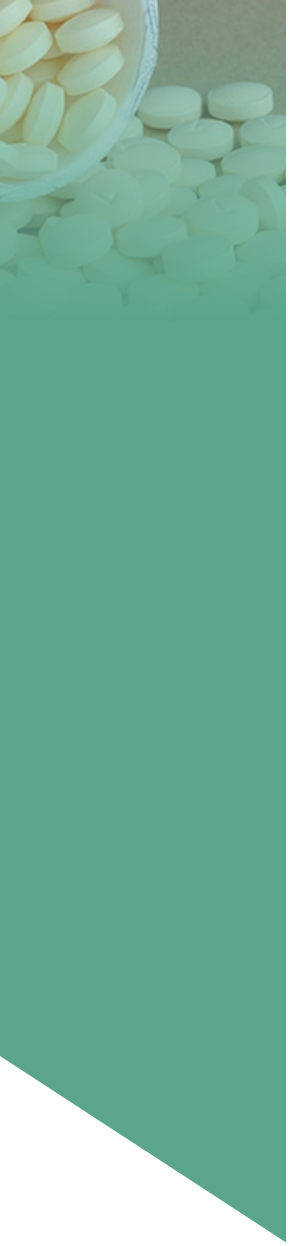
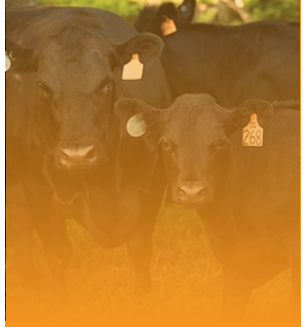
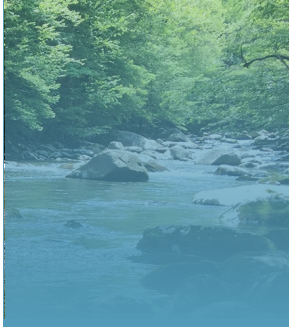





THE UNIVERSITY OF TENNESSEE

ONE HEALTH INITIATIVE

2021

Annual Report

Director's Update

This spring, the UT One Health Initiative celebrated the completion of its second year, and what a busy year it's been! We continue to face local, national, and global health issues—emerging pathogens, food insecurity, changing climate, biodiversity loss, and antimicrobial resistance, among others. Despite these daunting challenges, we've seen an encouraging shift toward consilience and interdisciplinary collaborations, which is critical if we are even to begin to tackle these wicked problems.

We've accomplished much this year by focusing on research, education, and outreach. Through our seed funding program, we awarded six research teams small grants of $40,000 each, including one exploring healthy, living shorelines on the Tennessee River in partnership with Tennessee RiverLine and one globally-focused award in partnership with the Smith Center for International Sustainable Agriculture and the Center for Global Engagement. In addition to these new projects, we celebrated nearly $3M of extramural funds generated from the inaugural round of awardees, bringing the total of extramural funds generated from teams fostered by OHI in the past two years to over $10M!

The new One Health minor (for undergraduate and graduate students) and the "Introduction to One Health" course launched in the fall of 2021, and we've received very encouraging feedback so far. In fact, we've added courses to the minor as more faculty approach us to have their programs included.

Through our partnership with UT Extension, UT Gardens, Biology in a Box, MEGA:BITESS, the Tennessee Department of Health, Tennessee Department of Agriculture, and the Nashville Zoo, we're developing an amazing K-12 program, including curricula for classrooms and educators.

We also continue to offer high caliber presentations from experts around the globe in our monthly Lunch and Learn series. All presentations are available on our website, as are episodes of our podcast series with comedian Shane Mauss, which feature interviews with our amazing UT faculty. In addition to these recurring resources, we hosted several noteworthy events in our second year. In November, our One Health Day celebration was a truly global event. The theme was "Climate Change and One Health," and we had outstanding keynote speakers and a panel discussion featuring experts from UT and Oak Ridge National Laboratory. Also in November, we partnered with the Center for Global Engagement to host a jointly held One Health workshop with presenters from UT, Hebrew University of Jerusalem, and Tel Aviv University, designed to share research ideas and foster collaboration. More recently, we hosted a Team Science workshop in March of this year that was well-received and truly the beginning of a full line of team-building workshops.

All that we have accomplished this past year is a testament to our amazing UT faculty. It emphasizes that there is nothing we cannot achieve when we believe in something and work together to make it happen. So, let us continue to inspire one another locally, nationally, and globally as we continue uniting disciplines to protect and promote the health of all life on Earth!

Debra Lee Miller

Year Two Accomplishments

Research

One Health Research Seed Grant Program

Funded 6 projects across UT for a total of $240,000 through second annual seed grant program

Working Groups and Research Teams

Formed 7 working groups to foster collaboration across disciplines within a one health framework

Extramural Funds Generated

Of the 33 new proposals submitted by the One Health community, 15 are already funded, totaling $2.9M

Education

One Health Minor

Nine students have declared the minor since it became available Fall 2021; additional courses will be added Fall 2022

Global Health Concentration

OHI helped inform the design of the Global Health Concentration in the College of Arts and Sciences, Division of Biology

K-12 Materials

Deployed educator materials to introduce K-12 communities to One Health via 4-H; developed One Health booklet for students through partnership with Biology in a Box

Outreach

Monthly Seminar Series

Features local and international speakers discussing their One Health approach to current global challenges

One Health Day Celebration

Full-day event with keynote speakers, UT research highlights, and discussion panels on International One Health Day (Nov 3)

Nashville Zoo Partnership

Program focused on implementing accessible One Health information into camps, messaging, and everyday zoo visits

Deliverables by 2024

Formation of the Tennessee Center for Global One Health

>1.2M annual operating budget supported by state and federal funds and private industry

Increase in extramural grants

>2.7M per year

Expected >8 proposal submissions per year by One Health-associated faculty

Increase in peer-reviewed publications

10-20 per year

Provide diagnostic support for research/surveillance activities

>20 UT faculty per year

Train >100 students and post-docs in One Health

Organize 12+ public seminars and 4 One Health Day celebrations

Become nationally recognized as one of the premier One Health programs and partners

Leadership

Dr. Deb Miller
Interim Director

Dr. Nina Fefferman
Associate Director

Dr. Carole Myers
Associate Director

Dr. Elizabeth Strand
Consilience Facilitator

Dr. Kimberlyn Roosa
Post-Doctoral Researcher

Alyssa Merka
Administrative Assistant

One Health Scholars

Zack Buck

Associate Professor,
College of Law

Brad Collett

Assistant Professor,
Dept. of Plant Sciences

Associate Professor,
School of Landscape Architecture

Dr. Jennifer DeBruyn

Associate Professor,
Dept. of Biosystems Engineering and Soil Science

Dr. Shigetoshi Eda

Professor,
Dept. of Forestry, Wildlife, and Fisheries

Adjunct Professor,
Dept. of Microbiology

Dr. Matt Gray

Professor,
Dept. of Forestry, Wildlife, and Fisheries

Dr. Daniel Grove

Extension Assistant Professor,
Dept. of Forestry, Wildlife, and Fisheries

Dr. Denita Hadziabdic-Guerry

Assistant Professor,
Dept. of Entomology and Plant Pathology

Dr. Xueping Li

Professor,
Dept. of Industrial and Systems Engineering

One Health Scholars

Dr. Emily Martin

Associate Professor,
Dept. of Medicine

Dr. Laurie Miller

Associate Professor,
School of Communication Studies

Dr. Mircea Podar

Associate Professor,
Dept. of Microbiology

Distinguished Staff Scientist,
ORNL Biosciences Division

Dr. Hollie Raynor

Associate Dean of Research,
College of Education, Health, and Human Sciences

Professor,
Dept. of Nutrition

Dr. Laura Russo

Assistant Professor,
Dept. of Entomology and Plant Pathology

Dr. Heather Sedges Wallace

Assistant Professor,
Dept. of Entomology and Plant Pathology

Lecturer,
Dept. of Child and Family Studies

Dr. Charles Sims

Associate Professor,
Dept. of Economics

Director of Energy and Environment Program,
Howard H. Baker Jr. Center for Public Policy

Dr. Marcy Souza

Professor,
Biomedical and Diagnostic Sciences Dept.

Director of Veterinary Public Health,
Dept. of Public Health

One Health Scholars

Dr. Chunlei Su

Associate Professor,
Dept. of Microbiology

Dr. Becky Trout Fryxell

Associate Professor,
Dept. of Entomology and Plant Pathology

Dr. Brynn Voy

Professor,
Dept. of Animal Science

Associate Professor,
Genome Science and Technology

Dr. Adam Willcox

Research Associate Professor,
Dept. of Forestry, Wildlife, and Fisheries

Coordinator,
Smith Center for Intl. Sustainable Agriculture

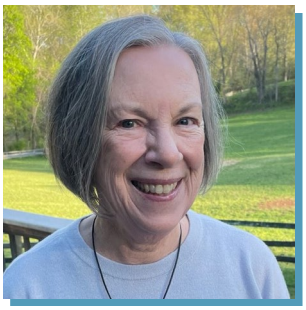
Dr. Jeanine Williamson

Professor,
Veterinary and Engineering Librarian,
Pendergrass Library

Dr. Yang Zhao

Assistant Professor,
Dept. of Animal Science

External Advisory Board Members



Dr. Cathie Woteki, Chair

Professor,
Dept. of Food Science and Human Nutrition,
Iowa State University

Dr. Alexa McCourt, Vice-Chair

One Health Program Director,
Tennessee Department of Agriculture,
Animal Health Division

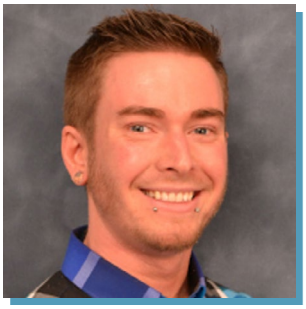
Dr. Samantha Beaty

State Veterinarian and Assistant Commissioner for Animal Health,
Tennessee Department of Agriculture

