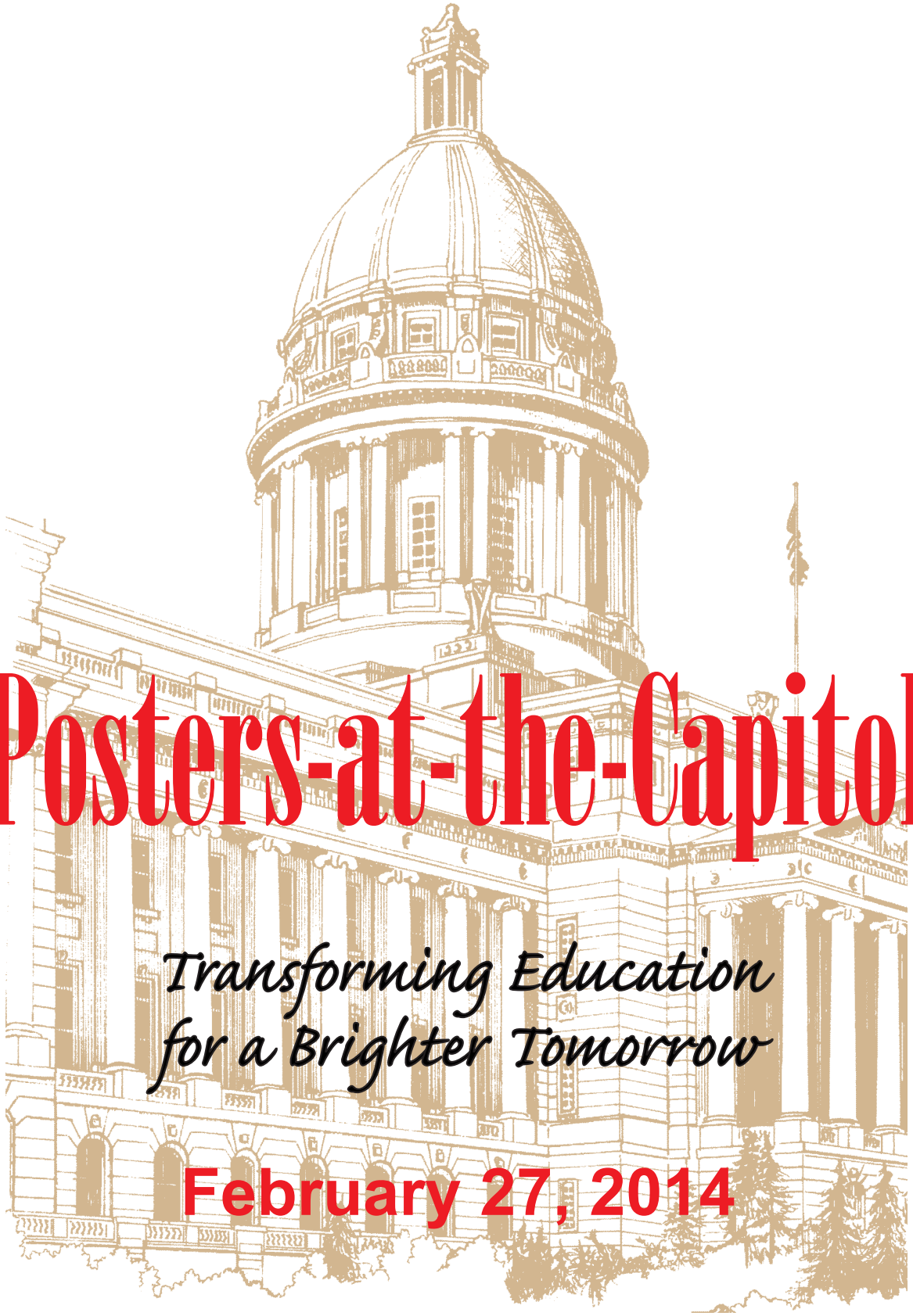
NORTHERN KENTUCKY UNIVERSITY • UNIVERSITY OF KENTUCKY • UNIVERSITY OF LOUISVILLE • WESTERN KENTUCKY UNIVERSITY • KENTUCKY COMMUNITY AND TECHNICAL COLLEGE SYSTEM • EASTERN KENTUCKY UNIVERSITY • KENTUCKY STATE UNIVERSITY • MOREHEAD STATE UNIVERSITY • MURRAY STATE UNIVERSITY •



Posters-at-the-Capitol

Transforming Education for a Brighter Tomorrow

February 27, 2014

Welcome from President Michael Benson of Eastern Kentucky University:

Eastern Kentucky University is proud to participate in the 13th 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 Michael B. McCall of the Kentucky Community and Technical College System:

The Kentucky Community and Technical College System is delighted to take part in this celebration. I applaud the efforts of the ***Posters-at-the-Capitol*** Organizing Committee and our university partners in promoting innovative student research and scholarship.

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

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 Mary Evans Sias of Kentucky State University:

Undergraduate research programs are a valuable resource for the Commonwealth of Kentucky. They drive innovation and support STEM studies at institutions of higher education. Ultimately, undergraduate research programs produce leaders who will discover technologies that lead to jobs.

Providing hands-on research opportunities is helpful in preparing students for careers in the sciences. Budding researchers and scientists benefit from close collaboration with faculty members. This exceptional experience captures students' interest and creates enthusiasm for the science disciplines. In addition, research trains students to think independently and to solve problems.

Meaningful undergraduate research experience can help science graduates land interviews and even jobs. With continued support from the Kentucky Legislature, the next generation of doctorates in the STEM fields will continue to get their start in Kentucky's undergraduate research programs.

Best wishes and much success for another great year of ***Posters-at-the-Capitol***.

Welcome from President Wayne Andrews of Morehead State University:

Once again, we are delighted to participate in the Annual ***Posters-at-the-Capitol*** program. We firmly believe that student research significantly enhances the already strong undergraduate experience at Morehead State University. In addition, 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.

It has been our experience that with respect to producing graduates who have the ability to bring vitally needed critical thinking skills to the workplace, having a meaningful experience as partners in the creation of new knowledge opens their minds to exciting new vistas of learning that can be acquired on no other terms. This is the reason we place such a high priority on faculty-mentored, student-centered activity in research, artistic and other creative endeavors, and community and regional stewardship at Morehead State University. 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.*

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' Welcome Cont'd.

To this end, participation in the 13th Annual ***Posters-at-the-Capitol*** demonstrates our commitment and that of Kentucky's other public institutions of higher education to undergraduate research in the pursuit of academic excellence.

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 Interim President Thomas I. Miller of Murray State University:

Welcome to the thirteenth annual ***Posters-at-the-Capitol***. Murray State's involvement in this worthy event is both a testament to our students, who are seeking out these kinds of 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 MSU students.

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

I join the ***Posters-at-the-Capitol*** Organizing Committee in inviting all of our Commonwealth's citizens to visit and review the work of Kentucky's most gifted students. These undergraduates are contributing ideas that are impacting communities and changing lives. Also, Murray State University is honored to play a key organizing role for this event each year. Congratulations to all those students and faculty whose hard work has made ***Posters-at-the-Capitol*** possible.

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

One of the most important goals of Northern Kentucky University is to expand student participation in undergraduate research and other forms of creative activity. This goal points to the very important role that undergraduate research plays in the mission of our university life. Direct interaction between faculty and students in undergraduate research and creative activities results in development by the students of critical thinking and analytic skills, as well as oral and written communication skills needed to present their work. These interactions also foster the deep intellectual bond between a faculty member and a student that is a defining characteristic of the educational experience we provide.

President Mearns' Welcome Cont'd.

We are proud and pleased to present our students' work at this, the thirteenth ***Posters-at-the-Capitol***. We have observed the growth of this event and that the quality of work has increased each year. These posters and presentations are the culmination of sustained effort by our students and their faculty mentors. They exemplify the high quality work by undergraduate researchers at Northern Kentucky University.

We know that the students displaying their work here are future leaders in the development of the intellectual infrastructure of the Commonwealth. Their talent gives us great faith in the future of our region, our state, and our country.

Welcome from President Eli Capilouto of the University of Kentucky:

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

Now in its 13th year, ***Posters-at-the-Capitol*** is an opportunity to recognize undergraduate research as an essential part of academia, one that benefits students, faculty and the Commonwealth. Now, more than ever, it is essential to understand and invest in the research and discovery that informs the education we provide, uplifts the communities we serve and fuels a global economy.

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

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

This year's statewide ***Posters-at-the-Capitol*** will be an exciting program that leads to the 2014 National Conference of Undergraduate Research, hosted by the University of Kentucky in April. More than 4,000 undergraduate researchers from across the nation will gather on our campus to present their findings, network with colleagues and build relationships with future scholars in their field.

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

Welcome from President James Ramsey of the University of Louisville:

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

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

Welcome from President Gary A. Ransdell of Western Kentucky University:

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

As in previous years, it is gratifying to see the number and diversity of student scholars, along with their faculty mentors participating in this thirteenth 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 Eaton
Jody Cofer Randall
www.murraystate.edu

Darrin Smith
www.eku.edu

George Antonious
www.kysu.edu

Michael Henson
www.moreheadstate.edu

John Farrar
www.nku.edu

Diane Snow
Evie Russell
www.uky.edu

Pamela Feldhoff
www.louisville.edu

Blaine Ferrell
www.wku.edu

Mary Janssen
www.kctcs.edu

Proclamation

by

Steven L. Beshear
Governor

of the

Commonwealth of Kentucky

To All To Whom These Presents Shall Come:

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

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

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

WHEREAS, The Commonwealth commends the undergraduate students participating in these life-changing educational opportunities and the 13th annual Posters-at-the-Capitol;

NOW, THEREFORE, I, STEVEN L. BESHEAR, Governor of the Commonwealth of Kentucky, do hereby proclaim February 27, 2014, as

UNDERGRADUATE RESEARCH DAY

in Kentucky.

DONE AT THE CAPITOL, in the City of Frankfort the 15th day of November, in the year of Our Lord Two Thousand Thirteen and in the 222nd year of the Commonwealth.

STEVEN L. BESHEAR
GOVERNOR

ALISON LUNDERGAN GRIMES
SECRETARY OF STATE

Group Photograph

All participants and mentors are encouraged to take part in the **group photograph scheduled for 10:00 a.m.** on the Senate Staircase. This photograph will be posted online shortly following the program.

Schedule of Activities

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

9:00 a.m. to 11:00 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)

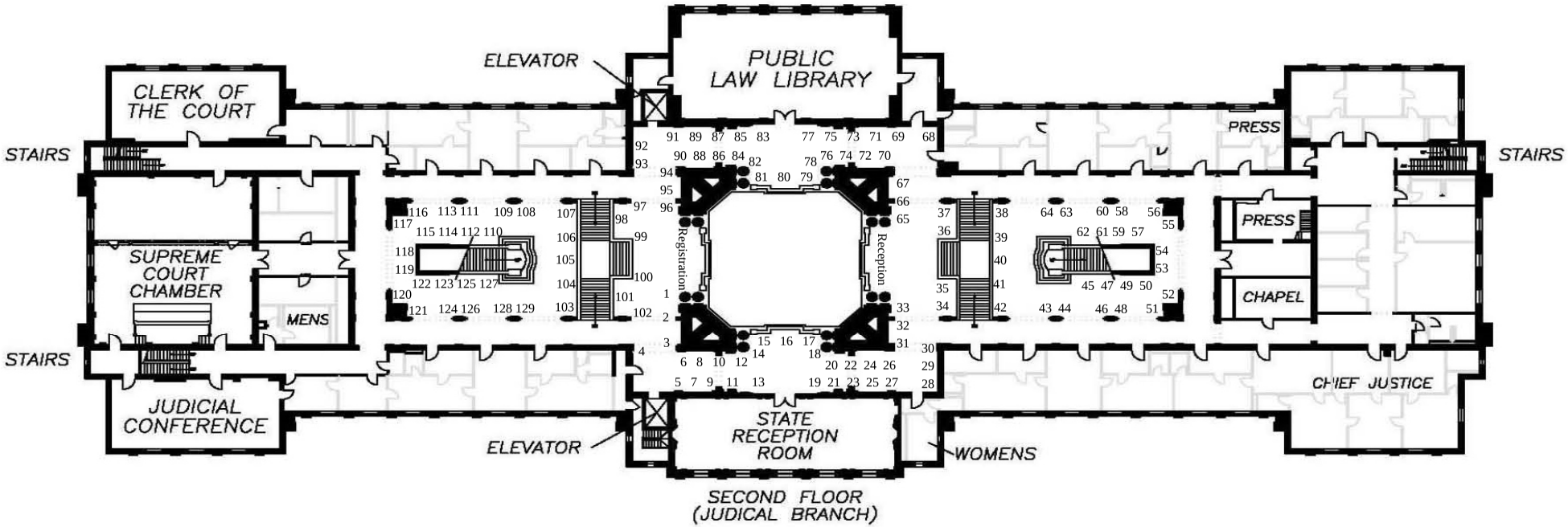
11:30 a.m. to 12:30 p.m. …….……...……Legislative Visit Time and Lunch Break

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
PRESS
CHAPEL
STAIRS
JUDICIAL CONFERENCE
ELEVATOR
STATE RECEPTION ROOM
WOMENS
CHIEF JUSTICE
Registration
Reception
SECOND FLOOR
(JUDICAL BRANCH)

Eastern Kentucky University

Poster No.	Student		Faculty Mentor(s)	Page No.	House No.	Senate No.
28	**Dame**	Lindsay	Michelle Gerken & Jon McChesney	33	81	34
39	**Dyehouse**	Renee	Neil Wright	39	80	34
28	**Fisher**	Eden	Michelle Gerken & Jon McChesney	33	61	7
45	**Forbes**	Karin	Buchang Shi	42	39	22
58	**Henderson**	Seth	Jennifer Hochschild	48	81	34
60	**Hopkins**	Ian	Beth Polin	49	57	7
63	**Johnson**	Brooke	Bill Staddon	51	54	22
66	**Kelsey**	Sarah	Tanea Reed	53	39	22
72	**Kyles**	Philip	Neetu Tyagi, Pradip Kamat, Anuradha Kalini, & Suresh Tya	56	76	7
74	**Leigh**	Dana	Stephen Richter	57	80	34
80	**Malone**	Payton	Rebekah Waikel	61	66	11
83	**Mayo**	Emily	Ryan Sharp	63	100	27
89	**Overbay**	Jonathan	Tanea Reed	67	39	22
100	**Salazar**	Nina	Barbara Wheeler	73	39	22
100	**Seitz**	Rebecca	Barbara Wheeler	73	39	22
103	**Sizemore**	Brislyn	Rebekah Waikel	75	36	22
105	**Smith**	Kevin	Catherine Clement	76	81	34
119	**Ward**	Heath	Bill Staddon & Jason Marion	84	92	25
123	**White**	Malcolm	Martin Brock	87	36	34

Kentucky Community and Technical College System

Poster No.	Student		Faculty Mentor(s)	Page No.	House No.	Senate No.
14	**Caldwell**	Brittany	Norman Strobel	26	76	13
24	**Coomer**	Cagney	Keith D. Allen	31	76	13
35	**Disney**	Robin	John E. Ward	37	35	35
36	**Donaldson**	Grace	Kirk Greenfield	37	4	4
38	**Doyle**	V. Patrice	Norman Strobel	38	76	13
43	**Flener**	Josh	Jennifer Welch	41	10	6
118	**Goff**	Tammy	Mary Janssen	84	10	6
43	**Hack**	David	Jennifer Welch	41	10	6
53	**Haley**	Nicole	C. Steven Cahill & Felix Akojie	45	3	2
54	**Hall**	Aaron	Timothy Dick & Kathy Hoffman	46	7	8
54	**Harpe**	Kenneth	Timothy Dick & Kathy Hoffman	46	7	8
118	**Hibbs**	Blakeley	Mary Janssen	84	10	6
36	**Holt**	Tristin	Kirk Greenfield	37	4	4
54	**Kelly**	Candace	Timothy Dick & Kathy Hoffman	46	7	8
53	**Lyles**	Natalie	C. Steven Cahill & Felix Akojie	45	3	2
36	**Meredith**	Maddie	Kirk Greenfield	37	4	4
87	**Morgan**	Cheyenne	Joe Wolf	66	18	5
118	**Morgan**	Hilary	Mary Janssen	84	10	6
54	**Oakes**	Bethany	Timothy Dick & Kathy Hoffman	46	7	8
24	**Ochsner**	Davetta	Keith D. Allen	31	76	13
24	**Paudel**	Sandhya	Keith D. Allen	31	76	13
36	**Potts**	Alexzandria	Kirk Greenfield	37	4	4
87	**Register**	Ashley	Joe Wolf	66	18	5
24	**Richard**	Tiffany	Keith D. Allen	31	76	13
43	**Roy**	Talon	Jennifer Welch	41	10	6
43	**Royal**	Tiffany	Jennifer Welch	41	10	6
87	**Singletary**	John	Joe Wolf	66	18	5
43	**Smith**	Jenna	Jennifer Welch	41	10	6
118	**Wall**	Justin	Mary Janssen	84	10	6
43	**Zachary**	Kayla	Jennifer Welch	41	10	6

Kentucky State University

Poster No.	Student		Faculty Mentor(s)	Page No.	House No.	Senate No.
41	**Estill**	Leticia	John D. Sedlacek & Karen L. Friley	40	57	7
50	**Graves**	Rebecca	Jeremiah Lowe, Kirk Pomper, & Sheri Crabtree	44	56	7
77	**Lyles**	Tianna	George F. Antonious & Eric Turley	59	56	7
82	**Mathis**	Victoria	Avinash M. Tope & Phyllis Rogers	62	56	7
121	**Watts**	Chelsea	James Tidwell & Shawn Coyle	86	55	7
128	**Woodberry**	Mark J.	George F. Antonious	90	56	7

Morehead State University

Poster No.	Student		Faculty Mentor(s)	Page No.	House No.	Senate No.
117	**Blair**	Allison	Kim Nettleton	83	85	15
5	**Brickey**	Shelby	Johnathan Nelson	20	99	27
6	**Brooke**	Sharon	Jen O'Keefe & Michelle Johnston	21	71	27
12	**Burton**	Lindsay	Joy Gritton	24	96	18
20	**Clausen**	Amy	Sarah Hawkins-Lear	29	71	27
22	**Conn**	Chelise Lynn	Kristina DuRocher	30	95	29
27	**Cundiff**	Michael	Joy Gritton	33	25	10
20	**Fulton**	Olivia	Sarah Hawkins-Lear	29	71	27
48	**George**	Sarah	Beverly McCormick & Janet Ratliff	43	25	10
51	**Greene**	Andrew	Hans Chapman	44	52	15
106	**Ibekwe**	Francis	April Haight & Christine Emrich	77	71	27
106	**Jex**	Jamie	April Haight & Christine Emrich	77	99	27
64	**Johnston**	Allison	E. Noel Earl	52	62	17
48	**Kuessner**	Kelsey	Beverly McCormick & Janet Ratliff	43	78	24
73	**Lambert**	Tyler	Steve Chen & Janet McCoy	57	74	28
85	**Messer**	Katherine	Alana Cain Scott	65	71	27
88	**Napier**	Jared	Thomas Pannuti	66	41	36
73	**Neely**	Adriana	Steve Chen & Janet McCoy	57	71	27
91	**Parker**	William	Gary O'Dell	68	87	30
5	**Polk**	Noah	Johnathan Nelson	20	85	15
102	**Sharma**	Biswas	Thomas Pannuti	75	99	27
106	**Smith**	Porsha	April Haight & Christine Emrich	77	93	31
106	**Spencer**	Tyler	April Haight & Christine Emrich	77	71	27
106	**Thompson**	Christopher	April Haight & Christine Emrich	77	89	25
117	**Wages**	Alexandria	Kim Nettleton	83	99	27
125	**Wilhoite**	Andrea	Wilson Gonzalez-Espada	88	60	11

Murray State University

Poster No.	Student		Faculty Mentor(s)	Page No.	House No.	Senate No.
1	**Adams**	Drew Feldhaus	Jessica Naber	17	5	1
3	**Bell**	Savannah	Claire Fuller	18	5	1
4	**Bergman**	Quintin	Howard Whiteman & Scot Peterson	19	5	1
8	**Brown**	Christian	Howard Whiteman & Christopher Mecklin	22	5	1
19	**Clark**	Haley	Nancy Armstrong	28	5	1
19	**Clark**	Joshua	Nancy Armstrong	28	5	1
26	**Crump**	Chesika	Terry Derting	32	5	1
29	**Daniel**	Alessandra	Lara K. Homsey	34	5	1
3	**Darling**	Victoria	Claire Fuller	18	5	1
31	**De La Fuente**	Aida	David Pizzo & Mary Tripp Reed	35	5	1
40	**Eichelberger**	Danielle	William Dewees & Anna Doom	39	5	1
56	**Hartman**	Bradley	Everett Weber	47	5	1
112	**Huynh**	Nhan	Dayle E. Saar	80	5	1
62	**Jablinski**	Anne	Tony Brannon	51	5	1
19	**Kirschbaum**	Joel	Nancy Armstrong	28	5	1
8	**Kiser**	Adam	Howard Whiteman & Christopher Mecklin	22	5	1
81	**Mark**	Nolan	Ben Ashburn	62	5	1
84	**McIntyre**	Chasity	Lloyd P. Horne	64	1	2
95	**Ramlose**	Victoria	Shea Porr	70	5	1
32	**Russell**	Haley	David Pizzo	35	79	12
124	**Shelley**	Abigail	David Eaton	88	1	2
19	**Short**	Taylor L.	Nancy Armstrong	28	33	36
104	**Smith**	Amanda	Brandi J. King	76	88	12
3	**Stringfield**	Kayla	Claire Fuller	18	12	4
112	**Thomas**	Samantha	Dayle E. Saar	80	5	1
84	**Trent**	Lauren	Lloyd P. Horne	64	29	38
124	**White**	Sierra	David Eaton	88	13	8
26	**Whitewood**	Kaitlyn	Terry Derting	32	48	36

Northern Kentucky University

Poster No.	Student		Faculty Mentor(s)	Page No.	House No.	Senate No.
9	**Brown**	James	Kristine Hopfensperger	22	64	17
10	**Brown**	Josephine	Christine Perdan Curran	23	68	24
110	**Duncan**	Maureen	Rachael Clark	79	60	11
42	**Farris**	Katlyn	Shauna Reilly	40	31	19
47	**Gabbard**	Lauren	Kimberly Weir	43	68	24
110	**Hayden**	Tamesha	Rachael Clark	79	76	13
57	**Heard**	Craig	David Agard & Joseph Nolan	47	68	24
65	**Jones**	Brittany	Lindsey Walters	52	69	17
69	**Koester**	Laura	Cindy Foster & Kathy Bergman	54	64	17
71	**Kotnik**	Kacie	Gail Mackin	55	67	24
76	**Lovins**	Meagan	Joseph Nolan	58	60	11
110	**McIntosh**	Tia	Rachael Clark	79	78	18
90	**Owens**	Heather	Kajsa Larson	67	67	24
9	**Poynter**	Zach	Kristine Hopfensperger	22	68	24
110	**Richards**	Rasha	Rachael Clark	79	67	24
108	**Staverman**	Kevin	David Raska	78	63	23
110	**Stubbeman**	Bobbie Lee	Rachael Clark	79	67	24
127	**Winslow**	Tony	David Raska	89	63	23

