



**Virginia Academy of Science
Fall Undergraduate Research Meeting**

Saturday, November 2, 2019

Christopher Newport University
Newport News, VA

8:30 am - 5:00 pm

The VAS Fall Undergraduate Research Meeting is a research grant proposal competition which has been held annually since the Fall of 2001. Undergraduate students conducting research projects under the mentorship of VAS members at Virginia colleges and universities are invited to participate.

Interested undergraduate students, along with their mentors, must submit their grant applications/research proposals by the October 1 deadline. The grant applicants subsequently present posters outlining their research projects at the Fall Undergraduate Research Meeting. Both the grant applications-research proposals and the poster presentations at the meeting are evaluated to determine the recipients of the grants.

Nine research grant awards of \$750 each will be given to the top student grant applications/research proposals and poster presentations selected by the Fall Meeting Judges. The recipients of these research grant awards will be announced at the meeting's conclusion. The research grant award recipients will also be awarded Student Membership in the VAS for 2020 and will be expected to present the results of their funded research at the 2020 VAS Annual Meeting in May at James Madison University.

Corporate sponsorship of the 2019 Fall Undergraduate Research Meeting has been provided by Wetland Studies and Solutions, Inc. (WSSI), a Davey Company. The Academy wishes to thank WSSI for again supporting this conference, and for promoting scientific research, public education and environmental sustainability.

Additional financial support for this year's meetings has been provided by the Hampton Roads Sanitation District, RK & K, VHB as well as the Fellows of The Academy. The Academy wishes to thank these donors for supporting today's conference, and for promoting scientific research and science education.

The Academy extends special thanks to the administration, faculty (especially Robert Atkinson), staff and students of Christopher Newport University for hosting the VAS 2019 Fall Undergraduate Research Meeting. Food for this event has been provided by Christopher Newport University's Dining Services.

VAS President-Elect Michael Wolyniak, Elliott Associate Professor of Biology at Hampden-Sydney College, serves as the Program Chair for the 2019 Fall Undergraduate Research Meeting.

Special thanks are extended to the following individuals who are serving as Judges at this the meeting:

Ashley Artese, Roanoke College
Amorette Barber, Longwood University
Travis Comer, RK & K
Todd Gruber, Christopher Newport University
Sujan Henkanaththegeedara, Longwood University
Gary Isaacs, Liberty University
Kevin Kittridge, Virginia Wesleyan University
David Knight, Christopher Newport University
Elena Kuchina, Thomas Nelson Community College
Aylin Marz, Norfolk State University
Bryan Tims, Reynolds Community College and Hampden-Sydney College
Heidi Villanueva, Virginia Union University
Michael Wolyniak, Hampden-Sydney College

Special thanks are also extended to the following individuals who are serving as panelists for the Science Careers Discussion:

David Byrd, US Fish & Wildlife Service
Kevin Parker, Hampton Roads Sanitation District
Janet Stevens, Christopher Newport University
Bryan Tims, Reynolds Community College and Hampden-Sydney College



Virginia Academy of Science Fall Undergraduate Research Meeting

Saturday, November 2, 2019
Christopher Newport University
Newport News, VA

SCHEDULE OF EVENTS

8:30 - 9:50

Check-In/Registration, Poster Set-up and Meet and Greet
(David Student Union - Ballroom)

All meeting attendees should check in at the Check-In Table in the Registration Area.

Following Check-In student applicants for the Undergraduate Research Grants should set up their posters on their assigned poster boards.

Coffee, tea and other beverages will be available for all meeting registrants in the Check-In area.

9:00 - 9:50

Judges Meeting
(David Student Union - Board Room)

All judges will meet with the VAS President-Elect and review the criteria for evaluating the grant proposals and posters as well as the procedure for selecting the grant recipients.

