

GRADUATE SCHOOL

MARCH 2021 NEWS



DATES & DEADLINES

March 5

- Late graduation application submission deadline (\$75 fee) for May 2021

March 15

- Graduate School deadline for the March payroll

March 19

- Dissertation Research Assistantship Award (DRA) nominations due to Dean's office

March 26

- Last day to submit paperwork to the Registration office related to the last-day-to-drop or for a withdrawal from the University

March 28

- Last day for students to drop a full-term course (no refund; resulting in a W grade) online using SalukiNet

March 30

- Graduate Recruitment Workshop, 2 pm – 3:30 pm (via Microsoft Teams) – Registration Required

April 2

- Initial Submission Deadline to submit research paper/thesis/dissertation for initial format check to graduate in May 2021
- Dissertation Research Assistantship Award (DRA) ranked nominations due to Graduate School

February D.O.G.S. Workshops – Recordings Available Online

We had a great turnout for the DOGS meetings in mid-February with participants from all over campus joining Graduate School staff to discuss Information and Procedures (Feb. 17) and Updates and Issues (Feb. 18). Information was presented from all areas of graduate student support, from admissions to graduation. There was a productive discussion about the very crucial issue of graduate student mental health. The Graduate School will be organizing a workshop with additional resources for faculty and staff on how best to respond to students who are struggling with mental health issues. Anyone can view the workshop recordings by visiting our website at <https://gradschool.siu.edu/faculty-and-staff-resources/>. Look under STAFF TRAINING. While you're there, download the *Graduate School Manual 2021*, created to guide faculty and staff as they advise and process forms for graduate students.



Graduate Recruitment Workshop

Tuesday, March 30

2:00 PM – 3:30 PM

The Graduate School is to host a virtual Graduate Recruitment Workshop specifically designed for **currently enrolled SIUC senior undergraduate students**. It will be held on Tuesday, March 30, 2021 starting 2 pm until 3:30 pm (via Microsoft Teams). This workshop will provide students with the information, including but not limited to:

- An overview of the graduate programs at SIUC
- Accelerated master's programs
- Financial assistance opportunities
- Graduate admission requirements and process
- Trends in graduate and professional education
- Employment outlook for graduate-level occupations

Registration is required. Please send an email to Dr. Stephen Shih (shihcs@siu.edu) to register for the workshop. Due to the capacity of Microsoft Teams, registration will close when the limit is reached.

2021 SIUC 3MT Competition results



There were twenty-two contestants presenting their 3MT (Three-Minute-Thesis) research work via Microsoft Teams on February 5. With great pleasure, we would like to announce the winners of the 2021 SIUC 3MT Competition. **Narges Asefifeyzabadi** (Chemistry and Biochemistry) is placed first in the competition, followed by second-place winner **Ryan Crawford** (English) and third-place winner **Ali Parizad** (Electrical and Computer Engineering). Our sincere congratulations to them all on their outstanding presentations and well-deserved awards!!

Our special thanks go to **Dr. Junghwa Lee**, **Dr. Ruopu Li**, and **Dr. Kristiana Feeser** for serving as the judge of the competition.

Please click the link below to view the presentations.

<https://web.microsoftstream.com/video/d852605a-b06b-4076-936e-994a5083f4fe?list=user&userId=04681052-64d7-47e7-a22c-52c083fd42df>



Narges Asefifeyzabadi is a PhD Candidate of chemistry in the department of chemistry and biochemistry at Southern Illinois University Carbondale and doing her dissertation work in the Dr. Mohtashim Shamsi's lab. She did B.Sc. in Pure chemistry from Ferdowsi University of Mashhad, Iran in 2014. Then she moved to US in 2016 and joined department of chemistry and biochemistry at SIUC as a PhD student.

Her research area is currently an interplay between chemistry, biosensing, bioelectronics, biomaterials, and bioengineering that has a promise of significant development and breakthroughs in wearable sensing. She worked on developing low-cost biosensors using printing platforms for point-of-care diagnostics and biomedical applications.

Her research accomplishments have been published in peer-reviewed journals, including "ACS applied materials and interfaces, Journal of materials of chemistry B and Scientific reports. She is also the recipient of several awards and scholarships regarding to my PhD research program, including Gower Fellowship for summer 2020, Dissertation Research Award, and Graduate and Professional Student Council (GPSC) Research and Creative Award.



Ryan Crawford has an MFA in creative writing, and is a PhD candidate in rhetoric and composition, with specializations in neuroscience and writing program administration. His interdisciplinary research integrates neurobiological evidence of self, intrinsic motivation, and creativity to improve composition pedagogy and practice, and inform posthuman approaches to diversity.



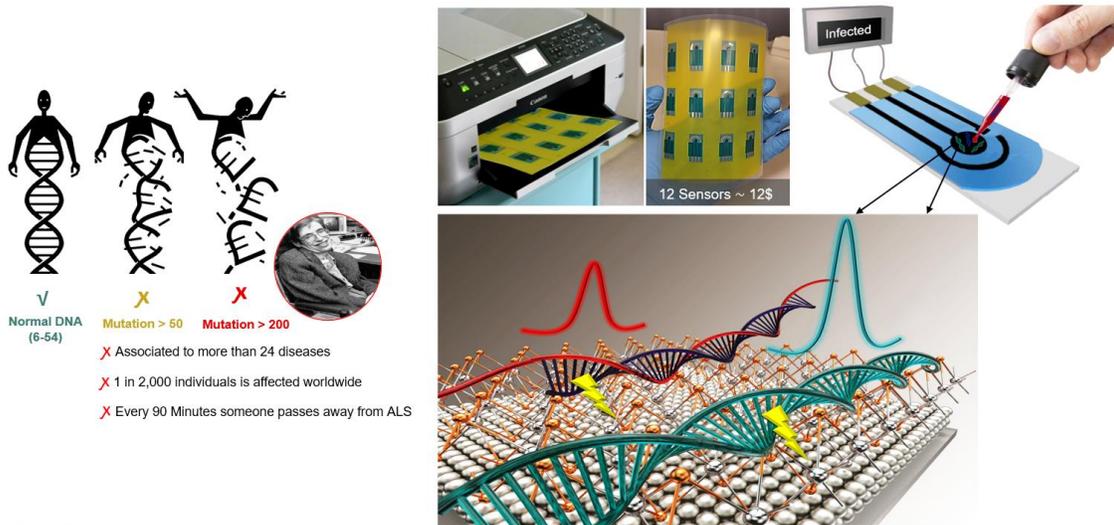
Ali Parizad is a Ph.D. candidate at Southern Illinois University in the electrical and computer engineering department with a focus on new challenges in modern power systems and smart grids. During his Ph.D. he engaged in developing software for Ameren Electric Company in distribution system planning considering Distributed Energy Resources (DERs) to improve electric distribution network performance. Currently, Ali is working on data forecasting applying Machine/Deep Learning algorithms as well as working on Cyber-Security and False Data Detection methods in the power system. His research interests include smart grids, distributed generation and renewable energies, power system operation and control, and applications of the real-time simulator in the power systems. He received SIUC Dissertation Research Assistantship Award (DRA) fellowship for the 2020-2021 academic year.