University of Kentucky

Poster No.	Student		Faculty Mentor(s)	Page No.	House No.	Senate No.
68	**Auvenshine**	Christopher	Steven Arthur & Andrea Friedrich	54	75	13
15	**Carney**	Anthony	Frances Hardin-Fanning & Yevgeniya Gokun	26	31	19
68	**Case**	Jacob	Steven Arthur & Andrea Friedrich	54	75	13
37	**Doran**	Madeline Marie	Richard Milich & Elizabeth Lorch	38	75	13
44	**Flynn**	Tyler J.	Christine Trinkle & L.S. Stephens	41	79	12
46	**Francis**	Mary Allison	Kristin Ashford	42	79	12
126	**Gambrel**	Jessica	Anthony Sinai, Luke Bradley, & Animesh Dhara	89	90	21
59	**Homann**	Melissa	Steven Estus	48	75	13
61	**Hughes**	Corinna	Kristin Ashford, Andrea K. McCubbin, Janine Barnett, & Susan Westneat	50	51	15
68	**Knox**	Summer	Steven Arthur & Andrea Friedrich	54	75	13
75	**Loughrin**	Karyn	Andrew Stainback	58	75	13
78	**Magyarics**	Casey Lorraine	Jonathan Golding	60	60	11
68	**Mays**	Stephanie	Steven Arthur & Andrea Friedrich	54	75	13
68	**Mudd**	Tommy	Steven Arthur & Andrea Friedrich	54	75	13
93	**Poore**	Holly	Richard Milich & Elizabeth Lorch	69	75	13
98	**Sauer**	Helen	Alison Davis	72	39	22
99	**Schwager**	Rebecca	John Cox	72	59	10
101	**Shaikh**	Nazeer	Matthew Gentry	74	39	22
68	**Thompson**	British	Steven Arthur & Andrea Friedrich	54	75	13
113	**Thompson**	Christina	Kristin Ashford	81	19	5
116	**Vollrath**	Heidi	Magdalena Muchlinski	83	75	13
68	**Williams**	Jimmy	Steven Arthur & Andrea Friedrich	54	75	13
126	**Wingerter**	Danielle	Anthony Sinai, Luke Bradley, & Animesh Dhara	89	90	25

University of Louisville

Poster No.	Student		Factulty Mentor(s)	Page No.	House No.	Senate No.
129	**Abeyweera**	B.K.	Palaniappan Sethu	90	30	35
2	**Barve**	Priyanka	Craig McClain	17	48	26
7	**Brooks**	Fawn	C. Andrew Day	21	42	35
13	**Butterbaugh**	Sean T.	James L. Wittliff	25	3	2
23	**Carver**	Elizabeth Corin	Valerie McCarthy	30	50	20
17	**Chlebowy**	Rachael	Barbara Polivka	27	76	12
23	**Connelly**	Jennifer	Valerie McCarthy	30	50	20
52	**Haley**	John	Kyoungmee Kate Byun	45	41	35
67	**Keown**	Jared	Gerard Williger, Scott Schnee, Tyler Bourke, & Rachel Friesen	53	18	5
70	**Koopman**	Kelsey	Barbara Polivka	55	25	10
109	**LeBlanc**	Alexander	Avery Kolers	78	42	35
86	**Monarch**	Andrew	Sherri Wallace	65	55	7
129	**Patibandla**	P.K.	Palaniappan Sethu	90	30	35
94	**Rakotoniaina**	Ann-Claude	Charles Hubscher	69	13	8
114	**Rice**	Jason A.	Kristi M. King	82	41	35
109	**Stewart**	Heather	Avery Kolers	78	65	23
52	**Studzinski**	Heather	Kyoungmee Kate Byun	45	30	35
111	**Taylor**	Annetra	Barbara Polivka	80	32	36
114	**Todd**	Amber J.	Kristi M. King	82	15	6
120	**Warfield**	Carly	Diane Orr Chlebowy	85	40	35
122	**Watts**	Shane	Diane Orr Chlebowy	87	35	19
129	**Zusstone**	Esther	Palaniappan Sethu	90	30	35

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Poster No.	Student		Faculty Mentor(s)	Page No.	House No.	Senate No.
11	**Buckley**	Tori	Rajalingam Dakshinamurthy	23	23	9
30	**Calvo**	Angelia	Barbara Bush	34	20	32
16	**Chavda**	Fenil	Rajalingam Dakshinamurthy	27	8	3
18	**Clark**	Ashlan	Gregory Goodrich	28	50	14
21	**Cliburn**	John	Lan Nguyen	29	18	5
25	**Correll**	Amy	Dana Burr Bradley	31	85	15
30	**Day**	Maggie	Barbara Bush	34	20	32
33	**Deshpande**	Ajit	Shivendra Sahi & Sneha Krishnamurthy	36	59	26
34	**Dinga**	Samantha	Cara H. Cashon	36	71	26
49	**Gover**	Caitlin	Gregory Ellis-Griffith & Aki Michimi	43	20	32
96	**Hagan**	Carlet	Brad Stinnett & Fred Gibson	71	21	32
55	**Hamilton**	William R.	Rajalingam Dakshinamurthy	46	9	3
79	**Mahmood**	Suhaib	Kevin Williams	61	59	26
96	**Manny**	Gabrielle	Brad Stinnett & Fred Gibson	71	21	32
92	**Payne**	Jason	Rajalingam Dakshinamurthy	68	18	5
96	**Ray**	Keisha	Brad Stinnett & Fred Gibson	71	20	32
97	**Rodgers**	Hannah	Rajalingam Dakshinamurthy & Rammohan Paripelly	71	60	11
107	**Spraggs**	Mary	Steven Gibson	77	54	22
115	**VanMeter**	Connor	Rodney A. King	82	45	22

Notes:

1. Drew Feldhaus Adams

Murray State University
Mentor: Jessica Naber

The Role of the Nurse Clinician in International Aid

The responsibilities of the nurse as a clinician expanded immensely over the past 20 years. Modern nurses regularly perform duties once thought solely to be in the realm of the physician. The ability to anesthetize patients, suture wounds, oversee clinics, and prescribe medications have been commonplace for the advanced practice nurse. This increase in scope of practice has allowed nurses to serve in ever-expanding capacities in the hospital setting and beyond. While United States-based nurses have served in international aid organizations, the expanding territory of their clinical space presented a unique opportunity: As clinicians, advanced practice nurses can assume roles in aid organizations (such as Doctors Without Borders, the Red Cross/Red Crescent) that were formerly reserved for physicians. Utilizing nurses means accessing a much larger pool of healthcare professionals and adept clinicians that may represent a significant cost savings to the budget-minded nonprofits. Cost savings in such groups would translate to additional care given to people who are desperately in need. Many studies exist that explore the expanding role of the nurse; however, studies that explore the benefits of that role in international aid remain sparse. For this research, completed using information from Doctors Without Borders, recommendations have been made regarding the economic, health, and social benefits of engaging the full clinical capacity of the modern nurse in administration of health care around the world.

2. Priyanka Barve

University of Louisville
Mentor: Craig McClain

Pathogenic Mechanisms in HIV Treatment Associated Hepatotoxicity: Role of Phosphodiesterase-4 and Endoplasmic Reticulum Stress

Highly Active Antiretroviral Therapy (HAART) has led to major increases in the life expectancy of HIV patients; however, there are significant side effects including lipodystrophy and hepatotoxicity. HIV protease inhibitors (HIV-PIs) are the major components of HAART and have been successfully used in the treatment of HIV-1 infection. The present study examined the potential mechanisms underlying HIV-PI induced liver toxicity, with a particular emphasis on endoplasmic reticulum (ER) stress and the pathogenic role of phosphodiesterase 4 (PDE4) family of enzymes. The data obtained from these studies demonstrated that the clinically relevant combinatorial treatment of HIV-PIs (Ritonavir+Lopinavir) led to a significant loss of hepatocyte survival. Notably, inhibition of PDE4 by rolipram markedly attenuated hepatotocyte cell death. The data also demonstrate that HIV-PIs triggered ER stress with activation of transcription factors ATF-3 and ATF-4, and the pro-apoptotic protein CHOP. Moreover, exposure to HIV-PIs up-regulated the hepatocyte death-inducing ligand, FasL. These effects were markedly decreased by PDE4 inhibition, indicating its pathogenic role. Overall, these studies demonstrated the critical role of PDE4 enzymes in the development of HIV-PI induced ER stress and hepatocyte apoptosis, and consequent liver injury. Notably, these studies also suggest that the HIV-PI induced pathogenic expression of PDE4 is a relevant therapeutic target and PDE4 inhibitors may provide significant treatment options in HIV patients.

3. Savannah Bell, Kayla Stringfield, & Victoria Darling

Murray State University
Mentor: Claire Fuller

The Effect of Temperature and Fungal Resistance on Termites,* Nasutitermes acajutlae*: Influences of Temperature and Resistance to a Pathogenic Fungus on Colony Growth and Individual Survival

STUDY 1 (Bell): *The Relationship Between Ambient Temperature and Survival of the Tropical Termite* Nasutitermes acajutlae

Due to climate change, the effect of temperatures on the interactions between organisms and their pathogens has been of great interest. While climate change has not been as pronounced in tropical regions as in temperate and arctic zones, it has no less effect as tropical species have narrow physiological tolerances. We investigated the relationship between ambient temperature and survival of the tropical termite *Nasutitermes acajutlae* on the island of St. John in the U.S. Virgin Islands. Our previous research showed that termites living in warmer, dryer areas had stronger immune systems and were less susceptible to fungal pathogens. However, we also found high levels of variation among termite colonies. The current study replicates these findings to determine the extent of colony-level variation. We collected termites from nests within warm and cool environments and exposed them to four levels (control, 103, 105, 107 spores per ml) of the known insect pathogen *Metharizium anisopliae*. Once the termites were exposed the replicates were incubated at two different temperatures and checked twice daily to determine the number of surviving termites. The data were analyzed using survival analysis. As expected, the termites from nests in warm, dry habitats had higher survival rates. However, the influence of individual colony was more important than the influence of climate. We hypothesize that these colony-level differences are genetically determined and predict that colonies with similar levels of survival will be genetically similar. We are developing genetic techniques to test this prediction.

STUDY 2 (Stringfield & Darling): *Mathematically Modeling Tropical Termite Nest Growth Rate in Relation to External Temperature Variations*

Termites act as *ecosystem engineers*, capable of maintaining the flow of resources in an ecosystem by recycling dead organic materials. This characteristic may be especially important on St. John, USVI, where the arboreal nesting termite, *Nasutitermes acajutlae* is the major invertebrate degrader. Our goal is to investigate nest growth rate patterns of these termites in five tropical habitat types (dry forest, mangroves, moist forest, sparse vegetation, and woodlands) on St. John via mathematical modeling. We have collected data on >200 *N. acajutlae* nests from these habitats spanning the years 1998-2013. Using nest volume data, we incorporated external temperature of both the mangrove and dry habitats into a logistic model describing nest growth rate annually in each habitat. We modeled the external temperature as being directly proportional to growth rate. The internal temperature of nests tends to be warmer, and therefore a warmer temperature seemed to be beneficial for growth. Our hypothesis is that each habitat will have its own pattern of growth rate in relationship to temperature. Modeling the dry and mangrove habitats in St. John showed temperature did not have a profound effect on growth rates.

4. Quintin Bergman

Murray State University
Mentors: Howard Whiteman & Scot Peterson

Impacts of Habitat Degradation and Interspecific Interactions on Riparian Animal Populations

Habitat degradation is a known driver of global biodiversity losses and is common in streams of the western U.S. Understanding the impacts of such degradation on biodiversity is an important goal, as stream and riparian zones are often keystone resources and provide important corridors between habitats. Kimball Creek, a 3rd-order stream located near De Beque Colorado at the High Lonesome Ranch, has been degraded by decades of poor management, including overgrazing by cattle and eradication of beaver. The upper reaches are less degraded than those further downstream. In an effort to provide baseline biodiversity data to evaluate a planned restoration of the stream, and to test the hypothesis that degradation (location and cattle presence) affects large mammal populations, we monitored camera traps during 2011-13. Cameras were placed along the stream corridor based on obvious animal crossings and natural landscape funnels. Large mammals, including native ungulates (mule deer and elk), carnivores (bear, cougar, coyote), and cattle, were captured in ~15% of >40,000 digital photographs. We are currently correlating the richness, relative abundance, and time budgets of these species with the presence of predators, cattle, and location (= degradation). Our preliminary observations suggest that cattle usage of the riparian zone negatively affects the diversity, abundance, and activity of native large mammals, and cattle presence is a more important factor affecting native large mammal biodiversity than stream degradation per se. This implies that successful restoration of stream environments may require careful management of historically and economically important ranching operations.

5. Shelby Brickey & Noah Polk

Morehead State University
Mentor: Johnathan Nelson

The Influence of Implicit Theories of Personality on Behavior in Organizational Settings

Individuals hold implicit beliefs regarding achievement and intelligence, reflecting the degree to which they believe people can change. There are two types of implicit theories; an entity (fixed) view, where individuals believe people can't change, and the opposing incremental (alterable) view, where individuals believe people can change. For example, someone with an entity perspective views intelligence as fixed; intelligence for these individuals is reflected by low effort successes. An incremental theorist perceives intelligence as more alterable; incrementalists focus on challenges to develop their intelligence. Implicit beliefs have a powerful influence on the decisions and actions of individuals. For example, managers with an entity view are more likely to judge employees from a first impression, and less likely to alter that impression based on subsequent behavior than managers with an incremental view. Additionally, entity holders are more comfortable doing tasks where they will succeed instead of seeking opportunities where they may fail, out of a fear of looking foolish. This contributes to performance apprehension and a reluctance to try challenging tasks, hindering performance. As indicated by these examples, there are profound consequences for subscribing to either behavior theory. Our research has identified consequences of these beliefs at individual, group, and organizational levels. We have conducted an in-depth literature review on implicit theories of personality and identified the consequences of these beliefs in organizational contexts. We present organizational implications based on our synthesis and integration of this literature, to facilitate more effective communication, reduce stereotypes, and increase willingness to help others.

6. Sharon Brooke

Morehead State University
Mentors: Jen O'Keefe & Michelle Johnston

Examining Mcrobial Diversity in a Paleocene Wilcox Group Coal from Texas

The distribution and ecological niches of fungi found in coals are poorly understood. Organic petrography and palynology are used in tandem to study fungi preserved in a Wilcox Group Coal and associated sediments from Texas. Fungal remains are a common petrographic component of the coals (up to 8.5%), and fungal palynomorphs are very common and diverse components of the palynological spectrum, ranging from 6–71% of the total. Saprophytic, parasitic, and mutualistic forms are all present, as are abundant hyphae. Samples are dominated by hyphae, Monoporisporites, Diporisporites, with some containing abundant Nigraspora. When the dominant taxa are excluded from statistical analyses, four groupings can be made: 1) samples containing high-diversity, low-abundance assemblages, including Fusiformisporites; 2) very low diversity, low-abundance assemblages; 3) assemblages that are enriched in Dicellaesporites; and 4) assemblages that contain Fusiformisporites and Lacrimasporites. The Fusiformisporites contained in this coal are morphologically identical to *Atrotorquata lineata*, known to occur only as a saprophyte on Juncus stands, and Lacrimasporites forms are indistinguishable from an unnamed associate of *A. lineata*. Groups 1 and 4, which occur at the top of each seam indicate deposition in a salt-marsh environment. Petrographically, groups 1 and 4 are also the most densinite enriched, pointing toward significant aerial exposure of the peat prior to incorporation in the mire. Thus, there is strong evidence for increased peat decomposition up-section within the coals coupled with a transition from peats formed in freshwater swamp environments to those formed in marshes that may have been impacted by brackish waters.

7. Fawn Brooks

University of Louisville
Mentor: C. Andrew Day

Analyzing the Mixed Flood Hydroclimatology of the Red River Gorge, Kentucky

Flooding in the Midwest has been responsible for billions of dollars in damages as well as hundreds of deaths. The danger of flooding is magnified on rivers that have no controls of any kind to regulate discharge during flooding events. This study uses a detailed hydroclimatic analysis to categorize floods of the Red River at Clay City, Kentucky using homogenous subgroups based on the atmospheric mechanism which are then plotted on histograms. The results find that the majority of floods in Clay City occur between January and March due to frontal boundary systems. The shape of the distribution suggests that the subgroups created are mostly homogenous with the individual climate mechanisms directly linked to the amount of discharge.

8. Christian Brown & Adam Kiser

Murray State University
Mentors: Howard Whiteman & Christopher Mecklin

An Analysis of Tiger Salamander (*Ambystoma tigrinum nebulosum*) Survival Based on Body Size and Other Covariates

Polyphenisms occur when populations exhibit alternative, discrete phenotypes in response to environmental variation, and are examples of phenotypic plasticity. This phenomenon is thought to be adaptive because it allows quicker response to environmental shifts than those that are genetically fixed. However, few studies have quantified the fitness consequences of polyphenisms. *Ambystoma tigrinum nebulosum* (Arizona Tiger salamander) inhabits montane ecosystems throughout Colorado, Utah, Arizona, and New Mexico. This species is polyphenic, in that genotypic variation coupled with environmental stimuli trigger two distinguishable adult forms (metamorphic and paedomorphic), which is termed *facultative paedomorphosis*. Using a capture-recapture database started in 1988, we analyzed survivorship of the Mexican Cut population to test hypotheses about how survival, one component of fitness, varies within this population. MARK was used to estimate survivorship of the salamanders based on parameters such as sex, morph, and size. To incorporate size, we used the ratio of mass to snout-vent length defined as body condition, which was categorized into four size classes. We found that the medium size class had lower survival than other size classes, irrespective of morph, and that neither morph nor sex appears to have a major impact on survival.

9. James Brown & Zach Poynter

Northern Kentucky University
Mentor: Kristine Hopfensperger

Can Constructed Wetlands Improve Stormwater Runoff Quality?

Waterways in the U.S. transport nutrient pollutants into our estuaries creating large annual hypoxic zones. Constructed wetlands can act as natural filters by reducing nutrient levels carried by stormwater. The purpose of this research project was to examine the function of a constructed wetland by calculating its nutrient flux during storm events. The constructed wetland studied was located at an elementary school in Boone County, KY. Water samples were collected at wetland inlet and outlet locations during five storm events from April through June of 2013. Water quality analyses including total dissolved solids, total suspended solids, phosphorus, ammonium, and nitrate concentrations were performed. Levelogger equipment was installed to provide information on the volume of water in the wetland. A flow meter was added to capture outflowing velocity data. Overall, we found improved runoff water quality from the constructed wetland. Specifically, nitrate, ammonium, and phosphorus levels all showed a decrease in concentration at the outlet compared to the inlet during storm events. In addition, we found that while the wetland was designed to hold water for 48 hours, our volume data showed that the wetland is actually holding water for 72 hours. Holding the water for a longer period of time allows further cycling to occur during larger storm events. The nutrient data combined with the volume and velocity data will be used to calculate total nutrient flux in the stormwater wetland. Our results will be used by the U.S. EPA to help guide green infrastructure and promote stormwater wetland construction in other urban areas around the U.S.

10. Josephine Brown

Northern Kentucky University
Mentor: Christine Perdan Curran

Spontaneous Alternation Behavior of AhrdCyp1a2(-/-) and AhrbCyp1a2(-/-) and AhrbCyp1a2(+/+) Mice Exposed to Polychlorinated Biphenyls During Gestation and Lactation

Cytochrome P450 1A2 (CYP1A2) has been shown to play an important role in metabolizing some toxicants including polychlorinated biphenyls (PCBs). CYP1A2 upregulation is dependent on the relative binding affinity of the aryl hydrocarbon receptor (AHR) to a ligand, in our case coplanar PCBs. Previous work in our lab found learning and memory deficits in PCB-exposed Cyp1a2(-/-) mice compared to Cyp1a2(+/+) wild type mice. Both poor-affinity AhrdCyp1a2(-/-)and high-affinity Ahrb1Cyp1a2(-/-) mice had significant deficits in novel object recognition and Morris water maze tests compared with Ahrb1Cyp1a2(+/+) wild type mice. For this project, we modified our dosing protocol to provide an environmentally relevant mixture of PCBs in corn oil-soaked food daily to dams from gestational day 0 (GD0) to postnatal day 25 (PND 25). We tested spatial learning and working memory in the offspring at PND60 using the Y-maze test of spontaneous alternation. We found no significant differences in latency to leave the original arm, total number of arms entered, or percent alternation based on genotype or treatment ($P>0.05$). This suggests that the Y-maze is not as sensitive as the Morris water maze in detecting deficits in spatial learning and memory following developmental PCB exposure.

11. Tori Buckley

Western Kentucky University
Mentor: Rajalingam Dakshinamurthy

Molecular Level Interaction of an Aminoglycoside Antibiotic with Human Fibroblast Growth Factor 1

Fibroblast growth factors (FGF) work as modulators of different cell activities like mitosis, differentiation, and cell survival. Within the FGF family human FGF-1 is the potent angiogenic factor, involved in the formation of new blood vessels in tissues. Human FGF-1 binds with heparin and forms a binary complex, which further binds to fibroblast growth factor receptors (FGFRs), this binding triggers downstream events involving different cell signaling pathways and ultimately leads to cell proliferation. Human FGF-1 is one of the targets in cancer inhibition and obesity due to its involvement in blood vessel formation in cancerous regions and adipose tissues. Results of recent studies have indicated that there is a decrease in cell proliferation capacity of patients who have been on antibiotics for longer periods. It could be due to interaction of antibiotics with proteins involved in cell proliferation like FGFs. Recently anticancer activity of an antibiotic called Lidamycin, which is an aminoglycoside, was noticed in cancer cell lines. Antibiotics like aminoglycosides have resemblance in their molecular structure with heparin, hence the amino glycosides can compete with the heparin in order to bind with the hFGF-1and these interactions may affect the normal cell proliferation process. On the basis of above experimental studies and associated hypothesis, we designed a project to study the interaction between hFGF-1 and kanamycin, which is an aminoglycoside antibiotic.

12. Lindsay Burton

Morehead State University
Mentor: Joy Gritton

Renaissance Gold Gilding

Gold leaf was once used extensively in paintings by master artists and was highly prized to the point of often being reserved for religious works. Today it has mostly been relegated to decorative uses, framing, and in the creation of icons. Because of its rarity in the fine art world, the skilled application of this technique could be an invaluable addition to an artist's repertoire. The purpose of this project was to study the various methods of gold gilding that have been used from antiquity to modern times and to gain an understanding of the techniques and materials used. The final goal was to use this research in creating an artwork that makes extensive use of gold gilding and to document the process, necessary experimentation, and the results thereof. The methodology of this project centered around using both modern and Renaissance texts to not only successfully lay gold leaf, but to build and prepare the rigid supports needed for this type of technique. Recipes for the making of size, gesso, and bole that dated back to the Renaissance were studied and carefully carried out. The result was a beautiful technique that made the artwork it was applied to radiant. In this era of technology, the art market is heavily flooded and competition can be fierce. The study of gold gilding and its use not only sets an artist's work apart as unique, it also preserves a process that has changed very little for several centuries.

13. Sean T. Butterbaugh

University of Louisville
Mentor: James L. Wittliff

A Microgenomic Approach to Identify Clinically Relevant Gene Signatures that Discriminate Between Invasive Lobular and Ductal Breast Carcinomas

In an effort to distinguish between the two most common invasive breast carcinomas, lobular (ILC) and ductal (IDC), we searched for a genomic marker that discriminates these histologic types when conventional tests are conflicting. A specific genomic marker would be useful to distinguish IDC from ILC, due to the varied responses of luminal A-like-IDC and ILC to the aromatase inhibitor letrozole in post-menopausal women [Metzger et al. Cancer Res 2012]. Although CGH analysis shows that ILC is closely related to low grade IDC (luminal A-like) and genetically unrelated to intermediate and high grade IDC [Pathol Res Pract 2005; 201:713], ILC response to letrozole is more like luminal-B-like IDC (intermediate or high grade). To identify candidate genes, microarray analysis of expression levels were evaluated in laser capture microdissected carcinoma cells of biopsies that were positive for estrogen (ER) and progesterone receptors (PR). In low grade IDC and ILC, 299 probes were differentially expressed ($p<0.01$), and 99 of these probes were not differentially expressed ($p>0.01$) between high grade IDC and ILC. These 99 genes serve as candidates for a genomic marker differentiating these two histologic types. Microarray results showed varying expression levels of BRWD1, CAPSL, CHRNA, CMTM7, CRMP1, GSKIP, HBEGF, PAPPA, and LRBA among the different cancer pathologies. By using quantitative polymerase chain reaction (qPCR), we determined expression levels relative to Actin, beta for the gene candidates in order to validate those from the microarray array results. qPCR analyses are used to validate and refine the gene subset distinguishing ILC from low grade IDC. Our novel approach is revealing microgenomic features that discriminate these carcinomas which exhibit different clinical behaviors. Supported in part by a grant from NIH/NCI R25-CA134283 and Phi Beta Psi Charity Trust.