Dr. Mary-Margaret Fill

Deputy State Epidemiologist,
State of Tennessee

Medical Epidemiologist,
Tennessee Department of Health



Dr. Brad Greening

Health Scientist and Mathematical Modeler,
US Centers for Disease Control and Prevention

Dr. Marti Head

Executive Director,
Computational and Data Sciences,
Amgen

Stephanie Karns

Assistant Chief,
Game Species Program,
Tennessee Wildlife Resources Agency

Dr. Tim Kurt

Scientific Program Director, Advanced Animal Systems,
Foundation for Food and Agriculture Research

Dr. Nick Patterson

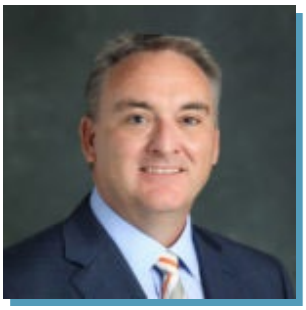
Owner,
Honest Abe Log Homes

Tennessee Farm Bureau

Chuck Yoest

Regional Director,
Tennessee Department of Environment and Conservation

Ex Officio Advisory Board Members



Dr. Brad Day

Associate Vice Chancellor,
UT Office of Research,
Innovation, and Economic
Development

Dr. Paul Hauptman

Professor and Dean,
Division of Cardiology,
UT Graduate School of
Medicine

Dr. Stacey Patterson

Vice President for
Research, Outreach, and
Economic Development,
Office of Research

President,
UT Research Foundation

Dr. Ashley Stokes

Professor and Dean,
UT Extension,
UT Institute of Agriculture

Dr. Jim Thompson

Professor and Dean,
UT College of Veterinary
Medicine,
UT Institute of Agriculture

Dr. David White

Associate Dean and
Professor,
UT AgResearch,
UT Institute of Agriculture

Dr. Hongwei Xin

Dean and Professor,
UT AgResearch,
UT Institute of Agriculture

Working Groups

Chronic Wasting Disease

Led by Drs. Shigetoshi Eda and Allan Houston (Herbert College of Agriculture), this group is a collaboration between Tennessee Wildlife Resources Agency and UT (including UT Medical School, College of Arts and Sciences, and Herbert College of Agriculture); evaluating environmental testing from field-collected samples is at beginning stages; efforts have been augmented by OHI seed funding to Dr. Eda for development of prion sensor technology.

Green Spaces

Led by Drs. Carole Myers (College of Nursing) and Sharon Jean-Philippe (Herbert College of Agriculture), a broad complement of community scholars and practitioners came together to explore opportunities to address inequities in the distribution and availability of parks and green spaces. In late June 2022, the group will meet with key stakeholders to discuss opportunities related to several recently announced UT interdisciplinary cluster hires and collaborative grant proposals. Broadening the focus of the group and integrating mental health and wellness is under consideration.

Mental Health

Led by Dr. Carole Myers (College of Nursing) and Kristi Gordon (College of Education, Health, and Human Sciences), the group is in discussions with school representatives to collaboratively assess needs and funding opportunities. They are also exploring how work on green spaces and mental health can be integrated.

Microbiome

Currently seeking a leader, this group connects microbiome researchers across UT (including College of Nursing, College of Veterinary Medicine, College of Arts and Sciences, Herbert College of Agriculture, and Oak Ridge National Laboratory) to foster collaboration and improve techniques across campus.

One Health in K-12

Led by Dr. Kimberlyn Roosa (College of Arts and Sciences), this group seeks to introduce One Health to the next generation and to serve as a liaison to underserved communities. Over the past year, the group has expanded partnerships across the state to include Tennessee Department of Agriculture, UT Gardens, TN STEM, and the Nashville Zoo. The group continues to incorporate One Health messaging to a K-12 audience, including presentations at local schools and a virtual event with zookeepers at the Nashville Zoo. They have also developed an activity book for children to learn about One Health and how it relates to what they see in their own backyards, which has been distributed at various events and presentations. They have also developed training for educators to convey One Health ideas through in-service training for 4-H agents.

Science of Team Science

Current Group Leader: Elizabeth Strand (College of Veterinary Medicine; College of Social Work). Multidisciplinary group of researchers at UT (including College of Social Work; College of Veterinary Medicine; Dept. of Ecology and Evolutionary Biology; Dept. of Child and Family Studies; College of Nursing; and Institute of Agriculture) interested in exploring effective collaborative teamwork and providing training and service to foster facilitative skills needed to promote synergy and productivity in One Health research.

Substance Misuse and Addiction Resources for Tennessee (SMART) Policy Network

Dr. Carole R. Myers (College of Nursing) is serving on the SMART Policy Network Steering Committee on behalf of OHI to promote synergy across UT and the state to combat substance misuse in Tennessee. Major action areas for the SMART Policy Network include criminal justice reform, naloxone, stigma, telehealth, and youth prevention.

2022 Seed Grant Recipients

***Effectiveness of a "Living Shoreline" on Environmental and Human Health on the Tennessee River**

- Dr. Michael McKinney, College of Arts and Sciences, Dept. of Earth and Planetary Sciences
- Garret Ferry, Facilities Services
- Dr. Andrea Ludwig, Herbert College of Agriculture, Dept. of Biosystems Engineering and Soil Sciences
- Dr. Michael Ross, Herbert College of Agriculture, Dept. of Plant Sciences
- Dr. John Schwartz, Tickle College of Engineering, Dept. of Civil and Environmental Engineering
- $40,000

****Training the Next Global One Health Workforce: An Educational Pilot Program for Cross-Sectoral Engagement in Darien, Panamá**

- Dr. Jennifer Retherford, Tickle College of Engineering, Dept. of Civil and Environmental Engineering
- Dr. David Ader, Smith Center for International Sustainable Agriculture
- Dr. Nan Gaylord, College of Nursing
- Dr. Sara Mulville, Smith Center for International Sustainable Agriculture
- $40,000

Multiscale, Poly-topographic Platforms for Complex, Multifunctional Tissue Regeneration Using Precision Engineering: A Prelude to Organogenesis

- Dr. Madhu Dhar, College of Veterinary Medicine, Large Animal Clinical Sciences
- Dr. Dayakar Penumadu, Tickle College of Engineering, Dept. of Civil and Environmental Engineering
- $40,000

Integration of Molecular Biology, Electrochemistry, and Electrical Engineering for the Development of a Rapid On-site Detection Platform for Zoonotic RNA Viruses

- Dr. Shigetoshi Eda, Herbert College of Agriculture, Dept. of Forestry, Wildlife, and Fisheries
- Dr. Doris D'Souza, Herbert College of Agriculture, Dept. of Food Science
- Dr. Jayne Wu, Tickle College of Engineering, Dept. of Electrical Engineering and Computer Science
- $40,000

Towards a Biogeochemical Coupling of Machine Learning and Process-based Modeling for Improved Prediction of Soil's Climate Mitigation Potential

- Dr. Debasish Saha, Herbert College of Agriculture, Dept. of Biosystems Engineering and Soil Sciences
- Dr. Subhadeep Chakraborty, Tickle College of Engineering, Dept. of Mechanical, Aerospace, and Biomedical Engineering
- $40,000

Physics-Based and Machine-Learning Models for Goat Tibia Fracture

- Dr. Timothy Truster, Tickle College of Engineering, Dept. of Civil and Environmental Engineering
- Dr. Pierre-Yves Mulon, College of Veterinary Medicine, Large Animal Clinical Sciences
- Dr. David Anderson, College of Veterinary Medicine, Large Animal Clinical Sciences
- $40,000

**in partnership with Tennessee RiverLine*
***in partnership with UT's Smith Center for International Sustainable Agriculture and the Center for Global Engagement*

2021 Seed Grant Updates

Transdisciplinary Diagnostic Investigation of Freshwater Mussel Mortality in the Clinch River

- Dr. Michelle Dennis (College of Veterinary Medicine, Biomedical and Diagnostic Sciences)
- Dr. Nina Fefferman (College of Arts and Sciences, Dept. of Ecology and Evolutionary Biology, Dept. of Mathematics)
- Gerald Dinkins (McClung Museum of Natural History and Culture)

This study aims to determine likely causes of die-offs in the Clinch River with a two-year-long in-situ experiment that measures seasonal changes in health and mortality of hatchery-reared *Actinonaias pectorosa* maintained in silos at two die-off sites. The team has successfully set up the experiment by placing 20 silos at each study site, which contained 5 hatchery-reared, healthy *A. pectorosa,* for a total of 100 mussels. From August–November, a wild mussel die-off event was observed at both sites in the first year of the experiment; no silo mussels presented signs of disease, and few mortalities occurred that were not associated with disease. During the period of mass mortality, they worked with partners to conduct three surveys for wild moribund *A. pectorosa*. collecting data on survival and growth, clinical signs of disease, hemolymph indices, histopathology, and bacterial microbiome in moribund and hatchery-reared mussels. Around half of the mussels stocked in silos remain to be sampled in 2022. Moving forward, they plan to pair this data with historical population demographic and die-off data. These data, in combination with environmental data (i.e., river flow, temperature), will be used to build models that explore likely causes of die-off events and make predictions considering climate change scenarios. This work is the focus of UT-CEM PhD student, Jeronimo Silva. They are presently working with a team at US Geological Survey and National Wildlife Health Center to publish the observation of a novel rickettsial-like organism in wild and hatchery-sourced mussels. They have also started a collaboration with Tennessee State University and the USGS Lower Mississippi Gulf coast Water Science Center to correlate harmful algal bloom toxins detected in the water and in the tissues of the silo mussels.

