functional ndk gene. Campothecin, derivatives of which are being tested for treatment of esophageal cancer, induced apoptosis in KYSE-30 cells. Infection with wild type P. gingivalis inhibited CAMP-induced esophageal cancer cell death, whereas ndk-deficient P. gingivalis mutants were less efficient in blocking apoptosis. Therefore, the epidemiological association noted between P. gingivalis and esophageal cancer may be partly explained by NDK-dependent inhibition of apoptosis.

76. Courtney McKelphin

University of Kentucky
Mentor: Mark Crocker

Optimization of Microalgae Lipid Extracts for the Production of Fuels

The new federal rules designed to reduce CO2 emissions from power plants demand innovation in the field of carbon capture and utilization. The use of algae to sequester CO2 from coal-fired power plants constitutes an interesting solution, particularly because algae can intermediate the conversion of these emissions into valuable fuels and chemicals. Our previous research showed that this approach was feasible from a technical standpoint, current work being focused on cost reduction. Past work has shown that oil can be extracted from algae and converted to hydrocarbon fuels that are fully compatible with existing infrastructure. To date efficient extraction of the oil has required that the algae are first subjected to an energy intensive and costly drying step. To improve the economics of the extraction process, we have investigated the extraction of oil from wet algae grown using the flue gas of a Kentucky coal-fired power plant. The research conducted in this project tested the extraction efficiency of sonication, mechanical disruption methods (milling and beating), suspension in supercritical hexanes and a modified Bligh-Dyer solvent extraction method (employing a CHCl3/CH3OH/H2O solvent system). From these studies it is concluded that the optimal methods in terms of the oil yield are suspension in supercritical hexanes and the modified Bligh-Dyer method. The lipid profile and elemental analysis of the oils extracted using these methods provide valuable insights regarding the effect of the extraction method on the composition of the oil obtained.

77. Laura Mims

Eastern Kentucky University
Mentor: William Staddon

Antimicrobial Resistance of Bacteria Isolated Above and Below the Town Branch Wastewater Treatment Plant

Wastewater treatment plants appear to play a role in releasing antimicrobial compounds and resistant genes into the environment. The phenomenon of bacteria being resistant to multiple antimicrobial compounds is not well understood. Sediment samples were collected from above and below the Town Branch wastewater treatment plant in Lexington, KY. Bacteria capable of growing in the presence of triclosan were subcultured on media containing antibiotics. A number of isolates capable of growing in the presence of triclosan were also resistant to several antibiotics. The relevance of this co-resistance remains unclear.

78. Bailey Moore, Courtney Copeland, Hailey Cunningham, and Wade Workman

Dawson Springs High School / Madisonville Community College
Mentor: Keith Gregory

Habituation of* Tenebrio molitor *Larvae using Tactile Stimulation: An Experimental Replication

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 36 mealworms. Seventy trials were conducted in which each mealworm was stroked with a small paintbrush once per trial at a 5-second interstimulus interval (ISI), and its movement was recorded on each trial. The results showed that on Trial 1, 75% of the mealworms responded, compared to Trial 70, when 31% of the larvae responded.

79. Kristin Mulliniks

University of Kentucky
Mentors: Sundar Authimoolam, David Puleo, and Thomas Dziubla

Cross-Linking of Polymeric Micelles in Bulk Solution for Regenerative Medicinal Applications

Mucin is a lubricating, protective barrier that coats most of the human body's epithelial barriers. The exact function of mucin varies greatly from surface to surface (e.g. GI tract, mouth, eye, etc.), and is highly dependent upon the structural, chemical, and mechanical properties. Changes to these properties can lead to a variety of complex and debilitating pathologies, including dry mouth, increased risk of infection, and colitis. In our current work, we proposed development of a synthetic mucin network that could serve as a biomimetic barrier capable of treating those specific pathologies through targeted tissue adhesion. It has been previously shown that methoxy-poly(ethylene glycol)-poly(lactic acid), an amphiphilic diblock copolymer, is capable of forming micelles with different structural morphologies (i.e., spherical or filamentous). Utilizing the unique structure of the worm-like micelles, it is possible to produce a 3-dimensional mucin mimicking network. In our previous research, biotinylated worm micelles were surface-deposited forming networks via a layer-by-layer deposition approach, utilizing high affinity biotin-avidin linkages. In order to form a thixotropic network that can be applied in a single thick coat, we studied the ability to bulk crosslink filomicelles into a continuous gel. By adjusting the solution properties, including, density, viscosity and micelle concentration, we demonstrate the ability to formulate crosslinked micelles leading towards a practical bulk synthetic mucin. Changing the micelle concentration allowed us to control the porosity and degree of cross-linking within the networks. On the other hand, varying the viscosity and density of the bulk solution allowed us to control stability of network suspension as well as cross-linking duration. Therefore, tuning the reaction parameters allowed the achievement of optimal conditions for network formation with a porous, uniform, gel-like structure mimicking that of natural mucin found in the body.

80. Maggie Nawa

Murray State University
Mentor: Shea Porr

Efficacy of an Oral Joint Supplement in Exercising Horses

The equine healthcare market is a multimillion-dollar industry. Supplements are intended to maintain or improve health and performance. Supplement selection is often driven by owner conjecture or consumer advertising instead of scientific evidence. Information made available by equine healthcare companies concerning supplement effectiveness is inconsistent, often due to marketing bias. This has led to conflicting views on the effectiveness of equine dietary supplements. Hyaluronic acid (HA), found the in synovial fluid of normal joints, is commonly found in joint supplements and has been used as an oral supplement in horses for over 10 years. However, it is often used in combination with other joint supplements, including glucosamine, chondroitin sulfate, and methylsulphonylmethane. There is little research on how HA alone affects joint health in horses. Hyaluronex® is an HA supplement used to support joint health as an alternative for joint injections. The objective of this study was to evaluate the effect of an orally fed HA gel supplement on exercising horses. Twenty exercising horses were initially selected for the study. Three horses were dropped for reasons unrelated to the study, resulting in 8 treatment and 9 control horses. Treatment horses received Hyaluronex® for 35 days. Before and after supplementation, each horse had a flexion test performed by a licensed veterinarian, and a subset of horses was evaluated for stride length under saddle. A survey was also completed by riding instructors at 3 and 5 weeks of supplementation to assess changes in horses during exercise periods. Statistical analysis will be performed to assess changes as a result of HA supplementation. It is expected that HA supplemented horses will show a difference in flexion test scores and stride length, corroborated by instructor surveys after feeding. If shown, this type of supplement could potentially decrease costs associated with joint health care in horses.

81. Tracey Newport

Murray State University
Mentor: David Pizzo

The Evil that Men Do: Comparative Genocide in the Twentieth Century

In the past one hundred years, there has been an ongoing mission of the civilized world to prevent the atrocities of genocide from happening. While admirable in thought, the policies taken to prevent the measures have failed. With early warning signs in situations of genocide being different in each case it is hard to determine when genocide is imminent. The lack of knowledge about the situation proves to be a serious problem to global actors that are required to work within the information available to them. By using three different case studies of genocide with each occurring within different contexts; the Herero genocide as German retaliation against the Herero and Nama people of South-West Africa revolting against the colonial regime, the Armenian genocide as a regime seeking to create a more homogeneous nation and remove Christian minority in the crumbling Ottoman empire, and the Bosnian Genocide of the ethnic Muslims by Bosnian Serbs in their attempt to join with Serbia to create a greater Serb-nation during the Yugoslavian civil war. These genocides occurred under ideas of racial and religious superiority along with perceived threats to the general populations way of life by those persecuted. By examining these ideas of racial and religious disparities, the perceived threat posed by the victim and how these factors contributed to the respective genocidal environments a predictor of genocidal behavior can be determined.

82. Julia Niemann

Eastern Kentucky University

Mentor: Elizabeth Underwood

Could the United States Function Without Undocumented Labor? The Impact of Undocumented Labor on our Economy

In January 2015, I took a trip with an Honors Diversity of Perspectives and Experiences class. While in South Carolina, our class saw first-hand the conditions of living in a migrant labor camp. Seeing such conditions raised the question: could the United States properly function without the contributions of undocumented laborers? By analyzing the history of undocumented labor, how undocumented labor affects the economy and what would theoretically happen to the economy if all undocumented laborers were deported, this project concludes that undocumented laborers are indeed an essential component of the U.S. labor market today.

83. Morgan Owens

Murray State University

Mentor: Maria Vazquez Brown

Bilingual Language Distance Predicts Dementia Rating

This study explored the differences in the languages spoken by bilingual people may lead to differences in cognitive reserve and the progression of AD. Individuals who speak distant languages (e.g., a Romance and a Germanic language) will have a different linguistic experience than individuals who speak two near languages (e.g., two Romance languages). Knowledge of distant languages may provide speakers with a large set of cognitive tools (e.g., linguistic constructs, concepts, schemas) that could increase cognitive reserve. We hypothesized that greater language distance would predict lower dementia scores in a clinical AD population.A subset of the data from the National Alzheimer's Coordinating Center was used in the analyses. This dataset consists of clinical and demographic information from AD patients collected at various Alzheimer's Disease Centers. The data used in the current analyses were from bilinguals speakers of two Indo-European languages who were 85 years or older at the time of testing. Differences in reported primary language and test language were used as a proxy for bilingualism.A two stage hierarchical regression analysis was conducted with Clinical Dementia Rating (CDR) as the dependent variable. Three demographic predictors (age, sex, primary language) were entered in the first step of the hierarchical multiple regression. This model was not statistically significant ($F(3, 164) = 1.604$; $p = .190$) and explained 3% of the variance in CDR. However, after entering language distance in step 2, the total variance explained by the model was 10% (R2 Change = .07; $F(3, 164) = 12.401$, $p<.001$). Two out of the four predictors in the final model were statistically significant: language distance ($\beta = .27$, $p< .001$) and age ($\beta = .17$, $p< .05$).Language distance was a better predictor of dementia scores in this clinical population than age, gender or primary language.