14. Brittany Caldwell

Bluegrass Community & Technical College
Mentor: Norman Strobel

Interactions of Wheat Seedlings with Bis-phenol A in Heat-sensitive Cash Register Receipt Paper: Detection, Toxicity, and Detoxification

Bis-phenol A (BPA) acts as an estrogen mimic at low doses and is toxic at higher doses. The question of interest was the possible harmful effects of BPA in discarded paper receipts on organisms in the environment. Wheat seeds were germinated in contact with receipt papers from several different sources. With one type of paper, seed coats became darkened and a green-colored material accumulated in the vicinity of the germinating seeds within 24 hours. Continued incubation of seeds on the paper for 7 days (chronic exposure) resulted in toxicity symptoms that included stunted roots with black-brown discoloration at their tips and a reduction in total biomass production. Prior incubation of the toxic receipt paper with an extract prepared from germinating wheat seeds led to accumulation of the green material and markedly reduced the toxic effects. The hypothesis was that an enzyme present in the wheat seed coat (likely a phenol oxidase) leads to oxidation of BPA to a free radical, a portion of which is removed from the system and thus detoxified when it reacts with amino acids liberated from germinating seeds to form the green-colored products. Results suggest potential use of wheat seeds for convenient detection and detoxification of BPA in contaminated food and drinking water.

15. Anthony Carney

University of Kentucky
Mentors: Frances Hardin-Fanning & Yevgeniya Gokun

Food Cost May Be An Incentive to Healthy Eating in Kentucky Counties

Does the cost of healthy foods put Kentuckians at higher risk of heart disease? Eating at least five daily servings of fresh fruits and vegetables while limiting fat from red and processed meat may help reduce the risk of heart disease. However, the choices that people make when grocery shopping are often based on price rather than how much the food protects against heart disease. We compared the cost of processed meats with cost of fresh fruits and vegetables in Kentucky counties, using the Kentucky Healthy County Rankings as our guide. The counties were divided into three groups based on health ranking. Five counties were chosen randomly from each group for a total of 15 counties. The prices of 14 processed meats and 17 fresh fruits and vegetables were assessed in grocery stores in all 15 counties. We discovered that fresh fruits and vegetables had a lower cost of $0.61 per serving when compared to processed meats. This lower cost of fresh produce was the same across all counties. Fresh fruits and vegetables, which may help lower the risk of heart disease, were less expensive than processed meat products, which can increase the risk of heart disease. Further research is needed to find ways to help Kentuckians recognize and prepare affordable, risk-reducing foods available in their local grocery stores.

16. Fenil Chavda

Western Kentucky University
Mentor: Rajalingam Dakshinamurthy

Green Synthesis, Characterization of Sugar Coated Gold Nanoparticles for Catalytic Applications

Gold nanoparticles (GNPs) are of interest because of their wide applications in the biomedical and pharmaceutical fields, which is due to their unique physico-chemical properties when they are reduced to their nanoscale size range. We developed a novel single step biofriendly process for synthesis of fructose (monosaccharide), sucrose (disaccharide) and raffinose (trisaccharide) capped GNPs, wherein sugar was directly capped onto gold without the use of any secondary capping/stabilizing agent. Our study was mainly focused on the effect of various lengths of sugars in formation and catalytic reduction activity of sugar capped GNPs. Characterization of synthesized GNPs was done using various analytical techniques like transmission electron microscopy (TEM), SEM-EDS, FTIR, UV-Vis spectroscopy. P-nitrophenol assay was used to evaluate the catalytic reduction activity of various sugar capped GNPs at different temperatures using UV-Vis spectrometer. Using the spectroscopic data, the rate constant for three sugar capped GNPs was determined followed by its activation energy using different equations. From the kinetic data, the catalytic reduction activity for three sugars was in the descending order of fructose, sucrose and raffinose GNPs respectively. This difference in the catalytic activity is believed to be due to the size of ligand on gold surface that greatly influences the surface/volume ratio.

17. Rachael Chlebowy

University of Louisville
Mentor: Barbara Polivka

Nurses' Perceptions of Family-Witnessed Resuscitation

Advantages and disadvantages of family presence during resuscitation (FPDR) continues to be debated among nurses and healthcare providers (HCP). Few hospitals have a written protocol for when this type of event occurs. It is important to understand and identify the risks and benefits of FPDR along with the HCP perception of FPDR. To determine: (1) nurses' perceptions of self-confidence, risks, and benefits concerning FPDR, and (2) explore differences by: years of experience, number of resuscitations attended, and number of times family members invited to patient's room during a resuscitation. Design: Cross-sectional survey of registered nurses (RN) at a metropolitan hospital. Instrument: Participants completed two valid and reliable scales: Family Presence Risk-Benefit Scale (FPR-BS) and Family Presence Self-Confidence Scale (FPS-CS) as well as demographic data. Participants. The majority of the 154 survey participants were Caucasian female nurses. More than half were between the ages of 25 and 55 years old (73.5%) and had more than six years' of experience (68%) as an RN. Work units of the participants varied, but the most prevalent unit was transitional care unit (27%). Over three-fourths were trained in Advanced Cardiac Life Support and had participated in a mock code. Most (54.5%) had been involved in over 10 resuscitations but only 38% had ever invited a family member to be present during a resuscitation. Analysis: Data analysis is ongoing. Descriptive statistics will be used to describe the FPR-BS and the FPR-CS results. Differences between groups will be assessed using t-tests and ANOVA.

18. Ashlan Clark

Western Kentucky University
Mentor: Gregory Goodrich

Risks of Nocturnal Tornadoes in the Mid-South

Nocturnal tornadoes are those that occur between the hours of sunset and sunrise. Nocturnal tornadoes have been shown to have an increased fatality rate since nocturnal tornadoes are difficult to spot and often occur when the victims are sleeping. The vulnerability to nocturnal tornadoes was found to be greatest in the Mid-South region of the United States. Tennessee and Kentucky ranked 1st and 3rd in the United States in the percentage of all tornadoes that are nocturnal.

19. Joshua Clark, Haley Clark, Joel Kirschbaum, & Taylor L. Short

Murray State University
Mentor: Nancy Armstrong

Evidence-based Nursing Practice: Promoting Best Practices Through Research

STUDY 1 (J. Clark & H. Clark): ***Nasogastric Tubes: "Auscul-wait"***

The placement of nasogastric tubes is common in many health care settings. This is a technical procedure that takes skill and attention to be performed safely and effectively. Many times health care professionals perform a less reliable and unsafe procedure to check for correct placement at the bedside. This poster will outline what research has shown to be the best clinical practice for verifying nasogastric tube placement at the bedside. Testing the pH of aspirated content has been shown to be far more effective and safer than the commonly practiced method of inserting 5mL of air into an unknown space and listening for a "whoosh" sound over the stomach. With this information it is critical that all facilities update the policy/procedure to reflect the current findings in research. This information will be displayed and utilized to inform healthcare providers of this change in practice. In conclusion, this project was done to provider safer and more effective care to every patient.

STUDY 2 (Kirschbaum & Short): ***A Policy Pertaining to Infection Control of Needless Intravenous Catheter Hubs: "Scrub the Hub"***

Needleless intravenous systems are an essential tool when providing care to patients. The use of these systems has been associated with an increase in catheter-related bloodstream infections related to peripheral and central intravenous lines. Research has been conducted that examines different processes, different chemicals, and different devices to achieve catheter hub disinfection. Utilizing the information provided in this research allows the implementation of evidence-based practice. Through evidence-based practice, best nursing practices can be established to ensure safe and quality patient care. Use of either 70% isopropyl alcohol or chlorhexidine for a minimum of 15 seconds can drastically reduce the number of catheter-related bloodstream infections.

20. Amy Clausen & Olivia Fulton

Morehead State University
Mentor: Sarah Hawkins-Lear

Using Constant Time Delay to Teach Discrete Skills to Individuals with Significant Disabilities

Amy Clausen and Olivia Fulton, under the advisement of Dr. Sarah Hawkins-Lear from the department of Special Education, conducted a research study to examine the effects of Constant Time Delay when teaching discrete target skills to students with significant disabilities. Constant Time Delay is an errorless teaching strategy that is widely used in the field of Special Education. Within the research study, there were two subjects (Subjects A and B) that participated. Subject A was a sixth grade male with Autism learning to identify health service professionals, and Subject B was a first grade male with intellectual disabilities learning basic sight words. Baseline, intervention, maintenance, and generalization date were collected throughout the research study. The results indicated that when Constant Time Delay is implemented to teach target skills, students make progress above baseline data and can maintain and generalize the skills at high rates. This study concludes that when systematic instruction is implemented to teach target skills, students achieve and maintain the skills with high accuracy and then generalize across people, environments, and materials.

21. John Cliburn

Western Kentucky University
Mentor: Lan Nguyen

Applications of the Banach Fixed Point Theorem

We investigated the application of the Banach fixed-point theorem, especially as it applied to initial value problems in differential equations. Many partial differential equations (PDE's) model biological growth and could be reduced to ordinary differential equations (ODE's) with time delay on a real Banach space. Other PDE's are abstract and non-homogeneous. For any contraction operator on a Banach space, the Banach fixed-point theorem could be used to prove the existence and uniqueness of a solution to these equations.

22. Chelise Lynn Conn

Morehead State University
Mentor: Kristina DuRocher

The Eugenics Movement in America, 1920-1980

The eugenics movement in America affected women of various backgrounds during the 1920s-1980s. Through the use of compulsory sterilization women became victims of the inherent violence of the movement that sought to "purify" society by sterilizing "unfit" women. African American women, women of mixed race, immigrants, and poor and working class white women who conceived too many children became the target of these sterilizations. Additionally, many Americans still held on to the theories of Social Darwinism and the belief that mental and physical defectiveness was a genetic disorder. Therefore, the feeble-minded, the insane, the blind, the deaf, and criminals were included in this group. By 1932, twenty-eight states had adopted the practice of compulsory sterilization of the mentally impaired. By the 1970s, sixty thousand Americans had been subjected to forced sterilization. As women's societal roles began to change so too did the eugenics movement. The movement offers a reflection of how social attitudes about women of different class, race, and educational backgrounds evolved throughout time and place and how the violence of the movement physically and emotionally affected women.

23. Jennifer Connelly & Elizabeth Corin Sekeye Carver

University of Louisville
Mentor: Valerie McCarthy

Transcendence in Older Adults: A Review of Recent Literature

Transcendence is an inherent aspect of maturity that changes one's perspective on self, others, and the meaning of life. Literature published since 2008 was reviewed to update our understanding of the concept of transcendence. CINAHL, MedLine, AgeLine, and PsycInfo databases were searched for the terms: transcendence, self-transcendence, and gerotranscendence. Inclusion criteria were: explicit definition among older adults, basis in theory, or late life developmental process. Twenty-four articles were included. Content analysis was performed by examining: 1) search terms; 2) seminal vs. contemporary theory, and 3) theory vs. empirical research. Literature was coded for broad categories and major themes were identified. Five theoretical viewpoints on transcendence were identified: three seminal and two contemporary. Only the contemporary theories of self-transcendence and gerotranscendence were testable and had been used as theoretical bases for multiple studies. Eighteen articles reported empirical research. Major themes identified were: adaptation; creativity; mindfulness (contemplation/introspection); meaning in life; purpose in life; relationships; spirituality; and well-being. The themes identified in this review of the literature were largely congruent with recently developed theory that proposes five domains of self-transcendence. This review suggests an additional domain – adaptation – may play a part in transcendence, and two domains – introspection and contemplation – might be collapsed into a single domain titled mindfulness. Transcendence provides a theoretical basis for nursing research to increase quality of life among older adults. Interventional studies are needed to examine the potential role of transcendence in developing evidence-based nursing practices.

24. Cagney Coomer, Tiffany Richard, Sandhya Paudel, & Davetta Ochsner

Bluegrass Community & Technical College
Mentor: Keith D. Allen

Using a Next-generation Sequencing Platform for the Elucidation of the Gel-like Substance from* Aloe barbadensis *(Aloe vera)

Extracts from *Aloe barbadensis*, a species of succulent plant, are marketed as cosmetics and alternative medicine. There has been a commercial increase in the production of Aloe vera but its propagation rate is slow; the plant produces only 3-4 offshoots per year. An earlier study identified plant tissue that gives rise to totipotent cells under specific hormone concentrations of cytokine and auxin. The present study is a continuation of effects of combinations of hormones on the growth rate of shoots, callus, and root tissue of Aloe vera. Currently a long-term study is being carried out, with the purpose of identifying the genetic pathway required to synthesize the large amount of gel-like substance in leaves.

25. Amy Correll

Western Kentucky University
Mentor: Dana Burr Bradley

International Health and Aging: Observation and Analysis of Elderly Care in Migori Kenya

While generally respected in Kenya, Elders are not primary recipients of health care services in later life. This research documented the need for geriatric specific care and the availability of resources for seniors in Migori, Kenya. Lastly, a set of 5 recommendations was developed to guide the delivery of health services provided to older residents in this small village of 6000. After a literature review and analysis of existing demographic data, a needs assessment instrument was developed to guide gathering of relevant data from Migori. Using a research protocol approved through the WKU IRB Committee, the Primary Investigator interviewed 25 elders and 3 key informants in August 2013 in Migori Kenya. She performed referencing vital statistics checks (weight, blood pressure and nutritional assessment) and in depth interviews with the assistance of a translator. Descriptive statistics were used to analyze the vital and nutrition profiles and narrative analysis was used to determine primary and secondary themes in respondent's health lives. Because of the high prevalence of HIV Aids, many elders have lost their own children and are the primary caregivers for their grandchildren. Older Kenyan's are chronically underweight, malnourished and at risk for many chronic diseases. This group of elders was no exception to norms. Issues of food availability and the constant caregiving strain meant that many elders face stark choices: feed their grandchildren or themselves. Personal health concerns were secondary and interviewees reported widespread discouragement from using what little formal health services existed.

26. Chesika Crump & Kaitlyn Whitewood

Murray State University
Mentor: Terry Derting

Effects of Pet Therapy on the Stress Level of Therapy Dogs and First-Year Female Undergraduates

STUDY 1 (Crump & Whitewood): ***The Experimental Analysis of the Effects of Pet Therapy on the Blood Pressure and Stress Levels of First-year College Females***

Students experience significant stress during their undergraduate studies. Universities provide counseling and activities to help students alleviate stress but more cost-effective approaches are needed. Recent research indicated that humans can gain stress relief through pet therapy. My objective was to determine if pet therapy had an effect on stress levels of first-year female undergraduates. My null hypothesis was that pet therapy did not affect first-year females' physiological and perceived stress levels. I recruited 27 first-year female students and nine certified pet therapy dogs. Baseline measurements of blood pressure (BP), heart rate, respiration rate, salivary cortisol level, and perceived stress and arousal level were made. Participants were then randomly selected to participate in the dog group or the no-dog control group for 15 min. Afterwards, a second set of measurements was taken, and then participants switched groups for another 15 min, followed by a final set of measurements. There were no significant effects of pet therapy on diastolic BP, heart rate, and respiration rate. Arousal of participants was significantly higher after pet therapy, as indicated by higher systolic BP, cortisol, and perceived arousal measurements compared with measurements after the control period. Concurrently, perceived stress level was reduced. My results paralleled changes that occur during exercise where physiological stress increases and psychological stress decreases. My results indicated that pet therapy may be useful as a cost-effective method of helping students reduce their psychological stress level. Pet therapy sessions of longer duration are needed to further study its potential as a means of reducing physiological stress in college students.

STUDY 2 (Whitewood): ***Effects of Pet Therapy on the Stress Level of Therapy Dogs***

There are numerous studies that show positive effects of animal-assisted therapy (AAT) on humans, although little is known about the effects that AAT has on therapy animals themselves. The objective of my research was to determine the effect of human interactions with therapy dogs on the dogs' stress level. My null hypothesis was that AAT has no effect on the stress level of therapy dogs. In order to accurately measure the stress that a therapy dog may experience while doing a therapy session, I measured the level of salivary cortisol present before and after nine certified dogs were engaged in a 15-minute therapy session with 2-4 persons, as well as their heart rate and respiration rate. None of the physiological measures of the dogs before they engaged in a therapy session differed significantly from the same measures made after the therapy session. From these results, we concluded that therapy dogs did not experience a change in stress. While interactions with humans had no adverse effects on the stress level of the dogs; the dogs also did not exhibit measurable benefits of the interactions. The results suggested that beneficial effects of AAT on human stress are not reciprocated to the therapy dogs involved. Alternatively, because therapy dogs are trained to interact with humans they may have low levels of stress that are maintained during therapy sessions. Further research is needed to determine the effects of AAT on dogs engaged in longer therapy sessions (e.g., 1 hour) that more closely match the actual work periods experienced by most therapy dogs.

27. Michael Cundiff

Morehead State University
Mentor: Joy Gritton

Individuality and the Military Construct: Nose Art in a World of Order

Military fighter planes are not thought of as an art form, yet from the very beginning of aeronautic flight planes have been customized to showcase the personality of the pilot. During World War II, the "Golden Age" of nose art, the United States, Germany and Britain allowed their pilots to embellish their pieces of military equipment with images expressing their personal tastes, from pin-up girls to cartoon characters. One common theory was that it boosted moral at a time of high pilot casualty rates. Investigation shows that not every branch of the military permitted such disregard for regulations, however. For example, though Navy casualties were on par with those in the European theater, they did not allow nose art. This raises questions as to why only certain branches of the military have allowed such art forms, and how the images have adjusted to changes in society, the military, and technology over time (such as the move to gender neutral imagery as women took on a more prominent role in the military). Creating ways to channel one's creativity and express individuality within the confines of the military structure could have important contemporary applications, such as decreasing the shockingly high suicide rate among enlisted men and women, as well as helping those suffering from disorders such as PTSD.

28. Lindsay Dame & Eden Fisher

Eastern Kentucky University
Mentors: Michelle Gerken & Jon McChesney

SWOT Analysis Applied to Therapeutic Recreation Services

This qualitative study utilized a panel of four recognized experts in the field of therapeutic recreation for the SWOT analysis. There are currently 54 million Americans living with a disability, 830,000 of those people are living in Kentucky. The 153,000 Kentuckians (4.0% of the population) have difficulties performing activities of daily living. The need for Therapeutic Recreation services is visibly needed, hence this qualitative study. The purpose of this research is to define and determine the strengths, weaknesses, opportunities and threats to the field of Therapeutic Recreation. Strengths include holistic benefits, national and state statistics, and the personal interviews on the benefits for therapeutic recreation. Weaknesses of Therapeutic Recreation are insurance reimbursement in Health Care Services and disconnect between academia and practitioners. Opportunities of therapeutic recreation include licensure for Kentucky, and help with the increased employment opportunities. Threats include the slow elimination of Therapeutic Recreation services in Kentucky.

29. Alessandra Daniel

Murray State University
Mentor: Lara K. Homsey

The Analysis of Microartifacts to Evaluate the Diet and Cooking Techniques of Paleoindian and Archaic Age Inhabitants of the Dust Cave Archaeological Site in Alabama

Dust Cave, an archaeological site in Alabama, dating to the Paleoindian and Archaic Age has excellent preservation conditions for features such as charcoal pits, fired clay surfaces, and hearths, utilized for cooking. For this reason researchers were able to study not only what types of foods the inhabitants of the site were eating, but their cooking techniques and the locations of food preparation within the site. During the excavation of the site, geoarchaeologists collected chemical and micromorphology samples from the features. These samples indicated the types of microartifacts (artifacts centimeters to millimeters in size) that latter researchers could expect to find. This microartifact analysis of the Dust Cave features was an attempt to provide quantitative data about the diet and cooking techniques of the inhabitants and promote microartifact analysis as a means of complementary data to better interpret archaeological sites. The 2-4 mm size grade of microartifacts from each feature was analyzed. Microartifacts were sorted by types such as charcoal, faunal remains (animal/ fish bones), snail shells, botanicals such as charred nutshells and hackberries, and stone flakes created by tool making. A count and weight for each microartifact category was recorded for each feature. It was found that the volumes of each microartifact type in a feature depended on the type of feature, the feature's chemical signature and the contents of its micromorphology samples. These results helped archaeologists better understand the food ways of Dust Cave inhabitants and contributed to the promotion of microartifact analysis.

30. Maggie Day & Angelia Calvo

Western Kentucky University
Mentor: Barbara Bush

Serving the Underserved

In order to determine the status of the availability of dental care to citizens of Kentucky and beyond and determine barriers to meeting the needs, a review of several data sets was initiated. Based on this review of data it was determined for example that approximately 1.7 million adults in Kentucky lack access to dental care. More than 100 million Americans don't go to the dentist because they can't afford it. Because of the severity of Americans' need for more access to oral health care, both locally and nationally, several potential solutions will be presented to alleviate some of the perceived barriers, such as volunteer events that could be held in order to provide dental care to anyone who is willing to come, mobile dental units and University facilities could provide free or reduced cost care to individuals and Public Health Registered Dental Hygienists and Advanced Dental Hygiene Practitioners could perform services without a dentist's supervision, thus providing services in remote or underserved areas.

31. Aida De La Fuente

Murray State University
Mentors: David Pizzo & Mary Tripp Reed

Europe in the Age of Austerity: An Analysis of the Causes and Effects of Austerity in Spain, France, and Britain

Spain, France, and Great Britain are, at this time, suffering from continued recession. In effect, austerity, round after round of budget cuts, and the slashing of social programs has become the primary focus of the European Union in order to resolve this devastating problem that has caused millions of people unemployed and without a home. By definition, austerity is the policy governments place on a country in order to reduce budget deficits during a time of economic turmoil. Austerity has become such a controversial topic, with political leaders having different attitudes towards it. Through travel abroad experiences, and interviews being conducted while abroad, I will be able to collect primary sources for this project. The interview purpose of this project is to acquire a different outlook on the topic rather than a mere academic point of view (i.e. historical, economic). Essentially, austerity has had a profound effect on contemporary Europeans and I seek to understand these changes qualitatively and subjectively in terms of how they are perceived. Ultimately, for my research I will propose a theory that describes how people experience, understand, and cope with austerity and economic hardship in the twenty-first century.

32. Haley Russell

Murray State University
Mentor: David Pizzo

The Woodhouse's Use of an Apothecary: The Ambiguous Mr. Perry

When reading Jane Austen's *Emma* (1815), scholars have tended to quickly fall in love with Mr. Woodhouse, and rightfully so: he is elderly, unrealistic, comedic, and endearing. Why, though, is his diagnosis so important? Numerous scholars have diagnosed Mr. Woodhouse: Nicola Cummins believed his condition to be dyslexia, and Ted Bader believed he is not suffering any illness; he is simply an aging man, more aware of his body and health than most. Mr. Woodhouse's diagnosis was not my concern, however. His worry, no matter where it is rooted, required him to see an apothecary, Mr. Perry, despite the Woodhouse's wealth. The Woodhouse's financial situation was made clear very early in the novel. Their house sat on a large garden; Mr. Woodhouse was able to provide his daughters with a governess—a luxury some of Austen's other characters were unable to afford. The Woodhouses also hire coachmen and own carriages, also a luxury at the time. If this was the case, if the Woodhouses are so fortunate to be more than financially stable, there was no reason for Mr. Woodhouse to continually call upon Mr. Perry, a man scholars often confuse with a physician, a mere apothecary. Mr. Woodhouse, the ever-habitual old man was comfortable with Mr. Perry, a medical practitioner who indulged his hypochondria, and who also allowed Austen to participate in a social debate believing that apothecaries were credible medical professionals.