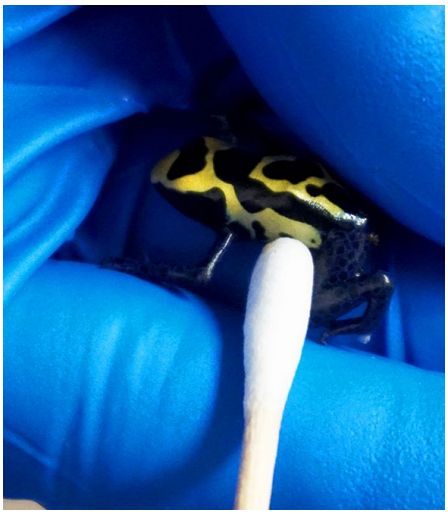
Grant Submissions:

Linking health with hydrology to inform management of imperiled freshwater mussels affected by mass-mortality events
South East Climate Adaptation Science Centers
$208,130
Pending

Initial assessment of hemolymph analytes as disease biomarkers in freshwater mussels
Morris Animal Foundation Wildlife Pilot Study
$10,433
Funded

2021 Seed Grant Updates

Socio-Economic Epidemiology of Disease Risk in Wildlife Trade Networks



- Dr. Matthew Gray (Herbert College of Agriculture, Dept. of Forestry, Wildlife, and Fisheries)
- Dr. Neelam Poudyal (Herbert College of Agriculture, Dept. of Forestry, Wildlife, and Fisheries)
- Dr. Nina Fefferman (College of Arts and Sciences, Dept. of Ecology and Evolutionary Biology, Dept. of Mathematics)

The team created a project website and met weekly with the US pet amphibian industry to design socioeconomic surveys. Two online surveys were launched in summer 2021 targeting US pet amphibian businesses and consumers. The team assessed the knowledge of US pet amphibian businesses and consumers on the threat of amphibian pathogens in trade and risk of spillover to wild populations, as well as quantified ongoing biosecurity practices in businesses and disposal practices of wastewater, aquarium contents, and dead or unwanted amphibians of businesses and consumers. They also estimated the willingness of businesses and consumers to pay a price premium for certified, pathogen-free amphibians and summarized their findings in an executive summary that is available on the project website. One manuscript has been submitted to the *Journal of Cleaner Production* and two additional are in preparation. Businesses that participated in the survey were asked to volunteer to participate in amphibian pathogen surveillance at their facilities. In total, nine businesses sent samples from captive amphibians in their facility, and two businesses sent samples from arriving amphibian shipments. Currently, the team is in the process of testing these samples for the presence of three notifiable amphibian pathogens and one beneficial microbe species. Future activities include using surveillance sample results to estimate where is best to target future pathogen surveillance sampling, and working with industry to identify possible components of a clean trade program. In November 2021, they submitted a $3M proposal to the National Science Foundation to expand this research. Data collected using OHI seed grant funds were instrumental to increasing the competitiveness of our proposal submission.

Publications:

Perceived risk of pathogen and attitudes towards biosecurity practices: an assessment of US businesses involved in pet amphibian trade
Journal of Cleaner Production, in review
Cavasos, K., N. C. Poudyal, J. L. Brunner, A. R. Warwick, J. Jones, N. Moherman, M. George, J. D. Willard, Z. T. Brinks, and M. J. Gray

Grant Submissions:

Socioeconomic and Epidemiological Drivers of Pathogen Dynamics in Wildlife Trade Networks
National Science Foundation, Ecology and Evolution of Infectious Diseases Program.
$2,999,695
Pending

2021 Seed Grant Updates

One Health Approach to Controlling Escherichia albertii, the Emerging Human Pathogen

- Dr. Jun Lin (Herbert College of Agriculture, Dept. of Animal Science)
- Dr. Qiang He (Tickle College of Engineering, Dept. of Civil and Environmental Engineering)

With aid of the OHI seed grant and seamless collaboration among multiple units, the team has examined the prevalence of *E. albertii* in US poultry production and wild raccoons, and characterized isolated *E. albertii* strains using a panel of microbiological and genomics approaches. Examination of 30 chicken fecal samples in east Tennessee and 270 fecal samples from the chickens in 9 different farms in Mississippi (6 farms) or Alabama (3 farms) led to isolation of 18 *E. albertii* isolates. The team completed a longitudinal surveillance to analyze a total of 289 raccoon fecal samples collected in Tennessee and Kentucky, and successfully isolated 22 raccoon *E. albertii* strains. Additionally, they performed whole genome sequencing for a total of 70 diverse *E. albertii* strains of different origins (18 US chicken, 22 US raccoon, 20 Japan raccoon, 7 Japan human, 1 Japan swine, and 2 Japan bird) for comparative genomics analysis together with those US human strain sequences deposited in public domain. The comparative characterizations led to important and insightful discoveries, and strongly supported the hypothesis that chickens and raccoons are unique and significant players in the dynamic interactions among the enteric *E. albertii* pathogen, animals, humans, and their shared environment. This project has led to three published journal articles, and the novel and solid data obtained from this project position the team well to pursue various funding opportunities in the future.

Publications:

Isolation and characterization of *Escherichia albertii* in poultry at the pre-harvest level
Zoonoses and Public Health, 2021
Hinenoya, A., X. P. Li, X. Zeng, O. Sahin, R. A. Moxley, C. M. Logue, B. Gillespie, S. Yamasaki, J. Lin

Isolation and characterization of *Escherichia albertii* originated from the broiler farms in Mississippi and Alabama
Veterinary Microbiology, 2022
Wang, H., L. Zhang, L. Cao, X. Zeng, B. Gillespie, J. Lin

Longitudinal surveillance and comparative characterization of *Escherichia albertii* in wild raccoons in the United States
One Health, 2022
Hinenoya, A., H. Wang, E. M. Patrick, X. Zeng, R. L. Lindsey, B. Gillespie, Q. He, X. P. Li, S. Yamasaki, J. Lin

2021 Seed Grant Updates

Developing a System for Molecular Detection/Identification of Zoonotic Pathogens of Most Concern in the US

- Dr. Chunlei Su (College of Arts and Sciences, Dept. of Microbiology)
- Dr. Richard Gerhold (College of Veterinary Medicine, Biomedical and Diagnostic Sciences)
- Dr. Michelle Dennis (College of Veterinary Medicine, Biomedical and Diagnostic Sciences)
- Dr. Sree Rajeev (College of Veterinary Medicine, Biomedical and Diagnostic Sciences)

This project proposes the establishment of an integrated system to detect and identify zoonotic pathogens. This system aims to detect novel and known zoonotic pathogens from animals. This project was meant to be a proof of concept, and it is aimed to be scalable for surveillance of a large number of pathogens from animals, plants, humans and environment in the future. There were three objectives: (1) establish a shared resource database of biological samples; (2) develop molecular methods to detect and identify zoonotic pathogens; and (3) isolate zoonotic pathogens and establish reference depositories.

The team made progress on all three objectives. For objective 1, they established a prototype biobank consisting of over 300 domestic and wild animal samples organized in a shared database available for future research on disease transmission dynamics. For objective 2, they established a comprehensive methodology that is able to detect and identify viruses, bacteria, fungi and parasites by metagenomic and targeted sequencing analysis. Specifically, they tested samples from bat, white-tailed deer, goose, turkey, duck, and cat, and are to detect and identify alphacoronavirus, betacoronavirus, *Staphycoccus*, *Salmonella*, *Toxoplasma gondii* and related parasites. For objective 3, they were able to isolate and expand over 20 *T. gondii* strains from animals; these isolates will be included in a national reference depository. The team is currently looking for extramural funding to expand the biobank sample collection, target additional pathogens for detection, test sample pooling strategy to increase detection efficiency at the animal population level, and isolate a variety of zoonotic pathogens of interest. The OHI seed grant provided a much needed resource for them to prove the concept that a comprehensive system for pathogen detection and identification is feasible.

2021 Seed Grant Updates

Developing a Model of Chronic Inflammation to Elucidate its Effects on Reproduction

- Dr. Brian Whitlock (College of Veterinary Medicine, Large Animal Clinical Sciences)
- Dr. Bhavya Sharma (College of Arts and Sciences, Dept. of Chemistry)
- Allison Renwick (College of Veterinary Medicine, Comparative and Experimental Medicine Program)

The animal portion and parts of the laboratory work related to this project have been completed. The animal work was completed at the Johnson Animal Research and Teaching Unit with the assistance of the unit staff, many undergraduate student volunteers, and UTCVM Drs. Strickland, Lear, Adkins, Griffin, and Daniel. The team used 23 individually housed wethers in the study, which were equipped with HOBO accelerometers (to track animal activity), Star-Oddi temperature sensors (subcutaneous implants to capture temperature), CowManager ear accelerometers (to track eating, ruminating, and activity) and monitored continuously with security cameras and Blue Iris security software (behavior data from the video files will be compared to HOBO and CowManager accelerometers). Sheep were acclimated to serial venipuncture before experimentation where they received one of five treatments (control, single acute dose of endotoxin, daily acute dose of endotoxin, daily rising dose of endotoxin, and chronic subcutaneous administration of a static dose of endotoxin) over seven days. Blood samples were collected at the beginning and end of the week of treatment administration.
At the end of the last day of treatments, sheep were humanely euthanized and tissue samples were collected. Most importantly, the heads were perfused with 4% paraformaldehyde and brains and pituitaries were collected. Temperature and activity data have been analyzed as well as plasma concentrations of luteinizing hormone, cytokines and cortisol. Immunohistochemical determination of hypothalamic expression of kisspeptin and c-fos have been completed and analysis is pending. Assessment of hypothalamic expression of Iba-1 (marker of activated microglia indicating neural inflammation) and pituitary expression of LH-beta are pending. Temperature data and plasma luteinizing hormone concentration profiles indicate that the most appropriate dosing scheme for chronic endotoxin-induced suppression of the hypothalamic-pituitary-gonadal axis is a daily rising dose. Once the immunohistochemical analysis of the KNDy neurons is complete, the team will have a greater understanding of the effects of chronic inflammation on hypothalamic regulation of reproduction.

Grant Submissions:

Salary Savings
Effect of endotoxin-induced acute inflammation on plasma luteinizing hormone concentrations, vaginal temperature, and KNDy neurons in beef cows
Animal research completed and lab work underway.

UT COE
Evaluation of general COX inhibitor for protection of KNDy neurons in ewes
$15,000
Funded and in progress. Animal research completed and lab work underway.

USDA-NIFA
The role of the melanocortin system on inflammation-induced suppression of reproduction through KNDy neurons
$538,943
Not funded. Resubmitting August 2022 with help from the Hannover Research Group.