2021 SIUC 3MT presentations

Narges Asefifeyzabadi

Low-cost, Simple and Fast Detection of Length Mutation



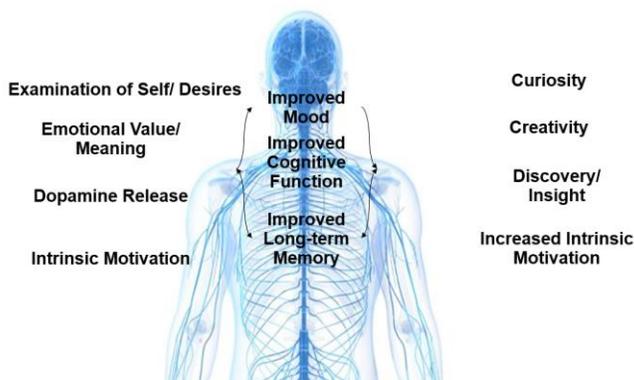
Theguardian.com
Narges Asefifeyzabadi, et.al, ACS Applied Materials and Interfaces, 2020, 12, 52156-52165

DNA is a biomaterial that contains genetic information. It is carrying the information that makes us who we are and what we look like, for example, having blue or brown eyes, straight or curly hairs. And many of this information can pass from one generation to the next in family by genes. When DNA works correctly, it helps keep body functioning properly. However, mistakes happen in DNA which called mutation. Depending on the type of mutation, it can cause different problems or diseases. In severe mutation, it can cause genetic disorders such as ALS. To monitor our health and body functioning regularly, we need an approach which offers simple operation, and it is inexpensive that make it available for everyone. For this purpose, during my PhD research program I worked on development of low-cost devices for detection on length mutations using inkjet printer. Ink cartridges can be filled with functionalized materials to pattern devices on variety of substrates. We can modify these devices for different types of DNA repeats. Based on the type of DNA the device provides different response, and it can tell us what type of DNA we carry. Do we have the healthy one or the disease-related one.

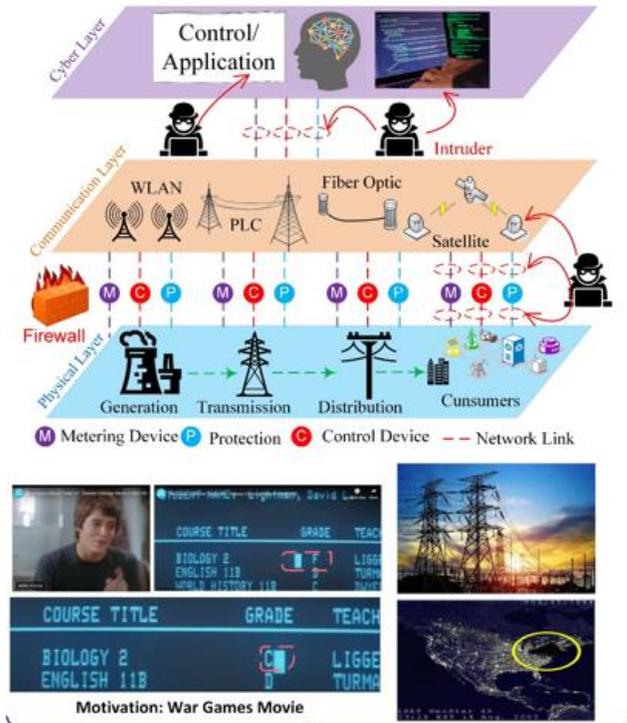
Therefore, these devices give us the unique opportunities for self-management of our health and body functioning. It reduced unnecessary hospital visiting and helps to preclinical diagnostics at early stages of diseases.

Ryan Crawford

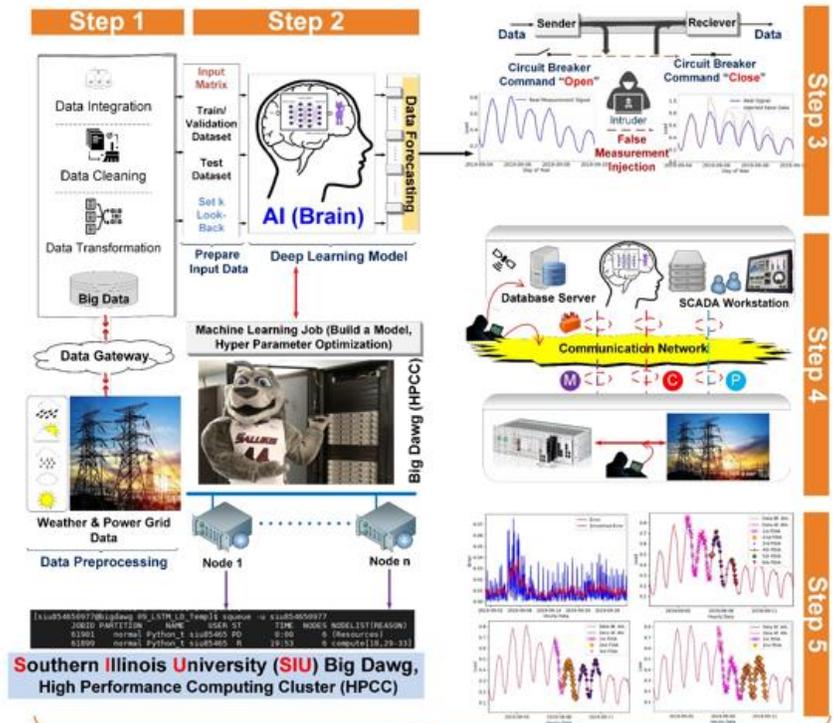
Starting with Self: Homeostatic Reward, Intrinsic Motivation, and Creativity



Modern composition theory calls for a posthuman view of meaning-making, challenging oppressive structures built on the habitual perspective of individual self and agency. There is a disconnect, however, between this theory and actual practice in the composition classroom. Before students can adopt such a fundamental shift in mindset, there must be inceptual motivation connecting self to instructional environment. My project argues that, through study of the modern neurobiological correlates of self and desire, scholars and instructors are given empirical footholds in theoretical concepts. For students, examination of self and desire provides early, intrinsic motivation in composition, which, through a creative production model, provides ongoing motivation and a framework through which to discover self's entanglement in complex ecologies.



