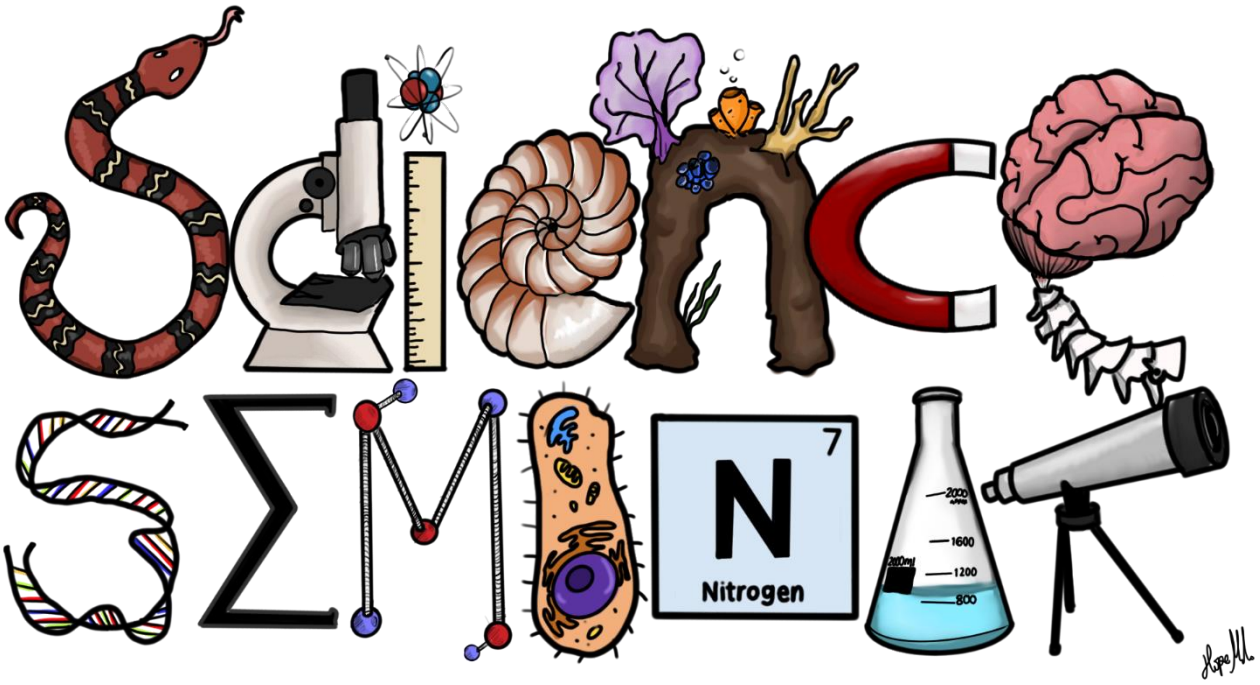
63rd Annual

Hollins



April 5 – 8, 2021

We are excited to invite you to join us as we once again celebrate the dynamic research that has been conducted by Hollins University science and mathematics students during the 2020-2021 academic year. Though we have been pressed by a pandemic, we have continued in our quest to expand our mathematical and scientific understanding of the world around us. In this, the 63rd year of the celebration of scientific research and inquiry at Hollins, we will offer a four-day virtual meeting comprised of student research presentations in both oral and poster formats; separate student/faculty panels exploring research in Biology/ES, Chemistry/Physics, Math/Statistics/Computer Science, and Psychology; an alumnae panel exploring research in STEM fields; and a keynote address by Dr. Susan Campbell.

While COVID restricts our ability to gather in person, we will be using our physical and virtual space to connect and celebrate research. Research posters describing the research our students have engaged in this academic year will be on display in Dana Science Building beginning April 3, 2021. These students have produced a short informative video with their poster that is available here, Science Seminar Website.

MONDAY, April 5th

Science Seminar launches with two Zoom sessions focused on the process and value of doing research in STEM fields. See Science Seminar Website for links to bios.

Session I: 4:45-5:45 p.m.
Conversations about Research with Students of Science and Math

Come learn more about how and why to get involved with research during your time at Hollins from students in STEM fields. Student panelists will discuss how they found research opportunities, describe what lessons they learned and skills they gained during their research, and explain how this has prepared them for their future. After an initial discussion between the panelists, there will be time for questions from the audience.

Student Panelists (*Please see bios at the end of the program)*
Hannah Arthur '21 (chemistry), Morgana Costanzo '24 (biology/ES), Hinza Malik '21 (psychology), Hannah Schleupner '21 (biology)

Register in advance for this meeting:
https://hollins.zoom.us/meeting/register/tJIkdu-hqj4rHdKHKzRm1dWuDprvR6UCv8wv
HOST: Dr. Meg du Bray, Environmental Studies (dubraymv@hollins.edu)

Session 2: 6:30-7:30 p.m.
A Conversation with STEMinist Alumnae in Research

Please join us for an engaging exploration of careers in research. This conversation will be led by several of our recent Hollins alumnae who are actively pursuing careers in research in psychology, environmental science, biomedical technology, and chemistry. After an initial discussion between the panelists, there will be time for questions from the audience.

Alumnae Panelists (*Please see bios at the end of the program)*
Brianna Berry '19 (chemistry**)**
Currently an organic lab technician at James R. Reed and Associates.
Dr. Erin Lavender-Stott '10 (psychology), Ph.D. in Human Development (Virginia Tech)
Currently an Assistant Professor in the Department of Counseling & Human Development, SDSU
Lan Nguyen '18 (environmental science and economics), PhD Student in Ecology, Evolution, Ecosystems, and Society program at Dartmouth University
Dr. Puja Sharma '11 (biology) Ph.D. in Biomedical Engineering (Virginia Tech)
Currently working for a biotech start-up (Oleolive) in Shreveport, La.
Dr. Laura Strausberg '08 (chemistry), Ph.D. in chemistry (U.V.A.)
Currently an Assistant Professor of Chemistry at Wesleyan College (Ga)

Register in advance for this meeting:
https://hollins.zoom.us/meeting/register/tJAocuipqDouHdVbsIZ3o4ZXJXRaUQM2Uxdx
HOST: Dr. Rebecca Beach, Biology (rbeach@hollins.edu)

TUESDAY, April 6th

On the second day of Science Seminar we will explore research in Biology/ES and Math/Stats. Join Zoom conversations with faculty and research students in these fields in the afternoon. See Science Seminar Website for links to posters and recorded talks. In the evening, enjoy two formal research oral presentations by seniors engaged in thesis work.