Publications:

PSX-A-2 Late-Breaking: Acute Endotoxinemia May Increase Intercostal Temporary Mechanical Nociception in Wethers
Journal of Animal Science, 2021
Whitlock B. K., A. N. Renwick, A. Pi, J. A. Daniel.

PSX-A-25 Late-Breaking: The Effects of Chronic Endotoxinemia on Rectal and Subcutaneous Temperature in Wethers
Journal of Animal Science, 2021
Renwick A., J. A. Daniel, B. K. Whitlock

2021 Seed Grant Updates

Impact Assessment of Climate Change on Cotton Production via Computational Simulation

- Dr. Xinhua Yin (Herbert College of Agriculture, Dept. of Plant Sciences)
- Dr. Joshua Fu (Tickle College of Engineering, Dept. of Civil and Environmental Engineering)
- Dr. Sangeeta Bansal (Herbert College of Agriculture, Dept. of Plant Sciences)

The team has finished the simulation of the weather conditions for the designated years and acquired all necessary data. They have also collected and measured most of the relevant crop, soil, and weather parameters needed for the simulation of climate change on cotton production with the DSSAT Cotton Model. Meanwhile, they submitted a grant proposal titled “Calibrating and validating soybean model in DSSAT and simulating future climate change impacts on Southeast soybean production” to the Foundation for Food and Agriculture Research (FFAR) with a budget of about one million dollars, but they were not selected for funding.

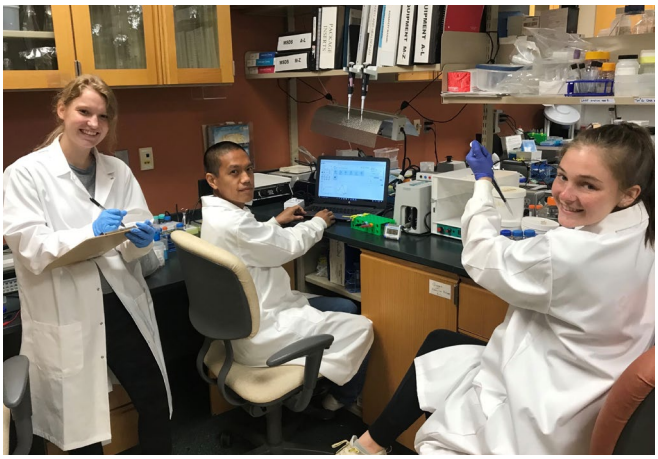
The postdoc research associated needed for this project needs to have good knowledge of the DSSAT crop models and the skills for using them. After receiving the OHI seed grant, they began the search process for such a research associate for this project in early January, 2021. However, due to delays caused by COVID-19, the research associate did not begin work until June 1, 2021. Therefore, a five-month, no-cost extension was approved for this project.

Other OHI-Supported Research

Detecting Chronic Wasting Disease Prions in Environmental Samples

- Dr. Shigetoshi Eda (Herbert College of Agriculture, Dept. of Forestry, Wildlife, and Fisheries)
- Joseph Ramos (Herbert College of Agriculture, Dept. of Forestry, Wildlife, and Fisheries)

Chronic wasting disease (CWD) causes drastic weight loss, stumbling, listlessness, and eventually the death of the affected animals. The disease is present in 26, states causing both ecological and economic issues. Since there is no treatment or vaccine for the disease, early detection and management of CWD-affected animals are vital for mitigating the significant ongoing and future impacts of the disease. A major method currently used for detecting CWD prion is enzyme-linked immunosorbent assay (ELISA); however, this method lacks sensitivity to detect prion proteins in live animal samples and the environment. Since March 2021, the team has been working on the development of a new platform for detecting CWD prion in live animal samples and the environment. The platform utilizes a combination of magnetic nanoparticles and our newly invented electrochemical detection method, which enables rapid detection of the protein with a higher sensitivity than ELISA. The team made significant progress in selecting reagents and optimizing assay conditions, which resulted in funding from USDA-ARS's Detect to Protect Challenge Program. In collaboration with Kord Animal Health Diagnostic Laboratory, the team tested live animal tissue samples (brain and lymph node). The result showed that the platform could detect CWD prion in brain samples with 100% accuracy. Since lymphoid tissue and other environmental samples contain a lower amount of CWD prion, the team is currently improving the platform to increase the sensitivity of CWD prion detection for testing other tissue and environmental samples. Through this project, two undergraduate students were trained and presented at EUReCA 2022. Dr. Eda, the project PI, has led the University of Tennessee CWD Working Group since May 2021. The group prepared a roadmap, met with the external advisory board, had regular meetings, and created its website.



Grant Submissions:

USDA-ARS SENSIS
Detect to Protect Challenge - A Live Animal Test for CWD, Phase I
$10,000
Funded

Faculty Research Assistants Funding
Development of a Portable System for Rapid and Sensitive Detection of Chronic Wasting Disease Prion in Live Animal Samples
$2,250
Funded

Presentations:

Chronic Wasting Disease Prion Detection: Use of Gold Nanoparticles and Modified Nucleic Acids for Improved Sensitivity of an Immunoassay (Haley Channell, Veronica Hafner, Joseph Ramos, Shigetoshi Eda)
EURēCA (Exhibition of Undergraduate Research and Creative Achievement)
April 25, 2022

Chronic Wasting Disease Prion Detection: Optimizing Electrochemical Conditions for a Higher Sensitivity (Veronica Hafner, Haley Channell, Joseph Ramos, Shigetoshi Eda)
EURēCA (Exhibition of Undergraduate Research and Creative Achievement)
April 25, 2022

Other OHI-Supported Research

Farm and Ranch Stress Assistance Network: Southern Region

- Dr. Heather Sedges (Herbert College of Agriculture, Family and Consumer Sciences)

In 2020, the USDA created the Farm and Ranch Stress Assistance Network (FRSAN) to provide stress management assistance to people in farming, ranching, and other agriculture-related occupations, as well as their families. UT leads the Southern Region (SR) of the program under the direction of Dr. Heather Sedges.

During its first year, the FRSAN-SR has expanded from 5 founding states to 13 states and 2 US territories, making it the only one of the four regions in the program to have 100% engagement from all eligible states and territories. This was particularly important when the USDA offered each state and territory $500,000 to further the efforts of the program, resulting in an additional $1.5 million leveraged directly to UT. In addition to the new states, the following national organizations have joined the FRSAN-SR network: Rural Advancement Foundation International (RAFI), Intertribal Agriculture Council, Migrant Clinicians Network, the Federation of Southern Cooperatives, and Latino Farmers Outreach Initiative.

By the end of 2021, over 100 participants engaged in an inaugural (virtual) working meeting and conference, a few highlights of included: unveiling options for official branding, welcoming speakers from the USDA and Farm Service Agency, sharing the plans and procedures for the official network-based hotline before its launch in spring 2022, and providing a network-based approach to a collective evaluation plan, along with data management and sharing practices.

Interwoven into the event were countless presentations about farmers' stress throughout the region, increased capacity via evidence-based trainings to respond to farmers' mental health concerns, and ongoing research dedicated to uncovering the nuances of farmers' stress and effective interventions.

Proposals: OHI-Supported

FUNDED

National Science Foundation - Ecology of Infectious Diseases
Transmission Pathways and Immunological Factors Driving Invasion Potential of the Recently Discovered Pathogen, *Batrachochytrium salamandrivorans*
Status: Funded
Requested: $2,494,512 (continued from 2018)
PI: Matt Gray (Herbert College of Agriculture, Dept. of Forestry, Wildlife, and Fisheries)
Co-PI: Deb Miller (Herbert College of Agriculture, Dept. of Forestry, Wildlife, and Fisheries; College of Veterinary Medicine, Biomedical and Diagnostic Sciences)

National Science Foundation
Socioeconomic and Epidemiological Drivers of Pathogen Dynamics in Wildlife Trade Networks
Status: Recommended for Funding
Requested: $2,759,695
PI: Matt Gray (Herbert College of Agriculture, Dept. of Forestry, Wildlife, and Fisheries)
Co-PI: Nina Fefferman (College of Arts and Sciences, Dept. of Ecology and Evolutionary Biology, Dept. of Mathematics), Neelam Poudyal (Herbert College of Agriculture, Dept. of Forestry, Wildlife, and Fisheries)

Tennessee Wildlife Resource Foundation
Multistate (C-SWG) Threat of *Batrachochytrium salamandrivorans* (Bsal) to Species of Greatest Conservation Need and Proactive Development of Disease Management Strategies
Status: Funded
Requested: $205,465 (continued from 2019)
PI: Matt Gray (Herbert College of Agriculture, Dept. of Forestry, Wildlife, and Fisheries)
Co-PI: Deb Miller (Herbert College of Agriculture, Dept. of Forestry, Wildlife, and Fisheries; College of Veterinary Medicine, Biomedical and Diagnostic Sciences)

Gates Foundation
Next Generation Sequencing (mNGS) to Detect, Identify, and Characterize Pathogens in Domestic Animals and Wildlife
Status: In Review
Requested: $191,204
PI: Chunlei Su (Herbert College of Agriculture, Dept. of Forestry, Wildlife, and Fisheries)
Co-PI: Richard Gerhold (College of Veterinary Medicine, Biomedical and Diagnostic Sciences)

Upwell
Leatherback Captive Rearing and Release Research Initiative
Status: Funded
Requested: $22,680
PI: Deb Miller (Herbert College of Agriculture, Dept. of Forestry, Wildlife, and Fisheries; College of Veterinary Medicine, Biomedical and Diagnostic Sciences) and Samantha Kuschke (College of Veterinary Medicine, Biomedical and Diagnostic Sciences)

USDA/ARS
Rapid and Specific Test Format for Detection of Chronic Wasting Disease Prion in Live Animal Samples
Status: Funded
Awarded: $10,000
PI: Shigetoshi Eda (Herbert College of Agriculture, Dept. of Forestry, Wildlife, and Fisheries)