Problem



Solution

The integration of Information and Communication Technologies (ICT) into the modern power system makes it a complicated cyber-physical system (CPS). It gives this opportunity to an adversary to find some loopholes, penetrate to CPS layer, inject false data, and consequently, result in security and stability issues such as power system blackout. This is the challenge I am going to address in my Ph.D. dissertation. To this end, I employ the capability of Artificial Intelligence and Machine Learning Algorithms to train an artificial brain and fight against cyber-attacks. As you know, the brain functionality is too complicated and each part has its own tasks. Therefore, the training process is computationally expensive. To overcome this issue, I employ several high performance computers in parallel, namely BigDawg from SIU to simulate brain model, accurately. In the next step, the performance of the artificial brain is investigated by injecting false data in the power system. Following that, false data goes to the control center, and into the trained brain. In the last step, our artificial brain compares the received signals with its learning model, detects the false data, marks in a graph and generates an alarm for the operator.

Fatوماتا Saidou Hangadumbo



DISABILITY IN THE FACE OF AMERICA'S HEROES

Fatوماتا Saidou Hangadumbo



Do Politically and Economically Similar States in the USA Trade More With Each Other?

Nawaraj S. Paudel - PhD Candidate (Economics)
School of Analytics, Finance & Economics- SIUC

Research Question

Do Politically and Economically Similar States in the USA Trade More With Each Other? This is the main Research question that this paper address.

Introduction

- Political division- USA- economic disconnection among states (Ishise & Matsuo, 2015)
- Border Effect in the Germany after unification is decreasing (Nitsch & Wolf 2013)
- Linder Hypothesis (Linder 1962)

Table1: Descriptive Statistics

Variables	Obs	Mean	Std.D	Min	Max
Domestic Trade	15300	2177	4708	0	78028
Y _{it} -Y _{jt}	15300	6562	0027	0	43227
(Y _{it} -Y _{jt}) ²	15300	7938	15407	0	186857
President(ijt)	15300	0.051	0.5	0	1

Data

- Domestic Trade (ijt): Commodity Flow Survey (CFS) of the year 1993 1997 2002 2007 2012 and 2017.
- President (ijt) : 1 (same political party), 0 otherwise
- Governor (ijt): 1 (same political party), 0 otherwise
- Senator (ijt): 0 (if both seats taken by different party) 2(same party) and 1 otherwise.

Econometrics Model

Gravity Equation

- Anderson and Wincoop (2003)

$$X_{ij} = \frac{Y_i * E_j}{Y} * \left(\frac{L_{ij}}{P_j * \Pi_i} \right)^{1-\sigma} \quad (1)$$

$$X_{ijt} = \begin{cases} Y_{ijt}, & \text{for OLS} \\ e^{Y_{ijt}}, & \text{for PPML,} \end{cases}$$

$$Y_{ijt} = \beta_0 + \beta_1 \text{POLITICS}_{ijt} + \beta_2 \text{LINDER}_{ijt} + \eta_{it} + \theta_i + \delta_{jt} + \epsilon_{ijt} \quad (2)$$

Conclusion

Using a different alternative definition of Political and Economic Similarities- We find in a fairly robust way that both Politically and Economically similarity result in significantly more trade.



Figure 1: Political Division

Additional Information

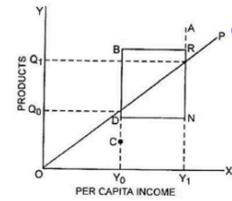


Figure 3: Linder Effect

Important Result

The states which votes for the candidate from same political party- around \$80 Million worth more trade than other states. As per the Linder Effect, a difference in \$1000 in PCI implies a higher trade between the states by around \$20 million.

Results

Domestic Trade	1	2
President (ijt)	80** (0.037)	74.15*(0.033)
(Y _{it} -Y _{jt})	-0.022*** (0.000)	—
(Y _{it} -Y _{jt}) ²	—	-0.5*** (0.000)

Table 1: Main Result

Which States are Contributing the Most to U.S. GDP?



Figure 2: Economic Division

Positive Relation between PCI and the quality of exports.

References

- Ishise, H., & Matsuo, M. (2015). Trade in polarized America: the border effect between Red States and Blue States. *Economic Inquiry*
- Nitsch, V., & Wolf, N. (2013). Tear down this wall: on the persistence of borders in trade. *Canadian Journal of Economics*
- Linder, S. B. (1961). An essay on trade and transformation (pp. 82-109). Stockholm: Almqvist & Wiksell.
- Anderson, J. E., Van Wincoop, E. (2003). Gravity with gravitas: A solution to the border puzzle. *American economic review*, 93(1), 170-192.

Acknowledgements

I would like to express my deep gratitude to my Dissertation Chair- Professor Sajjal Lahiri

Estimating a Gravity model for trade between the U.S. States using CFS data of the year 1993, 1997, 2002, 2007, 2012 and 2017, we find that politically and economically similar states trade more among themselves. We use three different definitions of political similarity based on election outcome and all results are robust and consistent. For Economic similarities, we follow the literature on Linder's hypothesis.

Waseem Hussain



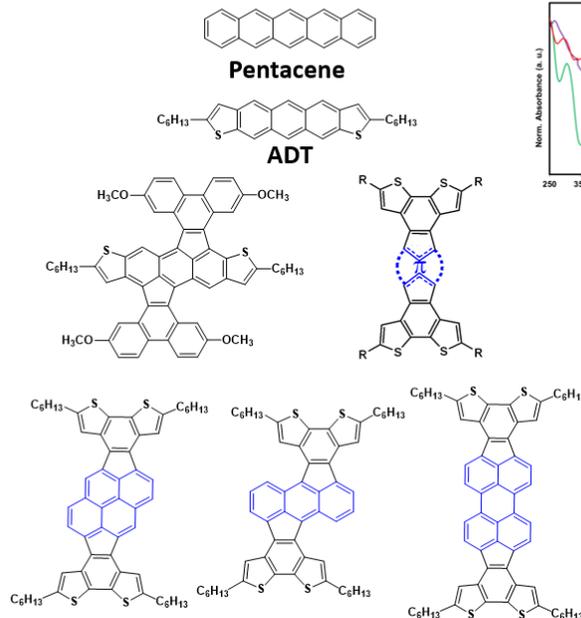
New Acene Based Organic Semiconductors



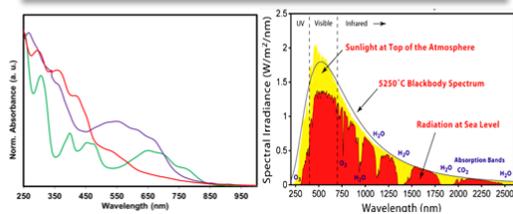
Future is Flexible



New Acene Based Materials



Absorption



Organic Solar Cells	Si-based Solar Cells
Light weight	Heavy
Inexpensive	Expensive
Flexible	Rigid
Tunable	Non tunable
Eco-friendly	Non eco-friendly