9:50 - 10:00

Welcome and Opening Remarks (David Student Union - Ballroom)

Michael Wolyniak
Dept. of Biology, Hampden-Sydney College
VAS President-Elect and Fall Undergraduate Research Meeting
Coordinator

10:00 - 11:00

Invited Keynote Speaker

(David Student Union - Ballroom)

Amorette Barber

Dept. of Biological & Environmental Sciences, Longwood University
VAS Vice President

Harnessing the Immune System for Cancer Therapy

Cancer therapy is entering a new phase in which immune cells can be engineered to become living drugs. Many immune therapy approaches not only increase patient survival but also have high specificity for cancer cells and reduce collateral damage to healthy tissue. This new generation of cancer therapies successfully harnesses a patient's own immune system to treat cancer and is an example of one of the many ways biotechnology has revolutionized cancer treatment and medicine in general.

One immune therapy option is to use cells of the immune system, specifically T cells, which kill cells that appear dangerous or foreign. To maximize tumor cell-targeting by T cells, genetic engineering is used to express receptors that enhance tumor cell recognition. These receptors, named chimeric antigen receptors (CARs), endow the T cell with a way to recognize the tumor cells and activate many cellular functions to eradicate the tumor. Encouragingly, CAR-expressing T cells have recently received FDA-approval for cancer therapy for some types of cancers. Dr. Barber's current research at Longwood University focuses on studying how to enhance T cell immunotherapy for many different types of cancer through 1) creation and testing of novel CARs, 2) investigation of immune cell function, and 3) study of how various compounds (including natural products and parabens) alter immune cell function.

11:00 - 1:30

Poster Session and Lunch

(David Student Union - Ballroom)

Posters will be evaluated judged in two blocks:

- 1st block from 11 am to 12:15 pm
- 2nd block from 12:15 pm to 1:30 pm.

Each poster will be evaluated by a team of judges. The judges will meet with the grant applicants/poster presenters and the presenters should be prepared to give a brief summary (≤ 5 minutes) of the proposed research and then respond to questions from the judges.

During this time, all meeting attendees are encouraged to look at the posters and talk with the students about their projects. Also, lunch and beverages will be available for all meeting attendees.

- 1:30 - 2:15** **Panel Discussion**
(David Student Union - Ballroom)

Advice from Science Professionals about Careers and Graduate School
- 1:30 - 3:45** **Judges Lunch and Meeting**
(David Student Union - Board Room)

During this lunch meeting the judges will select the recipients of the 2019-2020 VAS Undergraduate Research Grant Awards.
- 2:15 - 3:00** **Tour of Forbes Hall science facilities and projects led by CNU STEM students**
- 3:00 - 3:45** **Lightning Talks**
(Forbes Hall – Room 1022)
- 3:45 – 4:00** **Welcome to Christopher Newport University**
(Forbes Hall – Room 1022)

David Salomon
Director of the Office of Undergraduate Research & Creative Activities
- 4:00 - 4:30** **Announcement of 2019-2020 Undergraduate Grant Recipients**
(Forbes Hall – Room 1022)

Gary Isaacs
Dept. of Biology & Chemistry, Liberty University and VAS President
- 4:30 - 4:45** **2019-2020 Undergraduate Grant Recipients Assemble for Photographs**
(Forbes Hall – Room 1022)
- 4:30 - 5:00** **Poster Removal, Check-Out and Departure**
(David Student Union - Ballroom)

Student applicants/poster presenters should remove their posters from their assigned poster boards. Please leave the poster board and binder clips (placed back in plastic bag) on the easel for subsequent pickup.

POSTER PRESENTATIONS

1 **Identification of hepatopancreatic parasites afflicting crayfish in local Virginia streams**

Cara Arrasmith

Mentor: Kyle Harris, Dept. of Biology & Chemistry, Liberty University

This project will aim to identify and quantify trematodes in central Virginia streams. Attention will be given to snails and crayfish as target hosts of trematodes. If trematodes are identified, urban and rural stream collection sites will be compared for trematode diversity and abundance.