Proposals: Others Involving OHI

FUNDED

National Science Foundation
Predicting the Evolution of Vector-borne Disease Dynamics in a Changing World
Status: Funded
Awarded: $2,498,876 (continued from 2017)
Co-PI: Nina Fefferman (College of Arts and Sciences, Dept. of Ecology and Evolutionary Biology, Dept. of Mathematics)

National Science Foundation
CPS: Medium: Bio-Socially Adaptive Control of Robotics-Augmented Building-Human Systems for Infection Prevention by Cybernation of Pathogen Transmission
Status: Funded
Awarded: $1,132,178 (continued from 2020)
PI: Shuai Li (Tickle College of Engineering, Dept. of Civil and Environmental Engineering)
Co-PI: Jindong Tan (Tickle College of Engineering, Dept. of Mechanical, Aerospace and Biomedical Engineering), Nina Fefferman (College of Arts and Sciences, Dept. of Ecology and Evolutionary Biology, Dept. of Mathematics), Qiang He (Tickle College of Engineering, Dept. of Civil and Environmental Engineering), Mingzhou Jin (Tickle College of Engineering, Dept. of Industrial & Systems Engineering)

National Science Foundation
RAPID: Modeling the Coupled Social and Epidemiological Networks that Determine the Success of Behavioral Interventions on Limiting Spread of COVID-19
Status: Funded
Awarded: $198,932 (continued from 2020)
PI: Nina Fefferman (College of Arts and Sciences, Dept. of Ecology and Evolutionary Biology, Dept. of Mathematics)
Co-PI: Alex Bentley (College of Arts and Sciences, Dept. of Anthropology)

IARPA
Bio-Inspired Robustness and Resilience in Dynamic Supply Chain Distribution Networks
Status: Funded
Awarded: $575,332 (continued from 2021)
PI: Nina Fefferman (College of Arts and Sciences, Dept. of Ecology and Evolutionary Biology, Dept. of Mathematics)

Department of the Interior
Enhancing Climbing Recreation and Conservation in Vertical Environments Shared by Humans and Bats Through Input from Climbers Visiting National Parks
Status: Funded
Awarded: $50,350
PI: Adam Willcox (Herbert College of Agriculture, Dept. of Forestry, Wildlife, and Fisheries)

University of Tennessee College of Veterinary Medicine
Confirming *Anaplasma arginale*, *Ehrlichia ewingii*, and *Theileria orientalis Ikeda* in Tennessee Collected Ticks
Status: Funded
Awarded: $15,000
PI: Becky Trout Fryxell (Herbert College of Agriculture, Dept. of Entomology and Plant Pathology)
CO-PI: Rebecca Butler (Herbert College of Agriculture, Dept. of Entomology and Plant Pathology)

Proposals: Others Involving OHI

University of Tennessee Medical Center Cancer Research Endowment Gift Fund
Health Assessment via Mobile Outreach
Status: Funded
Awarded: $40,000
PI: John Bell (Graduate School of Medicine, Dept. of Surgery), Patricia Robertson (College of Nursing), Eric Heidel (Graduate School of Medicine, Dept. of Surgery), Carole Myers (College of Nursing), Garland Wilson (Graduate School of Medicine, Dept. of Family Medicine), Jill Lloyd (Graduate School of Medicine, Dept. of Surgery)

USDA
Multi-Trophic Effects of Agricultural Microplastics: Implications for Soil Biological Health
Status: Funded
Awarded: $750,000
PI: Jennifer DeBruyn (Herbert College of Agriculture, Dept. of Biosystems Engineering and Soil Science)
Co-PI: Ernest Bernard (Herbert College of Agriculture, Dept. of Entomology and Plant Pathology), Sindhu Jagadamma (Herbert College of Agriculture, Dept. of Biosystems Engineering and Soil Science)

USDA-AFRI
Development of Functional Lignin Additives to Replace Perfluorinated Compounds of Omniphobic Molded Fiber and Paper Packaging Products
Status: Funded
Awarded: $1,000,000
PI: Niki Labbé (Herbert College of Agriculture, Dept. of Forestry, Wildlife, and Fisheries), Kalavathy Rajan (Herbert College of Agriculture, Dept. of Biosystems Engineering and Soil Science), Siqun Wang (Herbert College of Agriculture, Dept. of Forestry, Wildlife, and Fisheries), Priya Voothuluru (Institute of Agriculture, Center for Renewable Carbon), Kimberly Jensen (Herbert College of Agriculture, Dept. of Agricultural and Resource Economics), Carole Myers (College of Nursing), Mark Littmann (College of Communication and Information, School of Journalism and Electronic Media)

USDA Forest Service
Recognizing Tick Encounters by Forestry Personnel Throughout the Southeastern United States
Status: Funded
Awarded: $51,481
PI: Becky Trout Fryxell (Herbert College of Agriculture, Dept. of Entomology and Plant Pathology)

USDA-NIFA
Medical Entomology and Geospatial Analyses: Bringing Innovation to Teacher Education and Surveillance Studies (MEGA:BITESS)
Status: Funded
Awarded: $149,983
PI: Becky Trout Fryxell (Herbert College of Agriculture, Dept. of Entomology and Plant Pathology)
Co-PI: Julie Andsager (College of Communication and Information, School of Journalism and Electronic Media), Michael Camponovo (College of Arts and Sciences, Dept. of Geography), Joshua Rosenberg (College of Education, Health, and Human Sciences, Theory & Practice in Teacher Education)

USDA-NIFA
BiGG FACTS: Research Experiences in Plant Health and Production to Increase Numbers of Women in Bioinformatics, Genetics, and Genomics Sciences

Proposals: Others Involving OHI

Status: Funded
Awarded: $475,895
PI: Kimberly Gwinn (Herbert College of Agriculture, Dept. of Entomology and Plant Pathology)
Co-PI: Bonnie Ownley (Herbert College of Agriculture, Dept. of Entomology and Plant Pathology), Denita Hadziabdic-Guerry (Herbert College of Agriculture, Dept. of Entomology and Plant Pathology), Meg Staton (Herbert College of Agriculture, Dept. of Entomology and Plant Pathology), Carrie Stephens (Herbert College of Agriculture, Dept. of Agricultural Leadership, Education, and Communications), Becky Trout Fryxell (Herbert College of Agriculture, Dept. of Entomology and Plant Pathology)

USDA-NIFA
Farm and Ranch Stress Assistance Network: Southern Region
Status: Funded
Awarded: $100,000
PI: Heather Sedges (Herbert College of Agriculture, Dept. of Family and Consumer Sciences)

PENDING

National Science Foundation
DISES: Will Urban Greening and Climate Change Affect Transmission of West Nile Virus in Historically Disadvantaged Neighborhoods
Status: Pending
Requested: $1,600,000
Co-PI: Nina Fefferman (College of Arts and Sciences, Dept. of Ecology and Evolutionary Biology, Dept. of Mathematics)

National Science Foundation
PIPP Phase 1: Predicting Emergence in Multidisciplinary Pandemic Tipping-points
Status: Pending
Requested: $999,790
PI: Nina Fefferman (College of Arts and Sciences, Dept. of Ecology and Evolutionary Biology, Dept. of Mathematics)
Co-PI: Michael Blum (College of Arts and Sciences, Dept. of Ecology and Evolutionary Biology), Deb Miller (Herbert College of Agriculture, Dept. of Forestry, Wildlife, and Fisheries; College of Veterinary Medicine, Biomedical and Diagnostic Sciences), Elizabeth Strand (College of Veterinary Medicine, College of Social Work)

National Science Foundation
The Institute for the Study of Theory and Mathematics of Health Systems
Status: Full Proposal Invited
Requested: $50,000,000
PI: Nina Fefferman (College of Arts and Sciences, Dept. of Ecology and Evolutionary Biology, Dept. of Mathematics), David Talmy (College of Arts and Sciences, Dept. of Microbiology)
Co-PI: Suzanne Lenhart (College of Arts and Sciences, Dept. of Mathematics), Vasileios Maroulas (College of Arts and Sciences, Dept. of Mathematics)

National Science Foundation
CPS: Medium: Integrated Real-time Monitoring, Diagnosis, and Predictive Data Analytics for Early Decision-making and Treatment of Prevalent Diseases in Precision Dairy Farming
Status: In Review
Requested: $1,200,000

Proposals: Others Involving OHI

PI: Charles Cao (Tickle College of Engineering, Min H. Kao Department of Electrical Engineering and Computer Science)
Co-PI: Hairong Qi (Tickle College of Engineering, Min H. Kao Department of Electrical Engineering and Computer Science), Jayne Wu (Tickle College of Engineering, Min H. Kao Department of Electrical Engineering and Computer Science), Raul Almeida (Herbert College of Agriculture, Dept. of Animal Science), and Shigetoshi Eda (Herbert College of Agriculture, Dept. of Forestry, Wildlife, and Fisheries)

USDA-NIFA
Development of a One Health Entomology Training Program for Current and Aspiring Veterinarians and Associated Health Professionals
Status: In Review
Requested: $226,906
PI: Becky Trout Fryxell (Herbert College of Agriculture, Dept. of Entomology and Plant Pathology)

NOT FUNDED

National Science Foundation
Developing Healthy Behavioral Choices to Promote Illness Prevention in Preschool Children
Status: Not Funded
Requested: $938,790
Co-PI: Nina Fefferman (College of Arts and Sciences, Dept. of Ecology and Evolutionary Biology, Dept. of Mathematics)

SENSIS
Rapid and Specific Test Format for Detection of Chronic Wasting Disease Prion in Live Animal Samples
Status: Not Funded
Requested: $59,940
Co-PI: Shigetoshi Eda (Herbert College of Agriculture, Dept. of Forestry, Wildlife, and Fisheries)

USDA-AFRI
An ELISA for the Emerging Cattle Pathogen (*Theileria orientalis Ikeda*) and Population Dynamics of its Tick Vector (*Haemaphysalis longicornis*)
Status: Not Funded
Requested: $1,000,000
Co-PI: Becky Trout Fryxell (Herbert College of Agriculture, Dept. of Entomology and Plant Pathology)