Waseem A. Hussain
Kyle N. Plunkett's Research Group

Mirian Filgueira Pimentel



One of the major threats to agriculture are fungal pathogens, which can kill or weaken plants causing root rot and foliar symptoms. Farmers use mainly resistant varieties and fungicides as tools to fight plant pathogens. However, pathogens can adapt, and these tools become ineffective. My research focuses on biological control, using beneficial fungi to fight plant pathogens. During my research, several beneficial fungi were identified with ability to reduce disease severity on soybean caused by major soybean pathogens. I further studied the beneficial fungi-pathogen interaction by using scanning electron microscopy, transcriptomics, and genomics, and demonstrated that these beneficial fungi can parasitize pathogens, induce plant defenses, and promote plant growth. Major agriculture companies are interested in further studying these beneficial fungi in partnership with us, which could allow the development of products that can be available for farmers to help fight plant pathogens and increase food production. Funding: NCSRP and USB.

Maryam Farhang



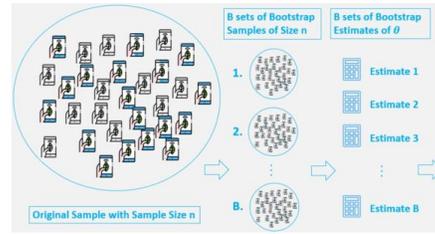
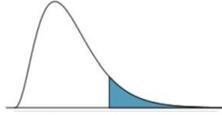
Kosman Watte Gedara Dimuthu Rajapaksha



$$H_0 : \mu = \mu_0 \text{ vs } H_1 : \mu \neq \mu_0$$

Wald Test:

$$W_1 = n(\bar{x} - \mu_0)\hat{\sigma}^{-1}(\bar{x} - \mu_0) \xrightarrow{D} u\sigma^{-1}u \sim \chi_1^2$$



$$\hat{\theta}^* = (\hat{\theta}_1 + \hat{\theta}_2 + \dots + \hat{\theta}_B) / B$$

$$W^* = n(\hat{\theta}^* - \hat{\theta})^T C^{-1}(\hat{\theta}^* - \hat{\theta}) \xrightarrow{D} u^T C^{-1}u$$

$H_0 : \theta = \theta_0$ vs $H_1 : \theta \neq \theta_0$, where θ & θ_0 a $g \times 1$ vectors

Wald Test:

$$W = n(\hat{\theta} - \theta_0)^T \hat{\Sigma}^{-1}(\hat{\theta} - \theta_0) \xrightarrow{D} u^T \Sigma^{-1}u \sim \chi_g^2$$

Common implementation:

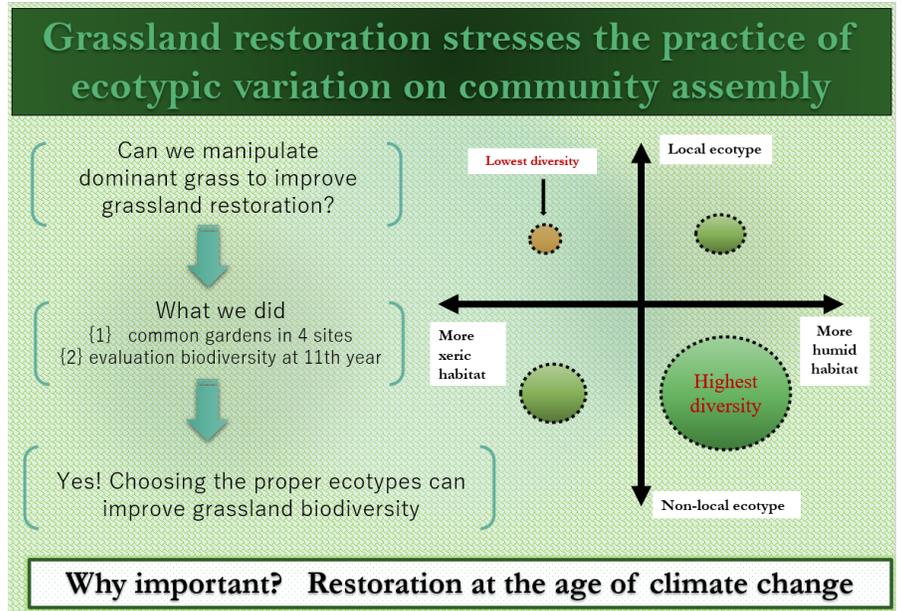
$$W^I = n(\hat{\theta} - \theta_0)^T C^{-1}(\hat{\theta} - \theta_0) \xrightarrow{D} u^T C^{-1}u$$