2 **The effects of probiotic yeast on the *in-vitro* rumen**

Alexandra Barbee

Mentor: Regenia Campbell and George Argyros, Dept. of Biology, Emory and Henry College

Bloat in ruminants is a medical emergency. We aim to use an in vitro rumen model to test the use of *Saccharomyces cerevisiae* to reduce the gas production and pH changes observed when small ruminants eat rich forage. Benefits have only been shown in cattle to date.

3 **Synthesis of DNA inspired nucleobase containing polyacrylates for chemotherapy capture**

Madison Bardot

Mentor: Michael Schulz, Dept. of Chemistry, Virginia Tech

We focus on the synthesis of nucleobase containing polymers that mimic DNA for the capture of chemotherapy. During chemotherapy treatment the drug is administered into the tumor site, however it leaks out and kills healthy cells causing side effects. We hope to capture that excess chemotherapy and diminish these side effects.

4 **FOCI analysis of gene expression in *Cryptococcus neoformans***

Jacqueline Baumann

Mentor: Michael Price, Dept. of Biology & Chemistry, Liberty University

First-order conditional independence (FOCI) and clustering was used to look into the genome of *Cryptococcus neoformans* and find the significance of its genes and look into the functions and significance of any unknown genes through the use of bioinformatic programs and Perl scripts.

5 Chemical kinetics of the mechanochemical synthesis of tetrathiafulvalene tetracyanoquinodimethane (TTF-TCNQ), an organic metal

Richard Chen

Mentor: Silvina Pagola, Dept. Chemistry & Biochemistry, Old Dominion University

The proposed work focuses on the study of the chemical kinetics of the neat mechanochemical synthesis of the organic metal TTF-TCNQ (tetrathiafulvalene tetracyanoquinodimethane). Kinetic profiles will be measured by quantitative phase analysis using laboratory X-ray powder diffraction data of the mechanochemical products, and by *in-situ* measurements of electrical resistance of the powders while ground in a mortar.

6 Titanium surface enhancement via chemical modification

Sebastian Bernaschina and Noah Kohl

Mentors: Hector Medina and Michael Korn, Dept. of Biology & Chemistry and School of Engineering, Liberty University

Novel rosette-like crystallized formations have been observed on the surface of titanium plates after being etched with sulfuric acid. This study seeks to investigate the factors that influence nucleation and cause these formations to grow on the surface of titanium plates. Characterization and subsequent chemical modification of these structures for analytical applications are planned.

7 Investigating the response of mummichog (*Fundulus heteroclitus*) to climate change: Availability of terrestrial insect prey during rain events

Cade Cobbs and Emma Dryden

Mentors: Jessica Thompson and Heather Harwell, Dept. of Organismal & Environmental Biology, Christopher Newport University

Our objective is to find the relationship between storm events and availability of terrestrial insect prey to mummichogs (*Fundulus heteroclitus*). This question will be addressed through investigation of gut contents of mummichogs collected before and during storms. This research is important because it links the impact of climate change in estuaries to the diet composition of mummichogs, an ecologically-important species.

8 Species flight composition comparison of a Piedmont and an Appalachian ridge hawk lookout

Wesley L. Carr

Mentor: Gene D. Sattler, Dept. of Biology & Chemistry, Liberty University

As part of a long-term effort to monitor fall diurnal raptor migration in the inner Piedmont of central Virginia this study compares species composition at our lookout with a nearby Blue Ridge lookout and considers whether migration dynamics between the two locations varies.

9 The effect of happiness on resistance to cold

Camryn Cooper

Mentor: Heidi Villanueva, Dept. of Psychology, Virginia Union University

Previous studies of pain sensitivity have focused on many manipulations of emotional state, including happiness, anger and worry. Few studies have focused on personality traits and even fewer have focused on African Americans. The current study will examine the relationship between personality traits and cold pressor pain tolerance.

10 Examination of bisphenol A and bisphenol A alternatives for zebrafish development

Emma Curtis and Rachel Nas

Mentor: Cameron Sheeler, Dept. of Biology & Chemistry, Liberty University

The investigation of various concentrations of bisphenol A (BPA) and BPA alternatives on zebrafish embryo development.