33. Ajit Deshpande

Western Kentucky University
Mentors: Shivendra Sahi & Sneha Krishnamurthy

Comparison of Antimicrobial Effects between Biologically and Chemically Synthesized Silver Nanoparticles

In the field of biotechnology, nanoparticles are one of the fastest developing areas of research. While chemical synthesis of nanoparticles is the standard, biological synthesis offers a safer and more environmentally friendly alternative. This experiment analyzed the inhibition of microbial growth when the microbes were treated with biologically-synthesized silver nanoparticles that were created using yucca extract as a reducing agent compared to chemically-synthesized silver nanoparticles that were purchased commercially. The antimicrobial effects were analyzed by treating *Saccharomyces cerevisiae* and *Escherichia coli* with varying concentrations of nanoparticles. The inhibition of growth was tested first with disk diffusion method, and then the growth curves of the microbes that were treated with varying concentrations of nanoparticles were quantified and analyzed. The results showed that the biologically synthesized nanoparticles had a significantly more potent antimicrobial effect than their chemically synthesized counterparts.

34. Samantha Dinga

Western Kentucky University
Mentor: Cara H. Cashon

The Effect of Inversion on Adult Attention Disengagement from Faces

The disengagement of attention is necessary for basic daily function. In this study, we looked at how the disengagement of visual attention in adults was affected by the inversion of the initial stimulus. This inversion effect is found to be present if the length of the latency between the appearance of an experimental stimulus and the saccade to that item is longer than the period of time of saccade latency to a control stimulus. The inversion effect was studied using 23 adult participants, who were asked to watch a monitor that displayed an image of a human face. This face was shown both upright and inverted in 16 different trials. A peripheral, non-face stimulus was presented after the ASL® eye-tracking software detected that the participant had been looking at the initial stimulus for one second. The saccade latency of the attention disengagement per trial was calculated, and it was found that there was, on average, less than one millisecond of saccade difference between each upright and inverted trial. This shows no correlation between the inversion of a facial stimulus and saccade latencies.

35. Robin Disney

Jefferson Community & Technical College
Mentor: John E. Ward

The Health Insurance Mandate and Informed Voters

A survey examined relationships between ethnicity, political party, and the age of the student as related to a presidential candidate's platform and to the reason the respondent stated for voting for a particular candidate. Demographic variables included education level and degree plan. One research hypothesis was that a relationship exists between approval of the health insurance plan and those who voted Democratic in the past election or those who changed their voting party to reflect support of the plan. It was also hypothesized that ethnic origin would be a significant variable. Another hypothesis was that the degree of self-expressed voter knowledge about the health care plan would be related to the respondents' college degree plan.

36. Grace Donaldson, Maddie Meredith, Alexzandria Potts, & Tristin Holt

Caldwell County High School/Madisonville Community College
Mentor: Kirk Greenfield

Bacteria Growth on Refrigerated Meat

While refrigeration slows the growth of bacteria, cooler temperatures do not halt growth completely. Exposing raw meat to a specific environment such as a refrigerator affects the growth rate of *Escherichia coli* (*E. coli*) and other bacteria colonies. Growth rate of bacteria varies with the type of meat under the same conditions and in the same time frame. For 24 hours, chicken, beef, and pork meats were incubated or refrigerated. The meats were then swabbed, and the residue was transferred to petrifilms for further growth. After 48 hours, the petrifilms were removed from incubation and colonies of *E.coli* and other bacteria were counted. *E. coli* and other bacteria were present on incubated meat after the first 24 hours. Of the refrigerated meat, chicken grew the most bacteria in 14 days.

37. Madeline Marie Doran

University of Kentucky
Mentors: Richard Milich & Elizabeth Lorch

Goal Comprehension Mediates the Relation Between ADHD and Social Functioning Deficits

The core symptoms of attention deficit/hyperactivity disorder (ADHD) are associated with significant academic and social impairment among these children. Notably, children with ADHD are more likely than peers to repeat grades, drop out of school, and have fewer friends. However, few studies have attempted to explain these phenomena in terms of social-cognitive difficulties that these children experience. The present study had two purposes: (1) to examine the extent to which negative social behaviors are exhibited during a playgroup with unacquainted peers and (2) to determine how children's understanding of story characters' goals mediates negative social behaviors of children with ADHD in real-life social situations. To address these aims, 8-10-year-old children with a range of ADHD symptoms, as reported by parents and teachers, listened to and recalled two audio-taped fables. Recalls were coded for inclusion of the protagonist's main goal, as well as other story events linked to this goal. Children then participated in a playgroup session of 6-10 unacquainted children, half of whom met criteria for ADHD. Coders with no knowledge of ADHD symptoms assigned global ratings of several categories of social behavior. Preliminary analyses indicated that teacher and parent report of ADHD symptoms are related to negative behaviors and emotion dysregulation observed during group play. Further analyses will investigate the extent to which children's understanding of characters' goals accounts for the relation between ADHD symptoms and negative social behaviors. Findings give insight to the importance of social cognition for understanding the social functioning deficits experienced by children with ADHD.

38. V. Patrice Doyle

Bluegrass Community & Technical College
Mentor: Norman Strobel

Differential Effects of Bis-phenol A on the Germination and Growth of Wheat* Triticum aestivum *L., (Graminaceae) Cultivars Containing High and Low Polyphenol Oxidase Activity in Their Seed Coats

Bis-phenol A (BPA) is a synthetic chemical used in the manufacture of heat-sensitive papers for cash register receipts. Prior work implicated the enzyme polyphenol oxidase (PPO) in the catalysis by wheat seeds of a pigment-producing reaction of BPA with oxygen. BPA dose was positively correlated to the extent of pigment production and degree of BPA toxicity toward germinating seedlings. In the present work, seeds of wheat cultivars high and low in seed-coat PPO activity were used to test the hypothesis that wheat seed-coat PPO was responsible for the observed pigment production, and to determine whether PPO activity affected the degree of BPA toxicity towards seedlings. Wheat seeds known to be low in PPO activity produced very little pigment when incubated with BPA, whereas seeds of standard cultivars promoted abundant chromogenesis. Germinating wheat seeds with higher PPO activity were moderately less sensitive to the damaging effects of BPA. BPA was also toxic to germinating seeds of radish, *Raphamus sativas* L. (Brassicaceae) and mung bean, *Vigna radiata* L. (Fabaceae), and to leaf tissue of wheat and cucumber, *Cucumis sativas* L. (Curcurbitaceae). These findings support the hypothesis that wheat seed PPO plays a key role in the chromogenic reaction with BPA, and provide evidence that PPO may partially detoxify BPA.

39. Renee Dyehouse

Eastern Kentucky University
Mentor: Neil Wright

Religious Disparity in India and Pakistan: The Prospect of Peace through the Literary Views of Salman Rushdie and Manil Suri

This research discusses religious diversity and the search for identity on the Indian subcontinent. In order to gain a better understanding of the clash between the two religions and cultures, this work examines the complexities of the intercultural experience of Hindus and Muslims during both the time of the partition and in modern India and Pakistan through the literary views of Salman Rushdie and Manil Suri. Rushdie's novel Midnight's Children (1980) demonstrates the interrelated nature of Islam and Hinduism by both subtly and forcefully intertwining daily life with seemingly impossible disputes of a political nature between Pakistan and India and in personal affairs between Muslims and Hindus. Ultimately, Rushdie reaches the conclusion that there is no immediate way to resolve the political and social challenges which prevail among different ethnic groups. Suri's novel The Death of Vishnu (2001) centers around a host of Hindu and Muslim characters who find themselves connected because they live within the same apartment complex. The novel suggests that at the highest level of spirituality, religious ideas converge. However, on lower and more mundane levels, differences become more apparent and problematic. Each text allows for insight into problems faced by Muslims and Hindus and their attempt to live together peacefully in a society permeated by ideals derived from each religion.

40. Danielle Eichelberger

Murray State University
Mentors: William Dewees & Anna Doom

Prevalence of Canine Distemper in Western Kentucky and Western Tennessee

Canine distemper is a viral disease with a high fatality rate; about 50 percent of adult dogs and 80 percent of puppies who contract the disease die if left untreated. Preventative inactive vaccines for this disease were released in the 1940s, which were then replaced with a modified live vaccine in the 1960s. This modified live vaccine is nearly perfect at preventing contraction of the disease. Recently, some veterinarians have questioned the necessity of the current vaccine. Due to the risks all vaccines present, including this vaccine, it is in the best interests of the health of the animal to minimize the number of vaccines administered. Therefore, the Prevalence of Canine Distemper in Western Kentucky and Western Tennessee Project aimed to determine whether the vaccine was still necessary in western Kentucky and Tennessee with the hypothesis that if clear data was found verifying that the disease was no longer prevalent in the area, then the vaccine could potentially be removed from the list of core vaccines, thus reducing the number of required vaccines administered to canine patients and preventing unnecessary risk. Alternatively, if it was found that the vaccine was still necessary to prevent the spread of canine distemper, then veterinarians and researchers could be notified and steps for further prevention, such as perfecting recombinant CDV and DNA vaccines, could be taken. Dr. Dewees, my faculty mentor; Ms. Doom, my laboratory mentor; and I hoped to increase the health and general well being of animals within the researched area by deciding the current threat of canine distemper and determining the proper steps for further prevention of mass contraction by the canine population.

41. Leticia Estill

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

Beneficial Insects in Native Perennial and Pasture Borders in Franklin County, Kentucky

This research was conducted on the Kentucky State University Research and Demonstration Farm in Franklin County, Ky. Sticky traps 15 cm x 15 cm were set in native perennial and pasture border rows to compare diversity and abundance of insects. Native perennial border rows contained 16 species of plants. There were five grasses and eleven species of flowering plants including big bluestem (*Andropogon gerardii),* thimbleweed (*Anemone virginiana*), New England aster (*Aster novea-anglica*), side-oats Grama (*Bouteloua curtipendula*), purple coneflower (*Echinacea purpurea*), gray-headed coneflower (*Ratibida pinnata*), rattlesnake master (*Eryngium yuccifolium*), common boneset (*Eupatorium perfoliatum*), blue lobelia (*Lobelia siphilitica*), bee balm (*Monarda fistulosa*), switchgrass (*Panicum virgatum*), foxglove beardtongue (*Penstemon digitalis*), hairy beardtongue (*Penstemon hirsutus*), slender mountain mint (*Pycantheum tennuifolium*), little bluestem (*Schizacharium scoparium*), and prairie dropseed (*Sporobolus heterolepis*). Pasture borders were a mixture of grasses and broad leaf weeds such as johnsongrass, foxtail, fescue, orchard grass, and pigweed. Four sticky traps were deployed in each border 25 m long X 2 m wide. Traps were collected and analyzed for 16 weeks. Insects were identified to family and species when possible. Big eyed bugs and syrphid fly adults were the most abundant insects caught overall. Asian lady beetles, seven spotted lady beetles, green lacewings, spotless lady beetles, minute pirate bugs and pink lady beetles were not as abundant, but still exhibited differences in numbers between the two habitats. Results indicated that this research should continue for several more growing seasons to determine if age and maturity of the border plots influence beneficial insect numbers.

42. Katlyn Farris

Northern Kentucky University
Mentor: Shauna Reilly

Women Judges

Female judges have been significant inside the courtroom due to their ability to see judicial cases from a different perspective then traditional male judges. A greater placement of women in judicial positions has influenced the rulings and decisions made. This research will attempt to examine the differences of female judges in relation to the role of gender in the courts, looking specifically at female judges' confirmations, rulings, and decisions. It will seek to discover if the socialization of female judges plays a key role in their decision-making abilities through the process of individual interviews. The installment of female judges in past research has shown that women have a key role in liberalizing the courts.

43. Josh Flener, David Hack, Talon Roy, Tiffany Royal, Jenna Smith, & Kayla Zachary

Madisonville Community College
Mentor: Jennifer Welch

Analyzing Yeast Fermentation to Compare Treatments for Lactose Intolerance

Various treatments for lactose intolerance were examined for their effectiveness in breaking down lactose in a 30-minute time span. The study tested the brand name Lactaid, its generic equivalent, and 3 probiotic formulas. Their effectiveness was measured by the amount of carbon dioxide produced when yeast broke down the simpler saccharides after lactose metabolism. The CO_2 release was measured by a homemade respirometer formed by 2 interlocking test tubes. The most effective treatment, with the greatest release of CO_2, was the generic Lactaid, and the least effective treatments were the probiotics. These results did not support the initial hypothesis that the brand name Lactaid would be the most effective.

44. Tyler J. Flynn

University of Kentucky
Mentors: Christine Trinkle & L. S. Stephens

Magnetic and Electrostatic Hybrid Microstructures for Microfluidic and Microrobotic Applications

The application of magnetic and electrostatic microscale devices and sensors is ever increasing as the length scales observed in many research areas decrease. The contact-free nature of these actuation methods makes them attractive for many devices, however, the integration of materials responsive to multiple control methods in microscale systems is currently difficult to achieve and not well examined. In this work, we present characterized microfabrication methods for both uniform magnetic composite microstructures and uniform electrostatic composite microstructures, as well as the creation of novel micromagnet designs with unique geometries and controllable heterogeneity of magnetic properties. Our current research additionally involves the fabrication of hybrid microstructures that can be independently actuated with either magnetic or electrostatic properties using UV photolithographic and thermal vapor deposition methods. These microstructures can be fabricated with relatively inexpensive materials and are easy to integrate into typical microfabrication processes. This research also involves the demonstration of these hybrid structures as functional microrobotic systems. Because the hybrid microstructures are created to be independently responsive to both magnetic and electrostatic actuation forces, one mode of actuation can be used to provide controlled motion of these free-standing microrobots, while the other can be used to change the conformation of the structures or selectively immobilize them. This dual-control method can be used to provide useful interaction of the robots with their microenvironment or make it possible to individually manipulate single robots within a larger swarm.

45. Karin Forbes

Eastern Kentucky University
Mentor: Buchang Shi

Hemp - An Ideal Candidate for Biofuel Production

The *Cannabis sativa* plant has had a long history of controversy. One of the varieties of this plant, hemp, is of particular interest because it has the potential for contributing to a new renewable energy source. This study evaluates the history of this plant, its infinite number of uses, the legal issues that ceased its production, and the potential it has to be resurrected. Comparable to other crops, hemp is a very environmentally friendly crop that warrants further investigation.

46. Mary Allison Francis

University of Kentucky
Mentor: Kristin Ashford

Impact of Prenatal Psychosocial Wellness on Risk for NICU Admission

Kentucky ranks among the top 5 states for preterm births (13.4%). Psychosocial health (depressive symptoms, stress and anxiety) can negatively impact perinatal outcomes. The purpose of this study is to determine the relationship between adverse infant outcomes (Neonatal Intensive Care Unit (NICU) admission) and prenatal depressive symptoms, stress and anxiety scores measured throughout each trimester of pregnancy. This is a secondary data analysis of a prospective trial of pregnant women (n= 252) with single gestation. Women completed the Edinburgh Postnatal Depression Scale, (EPDS), Everyday Stressors Scale (ESS), and the State Trait Anxiety Index (STAI) during each trimester of pregnancy. Positive depressive symptoms were defined as a score > 10. Maternal anxiety and stress were measured continuously. Twelve percent of infants were admitted to NICU (n =31). First trimester anxiety and depressive symptoms were significantly associated with NICU admission (p =.04; p =.005, respectively); however, but not associated in the second or third trimester. In all trimesters, mean anxiety scores were consistently higher in women whose infants were admitted to NICU compared to women who delivered healthy, term infants (1st: 42.7 vs. 35.7; 2nd: 38.6 vs. 34.2; 3rd: 31.6 vs. 35.5). High maternal anxiety and depressive symptoms in the first trimester are associated with NICU admission. Obstetric nurses need to follow a psychosocial screening protocol to identify and treat women throughout pregnancy to reduce risk for adverse maternal and infant outcomes, including NICU admission.

47. Lauren Gabbard

Northern Kentucky University
Mentor: Kimberly Weir

A Macro-Evaluation of Microfinance

Microfinance emerged as a poverty alleviation tool in the 1980s as less developed countries were subjected to structural adjustment programs that entailed economic and financial restructuring. Microfinance thus emerged as a means to provide small loans and financial services to the poor for income-generating activities. Large populations with no access to financial services in less developed countries mean the poor have no means to turn from less profitable income sources, such as farming and wage labor, to more profitable, self-employment activities such as owning a business. Since its implementation in the 1980s, the success of microfinance has been debated, due to barriers to that prevent consistency in evaluating microfinance programs and institutions. In order to get a better sense of the effectiveness of microfinance schemes, the variables used to define success are examined to offer a comprehensive and systematic way to evaluate this approach to poverty alleviation.

48. Sarah George & Kelsey Kuessner

Morehead State University
Mentors: Beverly McCormick & Janet Ratliff

A Comparison of Entrepreneurial Perspectives Between Middle School Students and College Students

This study involves a pre/post survey of entrepreneurial perspectives administered to students in entrepreneurship programs at middle schools in an eastern Kentucky county and college students at Morehead State University. Data collection occurred in Fall 2013. The analysis included defining an entrepreneur, types of businesses affiliated with entrepreneurship, ranking of the most important attributes of an entrepreneur, a person's own ranking of personal entrepreneurship attributes, views of entrepreneurship overall, and contributions to society, locally and beyond. Differences found between the two groups are reported as well as differences found between males and females.

49. Caitlin Gover

Western Kentucky University
Mentors: Gregory Ellis-Griffith & Aki Michimi

Analysis of House Bill One the "Pill Mill Bill"

Kentucky's House Bill One was passed last year as an effort to decrease prescription drug abuse in the Commonwealth. This law requires that all schedule prescription drugs be subject to electronic reporting known as the Kentucky All Schedule Prescription Electronic Reporting system. I sought to identify if the passage of the bill had affected the prescription drug problem in our Commonwealth. My overall approach to analyzing the Pill Mill Bill was to conduct a pretest-posttest study design. In order to humanize these numbers, I conducted interviews with members of law enforcement and the judicial branch, health care providers, and politicians in different regions of Kentucky. The impact of the law on patients who really need prescription drugs was addressed. Since most students were not aware of the dangers of prescription drugs and the impact of the "Pill Mill Bill," awareness of prescription drug abuse on Western Kentucky University's campus needs to be addressed.

50. Rebecca Graves

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

Comparison of Acetogenin Activity in Twig and Ripe Fruit of Six Pawpaw [*Asimina triloba (L.) Dunal*] Varieties Using the Brine Shrimp Test

Pawpaw [*Asimina triloba (L.) Dunal*] is a native tree fruit in eastern North America. Annonaceous acetogenins are long chained fatty acids contained in pawpaw fruit and vegetative tissues, which display pesticidal activity, possibly representing a new botanical pesticide for agronomic pest control. Kentucky State University (KSU) is the site of the USDA Repository for pawpaw species and germplasm evaluation and collection are program priorities. Fruit is a major biomass source for acetogenin extraction; however, 5 to 8 years are required for a tree to mature and produce fruit. Early detection of high acetogenin fruit selections as first year seedlings would shorten the pawpaw breeding cycle. The objective of this study was to determine if there is a correlation between annonaceous acetogenin activity in ripe fruit and twig tissues. Twigs and fruit were collected from individual trees of pawpaw varieties and advanced selections (Sunflower, Susquehanna, Pennsylvania Golden, Zimmerman, Hi4-1, and Hi7-5) that vary from high to low in fruit acetogenin activity. Two and one half grams of dried twig tissue or ten grams of frozen fruit pulp were extracted with 95% ethanol and the brine shrimp test (BST) was used to evaluate acetogenin activity in pulp and twig extracts. Concentrated extract was transferred to vials to correspond to 0, 0.5, 1.0, 5.0, and 10 ppm concentrations for twig and 5, 10, 20, and 50 ppm concentrations for pulp with three replicate vials per concentration. LC50's of twig and pulp were compared.

51. Andrew Greene

Morehead State University
Mentor: Hans Chapman

Assessment of the Solar Energy Variability and Effects in Eastern Kentucky

This study was to assess the yearly solar energy availability in the eastern Kentucky region and determine its effects on other atmospheric factors. The methods employed involve outdoor measurements of solar irradiance. Data from the Kentucky Mesonet Station in Morehead was acquired and analyzed. Previous work investigated the correlation between solar irradiance and atmospheric factors such as ambient temperature and wind speed, for selected months. This study has been expanded to review solar irradiance data for the region over a one-year period and the correlations were re-assessed to account for seasonal variability. The development of more location-specific solar resources has the potential to increase the level of interest and investments in renewable energy technologies in the region. The study serves as a foundation for further research in renewable energy at MSU and in the region.

52. John Haley & Heather Studzinski

University of Louisville
Mentor: Kyoungmee Kate Byun

Runaway- Renzo Piano Inspired Pavilion Design

Technology has influenced the human's perception of reality to such extent that it has altered what is being perceived “The very act of creating cities that make international business people feel at home in generic non-places also creates environments that repel heritage.” (Labine, Traditional Building) New social groups, new ways of thinking, cycling and recycling, reprocessing perceptions, consuming and digesting ideologies are all aiming to produce a reality that hasn’t existed until these technological advancements. We, as humans, are no longer running away from our homes, to which we use to threaten, and no longer are we tempted to distance ourselves from our daily routines, to which we become accustomed to. Rather, we are running away from our historical past. We are running from our mistakes as a species. The mistake in assuming that we are the natural stakeholders of our Earthly bounds. We are vacating from the comfortable ways of thinking to which fear is avoided. Instead, we are finding ourselves in realms where questions and curiosity are praised. We are discovering a world where man takes ownership of his reality and attempts to rebuild his perception smarter, better, and stronger. By absorbing knowledge created from years of discovery, centuries worth of dialogues and countless amounts of scientific explorations our modern aspirations we are upon such explorations.

53. Nicole Haley & Natalie Lyles

West Kentucky Community & Technical College
Mentors: C. Steven Cahill & Felix Akojie

Preliminary Studies on the Carbohydrate Content in Various Edible Tubers and Roots

Edible tubers and roots were purchased from a local grocery store. Total carbohydrate from each of the tubers and roots was extracted. This was digested to glucose with the enzyme amylase. The amount of glucose in each vegetable was determined using the glucose-hexokinase technique. The glucose content of each tuber is equivalent to the total carbohydrate content.

54. Aaron Hall, Kenneth Harpe, Candace Kelly, & Bethany Oakes

West Kentucky Community & Technical College
Mentors: Timothy Dick & Kathy Hoffman

A Theoretical Mechanism for Caffeine-Induced Cystogenesis in Polycystic Kidney Disease

Polycystic kidney disease (PKD) occurs when one of two genes, the PKD 1 gene on Chromosome 16 or the PKD 2 gene on Chromosome 4, is mutated, leading to the development of cysts in affected individuals. The protein products, polycystin 1 and polycystin 2, activate the WNT pathway, a signaling cascade that can control cell proliferation. These proteins also activate cAMP, a second messenger in the cell. Since caffeine increases cAMP levels, use of this substance may lead to the phosphorylation of a specific WNT pathway kinase called ERK. The phosphorylation of ERK ultimately leads to the activation of specific transcription factors which control genes responsible for the regulation of cell proliferation. An individual with PKD already has a malfunctioning WNT cascade; thus caffeine may hasten cystogenesis. This study constructs a theoretical mechanism for the role of caffeine in cystogenesis. The mechanism will be tested in future research by exposing Zebra fish (*Danio rerio*) to an aquatic environment containing caffeine. Since their embryos are clear and kidney development consists of a single tubular structure, a cyst is easily detected.