Session IA: 4:45-5:45
Exploring research in Biology and ES

Please join the biology and ES faculty to learn about ongoing faculty and student research at Hollins and how to pursue research opportunities if you are interested. This session will open with brief introductions from faculty about their research areas and will be followed by Q&A opportunities with students that have summarized their research on posters displayed in Dana and available on the Science seminar website. **(***Prior to the session, please visit the website to see short video introductions by these students)*

Faculty: Renee Godard, Morgan Wilson, Mary Jane Carmichael, Meg du Bray, Liz Gleim, Rebecca Beach

Students: Geneva Waynick '21, Ellie Song '24, Breanne Sharpe '24, Morgana Costanzo '24, Katie Bushing '22

Register in advance for this meeting:

https://hollins.zoom.us/meeting/register/tJ0sdOiorDMqG9c0qG7oANSkNLptOnHjiyD-

HOST: Dr. Renee Godard, Biology/ES (rgodard@hollins.edu)

Session IB: 4:45-5:45
Exploring research in Math, Statistics, and Data Science

Please join the faculty and senior majors in the Department of Mathematics, Statistics, and Computer Science for an exploration of research in this field. Senior majors take a two-semester senior seminar, and during the second semester, each student works with a faculty advisor on a research topic. Our seniors, Megan, Pragya, Sam, and Sara, will give short presentations about the current state of their research. The math faculty will also say a few words about their own research areas. **(***Please see bios and abstracts at the end of the program)*

Faculty: Julie Clark, Erin Levering, Molly Lynch, Giancarlo Schrementi, Steve Wassell

Students: Megan Bull, Pragya Khanal, Samantha Lake, Sara Neal

Register in advance for this meeting:

https://hollins.zoom.us/meeting/register/tJcrf-2trzksHNS84qdEKB3BeKF_8PkoomiN

HOST: Dr. Steve Wassell, Math (wassellse@hollins.edu)

Session 2: 6:30-7:30 p.m.
Senior Research Presentations

Please join us as we hear from two seniors exploring research projects at the intersection of biology, environmental science and mathematics/statistics. **(***Please see bios and abstracts at the end of the program)*

Shravani Chitineni '21 – *"Using Modeling to Identify Optimized Tick Control Methods for Reduction of Lyme Disease Risk"*

Bronte Hoefer '21– *"Role of Edge Effects on Emerald Ash Borer Infestation & Forest Responses"*

Register in advance for this meeting:

https://hollins.zoom.us/meeting/register/tJErcumsrD0jGtzp1Rplx957Jdc_4Kd0-CYt

HOST: Dr. Liz Gleim, Biology/ES (egleim@hollins.edu)

WEDNESDAY, April 7th

On the second day of Science Seminar we will learn about research in Chemistry/Physics and Psychology. In our afternoon sessions, you can join in Zoom conversations with faculty and students who have presented their research projects in Posters displayed in the Dana Science Building and online here Science seminar website. In the evening, you can join us for two formal research presentations by seniors engaged in thesis work.

Session IA: 4:45-5:45
Exploring research in Chemistry and Physics

Please join faculty in Chemistry and Physics to learn about ongoing research at Hollins and how to pursue these opportunities in these areas. Our session will begin with conversations with faculty about their areas of research followed by separate discussions with students presenting research posters in Dana. This is a great opportunity for you to learn about research in these programs. **(***Please see bios and abstracts at the end of the program)*

Faculty: Bansi Kalra, Dan Derringer, Son Nguyen, Brian Gentry, Khadijatul Kobra, Kazi Tawhid-Al-Islam
Students: Hannah Arthur '22, Holly Moak '21, Kaitlyn Okin '21, Alayna Pruitt '21, Jaclyn Ward '21

Register in advance for this meeting:
https://hollins.zoom.us/meeting/register/tJwlfuGoqzMpEtXLPxo6KTNKuQohtd2nwVc8
HOST: Dr. Son Nguyen, Chemistry (nguyensh@hollins.edu)

Session IB: 4:45-5:45
Exploring research in Psychology

Please join the faculty in the psychology department in a session where they will spotlight their research and discuss various research opportunities for students. In the second half, attendees will have the chance to ask questions of students about their research posters. Come and learn about the different psychological research being conducted at Hollins! **(***Please see bios and abstracts at the end of the program)*

Faculty: Caroline Mann, Rick Michalski, Alex Wooten, Seung-Hee Han,
Students: Soha Munir, Hinza Malik

Register in advance for this meeting:
https://hollins.zoom.us/meeting/register/tJwtdOmrrjIvHtYCiQwk-AftpiyvHgcQg6mi
HOST: Dr. Alex Wooten, Psychology (wootenar@hollins.edu)

Session 2: 6:30-7:30 p.m.
Senior Research Presentations

Please join us as we hear from two seniors exploring research projects in chemistry and psychology.
(*Please see bios and abstracts at the end of the program)*

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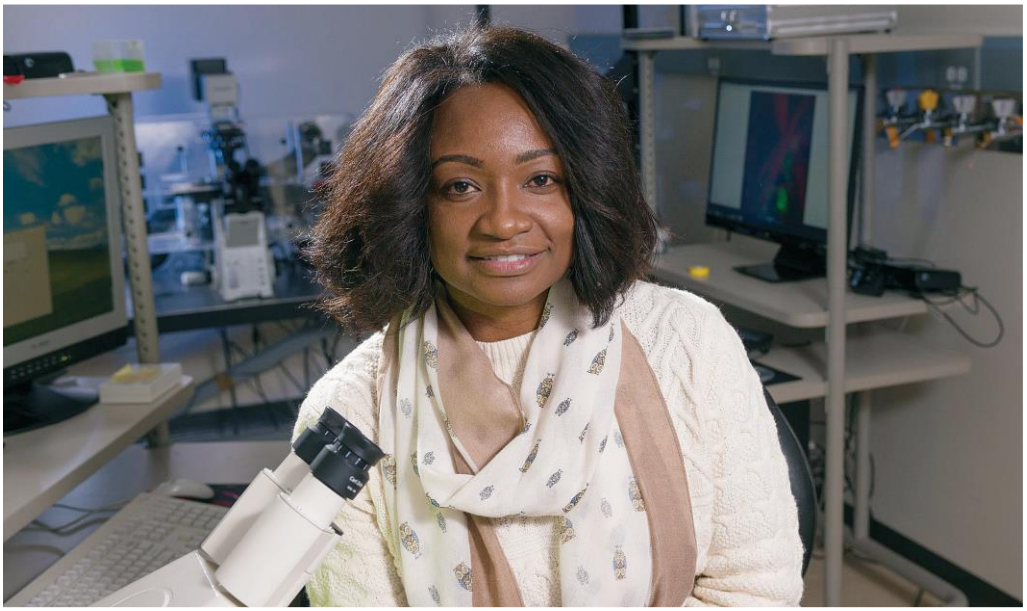
Kaitlyn M. Okin - Synthesis and evaluation of the rhodamine- and biotin- probes for detection of cysteine containing proteins
Hinza Malik - A correlational study of self-concept clarity, stigma, and help-seeking behavior

Register in advance for this webinar:
https://hollins.zoom.us/webinar/register/WN_ACD9em_WQrSbk94ivF4bdw
CO-HOSTS: Dr. Caroline Mann (mannce@hollins.edu) and Dr Son Nguyen (nguyensh@hollins.edu)

Thursday, April 8th

KEYNOTE ADDRESS: 7:30-9:00

Mechanism of Seizure Development: Switching Roles and Gut Feelings



We are delighted to conclude the 63rd Annual Science Seminar with a Keynote Presentation from Dr. Susan Campbell. Dr. Campbell completed her Ph.D. in neurobiology at the University of Alabama at Birmingham and is currently an assistant professor in the department of animal and poultry sciences at Virginia Tech. The main focus of her scientific career has been devoted to studying epilepsy and mechanisms involved in seizure development. Campbell's research group is investigating novel mechanisms that lead to seizure development by combining electrophysiology and clinically relevant seizure models.

Dr. Campbell will be introduced by President Mary Hinton.