11 Study of physical changes in artificially aged polymers in a saline solution that mimics a marine environment by FTIR spectroscopy

Christopher Fegan

Mentor: Kevin Kittredge, Dept. of Chemistry, Virginia Wesleyan University

The study of physical changes in artificially aged polymers in saline solution by FTIR spectroscopy will be investigated. The polymers should exhibit spectroscopic changes in their absorption spectra that will indicate they are being photodegraded in a marine environment. Differences in absorption intensities will be used to determine the rate and/or extent of photodegradation.

12 Synthesis and characterization of a fluorinated molecularly imprinted polymer for specific sorption of perfluorooctanoic acid.

James M. Davis

Mentor: Stephen T. Hobson, Dept. of Biology & Chemistry, Liberty University

Perfluorooctanoic acid (PFOA) is toxic and persistent compounds resulting from the production and use of fluoropolymers such as Gortex® and Teflon®. Its structure precludes environmental degradation and can lead to bioaccumulation in animals and humans. Proposed is the synthesis of a monomer and the preparation of a crosslinked molecularly imprinted polymer that specifically sorbs PFOA in water.

13 Environmental stress response genes crosstalk with the floral developmental program in *Arabidopsis thaliana*

Kelly Flynn

Mentor: April Wynn, Dept. of Biological Sciences, University of Mary Washington

This project will examine the crosstalk between environmental stress response genes and the floral developmental pathway in *Arabidopsis thaliana*, which will hopefully elucidate which genes integrate the two pathways and how alterations of these genes affect plant reproductive development.

14 Microbial assemblages in relation to host microsites and the surrounding environment

Mark Fischer and John Hoverson

Mentor: Kyle Harris, Dept. of Biology & Chemistry, Liberty University

Freshwater microbial assemblages can be supported and influenced by the surrounding environment (e.g. water and substrate) and available biotic microhabitats. This project will utilize molecular techniques to investigate microbial assemblage diversity and composition within a Virginia stream in the water, substrate, and on two microsites found on crayfish where another ectosymbiont (annelid: branchiobdellidans) is known to exhibit a cleaning symbiosis.

15 Role of estradiol in the neurological basis of addiction relapse in females

Susannah Garber

Mentor: W. David Knight and Olga Lipatova, Dept. of Molecular Biology & Chemistry and Dept. of Psychology, Christopher Newport University

According to the National Institute on Drug Abuse, overdoses and other drug-related conditions have surged in Virginia over the past two reporting years. Further, women are significantly more vulnerable to relapse into behavioral addiction, especially during periods of hormonal fluctuation. This project will investigate estrogen's role in the neurobiological basis of learning and memory, as related to behavioral habituation.

16 The antifungal effects of curcumin on different fungi

Julia Guarini

Mentor: Michael Price, Dept. of Biology & Chemistry, Liberty University

I am proposing testing the antifungal effects of curcumin on other fungi, specifically for this project two strains of *Cryptococcus*, *C. neoformans* and *C. albidus*, along with *Candida albicans*.

17 Transgenic *Arabidopsis*

Logan Hargis

Mentor: April Wynn, Dept. of Biological Sciences, University of Mary Washington

The experiment is to extract the luciferase gene from the dinoflagellate organism, *Lingulodinium polyedra*, isolate it through PCR amplification, incorporate it into a cloning vector, transform the vector into *Rhizobium radiobacter* and transfer the gene into the plant *Arabidopsis thaliana* using the floral dip method.

18 Characterization of a *pyk1Δ* rescue mutation in *Cryptococcus neoformans*

Allyson Hardin

Mentor: Michael Price, Dept. of Biology & Chemistry, Liberty University

Three genes have been identified that may allow *C. neoformans* to grow in glucose without a functional pyruvate kinase. Throughout this project, we will be examining the three genes to determine which one(s) allow for this growth. To do this, we will use PCR, DNA cloning, gel electrophoresis and more.