USDA-AFRI
The Role of the Melanocortin System on Inflammation-Induced Suppression of Reproduction Through KNDy Neurons
Status: Not Funded
Requested: $538,943
Co-PI: Brian Whitlock (College of Veterinary Medicine, Large Animal Clinical Sciences)

Proposals: Flagged One Health

FUNDED

eXtension Foundation
Improving Vaccination Rates Through Education and Partnership
Status: Funded
Awarded: $123,652
PI: Soghra Jarvandi (College of Education, Health, and Human Sciences , Dept. of Public Health; Herbert College of Agriculture, Dept. of Family and Consumer Sciences)

Purdue University
This is How We "Role"®- Tennessee
Status: Funded
Awarded: $1,500
PI: Michael Jones (College of Veterinary Medicine, Small Animal Clinical Sciences)

PENDING

University of Florida
One Health-Based System Approach to Improve Dairy Cattle Health and Productivity in East Shewa Zone of Ethiopia
Status: Pending
Requested: 208,130
PI: Gus Engman (Herbert College of Agriculture, Dept. of Forestry, Wildlife, and Fisheries)

NOT FUNDED

USDA-AFRI
Human Health Risk Implications and Control of Antimicrobial Use and Resistance in Dairy Farming
Status: Not Funded
Requested: $1,000,000
PI: Oudessa Kerro Dego (Herbert College of Agriculture, Dept. of Animal Science)

University of Florida
One Health-Based System Approach to Improve Dairy Cattle Health and Productivity in East Shewa Zone of Ethiopia
Status: Not Funded
PI: Oudessa Kerro Dego (Herbert College of Agriculture, Dept. of Animal Science)

Publications: One Health

PUBLISHED

Attitudes Towards and Relationships with Cave-Roosting Bats in Northwest Cambodia
Journal of Ethnobiology, 2021
Shapiro, H., A. S. Willcox, D. Ader, and E. V. Willcox

Cat and/or Dog Ownership, Cardiovascular Disease, and Obesity: A Systematic Review
Veterinary Science, 2021
Barroso C., K. Brown, D. Laubach, M. J. Souza, L. Daugherty, M. Dixson

Do Long-term Best Pasture Management Practices Influence Microbial Diversity and Antimicrobial Resistant Genes in Runoff?
Frontiers in Microbiology, 2021
Yang, Y., A. J. Ashworth, L. Durso, M. Savin, J. M. DeBruyn, K. Cook, P. A. Moore Jr., and P. R. Owens

The Dynamics of Disease Mediated Invasions by Hosts with Immune Reproductive Tradeoff
Nature Scientific Reports, 2022
Young, M. and N. H. Fefferman

Emerging Pathogens and Current-use Pesticide: Potential Impacts on Eastern Hellbenders
Journal of Aquatic Animal Health, 2021
Cusaac J. P. W., C. E. Davis, D. C. Woodhams, J. Robert, J. A. Spatz, J. L. Howard, C. Lillard, A. W. Graham, R. D. Hill, S. Reinsch, D. McGinnity, B. Reeves, D. Bemis, R. P. Wilkes, W. B. Sutton, T. B. Waltzek, R. H. Hardman, D. L. Miller, and M. J. Gray

Global Patterns of Ranavirus Detections
FACETS, 2021
Brunner J. L., D. H. Olson, M. J. Gray, D. L. Miller, and A. L. J. Duffus

How Limitations in Energy, Poverty, and Socioeconomic Disparities Compromise Health Interventions for COVID Outbreaks in Urban Settings
iScience, 2021
Fefferman, N. H., C. Chen, G. Bonilla, H. Nelson, and C. P. Kuo

How Public Reaction to Disease Information Across Scales and the Impacts of Vector Control Methods Influence Disease Prevalence and Control Efficacy
PLoS Computational Biology, 2021
Jiao, J., G. Suarez, and N. H. Fefferman

How Social Learning Shapes the Efficacy of Preventative Health Behaviors in an Outbreak
PLoS One, 2022
Carrignon, S., R. A. Bentley, M. J. Silk, and N. H. Fefferman

Influence of Herbicide Exposure and Ranavirus Infection on Growth and Survival of Juvenile Red-Eared Slider Turtles (*Trachemys scripta elegans*)
Viruses, 2021
Goodman, R. M., E. D. Carter, and D. L. Miller

Monitoring the Dead as an Ecosystem Indicator
Ecology and Evolution, 2021
Newsome, T., B. Barton, J. C. Buck, J. M. DeBruyn, E. Spencer, W. Ripple, and P. S. Barton

Publications: One Health

Pathologic Findings in Stranded Marine Mammals: A Global Perspective
Frontiers in Marine Science, 2021
Bossart, G. D., A. C. Camus, D. L. Miller, and S. J. Raverty

Pet Ownership and Quality of Life: A Systematic Review of the Literature
Veterinary Science, 2021
Scoresby K., E. Strand, Z. Ng, K. Brown, K. Strobel, R. Stilz, M. J. Souza

Perceptions of Bat and Cave Management in U.S. National Parks
The Wildlife Society Bulletin, 2021
Shapiro, H., A. S. Willcox, M. Verant, and E. V. Willcox

Soil Health Management Enhances Microbial Nitrogen Cycling Capacity and Activity
mSphere, 2021
Hu, J., V. Jin, J. Konkel, S. M. Schaeffer, L. Schneider, and J. M. DeBruyn

Species Misidentification in Local Markets: Discrepancies Between Reporting and Molecular Identification of Bushmeat Species in Northern Uganda
One Health, 2021
Dell, B, C. Masembe, R. Gerhold, A. S. Willcox, and M. J. Souza

U.S. National Park Visitor Attitudes Towards Bats and Knowledge of White-nose Syndrome
Biological Conservation, 2021
Shapiro, H., A. S. Willcox, M. Verant, and E. V. Willcox

Winter is Coming: Temperature Affects Immune Defenses and Susceptibility to *Batrachochytrium salamandrivorans*
PlosPathogens, 2021
Carter E. D., M. C. Bletz, M. Le Sage, B. LaBumbard, L. A. Rollins-Smith, D. C. Woodhams, D. L. Miller, and M. J. Gray

SUBMITTED/IN REVIEW

A General Modeling Framework for Exploring the Impact of Individual Concern and Personal Protection on Vector-borne Disease Dynamics
Parasites and Vectors
Roosa, K. and N. F. Fefferman

Diversity in Valuing Social Contact and Risk Tolerance Lead to the Emergence of Homophily in Populations Facing Infectious Threats
Physical Reviews E
Young, M., A. Pritchard, M. Silk, and N. Fefferman

Publications: Others Involving OHI

PUBLISHED

Are They Ready? Trials, Tribulations, and Professional Skills Vital for New Veterinary Graduate Success
Frontiers in Veterinary Science, 2021
Reinhard, A. R., B. J. Hains, K. D. Hains, and E. B. Strand

***Batrachochytrium salamandrivorans* Can Devour More Than Salamanders**
Journal of Wildlife Diseases, 2021
Towe, A. E., M. J. Gray, E. D. Carter, R. J. Ossiboff, K. Ash, M. Bohanon, B. A. Bajo, and D. L. Miller

Breaking Down Institutional Barriers to Advanced Practice Registered Nurse Practice
Nursing Administration Quarterly, 2022
Kleinpell, R., C. R. Myers, W. Likes, and M. Schorn

Comparative Decomposition of Humans and Pigs: Soil Biogeochemistry, Microbial Activity and Metabolomic Profiles
Frontiers in Microbiology, 2021
DeBruyn, J. M., K. Hoeland, L. S. Taylor, J. D. Stevens, M. A. Moats, S. Bandopadhyay, S. P. Dearth, H. F. Castro, K. K. Hewitt, S. R. Campagna, A. M. Dautartas, G. M. Vidoli, A. Z. Mundorff, and D. W. Steadman

COVID-19 Pandemic Mental Health Challenges: Patients and Providers
Issues in Mental Health Nursing, 2021
Myers, C. R., L. R. Munoz, T. Stansberry, M. Johnson, and M. Schorn

The Dynamics of Evolutionary Rescue from a Novel Pathogen Threat in a Host Metapopulation
Nature Scientific Reports, 2021
Jiao, J. and N. H. Fefferman

Electrochemical Detection of Serum Antibodies Against *Mycobacterium avium* Subpecies *paratuberculosis*
Frontiers in Veterinary Science, 2021
Hatate, K., J. H. Rice, K. Parker, J. Wu, A. Turner, J. Stabel, and S. Eda

Health Policy and Politics: Get involved!
Contemporary Nursing: Issues, Trends, and Management (9th Edition), 2021
Cherry, B. and C. R. Myers

Hepatocellular Toxicity of the Metabolite Emodin in Tadpoles
Journal of Wildlife Diseases, 2022
Brenes, R., L. M. N. Nguyen, D. L. Miller, and M. L. Rohde

How Territoriality Reduces Disease Transmission Among Social Insect Colonies
Behavioral Ecology and Sociobiology, 2021
Lemanski, N. J., M. J. Silk, N. H. Fefferman, and O. Udiani

Impact of COVID-19 Pandemic on APRN Practice: Results for a National Study
Nursing Outlook, 2021
Kleinpell, R., C. R. Myers, M. Schorn, and W. Likes

The Impact of the COVID-19 Pandemic on APRN Practice in Tennessee
Nursing Forum, 2022
Myers, C. R., L. Munoz, T. Stansberry, M. Schorn, and W. Likes

Publications: Others Involving OHI

Improving Pandemic Mitigation Policies Across Communities Through Coupled Dynamics of Risk Perception and Infection
Proceedings of the Royal Society B, 2021
Silk, M. J., S. Carrignon, R. A. Bentley, and N. H. Fefferman

"It Would be Nice to Think We Have a Voice": Exploring Registered Nurses in Hospital Staffing Policymaking
American Journal of Nursing, 2022
Bartmess, M., C. R. Myers, and S. T. Thomas

Media Competencies for Nurses: A Delphi Study
Nursing Outlook, 2022
Myers, C. R., L. Munoz, D. J. Mason, and B. Glickstein