84. Abbigail Pace

Western Kentucky University

Mentors: Elizabeth Cash, Adam Seibert, Whitney Rebholz, Liz Wilson, and Jeffrey M. Bumpous

Psychological Distress and Malnutrition Biomarkers are associated with Head and Neck Cancer Progression and Survival

Our data show that depressive symptoms predict greater likelihood of interruption and incomplete response to treatment in head and neck cancer (HNC). Given relationships between depression and appetite, these patients are at high risk for cachexia. We hypothesized that greater psychological symptoms and malnutrition biomarkers would be associated with increased weight loss, and poorer two-year disease-free (DFS) and overall survival (OS). Patients with primary HNC (N=98) completed distress, anxiety and depression measures. Pretreatment albumin and hemoglobin, ALT, AST, weight lost during treatment, and two-year follow-up data were collected. Hierarchical and Cox regressions adjusted for age, stage, site, and treatment tested hypotheses. Oropharyngeal (33.7%), laryngeal (17.3%), and oral (10.2%) cancers were included. Many patients reported clinically significant anxiety (42%) and/or depressive symptoms (33%). The vast majority demonstrated biomarker levels WNL, and N=65 demonstrated weight loss averaging 3.6kg. Anxiety, depressive symptoms, and malnutrition biomarkers did not relate to weight loss over the course of treatment. Anxiety was associated with poorer DFS (HR=1.124, 95% CI=1.005-1.258, p=.041), depressive symptoms were associated with poorer OS (HR=1.109, 95% CI=1.012-1.216, p=.027). Lower pretreatment hemoglobin was associated with poorer OS (HR=.740, 95%CI=.561-.977, p=.033). Depressive symptoms are associated with a greater likelihood of poorer short-term (treatment interruption and incomplete response) and long-term (OS) outcomes in HNC. Malnutrition biomarkers should be further examined to determine their predictive value. Future studies should also examine biological (e.g., inflammatory, immunologic) factors with the potential to mediate psychosocial symptoms and their relationship to tumor progression and survival. (Support: NCI R25-CA134283)

85. Thomas Packer

University of Louisville
Mentor: La Creis Kidd

Impact of Quercetin on miR-21, Cell Proliferation and Migration of Metastatic and Non-Metastatic Prostate Cancer Cell Lines

The over-expression of oncogenic microRNAs (miRs) may be counteracted by chemopreventive agents. Quercetin inhibits aggressive PCA (cell invasion, migration, proliferation) in vitro and modulates the expression of selected miRs in vivo. However, it is not clear whether quercetin modulates miR-21 expression and cancer behavior in African-American derived PCA cell line (E006AA). We hypothesized quercetin would decrease cell proliferation, migration and miR-21 levels in a metastatic (PC-3) and non-metastatic PCA cells (E006AA). After E006AA and PC3 cell were plated and treated with quercetin, cellular proliferation at 24 and 48 hrs was assessed with Trypan Blue and BrDU assays. For the cell migration assay, treated and untreated cells were plated onto silicon cell culture plates with five 2mm plugs. After removing the plugs, the area was photographed and quantified at 8-16 hrs. MiRNA levels were determined by qRT-PCR. There was a modest decrease in cell proliferation for PC3 and E006AA cells treated with quercetin (12.5-75μM) compared to vehicle control under the Trypan Blue assay. These effects only persisted in PC3 cells treated with 23uM quercetin under the BrDu assay. Quercetin treatment (23-39.475μM) revealed a 23 and 14% reduction in cell migration at 48hrs in PC3 and E006AA cells. The impact of quercetin on cell proliferation and migration is not mediated through a reduction in miR-21-3p. The findings of our study may serve as a foundation for future studies that seek to identify and validate new treatment strategies for individuals susceptible to pre- and metastatic PCA. Research was supported by NCI grant R25-CA134283

86. Eryn Pritchett

Murray State University
Mentor: Aaron Irvin

Finding the Truth: An Examination into the Use of Rhetoric in Thucydides

For centuries, scholars have looked to Thucydides as truth--a factual and accurate account of the Peloponnesian War--due to his thorough use of critical analysis and logical deduction. Unlike his predecessor, Herodotus, Thucydides dodged the critical and literary analysis that has plagued Herodotus for years. However, in the past few decades historians have began to realize that Thucydides is far more than facts on paper. This research project will show that Thucydides use of Athenian rhetoric transforms his work from that of historical accuracy into a "possession for all time," redefining the way other historians would construct their own narrative. (Thucydides, 1.22.1) Thucydides is clear throughout his entire history that he is planning to be remembered. In fact, the beginning of his book is filled with concern about his eternal resting place in the minds and hearts of those who will come after him. His work is not merely a collection of truths and date-to-date happenings during the Peloponnesian War, as once thought. This magnificent work was artfully crafted into something that would surpass fact and transcend truth; thanks to the rhetoricians who came before him. By examining his use of speeches, and the format of these orations as well as the book itself, we can see how influential Thucydides is to modern history. By treasuring the work of Thucydides for its rhetorical influence, his impact on historical writing can be better understood.

87. Alexandria Potts, Steven Survant, and Tamara Nichols

Madisonville Community College
Mentor: Mary Janssen

***Effects of One or Two Daily Trials on Learning in a T-maze by Larvae of the Grain Beetle* Tenebrio molitor**

Earlier studies of learning by mealworms, larvae of the grain beetle *Tenebrio molitor*, investigated post-acquisition effects of temperature, delay in reminiscence, or retention through metamorphosis. In the present series of three experiments, effects of time between trials were compared over the first ten trials of acquisition. Mealworm larvae show negative phototaxis. In an aversive conditioning procedure in which a white light was paired with an incorrect choice, larvae were placed individually into a T-maze and allowed to traverse the start arm. At the choice point, a correct turn was followed by darkness and the larvae dropping into its food cup. An incorrect turn was followed by onset of a white light at the end of the incorrect arm, and the larva was given a chance to self-correct. Larvae in two conditions were trained to turn right or left and given daily trials or two trials each day for the first 10 trials. A learning criterion was used. Results showed that larvae given two trials each day reached the criterion in fewer trials, but larvae given one daily trial made more successive correct turns after reaching the criterion.

88. Jonathon Proctor

Northern Kentucky University
Mentor: Michael Baranowski

Northern Kentucky University and the Changing Nature of Higher Education Funding in the Commonwealth

In the last decade, higher education across the United States has experienced dramatic shifts in the source, amount, and application of funds. The 2008 economic crisis played a huge role in these shifts, causing state governments to implement often draconian austerity measures. These measures are particularly evident in Kentucky, where funding for higher education is still 11.4% less than it was before the 2008 economic crisis. Along with the financial strain, institutions face a number of obstacles when deciding how to allocate their money. The American system, while encouraging competition, also allows for great disparity in educational quality and often causes institutions to care more about increasing their ranking than increasing their educational quality. Gaining an understanding of how public institutions have reacted to these changes will allow for a greater understanding of the state of higher education in Kentucky, and how state legislators and academic leaders can work to improve matters. Northern Kentucky University, the youngest of Kentucky's eight public universities, has managed to grow in spite of broad government funding cuts. This research project examines changes in and responses to the funding model of NKU in comparison to the other seven public universities in Kentucky. It is hoped that this comparative analysis can assist legislators and academic leaders in addressing the problems that they are facing and encourage a dialogue on the future of Kentucky's higher education system.

89. Alexander Rainford

Northern Kentucky University
Mentor: Bridget Nichols

Consumer Beverage Products and Partnerships with Charitable Organizations

For years, consumer product companies have struggled with the task of developing productive and meaningful Corporate Social Responsibility (CSR) partnerships. These companies have long been trying to figure out the perfect partnership between them and a charitable organization. The task of choosing the correct charity that matches the company's values, attitudes, and goals has remained difficult, with several companies experiencing positive gains, and others suffering from ill-fated partnerships. One industry that demonstrates this issue is the consumer beverage industry. Whether it's a soda company's partnership with a health organization, or a sports drink's partnership with an athletic team, this industry provides the perfect scenario for various charitable partnerships. The general purpose of this study was to identify the impact of brand and charity collaborations in consumer beverage products. The study aimed to measure the perceived value of a brand based on the brand's partnership with various forms or charitable organizations. This study aimed to measure the consumer perceptions of various purported causes related to marketing partnerships between a fictional bottled water company and a charitable organization and do the same for a fictional tea company. The study measured participant's general attitudes about charitable organizations and their effectiveness. The results of this study will be used to suggest and recommend the most beneficial partnerships for companies to engage in, based on consumer perception of values, attitudes, and emotions evoked by the purported partnerships.