19 Effects of stress on behavioral inhibition in male and female rats tested via operant touchscreen chambers

Emery Harlan

Mentor: Olga Lipatova, Dept. of Psychology, Christopher Newport University

Drug addiction has an undeniable negative impact on our society and can severely damage the psychological and physical health of both men and women. The goal of this research is to produce new scientific knowledge about sex-specific mechanisms that influence behavioral inhibition. In the proposed experiment, we will use operant touchscreen apparatus to investigate behavioral inhibition.

20 Evaluation of aggressive interactions between native and invasive crayfish

Abigail Harris and Thomas Hoke

Mentor: Sujan Henkanaththegedara, Dept. of Biological & Environmental Sciences, Longwood University

Aggressive behavior between invasive and native crayfish will be examined using a video tracking system. Our proposed research will allow us to track the crayfish behavior in 3D space using special QR codes attached to specific body parts of crayfish. This project introduces a new method to study crayfish behavior and may extend to behavioral studies of other species.

21 Improving clinical outcomes in cancer treatment with mathematical modeling

Jordan Hines and Tatiana Elizarova

Mentor: Iordanka Panayotova, Dept. of Mathematics, Christopher Newport University

Mathematical models can be used for understanding the cancerous tumor growth, for better predicting the prognosis for patients, and to improve the effectiveness of treatment plans. The primary objectives of this project are to investigate how existing mathematical models can help clinicians to decide between alternative treatment options and to establish whether additional data could improve their decision-making for each patient's case.

22 Exploring the compounding effects of common herbicides on freshwater microbiomes

Gabriel Hooper

Mentor: Kyle Harris and Matthew Becker, Dept. of Biology & Chemistry, Liberty University

This lab-based project examines the microbial communities of crayfish, sediment, and water before and after a 48-hour exposure to 500 ppb 2,4-D, glyphosate, and atrazine. This study seeks to determine to what extent herbicide exposure restructures the microbiome of an invertebrate freshwater species and its surrounding environment.

23 The influence of physical exercise stress and social enrichment on cognition and hippocampal physiology in laboratory mice.

Haley Lavach and Laura Leonard

Mentor: Parrish Waters, Dept. of Biological Sciences, University of Mary Washington

We will examine the influence of two independent stressors on laboratory mice: exercise and social enrichment. These stressors are similar in that they induce an acute stressed state, but reduce an animals reactivity to stress and increase overall cognitive performance when applied chronically.

24 Electrochromic tungsten oxide thin films for dynamic glass utilizing intercalating chemistry

Scott McGuigan

Mentor: Feng Lin and Anyang Hu, Dept. of Chemistry, Virginia Tech

This project will be to produce and study electrochromic tungsten oxide thin films for use in dynamic color changing window applications. A typical five layer electrochromic framework will be modeled after, with the tungsten oxide layer filling the role of a cathodic metal oxide.

25 Evolutionary transitions to new habitats in *Silene* and adaptation to climate change

Jenna Miladin

Mentor: Janet Steven, Dept. of Organismal & Environmental Biology,
Christopher Newport University

Studying past adaptive responses to shifting environmental conditions in plants gives us insight into their ability to adapt under climate change. I plan to explore the evolutionary relationships between habitat transitions, pollinator identities, and plant morphology in the genus *Silene*. More frequent historical transitions in habitat would suggest that *Silene* will adapt more quickly and efficiently to changing habitats.

26 Drought stress during gametophyte development may cause germination delay in offspring through epigenetic variability in the endosperm of *Arabidopsis thaliana*

Benjamin Moss

Mentor: April Wynn, Dept. of Biological Sciences, University of Mary Washington

The effects of drought stress of parental *Arabidopsis thaliana* plants on the germination time of their seeds will be analyzed as a function of methylation status on germination-associated genes. The relative parental contribution of male and female plants will be assessed in relation to the inheritance of epigenetic marks on the offspring.