$$C = I_g \text{ or } C = \text{diag}(\hat{\Sigma}) \text{ or } C = S_p$$

Then the percentiles of W^I can be estimated from percentiles of W^*

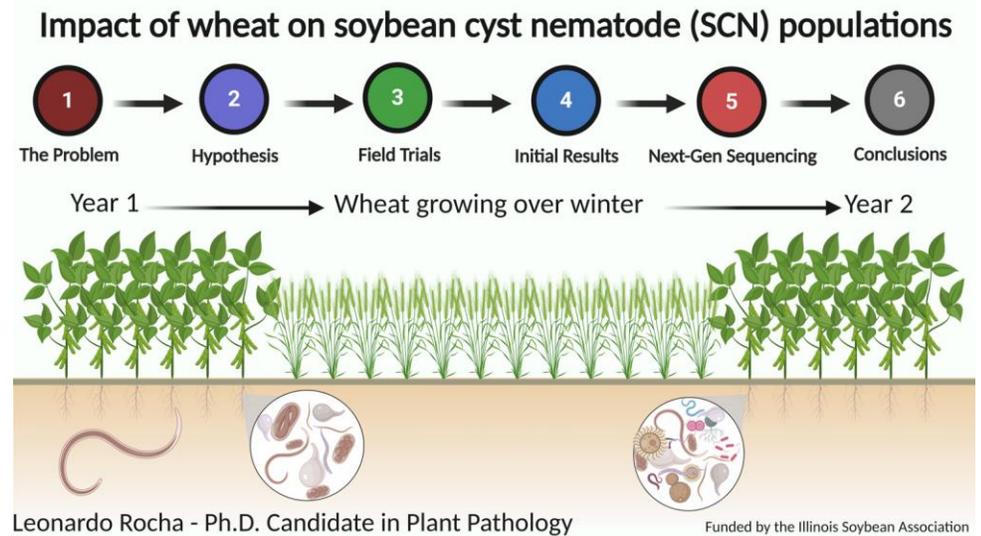
A Wald type test with the wrong dispersion matrix is used when the dispersion matrix is not a consistent estimator of the asymptotic covariance matrix of the test statistic. One class of such tests occurs when there are g groups and it is assumed that the population covariance matrices from the g groups are equal, but the common covariance matrix assumption does not hold. The pooled t-test, one-way ANOVA F test, and one-way MANOVA F test are examples of this class. Two bootstrap confidence regions are modified to obtain large sample Wald type tests with the wrong dispersion matrix.

Zhe Ren



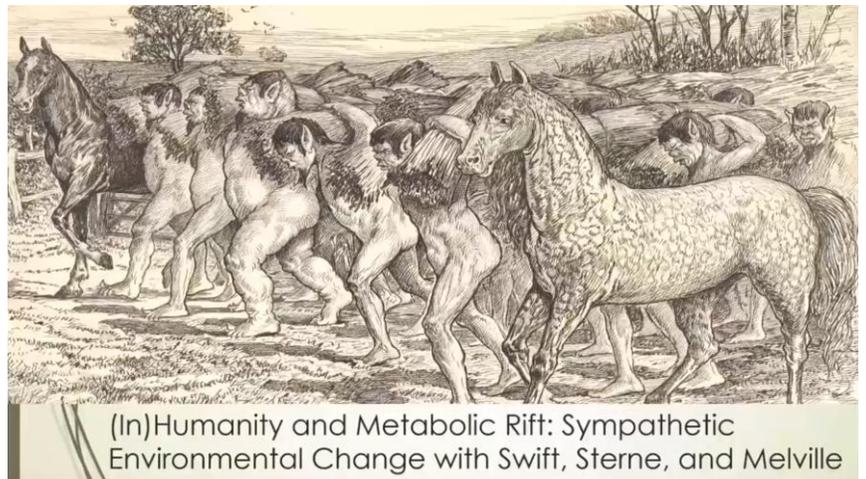
Worldwide, grasslands became one of the most susceptible ecosystems undergoing extensive degradation. Grassland ecosystems are particularly vulnerable. My study chose four sites along the aridity gradient across North American tallgrass prairie. And in each site, we planted local and non-local sources of a dominant grass, also called ecotypes, big bluestem to see if biodiversity is different among the ecotypes. From the survey on the species richness at the 11th year when we planted non-local dominant grass in a humid habitat on the lower-right side, we noticed the highest biodiversity; Conversely, the lowest biodiversity on the upper-left side generally occurred in vegetations planted with local dominant grass. Choosing the right ecotypes can improve grassland biodiversity. By manipulating ecotypes, for example, using suitable grass sources, we can improve biodiversity. As a grassland restoration practitioner, we need to use various methods, such as our technique, "the practice of different ecotypes," to achieve our goal to improve biodiversity and consider future climate change.

Leonardo Rocha



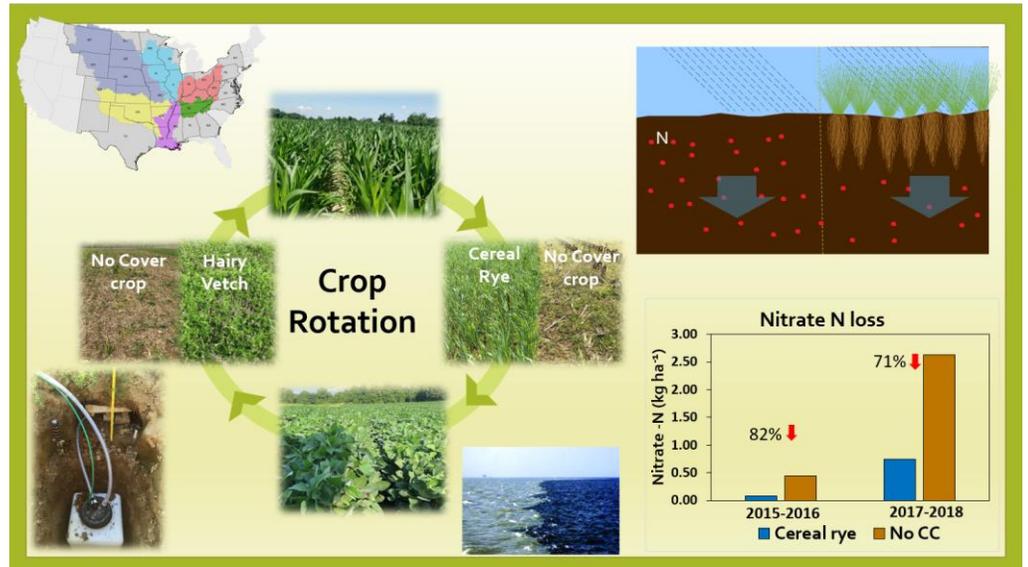
Plant-parasitic nematodes represent a significant constraint on global food security. The soybean cyst nematode (SCN) (*Heterodera glycines*) is a major disease reducing soybean yield in the US. Double cropping (DC) is defined as producing more than one crop on the same parcel of land in a single growing season. Soybean is commonly planted following winter wheat. Field trials were conducted from 2017 to 2018 to investigate the effect of wheat on SCN populations. Fields with wheat as a winter crop had reduced SCN populations compared to fallow (no winter crop) fields at R1 stage (soybean flowering) (-31.8%) and after soybean harvest (-32.7%). This study is meant to be the first step towards a better understanding of the mechanisms governing SCN suppression by wheat, and future research will investigate these soil samples to explore the effects of wheat on soil microbial communities and chemical profiles, and their link with SCN suppression.