Register in advance for this webinar:
https://hollins.zoom.us/webinar/register/WN_96UqUTmrTrOeY6IC_T-duw

CO- HOSTS – Dr Renee Godard (rgodard@hollins.edu) and Dr. Meg du Bray, (dubraymv@hollins.edu)

Research Abstracts by Department

Departments of Biology and Environmental Studies

Green Turtles (*Chelonia mydas*) prefer foraging locations with reduced abundance of the invasive sea grass, *Halophila stipulacea*

Katie Bushing, Ellie Song, Breanne Sharp and Morgana Costanzo
Under the direction of Renee Godard and Morgan Wilson

Sea grass meadows are critical foraging habitat for sub-adult and adult green turtles (*Chelonia mydas*). Until recently, seagrass meadows in St. John (STJ), USVI were dominated by three native Caribbean seagrasses: *Thalassia testudinum, Syringodium filiforme*, and *Halodule wrightii*. An invasive sea grass species was introduced to the Caribbean in 2002 and first appeared in STJ in 2010. We evaluated the extent of the invasion of *H. stipulacea* by sampling grassbed composition at regular intervals along a transect line in five different seagrass meadows in STJ in January 2020. Snorkelers took a 25 cm^2 photo of the grassbed along the transect line as well as at identified foraging sites of turtles in each of the five bays. Each photo transect was evaluated separately by four individuals who identified and counted each blade of grass and an average abundance of each species was calculated. *H. stipulacea* accounted for more than half of all seagrass blades/transect in three of the five bays and was at least 30% of blades in the other two bays. However, *H. stipulacea* was significantly less common in the foraging sites when compared to transect sites, and native grasses were more abundant in foraging sites than in transect sites. Our results indicate that *H. stipulacea* has rapidly colonized multiple seagrass meadows in STJ and that the foraging preferences of green turtles may facilitate the expansion of the invasive species in the future.

Use of LYMESIM 2.0 to assess the potential for single and integrated management methods to control blacklegged ticks (*Ixodes scapularis*; Acari: Ixodidae) and transmission of Lyme disease spirochetes

Shravani Chitineni
Under the direction of Drs. Elizabeth R. Gleim and Holly D. Gaff[1]
[1]Department of Biological Sciences, Old Dominion University

Annual Lyme disease cases continue to rise in the U.S. making it the most commonly reported vector-borne illness in the country. The complex relationship between the bacteria that causes the disease (*Borrelia burgdorferi or Bb)* and the primary vector (*Ixodes scapularis;* blacklegged tick*)* is complicated by the multitude of vertebrate hosts and varying environmental factors. LYMESIM 2.0, a mechanistic model, has been shown to be effective in understanding and predicting tick population and pathogen transmission dynamics based on these many factors. However, this current version of LYMESIM has not

been used to explore the effectiveness of different tick control methods. Thus, the purpose of the current study was to examine the effectiveness of three commonly used tick control treatments: habitat-targeted acaricide (spraying), small mammal targeted acaricide (bait boxes), and white-tailed deer targeted acaricide (4-poster). The model was used to evaluate the most effective combination of controls and time window of application. Additionally, simulations were run to evaluate this combination applied at various durations, e.g., consecutive years vs every other year, and various effectiveness levels. It was determined that spraying in tandem with bait boxes and 4-posters, would be the best method of control as this combination of treatments results in > 80% suppression in the density of blacklegged tick nymphs (DON). Furthermore, the best time to apply those treatments was between weeks 1-16 (e.g., January through mid-April) and 37-48 (e.g., mid-September to early December). Additionally, application of treatment every year or every other year at a minimum effectiveness of 25% is required to achieve 80% DON suppression and no increases in blacklegged ticks beyond their pre-treatment abundance in the years after treatments are stopped. With these conclusions, we can recommend the best method of blacklegged tick population control that is both time and cost-effective.

The role of edge effects in emerald ash borer infestation and forest regeneration

Bronte E. Hoefer, Madison H. Hill, Catherine P. Kirkpatrick
Under the direction of Dr. Elizabeth R. Gleim

The emerald ash borer (EAB; *Agrilus planipennis*) is a buprestid beetle Native to Asia and now an invasive species in North America. EAB infests trees of the genus Fraxinus (ash), and has spread to 35 states since its introduction in the early-to-mid-1990s. EAB has the potential to functionally extirpate all native ash species within North America. Our study aims to characterize the ecological impacts of EAB infestation in Southwest Virginia, quantify the impact of edge effects on forest invasion and subsequent mortality of ash trees, as well as the role that forest edge effects play in forest regeneration post-ash tree mortality. In 2017, a total of 33 forest transects across 12 study sites located across the Roanoke Valley were established. Data was collected annually on woody species composition, growth, canopy position, and understory woody plant composition. Signs of EAB infestation and ash mortality were tracked at our ash sites across all study years as well. Although analyses are on-going, initial findings indicate significant increases in dieback scores of large (>12cm DBH) and small (<12cm DBH) trees across all years, indicating progressive mortality of ash trees. Trees in the core had significantly higher average dieback scores than trees in the edge in 2019, and large trees die more rapidly than small trees, particularly in 2019 and 2020. Finally, the mean number of seedlings at ash sites at the edge and core significantly decreased from 2017 to 2020 as ash mortality progressed. Additional analyses are underway to determine whether this might indicate a depletion of ash seeds in the seed bank.

Attention-Deficit/Hyperactivity Disorder Etiology and Symptomatology: The Potential Role of the Gut Microbiota-Gut-Brain Axis

Hannah V. Schleupner
Under the direction of Dr. Mary Jane Carmichael

A healthy human microbiome is crucial for normal physiological functioning of the human host. The gastrointestinal tract harbors a densely populated, sexually dimorphic community of microbes, and dysbiosis of this community has been associated with chronic human disease states ranging from metabolic diseases to neuropsychiatric disorders (NPDs). The gut microbiota-gut-brain axis (GMGBA) is a bi-directional pathway that facilitates the interaction of the gut microflora with human host physiological functions. Recently, research surrounding the potential roles of the GMGBA in the development of NPDs (e.g., depression, anxiety, and autism spectrum disorders) has increased; however, attention-deficit/hyperactivity disorder (ADHD), a NPD that affects an estimated 8.4% of children and 4% of adults in the United States, remains under-studied. Over the 2020-21 academic year, a proposal was developed for a project aimed at preliminarily characterizing gut microbial composition in adult human subjects based on host sex and ADHD diagnosis using high-throughput 16S rRNA sequencing. Additionally, prediction of the functional capacity of the subjects' gut microbiomes based on presence or absence of ADHD diagnosis will be carried out using the PICRUSt2 and HUMAnN3 pipelines. The proposed project seeks to contribute preliminary data to the overall understanding of the physiological underpinnings of ADHD in the human supraorganism. Ultimately, the hope is that this research provides a springboard for future studies that will facilitate the translation of experimental knowledge into increasingly efficacious clinical practices for the treatment of ADHD.

The influence of infant formulas on the growth of commensal and pathogenic Streptococcus species in the infant oral cavity.