27 Soil respiration in wet mineral flats: Understanding climate change and habitat consequences

Meagan Moore

Mentor: Robert Atkinson, Dept. of Organismal & Environmental Biology,
Christopher Newport University

Wet mineral flats provide valuable habitats and mitigate climate change, but are often drained for development. This study seeks to simulate field conditions in laboratory soil cores in order to predict the effect of moisture intensity on soil respiration rates. Low respiration rates favor carbon sequestration ecosystem services.

28 Exploring the sub-lethal effects of pesticide pollution on freshwater invertebrates

Megan Pizzo

Mentor: Kyle Harris, Dept. of Biology & Chemistry, Liberty University

This project utilizes three of the most commonly used pesticides (atrazine, glyphosate, and 2,4-D) in the United States to test the impact of environmentally relevant concentrations of pesticide pollution in freshwater organisms. Non-target organisms (crayfish) will have tissue examined to look for sub-lethal effects.

29 Assessing the genetic diversity and age of *Osmunda claytoniana* populations

Ryo Murasaki

Mentor: Janet Steven, Dept. of Organismal & Environmental Biology,
Christopher Newport University

Trees are known to have a long lifespan but long lifespans in smaller plants are harder to determine. The goal of this project is to identify DNA markers for the clonally growing interrupted fern, *Osmunda claytoniana*, that can be used to estimate the age of individuals and quantify genetic diversity of populations.

30 Surveillance of microplastic pollution in Central Virginia freshwater ecosystems

Alexandra Reddy

Mentor: Kyle Harris and Michael Bender, Dept. of Biology & Chemistry, Liberty University

This project explores the occurrence and ecological implications of microplastic pollution within freshwater invertebrates of Central Virginia. In particular, this project investigates the identification and prevalence of microplastic pollution in an abundant and ecologically important species: crayfish. As research regarding microplastic contamination in freshwater invertebrates is scarce, this project will contribute to the knowledge of freshwater microplastic contamination and its ecological significance.

31 Controlled synthesis and investigation of electrode-electrolyte interphase films formed on positive electrode materials

Nicholas Sarvella and Caleb Hoffman

Mentor: Ronald A. Quinlan, Dept. of Molecular Biology & Chemistry, Christopher Newport University

Lithium-ion batteries have been investigated by the scientific community as light-weight and high-energy density storage devices. However, the widespread adoption of lithium-ion batteries for electric vehicles has been slow due to concerns of cost and safety. Our data will enable the production of synthetic interphase films that do not require the degradation of electrolyte and without sacrificing performance and safety.

32 Titan cell formation in *Cryptococcaceae*

Mary Richfield

Mentor: Michael S. Price, Dept. of Biology & Chemistry, Liberty University

This project will expound upon previous research done on the *Cryptococcaceae* family, investigating the virulence trait of titan cell formation. Specifically, I will investigate whether titan cell formation can be observed in non-pathogenic strains in the *Cryptococcaceae* family.

33 A comparison of strength, muscle power, and range of motion in the affected and unaffected arms in breast cancer survivors

Christian Sanchez-De La Cruz and Savannah-Faith Clark

Mentor: Ashley Artese, Department of Health & Human Performance, Roanoke College

Breast cancer treatment results in impaired upper body function. Research is needed to examine the extent of losses in the affected arm, where breast cancer was present, compared to the unaffected arm. The purpose of this study is to compare strength, power, and range of motion in the affected and unaffected arms in breast cancer survivors and in non-cancer controls.

34 Epithelial mucosal swabbing of Southwest Virginia native anurans: A non-invasive method to assess watershed quality and the distribution and prevalence of waterborne pathogens

Sarah Savona

Mentor: George C. Argyros, Dept. of Biology, Emory and Henry College

By swabbing the skin of Virginia native frogs and toads, we can assess water quality by testing for the presence of fecal coliforms (e.g., *E. coli*) and other waterborne pathogenic bacteria such as *Salmonella*. In addition, we can test the swabs for *Batrachochytrium dendrobatidis* (BD) to survey the presence of chytrid fungus among southwestern Virginia's anuran populations.

