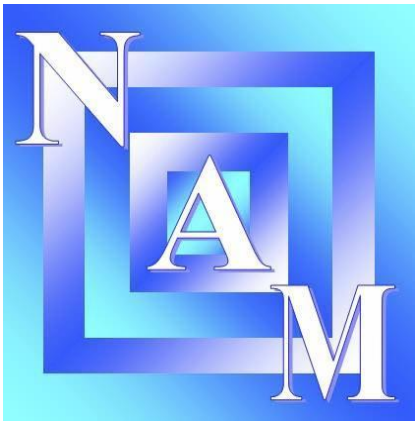
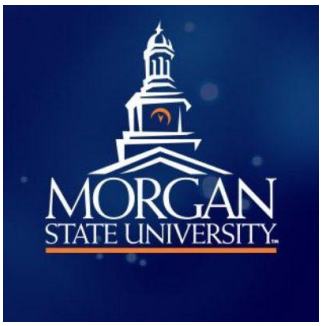
National Association of Mathematicians, Inc.





SIMONS FOUNDATION

AMS AMERICAN MATHEMATICAL SOCIETY

Undergraduate MATHFest XXXII

September 23-25, 2022
Morgan State University
https://www.nam-math.org/mathfest.html#XXXII

NAM Undergraduate MATHFest XXXII

The National Association of Mathematicians (NAM) is a non-profit professional organization in the mathematical sciences with membership open to all persons interested in the mission and purpose of NAM which are (1) promoting excellence in the mathematical sciences and (2) promoting the mathematical development of all underrepresented minorities. NAM was founded in 1969.

NAM's Undergraduate MATHFest is a three-day meeting, Friday through Sunday in the Fall, which rotates around the country based on NAM's regional structure. It is held annually to encourage students to pursue advanced degrees in mathematics and mathematics education. The conference is geared for undergraduates from Historically Black Colleges and Universities (HBCUs), although all are welcome to attend. The conference consists of five components:

Student Talks
There will be 9 talks given by undergraduate/graduate students. Each talk should be 20 minutes long, including 5 minutes for questions and answers. There will be a friendly competition for the *most outstanding oral presentation*.

Poster Presentations
Students will have the opportunity to present posters outlining their research. The Poster Session will take place Saturday afternoon from 4:00 PM—5:00 PM in Room 316 in the Student Center. There will be a friendly competition for the *most outstanding poster presentation*.

Graduate Fair
Graduate programs, REUs and employers will have an opportunity to showcase their programs and interact with undergraduate students in a one-hour fair. The Graduate Fair will take place Saturday afternoon from 4:00 PM - 5:00 PM Room 315 in the Student Center.

Problem Time
Throughout the conference, students will be presented with challenge problems. Students with correct solutions will be awarded prizes.

The J. Ernest Wilkins Lecture
This is an hour-long talk, given by an established researcher, to motivate our undergraduates to continue to pursue research in the mathematical sciences. This year's Wilkins Lecturer is Professor Akil Parker (All This Math). His talk will be held with Dinner on Friday from 4:00 PM—6:00 PM in Ballroom C of the Student Center.

Visit www.nam-math.org to learn about the other annual programs and meetings that NAM sponsors.

Which MathFest Came First?

NAM's Undergraduate MATHFest began in 1991, and it inspired other similar undergraduate-focused conferences over the years.

- The Mathematical Association of America (MAA) MathFest began in 1997, with a meeting in Atlanta, Georgia. According to Zitarelli:

  > A historic change for MAA national meetings took place in 1996 when the AMS voted to disband its summer gatherings. The MAA decided to continue alone, adopting the name "MathFest" starting in 1997, and has sponsored this meeting every summer since then.

- The American Statistical Association (ASA) StatFest began in 2001, with a meeting on November 1, 2001 at Spelman College.
- The National Math Festival, a biennial conference which began in 2015, was originally slated to be called "MathFest."

Welcome to NAM's Undergraduate MATHFest XXXII!