Elias Taylor



From the trans-Atlantic slave trade, to sweat shops, sex trafficking (of minors a la Epstein), and the international ivory trade, humanity is solely responsible for most of the inhuman cruelty in world history, but, as Jason W. Moore has shown us: "humanity is a species-environment relation."¹ Our humanity is determined by our relationship to the environment. In fact, literature has been telling us all along: Jonathan Swift's *Gulliver's Travels*, Laurence Sterne's *Tristram Shandy*, and Herman Melville's *Moby-Dick* all foreground ecological crises that simultaneously foreground humanity's inhumanity. Furthermore, the call in all of them is for a social-environmental ethics that accounts for inhumanity but remains steadfastly focused on moving toward an ethic of: "As human individuals are able to flourish... so should nature."

Denamulle Gedara Ashani Thilakarathne



Greener the Fields, Cleaner the Water. The winter fallow season and spring are critical times for nutrient management as precipitation has great potential to flush available nutrients from the soil profile in row-crop agricultural fields. Cover Crops (CC) are a promising strategy to reduce nutrient leaching during these time-periods through nutrient uptake by the growing vegetation. Our research at SIU farms has evaluated hairy vetch before corn and cereal rye before soybean as CCs in a corn-soybean rotation. Cereal rye reduced nitrate leaching by 70 – 80 %, while hairy vetch did not improve water quality. However, hairy vetch before corn increased the corn yield by 32 %, presumably through its' role as a nitrogen-fixing legume. This increased grain yield and reduced leaching can compensate for the additional expenses a farmer has to bear due to planting and terminating CCs in the fallow season.

Bhargav Krishna Thota



CYBER ARGUMENTATION WITH SOCIAL NETWORKING

Designed to enable online deliberations with large-scale, in-depth argumentation for productive discussions over the Internet.

Intelligent Cyber Argumentation System	Research
<ul style="list-style-type: none"> Structured online discussions. Capture decision rational. Decision making support, Analysis of the discussion and individual contribution. Users discuss topics(Issues) and subtopics(Positions) by posting arguments. Explicitly express different agreement levels from -1 to +1. Incorporated several analytical models to capture collective opinions, detect opinion polarization, and predict missing user opinions. 	<ul style="list-style-type: none"> Refactor Mobile version to support both Android and iOS. Behavior of friends in the system, effect of the polarization and controversy of friends. Impact of polarization by number of followers. Relationship between polarization and controversy in user posts. Reasons for increase and decrease of controversy in arguments.

BHARGAV KRISHNA THOTA
DAWG: 853933017
DEPARTMENT OF COMPUTER SCIENCE

Cyber argumentation researchers have developed specialized argumentation platforms that are designed to facilitate and analyze online deliberation effectively. These platforms typically implement theoretical argumentation structures that promote higher quality argumentation and allow for informative analysis of the discussions. Intelligent Cyber Argumentation System (ICAS) one of such platforms structures its discussion into a weighted cyber argumentation graph, which describes the relationships between the different users, their posts in a discussion, the discussion topic, and various subtopics. In my study I would like to study, 1) The behavior of friends in the system, how will the friends respond to their friend's relations or replies. 2) How will the number of followers and friends in the network effects the polarization of the group 3) What is the correlation between controversy and polarization of the discussion? 4) What are the attributes that trigger the controversy in the discussion?

Musa Yahaya



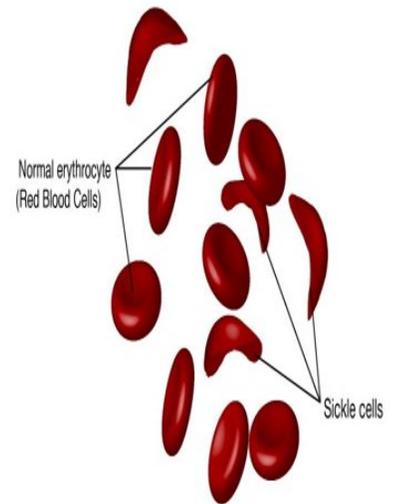
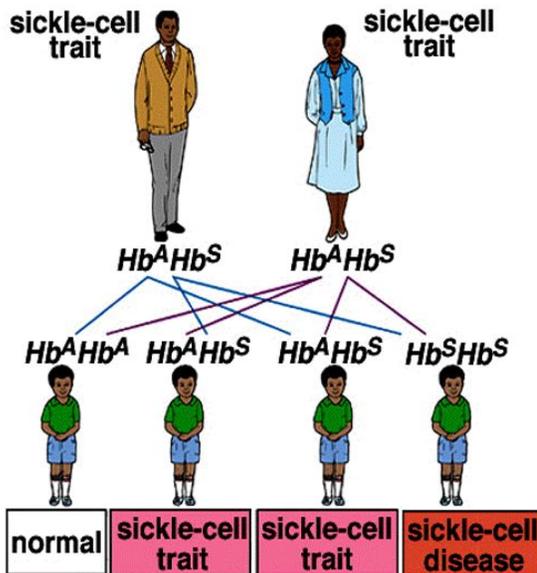
Vaping is the inhalation and exhalation of aerosols using electronic cigarettes or similar devices. Its popularity is on the rise—the most used tobacco product among youths and young adults ages 18-24 years despite the established and evolving health consequences associated. There are millions of users across the globe including high school students. Health-related quality of life means quality of life in the context of health and diseases: a two-way concept comprising positive view which involves feelings of physical and mental wellness, bodily fitness and complete function, modification, mind and body productivity, and a negative view which includes illnesses and dysfunctions. HRQOL is useful in understanding actual information from an individual's perspectives, and its assessments guide decision making in an abnormal situation; it consist of four components: general health, physical and mental health, and poor health.

Eunice Yeboah



Inheritance of sickle-cell disease

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According to research, the ratio of people living with Sickle Cell Disease (SCD) and those who see healthcare or rehabilitation professionals for care is unbalanced. Most patients claim professionals use trial and error methods on them as they do not understand the nature of the disease and how it impacts their lives. This makes them feel insignificant. There has been little research examining the knowledge of rehabilitation professionals on the disease. This ongoing research is to find out how much knowledge vocational rehabilitation counselors of the National Council on Rehabilitation Education (NCRE) have on Sickle Cell Disease, and compare with the knowledge of novice students to see if the assumption that vocational counselors have little knowledge on SCD is sustained or rejected. The results of the study will help create awareness of the disease and promote efficient and effective services for this population who feel deserted.