90. Heather Raley

Murray State University
Mentor: Jessica Naber

The Impact of Quality of Sleep on Academic Performance in University Students

Current literature suggested that the most effective method for improving quality of sleep for students includes regulating a consistent sleep schedule throughout the week. But the relationship between quality of sleep and the academic performance of university students is not sufficiently addressed in literature. The aim of this research study was to assess the relationship between various aspects involving overall quality of sleep and academic performance of university students. The data were collected between 10 February and 10 March 2015 at a midsize, rural, public university in the South. The study included a systematic random sample of students from all student classification levels (undergraduate freshman, sophomore, junior, senior; and graduate) currently enrolled in university courses. Participants (n=158) answered a self-administered questionnaire which assessed demographics; a sleep quality profile including sleep duration, contributing factors to sleep deprivation, daytime sleepiness, and the use of sleep remedies; and an academic profile including number of enrolled courses, and current cumulative Grade Point Average (GPA). Quality of sleep and GPA were analyzed using a one-way analysis of variance (ANOVA) and χ^2 test for independence. This study found that most university students (n=93, 60.4%) feel they do not get a sufficient amount of sleep. As a result, most of the students suffer from daytime sleepiness, which interferes with their ability to concentrate, and results in impaired ability to learn or retain information as demonstrated by their GPA.

91. Vaughn Reed, Caleb Brannon, and Daniel Ingram

Murray State University
Mentors: Tony Brannon and Jason Robertson

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 500 unit—BB-500— 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, along with providing some heat to The Equine Center at Murray State University. Loose forms of switch grass, energy sorghum, miscanthus, equine waste, and wood shavings were burned over 4-day 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 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, and sorghum. The grasses burned less effectively than the woody materials, however, it required less material. Wood shavings and equine waste burned more effectively, and less labor intensity, however, more material was required. The research conducted in this study can provide Murray State and the scientific community insightful information about future applications of bioenergy.

92. Ian Ries

Kentucky State University
Mentor: Buddhi Gyawali

Using Geographic Information Systems (GIS) to Quantify the Relationship Between Changes in Land Cover And Surface Urban Heat Island

The World's global urban population is expected to increase by an additional three (3) billion people by the year 2050. As urban areas expand to accommodate the growing demand for impervious infrastructure resulting land cover changes drive changes in ambient environmental conditions. This expansion in urban area creates an urban heat island effect (UHI), a general term used to describe the relative difference in surface temperatures between urban and non-urban areas. The purpose of this study was to quantify the relationship between changes in land cover and change in surface temperature. Information derived from this project is needed to inform land managers and policy makers of the impact of land cover change on local environmental conditions and, potentially, how these issues may be mitigated. We utilized a geographic information systems (GIS) based approach to assess and ultimately quantify the spatial relationship between MODIS derived surface heat data and National Land Cover Dataset (NLCD) land classification data for central Kentucky. It is hypothesized that increases in total area of impervious developments per given unit of observation are correlated with increases in mean land surface temperatures. Preliminary results suggested that the mean land surface temperature of a given observation increased as the total portion of land cover impervious increased. Mean land surface temperatures were found to be positively and significantly correlated to increases in impervious land cover. It was concluded that increased impervious land cover was a dominant driver of increased surface temperatures in this study area.

93. Jordan Robbins

Murray State University
Mentor: Terry Derting

Effects of White-Nose Syndrome on the Bat Population in Land Between the Lakes

A rapid decrease in bat populations is occurring in eastern North America due to the emergence of *Pseudogymnoascus destructans* (A. Gargas), the causative agent of white-nose syndrome (WNS). WNS affects cave-dwelling species, causing mortality during winter hibernation. Substantial declines in bat abundance in Kentucky during summer were first apparent in 2014, although infected bats were first detected in the state in 2011. We investigated the impact of WNS on bat populations in Land Between the Lakes by comparing historical bat survey data (1994-2005) with data from summer 2015. We compared the abundance of WNS-susceptible species with non-susceptible species. Capture rates of susceptible species that were abundant pre-WNS (i.e., *Eptesicus fuscus* (Beauvois), *Myotis septentrionalis* (Trouessart), *Perimyotis subflavus* (F. Cuvier)) declined by 60-87%. Capture rates of males and females of WNS-susceptible species were reduced substantially in July 2015 compared with July 2005, with the decline greatest for males. Among age classes, capture rates of adults and juveniles in July declined by at 30% and 76%, respectively, for WNS-susceptible species between 2005 and 2015. Capture rates of non-susceptible species were stable for *Lasiurus borealis* (Muller) and increased by over 100% for *Nycticeus humeralis* (Rafinesque). Males may be more vulnerable to WNS because they carry smaller fat stores during hibernation and, therefore, are more likely to exhaust their energy reserves when infected with P. desctructans. The increase in capture rates of N. humeralis suggests that the species may be exhibiting competitive release and niche expansion as WNS-susceptible species decline.

94. Nicole Robertson

University of Louisville
Mentor: Gerald Hammond

Selective Ring Opening Reactions Using HF-DMPU

The utility of fluorine in medicinal and manufacturing chemistry is undisputed. Despite its usefulness, the incorporation of fluorine in organic molecules is not without challenges. Regardless of their electrophilic or nucleophilic nature, most, if not all, fluorinating reagents derive from HF. Nucleophilic reagents are less expensive compared with their counterparts, and many are not commercially available. The popular Olah's reagent (pyridine-HF complex) and triethylamine-HF have been explored extensively as nucleophilic sources of fluorine in many reactions. Laurence and co-workers recently published a comprehensive library of hydrogen bond basicity for various organic and inorganic compounds. This library guided our path towards improving the reactivity of HF as well as to tame its corrosiveness and led to our initial finding that DMPU, a relatively common solvent, formed a stable complex with HF. We showcased the usefulness of the HF-DMPU complex in the fluorination of alkynes. Our success on the investigation of HF-DMPU on the hydrofluorination of alkynes, which was cited on the American Chemical Society's Chemical & Engineering News, inspired and motivated us to investigate further the synthetic utility of HF-DMPU reagent. In this poster we will show some recent studies on the selective fluorinations of aziridine, epoxides and thiiranes.In our preliminary findings, we observed that the opening of aziridines by HF-DMPU gave high yields of 60-90% and also gave high regioselectivity of > 30:1 of the corresponding β-fluoroamines. More importantly, the reactions were well tolerated by different N-substituents on the aziridine, especially the acid sensitive N-Boc group. Tuning the reaction condition slightly, we observed that HF-DMPU was effective in the ring opening of epoxides, giving good yields of 56-92% and good to moderate regioselectivity of the corresponding fluorohydrins.

95. Sheila Rolfe

University of Louisville
Mentor: Cynthia Logsdon

Educational Preferences of Hispanic Mothers with Limited English Proficiency

The Hispanic population is the fastest growing minority in the United States, Kentucky, and Louisville. The purpose of this study was to examine the use of social media and internet among Hispanic mothers with limited English proficiency (LEP). Furthermore, the study aimed to explore current and preferred methods of obtaining electronic health information among these mothers. Using a descriptive design, interviews were conducted by an investigator with participants. The interviews lasted approximately one hour and utilized various surveys, scales, and questionnaires exploring demographic information, sources for health information, and internet/social media usage. From the total sample size of 6 participants recruited thus far, 60% have completed 8th grade education, 50% are married, and 83.3% live with a spouse. 100% of respondents get "a lot" of health information from doctors and nurses, 80% get "a lot" of information from the internet, and 40% get "a lot" of information from friends, boyfriends, television, radio, and social media. 66.7% of respondents stated they find the internet "very useful" for obtaining health information, and 83.3% of individuals had used the internet to locate health clinics, along with 66.7% using internet resources to locate information on pregnancy and birth control. 83.3% of these respondents reported the use cell phones and only 33.3% use laptops or computers. These findings reveal the various methods and sources of obtaining health information among Hispanic mothers with LEP. As the study continues and gathers more comprehensive data, the research team hopes to use this data to improve health care service provision to this population by providing more culturally sensitive interventions and resources that fit the needs and preferences of this population.

96. Abigail E. Ross

Eastern Kentucky University
Mentor: Rebekah L. Waikel

Sex-specific Differences in Gene Expression of Hypertrophy Markers in Primary Neonatal Cardiomyocyte Cultures

It is well established that premenopausal women develop cardiovascular disease (CVD) at a lower rate than men. Postmenopausal rates of CVD increase and, in some studies, surpass that of their age matched male counterparts, suggesting that estrogen may be an important cardioprotective agent. It is not understood how estrogen and other female-specific factors prevent the development of CVD, including cardiac hypertrophy (enlargement of the heart), and heart failure. Our goal is to assess sex-specific gene expression changes that occur during cardiac hypertrophy, particularly cardiomyocyte hypertrophy (enlargement of individual heart cells), in the presence or absence of estradiol (E2) using a primary neonatal rat cardiomyocyte culture system. Sex specific cardiomyocyte cultures were established and treated with phenylephrine (PE) to induce hypertrophy in the presence or absence of E2. After 24 hours of incubation, RNA was extracted from the cells and converted into cDNA for Real-Time PCR analysis to determine gene expression levels. Known hypertrophy markers: BNP (brain natriuretic peptide), ANP (atrial natriuretic peptide), and MHC-beta assays were used to test for hypertrophy in all samples. Interestingly, male and female cultures expressed hypertrophy markers at different levels, regardless of hypertrophy. Observations of the sex-specific cardiomyocyte cultures suggest that the male cells are proliferating faster than the female cells. We performed cell cycle analysis utilizing BrdU in ELISA, and flow cytometry to establish proliferation rates for male cardiomyocytes vs female cardiomyocytes. Variations in proliferation rates between male and female cardiomyocytes may also be a key to understanding male/female differences in the development of CVD.