55. William R. Hamilton

Western Kentucky University
Mentor: Rajalingam Dakshinamurthy

Designing a Unique Therapeutic Agent Involving Gold Nanoparticles Capped with Ceftazidime for Potent Antibacterial Applications

There is a desperate need for creating new antibiotics or modifying existing antibiotics in response to the soaring increase in cases of multi-drug resistant (MDR) bacteria that are commonly known as “Superbugs” all across the world. We have tried to design an effective antibacterial agent involving gold nanoparticles (AuNPs) capped with an antibiotic (ceftazidime). Keeping the 12 principles of ‘green chemistry’ in mind a unique, single step process that is unlike conventional methods was conceived for making AuNPs using the combined reducing and capping ability of ceftazidime to yield ceftazidime capped gold nanoparticles (C-AuNPs). The C-AuNPs were then characterized using various analytical techniques that utilized such tools as the transmission electron microscope (TEM), scanning electron microscope (SEM) and UV-Vis spectroscope to determine the morphology of the AuNPs. The efficiency of the antibacterial activity of C-AuNPs was assessed using several antibacterial assays such as turbidimetry, spread plate method, and XTT assay. A variety of bacterial strains including both Gram-positive and Gram-negative were used for the above assays. The minimum inhibition concentration (MIC) of C-AuNPs, obtained from the assays was compared with the MIC of ceftazidime pure drug in order to evaluate the efficacy of C-AuNPs compared to pure ceftazidime drug.

56. Bradley Hartman

Murray State University
Mentor: Everett Weber

A Cost Efficient Method, in Conjunction with EPA Method 7474, of Detecting Mercury Contamination in Fish Tissues

Mercury is a highly toxic metallic substance, and a persistent, bio-accumulative, biomagnified environmental contaminant, and is known to cause multiple adverse medical side effects in humans such as damage to the brain, kidney, lungs, and even increases in chances of cardiovascular disease. The biggest source of human mercury poisoning is through the consumption of fish that inhabit contaminated aquatic ecosystems. Current mercury testing methods are time-consuming, insensitive enough to detect the maximum allowable mercury levels in biological tissues established by governmental agencies, and expensive due to required specialized equipment such as an atomic fluorescence spectrometer. By developing a cost efficient and accurate method of mercury testing, universities, research labs, hospitals, and many other organizations that do not possess an atomic fluorescence spectrometer would have an opportunity for increased research and monitoring of mercury contamination levels. Boris' Mercury CheckTM (BCM) test strips can detect mercury levels in water, are inexpensive, and are sensitive to a concentration of 2 parts per billion, the Maximum Concentration Level established by the United States Environmental Protection Agency (EPA). During a preliminary study, where fish tissues were emulsified in an aqueous solution and spiked with predetermined mercury concentrations, we found that the biological tissue either interfered with the test strips ability to detect mercury or absorbed any mercury that was present, and that further method development and research was required. We expanded our previous study by thermally digesting fish tissues with an acid solution in conjunction with EPA Method 7473 (4), and tested fish tissues from several species that have low, medium, and high ranges of expected mercury bioaccumulation, a laboratory control sample, and spiked samples with predetermined mercury concentrations with the BCM test strips, and verified the results with a replicate of each sample by atomic fluorescence spectrometry.

57. Craig Heard

Northern Kentucky University
Mentors: David Agard & Joseph Nolan

Challenges of NCAA Reclassification

Colleges transferring from NCAA Division II athletics to Division I face a substantial challenge in competing with bigger and wealthier schools. This study examines the road to success for such transfers across five sports. Repeated Measures Analysis of Variance is used to examine winning percentage across different sports and years. Survival analysis estimates the probability of success at certain points in time. Unsuprisingly, it was found that the winning percentages of the schools prior to Division I was significantly higher to when they transferred. Additionally, the probability of the athletic teams achieving their first successful season (as defined by a winning record) within 5 years is roughly 50%. For Men's Basketball, the NCAA tournament was also examined and it is noted that the probability of making a tournament appearance within 10 years of transfer is between 30% and 60%.

58. Seth Henderson

Eastern Kentucky University
Mentor: Jennifer Hochschild

Could Your DNA Soon Be in a State or Federal Database?

On June 3, 2013 a narrowly divided United States Supreme Court made a decision that could possibly be the most significant ruling in recent history to affect how the criminal justice system operates. In the case of Maryland v. King, justices ruled 5-4 that police can collect DNA from an individual under arrest, even without conviction. In addition, suspects who are detained in custody will have their DNA collected as well. The decision affects all United States residents and may lead to a substantial portion of DNA collected from U.S residents. DNA collection is ambiguous in the 28 states where it is being practiced, but the Supreme Court has signaled to all 50 states that DNA collection does not violate the Fourth Amendment, which guards against unreasonable search and seizure. One of the many goals of this project is to examine the dialogue and opinions across racial and ethnic communities as expressed through newspapers across the United States and assess the levels of support and opposition to DNA collection. To achieve this goal, I am utilizing Lexis Nexis and Ethnic News Watch databases using key terms to collect the desired information. We hypothesize there will be significant differences among the newspapers and that underrepresented populations will be more likely to oppose DNA collection.

59. Melissa Homann

University of Kentucky
Mentor: Steven Estus

Triggering Receptor Expressed by Myeloid Cells-2 (TREM2) Spicing Forms Effects on Function of Gene and Relationship with Alzheimer Disease

Alzheimer disease (AD) is known to be a predominantly sporadic late-onset disease, which increases in prevalence after the age of 65 years. Recent studies have identified that Triggering receptor expressed by myeloid cells-2 (TREM2) heterozygous rare variants can increase the susceptibility of AD. TREM2 is an immunoglobulin-like orphan receptor of the TREM family, which can be expressed in many places like activated macrophages, immature dendritic cells, osteoplasts, and some microglia. Most recent studies suggest that TREM2 is expressed in neuronal cells and none of the above. Other diseases, such as Nasu-hakola disease, are caused by TREM2 losing function. Loss of function in a gene could be caused by alterative splicing which can affect the prevalence of AD. TREM2 has been accredited to being an alternative splicing having a 55 base-pair insert at the end of exon 3, which creates a protein shift and effects where the gene is expressed. We sought to look at other splice forms and where they were expressed. We report that there are 4 different splice forms of TREM2. They are as followed: exon 2 deleted, exon 4 deleted, exon 2/4 deleted, and exon 2/3/4 deleted. Each splice form has an effect on where the gene is expressed. There is also significant reason to believe that when exon 2 is skipped, the prevalence of AD will consequently increase by 2 fold.

60. Ian Hopkins

Eastern Kentucky University
Mentor: Beth Polin

Value Congruence: Differences along the Nonprofit / For-profit Organization Line

Academics have examined the relationship between the espoused values of an organization and the values held by its employees in great depth. The relationships between this employee-organization value congruence and several outcomes such as job satisfaction, employee turnover, and performance outcomes have been established. However, one aspect of value congruence that was still not well understood was how the type of ownership of an organization (nonprofit compared to for-profit) affects this degree of congruence. A lack of consensus and the failure of the emergence of a dominant theory have encouraged calls for further study by academics such as Ren (2013). In response to this call, this study aimed to analyze the relationship between employee-organization value congruence and the nonprofit/for-profit organization line by comparing the espoused values of certain organizations with the values held by their employees. Given the lack of previous evidence, it was hypothesized the organizational and employee values would be more strongly correlated within the nonprofit organizations because of their socially responsible nature. This hypothesis was tested by administering a modified version of the Rokeach Value Survey to employees of for-profit and nonprofit organizations and then comparing these results to the values that were officially endorsed by the organizations within mission statements and other official documents. This study contributed to the understanding of organizational behavior between the two types of organizations by providing empirical evidence of the patterns of value congruence across organizational ownership types and helps to provide a clearer foundation for future research. This study also provides a clearer understanding of value congruence to practitioners and will aid them in using value congruence as a source of intrinsic motivation.

61. Corinna Hughes

University of Kentucky

Mentors: Kristen Ashford, Andrea K McCubbin, Janine Barnett, & Susan Westneat

Exploring Racial Differences in Biomarkers, Stress and Anxiety throughout Pregnancy

Introduction: Preterm birth (PTB) disproportionately affects African American (AA) women at nearly twice the rate of White (W) women. Prenatal stress and anxiety may contribute to increased levels of CRP associated with PTB. The inflammatory process triggers increased levels of CRP and IL-10. Gaps exist when identifying racial differences in reported prenatal stress and anxiety. The purpose of this study is to examine the relationship between prenatal stress, anxiety and IL-10 in racially diverse women. Method(s): A secondary analysis from a prospective multicenter study with repeated measures design was used. Each trimester, serum CRP and IL-10 were collected (n=143, n=128, and n=116) after survey administration. Maternal stress was also measured using the Everyday Stress Scale (ESS). Anxiety was measured using the State Trait Anxiety Inventory (STAI). Data analysis included descriptive statistics, Spearman Rho (ρ), and ANOVA using SAS 9.3. Results: AA women consistently reported higher stress than Hispanic or White women in all trimesters ($p<.0001$; $p=.003$; $p=.0043$). Similarly, AA reported significantly higher anxiety scores in the first and third trimesters (p=01;p=.01). White women consistently reported the lowest stress and anxiety scores. Overall, there is a significant, inverse correlation between self-reported maternal stress and IL-10 in the first and second trimester ($\rho= -.21$, $p=.01$; $\rho= -.18$, $p=.05$; however there was no association in the third trimester ($\rho= -.07$, $p=.43$). There was no association between maternal stress and CRP during any trimester of pregnancy. Furthermore, anxiety was not significantly associated with IL-10 or CRP. Conclusion: Throughout pregnancy, AA women report higher levels of stress and anxiety when compared to other races. High levels of maternal stress appear to decrease the potent anti-inflammatory effects of IL-10; potentially providing mechanistic evidence of racial disparities for preterm birth. Further investigation of the relationship between IL-10, maternal stress and race is warranted.

62. Anne Jablinski

Murray State University
Mentor: Tony Brannon

Biomass: Green Energy for the Future of Agriculture

There is a growing trend towards the promotion of sustainability in the world of agriculture, particularly through alternative sources of energy than fossil fuels. Biomass, vegetative waste from energy crops such as switch grass and sorghum, is a key input for transforming the face of energy for the future of Kentucky, the nation, and the world. The purpose of this particular agricultural experiment at Murray State University using the Bio-Burner 100 unit from L.E.I products in Madisonville, KY, was to determine the most efficient biomass as input for output of energy in the form of heat, and as a preliminary trial for burns utilizing larger burning units. Loose and pelleted forms of switch grass, energy sorghum, Miscanthus, equine waste and wood shavings were burned over eight-hour periods in outdoor temperatures below 55°F. Factors including burn and ash weight, ash clinkers, fan and fuel speed, and chemical and BTU measurements taken by Twin Ports Testing were recorded to assist in determining the success of each burn trial and overall energy balance. Upon analysis of the data, the biomass with the most efficient burn proved to be the wood shavings. The least efficient burn proved to be the forage-based biomass, which included Miscanthus, switch grass and sorghum. Forages burn less efficiently due to their high sugar content, heavy ash production, and need for a high volume of dry matter. The application of this experiment with biomass as energy is vital for improving sustainability in equine and farm-level operations.

63. Brooke Johnson

Eastern Kentucky University
Mentor: Bill Staddon

Incidence of Antibiotic Resistant Genes near Wastewater Treatment Plants

The incidence of antibiotic resistance genes near wastewater treatment plants (WWTP) was assessed. Water and sediment samples were collected from streams near WWTPs associated with small communities in south-central Kentucky. Samples were collected downstream, at the effluent of, and upstream from nine different WWTPs. The DNA was isolated using MOBIO kits. Genes for antibiotic resistance were then amplified using polymerase chain reaction (PCR) and visualized using agarose electrophoresis. Evidence for the tetA, tetB, and tetX genes were found in several WWTP, and was found upstream, downstream, and at the effluent.

64. Allison Johnston

Morehead State University
Mentor: E. Noel Earl

Leadership: Lessons Learned at Summer Camp

The purpose of this qualitative study was to investigate the leadership characteristics and lessons that were learned in a summer camp environment. This was inspired by the award-winning novel The Cabin Path by Jay Gilbert and compared to the popular theory Reframing Leadership by Bolman and Deal using a typological approach. Gilbert's novel categorizes and explains how essential leadership experiences such as working in a team or improvisation can be honed outside of the traditional classroom setting. The hypothesis was that those leadership lessons identified by Jay Gilbert were in fact, essential to becoming a leader and were comparable to the scholarly work in Bolman and Deal's theory. The goal was to establish the lessons outlined in the novel as paralleled to the theory and identify their value beyond summer camp into a career field and adulthood. The findings concluded that a popular novel written for a juvenile audience may still outline very scholarly ideas as compared to a widely accepted theory. Those leadership lessons are valuable and crucial to success in post-secondary education as well as a profession.

65. Brittany Jones

Northern Kentucky University
Mentor: Lindsey Walters

Incubation Patterns of Carolina Chickadees (*Poecile carolinensis*) Measured with Remote Temperature Data Analysis

The purpose of this research was to determine any temporal patterns in the incubation behavior of Carolina Chickadees (*Poecilie Carolinensis*) using remote temperature data loggers, or iButtons. Thirty-eight nest boxes were placed at St. Anne Convent in Melbourne, KY. In 2012 and 2013, iButtons were placed inside and outside of each active nest box. Temperature data were then gathered and analyzed to determine if any patterns were present in what time of day the incubating females left the nest. Visual observations were also done to ensure the iButtons were working properly. We found that the incubating females left the nest boxes more often during the daylight hours, but they also left occasionally during the night. These data make sense because a female would be more likely to forage for food during the day, and the higher temperatures would allow her to leave the eggs safely.

66. Sarah Kelsey

Eastern Kentucky University
Mentor: Tanea Reed

The Effects of Gamma-glutatmylcystein Ethyl Ester on Glutathione Elevation as a Post Treatment to Moderate Traumatic Brain Injury

A moderate traumatic brain injury causes irreversible protein damage due to oxidative stress. Oxidative stress is caused by an imbalance between harmful free radical species and protective antioxidants, the most prominent being glutathione (GSH). The GSH protects proteins from irreversible damage through a reversible protein modification. This covalent modification is reversed once the concentration of free radical species is below the toxic threshold. The GSH is produced through a recycling assay that is halted by feedback inhibition. In the event of an injury, gamma-glutamylcysteine ethyl ester (GCEE) is being studied as a possible post-treatment to prevent inhibition and increase the production of GSH. This study focuses on enzymatic recycling assays and Western Blotting as a means to quantify the amount of GSH present in brain tissue samples that have a moderate traumatic brain injury. These methods have determined the concentration and protein protection of GSH in samples treated with GCEE were greater than that of a non-injured or non-treated sample. The information from this study can be used as a means to assess the viability of GCEE as a post-injury treatment for moderate traumatic brain injury.

67. Jared Keown

University of Louisville
Mentors: Gerard Williger, Scott Schnee, Tyler Bourke, & Rachel Friesen

Infall as a Function of Position and Molecular Tracer in L1544 and L694

Stars form within dense, cold, and compact regions of gas and dust known as prestellar cores. When the inward force of gravity overcomes the outward push of the internal pressure of these systems, they begin to collapse and a new star can be born. The standard model of core collapse suggests that this process works from the inside and moves outwards, with the fastest motions at the center. The relative abundances of many molecules also vary within cores, with certain molecules found only in specific regions characterized by narrow ranges of temperature and density. These characteristics lead to the hypothesis that the observed infall speeds in starless cores (i.e. how fast they are collapsing) depend on both the position of the observations and the molecular tracer chosen. Although surveys of infall motions in dense cores have been carried out for years, very few surveys have been awarded enough time to map infall across cores using multiple molecules as tracers. To fill this gap, we present IRAM 30 meter telescope maps of N2H+(1-0), DCO+(2-1), DCO+(3-2) and HCO+(3-2) towards two prestellar cores (L1544 and L694). We find that the measured infall velocity varies as a function of position across each core and varies with the choice of molecular line, likely as a result of radial variations in core chemistry and dynamics.

68. Summer Knox, Christopher Auvenshine, Stephanie Mays, British Thompson, Jacob Case, Tommy Mudd, & Jimmy Williams

University of Kentucky
Mentors: Steven Arthur & Andrea Friedrich

Personality Traits and Occupations Stereotypically Perceived as Masculine or Feminine

Previous research has found that certain personality traits and occupations are stereotypically perceived as either masculine or feminine. However, individuals with stereotype-inconsistent traits lead perceivers to utilize more individuating information to categorize a target. The study used a 2X2X2 (occupation X gender traits X order of presentation) independent factorial designs that explored how individuals utilized consistent and inconsistent stereotypic information when target gender is not explicitly provided. Participants read a description of an individual with either a "masculine" or "feminine" occupation (engineer or nurse), in addition to either masculine or feminine personality traits. Results showed that perception of the target's gender was strongly influenced by occupation. The presence of masculine or feminine traits did not moderate this effect nor did the order of presentation of the information. Participants perceived the targets most competent when the stereotypical personality traits and occupations were consistent rather than inconsistent. Finally, participants were more likely to falsely recall stereotypical information when the character was described as feminine rather than when the character was described as masculine. These findings indicated that participants did not individuate the stereotype inconsistent targets more than the stereotype consistent targets. Other implications and limitations of the study are discussed.

69. Laura Koester

Northern Kentucky University
Mentors: Cindy Foster & Kathy Bergman

Promoting Self-Efficacy for Inner City Girls Using a Fitness Education Program

The goal for the Nurse Advocacy Center for the Underserved and this change project was to promote self-efficacy and to promote positive attitudes towards exercise and nutrition among teen girls. This was to be achieved using a structured exercise and nutrition program once a week over a six month time period. Pre and post-test surveys were administered to measure perceived benefits and barriers to exercise, social support, and feelings of self-efficacy. The results of the completed change project determined that no significant changes had occurred throughout the study. The student and faculty involved in this study would like to continue to conduct programs with the goal of promoting healthy lifestyle changes and self-efficacy. Suggestions for future studies would be to incorporate a self-esteem program to help teen girls develop healthier habits and positive feelings about their capabilities.

70. Kelsey Koopman

University of Louisville
Mentor: Barbara Polivka

Development and Validation of a Nausea Assessment Tool

Nausea is a common symptom presented in healthcare which can have a profound impact on quality of life, nutrition, therapeutic response, and compliance of treatment. However, there are no existing nausea assessment tools validated for adults specifically developed for the acute care setting. This study developed and validated a newly created nausea assessment tool (NAT) designed for use with adult patients. The NAT was finalized and validated in two phases. Development of the NAT involved having at least 50 nurses and student nurses individually create their own version of the NAT based on a set of 10 different animated faces and 10 different descriptive phrases. A final NAT version was determined based on common sequences identified by the nurses/student nurses. The validation phase addressed content, convergent, and discriminant validity. Adult patients (N=100) were asked to rate their nausea on the NAT and a visual analog scale, as well as rate their pain on a separate visual analog scale. If they received treatment for their nausea, they were asked to again rate their symptoms on each of these scales post treatment. Data were initially be analyzed using descriptive statistics and scatter plots. Pearson's correlation coefficient (r) were calculated. Data collection and analysis are ongoing.

71. Kacie Kotnik

Northern Kentucky University
Mentor: Gail Mackin

Exploring Marine Population Dynamics with Agent Based Models

Accessible, flexible population models are in great demand to model the populations of commercially fished benthic marine species. This project explored extended previous work using a continuous model to develop a parallel agent based model. The parameters of the continuous models are rederived to reflect the behavior of either the entire system or the individual. The modeling software NETLOGO is then used to create a programmed scenario which reflects the real world environment. Various limitations were placed on the model because of the discrete nature of the NETLOGO system, so various factors were explored to determine the most accurate setup of the model.

72. Philip Kyles

Eastern Kentucky University

Mentors: Neetu Tyagi, Pradip Kamat, Anuradha Kalini, & Suresh Tya

Neuroprotective Effects of Hydrogen Sulfide Through the NMDA Receptor Against Intracerebral Homocysteine Induced BBB Dysfunction and Vascular Remodeling

The disruption and subsequent irregularity of the blood brain barrier (BBB) leads to an abnormal cerebral blood flow (CBF) and dramatically affects neuronal toxicity and cognitive impairment. Homocysteine (Hcy) is a known aggravator in this process by causing the over activation of the NMDA receptor. The over activation of the NMDA receptor creates excitotoxicity impart by BBB disruption and hippocampal neurotoxicity. Hydrogen sulfide can be used to alleviate the effects of homocysteine by facilitating hippocampal long-term potentiation. Therefore, the present study was designed to study the effect of Hcy (0.5μg/ μl) induced NMDA receptor activation on BBB integrity, CBF, memory function, and determine if hydrogen sulfide can attenuate the associated negative effects. Our results suggest that Hcy administration (IC) resulted in altered CBF BBB permeability, depressive behaviors, memory function, and blood pressure. In our experiment, sodium hydrogen sulfide (H2S donor) and MK801 (NMDA antagonist) were injected intraperitoneally once daily for a period of 7 days after Hcy treatment. Pretreated groups with NaHS (30μM/kg) and MK801 (0.05mg/kg) showed improved memory formation as evaluated by recognition tests, CBF, and BBB permeability. In terms of hippocampal alteration, we observed changes in protein and mRNA expression levels of the following: NR1, GFAP, eNOS, ICAM-1, SAP97, PSD95, BDNF, NOX, and MMPs. The present study clearly demonstrates that Hcy (IC) induces altered BBB integrity and CBF which is related to memory impairment and hippocampal toxicity and more importantly that NaHS and MK801 treatments can help ameliorate homocysteine's negative effects.

73. Tyler Lambert & Adriana Neely

Morehead State University
Mentors: Steve Chen & Janet McCoy

Faculty Members' Perception and Motivation for Engaging in Service Learning

Service-learning is a form of intentional and experiential learning that incorporates an academic focus with useful skills applied in the workforce. To promote faculty members' engagement in service-learning, a survey was conducted at a regional public university in eastern Kentucky to examine the faculty's perceptions and expectations toward this high impact teaching strategy. Eighty-five faculty members (31 males; 54 females) completed a self-created questionnaire (64 items) based on six existing survey-learning evaluation tools. Using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree), participants were asked to rate factors related to service-learning such as reasons for involvement, potential benefits and shortcomings of this pedagogy, and perceived support provided by the institution. A series of high Cronbach's Alpha values (all of them > .912) represented a strong level of reliability on ratings of all Liker items. The results showed that faculty participants highly valued service-learning, since it enhanced student learning and supported community partners. This perceived benefit was also the primary factor driving the participants to be involved in service-learning. Participants also showed support in continuing or beginning a service-learning program in the near future (M = 4.05). However, concerns related to how the adoption of service-learning may impact faculty members' performance in research and professional service areas were identified. In conclusion, it is believed that service-learning would help students build hands-on experience and networking opportunities for their future employment. Those who were satisfied with their service-learning experience (M = 3.93) tended to perceive the benefits of service-learning highly. The needs for establishing clear policies that reward and encourage faculty members' engagement in service-learning were further discussed.