Geneva Waynick
Under the direction of Dr. Mary Jane Carmichael

The oral microbiome is a complex community of microorganisms that can both reflect and greatly influence the health of the human host. A number of diseases are associated with dysbiotic oral microflora in infants and children, including dental gastrointestinal diseases, such as gingivitis, periodontal disease, and pediatric IBD. The oral microbiome is acquired primarily through exposure to various microorganisms present within the environment during parturition and after birth. A variety of factors can influence the composition of the oral microbial community in infants, including gestation length, mode of delivery, feeding method, and diet. This study focuses on the effects of diet on the growth of a commensal species (*Streptococcus mitis*) and a pathogenic species (*Streptococcus mutans*) that are both commonly found in the oral cavity of infants. A culture-dependent model will be utilized to

test the effects of two commercially available powdered infant formulae on the growth of the species: one supplemented with a probiotic (*Lactobacillus rhamnosus*) and a second without probiotic supplementation. Snyder's Media will be used to assess the cariogenic potential of each species. The growth of the commensals and opportunistic pathogen will be assessed by enumerating colony forming units (CFUs) and measuring pH over time. Based on the existing literature, it is expected that the probiotic-supplemented formula may aid in producing more favorable conditions for the commensal. The results of this study may assist mothers in selecting alternatives to breastfeeding that will support the proper development of the infant oral microbiome by favoring the growth of commensal bacteria.

Department of Chemistry

Two diphosphines and the dirhenium compounds derived from them

Hannah Arthur
Under the direction of Dr. Dan Derringer

Two analogs of the compound dppm ($Ph_2PCH_2PPh_2$) were synthesized: dppmCN ($Ph_2PCH(CN)PPh_2$) and dppmMe ($Ph_2PCH(CH_3)PPh_2$). These diphosphines were subsequently used to prepare complexes of the type $Re_2(O_2CCH_3)Cl_4(dppmR)_2$ (R = CN, CH_3). The dirhenium starting material for these reactions was $Re_2(O_2CCH_3)_2Cl_4(H_2O)_2$, which was prepared from commercially available $(n\text{-}Bu_4N)_2Re_2Cl_8$. All compounds were characterized by infrared spectroscopy. The dirhenium compounds were further characterized by cyclic voltammetry. The ultimate goal of this project is to make species of the type $Re_2(O_2CCH_3)_2Cl_2(dppmR)_2$. If we successfully prepare the *cis* isomer of $Re_2(O_2CCH_3)_2Cl_2(dppmR)_2$, the absence of one of the two bridgehead hydrogens in each of two dppm ligands of *cis*-$Re_2(O_2CCH_3)_2Cl_2(dppm)_2$ may help us to understand the reason for the unusual chemical shift of one of the $–CH_2–$ hydrogens in the H-1 nuclear magnetic resonance spectrum of the dirhenium compound that contains dppm.

Characterization of $Ph_2PCH(CH_3)PPh_2$ by nuclear magnetic resonance spectroscopy

Holly Moak
Under the direction of Dr. Dan Derringer

The compound $Ph_2PCH(CH_3)PPh_2$ was synthesized using a published method (see *Organometallics* **1986, 5,** 2220-2228). A 60-MHz H-1 nuclear magnetic resonance (NMR) spectrum was recorded to determine the sample's purity. A complex pattern, not reported by the authors of the *Organometallics* paper, was observed at about 1 ppm. The work described here was undertaken to understand this inconsistency. The conclusions we present will be informed by computer modeling as well as high-field and two-dimensional NMR studies.

Synthesis and evaluation of the rhodamine- and biotin- probes for detection of cysteine containing proteins

Kaitlyn M. Okin*, Jaclyn E. Ward*, Maria Jdid, Mary C. Rash, Keyazia D. Taylor
Under the direction of Dr. Son H. Nguyen
** These authors contribute equally to the work.*

Along with glutathione, biological thiol cysteine (Cys) plays important roles in many biological processes such as cellular detoxification and metabolism in living organisms. Changes in intracellular Cys concentration have a profound effect on these biological processes. Given the critical importance of Cys homeostasis in biological systems, a strong interest has emerged in developing effective probes to detect and image Cys-rich proteins. In this oral presentation, the synthesis and evaluation of probes which we are working on and would be used to label Cys-rich proteins in biological systems, especially in redox systems, will be presented.

C-Glycosylation Through Reductive Halide Atom-Transfer Reaction with Photo-irradiation.

Jaclyn E. Ward, Mary C. Rash, and Kaitlyn M. Okin
Under the direction of Dr. Son H. Nguyen

The central theme of this proposal focuses on developing a new C-glycosylation method via reductive halide atom transfer with photo-irradiation with high stereoselectivity and yield and understanding mechanism of the method. Unlike previous radical glycosylation methods, this one does not use a chemical radical initiator but is carried out under irradiation using a low-pressure Hg lamp. In this poster, the scope of reaction with a number of different donor/acceptor pairs which we are working on will be presented. Mechanistic study of this method is proposed to provide valuable insight into the factors that help to improve the efficiency of the reaction as well as stereoselectivity. This method will be applied in the total synthesis of some valuable natural products which have effective pharmaceutical activities.

Department of Mathematics

Unfairness and Discrimination in Machine Learning

Megan Bull
Under the direction of Dr. Giancarlo Schrementi

Facial recognition has been a breakthrough in the development of Neural Networks and Artificial Intelligence. However, when used in a real-world setting, rather than just a testing dataset, specific programs will misidentify women and people of color far more often than white men. As facial recognition becomes more widely deployed these mistakes can have serious consequences. When police departments use biased technology to find suspects, it can lead to wrongful arrests and even convictions, as in the case of Robert Julian-Borchak Williams. I plan to create a facial recognition program of my own in which I train the algorithm on a dataset that proportionally represents both men and women and people of color. To do this, I will be using Google Colab and TensorFlow to create Neural Networks that we can train on our given dataset. I suspect that with a proportionally represented dataset, the program will be more accurate than one trained on a dataset that is disproportionately white men.

Gross Domestic Product Forecasting Model

Pragya Khanal
Under the direction of Dr. Giancarlo Schrementi

Gross Domestic Product or GDP is seen as the most conventional and comprehensive way of measuring the economic growth of a country. This paper, with 20 different indicators, showcases a data driven forecasting model of nominal GDP of the country U.S. The indicators are chosen within the aspects of business, trade, market, health, labor, government and prices and integrates the lagging, leading and coincident indicators. We will be using the concept of machine learning and creating testing and training set to create linear regression model and show how accurate the model is in predicting the nominal GDP of the country. The model will determine the nominal GDP of the U.S for the coming 10 years.

Tackling the Wedding Seat Arrangement Problem

Sam Lake
Under the direction of Dr. Molly Lynch

In this project, we examine possible solutions to the wedding seat arrangement problem. Namely, we attempt to evenly distribute guest seating assignments amongst tables, such that known personal relationships amongst guests are considered. In particular, we aim to have friends sitting together, and more importantly sitting those that do not get along at all to different tables. This is a practical application of a problem of combinatorial optimization that generalizes two different common combinatorial problems – the graph coloring and k-partition problems. We describe a heuristic approach to this problem that is currently being used on the commercial website, www.weddingseatplanner.com. We will then analyze its performance and hope to manage to program something with similar results in the computer language Python, where we will then compare the two outputs.