97. Robert Rowlett

Morehead State University
Mentor: Hans Chapman

Magnetic Induction Generator Powered By Vertical Waterflow

A magnet has been attached to a spring. A container wrapped in copper coils has a spring inside. Water is used to fill the section in the container above the spring and compress the spring. While the spring compresses a magnet attached to it lowers through the copper coils and produces magnetic induction. When the spring is most compressed the water will flow out of the container and allow the spring to decompress and reset the spring for cyclical motion.

98. Travis Schuyler and Samantha Emery

Northern Kentucky University

Mentors: Isabelle Lagadic, Sébastien Gauthier, Françoise Robin-Le Guen, Augustin Mot, and Radu Silaghi-Dumitrescu

Internationalizing Undergraduate Chemistry Research at Northern Kentucky University

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. Conducting scientific research is an area where those issues can easily be circumvented and is a way to provide STEM students with exposure to today's global society. Over the past four years, the department of chemistry at Northern Kentucky University (NKU) has established an International Summer Research Exchange program that hosted a total of 25 students coming from China, Ecuador, France and Romania to conduct research alongside NKU chemistry faculty and students during the summer. Recently, two NKU chemistry majors, Travis Schuyler and Samantha Emery, had the opportunity to work on research projects at our partner institutions in France and Romania, and next summer, five NKU science major students will join research groups in Ecuador, France and Romania to work on projects in environmental sciences, chemistry and biochemistry. This poster will highlight the key features of this program as well as Travis Schuyler's and Samantha Emery's experiences abroad.

99. Kendrick Settler

Murray State University
Mentor: Patrick Cushen

Influence of Authority on Attitude Change due to Vicarious Dissonance

With the idea of vicarious dissonance being relatively new, research has yet to look into what characteristics of the misbehaving individual may lead to more or less dissonance in the viewer. One possible characteristic that may influence this dissonance is whether the person behaving inappropriately is an authority figure. Research has suggested that authorities benefit from being perceived as fair (Rustichini & Villeval, 2012) and are considered legitimate only when they behave appropriately (Yau, Smetana, & Metzger, 2008).A pilot experiment was conducted comparing the differences in attitude change after participants experienced vicarious dissonance due to the behavior of a friend or a teacher. The results indicated that people reported lower interpersonal closeness (as measured by the Inclusion of Other in the Self Scale; Aron, Aron, & Smollan, 1992) with a teacher than with a friend, after experiencing vicarious dissonance. These findings provide preliminary evidence that the way people view authority figures could influence their responses to dissonant experiences. Based on these results, a replication and extension is currently being conducted to investigate this effect in greater depth. In the current study, participants are asked to write about either their favorite teacher or friend. They are then asked to read a story in which either that person or an unfamiliar person behaves in an inappropriate manner. The impact of the vicarious dissonance is measured using both the IOS and the Positive and Negative Affective Schedule (Watson, Clark, & Tellegen, 1988), a measure of emotional state. The results of this research will improve the understanding of how authorities can or cannot influence attitudes and may help to set different expectations for the behaviors of individuals in highly influencing positions.

100. Christina Sherman

Murray State University
Mentor: William DeWees

Stress Mitigation Techniques in Shelter Cats: Effectiveness and Usage

Animal shelters and rehoming facilities help to provide medical care, socialization, and hopefully access to potential adopters for homeless pets around the country. Over 3 million cats enter into shelters each year, making shelter welfare a vital issue. One important aspect of welfare is stress reduction, which can help lead to a decrease in illness and an increase in adoptability by way of reducing tension. In cats stress is often hard to detect, and even some of the stress tests available underestimate the amount of stress a cat is undergoing. Different mitigation techniques are invaluable to the efforts of reduction of this anxiety. Common techniques include shelter layout, environmental enrichment (which can refer to physical objects, handling, auditory enrichment, and olfactory enrichment, among others), pheromone usage, distance from dogs, regulation of handling and feeding times, housing type (single versus group housing), and frequency of cage and litter box cleaning. A review of the available literature regarding the technique types was performed, allowing for usefulness of each to be analyzed. A survey was then sent out to shelters around the country and 44 responses were recorded. The survey allowed actual usage of each technique to be analyzed, and found that while all shelters had some form of enrichment present, the degree of enrichment varied. Another area of the survey found that financial restrictions and size restrictions rated highest when looking at what the workers felt limited the stress reduction capabilities of the shelters. Overall, the degree of stress reduction techniques varied, though all shelters had some form in place. As the goal of stress reduction is in line with the goal of shelters, recommendations were made as to some cost-effective techniques that could be implemented within a potentially size-restricted shelter.

101. Eura Shin and Jenna Ellis

Western Kentucky University
Mentor: Uta Ziegler

The Development of a Computer Program to Simplify Complex Knot Diagrams using Global Moves

A mathematical knot is similar in concept to the everyday headphone cable, with the ends closed together to form a continuous loop. These knots are the subject of discussion in molecular biology, mathematics, physics, and chemistry. For example, some enzymes are known to interact with DNA by decreasing the self-entanglement of the genomic material (e.g. after replication). An important tool when it comes to the application of knot theory itself is the unraveling, or simplification, of knots. Every knot has many different two-dimensional representations, called diagrams – the entangled headphone cable can be arranged many different ways on a flat surface. Intuitively, the simpler it looks, the easier it is to identify the characteristics of the knot and untangle the cable. For this project, the number of 'crossings' in the cable (diagram) was used as the measure of complexity. Prior research used 'transformations' to change the appearance of a diagram without changing the knot itself (cutting the cable to get rid of crossings). However, each transformation involved only one to three crossings at a time. Even with a fast computer, using these transformations to reduce the number of crossings in a complicated diagram proved time-consuming. The purpose of this research project was to investigate whether an additional 'global slide' transformation, which usually involves a larger number of crossings, would simplify a diagram faster. The research resulted in the implementation of a computer program that can perform the various transformations on a given diagram. Data collected with the program indicated that, in some instances, the 'global slide' transformation lead to a further reduction in the number of crossings in diagrams where other programs would become "stuck." The results demonstrated the potential of the 'global' transformations to simplify knot diagrams and suggested further pursuit of such transformations is justified.

102. Kaelyn M. Short, John Schaller, Kylie Krupilski, Sierra Hedrick, and Hannah Oates

University of Kentucky
Mentor: Thomas E. Wallace

Exploring Health and Health Care: Examining our Health Care Crisis and Potential Solutions for Kentucky and the Nation

Health care is in crisis in Kentucky, and in the US as a whole. There are many misconceptions, emotions, and rhetoric surrounding health care. Many stakeholders have strong interests in the way in which our healthcare systems operate. This collective effort sought to identify the important potential approaches to improving our health system and involving the stakeholders in that solution. Using an Honors seminar approach, students presented and learned from each by addressing the following: What is health, and how is it defined? Should health care be a right or a privilege, or some combination? What is the history of US and Kentucky health care systems, including health care professions and health insurance? How do they influence our health system? How do economics drive our health care market? Who are the stakeholders in our country's health care system, and what role do they play? How do they influence our health care system? To address these questions, students worked in teams, researched the health systems of at least 20 countries, and compared and contrasted these systems with those in the US. Through analysis of the resulting data, they then designed new health systems and discussed how one might influence the stakeholders to achieve such innovative models. Many positive ideas were created to bring about positive change to improve our health system. Interestingly, many students favored health care as a right with responsibility and accountability included, but realized that many of these ideas must deal with the varied and sometimes opposing interests of stakeholders. This presentation will expound on these innovative ideas and the issues surrounding their potential implementation.

103. Megan Sircy

Western Kentucky University
Mentors: Christian Williams and Melanie Eaton

Nursing Home Administrators' Perceived Knowledge of the Affordable Care Act (PPACA)

Historically, skilled nursing facilities (SNFs) have been plagued with poor reputations due to a lack of quality and adequate care. The Omnibus Budget Reconciliation Act of 1987 was the first attempt at revising nursing care standards in SNFs. Since then, little has been done to improve standards of care in a SNF. The Patient Protection and Affordable Care Act (PPACA), signed into law in 2010, established new guidelines for SNFs as part of its health care reform goals. Title VI, Part B, of PPACA deals almost exclusively with SNFs. Some provisions under Title VI include increasing SNF accountability and transparency in order to enhance ethical standards and quality of care. To understand the effects of PPACA on SNFs, this study assessed the views of health care administrators on PPACA as well as gauged their knowledge level of PPACA and its implications. A survey was sent out to SNF administrators in Kentucky and Tennessee. The study showed that administrators showed concerns with the effectiveness of PPACA, agreed that they understood the implications of PPACA on its facility but not the entire act itself, and expressed issues with how to best implement the changes in their facilities. It was also observed that the administrators believe that their staff does not understand PPACA and the effects it has on their facilities. The results of this study indicate a lack of knowledge on how to best implement PPACA standards. It is interesting to note that the majority of respondents felt their staff did not have a basic understanding of PPACA and its effects. This would indicate a need for additional training. Overall, administrators seem uncertain of the positive effects of PPACA but indicate they are doing everything possible to comply with standards to maximize the best outcomes for residents.