Characterization of the CRISPR-Cas13b systems in Porphyromonas gingivalis.

CRISPR-based technologies have revolutionized biochemical and biomedical research. In the past few years, many CRISPR systems have been discovered and characterized. These CRISPR systems greatly expand the CRISPR toolkit. Cas13b is the most recently identified CRISPR system. The usefulness of the Cas13b system as a gene editing tool has been demonstrated in human cells. Cas13b system can be exploited to achieve not only RNA knockdown, but also highly specific and efficient RNA editing. The RNA editing ability of the Cas13b-based technology has been used for the correction of human disease-relevant mutations. Despite the rapid progress of Cas13b research, little is known about the structures and catalytic mechanisms of this important family of CRISPR enzymes. A cross-disciplinary research approach is employed in our study to characterize the two CRISPR-Cas13b systems in Porphyromonas gingivalis (Pgi5 and Pgi8 Cas13b systems). Both Cas13b enzymes possess dual RNase activities for pre-crRNA processing (to produce the mature crRNAs) and target RNA cleavage. The systems are capable of mRNA knockdown in human cells.

Mary Latham

Hydration Theory:
Water Imagery and
Watery Language in
Select 19th C
Transatlantic Authors

by Mary Marley Latham

THESIS:

Water imagery and watery language helped 19th century transatlantic authors explore their ethical obligations to others in an increasingly globalized world.

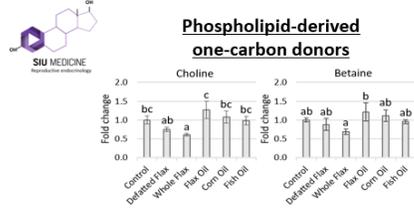
Talking Points

- ▶ 19th century globalization
- ▶ The “reflective” power of water imagery
- ▶ “Watery language” as writing technique
- ▶ Limits to “mutual responsibility”

William Weston

FLAXSEED'S PARADOXICAL ROLE IN INCREASING THE LIFESPAN AND REPRODUCTIVE CAPACITY OF WHITE LEGHORN LAYING HENS

William Chris Weston (PhD Candidate)
Dept: Molecular, Cellular & Systemic Physiology
Mentor: Dr. Dale B. Hales



BACKGROUND AND METHODS:

1-amino D-proline (1ADP) (Flaxseed's anti-B6 toxin) → Pyridoxal 5' phosphate (PLP) (vitamin B6)

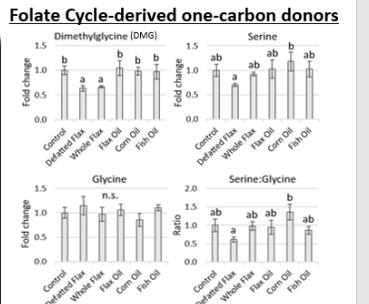
White Leghorn laying hens ($n = \sim 168$ hens per group) were supplemented with different dietary constituents (e.g. defatted flaxseed or whole flaxseed) for 325 days. Blood plasma metabolites were analyzed via liquid chromatography tandem mass spectrometry (LC-MS/MS), in order to evaluate one-carbon metabolism in hens. Daily survival and egg laying were also monitored by diet group.

Methionine cycle metabolites

Vitamin B6 metabolites

Transsulfuration

CONCLUSION: Flaxseed (via the action of 1ADP) induces a strong transsulfuration perturbation that reverses homocysteine flux, causing increased consumption of one-carbon donor molecules, increased SAM synthesis and increased methylation capacity in the hen. The associated outcomes are improved lifespan and/or increased daily egg laying. Flaxseed is a new form of nutritional biotechnology.



Survival and egg laying performance

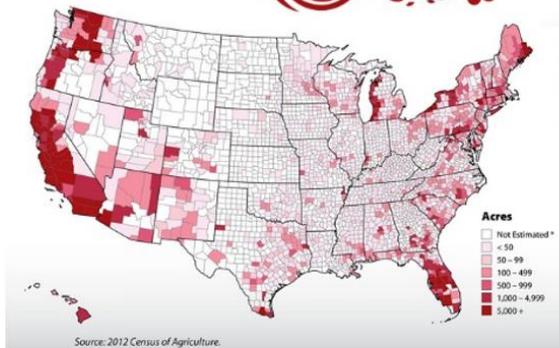
Diet	Survival			Daily eggs per hen
	Total survival (%)	Starting hens (n)	Surviving hens (n)	
Defatted Flax	71.4%	161	115	0.384 ^a +/- 0.005
Control	67.6%	182	123	0.365 ^a +/- 0.004
Whole Flax	66.5%	161	107	0.401 ^b +/- 0.005
Fish Oil	65.5%	165	108	0.394 ^b +/- 0.005
Flax Oil	64.0%	161	103	0.355 ^a +/- 0.004
Corn Oil	61.7%	175	108	0.355 ^a +/- 0.004
Average	66.1%	168	111	0.376 +/- 0.005

Statistical values determined by one-way ANOVA and Duncan's multiple range post-test ($p < 0.05$). +/- SEM