Non-Linear Differential Equations Models for Interacting Species with a Focus on Predator-Prey

Sara Neal
Under the direction of Dr. Stephen Wassell

Non-linear systems of differential equations have been used to model populations of interacting species since the 1920's, when the predator-prey model was first introduced by mathematicians Lotka and Volterra. This project will explore two-dimensional linear and non-linear systems, the relationship between phase plane portraits and the corresponding solutions of the systems, and applications to ecological population dynamics analysis. Further refinements of the predator-prey model from recent years will also be explored.

Department of Physics

Proposing Prometheus: Photobiomodulation and the Future of Medicine

Alayna Pruitt
Under the direction of Dr. Brian Gentry

In the U.S. alone, an estimated 60,000 individuals die from hemorrhaging yearly, and worldwide that number jumps to 2 million, with an estimated 1.5 million of those deaths resulting from physical trauma. Photobiomodulation is the therapeutic utilization of non-ionizing electromagnetic energy to trigger photochemical changes within cellular structures to promote healing with the potential to aid trauma patients. The goal of this research project was to investigate the feasibility of creating Prometheus, a light-weight, maneuverable, and affordable device designed to treat trauma patients using photobiomodulation. This device, installed in ambulances and primary care facilities, would not only aid in significantly reducing the rates of exsanguination, but also increase cellular regeneration and wound healing times, leading to shorter recovery periods for the patients and a reduction in scar tissue.

Department of Psychology

A Correlational Study of the Relationship Between Self-Concept Clarity, Stigma, Psychological Distress, and Help-Seeking

Hinza Malik
Under the direction of Dr. Caroline Mann

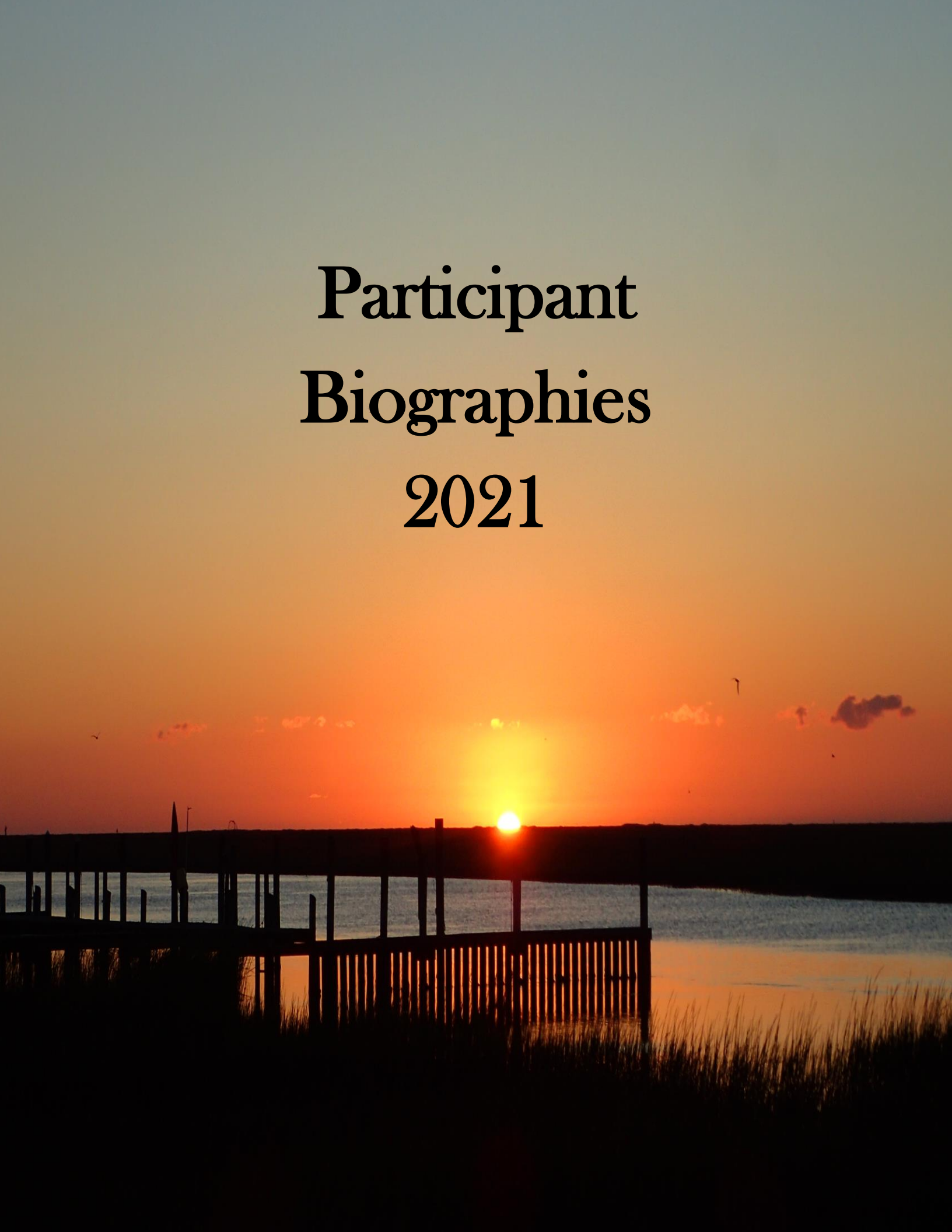
Extensive prior research has shown that individuals with low self-concept clarity (SCC) are more susceptible to mental health problems, e.g., depression and anxiety, than individuals with a high SCC. However, prior research has not focused on help-seeking in conjunction with SCC. Therefore, an online survey was distributed to Hollins University students (N=111) to investigate the potential relationship between SCC and help-seeking behavior. A positive correlation between SCC and help-seeking was found, indicating participants with a higher SCC had a greater help-seeking propensity and vice versa. Furthermore, as psychological distress and stigma are predictors of help-seeking, we also measured these variables. Stigma was further dissected into perceived public stigma, personal stigma, and perceived peer stigma. Previous research demonstrates that perceived public stigma is usually higher than personal stigma, and that personal stigma independently influences help-seeking behavior, but— despite prominent theories— public stigma does not. The current study altered the perceived stigma reference group (i.e from “public” to “peer group”) to investigate if that would change the associations with help-seeking behavior. Consistent with prior research, perceived public stigma continued to remain significantly higher than personal stigma and was not correlated with help-seeking behavior or personal stigma. However, both personal stigma and perceived peer stigma were negatively correlated with help-seeking and positively correlated with each other such that individuals high in personal and peer stigma

were less willing to seek help. The results can provide insight for future mental health help-seeking intervention programs and stigma reduction campaigns.

Understanding the effects of familiarity on cross-race eyewitness identification accuracy in lineups.

Soha Munir
Under the direction of Dr. Alex Wooten

Currently there have been 375 National DNA exonerations and over 70% of them have been due to eyewitness misidentification (Innocence Project, 2020). An alarming amount of these cases have involved cross-race identifications where the suspect and witness were of different races. In eyewitness research this phenomenon is known as the cross-race effect (CRE) where participants are typically better at identifying suspects of their own race as compared to identifying suspects of a different race (e.g., Meissner & Brigham, 2001). One potential issue that has not been explored before in this area is the role of prior familiarity and its effect on the CRE in a lineup procedure. Studies have found worse familiarity judgements for different vs same race individuals (Pezdek & Stolzenberg, 2014). The purpose of this study is to test whether the cross-race effect will be influenced by prior familiarity between White and Black suspects in a lineup. Participants will study faces of White and Black individuals during the first stage to create familiarity. After a distractor task, participants will then be shown images of culprits and later attempt to identify them from lineups where the suspect will be either familiar (studied earlier) or unfamiliar (completely new) and either guilty or innocent. This research will help us understand how eyewitnesses process and recognize unfamiliar and familiar faces for suspects of a different race in order to determine the reliability of such identifications for future cases and prevent more wrongful incarcerations as a result of cross-race identifications.