Minding the Gaps: Health Care Access for Foreign-born Adults in the U.S. — An Integrative Review
Journal of Healthcare for the Poor and Underserved, 2021
Adigun, S., C. Barroso, S. Mixer, C. R. Myers, and J. G. Anderson

Nurse Staffing Legislation: Empirical Evidence and Policy Analysis
Nursing Forum, 2021
Bartmess, M., C. R. Myers, and S. P. Thomas

Observations and Conversations: How Communities Learn About Infection Risk Can Impact the Success of Non-pharmaceutical Interventions Against Epidemics
BMC Public Health, 2022
Silk, M. J., S. Carrignon, R. A. Bentley, and N. H. Fefferman

Ranavirosis and Chytridiomycosis: The Impact on Amphibian Species
Wildlife Disease/Health and Conservation, 2022
Miller, D. L., E. D. Carter, R. H. Hardman, and M. J. Gray

Rapid and Sensitive Detection of miRNA Based on AC Electrokinetic Capacitive Sensing for Point of Care Applications
Sensors, 2021
Wan, N., Y. Jiang, J. Huang, R. Oueslati, S. Eda, J. Wu, and X. Lin

Results of a National Survey: Ongoing Barriers to APRN Practice in the United States
Policy, Politics, and Nursing Practice, 2022
Schorn, M. N., C. R. Myers, J. Barroso, K. Hande, T. Hudson, J. Kim, and R. Kleinpell

The Role of Registered Nurses in Transforming Primary Care
American Journal of Nursing, 2022
Beebe, L. H. and C. R. Myers

The Role of Social Structure and Dynamics in the Maintenance of Endemic Disease
Behavioral Ecology and Sociobiology, 2021
Silk, M. J. and N. H. Fefferman

SocialCattle: IoT-based Mastitis Detection and Control through Social Cattle Behavior Sensing in Smart Farms
IEEE Internet of Things Journal, 2021
Feng, Y., H. Niu, J. Wu, H. Qi, R. A. Almeida, S. Eda, and Q. Cao

Publications: Others Involving OHI

Using Open Calais to Identify the Research Areas of Engineering Faculty
Issues in Science and Technology Librarianship, 2021
Berry, T., and J. Williamson

"Was Definitely Because They Were Kids": Caring for Patients from a School Shooting
Journal of Trauma Nursing, 2022
McCall, T. W., J. G. Anderson, C. R. Myers, K. Sagherain, and P. Bamwine

What We Know About the ACA After the Third Failed SCOTUS Challenge
American Journal of Nursing: Off the Charts, 2021
Myers, C. R.

When Hospitals Sue Patients
Hastings Law Journal, 2022
Buck, Z.

When Do Children Avoid Infection Risks: Lessons for Schools During the COVID-19 Pandemic
iScience, 2022
Fefferman, N. H., K. A. Blacker, C. A. Price, and V. LoBue

SUBMITTED/IN REVIEW

Carceral Amplification of COVID-19: Impacts for Community, Corrections Officer and Incarcerated Population Risks
Epidemiology
Lofgren, E., K. Lum, A. Horowitz, B. Madubuonwu, K. Myers, and N. H. Fefferman

Optimal Substance Abuse Treatment
Changes in Telehealth for Advanced Practice Registered Nurses During COVID-19: United States Survey
Computers in Nursing
Schorn, M.N., C. R. Myers, J. Barroso, T. Hudson, K. Hande, J. Kim, and R. Kleinpell

Conflict Management and Veterinary Social Work
The Comprehensive Guide to Veterinary Social Work
Strand, E. B., A. Rinehardt, and B. Poe

History of Veterinary Social Work
The Comprehensive Guide to Veterinary Social Work
Poe, B., and E. B. Strand

New Beginnings for Humane Endings: Mental Health Implications
AVMA Viewpoint
Kollias, N., E. B. Strand, L. Kogan, K. Houlihan, S. Thompson-Iritani, D. Hoenig, Z. Ng, L. Hart

Selection Using Machine Learning
Association for Computing Machinery Transactions on Management Information Systems
Baucum, M., A. Khojandi, and C. R. Myers

Education

ONE HEALTH COURSE

A new course is available in the 2021-22 course catalog that allows students to explore the interconnectedness of human, animal, plant, and environment health, develop an understanding of the One Health approach, and serve as an introductory experience for students considering One Health careers. The course, Introduction to One Health: From Antimicrobial Resistance to Zika with a side of Thousand Cankers, is taught by Dr. Adam Willcox, a One Health Scholar.

ONE HEALTH MINOR PROGRAM

Also new to the 2021-22 catalog is the One Health Minor, available to undergraduate and graduate students wishing to develop skills to prepare themselves for careers in agricultural, environmental, and human sciences, in addition to scientific policy and communication. The required courses are interdisciplinary and will provide training that is relevant for all majors.

Nine students declared the One Health Minor in its first year. Based on growing interest from the UT community, the OHI team will be adding courses to both the undergrad and graduate minor in the fall of 2022.

Undergraduate Minor
The undergraduate minor consists of 18 hours, including at least one course from each of the six categories below. (Introduction to One Health is required.)

- Introduction
- Communication and Leadership
- Policy
- Global Issues
- Science
- One Health Capstone

Graduate Minor
The graduate minor consists of 10 hours (four courses) in the three areas of focus below.

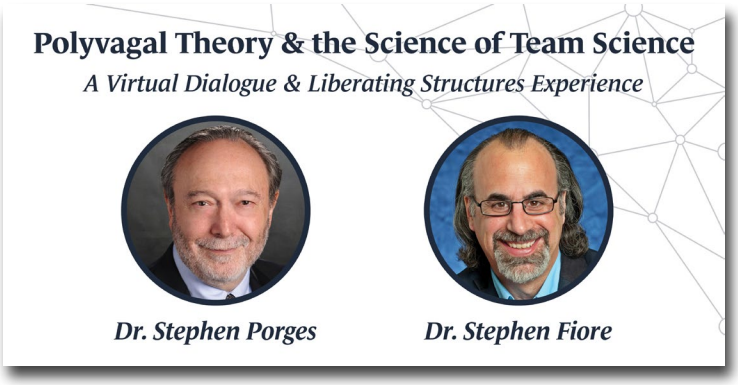
- Communication and Leadership
- Translation of Science to Policy
- One Health Focus

Education

SCIENCE OF TEAM SCIENCE WORKSHOP

In March 2022, Dr. Elizabeth strand (College of Veterinary Medicine, College of Social Work) and OHI staff organized a workshop on “High Functioning Teams and Breakthrough Solutions.” The virtual event was sponsored by the National Institute for Mathematical and Biological Synthesis (NIMBioS); the Bredesen Center; the Office of Research, Innovation, and Economic Development; and the UT-Oak Ridge Innovation Institute.

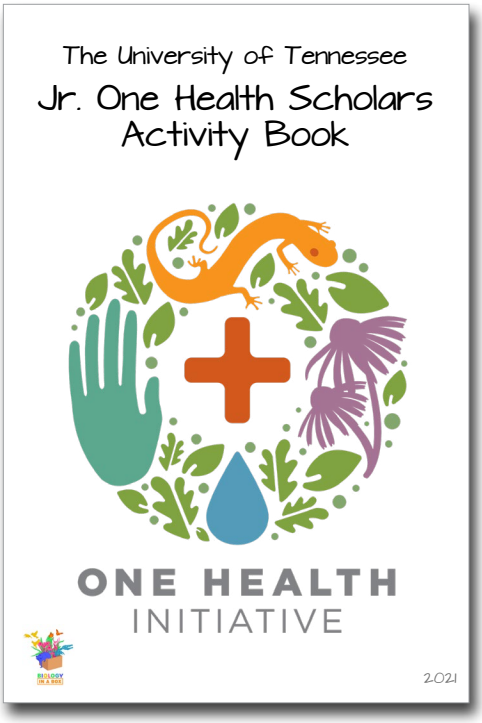
The goal of the event was to increase an understanding of emotion and collaborative cognition from the perspectives of Polyvagal Theory and the Science of Team Science. Featured guests were Dr. Stephen Porges and Dr. Stephen Fiore, giants in the fields of psychiatry and team science, respectively. Workshop attendees represented 15+ internal units and 20+ external universities and organizations. Feedback from the event was very positive, and Dr. Strand and her team plan to create a free, open access short course to share the ideas presented in the workshop.



K-12 EDUCATOR MATERIALS

The One Health in K-12 working group continues to curate and promote education resources for K-12 audiences and educators. Through a partnership with Biology in a Box (College of Arts and Sciences), the team produced the “Junior One Health Scholars Activity Book” in the fall of 2021, which teaches elementary school children about the One Health concept and how it relates to what they see in their own backyards. OHI staff have distributed this booklet at several community events and two elementary schools.

In addition to content for students, the working group is developing materials for educators and held an in-service training event for 4-H agents to introduce them to the One Health concept and provide them with resources to spread One Health messaging beyond the classroom. One Health, specifically its ties to environmental health, was also incorporated into the Backyard STEM in-service training.



Community Engagement

MONTHLY SEMINAR SERIES

OHI has continued holding its monthly Lunch and Learn Seminar Series. The series has attracted excellent speakers from across UT, the nation, and world to discuss their work, how they tackle current global challenges, and how solutions can be achieved with a One Health approach.

Seminars are held on the last Thursday of each month, and all past seminars are available on demand on the OHI website and YouTube channel.

COMMUNICATIONS

OHI continues to follow a communications plan to promote the initiative. The main components of the plan are: a quarterly electronic newsletter focused on periodic news and updates; a website with general and more enduring content about the One Health Initiative along with posting of timely content; and a social media presence to further develop the One Health brand and spread awareness. Initially, OHI has focused its social media efforts on a Twitter account, curating information, connecting people with people, as well as people with information.

PODCAST

OHI has partnered with comedian and science enthusiast Shane Mauss to produce One Health-themed episodes of his podcast, *Here We Are*. Through his interviews with One Health Scholars and other UT guests, Shane takes complex issues and makes them entertaining and accessible to the public.