104. Dennis Smith

Eastern Kentucky University
Mentor: Stephanie Mcspirit

Kentucky Streams and Wetlands: A Comparative Study of State-wide Conservation Efforts from 2005 to 2015

Through the process of analyzing past survey and field interview data collected approximately 10 years ago for the State's streams and wetlands planning process, (McSpirit 2009), the following themes have emerged: 1) Funding: This is the most recurring concern relating to all efforts and has been characterized as the main predictor of the success of any program or organization relating to conservation/restoration efforts. 2) Education: Experts have pointed to adoption of regular curriculum in all phases of primary education, as well as education of politicians and other decision makers. Education of land owners is also emphasized. 3) Regulations: Another recurring concern, mostly centering on not the creation of new or tougher regulations, but tighter enforcement of existing ones, and streamlining of various processes. 4) Partnerships: Included here for the time being are related concepts, such as continuing and strengthening of inter-agency partnerships, but also better communication and cooperation with citizens, especially farmers and others who have a stake in these matters. In this poster presentation, we will share the findings from this study of past interviews and will also share our plan to repeat and update this streams and wetlands study. We plan to interview key stakeholders and agency officials again, ten years later, to determine whether any progress has been made in protecting the streams and wetlands of eastern Kentucky, as well as uncover persistent barriers to this progress as well as potential present-day solutions. This work will form the basis of an Honors Thesis in the coming academic year at Eastern Kentucky University.

105. Kyle M. Smith and Sydney Guffey

Morehead State University
Mentor: Joy L. Gritton

Diversity: A Key to Healthy Living in the Appalachian Region

STUDY 1 (Smith): ***A Lifetime of Healthy Living: Unifying Awareness of Healthy Living Among Appalachia's Diversified Community***

Childhood obesity rates in Kentucky, including Rowan County, are much higher than the national average, with the Centers for Disease Control reporting nearly 36% of children are obese. Childhood obesity leads to numerous chronic health problems including hypertension, Type 2 diabetes, and high cholesterol. Remaining obese into adulthood leads to further health decline and increases the likelihood of lifelong health problems. Nutrition and physical activity are essential to the prevention of chronic health problems, but creating shared perceptions of healthy lifestyles remains at the forefront of the nation's healthcare challenges. Change is clearly necessary, but how can this change be respectful of diversity and yet create unity in understanding of wellness issues? This study examined the potential for health and physical education in an after school program setting to improve awareness and practice of healthy life style choices among the region's youth.

STUDY 2 (Guffey): ***Envisioning a Healthier Region: Diversity in Physical Education***

So many children miss out on important relationships with those around them because they don't understand the lesson, are afraid of what the other students may think of them physically, or are worried how their classmates will react if they perform an activity incorrectly. Teaching physical education requires the instructor to be sensitive to how each child learns differently from another, is not always comfortable in every social group, and can have diverse emotional responses to a given situation. It is important to establish an inclusive learning environment for children when encouraging them to participate in physical education. This presentation will provide practical suggestions for removing the mental, physical, and emotional barriers that can prevent children from enjoying and deriving benefit from physical activities, drawing on both current research and the presenter's experience at the Haldeman Community Center After School Program.

106. Shelby J. Smith

Eastern Kentucky University
Mentor: Lisa Day

You Have a Body to Share

Post-traumatic stress disorder has been conceptualized as a failure of communication. It is argued that this failure results from the effects of dissociation during trauma, the difficulty of expressing embodied experiences, and victim blaming in American rape culture which discourages survivors of sexual abuse to disclose their stories. The inability of survivors to create a trauma narrative results in separation from themselves, others, and reality, which further inhibits communication. The present discussion aimed to explore the utility of creative writing in overcoming the communication failure of trauma and reconnecting survivors to themselves, others, and reality. A review of the literature related to sexual abuse, post-traumatic stress disorder, and writing therapies was followed by a self-reflective, performative example of confessional poetry related to sexual trauma. Personal experience was chosen due to lack of representation of women's embodied experiences in the literature. The poems in the collection were written for personal expression rather than for the purpose of this discussion or other academic endeavors. The poetry collection was composed of poems written during exposure to sexual abuse and poems written after the trauma had ended. Poems from the two time periods were juxtaposed to create a conversation between the two selves of the artist. The format was designed to emulate the experience of time as punctuated while still maintaining fluidity, reflective of working and reworking identity. The conclusion of this creative project included a reflection from the artist about the process of creating her trauma narrative and how creative writing enhanced her coping with post-traumatic stress disorder by overcoming the inarticulacy of her experience.

107. Claire Stage

University of Louisville
Mentor: Barbara Polivka

Every Breath You Take: Circumstances Surrounding African American Parents/Guardians' Decision To Take Their Child To The Emergency Department For An Asthma Event

Background: This study is based on Shaw and O'Neil's (2014) exploration as to how parents balanced their lives in reference to having a child with asthma. Parents were asked what criteria they used to determine that their child needed to go to the emergency department (ED) for asthma. However, only two African Americans were included. In order to address this gap, the current study focused only on African American families as they are disproportionately affected by asthma and more likely to visit the ED compared to other racial/ethnic groups. Purpose: To explore the criteria used by parents of African American children ages 5 and under to determine if their child should seek care from the ED for a suspected asthma emergency. Methods: Grounded Theory qualitative methodology was used to identify patterns of behavior through recorded interviews with African American parents of children 5 years of age and under admitted to Kosair Children's Hospital (KCH) for an asthma exacerbation. Parents were asked the process they went through prior to deciding to take child to the ED and how they may use the experience or information received to prevent future ED visits for asthma. Results: Parents (n=6 to date) indicated weather conditions were triggers of their child's asthma exacerbation; none of the children had allergy testing. Retractions were reported in all children. Some parents used non-medical treatments such as steam and a de-humidifier. Conclusions: Parents consistently indicated only a vague understanding of child's specific asthma triggers and identified various characteristics of troubled breathing and lack of response to the nebulizer treatment as reasons they would bring their child into the ED. Parents were dismayed at the amount of information that previous healthcare providers had not provided them with and the depth of information they needed to adequately control their child's asthma.

108. Katryn I. Steenbergen

Western Kentucky University
Mentor: Jason Crandall

Functional Performance and Health Knowledge after a Combination Exercise, Health Education, and Bingo Game

Health promotion programs are needed to help older adults remain functionally independent, yet adherence and retention are challenges. Combining exercise, health education, and the game of bingo may be an effective strategy. PURPOSE: To determine if a 10-week health promotion program (Bingocize) could improve functional performance and acquisition of health knowledge in older adults. METHODS: Participants (>55 yrs. old) were assigned to an experimental group (n = 13; M=77.38 ± 8.16; 4 males, 9 females) or a wait-list control (n = 14; M =73.29 ± 8.51, 1 male, 13 females). The study consisted of two-45-60-minute sessions per week at an independent living senior facility. The program leader announced a health education question or led an exercise. Small prizes were awarded to game winners. Resting blood pressure (BP), body weight (BW), body mass index (BMI), health knowledge (HEIQ), and functional performance were measured in both groups. Adherence was monitored using weekly attendance. Independent sample t- tests were used to detect differences between groups ($p < .05$). RESULTS: Significant improvements in diastolic BP ($t(25) = -2.38$, $p = .025$), BW ($t(25) = -3.78$, $p = .001$), BMI ($t(25) = -3.81$, $p = .001$), arm curl repetitions ($t(25) = 5.44$, $p = .001$), 2-minute step test ($t(23) = 2.66$, $p = .014$), number of chair stands ($t(25) = 3.07$, $p = .005$), back scratch ($t(24) = 2.67$, $p = .013$), and 8 foot up and go ($t(23) = 2.62$), $p = .015$ were found in the experimental group compared to controls. There was no significant change in sit and reach (cm); ($t(24) = 1.96$, $p = .065$) or health knowledge. Mean adherence was 97.31% ±2.59%. CONCLUSION: Bingocize has the potential to improve measures of functional performance in older adults. A direct measure of health knowledge may be more efficacious for future research.

109. Julia Steffen

Northern Kentucky University
Mentor: Kajsa Larson

Conversation in Ecuador: An Ethnographic Investigation of Awareness and Attitudes Towards Oil Drilling and Conservation

Since Ecuador's president, Rafael Correa, lifted bans on oil drilling in the pristine Yasuní National Park of the Amazon, oil drilling has greatly expanded. Most Ecuadorians are aware of oil drilling and its effects on the environment. However, it is not known whether specific populations have a greater interest in the topic. On-site interviews were conducted with native Ecuadorians categorized in three groups: urban dwellers, those living in a rural setting, and indigenous populations. The purpose was to explore citizens' awareness and attitudes toward oil drilling and conservation. The hypothesis was that individuals living in rural and indigenous areas would have a greater interest in the impact of oil drilling and conservation efforts because of their increased opportunity for direct exposure to the environment and wildlife. Consequentially, it was hypothesized that citizens living in urban cities would have less interest in the negative effects of oil drilling and ways in which to curb hazardous activities that harm the environment. Our findings indicated that a citizen's area of permanent residence did not necessarily impact the individual's awareness of the topic. We found that indigenous peoples were opposed to oil drilling and were concerned with preserving their resources and homes. Those who had frequent contact with wildlife expressed a deep concern about oil drilling. A clear conclusion could not be made on urban citizens' awareness of oil drilling and conservation because some citizens only had general awareness of the topic. Thus, our hypothesis was rejected, as it was concluded that a citizen's residency does not necessarily affect their interest or concern regarding oil drilling and conservation in Ecuador. Instead, we concluded that an individual's career, travel opportunities, and use of free time provided a better indication of personal awareness of the topic.