Participant Biographies 2021

Biographies of STEMinist Alumnae

Brianna Berry graduated from Hollins University in 2019 with a B.S. in Chemistry and double minors in French and Physics. Currently, she lives in her hometown of Hampton, VA where she is an Organic Lab technician at James R. Reed and Associates. Brianna works to detect harmful chemicals in water and soil samples for local governments and companies. When she is not working, Brianna can be found reading, watching figure skating, and drinking copious amounts of tea.

Erin Lavender-Stott '10 is an Assistant Professor in the Department of Counseling & Human Development at South Dakota State University. She earned her bachelor's in psychology at Hollins University, master's in psychology at University North Carolina Wilmington, and her PhD in human development, with a focus in family science, at Virginia Tech. At SDSU, Dr. Lavender-Stott teaches courses in adult development and aging, as well as family theories and policies. Her research focuses on gender and sexuality within the family context across adulthood, with a particular interest in singlehood and aging.

Lan Nguyen '18 is currently pursuing a PhD in the Ecology, Evolution, Ecosystems, and Society (EEES) program at Dartmouth. She is interested in addressing environment-related questions and issues in the nexus of ecosystem science, economics, and governance. Her major fields encompass economics of ecosystem services, natural resource governance, sustainability, coastal resiliency, and climate change impacts. Particularly, she is interested in exploring how to value the benefits and tradeoffs of restoring mangroves and how we can best govern mangroves in such way that can generate both economic and environmental values. Lan is looking at mangrove

conservation and restoration in Vietnam – her home country - as a case study to answer her research questions. The mentorships and research opportunities that she received at Hollins as a double major in Economics and Environmental Science have truly shaped and guided where she is today, and she is delighted to be joining this year's Alumnae Research Panel to share with you her research journey where it all started at Hollins.

Puja Sharma graduated in 2011 with a major in Biology and minors in Math and Physics. She completed her Ph.D. in Biomedical Engineering from Virginia Tech, her postdoctoral training from Wake Forest School of Medicine, and is currently working for a startup company in Shreveport, Louisiana. She has spent most of graduate and postdoc years doing research on basic and translational research for wound healing and glioblastoma therapy. In her free time, she likes to spend time with her puppy who is just 4 months old.

Laura Strausberg graduated from Hollins in 2008 with a major in chemistry and minor in art history, having discovered a fascination with the properties and structure of transition metals. As a graduate student at the University of Virginia she discovered a love and deep satisfaction for teaching. After completing her dissertation in 2013 in organometallic synthesis she taught in Tacoma, WA, for two years before landing at Wesleyan College, a women's college in Macon, GA. She teaches courses in general chemistry, organic chemistry, and inorganic chemistry, along with doing research on condensation reactions and analytes of chocolate! She lives with two cats who have perfected the art of Zoombombing over the last year.

BIOGRAPHIES of Hollins STUDENTS

Hannah Arthur, class of 2022, is pursuing a B.S. degree in Chemistry with a concentration in Biochemistry and a minor in Physics. Hannah is also on the pre-veterinary track. Since her sophomore year, she has participated in undergraduate research with Dr. Derringer; she has been on the Dean's List; and she has received the Undergraduate Award in Analytical Chemistry from the American Chemical Society. In the fall of 2020, she served as the SSL for Dr. Derringer's First-Year Seminar, "Molecules That Changed History." Outside of academics, she is a member of the Hollins Volleyball and Riding Teams, and of the Pre-Med Society. In her free time, she enjoys drawing, painting, and digital art, as well as practicing clarinet and reading. After graduation, she plans on going to veterinary school (possibly abroad in Scotland) and eventually becoming a veterinary surgeon.

Kaitlyn "Katie" Bushing, class of 2022, is a Biology (B.S.) major. She transferred to Hollins University in the fall of 2020 after graduating from Central Virginia Community College with an Associate's Degree in Life Sciences. Here, she served as a student ambassador, treasurer of the school's Phi Theta Kappa chapter, vice president of LEAD, and acted on the Student Conduct Board. At Hollins, she has been elected to the Honor, Conduct, and Appeal Boards. After graduation, she plans on attending graduate school for genetic counseling.

Megan Bull, class of 2021, is majoring in Mathematics (B.S.) with a concentration in Data Science. During her time at Hollins, she has held various positions, including as an Admissions Ambassador, Quantitative Reasoning Tutor, and serving as Vice President of the class of 2021 for the past two years. Since her sophomore year, Megan has served on the Honor Court and has also been a swim team member for three of her years at Hollins. Additionally, she spent a term studying with Hollins Abroad- London and a short term in Florence, Italy. Following graduation, Megan plans to pursue a Master of Science in Computer Science, with a concentration in Artificial Intelligence.

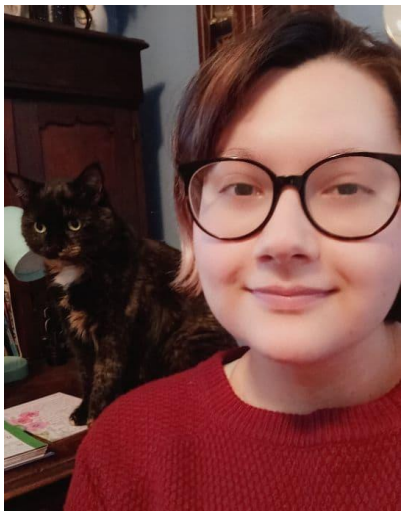
Shravani Chitineni, class of 2021, is a Biology (B.S.) major with double minors in Math and Chemistry. After graduating she plans to attend graduate school to attain her MS or MSPH in Biostatistics and use the opportunity to further explore her diverse research interests. The ability to work on her thesis pertaining to Lyme disease and vector-borne illness management has solidified her desire to pursue public health and epidemiology-based research. Though mostly interested in infectious disease research, she's contemplating a career in clinical trials and vaccine development or perhaps something related to identifying biomarkers for disease or genomics. She hopes to collect data and apply the best statistical methodology to answer various biological questions. Oh, she's also a captain of the soccer team and a campus QR tutor!

Morgana Costanzo, class of 2024, grew up in rural northeastern Pennsylvania, where her love of animals and fascination with the natural world began at an early age. Whether bringing home snake skins, bones or wayward creatures, Morgana's curiosity became a continual pursuit of knowledge in natural science. She is a 2020 National Honor Society Semi-finalist scholarship recipient, and currently a first-year biology major at Hollins University on a pre-vet track. She is president of the Hollins' APVMA chapter, on the riding team, and an active volunteer on campus and in her community. Morgana plans to minor in environmental studies and hopes to continue marine ecology research in the Caribbean next year.

Bronte Hoefer, class of 2022, is a Biology and Environmental Studies (B.A.) double major. Bronte has an interest in plant community ecology and forestry, botany, mycology, and environmental philosophy and geopolitics. She ultimately plans to attend graduate school to study plant community ecology. In addition to her thesis topic, she has been involved with the Campus Tree Assessment Project and a number of other non-science research projects during her time at Hollins.