This is the 32nd annual conference for NAM. We have 112 participants from 45 institutions:

- American Mathematical Society
- American University
- Boston University
- Caesar Rodney High School
- Carnegie Mellon University
- Centre College
- Clark Atlanta University
- Clemson University
- Delaware State University
- Dillard University
- Elizabeth City State University
- Georgia Gwinnett College
- Georgia Institute of Technology
- Howard University
- Iowa State University
- Johns Hopkins University
- Montana State University
- Morehouse College
- Morgan State University
- North Carolina A&T State University
- North Carolina State University
- Occidental College
- Pacific Northwest National Labs
- Phillips Exeter Academy
- Purdue University
- San Francisco State University
- Sonoma State University
- Southern University and A & M College
- Spelman College
- St. Mary's College of Maryland
- Stanford University
- Texas Southern University
- US Department of Defense
- University of California - Irvine
- University of California - Riverside
- University of the District of Columbia
- University of Florida
- University of Louisiana at Lafayette
- University of Michigan
- University of Mississippi
- University of Portland
- Virginia Commonwealth University
- Wake Forest University
- Washington & Lee University
- West Virginia University

This weekend, you are in for a treat. You'll have the opportunity to meet people from HBCUs, HSIs, PWIs, Research I Universities, and Liberal Arts Colleges. (If you don't know what any of these mean, this is a hint to use this conference to find out) You'll have the opportunity to learn some interesting mathematics, hear some great talks, and solve some challenging problems.

We are especially grateful for the hard work of the Morgan State University Local Organizing Committee, including: **Asamoah Nkwanta, Jemal Mohammed-Awel, Michelle Rockward, Guoping Zhang, Ahlam Tannouri, Patrick Wenkanaab, Guven Yilmaz, Charlita Woodruff-White and Jamyra Tingle-Baltimore;** as well as **the NAM Programming Committee members: Shea Burns, Aris Winger, Cory Colbert, Nathan Alexander, Brett Jefferson, and Leon Woodson** for your creative problem solving and your dedication to making this event great! If you see any of these good people around, be sure to thank them as well.

Enjoy MATHFest!

Omayra Ortega

President, National Association of Mathematicians, Inc.

Conference Schedule

(All times are Eastern Time. All activities are held in Morgan State University Student Center Ballroom C.)

Friday September 23	
12:00—4:00 PM **12:00—2:30 PM** **12:30—1:30PM**	Registration Check In and Badge Pickup Shuttle Service from Sheraton Baltimore North to Morgan State University Light Refreshments
1:45—2:10 PM	**Welcome** Dr. Omayra Ortega, President, National Association of Mathematicians Dr. Asamoah Nkwanta, Chairperson, Morgan State University
2:10—2:40 PM	Memorial for Dr. Abdul-Aziz Yakubu
2:40—2:45 PM	**Break**
2:45 —3:15 PM	**Student Talk 1** Quindel Jones-Virginia Commonwealth University *An ODE model for predicting pediatric patient pain in SCD based on patient sleep data*
3:15—3:45 PM	**Student Talk 2** Ryan Knight –St. Mary's College of Maryland *Detecting Local Moves With Knot Invariants*
3:45—4:00 PM	**Break**

4:00—6:00 PM	**J. Ernest Wilkins Lecture and Dinner** Professor Akil Parker All This Math, LLC. *HBCU Students as Math Ambassadors to the Black Community* Moderator: Dr. Omayra Ortega, President, National Association of Mathematicians
6:00—7:00 PM **7:00—7:30 PM**	Reception Shuttle Returns to Sheraton Baltimore North
Saturday **September 24**	
7:30—8:15 AM **8:00—9:00 AM** **8:30—11:00 AM**	Shuttle Service from Sheraton Baltimore North to Morgan State University Breakfast Buffet – Ballroom Registration -Ballroom
9:00—9:30 AM	**Student Talk 3** Winter Jones, Spelman College *A Choice to Build a Rocket: An Experiment with Paraffins*
9:30—10:00 AM	**Student Talk 4** Alexis Guevara, Occidental College Amelia Threatt, Occidental College *Numerical Investigations of Nonlinear First-Order Ordinary Differential Equations*
10:00—10:30 AM	**Break**

10:30—11:00 AM	**Student Talk 5** Kelsi Anderson, St. Mary's College of Maryland *The Safety Net Problem*
11:00—11:30 AM	**Student Talk 6** Janiah Kyle, Spelman College *Malaria Early Warning System*
11:30 AM—12:00 PM	**Student Talk 7** Salvador Ochoa Zavalza, Sonoma State University *Applications of Time Scales Calculus; The Maximum Likelihood Estimator & The Kalman Filter with Exponential Weighting*
12:00—1:00 PM	**Problem Time with Dr. Cooper – Round One** Dr. Duane Cooper, Morehouse College **Box Lunch - Ballroom**
1:00—1:30 PM	**Student Talk 8** Tiffani Clark, University of Louisiana at Lafayette Sophia Fogle, Centre College Kimani Daley, St. Mary's College of Maryland *Modeling Oysters Populations for Improving Restoration Efforts in the Chesapeake Bay*
1:30—2:00 PM	**Student Talk 9** Kimberly Hadaway, Iowa State University *Enumerating Unit Interval Parking Functions*