110. Paula Stepp

Western Kentucky University
Mentor: Rajalingham Dakshinamurthy

Novel Self-Patented Gold Nanoparticle Synthesis, Characterization and Antibacterial Susceptibility Testing

With soaring increase in the cases of multi-drug resistant (MDR) bacteria all over the world, we are on the verge of entering post-antibiotic era if no immediate action is taken against this global crisis. As an alternative route to modify current commercial antibiotics, we made an attempt to design an array of effective antibacterial agents involving gold nanoparticles (AuNPs) conjugated to an antibiotic, like those of the aminoglycoside, cephalosporin, and carbapenem drug classes. Due to recent emergence of infections due to both Gram-positive and Gram-negative bacterial strains with advanced patterns of antimicrobial resistance bactericidal agents such as these are being view as a prime candidates for further development and augmentation. Unlike conventional methods, a unique self-patented green process was used for AuNPs synthesis wherein the antibiotic assists in both reducing and stabilizing the AuNPs resulting in antibiotic conjugated gold nanoparticles (Ab-AuNPs) which were morphologically characterized using transmission electron microscope (TEM), UV-Vis spectroscopy, scanning electron microscopy/energy-dispersive X-ray spectroscopy (SEM-EDS), and dynamic light scattering (DLS). The presence of ligand (antibiotic) onto AuNPs was confirmed using TGA analysis. Antibacterial efficiency was evaluated on Gram-positive and Gram-negative bacterial strains using turbidmetric and spread plate assay. AuNPs activity was further confirmed with propidium iodide assay. Super-thin cross-sections of bacteria treated with Ab-AuNPs observed under TEM showed bactericidal activity by causing perforations and disturbing the cellular environment leading to cell lysis and apoptosis. The minimum inhibitory concentrations (MIC) of Ab-AuNPs were significantly less when compared to pure antibiotic drugs. This finding supports the idea of synergistic activity of Ab-AuNPs.

111. Ashley Stevens

University of Kentucky
Mentors: Arthur Hunt and Daniel Howe

***Alternative Polyadenylation in* Sarcocystis neurona**

This project studied the occurrence of alternative polyadenylation during the growth of *Sarcocystis neurona*. S. neurona is an obligate intracellular parasite that causes equine protozoal myeloencephalitis. Among the stages of growth of the parasite are the merozoite and schizont stages. The merozoite is the extracellular parasite that has been lysed from the host cell once the development has completed. The schizont is the intracellular development stage, where it grows and acquires nutrients, eventually producing 64 haploid merozoites. While some gene expression analysis has been conducted, there is no knowledge on polyadenylation in S. neurona. Moreover, there have been no genome-wide studies of poly(A) site choice for any member of the Apicomplexans phylum. Thus, it is not clear if alternative polyadenylation contributes to changes in gene expression in these organisms, and any findings will add to current knowledge. This study addressed the hypothesis that, indeed, alternative polyadenylation does contribute to regulated gene expression in S. neurona. Poly(A) tags (1) were made to conduct a genome-wide study of poly(A) site choice. The tag libraries were sequenced on a MiSeq instrument, returning 11.9 million reads. The data was analyzed using programs including CLC Genomics Workbench and Bedtools, as well as others designed specifically for APA analysis to define sites and assess alternative polyadenylation. The results suggested that S. neurona possesses a distinctive polyadenylation signal that is reminiscent of that seen in higher plants. The results also showed multiple instances of APA. The results from this study confirm our hypothesis that there will be changes in poly(A) site choice during the developmental stages of S. neurona.

112. Gidgett Taylor

Kentucky State University
Mentors: Lingyu Huang, Cecil Butler, and Changzheng Wang

Effects of Hot Water and Acidic Electrolyzed Water Treatment on Microbial Load and Quality Characteristics of Pawpaw Fruits

Pawpaw fruit has a relatively short shelf life, limiting the time for its processing and marketing. Deactivating enzymes involved in maturation and eliminating microbial contamination have the potential to extend the fruit's shelf life. The objective of this study was to determine the effects of pretreatment with hot water and acidic electrolyzed water on the microbial load and quality characteristic of pawpaw fruits. Pawpaw fruits were harvested from the research orchard of Kentucky State University. Fruits were randomly assigned to receive no pretreatment, pretreatment with heating in water at 60 C for 5 min, rinsing with tap water or acidic electrolyzed water for 2 min. Three fruits from each group were analyzed for weight loss, hardness, pulp color and Brix value on day 1, 7, 10 and 14 after the pretreatment. The fruits were also inspected visually. Microbial load was relatively high at the beginning and became lower during the experiment. Pretreatment with acidic electrolyzed water reduced the microbial load but did not delay the deterioration of the fruit. The hardness of the fruits declined for all groups but was slightly less for the hot water treated group. As time increased, fruits tended to turn dark in skin color and number of sagging spots increased. However, appearance of the hot water treated group remained acceptable up to 14 days, indicating that hot water treatment delayed the maturation process and extended slightly the shelf life of pawpaw fruits.

113. Erin Taylor

University of Kentucky
Mentor: Lindsey Fay

The Translation and Communication of Design Research

With the introduction of the new University of Kentucky Cardiovascular Unit designed by GBBN Architects, changes were visible in the design outcomes and functionality of the space. The primary difference in the transition of units was the use of decentralized versus centralized nursing models. The original hospital was centralized, which provides one unit for all nurses to work, while the new hospital houses the decentralized model, where there are smaller stations between patient rooms for individual or paired nurses to work. Traditionally, research presentations are composed into lengthy documents and published. For a designer, this format is frequently overlooked due to lack of visual interest and attraction to wordy documents- therefore causing a disconnect in the benefits accompanied by research. It is important that research is understood, valued, and used as a basis of design so we can continuously improve healthcare workplace design in regards to functionality and patient satisfaction. In order to demonstrate this, it is clear we must take existing research and provide a visual representation. Research was conducted by design students to examine the effectiveness of the decentralized nursing model on efficiency, workflow, and communication. The students hand documented observations of paths traveled, distance traveled, time spent with patients, and communication among users of the space. I then digitally documented the information to make it shareable for the design community. Methods of color-coding, easily readable lines and graphics, layering, and keying provide a clear illustration of several research documentation methods into one visual. These strategies of displaying research translate the information into an graphic document, which best articulates to the designers the influence of design in the hospital configuration. Once presented in an appropriate manor, ideally designers would learn from them and consider this as an opportunity for healthcare design improvement.

114. Rebecca Thiem

Eastern Kentucky University
Mentor: Michelle L. DePoy Smith

Do Study Halls Produce Valedictorians?

One of the greatest honors a graduating high school senior can receive is the title of "Valedictorian." Many students set this goal prior to high school and will forgo taking a study hall or free period in order to enroll in more weighted classes and useful electives. However, not taking a study hall may be causing these students to lose the "Number 1" ranking. This project compares prevalent methods for calculating high school GPAs and demonstrates the paradox of lowering class ranking by taking more classes. We provide suggestions and options for school administrators to improve their ranking methods in order to ensure that the top student receives their due honor.

115. Robert Theis and Jared Carr

Northern Kentucky University
Mentor: Chari Ramkumar

Enhancing Grain Size and Uniformity of Ferrite Magnets for Magneto-Elastic Pressure Sensor Applications

The objective of this research was to develop a toroid composed of a ferrite material that has the same grain structure and uniformity as a commercially manufactured toroid. A zinc, manganese, and iron mix [(MnZn)xFe3-xO4] was used for the ferrite material and was sieved using a 20 micron sieve in order to maintain uniform particle size. The calcination process was varied with the best results coming from a 45 minute rise to 1200 °C, holding at this temperature for 120 minutes and cooling down to room temperature in 720 minutes. We used 1% PVA binder and 1200 pounds of pressure for 15 minutes using a hydraulic press to make all of the toroids. A process of 120 minutes rise to 1200 °C, holding at this temperature for 180 minutes and then cooling down to room temperature in 720 minutes was used to sinter all these toroids to increase the size and uniformity of grains. Scanning electron microscope studies reveal that one of the toroids has developed grain structure that is very close to commercially manufactured toroid.

116. Cierra Thompson

Morehead State University
Mentor: Julie Harp Rutland

Families Involving Siblings in Early Intervention

Legislation and Recommended Practice recognize the importance of the interactions between the child and family. Family involvement in early intervention is vital to support the outcomes of very young children who are receiving special services (developmental intervention, occupational therapy, physical therapy, speech and language therapy, etc.) for their identified delays, disabilities, or risk factors. It is understood that family members spend more time with their children than any others and have the most influence on their child. Siblings, as family members, also have an impact. The research informs us of sibling interactions consuming a large part of everyday family routines, and offering naturally occurring opportunities for learning in multiple domains. The research also informs us that services should be delivered in natural environments as this increases opportunities for learning. When compared to environments that are not natural or normal for young children, these are the best settings for intervention because the child is able to use the skills and strategies in their normal day-to-day activities which is more functional and better generalized. This increase is due to the many more opportunities found in their typical every day routines such as home, car, playground, or church. Unfortunately, there is a gap in research about family involvement in early intervention, when including siblings. Sibling involvement in early intervention may offer very young children with special needs more opportunities to learn. We have conducted a survey to learn more about how families include siblings in the intervention strategies developed for their young child with disabilities.