35 Volatile organic compound emissions of three species of sexually dimorphic *Silene* differing in pollinator composition and morphological features

Lucas Sharrett

Mentor: Janet Steven, Dept. of Organismal & Environmental Biology,
Christopher Newport University

Flowers attract pollinators in a variety of ways. Visual signals such as flower size and color are often related to increased pollinator attraction, but other factors often come into play. This experiment focuses on the chemical scent components produced by flowers in order to attract pollinators and their relation to features like sexual dimorphism, physical floral traits, and circadian patterns.

36 Exploring ZIF-8 Nanoparticles as Additives to Growth Media for Myoblasts

Ryan Tomlin

Mentor: Paul Mueller and Kristin Fischer, Chemistry Dept. and Biology Dept.,
Hampden-Sydney College

Zeolitic imidazolate framework-8 (ZIF-8) nanoparticles, with attached glutamine and carboxaldehyde, will be implemented into in vitro cell studies to test their effects on skeletal muscle cell maturation. These nanoparticles are synthesized by methods found in the literature and characterized by IR, NMR, and MP-AES.

37 rdiA affects growth and aflatoxin production in *Aspergillus flavus*

Reagan Treadwell

Mentor: Michael S. Price, Dept. of Biology & Chemistry, Liberty University

Deletion of the *rdiA* gene from *A. flavus*, suggested that *rdiA* plays a role in hyphal growth and branching in *A. flavus*, and may be involved in regulating AF production via an intracellular signaling cascade. A plasmid vector containing the gene insert has been created for transformation into a Δ *rdiA* *A. flavus* strain in order to confirm the previous hypothesis.

38 The degradation of PET plastic by *Ideonella sakaiensis* under varied conditions

Caroline Tsui

Mentor: Todd Gruber, Dept. of Molecular Biology & Chemistry, Christopher Newport University

PETase is an enzyme discovered in the bacterium *Ideonella sakaiensis* that can break down polyethylene terephthalate, or PET, plastic. In this project we study the interaction of *I. sakaiensis* and PET, and the different factors that can be manipulated to increase the rate of plastic degradation.

39 Circadian interactions of PERIOD2 in cancer therapeutics

Esther L. Wisdom

Mentor: Carla V. Finkielstein, Dept. of Biological Sciences, Virginia Tech

The p53 tumor suppressor prevents the accumulation of dividing mutant cells and, therefore, cancer initiation. Drug treatments aimed at targeting a defective p53 promote structural rearrangements that lead to cell death. Drug binding in p53 occurs at the interphase of binding with the circadian regulator PERIOD2. We aim to elucidate how regulation of PER2 levels modulates cancer therapeutics.

40 Isolation of a new plastic degrading bacteria

Noah Wallace

Mentor: Todd Gruber, Dept. of Molecular Biology & Chemistry, Christopher Newport University

Plastic waste is a leading global environmental concern. Some strains of bacteria have been able to evolve to use plastic in the environment as a carbon source and as such can be used to degrade plastic in more controlled settings. Further environmental screening to find new strains of plastic degrading bacteria needs to be developed and implemented.

2019-2020 VAS Officers

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The Virginia Academy of Science

The **Virginia Academy of Science** (VAS) is the fifth largest state, region, or city academy of science in the US; it was founded in 1923 to promote the civic, academic, agricultural, industrial, and commercial welfare of the people of Virginia. Exemplary programs have included *Flora of Richmond and Vicinity* (published, 1930), the first comprehensive multidisciplinary studies of the James River Basin and the Great Dismal Swamp, volunteer research assistance to Virginia in the instance of the kepone pollution disaster, and leadership in establishing the Science Museum of Virginia.