74. Dana Leigh

Eastern Kentucky University
Mentor: Stephen Richter

Conservation Genetics of Crawfish Frogs at Big Oaks National Wildlife Refuge

Crawfish frogs (*Lithobates areolatus*) have been experiencing significant population declines across their range over the last several decades due to widespread habitat loss and fragmentation. The Big Oaks National Wildlife Refuge (BONWR) in southeastern Indiana, the easternmost locality of crawfish frog populations, houses recently discovered, isolated populations of crawfish frogs. We studied these populations to (1) determine the diversity and distribution of genetic variability among populations at BONWR and compare this to other genetic studies of crawfish frogs and (2) examine how landscape features and distance affect the distribution of genetic variability. We used 11 microsatellite loci to genotype frogs collected from eight sites on BONWR from the 2012 and 2013 breeding seasons. We then compared these genetic data to the landscape using GIS. Data from this study will provide a better understanding of patterns of gene flow among crawfish frog populations on the BONWR, yielding data necessary to inform management initiatives for this endangered species.

75. Karyn Loughrin

University of Kentucky
Mentor: Andrew Stainback

Sustainable Land Use around Nyungwe National Forest Reserve

We looked at sustainable land use options around a national forest in Rwanda, which would help local land users but also preserve the rich biodiversity of the region. Many local stakeholders rely heavily on resources from the forest and this compromises many ecosystem services and puts pressure on conservation efforts. First I began with a literature review of sustainable land use practices, the analytical hierarchy process (AHP), and developed a background on the area. Then focus groups were held to determine important factors of sustainable land use in this area. After collecting this information from extension agents and scientists, who were familiar with the Nyungwe, AHP was used to have the participants make pairwise comparisons between different factors they had come up with. The three major categories were improved ecosystem services, improved livelihoods, and increased land productivity. Then using this information and AHP Decision (a computer program) I was able to interpret the survey results and rank the importance of each factor within a category and then rank the categories as a whole to each other and eventually could give each factor a global priority value making them all comparable to each other. After finding the final rankings I was able to analyze what factors extension agents and scientist felt were most important and make suggestions on areas to focus energy and resources to provide the most benefit. I found that improved livelihoods were determined to be the most important specifically high net return to landowner and increased fodder and crop production. These were followed by food security and soil fertility. The sustainable land use practices which focus on helping local people feed and maintain themselves is important and would also address issues with conservation in the forest.

76. Meagan Lovins

Northern Kentucky University
Mentor: Joseph Nolan

An Investigation of the Impact of Socioeconomic Status on Educational Outcomes in Grades K-12

K-12 schools and their students are constantly evaluated at state and national levels based on student test scores. Students in Kentucky are required to take three related tests: EXPLORE, PLAN, and ACT. Using repeated measures analysis of variance, this study investigates the potential effects of various demographic variables on these test scores. Evidence indicates that socioeconomic status, ethnicity, special education, and limited English proficiency status may relate to scores. Understanding such relationships may assist educators throughout the state in decision-making as they strive to provide the best educational programming for their students.

77. Tianna Lyles

Kentucky State University
Mentors: George F. Antonious & Eric Turley

Assessment of the Kentucky River Water Quality

The water quality in the U.S. has greatly improved since the implementation of the Clean Water Act (CWA) in the early 1970's. Unfortunately, the Clean Water Act only addresses one kind of water pollution, point source pollution. Agriculture activity is commonly regarded as the leading contributor to nonpoint source pollution. The Kentucky River and its offshoots provide the essence to the frame of the basin. The streams provide water for communities, commerce, and agriculture. The streams also transport wastes from the body of the basin, such as, human and animal wastes, grease, oil and combustion by-products flushed from city streets, industrial wastes, pesticides, herbicides and fertilizers from home and farm use, and many others. In this project, water samples have been taken from three locations along the Kentucky River to assess water quality parameters. Dissolved oxygen, conductivity, pH, ammonia, and nitrate analyses were performed. Monitoring these water quality parameters revealed that the average concentrations of dissolved oxygen was 8.60 mg/L, conductivity was 347 µmho/cm, the pH was 8.17, ammonia-nitrogen was 0.144 mg/ L, and nitrate-nitrogen was 0.289 mg/L respectively. The data shows that the Kentucky River water quality are well below Kentucky water quality standard limits except for ammonia –nitrogen with its value being more than 100 % above the standard level.

78. Casey Lorraine Magyarics

University of Kentucky
Mentor: Jonathan Golding

Impact of Number and Type of Stalking Behavior on Perceptions in the Courtroom

Every state in the United States has legislation that designates stalking as a criminal behavior, but the specific behaviors that constitute stalking can vary across states. The purpose of the present experiment was to investigate the characteristics of stalking behavior that deem it as criminal in the eyes of community members acting as mock jurors. This experiment investigated mock-juror perceptions of ex-intimate stalking using Kentucky's anti-stalking legislation. The experiment used a mock-juror methodology, which 195 community members (121 females) recruited through "Mechanical Turk" (an online participant recruitment site) read a stalking trial summary and rendered individual judgments. The two levels for number of stalking incidences were 5 text messages per week or 30 text messages per week. The type of stalking behavior also had two levels, which were stalking through text message or in-person stalking. Three research questions were tested in this experiment. First, it was hypothesized that participant gender would have an effect on trial judgments (e.g., number of guilty verdicts) with women being more pro-victim (e.g., high guilt ratings) than men. Second, it was hypothesized that an increase in the number of stalking behaviors would increase pro-victim judgments. Finally, it was hypothesized that in-person stalking would increase pro-victim judgments more than stalking through text messaging. The results supported the hypotheses. Women were twice as likely to render guilty verdicts, regardless of condition, than men. In addition, both men and women rendered significantly more guilty verdicts in the 30 stalking incidents condition than in the 5 stalking incidents condition. Finally, there were significantly more guilty verdicts in the in-person condition than in the text message condition. The results of the present experiment may be used to gain a better understanding of the community's definition of stalking behavior, which could yield more consistent legislation within the United States.

79. Suhaib Mahmood

Western Kentucky University
Mentor: Kevin Williams

The Unorthodox Reaction Rates of Anti-cancer Familial Platinum Compounds with Methionine and Guanosine Monophosphate

Nuclear magnetic resonance spectroscopy has been used to determine the effects of various N-heterocyclic ligands on the reaction rate of platinum compounds with both DNA and protein. Common anti-cancer drugs such as cisplatin and oxaliplatin are known to react faster with methioinine residues when compared to guanosine monophosphate (5' GMP). This leads to cytotoxic side effects. The study synthesized multiple platinum analogs, differing only in the attached N-heterocyclic ligands. Comparisons on the reaction rates of these compounds with GMP and methionine were made and differing reaction speeds were observed. The addition of the heterocyclic ligand adds steric hindrance cis to the leaving ligand, and thus larger ligands will greatly diminish the rate of substitution. This steric hindrance retarded the methionine reactions to a degree that very much exceeded the adverse effects on the 5' GMP reaction. Also, it was found that once 5' GMP had reacted, methionine was unable to displace it but the reverse did not hold true as 5' GMP displaced a complete methionine reaction. It also appeared that regardless of the ratio of the reagents present in the various reactions, the products distribution remained constant. These findings could lead to an eventual reduction of cytotoxicity caused by platinum based anti-cancer drugs.

80. Payton Malone

Eastern Kentucky University
Mentor: Rebekah Waikel

Estrogen Mediated Regulation of TGF-β Pathway Signaling in Cardiac Hypertrophy

It is well documented that pre-menopausal women are protected from heart disease, in part through the effects of estrogen. The cellular mechanisms activated by estrogen are interesting due to undesirable side effects linked to estrogen therapy in practice. Once understood, these mechanisms can be targeted for cardioprotective therapeutic approaches. We focused on the TGFβ pathway, known to promote cardiac hypertrophy. Estrogen treatment can prevent the development of hypertrophy in cardiomyocytes and estrogen treatment attenuates TGFβ signaling in cardiomyocyte hypertrophy. However, the relationship between the two is unclear. Our working hypothesis is that estrogen mediates its cardioprotective effects through activating microRNAs (miRNA), which in turn target TGFβ member transcripts, inhibiting TGFβ signaling. The miRNAs are a class of functional RNAs inhibiting the expression of gene targets. To address the control of the TGFβ family expression by estrogen; we performed a series of *in vivo* experiments comparing levels of TGFβ family members and targeting miRNAs in male and female mice who had undergone a surgical procedure inducing cardiac hypertrophy, as well as sham surgical mice and those of various ages without surgical intervention. Next Generation Sequencing was performed to establish miRNA profiles in male and female cardiac hypertrophy. Using Target Scan, we determined which differentially expressed miRNAs likely inhibit TGFβ family members. We confirmed sex differential expression of TGFβ family members and potential inhibitory miRNA using TaqMan assays. Our identified miRNAs can be used as targets for the development of new therapies to bypass estrogen's negative effects.

81. Nolan Mark

Murray State University
Mentor: Ben Ashburn

Detection of Sand Boil Locations Along the Mississippi River in Fulton County, Kentucky

During the past years, the Jackson Purchase area of Kentucky has received significant amounts of rainfall. Coinciding with this increase of rainfall has been a large amount of snowfall over the tributaries of the Mississippi River in states north of Kentucky. Fulton County maintains a 17 mile long section of this floodway on the Kentucky north of the stateline border with Tennessee. Within the time span from 2008 to 2011, the river gage at Cairo, Illinois has reached flood stage sixteen times, moderate flood stage seven times and major flooding three times. In the months from February to May of 2011, major flooding occurred within the confluence area of the Mississippi and Ohio Rivers reaching a stage of 61.72 feet. Prior to breach of the Birds Point levee on May 2, 2011 in Mississippi County Missouri, the levees in Fulton County were subject to extreme hydraulic pressure. This caused sand boils to form. Sand boils occur when water from the river is forced below levees and then "boils" to the surface on the land side of the levees. This research had two objectives. The first objective was to find out how remotely sensed data can be used to identify the locations of sand boils. The second objective was to compare results from remote sensing results based on ground soil tested data.

82. Victoria Mathis

Kentucky State University
Mentors: Avinash M. Tope & Phyllis Rogers

Urinary Levels of Oxidative Stress Marker (8-OHdG) in Young African American Population with Metabolic Syndrome (MetS): A College Study

There are ethnic disparities in the prevalence of obesity in the US population. African Americans (AA) continue to report higher rates for obesity than any other ethnic group. Overweight and obesity are linked to greater risk for Metabolic Syndrome (MetS), a frank indicator of risk of future chronic and cardiovascular diseases (CVD). One of the possible mechanisms for increasing the risk for CVD might be the excessive generation of Reactive Oxygen Species (ROS) produced either endogenously or exogenously that could attack lipid, protein and nucleic acid in the living cells. 8-hydroxydeoxyguanosine (8-OHdG), an oxidized nucleoside of DNA, is the most frequently detected and widely studied DNA lesion and its urinary level is used as a good biomarker of generalized, cellular oxidative stress. There are limited data on prevalence of MetS and levels of 8-OHdG in young AA adults (18-24years). In the current study on evaluation of prevalence of MetS in college freshmen, fasting urine samples were collected from consenting healthy (n=113) and students detected with MetS (n=29), in the last two years. The average age of the participants was 19.5 years. Using ELISA technique, the urine samples were analyzed for assessing the levels of 8-OHdG. Correlations with individual factors for MetS and urinary levels of 8-OHdG were ascertained. The findings of the study would offer greater insight in designing effective nutritional and life style related strategies in better management of MetS, especially in young AA adults.

83. Emily Mayo

Eastern Kentucky University
Mentor: Ryan Sharp

Evaluating Environmental Education Programing: A Case Study at the Red River Gorge, Kentucky

All park systems face many different management issues including environmental aspects and visitor experience aspects. Environmental aspects would include the effects of visitor use in the designated area such as trail erosion and loss of plant and wildlife. While visitor aspects focus on aspects such as the visitors experience while visiting the park. One common way to find out if a park system is meeting the management needs is to perform surveys. These surveys can consist of oral or written surveys and/or observations. The purpose of this research is to determine if a correlation between visitor knowledge of reasonable impact levels (the management issues) and visitor education levels exists, based on quantitative and qualitative data. The researchers surveyed the visitors within the Red River Gorge over a period of four weekends resulting in a total of 500 surveys. The researchers analyzed visitor knowledge (management issues and visitor awareness of the issues) and the visitors' demographics (information including: sex, income, age, and education level). The researchers suspect that higher education levels offer more knowledge the visitor will have on reasonable impacts of visitor use within the designated recreational area (Red River Gorge). This will help determine the efficiency of parks and recreation management practices, when it comes to the "average" visitor. The parks system (Red River Gorge) will then understand how to better address the "average" visitor when it comes to park management.

84. Chasity McIntyre & Lauren Trent

Murray State University
Mentor: Lloyd P. Horne

Fundamental Studies of Electron Transfer Active Iridium Oxide Nanoparticles in Solutions and on Conducting Surfaces

STUDY 1 (McIntyre): ***The Effects of Dissolved Carbon Dioxide on the Optical and Electronic Properties of Solutions of Diffusing Iridium Oxide Nanoparticles***

One promising paradigm in alternative energy research is the photocatalytic conversion of sunlight, via water oxidation, into electrical energy. The overall efficiency of this water-splitting process is hindered by slow electrode kinetics, which result in large overpotentials. To mitigate this problem, research efforts are focused on developing catalysts for driving these electrochemical reactions closer to their respective thermodynamic potentials (i.e., at lower overpotentials). With respect to water oxidation, some of the lowest known overpotentials have been achieved using very small (~2 nm diameter) iridium oxide (IrO_x) nanoparticles dispersed in solutions (i.e., freely diffusing) and supported as films immobilized onto electrode surfaces.

We have recently discovered that both optical and electronic properties of these nanoparticles are affected by the presence of dissolved gas, such as carbon dioxide. In this study, we report a systematic investigation into these phenomena, as they relate to solar energy conversion.

STUDY 2 (Trent): ***The Effects of Film Architecture and Particle Chemistry on Proton-Coupled Electron Transfer at Mesoporous Films of Iridium Oxide Nanoparticles on Electrode Surfaces***

Iridium oxide (IrO_x) nanoparticles are excellent catalysts for water oxidation and have potential utility in dye-sensitized photochemical cells. These nanoparticles undergo proton-coupled electron transfer (PCET) in aqueous solutions, thereby making their redox behavior sensitive to environmental pH. This work reports progress towards a detailed understanding of how the architecture of IrO_x nanoparticle films and particle chemistry govern redox behavior. An anodic potential was applied to charge the IrO_x nanoparticles to the +6 oxidation state, thereby catalyzing the 4 e^-/4 H^+ oxidation of H_2O into O_2. This facilitates the flocculation, or adherence, of nanoparticles to the electrode interface. Consequently, a disk electrode was coated with a very thin, mesoporous film of 2 nm diameter IrO_x nanoparticles. Strategies for controlling film formation, structure, and reproducibility were investigated. Corresponding voltammetry provided new insights into how these variables influence film electrochemistry.

85. Katherine Messer

Morehead State University
Mentor: Alana Cain Scott

Cries for Democracy: The Causes of the 1989 Student Protests at Tiananmen Square

The celebrated founder of the People's Republic of China (PRC) Mao Zedong was criticized for his actions that led to the Cultural Revolution and the lessening of civil liberties. After his death Deng Xiaoping rose to power and backed Hu Yaobang as General Secretary of the Communist Party. Hu worked to make government more transparent and restore civil liberties. While opposing leadership removed Hu from power, after his death supporters protested the government's actions against him. Many supporters were university students who worked in Hu's memory for democracy. Feeling ignored by their government, the demand for democracy grew. The May 1989 Hunger Strike prompted President Yang Shankun to call for martial law and greatly intensified the movement on both sides. An internal struggle between China's people and government threatened to rip the country apart and eventually led to the June 4th Massacre. Yet other sectors of the population did not join the movement and it did not spread outside of Beijing. If the government was so corrupt, then why did other sections of the population not participate more? This research explains why the movement was limited to university students and Beijing and uses a variety of primary sources such as contemporary speeches and memoirs as well as telegraphs among Western embassies. By examining the protest movement from both the inside and outside one can better understand the motivations of the Chinese people as well as why the movement was doomed to fail.

86. Andrew Monarch

University of Louisville
Mentor: Sherri L. Wallace

Liquor Licensing in the Commonwealth

Kentucky distilling companies shipped around 2.5 billion dollars in product last year and created an estimated 8,600 jobs in our state. Kentucky is also responsible for over 90% of the world's bourbon whiskey yet we have some of the most complex laws regarding liquor licensing. There are over 70 types of liquor licenses throughout the state and we support Steve Beshear's attempt to streamline these liquor laws into something more manageable and more fiscally fruitful. We allow individual precincts to decide on their wet/dry status and this puts an enormous strain on our state's regulating officials. This is not only a financial burden but it also creates confusion among the people which hurts the overall political perception of our state's government. In trimming down the perplexity of our states liquor laws we will be more effective in alcohol regulation as well as pave the way for "cleaner" legislation that can allow our state to further capitalize on this enormous resource. This will also improve political attitudes towards our state government. With more clearly defined laws we have the opportunity to create more jobs and expand one of our states largest businesses to suffering counties. We can also increase revenue for existing Kentucky businesses and allow the KY Department of Alcohol Beverage Control to more efficiently regulate alcohol distribution and consumption throughout the state.

87. Cheyenne Morgan, Ashley Register, & John Singletary

Elizabethtown Community & Technical College
Mentor: Joe Wolf

β-lactamase Expression in* Bacillus cereus *from Greens

Bacillus cereus is a gram-positive soil bacterium that can release toxins and cause food poisoning when it contaminates food in sufficient numbers. In this study, low numbers of *B. cereus* bacteria were isolated from homogenates of mustard, kale, turnip, and collard greens plated on chromogenic Brilliance Agar. Proper differentiation of this species from closely-related species is important for identification; therefore several confirmation tests were performed on isolates. These tests included mannitol fermentation and multiplex Polymerase Chain Reaction (PCR). It was hypothesized that the isolates would show resistance to penicillin, based on studies by others where isolates from different sources were examined. All isolates were found to express β-lactamase, conferring resistance to penicillin, but were sensitive to several antibiotics, including vancomycin.

88. Jared Napier

Morehead State University
Mentor: Thomas Pannuti

Searching for Time Variability in the X-ray Emission from the Discrete Source Population of the Nearby Galaxy NGC 55 as Revealed by the Chandra X-ray Observatory

X-ray observations of nearby galaxies reveal classes of sources - such as x-ray binaries, galactic nuclei, and background galaxies - that are known to exhibit time dependence in their x-ray emission. To help characterize the discrete x-ray sources detected toward the nearby galaxy NGC55 by the ChandraX-Ray Observatory we have searched for evidence of time variability using the standard tool "glvary", the Gregory-Loredo algorithm based in Bayesian statistics. We have identified two sources which show robust evidence for variability during the sixty kilosecond observation: one source (CXOU J001502.2-391425,0) appears to be physcially associated with the galaxy and may be a resident X-ray binary while the other source (CXOU J001438.5-391241) appears to be seen outside of NGC 55 and is likely to be a background galaxy. We describe our analysis and methods as well as our initial results.

89. Jonathan Overbay

Eastern Kentucky University
Mentor: Tanea Reed

Enzymatic Analysis of Oxidatively Modified Proteins in Moderate Traumatic Brain Injury: A Time Dependent Approach

Traumatic brain injury (TBI) affects millions of people worldwide each year. It is harmful, not only due to initial trauma, but also secondary damage. Oxidative stress, due to reactive oxygen and reactive nitrogen species, is one of the major mechanisms investigated in secondary injury of TBI. This creates an imbalance in antioxidants and pro-oxidants in the brain, causing damage to components of the cell including proteins. A moderate TBI model involving Wistar rats was used to analyze enzyme activities of creatine phosphokinase and enolase, essential metabolic enzymes, relative to injured and non-injured samples. Creatine phosphokinase is used as an energy transport shuttle system and provides rapid ATP buffering capacity, thereby acting as an energy reservoir throughout the cell. Enolase, an integral part of the glycolytic pathway, is highly expressed in neuronal cytoplasm. In this experiment, a time dependent treatment model was used. Injured samples were given 150 mg/kg of gamma-glutamyl cysteine ethyl ester (GCEE) or saline, at either 30 minutes or 60 minutes post-injury. The GCEE is an ethyl ester moiety of gamma-glutamyl cysteine, which is a limiting factor in the formation of glutathione, the most potent antioxidant in the brain. This investigation, showing elevated metabolic enzyme activity in GCEE treated samples, further demonstrates the efficacy of GCEE as a possible therapeutic strategy in the treatment of TBI.

90. Heather Owens

Northern Kentucky University
Mentor: Kajsa Larson

Vida Cotidiana v. Everyday Life: A Study About the Effects of Studying Abroad on Students and Their Cultural Perceptions

The purpose of this poster is to examine the differences between undergraduate university students in Segovia, Spain and Northern Kentucky University, America. In addition to studying the different cultures, this poster also seeks to expound on the effects that studying abroad has had on the students' everyday lives as well as their cultural perception of both Spanish and American cultures. The main subjects of the research are the thirty undergraduate students who participated in the Kentucky Institute for International Studies' Spain II program to Segovia, Spain from July 1-July 31st, 2013. During the orientation meeting for the study abroad program, April 13th, 2013, students were given a pre-survey about their daily lives and routines in America. Informal research was done throughout the students' time in Segovia, and then a post-survey was issued on the final day of the trip to all the students that asked about their daily lives in Spain, what were the biggest differences between Spain and America for them, and what they intended to change about their routine in America. The final post-survey will be administered during the month of November to judge what changes to their daily lives have actually occurred. While the study has not been fully completed, from the data already received it is clear that many changes have occurred in the students' lives within their perceptions of themselves, their daily diets, and their level of exercise.

91. William Parker

Morehead State University
Mentor: Gary O'Dell

Historic "Moonshine" Distilling Sites in the Daniel Boone National Forest

Whiskey distillation has a long tradition in Kentucky. Many early settlers brought copper stills into Kentucky and set up their apparatus wherever they established a homestead, so that by 1810 there were more than 2,000 small distilleries operating in the state. In addition to satisfying the need for personal consumption, whiskey distillation provided significant value added through conversion of a bulky, low value crop such as corn into a compact, easily transportable and valuable commodity for export. Passage of the 1919 Volstead Act and imposition of nationwide Prohibition promoted widespread illegal distillation in the 20th century. Small-scale production continued in the form of illegal "moonshine" stills hidden away in remote areas of the state, usually destroyed when discovered by authorities. The only systematic survey of historic illegal still sites was conducted by archaeologists for the Daniel Boone National Forest on federal property in eastern Kentucky, a by-product of the need to assess prehistoric cultural resources in the DBNF. Information gathered was held only in hard copy and not subjected to analysis until, during 2012-13, the investigator examined all DBNF site reports and was able to identify 107 locations representing former illegal stills. Most sites were located within natural concavities in sandstone cliffs, known as rock shelters, and many artifacts display axe marks and other indications of intervention by law enforcement. For some sites, historic period of distillation can be determined by associated artifacts. The detailed information on these reports has allowed an analysis of the nature, distribution, and significance of this clandestine Kentucky industry.

92. Jason Payne

Western Kentucky University
Mentor: Rajalingam Dakshinamurthy

A Single Step Synthesis and Characterization of Nanowires & Nanospheres for Catalytic Applications

Nanoparticles are of immense interest due to their potency for a wide range of applications. Inorganic metals such as gold have been extensively used for catalytic reduction of p-nitrophenol in presence of NaBH4. p-Nitrophenol is an environmental and biological toxic agent which is widely used in industries for a variety of purposes. Here, we report a single step, biofriendly synthesis of gold nanoparticles (AuNPs) with the help of a fluorescent dye called rhodamine-6G. We were successfully able to form AuNPs of different morphology i.e. gold nanowires and nanospheres by varying the concentration of rhodamine-6G. The synthesized gold nanostructures were characterized using transmission electron microscope (TEM), scanning electron microscope (SEM) and UV-Vis spectroscopy that proved the formation of rhodamine-6G containing gold nanostructures. Catalytic activity in reducing p-nitrophenol to p-aminophenol was assessed and compared for similar concentration of rhodamine-6G gold nanowires and nanospheres using UV-Vis spectroscopy. Finally, using the spectroscopic data, rate constant (k) was calculated and compared for individual nanostructures to determine the effect of rhodamine AuNPs morphology on catalytic reduction activity.