117. Clay Thornton, Abby Shelton, Scotty Reams, and Annah Baykal

University of Kentucky

Mentor: Buck Ryan

On Jobs, Values, and Misguided Polls: An Analysis of Young Voters 'Bowling Alone' in Kentucky's 2014 Midterm Elections

The importance of young voters has increased with population size and political impact. Millennials 18 to 29 year olds, which have surpassed Baby Boomers as America's largest population group (Taylor, 2014), showed their power to swing elections when they showed up to re-elect Obama. According to the Pew Research Center, they swung battleground states including Ohio and Virginia, which border Kentucky, home to one of America's most watched midterm elections with its 2014 U.S. Senate race. The question arose: Would young voters flex their newfound political muscles in the midterms or would they follow trends and remain "bowling alone" (Putnam, 2000)? Although at least 10 million young people voted nationally in the 2014 midterm elections, they remained "bowling alone" with a turnout rate of 21.5 percent compared to 20.9 percent in 2010 midterms (CIRCLE, 2014). As the nation gears up for the 2016 presidential race, insights into how young voters think become increasingly valuable. An in-depth case study of first-time voters in Kentucky's 2014 midterms compared their "coming to public judgment" (Yankelovich, 1991) on which candidate to support in the U.S. Senate race with their voting decisions in a local mayoral election. The key determinants focused on issues and values for both races. A third determinant was party affiliation in the U.S. Senate race and character in the non-partisan mayoral election. News coverage was not found as a key determinant in their voting. The most important issue to young voters in the federal and local elections was jobs, but a content analysis of front-page newspaper headlines revealed little focus on jobs. Instead, news coverage, especially the U.S. Senate race, focused on conflict and horse race factors. Among the big losers in the midterms were the pollsters, as none predicted the 15-point victory for Sen. Mitch McConnell. For young voters, who kept journals of their coming to public judgment in the 10 weeks leading up to the election, seven possible factors emerged in their decision-making: issues, values, personal contact, character, competence, opinions of others, and party affiliation. In the mayoral race, the young voters had personal contact with the candidates, unlike the U.S. Senate race. Nonetheless, personal contact did not emerge as a key determinant. Public safety was a key issue for the young voters in the mayoral election, whereas in the U.S. Senate race, student loans and the Affordable Care Act were key. The case study, using quantitative and qualitative research methods, involved 19 Honors students. An analysis of their journals revealed 74 percent, 14 of 19, fell in line with Yankelovich's 7 Stages of Coming to Public Judgment. Findings from this study will be valuable to campaign managers and politicians, scholars researching young voters, and journalists covering future elections.

118. Karen Udoh

University of Louisville

Mentors: J. Christopher States, Jouett Mason Hoffman, and John O. Trent

Inhibiting the Anaphase-Promoting Complex/Cyclosome: An Innovative Approach for Cancer Chemotherapy

The anaphase promoting complex/cyclosome (APC/C) is a large, E3 ubiquitin ligase that regulates the cell cycle, in particular the metaphase to anaphase transition in mitosis and the re-entry into G1 phase. Inhibition of the APC/C results in mitotic arrest and apoptosis in cancer cells. ANAPC2 and ANAPC11 are shown to be two vital subunits for APC/C function. in silico screening of ANAPC2 identified compounds that are predicted to prevent the association of ANAPC2 and ANAPC11. Thus, we hypothesize that the relative levels of the APC/C molecular targets, securin and cyclin B, will increase in cells treated with lead compounds. To gain better insight on the inhibition of the APC/C in cancer cells, HeLa cells were treated with lead compounds 3, 8, 10, and 11 at their respective IC50s for 24 h and then harvested to make lysates. The Bradford Protein Assay was used to determine the protein concentrations in each of the samples. To examine the relative levels of securin and cyclin B, a western blot analysis was performed. Results showed that cells treated with compounds 3, 8, 10, 11 do not have increased levels of securin and cyclin B. However, future analysis may reveal that treatment with the lead compounds causes a decrease in the levels of ubiquitinylated cyclin B and securin. This research was supported in part by University of Louisville Cancer Education Program NIH/NCI grant R25-CA134283 and a Kentucky Lung Cancer Research Program grant to JCS.

119. Ava Vargason

University of Kentucky

Mentors: Thomas D. Dziubla, J. Zach Hilt, Kimberly W. Anderson and Carolyn Jordan

Quantification of the Internalization of Poly(trolox ester) Nanoparticles

Oxidative stress is characterized by an imbalance of reactive oxygen species and antioxidants in cells, impairing normal cell function. Through the upregulation of cell adhesion molecules (CAMs), this pathological state can exacerbate cancer metastasis by increasing the risk of cancer cell adhesion to injured endothelial cells. Recent research has shown that targeting antioxidant polymers with CAMs, such as platelet endothelial cell adhesion molecule-1 (PECAM-1) or intracellular cell adhesion molecule-1 (ICAM-1), can increase the specificity and efficacy of drug delivery systems. One particular antioxidant, trolox, a water-soluble analogue of vitamin E, can be synthesized into poly(trolox ester) (PTx). PTx has been shown to successfully scavenge for reactive oxygen species and suppress oxidative stress when formulated into nanoparticles. Past research has focused on the efficacy of PTx nanoparticles in the suppression of oxidative stress, although little research has been conducted to examine endocytosis of PTx nanoparticles and the impact that CAM-targeting can have. In this work, endocytosis of PECAM-1 targeted and non-targeted PTx nanoparticles is qualitatively determined using confocal imaging analysis and flow cytometry. The results of these studies implicate both the control of oxidative stress and the cytotoxicity and efficacy of PTx nanoparticles.

120. Hung Vuong

University of Louisville
Mentor: Jill M. Steinbach

Development of a Next-Generation Topical Pre-Exposure Prophylactic (PrEP) Technology Using SiRNA-Encapsulated, Surface-Modified Nanoparticles

Despite recent advances in our understanding of human immunodeficiency virus (HIV), HIV continues to spread at an alarming rate, with 2 million people newly infected in 2014. To manage this HIV pandemic, topical PrEP technologies − defined as active agents that prevent infection by inactivating or neutralizing pathogens − are being developed as vaccine alternatives. Current PrEP technologies are challenged with the safe delivery of active agents, specifically biologicals, for prolonged durations in the unique microenvironment of the female reproductive tract (FRT). Toward this challenge, our long-term goal is to develop short interfering RNA (siRNA) poly(lactic-co-glycolic acid) (PLGA) nanoparticles (NPs) to provide prolonged protection against HIV via multiple stages of infection. We hypothesize that delivery of siRNA NPs will inhibit the expression of the HIV-1 host cell receptor, C-C chemokine receptor type 5 (CCR5), and prevent one of the initial stages of virus infection, cell entry. Furthermore, we hypothesize that surface modifying siCCR5 NPs with Griffithsin (GRFT), a potent antiviral lectin that binds to and inactivates HIV; or MPG, a cell penetrating peptide (CPP) to enable enhanced uptake of siRNA-encapsulated NPs, will confer more temporally efficacious protection against HIV infection. The experiments conducted thus far aim to characterize and determine the efficacy of surface-modified siCCR5 PLGA NPs to achieve CCR5 knockdown (KD) and corresponding HIV inhibition in vitro. Preliminary data demonstrated that unmodified siCCR5 NPs achieved the highest CCR5 KD among the three surface modifications (37%) while CCR5 expression in cells treated with MPG siCCR5 NPs exhibited significantly lower expression (roughly 2-fold less). GRFT-modified NPs showed negligible CCR5 KD. We are currently optimizing dosage to provide more efficacious KD.

121. Mary Wagner

Eastern Kentucky University
Mentor: Kristen Renee Causey-Upton

The Gold Standard: Understanding the Impact of Perfectionism on Occupation

Occupational Science seeks to understand human occupation, often grouping occupations into categories and considering external factors that influence what people do. The current literature in psychology includes several studies on perfectionism, but there are no studies within occupational science literature that directly relate to perfectionism. Some research suggests a link between workaholism and perfectionist qualities. Other research contends that workaholism and the overemphasis on work and productivity may cause a life imbalance resulting in potential negative social and health related consequences. The purpose of this mixed methods study is to gain an understanding of how perfectionism impacts the occupations of college students studying occupational science and to describe the participant's experiences of being a perfectionist. Another objective was to examine how perfectionism positively or negatively influenced the occupations and well-being of students. In order to answer the main research question and associated questions, original research was conducted using a mixed methods approach. The Almost Perfect Scale, Revised (APS-R), developed by Stanley, et al. (1996) was administered to a class of Occupational Science (OS) students. The results of this assessment were used to categorize students as perfectionist or non-perfectionist. A smaller sample of students in both groups were selected and time logs of their occupations were compared and analyzed. For the qualitative portion, a follow- up survey with the subgroup of the perfectionists was conducted to help answer how being a perfectionist both supported and inhibited occupation. Using a mixed methods approach, the intent was to determine if a relationship between perfectionism and human occupation existed and provide a measurable and meaningful depiction of the interaction between these variables. The implications of this research would be used to better support the health and occupations of college students and mollify or prevent negative health effects of perfectionism.