Maria Jdid, class of 2021, is a Biochemistry and International Studies double-major on the premedical track. During her time at Hollins, she has been involved in a multitude of experiences, such as biomedical research and community-based research. After graduation, she intends to work at a hospital as a medical assistant for her gap year before attending medical school. Her medical interests are focused on neurosurgery and health disparities.

Pragya Khanal, class of 2021, is a double major in Economics and Mathematics with data science concentration. During her time at Hollins, she has served as a Quantitative Reasoning tutor, Academic Policy board chair and Career Connector. She also got to participate in J-term signature internships as a public policy and economics department intern at Lawyers' Committee and as a quantitative analyst intern at ProDeal. She enjoys working with data to analyze real-world problems. Her research interest lies in the interdisciplinary fields of Public Policy, Gender and Development Economics.



Samantha Lake, class of 2021, is a Mathematics major concentrating in Data Analysis and Physics minor. During her time at Hollins, she has been on the Dean's List, co-founded and was an officer for the WATTS Physics Club, successfully helped petition to reinstate the Physics minor, and had the opportunity to do data analytics on an important project with Climate Central in Princeton, NJ for an internship. She enjoys astronomy, anime, and reading with her cat. Samantha has settled into Roanoke, VA with her fiancé and is planning to take a gap year after graduation to network before continuing with graduate studies.

Holly Moak, class of 2021, is a Chemistry major with a concentration in Biochemistry. During her time at Hollins, she has held a number of leadership positions, including with the Honors, Conduct, and Appeals Board, the Student Government Association, ADA, and the French club. She enjoys playing piano and cooking for her friends. After graduation, she plans to move to Connecticut with her girlfriend.

Hinza Batool Malik, class of 2021, is a Psychology major with a Clinical/counseling concentration. She is an international student from Islamabad, Pakistan completing the accelerated 3-year degree program. Hinza is currently finishing her senior honors thesis with mentor Caroline E. Mann, Ph.D. During her time at Hollins, she continues to serve as the social media coordinator for the club ACCENT and is involved in AcPol. Upon graduation, she plans to attend graduate school in psychology to work towards obtaining a doctoral degree in clinical psychology.

Soha Munir, class of 2023, is a Psychology major and Biology, Data Analytics minor. She has been working with Dr. Alex Wooten since Fall 2020 on eyewitness identification which sparked her interest in pursuing research in psychology for graduate school. During her time at Hollins she volunteered at the Rescue Mission, interned at Beam Diagnostics and at Virginia Tech Carilion in Roanoke, where she was involved in research on decision-making and substance abuse. She likes to spend her free time watching movies, cooking, drinking coffee, and hiking.

Sara Neal, class of 2021, is a Mathematics Major (B.S.) with a concentration in Data Science. During her time at Hollins, she has been on the Dean's list, worked at the university rock climbing wall, and had the opportunity to work with the Chemistry, Biology, Physics, and Mathematics departments. She is also a member of the Pinnacle Honor Society. Sara is enthusiastic about computer programming and is planning to expand her knowledge of programming languages after graduation by beginning a career in data analysis.

Kaitlyn M. Okin, class of 2022, is a studying Public Health major with minors in both Chemistry and Communications. She has worked in the lab for 2 semesters and a J-term. She is also the chemistry department grader as well as the captain of the riding team.

Alayna Pruitt, class of 2021, is a Biology major and Chemistry Minor on the Pre-Medical Track. During her time at Hollins she has performed undergraduate research at NYU Langone Health and NC State University on projects related to HIV/SIV and Alzheimer's treatment and prevention. She has conducted independent research under Dr. Gentry and is currently president of the Pre-Medical Society at Hollins. Alayna is planning on taking a gap year and pursuing her master's in Biotechnology or Biomedical Ethics before continuing pursuit of her MD/PhD in the medical field.

Mary Rash, class of 2021, is a Chemistry major and Physics and Studio Art double minor. During her time at Hollins, she has been on the Dean's List and had the opportunity to research plant-based medicine under the direction of Dr. Derringer. She currently sits on the Hollins Activity Board as the Formal Events chair. Mary lives in Nottoway, VA and is planning to take a gap year before continuing with her graduate studies.

Hannah V. Schleupner, class of 2021, is pursuing a B.S. in Biology. She entered Hollins undecided as to her major, but eventually noticed herself approaching many disparate interests and classes with interconnections to biology in mind. Since Summer 2020, Hannah has been working on a literature review and project proposal as her senior thesis under the supervision of Dr. Mary Jane Carmichael. The proposed project aims to identify differences in gut microbial composition of adults with attention-deficit/hyperactivity disorder compared to healthy controls. After graduation, Hannah plans to work towards a career in the medical field.

Breanne Sharp, class of 2024, is working towards a Biology (B.S.) major with a minor in Environmental Studies. She is interested in zoonotic diseases, marine ecology, and conservation. She hopes to spend the upcoming January term in St. John participating in Caribbean Ecology research with Dr. Renee Godard and Dr. Morgan Wilson, post-Covid pandemic of course. In her spare time, she enjoys hiking, swimming, and fawning over her dog. Breanne hopes to go to graduate school to earn her PhD, followed by a career in research and a professorship.

Ellie Song, class of 2024, was extremely undecided as of late, but has recently chosen to major in English and to continue her pursuit of science - pathology and virology are of particular interest to her. She is from Los Angeles, California, where she finds she is able to indulge her love of spicy food and sushi. She can be found in Dana pestering Dr. Renee Godard with existential crises or trying to be the very best friend of Dr. Wilson's dog, Angus.

Keyazia D. Taylor, class of 2021, is a Chemistry major with a biochemistry concentration and a Physics minor. During her time at Hollins, she has made the Dean's List. She is a member of Hollins Varsity Basketball, Hollins Track & Field, and is a member of Chi Alpha Sigma. After graduation, she plans to attend a Master's program concentrated on Medical Sciences.

Jaclyn E. Ward, class of 2021, is a Chemistry major. During her time at Hollins, she has been on the dean's list. Working in the research lab she has worked on projects regarding the synthesis of fluorescent probes and a novel glycosylation method. She has had the opportunity to present the research she had been working on at a meeting of the Virginia Academy of Science and at the Rocky Mountain Regional meeting of the American Chemical Society. She has also received the James Lewis Howe award from the Blue Ridge section of the American Chemical Society.

Geneva Waynick, class of 2021, is a Biology major and Chemistry minor. Near the end of her sophomore year, she began working with Dr. Mary Jane Carmichael on researching the factors that influence the composition of the human oral microbiome. Though worldly circumstances have forced the project to morph over time, her experience researching orchid seed viability at the Atlanta Botanical Garden during J-Term 2020 solidified her desire to both complete the oral microbiome project as her senior thesis and to pursue research opportunities after graduation.