2:00—2:10 PM	**Break- Snacks**
2:10—3:00 PM	**Graduate School Panel (Students Only)-Ballroom** *The Graduate School Experience* **Faculty Networking- Room 316**
3:00—3:30 PM	**Problem Time with Dr. Cooper – Round Two** Dr. Duane Cooper, Morehouse College
3:30—4:00 PM	**Group Photo**
4:00—5:00 PM	**Graduate Fair-Room 315** **Student Poster Session- Room 316**
5:00—5:30 PM	**Break**
5:30—7:00 PM	**NAM Appreciation Dinner-Ballroom** **Awards Ceremony for Oral and Poster Presentations**
6:30—7:30 PM	**Shuttle to Sheraton Baltimore North from Morgan State University**
Sunday September 25	
8:30—9:15 AM **9:00—10:00 AM**	**Shuttle Service from Sheraton Baltimore North to Morgan State University** **Continental Breakfast**

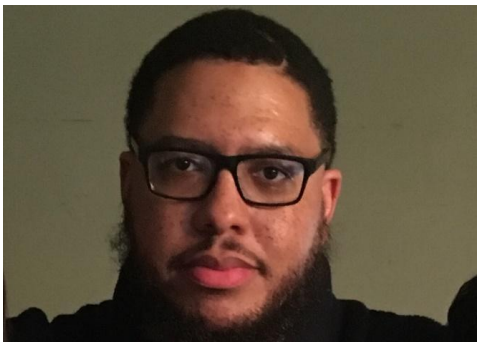
10:00—10:30 AM	**Problem Time with Dr. Cooper – Round Three** Dr. Duane Cooper, Morehouse College
10:30—10:45 AM	**Break**
10:45 AM—12:45 PM **10:45 AM—12:00 PM**	**Bag Lunch*- Ballroom** **Faculty & Student Networking**
12:00—1:00 PM	**Problem Time with Dr. Cooper Awards** **Closing Remarks**
1:00—1:30 PM	**Shuttle to Baltimore Penn Station and BWI Airport** ***Shuttle to Penn Station and BWI at 11am**

J. Ernest Wilkins Lecture

Jesse Ernest Wilkins, Jr.

The J. Ernest Wilkins Lecture series was inaugurated in 1994 during NAM's Undergraduate MATHFest IV at North Carolina A&T. It is named in honor of Jesse Ernest Wilkins, Jr. (November 27, 1923 – May 12, 2011), an internationally recognized nuclear scientist, mechanical engineer and mathematician.

J. Ernest Wilkins was known in the press as the "Negro Genius." Wilkins received his B.S. degree as a Phi Beta Kappa graduate at the age of 16, his M.S. degree at age 17, and his Ph.D. degree at the age of 19. Although he has been highly praised as a superb practitioner of his crafts, Wilkins is also widely recognized and acclaimed as a highly productive scholar, having published more than 80 journal articles and having produced an additional 22 unpublished reports for the Atomic Energy Commission. Wilkins is the only African American mathematician-engineer elected as a Fellow to the National Academy of Engineering (NAE). The inaugural lecture was given by Wilkins himself. The Lecture is to be given annually at the Undergraduate MATHFest, a conference for which Wilkins was a frequent attendee.



Professor Akil Parker
All This Math, LLC.

HBCU Students as Math Ambassadors to the Black Community

Akil Parker is a Black man playing his part by teaching mathematics in the Black community. He has been a mathematics teacher for 17 years in Philadelphia. Currently he serves as an adjunct professor at this country's first HBCU, Cheyney University where he teaches math courses. He is also founder and CEO of the educational services company, All This Math, LLC. Through All This Math he provides private math tutoring, educational consulting, teacher coaching and free online math instructional content via YouTube. He will soon be publishing his first book entitled 'Why All This Math?' which is a simplified guidebook parents can use to teach fundamental math skills to their children in the home, car or wherever they may be. Raised in Baltimore, MD, Mr. Parker attended Roland Park Elementary/Middle School before attending Baltimore Polytechnic Institute for high school. He later earned a bachelor's degree in Finance from Morgan State University and later a Master's Degree in Educational Leadership from Lincoln University while serving as a teacher in Philadelphia, PA.. He is a father of three children and lives in Philadelphia, PA where his company All This Math, LLC is based. He has committed himself to improving the Black community by way of mathematics education.