The **2020 VAS Annual Meeting** will be held on May 28-30 at James Madison University in Harrisonburg. During this meeting, Oral Presentation Sessions (for participating VAS sections) and a Poster Session (for all VAS sections) will take place on Friday morning and afternoon, May 29.

- Most section oral presentations will be scheduled at 15-minute intervals and presenters should be prepared for a talk of 10-11 minutes followed by 3–4 minutes for questions and/or comments.
- The poster session will be held from 10 am – 5 pm. Poster authors must be present from noon to 2 pm to discuss their posters and answer questions.

Award recipients from the Fall Undergraduate Research Meeting are expected to present the results of their projects at the Annual Meeting, and all of today's participants are encouraged to present the results of their projects at the 2020 Annual Meeting.

Specific details about online submission of titles and other information for both oral and posters presentations, as well as more detailed information about the 2020 Annual Meeting, will be made available on the VAS website (www.vacadsci.org) as it becomes available.

To become a VAS Individual Member, Institutional Member, or Business Member, please contact The Virginia Academy of Science at vasoffice@vacasci.org or 804-864-1450.

VAS Membership Applications for Individuals, Institutions and Businesses, are available at <http://vacadsci.org/vas-membership/>.

VAS and VJAS Scientific Research Grants, Awards, Scholarships, etc. are made possible by hundreds of corporate and individual donors who believe in our work to benefit the people of Virginia. Many have found this a meaningful way to memorialize a loved one, support a student's education, or recognize the work of a colleague.

To Create an Endowment or Make a Donation, please contact Philip M. Sheridan, Executive Officer, Virginia Academy of Science at psheridan@vacadsci.org or 804-864-1451.

For Information and Applications for Research Grants, please contact one of the following individuals.

- Philip M. Sheridan, Executive Officer, Virginia Academy of Science at psheridan@vacadsci.org or 804-864-1451
- Carolyn M. Conway, Associate Executive Officers, Virginia Academy of Science at vasoffice@vacadsci.org or cconway@vacadsci.org or 804-864-1450

**Virginia Academy of Science
2500 W. Broad Street
Richmond, VA 23220
804-864-1450
804-864-1451**

Remember

Founded the Science Museum of Virginia ... With the Garden Clubs of Virginia, established the Virginia State Parks System ... Established, with the early support of the DuPont family, the first Scientific Research Fund in Virginia ... Founded the Virginia Institute for Scientific Research (erected at the University of Richmond), the forerunner of Virginia Centers for Innovative Technology, funded by the Virginia General Assembly ... Founded The Virginia Junior Academy of Science to foster original research in Virginia middle and high schools ... Published the Flora of Richmond and Its Vicinity ... Leaders' testimony at the Scopes Trial and later resolutions on evolution and its teaching in science curricula of Virginia schools ... Advocated inclusion of women and African-American scientists and science educators in professional meetings ... Founded the Virginia Journal of Science ... Hundreds of teacher education and training programs in the sciences, mathematics, medicine, and technology ... Established the Kiser Fund for Science Teacher Education ... Published The James River Basin: Past, Present, and Future, funded by the Virginia General Assembly, the first comprehensive, multidisciplinary account of the James and its resources, landforms, flora, fauna, industries and businesses ... Established the VJAS Research Fund to support scientific investigations by Virginia's secondary school students ... Annually sponsors "The VJAS Experience" bringing hundreds of secondary students to Virginia colleges and universities to stay on campus and visit research facilities ... Founded the Virginia Science Resource Network to mentor Virginia's teachers and students ... Established the Annual Undergraduate Research Conference to financially support original research in four-year and two-year curricula ... Established scientific advisory service to Virginia Governors and state agencies beginning with the state's kepone disaster ... Supported the founding of the Virginia Institute of Marine Science (College of William and Mary) ... Decades of leadership for the publication of the first *Flora of Virginia* since 1739 (to be published 2012)... ... Annually awards over \$80,000 in sponsored/endedowed scholarships and prizes to Virginia middle and high school students for original research ...

NEXT ...???

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