93. Holly Poore

University of Kentucky
Mentors: Richard Milich & Elizabeth Lorch

Emotional Understanding as a Mediator of ADHD and Negative Social Outcomes

Children with Attention Deficit/Hyperactivity Disorder are more likely than peers without the disorder to be disliked or rejected by peers. In turn, social rejection of children with ADHD may be tied to more aggression or other negative behaviors shown by these children. The present study investigated to what extent children with ADHD symptoms exhibit negative behaviors during a playgroup with previously unacquainted children and whether children's understanding of others' emotions explained the relationship between ADHD symptoms and negative social outcomes. Sixty-one children aged 8-10 years old watched an episode of a televised family comedy. Then, participants were asked cued recall questions concerning the story characters' emotions and internal states. Children later participated in playgroups of 6-10 unfamiliar children. The children completed six tasks, including creating a group name, cooperating to solve a problem, and completing a puzzle. The number of ADHD symptoms was measured by parent and teacher reports. Emotional understanding was measured by the number of correctly answered cued recall questions about TV characters' emotions and internal states. Behavior measurements included the number of positive and negative behaviors displayed, as well as global ratings of each child' positive and negative behaviors, acceptance and rejection, and emotion dysregulation. Preliminary analyses indicated that children rated higher in ADHD symptoms by parents and teachers were rated by independent coders as higher in negative behaviors and emotion dysregulation than children rated lower in ADHD symptoms. Further analyses will evaluate the role of emotional understanding in the relation between ADHD symptoms and social behaviors.

94. Ann-Claude Rakotoniaina

University of Louisville
Mentor: Charles Hubscher

Step Training Alleviates Bladder Dysfunction in Spinal Cord Injured Rats

Patients with spinal cord injuries experience various types of dysfunction, including impaired mobility and bladder dysfunction. Therapies for spinal cord injury patients include physical therapy to improve mobility, but to address bladder dysfunction patients often must be catheterized, which can lead to complications such as bladder obstruction and kidney infection. We examined the effects of step training on bladder function in spinal cord injured male rats. The rats were divided into forelimb-trained, quadrupedal-trained, and non-trained groups. Metabolic cages were used to track the rats' fluid intake and urine output. This data was recorded every week throughout the course of a nine-week period of step training. Training of any kind showed a trend toward a return to pre-injury levels of void efficiency and mean urine volume in a 24-hour period. This suggests that physical therapy including step training alleviates spinal cord injury-related bladder dysfunction. Thus, physical therapies for spinal cord injury patients can be designed such that bladder function is improved through step training, reducing the need for catheterization.

95. Victoria Ramlose

Murray State University
Mentor: Shea Porr

Management of University Equitation Horses and its Effect on Soundness

Interest in equine programs has been increasing during the last decade. This has resulted in a greater use of horses in university programs across the country. Lameness limits the use of the horses, hampers both the health of the animals and teaching and learning opportunities for students, and is an added financial burden to the university. In university equitation programs, horses are often ridden much less frequently in the summer, as courses are typically only offered in the fall and spring semesters. Previous research has noted that changes in exercise programs sometimes result in increased lameness in some horses. The focus of this project was to monitor the exercise level of university horses throughout the summer and fall semester to determine whether there was a correlation between the sudden rise in horse workload in the fall and any lameness that might develop during that semester. Data was collected weekly from May through December, and included exercise frequency and level as well as any lameness that developed. Workload was categorized into four groups: light, moderate, heavy, and extensive based on the scale developed by the 2007 NRC Nutrient Requirements for Horses. Lameness was documented by experienced horsemen and addressed by a veterinarian as needed. Lack of a correlation between lameness and summer horse use would indicated that the university could continue its current equestrian management strategies. However, if a correlation is discovered, subsequent research would evaluate the implementation of a regular exercise program throughout the summer and its impact on subsequent equine lameness.

96. Keisha Ray, Carlet Hagan, & Gabrielle Manny

Western Kentucky University
Mentors: Brad Stinnett & Fred Gibson

Sustainability and Collegiate Recreational Sports Facilities

Sustainability is a hot topic in higher education. Green and renewable are buzzwords that have helped brand modern environmentalism. A greater emphasis on facility planning, development, and management is contributing to sustainability efforts. Collegiate recreational sports programs often include facilities that pose a challenge to the green movement, due to their size and operational requirements. The purpose of this study was to assess levels of personnel knowledge and institutional commitment related to sustainable initiatives at collegiate recreational sports facilities. This foundational study attempted to create some benchmark data for the collegiate recreation industry within the National Intramural-Recreational Sports Association (NIRSA). The Collegiate Recreational Sports Sustainability Survey was developed to assess the variables in the study and was sent to directors of NIRSA member institutions. This research produced a number of key findings: the LEED Accredited Professional (AP) certification is virtually non-existent among collegiate recreational sports professionals; institutions that led in commitment levels per their respective category type were two-year public institutions, large enrollment institutions, institutions from NIRSA Region VI, and institutions that contain large collegiate recreational sports facilities; statistically significant differences in commitment levels existed between four-year public and four-year private institutions, between large and small enrollment institutions, and between institutions that had large and small facilities. Implications from this study included providing benchmark data, LEED-AP credential considerations, creating advisory committees, and modeling NIRSA Region VI institutions. This study established a foundation for further research on sustainability efforts in collegiate recreational sports.

97. Hannah Rodgers

Western Kentucky University
Mentors: Rajalingam Dakshinamurthy & Rammohan Paripelly

Single Step, Antibiotic Mediated Synthesis of Gold Nanoparticles with Potent Antimicrobial Activity

Gentamicin is an aminoglycoside antibiotic with bactericidal activity that works through binding the 30S subunit of the bacterial ribosome, interrupting protein synthesis. In this study we synthesized Gentamicin capped gold nanoparticles (GNP's) through a single step process in an aqueous buffer. The GNPs were identified and size was determined with transmission electron microscopy. The average diameter of the particles is 50 +/- 10 nm. Further characterization was carried out with UV/vis spectrophotometer, Electron dispersion spectroscopy (EDS) and FTIR analysis. Elemental composition of GNP's was determined with EDS. Different antibacterial tests such as Turbidimetry, Spread plate assay, Tetrazolium salt based colorimetric assay and Micro-dilution Alamar blue assays were carried out on both Gram-negative and Gram-positive bacteria to determine the minimum inhibitory concentration of GNP's. Bacterial cross sectioning was performed, to document the morphological changes on bacteria caused by GNP's treatment. GNP's activity was further confirmed with propidium iodide assay. Compared with the concentration of the Gentamicin alone, the Gentamicin gold nanoparticles have yielded a lower minimum inhibitory concentration, indicative of their success.

98. Helen Sauer

University of Kentucky
Mentor: Alison Davis

Overview of Community and Economic Development Programming in Southern Land-Grant Universities

Modern budget constraints make it imperative to measure contributions made by community and economic development (CED) extension programs. As a first step, this research project surveys CED programming in continental land-grant universities associated with the Southern Rural Development Center. Comparing program information from the universities' Plan of Work and extension websites, this project identified regional trends in eight CED focus areas, finding widespread emphasis on entrepreneurship, emerging interest in environmental planning and differences in specialization between smaller and larger universities. Additionally, this research found that 81.8% of universities surveyed included CED programming in their extension portfolio. This overview provided the analytical framework to highlight innovation and areas of future growth in CED programming throughout the Southern region.

99. Rebecca Schwager

University of Kentucky
Mentor: John Cox

Parasite Prevalence in Kentucky Elk as Determined Through Abomasal Parasites and Fecal Egg Counts

Elk (*Cervus elaphus*) were extirpated from Kentucky in the mid-1800's, but a successful translocation of the Rocky mountain subspecies (*Cervus elaphus nelsoni*) from 5 western states has successfully reintroduced the species back to the Commonwealth. High reproductive and survival rates have allowed the elk to grow from 1500 to nearly 12,000 in the past decade. With elk numbers steadily increasing, it is important to be aware of potential pathogens that can have an effect on herd health. Studies have shown that parasite prevalence is directly related to cervid population health and density, and thus assessment of gastrointestinal parasite species in the current elk population will be an important monitoring tool to determining long-term population viability and general health. The objective of this study was to assess the prevalence of select parasite species in Kentucky elk, based on abomasal parasite and fecal egg counts. During the Kentucky elk hunt of 2012, abomasal and fecal samples were collected from 40 hunter-killed elk (20 cows and 20 bulls). Abomasal contents were used to quantify the luminal parasite burden, and fecal samples were used to quantitate the parasite eggs in each individual specimen. These results provide a baseline assessment of the most prevalent parasite species, and downstream analysis will also analyze the possible correlation between luminal parasite counts and fecal egg counts. The data from this analysis will assist in the maintenance and sustainability of a healthy elk population in Kentucky, which currently comprises about 80% of all elk in the eastern United States.

100. Rebecca Seitz & Nina Salazar

Eastern Kentucky University
Mentor: Barbara Wheeler

Forensics Serving the Community

Elmwood is a 9,000 square foot chateau-style mansion located on approximately 20 acres directly across from the main campus of Eastern Kentucky University. Upon her death, the will stated that the previous owner, Emma Watts, wanted her Elmwood estate to be preserved just as it was when she lived there and she provided for this by setting up a trust fund. The home and land was maintained until 2011, when after 41 years, the trustees transferred ownership to EKU. Agreeing to honor Emma's wishes, EKU is working towards preserving the estate through a complete restoration. One aspect of this project is the complete documentation of the estate in its current condition. Techniques commonly used by a forensic scientist are being performed to document and "preserve" materials found in the estate and its furnishings. Over 500 samples have been collected from the house and furnishings without leaving visible damage. A summary of this on-going community service project will be detailed during the presentation.

101. Nazeer Shaikh

University of Kentucky
Mentor: Matthew Gentry

In Vitro Starch Catabolism, a Novel, Environmentally Safe Means of Starch Processing.

Starch is a key component in many aspects of daily life, including nutrition, biofuel production, and industrial processing: 50-80% of daily caloric intake comes from starch; >20% of corn starch produced in the U.S. is converted to ethanol; and starch is a cheap and renewable industrial feedstock for producing paper, textiles, adhesives, plastics, and pharmaceuticals. However, starch is difficult to manipulate during industrial processing because it is insoluble in water. Current means of starch processing involves harsh chemicals and present environmental concerns. Starch-based feedstocks are generated using physical, chemical and enzymatic methods. Physical methods include cyclic heating/cooling between 50°C and >100°C. The addition of acids and bases to this process breaks down starch and converts starch to a structure that is more amenable to further processing. Lastly, an enzyme called amylase is utilized to break starch down into simple sugars (i.e. table sugar). Plants synthesize starch every 24 hours during daylight as a means to store energy captured from the sun. Plants then break down starch at night and utilize this stored energy cache. Clearly, plants do not use harsh chemicals or extreme temperatures to break down starch. Instead, they utilize a cyclic system of three classes of enzymes to break down starch: kinases, amylases, and phosphatases. Our lab is exploring how these enzymes break down starch, defining their properties, and optimizing how these enzymes work. To date, most of the work on the proteins from this system has been done using a standard laboratory model organism that is not agriculturally relevant. Therefore, I chose to study these proteins from agriculturally relevant organisms: potatoes, corn, and rice. I first used molecular biology techniques to obtain the genes of interest. Next, I optimized a protocol to produce the proteins of interest in sufficient quantities to study. With the proteins in hand, I then focused my efforts on characterizing their enzymatic activities. I found that the proteins from the different plants possess varying activities. Each protein from the different plants possesses properties that make them more or less interesting for bioengineering and industrial purposes. Starch catabolism requires multiple enzymes to break it down, but my data demonstrate that we can utilize these proteins from a wide array of agriculturally relevant plants and that the proteins have varying enzymatic activities. This allows our lab to move forward towards characterizing the remaining enzymes crucial to starch breakdown and to build a toolkit of different proteins that work under different conditions so that we can meet the needs of industrial starch processing.

102. Biswas Sharma

Morehead State University
Mentor: Thomas Pannuti

Studying the Dynamical Disturbance in Galaxy Clusters Cores through Analysis of Chandra X-ray Observations

Galaxy clusters are the largest gravitationally bound structures in the Universe. They are dark matter dominated objects, and also contain hot intracluster gas and galaxies by a much lesser amount. Optical and X-ray joint analysis allowed us to fairly determine the dynamical status of cluster cores through the study of the offset between the Brightest Cluster Galaxy (BCG) and the X-ray peak of the hot intracluster medium (ICM). We applied this method to a complete sample of 36 galaxy clusters: the 400d Cluster Survey Cosmological Sample. This is a high redshift sample with redshifts ranging from 0.35 to 0.89, very suitable for precision cosmology studies. The BCG's location was found by the analysis of optical datasets and the X-ray peak was found by surface brightness profile analysis of observations made with the Chandra X-ray Observatory. A better knowledge of the dynamical disturbance in each cluster will allow us to understand how cluster scaling relations change with respect to the fraction of unrelaxed systems and to test X-ray mass measurement assumptions.

103. Brislyn Sizemore

Eastern Kentucky University
Mentor: Rebekah Waikel

***Lipid Production in* Chlorella Protothecoides**

Given the concern for diminishing fossil fuel supplies and the environmental consequences of fossil fuels, it is vital to seek out alternative energy resources. Our laboratory seeks to study the use of the algal species, *Chlorella Protothecoides*, in biofuel production by identifying the genes that control lipid production as well as their regulation. To identify genes that are differentially regulated in lipid producing environments, we performed Next Generation Sequencing and Real Time PCR on algae grown in growth conditions (nitrogen sufficient) compared to algae grown in lipid producing conditions (nitrogen deficient). Lipid production in nitrogen deficient conditions was confirmed using Bodipy 505/515 staining, analyzed by flow cytometry. Analysis of Next Generation Sequencing data yielded distinct algal gene expression profiles for both lipid producing conditions and growth conditions. Blast analysis of differentially regulated mRNA sequences revealed the identity to known genes, as well as several unknown genes. Known genes thought to be involved in lipid production and eight (8) yet to be identified genes were further analyzed by quantitative Real Time PCR. We have confirmed that dihydrolipamide acetyltransferase and acetyl transferase are upregulated in lipid producing conditions. We have also confirmed the differential regulation of the 8 unknown genes. These confirmed differentially expressed genes will now be used as lipid producing markers to identify environmental condition such as pH, light, micronutrients, temperature, etc., which optimize lipid production.

104. Amanda Smith

Murray State University
Mentor: Brandi J. King

The Effects of Color on Students' Perceptions of Personalities

Color and how individuals perceive it has been studied for many years. Even the Internet guru Google studies the effects of color on productivity. In education, many suggestions are introduced with regard to how to decorate the classroom, paint the walls, etc. Even though physical components of climate are important, the teacher's appearance also plays a key role in classroom climate, therefore, this study provides information about how the way educators or presenters dress can influence the audience's perceptions of them. This pilot study seeks to discover how the color of individuals' clothes affects perceptions of whether they are or are not friendly, utilizing responses from students from Kindergarten through 12th grade, as well as adults. Throughout this presentation, the methodology will be presented, as well as the implications that this research may have in the educational community.

105. Kevin Smith

Eastern Kentucky University
Mentor: Catherine Clement

Projecting Self and Increasing Telepresence by Merging Identities

The purpose of the present study was to examine the effect of perspective-taking instructions (PTI) on (a) the tendency to project aspects of the self onto a video game character and (b) the degree of "telepresence" within a virtual world. Perspective taking instructions encourage subjects to imagine themselves as a story character. It has been found in the past that PTI may cause an individual to merge identities with a story character in written stories (Goldstein & Cialdini, 2007) and films (Davis et al., 1996). This study replicated these findings using a video game. Male video gamers completed a character trait measure about themselves before playing a video game, and completed the same measure about the game character after playing the game. Subjects given perspective-taking instructions (PTI) had more overlap in the character traits ascribed to themselves and the game character than did control subjects. PTI did not significantly impact telepresence. Positive and negative implications of these findings are discussed.

106. Tyler Spencer, Porsha Smith, Christopher Thompson, Francis Ibekwe & Jamie Jex

Morehead State University
Mentors: April Haight & Christine Emrich

Assessment and Use of Park and Recreation Areas in Rowan County, Kentucky

Morehead State University's Regional Analysis and Public Policy students researched the health and well-being of the citizens of Rowan County, Kentucky through park and recreation facilities. Rowan County has a variety of health problems that could be addressed by a focus on increased park and recreational area usage, which could improve the physical and mental health of its citizens. The National Recreation Foundation has found that the benefits of outdoor activity include: reduced risk of stroke and heart disease, lung cancer and colon cancer. These health indicators are prevalent in Rowan County. The community groups concerned with these issues include NewCity Morehead, Gateway Wellness Coalition, City of Morehead, Morehead Tourism's Trail Town Initiative, and Sustainable Morehead, Inc.. The main aspects of the research included conducting an asset inventory of existing facilities, collecting demographic information, usage data and health benefits that different recreational facilities provide to the community and developing a pilot survey to assess the public's interests. With an increased focus on park and recreation areas, our research provides community leaders with necessary scientific data to maximize economic and health benefits for Rowan County, Kentucky.

107. Mary Spraggs

Western Kentucky University
Mentor: Steven Gibson

A Multi-wavelength Analysis of Cold Evolving Interstellar Clouds

Since galaxies are essential parts of the universe's structure, their internal workings, like star formation and the interstellar medium (ISM), are important to understand. The ISM is mostly made up of atomic and molecular gas. At some critical point in the clouds' development, the atomic gas will cool and form molecular gas, which can then lead to gravitational collapse and new star formation. Certain properties like density and temperature are important to understanding this process, but are hard to determine without making various assumptions. To test the effects of these assumptions, we ran property analyses using different input parameters and computations involving interstellar dust and carbon monoxide (CO) data. From the data, we could see how different components of the ISM matched up and affected numerical values. A statistical overview of our results, including variations of cloud properties in different regions of the Galaxy to look for environmental influences on star formation will be presented.

108. Kevin Staverman

Northern Kentucky University
Mentor: David Raska

The Cocoon Report: The Healthy Solution for a Happier You!

The Cocoon Report: The Healthy Solution for a Happier You! is a marketing research report focusing on sustainability and the significance of a promotional advertisement on people's behavioral and affective reactions. Using Qualtrics to survey 900+ Northern Kentucky University students, this report is intended to assist NKU Wellness in gaining a better understanding of its target population and how to more effectively reach them. To achieve the goal, our Consumer Insights class distributed a survey. In our survey, a test advertisement was shown to about 60 respondents. Additionally, 60 more respondents were exposed to a control advertisement. We measured the results of both. After gathering and analyzing these data points side by side using SPSS, we were able to determine significant differences in the way respondents answered. Our data shows that respondents who were exposed to the test advertisement felt more surprised and vulnerable than those that were exposed to the control advertisement. Furthermore, we believe, based on the data, that these affective reactions to our test advertisement played a big role in respondents' behavioral reactions. Lastly, we were able to identify specific locations where consumers feel our test advertisement would be most effective. In conclusion, through our primary market research data we were able to gain access into the minds of our target population, determine the affective and behavioral reactions to our test advertisement, and provide recommendations for NKU Wellness. Access the report here: http://www.bluezzoon.com/Bluezzoon/Home/Entries/2013/10/8_How_Does_What_You_Eat_Says_A_Lot_Make_Students_Feel_and_Choose.html

109. Heather Stewart & Alexander LeBlanc

University of Louisville
Mentor: Avery Kolers

Defining and Defending the Incompatibility of Free Will and Determining the Moral and Judicial Implications of the Presence or Lack of Free Will

The project combines the work of two students who have been pursuing a response to a metaphysical dilemma: is free will compatible with determinism, or rather is it possible to be free in a deterministic universe. The first part of the work examines the debate and lays the foundations for an argument of Incompatibility. To achieve these ends, the argument by Compatibilist philosopher Daniel Dennett is explained, criticized, and challenged. Ultimately, we argue that free will is not compatible with a deterministic type of universe. The second part of the work deals with the implications of this conclusion. Largely, it deals with why it seems fundamentally essential to possess free will and the potential to act freely in order to possess moral responsibility. Moral responsibility, we argue, is an essential component of the type of Judicial system in place in the United States. We argue that without free will, people cannot be held morally accountable for their actions. For this reason, it would not seem logical to hold them legally accountable for their actions. We conclude that for the Judicial System to function requires abandoning the beliefs in factors that would make the Universe deterministic. One such factor that is examined is the “Divine Plan” of the Christian God.

110. Bobbie Lee Stubbeman, Maureen Duncan, Tamesha Hayden, Rasha Richards, & Tia McIntosh

Northern Kentucky University
Mentor: Rachael Clark

Measuring Hope and Meaning in Life in a Distressed Census Tract

Project Hope began as a three-year collaborative public engagement of local universities and the Greater Cincinnati Service Learning Network to provide service learning opportunities and enhance academic outcomes while positively impacting local communities. The concentration area for Northern Kentucky University comprised the 505 census tract of West Newport; identified as a distressed area through poverty levels, education attainment, and jobless rates. Under the 505 Initiative, the spring 2013 Positive Psychology class initiated an on-going study with the purpose to measure levels of hope and meaning in life within a sample of Newport residents. Researchers collected quantitative data by administering a Trait Hope Scale and Meaning in Life Scale. Demographic information was collected. Qualitative research is planned as the next phase of the study. Semi-structured focus groups will extend and deepen the information gained from the surveys. Data was analyzed by a fall Biometry class and participating researchers, with results available for poster inclusion. Researchers anticipated an inverse relationship between the measures (hope and meaning in life) and the number of years living in poverty. However, age differences were also predicted. We predicted that younger participants would have higher levels of hope and meaning in life. Researchers will present results to the Westside Citizen's Coalition and their community partner, the Brighton Center, with community action recommendations to promote positive emotion and attitudes (hope and meaning in life), psychological well-being, and community engagement through neighborhood green spaces and social activities.

111. Annetra Taylor

University of Louisville
Mentor: Barbara Polivka

The Impact of Receiving Reiki on Nurses Compassion Fatigue and Compassion Satisfaction

Chronic stress in nursing impacts the quality of patient care and employee satisfaction. Compassion fatigue, which includes burnout and secondary traumatic stress (STS), is manifested by physical, emotional, and spiritual depletion when caring for patients. Compassion satisfaction (CS) is a positive feeling of being able to care for others. To address compassion fatigue, a metropolitan hospital implemented a "Snack and Relax®" (S&R) program that provides healthy snacks and holistic modalities (i.e. Reiki–light touch therapy) to staff for relaxation and stress relief. This study explored: (1) the prevalence of CS, burnout (BO), and STS for nurses who participated in S&R, and (2) differences in CS, burnout, and STS based on receiving Reiki? Participants in this hospital-wide cross-sectional survey completed the Professional Quality of Life Scale, a reliable and valid scale measuring CS, BO, and STS. Forty-four (28%) of the 158 respondents participated in S&R. Snack and Relax participants were primarily staff nurses, female, Caucasian, 40-55 years old, with 20 or more years of experience. For nurses who attended S&R, 16% reported high CS scores; however 32% reported high BO scores and 27% had high STS scores. Twenty-five (57%) received Reiki during their S&R session. Burnout scores were significantly greater for those who received Reiki. There were no significant differences in CS or STS. Nurses participating in S&R reported more burnout and STS than CS. Nurses with greater levels of burnout may seek out Reiki as a relaxation modality. Efforts are needed to increase S&R participation and longitudinally evaluate its impact.