Student Oral Presentation Abstracts

Friday, September 23

- 2:45 PM—3:15 PM **Quindel Jones (Virginia Commonwealth University)**

  An ODE model for predicting pediatric patient pain in SCD based on patient sleep data

  Sickle Cell Disease (SCD) is a family of genetic blood disorders that affects over 20 million people worldwide, whose prevalent complication is pain. Pain crises in SCD are strongly linked to mortality morbidity and increased medical costs. The study in Valrie et al. 2019 revealed a correlation between sleep and pain using actigraphy and patient reported -sleep quality and pain in 88 pediatric SCD patients and we use this data to inform our model. Our model reflects that sickle cell pain in childhood presents differently than adulthood, without chronic pain, and that poor sleep quality is correlated with increased SCD pain. In this study, we investigate this sleep pain connection using mathematical tools that incorporate a dynamical systems approach. Based on the results in Clifton et al 2017 and Yang et al 2019, we created an ordinary ODE model for predicting subjective pediatric patient SCD pain levels based on patient data. Our initial model fit of the patient data had significant discrepancies but was improved by statistical parameter estimation for each patient. We then refined the model by incorporating accumulating time windows into the predictive component of the model via machine learning techniques. Our model aims to be a warning system for upcoming pain events for pediatric SCD patients, given the proper pain and sleep data. This is advantageous in the digital age as noninvasive monitoring will allow physicians to treat chronic pain in patients anywhere based on personalized, data-driven recommendations.

- 3:15 PM—3:45 PM **Ryan Knight (St. Mary's College of Maryland)**

  Detecting Local Moves With Knot Invariants

  We examine invariants for mathematical knots and how they aid in identifying local changes to knot diagrams. In particular, we look at the Delta Move using the Jones Polynomial and then find the HOMFLYPT Polynomial that generalizes this result. We note the challenges we face once we turn to the Double Delta Move. Finally, we show how, in understanding the calculation of the Jones Polynomial of diagrams, we may begin to simplify the calculation of the HOMFLYPT Polynomial for knot diagrams that differ by the Double Delta Move.

Saturday, September 24

- 9:00 AM—9:30 AM **Winter Jones (Spelman College)**

  A Choice to Build a Rocket: An Experiment with Paraffins

  This presentation covers the efforts to demonstrate paraffin wax's capabilities as rocket fuel. The research began in 2016, with experimentation on the combustion of different types of paraffin wax in a vacuum space. In 2021, it was found that there was correlation to Boyle's Law and Charles's Law. Other variables were inconclusive. There has since been a pivot to building a paraffin fueled rocket engine.

- 9:30 AM—10:00 AM **Alexis Guevara and Amelia Threatt (Occidental College)**

  Numerical Investigations of Nonlinear First Order Ordinary Differential Equations

  Since many real-world phenomena such as population change can be modeled through nonlinear ordinary differential equations, our team investigated numerical schemes for solutions of nonlinear first-order Ordinary Differential Equations. We compare Non-Standard Finite Differences (NSFDs) derived from non-local approximations to unity approximations of Standard Finite Difference methods (SFDs) like Euler's scheme to show that NSFD approximations have less error than standard methods. We applied many NSFD unity approximations to cubic decay equations $u'=-u^3 + F(u)$, where $F(u) = 0, u^2, u^3$. We were successful in creating NSFD schemes for the cubic decay, Bernoulli, and combustion equations. Our investigation came to an end while looking for an NSFD for the Bratu initial value problem. For the Bratu IVP we were successful in finding an NSFD scheme for it as a 2D system.