Science Seminar Speakers
(1957-2021)

1957-58	Dr. Michael Scriven, Swarthmore College
1958-59	Dr. Michael Scriven
1959-60	Dr. Kirtley Mather, Professor Emeritus of Geology, Harvard University
1960-61	Dr. Kirtley Mather
1961-62	No information available
1962-63	Dr. Milton D. Soffer, Professor of Chemistry, Smith College
1963-64	Dr. Henry Margenau, Physics, Yale University
1964-65	Dr. Ernst Nagel, Philosophy of Science, Columbia University
1965-66	Dr. Neil Miller, Psychology, Yale University
1966-67	No science seminar
1967-68	Dr. Andrew de Rocco, Theoretical Physics, University of Maryland
1968-69	Dr. I. J. Goode, Statistics, VPI & SU
1969-70	Dr. Peter Trower, Physics, VPI & SU
1970-71	Dr. John Cairns, Biology, VPI & SU
1971-72	Dr. Henry W. Morgan, Physics, Oak Ridge National Laboratory
1972-73	Dr. James Dumont, Biology, Oak Ridge National Laboratory
1973-74	Dr. Robert E. Lyle, Chemistry, UNH (Visiting Prof. at UVA)
1974-75	Dr. Robert Giles, Wildlife and Forestry Dept., VPI & SU
1975-76	Dr. Derek A. Davenport, Professor of Chemistry, Purdue University
1976-77	Anne Maher Matthews, Hollins ’68, Division of Public Health, U. Mass.
1977-78	Dr. Henry W. Morgan, Sr. Chemist, Oak Ridge National Laboratory
1978-79	Drs. Beatrice T. and R. Allen Gardner, Professors of Physiology, U. of Nevada
1979-80	Dr. Mary Beth Hatten, Hollins ’72, Asst. Professor of Pharmacology, NYU Medical Center
1980-81	Dr. Alan Goren, Chemistry, VPI & SU
1981-82	Dr. Bolling Farmer, Hollins ’70, Sr. Software Engineer, E-System, Dallas, TX
1982-83	Dr. Thomas Williams, Ocean View Veterinary Hospital, Pacific Grove, CA
1983-84	David E. Gushee, Chief, Environmental and Natural Resources Policy Division Congressional Research Service and Senior Specialist in Environmental Policy
1985-86	Dr. Dana Vardeman, Lab Supervisor, Stehlin Foundation for Cancer Research, Dr. R. Lowell Wine, Professor Emeritus, Statistics, Hollins University
1986-87	Dr. Michael Gazzaniga, Dept. of Neurology, NY Hospital, Cornell Medical Center, Southwestern
1987-88	Dr. Philip Tucker, Dept. of Microbiology, University of Texas Medical School
1988-89	Dr. Peter Anthony Cawood, Memorial University of Newfoundland *“Continental Drift and the Development of the Appalachian Mountains”*
1989-90	Dr. Neil Campbell, Biology, University of California at Riverside *“Science Education in the 1990’s: An Optimistic Forecast”*
1990-91	Dr. Doris Schattschneider, Professor of Mathematics, Moravian College *Visions of Symmetry: Mathematics in the Art of M.C. Escher”*
1991-92	Dr. Derek A. Davenport, Professor of Chemistry, Purdue University *“Early Vindication of the Rights of Woman Chemists”*
1992-93	Dr. Mary Kay Hemmenway, Dept. of Astronomy, University of Texas-Austin *“Results from the Hubble Space Telescope”*

1993-94	Dr. Kennan Marsh, Hollins '78, Abbott Labs, Illinois
1994-95	Dr. Elizabeth Brownlee Kolmstetter, Hollins'85, Industrial Psychologist, FBI
1995-96	Dr. Jerry Mohrig, Dept. of Chemistry, Carleton College *"Learning and Teaching: What's the Place for Undergraduate Research"*
1996-97	Brenda Wilson, Science Editor, National Public Radio
1997-98	Dr. Muriel Lederman, Associate Professor of Biology, Virginia Tech
1998-99	Dr. Jean Chin, MD, Hollins'72, New York, NY *"Health Issues of Importance to Young Women (especially STDs)" "Childbirth After Age 35" and "Breast Cancer and Genes"*
1999-00	Robert Hansen, Professor Emeritus, Computer Science, Hollins University
2000-01	Dr. Mary D. Ellison, Hollins '76, Dir. of Research, United Network for Organ Sharing, Richmond, VA
2001-02	Dr. Arlan Mantz, Oakes Ames Professor of Physics, Dept. of Physics and Astronomy, Connecticut College, New London, CT
2002-03	Col. Frank Borman, USAF, Retired *"The American Space Program"*
2003-04	Dr. David Bressoud, DeWitt Wallace Professor of Mathematics, Macalester College, St. Paul, Minnesota "Proofs and Confirmations: The Story of the Alternating Sign Matrix Conjecture"
2004-05	Dr. Kevin Shinpaugh, Director, Research and Cluster Computing, Virginia Tech *"System X: Virginia Tech's SuperComputer"*
2005-06	Dr. Bonnie Bowers, Associate Professor of Psychology, Dr. Randy Flory, Professor of Psychology, *"The Relative Effectiveness of Dim Green Light and Bright White Light for Treating Seasonal Affective Disorder"* And Dr. Erika Latty, Assistant Professor of Biology, *"Comparisons of the Biological Communities in Old-Growth and Previously Logged Forests"*
2006-07	Dr. Thomas A. Jenssen, Associate Professor, Department of Biological Sciences, Virginia Tech *"Infanticide in curly-tailed lizards: Selection to avoid eating your young"*
2007-08	Dr. Arthur M. Greene, Associate Research Scientist at Columbia University's International Research Institute for Climate and Society, Columbia University *"Applied Climate Research at the IRI: Intersection of Climate and Society"*
2008-09	Dr. David Mullins, Assistant Professor of Microbiology, Surgery and Human Immune Therapy, University of Virginia *"Immune Therapy in the Treatment of Metastatic Melanoma"*
2009-10	Dr. Larry Riddle, Professor of Mathematics, Agnes Scott College *"Pioneering Women in Mathematics"*
2010-11	Dr. Greg Morrisett, Professor of Computer Science, Harvard University *"RoboBees"*
2011-12	Dr. David Harrison, Virginia Tech Behavioral Neuroscience Laboratory, *"Emotion, the Angry, Hostile and Violent-Prone, A Functional Neural Systems Approach"*
2012-13	Dr. Sue A. Tolin, Professor Emerita Virginia Tech, *Viruses and Global Food Security"*
2013-14	Dr. Kennan Marsh, Director of Experimental Sciences, AbbVie formerly Abbott Laboratories, *"Neglected Tropical Disease Research: a new model for corporate citizenship"*
2014-15	Dr. Per Carlson, Royal Institute of Technology, *"Alfred Nobel and the Nobel Prizes"*
2015-16	Dr. Linda Powers, *Biomedical Engineering graduate faculty at the University of Arizona, "Sensors and Diagnostics for Microbial Health Hazards"*

2016-17	Dr. Talitha Washington, tenured Associate Professor of Mathematics at Howard University *"How Modeling Can Explain Our World"*
2017-18	Michelle Ferebee, NASA Langley Research Center, *"Women of NASA: Past, Present, and Future"*
2018-19	Suzanne E. Dorsey, Ph.D. Assistant Secretary, Maryland Department of the Environment, *"Touching Sea Turtles: Research collaboration and leadership in conservation"*
2019-20	CANCELLED due to COVID-19.
2020-21	Susan Campbell, Ph.D., Assistant Professor of Animal and Poultry Sciences at Virginia Tech, "Mechanism of Seizure Development: Switching Roles and Gut Feelings"