112. Samantha Thomas & Nhan Huynh

Murray State University
Mentor: Dayle E. Saar

Using Molecular Markers to Revise Species-range for Red and White Mulberry, and the Implications for Conservation

Red Mulberry (*Morus rubra*) fruits are an important food for wildlife. The native Red Mulberry looks similar to the non-native, weedy White Mulberry (*M. alba*), and the two species are often mis-identified. Using molecular markers, we tested trees sampled throughout eastern North America. When DNA-identified individuals were mapped, it was obvious that range maps are incorrect. White Mulberry is more cold-hardy and Red Mulberry is actually restricted to microclimates of winter warmth in northern areas. Red Mulberry in these states is very likely an unrecognized conservation concern.

113. Christina Thompson

University of Kentucky
Mentor: Kristin Ashford

Examining the Impact of Anxiety and Prenatal BMI on Preterm Birth

Anxiety is a significant predictor of preterm delivery. High prenatal BMI is also associated with pregnancy complications such as preterm birth. However, there is a lack of research establishing a relationship between prenatal weight, psychosocial factors, and preterm birth. The purpose of this research is to determine if there is a relationship between prenatal anxiety, BMI and preterm birth. A multi-center longitudinal study of 377 ethnically diverse pregnant women with repeated measures design was used. Women greater than 18 years old with singleton gestation were included. BMI was calculated using first trimester weight (kg) and height (cm). Participants' weights were categorized based on ACOG groups (81 of normal weight, 53 overweight, 48 obese). Anxiety was measured in all three trimester using the State and trait anxiety inventory (STAI). Data analysis included descriptive statistics, t-tests, and ANOVA using SAS 9.3 and an alpha of 0.05. Overall, there was no significant difference in anxiety score across the trimesters, with the highest anxiety reported in third trimester (1st: 34.4; 2nd: 32.9; 3rd: 34.5). First trimester BMI was not associated with anxiety or preterm birth (p=.34; p=.16 respectively). In the third trimester, there was a significant difference between mean STAI score when comparing term and preterm birth (p=.05). There was no association in the 2nd trimester (p=.69); however, this relationship approached significance in the 1st trimester (p=.06). When examining anxiety scores by ethnicity, African American (AA) women consistently reported the highest anxiety scores in each trimester; whereas Caucasian (CA) women reported the lowest. There were significant differences between AA and CA anxiety scores in the first and third trimesters (p=.01; p=.01 respectively). Maternal anxiety in the third trimester is significantly associated with preterm birth. Prenatal BMI does not appear to affect anxiety scores throughout pregnancy. Anxiety scores were consistently highest among AA women and lowest among CA women. These data support the need for assessment of anxiety throughout pregnancy, especially in high risk populations. Future research should investigate interventions to reduce anxiety in high risk women.

114. Amber J. Todd & Jason A. Rice

University of Louisville
Mentor: Kristi M. King

Meade Activity Center: Process Evaluation for Increasing Physical Activity Opportunities for Rural, Low-income Children

Rural residency is linked to health inequity because of a lack of access to healthcare services and physicians. Disease prevention is crucial since rural areas are considered medically underserved. The Meade Activity Center ("The MAC") in Brandenburg, Kentucky mobilized its community members to improve public health by creating physical activity programming for all children in Meade County, regardless of their socioeconomic status (SES). The purpose of this process evaluation was to determine if there were differences in physical activity participation among children with different SES backgrounds. The MAC offers a variety of after-school, weekend, and summer physical activity programs for children in Meade County. A sliding fee scale ensures that any child who wishes to participate in programming has access, regardless of SES. Children who were previously or currently enrolled in MAC programming (N = 766, ages 5-18 years) since the MAC's inception in 2011 were invited to participate in the survey study. Low SES children were less active than not-low SES children. There was not a statistically significant difference between SES and children's perception of access to MAC programs. The ultimate goal of MAC is to create physical activity opportunities for children who would not have otherwise been able to engage in physical activity due to fees or transportation barriers. The low response rate of the survey (N = 50, 5.5%) is discussed from the perspective of the rural participants' and parents'/guardians' limited experience with the familiarity of informed consent protocols and survey research.

115. Connor VanMeter

Western Kentucky University
Mentor: Rodney A. King

Functional Characterization of Newly Identified Antiterminator RNAs

Transcription is the central step in gene expression and is a heavily regulated process. Some bacteriophages control the expression of their genes by preventing transcription termination. Transcription terminators stop transcription while antiterminators convert RNA polymerase into a termination resistant form. RNA-mediated antitermination was first discovered in bacteriophage HK022. The transcripts of the phage polymerization utilization (put) sites directly modify RNA polymerase and promote terminator readthrough. New, put-like antiterminator RNAs were identified by searching DNA sequence databases. To determine if these sequences were functional, they were cloned into an antitermination reporter vector. Two different constructs were made using each put-like sequence: one contained transcription terminators upstream of a reporter gene and the other did not. Antitermination activity was estimated by calculating the ratio of reporter gene activity from a construct with terminators compared to a similar construct without terminators. Only one put-like sequence had significant antitermination activity. The sequence from *E. aerogenes* KCTC2190 promoted 8% readthrough. The sequence from *S. marcescens* AS13 promoted only 2.7% readthrough. The sequences from *E. asburiae* NCTC9394 and *E. cloacae* promoted less than 1% readthrough. These results have given insight into the sequence and structural requirements for antiterminator RNAs.

116. Heidi Vollrath

University of Kentucky
Mentor: Magdalena Muchlinski

The Relationship Between Brain Size and Muscle Mass Among Primates

Primates have larger brains than most other mammals, yet they do not have significantly higher metabolic costs. In other words, although the brain tissue needs more energy to function the overall energy needs of large brain primates do not increase significantly when compared to small-brained animals of a similar size. There have been a number of proposed theories to help clarify this phenomenon. The Expensive Tissue Hypothesis suggests that primates are offsetting the energetic demands of a large brain by reducing the size of other metabolically expensive tissues (e.g., the gut). Brain/tissue tradeoffs have been studied in depth with many organs however, little attention has been given to skeletal muscle. Skeletal muscle has exceptionally high metabolic requirements when active, higher than most other organ systems. To evaluate if there was an energy tradeoff between brain and skeletal muscle, we dissected and obtained muscle mass weights from 15 primates species. We then collected endocranial volumes (a measure of brain size) from the literature. We found a significant negative correlation between relative endocranial volumes and muscle mass. This study will allow evolutionary biologists to better understand how primates and humans can sustain a relatively large brain, without additional metabolic requirements. This is just the first phase of a long-term study that will evaluate the relationship between muscle fiber composition, growth and development, brain enlargement and human health (e.g. diabetes and obesity).

117. Alexandria Wages & Allison Blair

Morehead State University
Mentor: Kim Nettleton

Break Before You Start

“Brain breaks” a term used to describe brief physical activity that occurs during transition times in a classroom setting. Brain breaks promote movement throughout the day, increasing the amount of time students engage in daily physical activity recommended for students Studies have also shown that the student brain can pay attention for approximately 15 minutes before needing a break (Almarode & Almarode, 2008). A six week research project monitored first and second grade students' classroom attention rates with and without breaks. Analysis of both on and off-task behavior data indicated that breaks are highly effective in promoting student on-task behavior. Allowing students to give their brains a quick rest significantly cuts down on the amount of students’ off-task and decreased the amount of behavioral issues.

118. Justin Wall, Hilary Morgan, Blakeley Hibbs, & Tammy Goff

Madisonville Community College
Mentor: Mary Janssen

***Learning to Turn Left and Right in a T-maze by Larvae of the Beetle* Tenebrio molitor**

Mealworms, larvae of the beetle *Tenebrio molitor*, were trained to make correct left or right turns in an elevated T-maze, in a replication and extension of an earlier study in which larvae made left turns only. Larvae were put individually into the T-maze. A correct turn resulted in the larva dropping into its home food cup. Incorrect turns were punished by turning on a white light at the end of the alley of the incorrect arm. The learning criterion was five correct turns on successive experimental days after at least one turn in the opposite direction. Measures counted were number of larvae reaching criterion, number of days to criterion for each larva that reached criterion, number of larvae with left-turn or right-turn bias, and numbers of larvae that either died or changed into pupae and finally adult beetles. Results suggest circadian control of the optimum trial spacing for learning, and parameters of trial spacing on learning to a criterion for future investigations.

119. Heath Ward

Eastern Kentucky University
Mentors: Bill Staddon & Jason Marion

Incidence of Antibiotic Resistance Genes and Human Fecal Bacteria in Well Water

Many people from the southeastern part of Kentucky receive their water from natural underground aquifers for everyday use. These aquifers, often dubbed “wells”, are created by digging, driving, or drilling into the Earth and are often relatively shallow, especially well in the Appalachian region. Because these wells are shallow and often not properly lined, contamination exists as a major problem. Most contamination comes from fecal matter that may lead to the presence of antibiotic resistance bacteria and their genes. Volunteer participants collected water samples direct from tap in clean, but unsterile vessels. The DNA was isolated using MOBIO kits. Samples were screened for antibiotic resistance genes using polymerase chain reaction followed by agarose electrophoresis. Samples appear to have the tet(A) and tet(Q) genes and were screened for additional antibiotic resistance genes.

120. Carly Warfield

University of Louisville
Mentor: Diane Orr Chlebowy

Interventions Used in the Treatment of Comorbid Diabetes and Depression: A Review of the Literature

Type 2 diabetes mellitus affects many Americans and causes a myriad of both physical and psychological complications. Comorbid diabetes and depression has become a major issue of concern among health care providers. Individuals with comorbid diabetes and depression have greater difficulty with diabetes self-management than non-depressed people with diabetes. It is essential that health care providers implement appropriate interventions to assist clients with diabetes self-management and the prevention of diabetes-related complications. The purpose of the literature review was to examine interventions used in the treatment of comorbid diabetes and depression. A literature search was performed using electronic databases (CINAHL and PubMed). Different keywords used throughout the search process included: type 2 diabetes mellitus, depression, and interventions. Twenty-four published articles were selected for this review. Researchers recognize a link between diabetes and depression; few studies have examined interventions to address depression in the adult population. Certain focused interventions such as self-efficacy training, regular telephone interventions, cognitive behavioral therapy, and nurse-led psychological interventions were found to be effective in improving diabetes-self management practices. Limited studies have examined the effect of interventions on diabetes self-management behaviors and diabetes-related complications. This knowledge may be most helpful for health care providers caring for adults with diabetes. Additional studies are necessary to examine the interventions that address the process, outcome, and treatment modalities for adults with diabetes.

121. Chelsea Watts

Kentucky State University
Mentors: James Tidwell & Shawn Coyle

***Comparison of Different Light Technologies for Indoor Aquaponic Production of White-Stemmed Pak Choi* Brassica rapa**

To develop aquaponic systems for urban environments or northern latitudes, they will need to be located indoors in insulated buildings necessitating the use of artificial lights. Fluorescent and metal halide grow lights are widely used in hydroponics. More recently, light emitting diodes (LEDs) have become widely available. Another technology receiving increased interest is induction lighting. To date, these lighting technologies have not been compared for their application to indoor aquaponics. The objective of this research was to compare different artificial lighting technologies on plant growth. Each of the four replicate systems included a 415-L fish tank, a 190-L settling tank, a 115-L clarifier, and two 1.5 m2 floating raft beds. Tilapia of 100 g average weight were stocked in the culture tanks at 32 fish/m3. White-stemmed pak choi (*Brassica rapa var. chinensis*) seedlings where suspended in floating rafts at 16 seedlings per raft. There were four different types of lights evaluated, including: 1) metal halide; 2) fluorescent; 3) induction, and 4) light emitting diode (LED). The trial utilized a Randomized Complete Block Design over the four replicate systems. There were four replicates of each type of light, blocked by bed. Fish were fed a floating 32% protein commercial fish feed twice daily according to a feed chart. The duration of the experiment was four weeks. At harvest, the four plants in the center of each raft were separated into roots and leaves, then measured and weighed. Light effects were compared based on plant weights and "root to shoot" ratios. Average fresh weight of pak choi raised under light emitting diode lights (LED) (400 g) were significantly greater ($P \leq 0.05$) than weights of plants raised under florescent (87 g), induction (130 g), or metal halide lights (94 g). Similarly, the root:shoot ratios of pak choi plants raised under light emitting diode lights (LED) were significantly greater than ratios for plants raised under the other light types. Results indicated superior performance by LED for pak choi production in indoor aquaponics.

122. Shane Watts

University of Louisville
Mentor: Diane Orr Chlebowy

Effects of Depression, Anxiety, and Stress on Diabetes Biomarkers in African American Adults with Type 2 Diabetes

African Americans are disproportionately affected by diabetes and experience more diabetes-related complications than non-Hispanic whites. Individuals with comorbid diabetes and depression have poorer glycemic control and more difficulty with self-management than non-depressed people with diabetes. The purpose of this ongoing interdisciplinary study is to examine the effects of depression, anxiety, and stress on diabetes biomarkers in African American adults with type 2 diabetes mellitus. A convenience sample of 75 African American adults with type 2 diabetes mellitus will be recruited from an ambulatory internal medicine clinic at an academic medical center. To date, a convenience sample of 8 participants was recruited. Participants completed the Depression, Anxiety and Stress Scale-21. Diabetes markers (glycosylated hemoglobin [HbA1c] and body mass index [BMI]) were obtained from medical records. Spearman's rho was used to examine the relationships of depression, anxiety, and stress with diabetes biomarkers. Based on preliminary data, 50% of participants had moderate to high levels of depression and 75% reported moderate to high levels of stress and anxiety. All participants were overweight or obese (mean BMI of 43.6) with a mean HbA1c of 9.1. Higher BMIs were associated with higher anxiety levels. Results of the completed study (N=75) will be reported at the Posters-at-the-Capitol Event in 2014. Depression, stress, and anxiety should be further addressed in planning care for this population, as supported by preliminary findings. The knowledge obtained from the completed study will assist in designing interventions to improve diabetes outcomes and self-management in this vulnerable population.

123. Malcolm White

Eastern Kentucky University
Mentor: Martin Brock

The Activity of Dehydrogenases in the Presence of the Ionic Liquids 1-Butyl-3-methylimidazolium tetrafluoroborate and 1-ethyl-3-methylimidazolium ethyl sulfate

The abundant uses of fossil fuels are causing depletion in this resource as well as increased amounts of carbon dioxide (CO_2) in the atmosphere. The increased amount of CO_2 has shown to have an association to global temperatures. The burning of fossil fuels have caused for the development of alternative fuel source. This research is to form a developed method in which cellulose is converted to ethanol from switchgrass. However, enzymes are unable to perform at elevated temperatures. The discovery of thermophiles has shown that enzymes are able to perform at elevated temperatures. The aim of this research is to collect data for these enzymes, specifically malate dehydrogenase (and other dehydrogenases), and understand the stability of thermophillic bacteria in order to apply this information to cellulase. In conjunction, the concentration at which ionic liquids start to affect the activity of the malate dehydrogenase was researched and will be presented.

124. Sierra White & Abigail Shelley

Murray State University
Mentor: David Eaton
Applications of Economics

STUDY 1 (White): ***Trends in Study Abroad***
Over the past decade the number of students who participate in study abroad programs has increased significantly. Study abroad, and in particular, what causes a student to study abroad, is a field that has not been explored empirically. As a result, there are a number of interesting questions that have to be explored to more fully understand the increases that have occurred during the past decade. These include: as the number of students participating in study abroad programs has increased, has the composition of those who study abroad changed? Are the program lengths and immersion levels increasing along with the growing number of participants? Are there identifiable factors that increase a student's willingness to participate in study abroad programs? This paper will seek to answer these questions using information from study abroad interest surveys, applications, and pre- and post-trip interviews.

STUDY 2 (Shelley): ***Baseball Salaries as a Measure of Career Success***
The salary of a baseball player is a measure of career success for that particular athlete. There are a number of statistical measures which can be used to explain a player's salary. Those statistics include player productivity, career statistics, position played, and the length of the player's career. These may be of particular importance for pitchers especially as they relate to differences in roles for the team (starting pitcher, middle relief, closer), whether the pitcher is left or right handed, and especially whether the pitcher has suffered a major arm injury. The focus of this paper will be to understand the impact of injuries to pitchers and how those injuries impact salaries. I hope to determine whether a serious arm injury is necessarily detrimental to a pitcher's career, and if the impact of the injury varies by role on the team, age when injured, and whether a pitcher is left or right handed.

125. Andrea Wilhoite

Morehead State University
Mentor: Wilson Gonzalez-Espada
Use of CAM Therapies Among College Students in Eastern Kentucky: Is There a Relation with Attitudes Toward Science?
Dietary supplements are pills, capsules, tablets, or liquid products that contain a vitamin, mineral, herb, botanical, amino acid, or other concentrate, metabolite, constituent, or extracts. Although these products are usually marketed using health claims that do not have to be approved or safety-tested by the United States Food and Drug Administration, Americans annually spend 20 billion dollars on these therapies without strong evidence of their effectiveness. The literature on the use of dietary supplements has identified gaps in the knowledge associated with the actual cognitive and affective processes that people go through in deciding whether to use them. This gap is especially large for rural populations, people of low socioeconomic status, and young adults. The aim of this project was to establish whether there is a statistical relationship between use of dietary supplement therapies and the participants' perceptions and attitudes towards science. Our tentative hypothesis is that participants with a better perception of science will be less likely to use dietary supplements because many of these products are not science-based.

126. Danielle Wingerter & Jessica Gambrel

University of Kentucky
Mentors: Anthony Sinai, Luke Bradley, & Animesh Dhara

Application of Phage Display Technology to Establish Binding Partners to the Autophagy Protein ATG8 from Evolutionarily Diverse Organisms

The parasite, Toxoplasma gondii (Tg) is capable of infecting virtually all warm-blooded animals and is estimated to have infected one-third of the world's population. Despite considerable progress, there is still much to be learned about this pervasive parasite's infectious mechanism and many other diseases similar, such as malaria. Work in the Sinai laboratory has established the role of autophagy as a death mechanism. The protein ATG8 is a key player in this process. We are working with the autophagy related protein TgATG8 to test phage display technology that can be employed to identify interacting proteins. We are using the protein TgATG8 because we know the potential binding target sequences to be pulled out should be ATG3, ATG4, and ATG7-providing confidence in the identification of new interactions. We have cloned the ATG8 homologs from Toxoplasma, yeast and humans and expressed them in E. coli and His-tagged proteins. These proteins are being used as bait to isolate bacteriophage from a phage display library to identify sequences that bind to all the ATG8 homologs as well as those specific for each other species. The initial screen using TgATG8 as the bait has been completed with the phage plaque assays pointing to significant enrichment of binding sequences. By comparing the binding partners for TgATG8 with those for the yeast and human proteins we expect to gain new insights into this critical factor. In addition we hope to establish a technology platform based on phage display to apply to other proteins from infectious agents.

127. Tony Winslow

Northern Kentucky University
Mentor: David Raska

Turning the Tide: The Book of Bluezz

Can Tide use its Tide Coldwater to help P&G to achieve its 2020 sustainability goals? Specifically, its goal to make sure 70% of all laundry washes are washed in cold water? This secondary data research report covers the various stages of the marketing planning process including situation analysis, target marketing, and the marketing mix. In the first stage, Tide Coldwater has a great opportunity in pursuing the Millennial market, but they are threatened by the mind of the consumer as well as fossil fuel depletion. Migration of other cultures is also an important cultural issue identified in situation analysis. Tide Coldwater has the benefit of the Tide brand name, but it has weak promotion to back it up, especially with regards to its "sustainability" goals. Using the outcomes of the situation analysis, a set of specific target marketing recommendations was made. Namely, targeting U.S Millennials, an increasingly diverse target market that is being affected by values brought in by immigrants from Mexico, Brazil, China, and India was recommended. Furthermore, Millennials are heavily involved in social media, care about environmental causes, and have high values of family. The proposed value proposition, "Smart savings for your family, and the environment", seeks to provide U.S. Millennials with values that speak to them and help to position Tide in ways consistent with P&G's goals. Subsequent marketing mix recommendations were then designed to communicate this value proposition in a cost-efficient way. The report was reviewed by the client, Petra Stovickova (Associate Director, Communications, Procter & Gamble, Fabric Care, Americas) and can be accessed at http://www.bluezzoon.com/Bluezzoon/Home/Entries/2013/9/16_Wash_in_cold_water_and_end_malnutrition.html.

128. Mark J. Woodberry

Kentucky State University
Mentor: George Antonious

Quantification of Capsaicin in Hot Pepper Fruits

Crude extracts from hot pepper fruits having insecticidal and acaricidal performance were used for development of a new natural product for use as a biodegradable alternative to many synthetic pesticides in small acreage, high value crops. Hot pepper fruits also contain significant amounts of antioxidant compounds (ascorbic acid, total phenols, capsaicin, and β-carotene). Capsaicin [N-vanillyl-8-methyl-6-noneamide] is the most pungent of the group of compounds called capsaicinoids in chili peppers. A field study was conducted at Kentucky State University Research Farm to quantify the concentration of capsaicin in hot pepper fruits. Fifty-two Capsicum accessions selected from the USDA Capsicum germplasm collection were screened for their capsaicinoids content using gas chromatography (GC/NPD). At harvest, fresh fruits were extracted by blending with methanol and analyzed for capsaicin, dihydrocapsaicin and nordihydrocapsaicin. Mass spectrometric analysis of the fruit crude extracts indicated that the molecular ions at m/z 305, 307, and 293 which correspond to capsaicin, dihydrocapsaicin, and nordihydrocapsaicin, respectively, have a common benzyl cation fragment at m/z 137 that could be used for monitoring capsaicinoids in hot pepper fruit extracts. Concentrations of total capsaicinoids varied among accessions tested and were greatest in *Capsicum chinense* fruits (11.2 mg/fruit). Quantification of capsaicinoids in the selected accessions allowed us to identify genotypes with high levels of total capsaicinoids for the mass production of natural capsaicin from hot pepper fruits.

129. Esther Zusstone, P.K. Patibandla, & B.K. Abeyweera

University of Louisville
Mentor: Palaniappan Sethu

Efficacy of Stretched Membrane Immunoaffinity Capture of Circulating Tumor Cells (CTCs)

This project examined how immunoaffinity capture techniques can help isolate circulating tumor cells (CTCs) using microfluidic devices. CTCs are cells that originate from a primary tumor, travel within the bloodstream, and can often lead to metastasis. These cells are prevalent in small amounts (about 1-10 cells per 109 blood cells) and have been difficult to detect. Therefore, the researcher hypothesized that stretching and relaxing a polydimethylsiloxane (PDMS) membrane during each step of the functionalization process would increase the available surface area for modification, thus increasing the number and proximity of antibodies. To validate this hypothesis, model cell lines were used to represent both CTCs (MCF-7 cells, represent CTCs of epithelial origin) and blood cells (MOLT-3 cells, T-lymphoblast cell line). Stretching was achieved by clamping the outflow tubing of one of the devices and injecting an additional 0.35 mL of solution at each step of the surface modification process to increase the surface area by 5% via stretch. The membranes were evaluated by counting the amount of MCF-7 cells captured on each type of membrane. Results across four trials indicated that the amount of MCF-7 cells present on stretched membranes (109.3 ± 1.69) was ~ 5-fold greater than on non-stretched membranes (21.9 ± 26.6). No statistically significant difference was found in the non-specific binding of MOLT-3 in stretched (4.25 ± 0.306) and non-stretched (4.38 ± 0.161) devices. These results validate the hypothesis and have potential to be further developed into a point-of-care diagnostic device for health-care professionals, such as one that would spare cancer patients from invasive biopsies.

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