ONE HEALTH DAY

OHI participated in One Health Day on November 3, 2021, with an all-day hybrid event. Speakers included Dr. Kristi Ebi (Professor of Environmental and Occupational Health Sciences, Department of Global Health, University of Washington), Dr. Heidi Hanson (Senior Scientist, Oak Ridge National Laboratory; Research Scientist and Assistant Professor, University of Utah), and Dr. Richard Hamelin (Professor of Forestry, Department of Forest and Conservation Sciences, University of British Columbia). In addition to these virtual presentations, an in-person panel discussion was held on “Climate Change and One Health,” facilitated by Dr. Elizabeth Strand (College of Veterinary Medicine, College of Social Work). Panelists included Dr. Gus Engman (Herbert College of Agriculture), Dr. Kate Evans (Oak Ridge National Laboratory), Dr. Kristina Kintziger (College of Education, Health, and Human Sciences), Dr. Joshua Fu (Tickle College of Engineering), and Dr. Sindhu Jagadamma (Herbert College of Agriculture).

Presentations

SCIENTIFIC

Developing and Refining Media Competencies for Nurses
Association of Public Health Nurses Conference
Date: April 2022 Staff: Myers

Identifying and Prioritizing Appalachian Health Disparities: A Team-Based Case Study
Health Care in Appalachia: Practical Approaches for Addressing the Unique Needs of Our Region Conference
Date: April 2022 Staff: Myers

Differences Between Social Determinants of Health and Social Needs: Why Both Matter (keynote)
Health Care in Appalachia: Practical Approaches for Addressing the Unique Needs of Our Region Conference
Date: April 2022 Staff: Myers

Health and Community Vitality
East Tennessee Regional Leaders Association Advanced Alumni Experience
Date: April 2022 Staff: Myers

Strengthening the Capacity of Nurse Researchers to Influence Policy (panelist)
Eastern Nursing Research Society
Date: February 2022 Staff: Myers

Tennessee 40 Under 40 Rising Star Nurse Leader Program
Tennessee Action Coalition
Date: January 2022 Staff: Myers

Pandemic Healing for Today and Resilience for Tomorrow: Translating Mental Health and Informatics Science for Better Health
UT College of Nursing Annual Research Day
Date: November 2021 Staff: Myers

Veterinary Social Work and Wellbeing
MSD Animal Health Virtual Congress Europe
Date: November 2021 Staff: Strand

Networks and the Mathematics of Resilience (keynote)
BioResilience Integration Institute Annual Conference
Date: October 2021 Staff: Fefferman

Exploring Registered Nurses Involvement in Hospital Staffing Policymaking
American Nurses Association Forum
Date: September 2021 Staff: Myers

We Are All in This Together
Purdue University, Finibaker Honorary Wellness Lecture
Date: September 2021 Staff: Strand

A Taxonomy of Communication Functions on Higher-order Toplogies
Air Force Office of Scientific Research, Trust and Influence Program Review
Date: August 2021 Staff: Fefferman

COVID-19 Pandemic Mental Health Challenges
Thinking Qualitatively Conference
Date: July 2021 Staff: Myers

Presentations

How Infectious Diseases May Have Shaped the Evolution of Social Organization
Society for Mathematical Biology Annual Meeting
Date: July 2021 Staff: Fefferman

Aging Well: Resiliency and Social Connectedness in Older Adults
UT Alumni Summer College
Date: June 2021 Staff: Myers

Aging in Rural America Post-Pandemic
Rural Health Journalism Workshop
Date: June 2021 Staff: Myers

Veterinary Social Work: The Transdisciplinary Power of Merging, Yielding, and Staying in Your Lane (keynote)
International Society for Anthrozoology
Date: June 2021 Staff: Strand

Veterinary Social Work 101: Attending to the Human Side of Things in Animal Sheltering (keynote)
Association of Animal Welfare Advancement
Date: June 2021 Staff: Strand

Network Dynamics and Behavioral Models (plenary)
National Science Foundation Conference on Bridging Disciplinary Divides for Behaviorally Modulated Mathematical Models in Human Epidemiology
Date: May 2021 Staff: Fefferman

Veterinary Social Work 101
Association of Social Work Professionals
Date: May 2021 Staff: Strand

Your Right and Responsibility to Be Well
American Association of Swine Veterinarians Annual Meeting
Date: March 2021 Staff: Strand

OUTREACH

UT Science Forum	April 2022	Myers
CBA One Health Jenga	April 2022	Miller
UT AgResearch and Education Center Directors/Dept. Heads	December 2021	Miller
Cold Place Math Seminar	December 2021	Fefferman
UT Gardens Bewitching Beasts	October 2021	Miller
Knoxville Pecha Kucha	August 2021	Miller
UT CommuniCon	July 2021	Miller
The Nature Conservancy Center Directors	May 2021	Miller
NIAID Data Science Seminar	April 2021	Fefferman
Departmental Meetings: FWF, Nutrition, BESS, DBDS		Miller

Interviews and PR

Podcasts/Radio

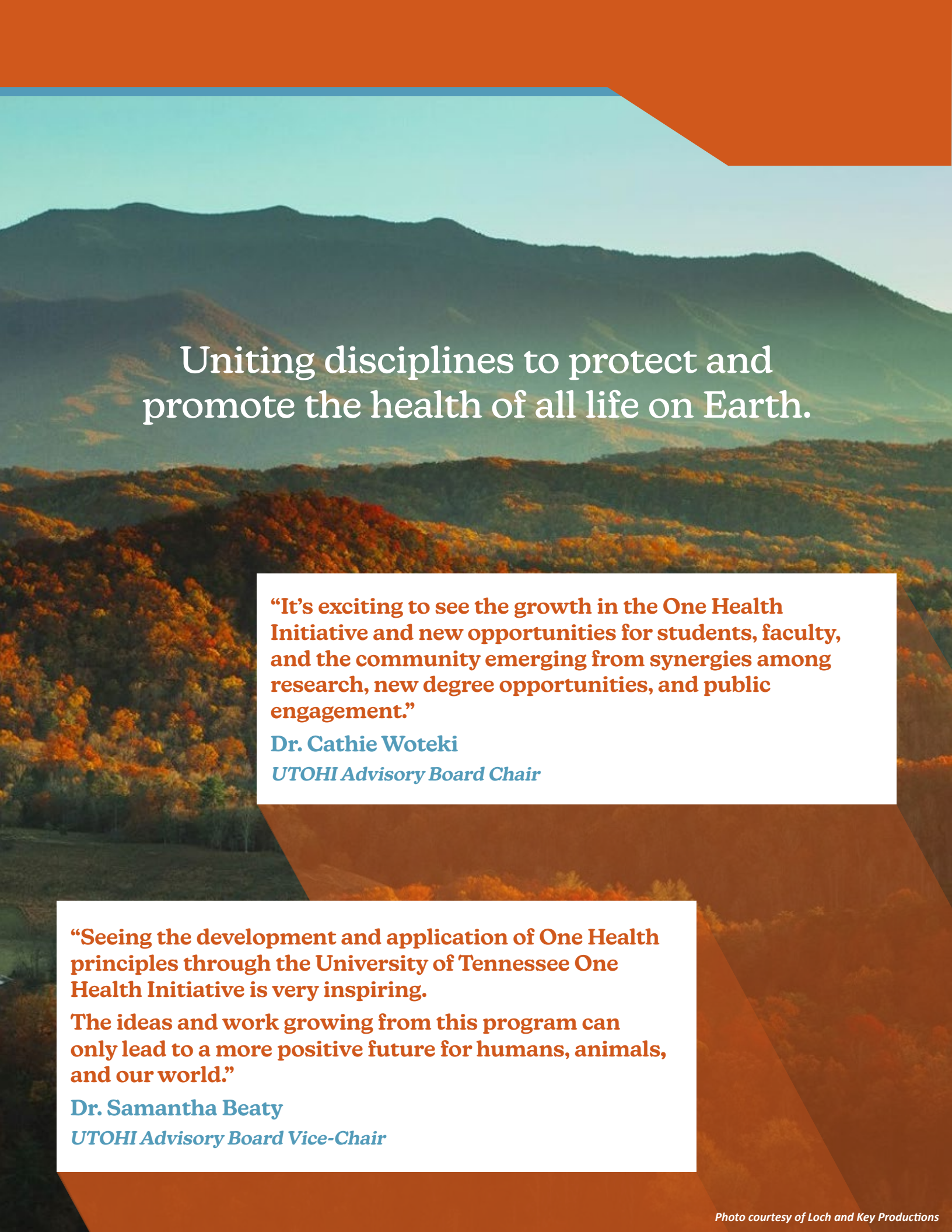
Health Connections (bi-weekly)	Myers
Antimicrobial Resistance	White
One Health	Miller
Importance of Urban Forests	Jean-Philippe
Here We Are	
Sustainable Living	Ader
Amphibians	Gray
Nutrition	Raynor
Economics and One Health	Sims
Influencing Environmental Norms	Willcox
Backyard Chickens	Souza
Fungal Pathogens	Hadziabdic-Guerry
Body Farm	DeBruyn

Print/Online

Input Mag	Fefferman
Psychology Today	Fefferman
Simons Foundation	Fefferman
Knoxville News Sentinel	Miller/Myers

Webinars

Eastern Nursing Research Society	Myers
Tennessee Nurses Association	Myers
Healthcare Advocacy Series	Myers
SEC Nursing Network Professional Development Series	Myers
UT College of Nursing Lunch and Learn	Myers



Uniting disciplines to protect and promote the health of all life on Earth.

"It's exciting to see the growth in the One Health Initiative and new opportunities for students, faculty, and the community emerging from synergies among research, new degree opportunities, and public engagement."

Dr. Cathie Woteki

UTOHI Advisory Board Chair

"Seeing the development and application of One Health principles through the University of Tennessee One Health Initiative is very inspiring.

The ideas and work growing from this program can only lead to a more positive future for humans, animals, and our world."

Dr. Samantha Beaty

UTOHI Advisory Board Vice-Chair

Photo courtesy of Loch and Key Productions

THE UNIVERSITY OF TENNESSEE

ONE HEALTH
INITIATIVE