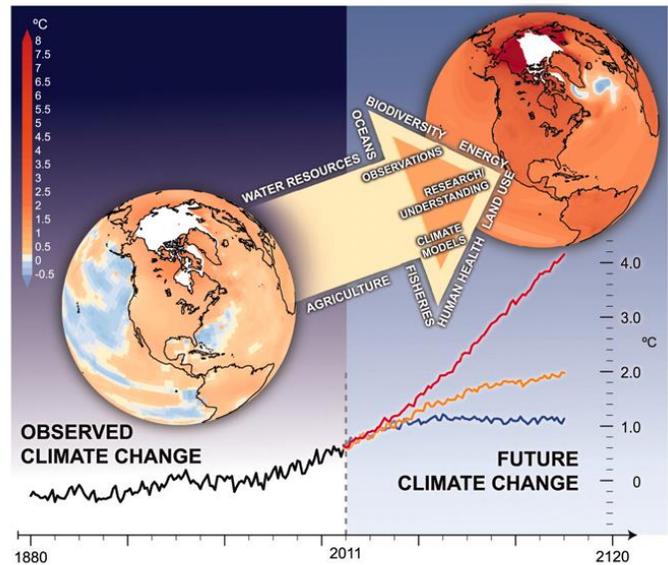
Yao Xue

Climate Change Impacts the Climatology of Freeze Events

Planting Map of Commonly Eaten Fruits



Gu et al. 2011



Overpeck et al. 2011

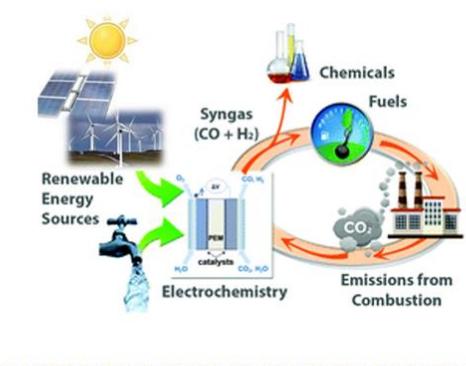
Burning of exhaustible fuels



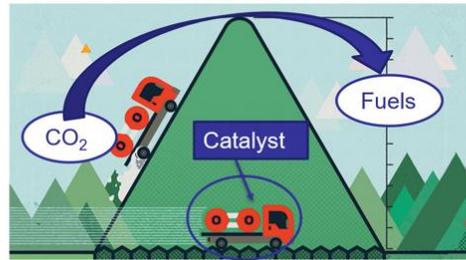
Causing global warming



Turning waste (CO₂) into fuels



But conversion efficiency is very low

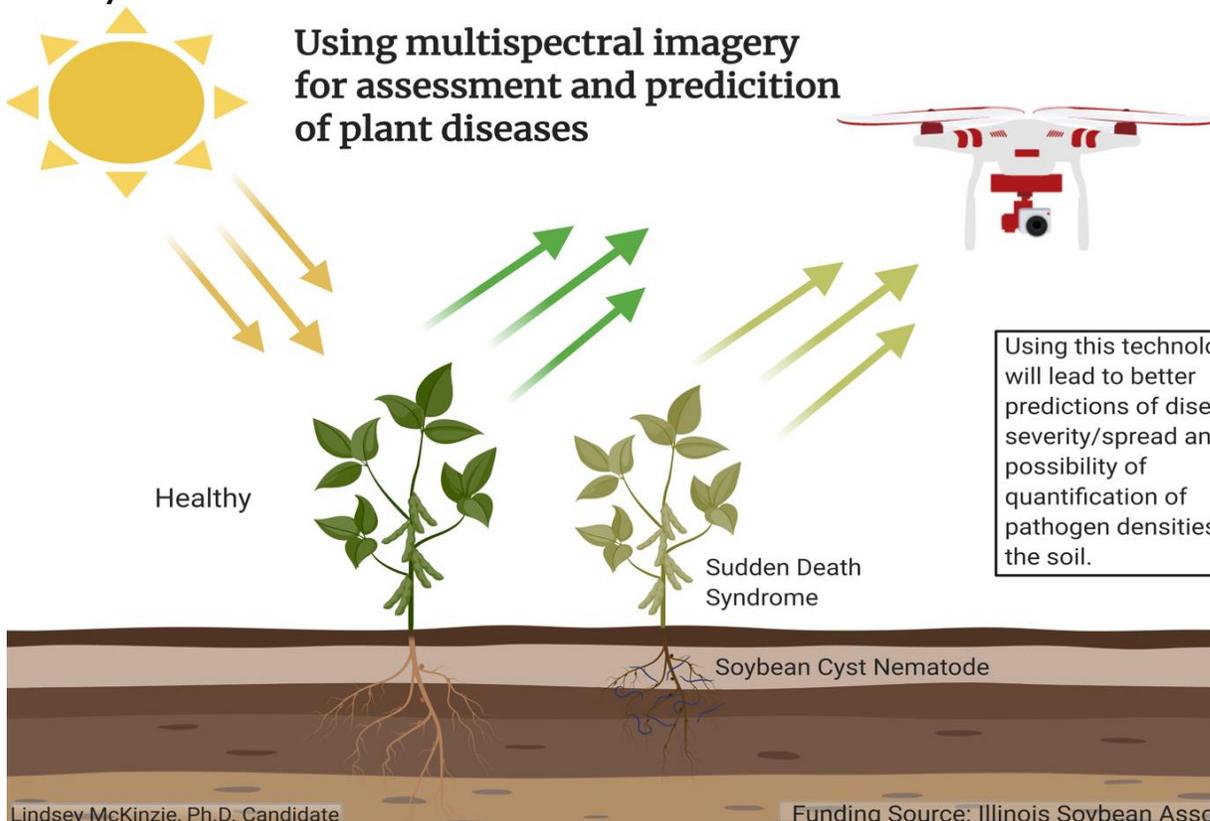


Our contribution



Lindsey McKinzie

Using multispectral imagery for assessment and prediction of plant diseases



Using this technology will lead to better predictions of disease severity/spread and possibility of quantification of pathogen densities in the soil.

• THURSDAY, APRIL 15, 2021 •

RESEARCH & CREATIVE ACTIVITIES VIRTUAL FORUM

CALL FOR POSTERS & FORUM JUDGES

Each spring the Research & Creative Activities Forum celebrates the research, scholarly, and creative projects of SIU Carbondale undergraduate and graduate students in all disciplines. Students are invited to display a virtual poster explaining their project. Zoom Judging sessions are 10:30am-12:00pm or 12:30-2:00pm with a public viewing session from 2:00-3:30. **Deadline to register-March 12**

FOR MORE INFO VISIT: [VCRESEARCH.SIU.EDU/STUDENT-RESEARCH](https://vcresearch.siu.edu/student-research)



FORWARD TOGETHER

On Wednesday, March 3, SIU is hosting its annual Day of Giving – a 24-hour online giving campaign. We hope you will join us and make a special gift on #SIUDAY to help move SIU forward.

HERE'S HOW YOU CAN HELP MAKE A DIFFERENCE:

GIVE: All SIU alumni, parents, students, faculty, staff and friends are challenged to show their support for our wonderful institution. All gifts made online between 6 a.m. March 3, and 6 a.m. March 4, count toward the Day of Giving. Visit siuday.siu.edu to make your gift in support of SIU!

SHARE: Spread the word about #SIUDAY of Giving. Post on Facebook, Twitter, Instagram and LinkedIn to share why you give back to SIU. Make sure you use #SIUDAY to see your content on the Day of Giving social media wall.

ASK: Ask your personal network to join you in making a gift!

[SIUDAY.SIU.EDU](https://siuday.siu.edu)

FOLLOW US:

You can follow our social media wall throughout the day, learn about current student experiences and share your Saluki pride!



Make a gift that can create life-changing experiences for current and future students!

For more information about #SIUDAY of Giving, scan the QR code below with your smartphone.



 SIU FOUNDATION