122. Frankie Wallace

Western Kentucky University
Mentor: Matthew Nee

Analytically Assessing the Safety of Innovative Technologies in the Future of Wastewater Treatment

Recent studies have shown that biologically harmful chemical pollutants are present at increasing concentrations in wastewater. Wastewater treatment facilities are highly effective in the removal of large scale and bacterial contaminants, however a variety of harmful chemical pollutants are able to make their way into drinking water. This problem is especially evident in Kentucky, where there is a great deal of pesticide pollution from farm runoff, as well as pharmaceutical waste in areas with hospitals nearby. Although there are several proposed technologies that could eliminate these organic pollutants, they rely on chemical reactions that are not well understood. Chemical reactions occur in a stepwise fashion, so even if the end products are safe, more must be learned about the nature of the intermediate species that arise over the course of a reaction for the overall safety of the process to be ensured. Our lab has shown that Raman spectroscopy is a useful tool for monitoring reactions in real time, much quicker than conventional methods of analysis, so that important short-lived intermediate species can be recognized and a comprehensive molecular mechanism can be determined. Here, work was done to expand the reach of this analytical tool, by introducing surface enhanced Raman spectroscopy, so that sparingly soluble compounds at low concentrations can be analyzed as they are broken down. Additionally, quantitative measurements in regard to concentration changes of compounds as reactions progress were made possible via the introduction of an internal standard. This work allowed for a much broader range of common pollutants to be individually studied, expanding the applicability of the tool. The ability to thoroughly study a wide range of compounds for a given reaction is essential to ensuring the safety of implementing technologies taking advantage of that reaction in the wastewater treatment process.

123. Katelyn Welch

Eastern Kentucky University
Mentor: David Brown

Ash Tree (*Fraxinus*) Population Data for Monitoring the Emerald Ash Borer (*Agrilus planipennis*) at Taylor Fork Ecological Area, Madison County, Kentucky

The objective of this study was to collect baseline data for use in monitoring and management of the ash trees (*Fraxinus* spp.) at the Taylor Fork Ecological Area (Taylor Fork) in central Kentucky, in preparation for the arrival of the Emerald Ash Borer (*Agrilus planipennis*). All ash trees located within the property lines of Taylor Fork were identified and the diameter at breast height (DBH) determined. There were forty-two ash trees located inside the boundaries of Taylor Fork. There was no significant difference in mean (± SD) DBH between white (n=18) and green (n= 23) ash tree species (17.6±12.2 vs 22.8±20.4 cm, respectively). The majority of green ash were located in moist soil or creek habitat, while white ash were mainly located in upland habitat.

124. Jasmine Wigginton

University of Louisville
Mentor: Daniel Vivian

African-American Education in Rural Kentucky: 1865-1885

After emancipation, former slaves showed fervent desire for education. During the first twenty years of emancipation, two programs were created to educate African Americans in Kentucky. The first was instituted by the U.S. Bureau of Refugees, Freedmen and Abandoned Lands, commonly known as the "Freedmen's Bureau." Federal authorities established the Freedmen's Bureau to ease freedpeoples' transition from slavery. Establishing schools for African Americans figured among the Bureau's major accomplishments. The second major program began in 1874, when the state of Kentucky created a separate school system for "colored" students. These two institutions, federal and state, contributed to the advancement of African American education in the immediate aftermath of the Civil War. This project examines African American education in the Kentucky Bluegrass. Using three communities in Nelson and Spencer counties as a case study, it examines the effectiveness of education provided by Freedmen's Bureau and state schools. To date, historians have concentrated on questions about black education in Louisville and Lexington. The poster examines African American education in rural communities. How many people went to rural black schools? What did students learn? Who made up the student body, and how effective were the programs provided? What did children not attending school do? In exploring these questions, this poster offers a fuller understanding of African American education in the immediate aftermath of emancipation.

125. Brittany Wilson

Morehead State University
Mentor: Kim Nettleton

In the Know: Classroom Teacher's Knowledge of Gifted Student Characteristics

The brightest students in our schools make the least progress each year (Colangelo, Assoulne, & Gross, 2004). Instead of setting a high standard of excellence in the classroom, when their educational needs are ignored, gifted students become disengaged and unmotivated. Students won't receive appropriate instruction if nobody knows they are gifted. This study examined classroom teachers' ability to identify the characteristics of students' in the 5 areas of giftedness recognized in Kentucky: Visual and performing arts, Creative thought, Leadership, General Intellect, and Specific Subject Area. Colangelo, N., Assouline, S. G., Gross. M. U. M. (2004). A nation deceived: How schools hold back America's brightest students (Vol.1). Iowa City: University of Iowa, Belin- Blank International Center on Gifted Education and Talent Development.

126. Sierra Wilson

Murray State University
Mentor: Terry Derting

The Relationship Between Canine Nasal Length and Second-Hand Smoke Cotinine Levels

Second-hand smoke (SHS) has been associated with respiratory cancers in canines, with the predisposed locations determined by the cephalic ratio (head length / head width). Exposure to SHS is frequently measured by analyzing urine or blood samples for the nicotine by-product cotinine. We investigated the suitability of saliva as an alternative source for cotinine analyses in dogs because obtaining saliva is less invasive and cotinine concentrations from SHS exposure are instantaneously measurable in saliva compared to other collection methods. Specifically, we tested for a quantitative relationship between cephalic ratio and the salivary concentration of cotinine. Our null hypothesis was that there is no difference in cotinine concentration in short- and long-nosed dogs that are exposed to SHS. Owners completed a survey about smoking habits, the dog's exposure to different types of tobacco smoke, dog's sex, and other variables associated with SHS impacts. Each dog's body condition and head length and width were recorded. We obtained a saliva sample from the participants' dogs and analyzed them for cotinine using an ELISA assay. Salivary cotinine concentration was significantly higher in dogs exposed to SHS versus dogs not exposed. There was also a positive linear relationship between cotinine concentration and cephalic ratio. The results did not differ significantly between male and female dogs. Our results supported previous studies reporting that long-nosed dogs accumulate more toxic by-products from SHS compared with short-nosed dogs. Saliva samples may be a useful alternative to more invasive methods when evaluating exposure of some domesticated species to SHS.

127. Alexandra Wright

Western Kentucky University
Mentor: Kevin Williams

Reactions of Anticancer Analogs with Proteins and DNA

Several platinum (II) compounds are known to demonstrate anticancer activity. In particular, platinum compounds of a "triamine" structure are known to contribute significantly to cell toxicity. Here, we have investigated platinum triamine complex that mimics the size and shape of other potential anticancer drugs. We observed the reactions between our platinum compound and small-molecule models of proteins and DNA. Our platinum compound was reacted with an amino acid (N-acetyl-L-methionine) and a nucleotide (guanosine monophosphate) with the expectation that either the methionine or the guanine would react. However, under some conditions, both the methionine and the guanine were shown to react with the platinum compound. The unique behavior of our compound is one that may be exploited in the design of future platinum-based drugs. An insight into the conditions that cause such unusual behavior could potentially be used to improve the efficacy of anticancer drugs used in chemotherapeutics.

128. Samantha Wright

Murray State University
Mentor: Eric Umstead

Don't Keep a Good Man Down: Intervention Strategies for Common Causes of Anger and Aggression

Seclusion and Restraint have been often used as intervention strategies in public schools for many years, and were not limited by law in Kentucky until 2012. 704 KAR 7:160 was the first legislation to respond to dangerous interventions being used in Kentucky's public schools. This presentation summarizes common causes of anger and aggression in our students, and provides research-based strategies for intervention in all three phases of a behavior: antecedent (prior to the behavior, the escalation of a situation), behavior (during the aggressive behavior itself), and consequences (subsequent actions that occur as a response.) The concept is to provide strategies for educators and paraprofessionals to aid in the de-escalation of their student's aggressive behaviors. The importance of this cannot be overstated especially in the area of special education where communication is the key to conquering setbacks. Literature reviewed has offered insight into the prevention of escalation by giving students choices between positive action and consequence, maintaining eye level with the student rather than standing in a dominating position, and keeping your tone of voice, level and calm. Further, literature has suggested that one contemplate the motive behind the behavior and proactively act to prevent further behavior of the aggressor. These and many more verbal and nonverbal actions can aid in the de-escalation or further aggression. However, the art of de-escalation and intervention strategies reach far beyond the field of education. The information presented may also prove beneficial to parents and caregivers, in law enforcement and for other emergency responders as well as in social work.

129. Kelly Yufeh

Kentucky State University
Mentors: Lingyu Huang and Cecil Butler

Acidic Electrolyzed Water Reduced Microbial Load on Vegetables Grown Hydroponically in Fish Ponds

Aquaponics is gaining popularity for production of vegetables and fish. Water used for fish culture tends to be relatively high in microbial load, and it may contaminate vegetables during production and distribution of vegetables. The objective of this study was to determine the effects of rinsing with acidic electrolyzed water on the microbial load of vegetables grown hydroponically in fish ponds. Basil and butter head lettuce were grown on a foam raft floating in fish ponds. Edible portion of basil and butter head lettuce were cut into 1 cm length with sterilized scissors and mixed thoroughly before 10 g of the sample was homogenized with 90 mL of peptone water for 2.5 min in a Stomacher bag. One mL of the homogenized sample was inoculated onto Petrifilm plates for total aerobic count and E. Coli/Coliform, respectively, after 10, 100, and 1000 times of dilution. Plates were incubated in a culture chamber at 32 °C for 24 hr before the colony forming units were counted. Separate samples, taken from the same pooled sample, were rinsed with tap water or acidic electrolyzed water for 5 min in a plastic container. After the rinsing water was drained off, the rinsed samples were analyzed in the same way as described for the unrinsed samples. Tap water rinse reduced microbial load of basil leaves by 40% and rinse with acidic electrolyzed water lowered it by 60%. For butter head lettuce, tap water rinse reduced the microbial load by about 90% and rinse with acidic electrolyzed water lowered it by 98%. These results indicated that it was more difficult to reduce microbial load of basil leaves than that of butter head lettuce leaves. Rinsing with acidic electrolyzed water was more effective than tap water in cutting down the microbial load of vegetables produced hydroponically in fish ponds.

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