- 10:30 AM—11:00 AM **Kelsi Anderson (St. Mary's College of Maryland)**

  The Safety Net Problem

  The Safety Net Problem, coined by myself and the members of my research team, asks the following question: If given an arbitrarily weighted grid graph, G, and a set of vertices, R, that we will further refer to as "required" vertices, what is the most efficient way to draw a low-cost path that connects every vertex but, if a random edge is deleted, would ensure that any required vertex would still have a path to get to every other required vertex? My team and I worked on two approaches to solve this problem. Our first approach, which we called "MST first," was to find the minimum spanning tree (MST) of our grid graph first, then we used a variation of Dijkstra's algorithm to establish a hamiltonian cycle to connect our required nodes without the edges from our MST. Our second approach, which we called "Path's first," was to find distinct paths between our required nodes first, represent those paths as one singular component (S), reform the graph with our new component (S), and then take the MST of the reformed graph. We

came to the conclusion that the approach that is more efficient depends on the graph, and at this time we do not have a complete solution.

- 11:00 AM—11:30 AM **Janiah Kyle (Spelman College)**

  Malaria Early Warning System

  As one of the oldest known diseases to inflict humanity (since the Agricultural Revolution about 12,000 years ago), malaria has proven to be a significant global challenge. Many intervention strategies have been undertaken in the last few decades such as widespread ITN/LLIN and IRS use and yet even with great success, malaria continues to be a ravaging disease requiring inventive solutions. In this study, a malaria early warning system is developed which utilizes an adapted Ross-MacDonald model to assess individual risk and disease epidemiology. Strategies for achieving a disease-free equilibrium state are also shown by performing local asymptotic stability analysis. The stages of the mosquito life cycle are highly influenced by weather conditions, both in the aquatic and adult stages, as well as the use of insecticides (either through ITN/LLIN use or via IRS), therefore, we consider regional data parameters, such as weather conditions, parasite rate and resistance, to estimate deviated risk from the baseline, with the final product being a progressive web application (i.e. a mobile app). Such a product has widespread application primarily in holoendemic areas in Africa to inform both native and tourist populations of their relative risk.

- 11:30 AM—12:00 PM **Salvador Ochoa Zavalza (Sonoma State University)**

  The Kalman filter with exponential weighting & the Maximum likelihood estimation on time scales

  When developing a probabilistic model for independently-sampled data, good estimates for the parameters of the potential models are critical. One method for finding good estimates is the maximum likelihood estimator (MLE), which uses calculus techniques to maximize the probability of obtaining the observed data for varying values of the underlying parameter. When a classical exponential model is under consideration, the (unbiased) MLE estimator is given by $\lambda = 1$. For geometric random variables, the estimator $p = 1$ is used as $x^{-}x^{-}$well. Time scales-closed subsets of the real line-have recently arisen and provide a means to understand these classical distributions as special cases of more general distributions on time scales. So, while the classical exponential distribution is valued on R+, and the geometric distribution on N, both can be seen as special cases of a more general “time scales exponential” distribution. We find general formulas for the maximum likelihood estimators (MLEs) for the parameters of the time scale exponential and time scales uniform distributions and see how their MLEs compare both algebraically and computationally to the MLEs of the classical distributions.

- 1:00 PM—1:30 PM **Tiffani Clark (University of Louisiana at Lafayette), Sophia Fogle (Centre College) and Kimani Daley (St. Mary's College of Maryland)**

  Modeling Oysters Populations for Improving Restoration Efforts in the Chesapeake Bay

  Native Oysters are an integral component of the Chesapeake Bay's ecosystem. Oysters filter excess sediment and phytoplankton out of the water and the reef structures they build provide habitat to many species of fish. However, only about 1-2 percent of the historic native oyster population remains in the Bay. Restoration efforts seek to rebuild these reef structures. Our research utilized systems of ordinary differential equations to model the change in oyster reefs over time. By utilizing pre-existing models representing the change in oyster population and habitat over time, we sought to find a threshold for habitat loss in a moratorium. Additionally, a mortality term was added to the pre-existing models that represented the relationship between habitat abundance and the mortality rate of oysters. These more detailed mathematical models will be used to improve the long-term restoration efforts to the Chesapeake Bay's ecosystem.

- 1:30 PM—2:00 PM **Kimberly Hadaway (Iowa State University)**

  Enumerating Unit Interval Parking Functions

  In 1966, Alan G. Konheim and Benjamin Weiss defined "parking functions" as follows: We have a one-way, one-lane street with n parking spaces, numbered in consecutive order from 1 to n, and we have n cars in line waiting to park. Each driver has a favorite (not necessarily distinct) parking spot, which we call its preference. We order these preferences in a preference vector. As each car parks, it drives to its preferred spot. If that spot is open, the car parks there; if not, it parks in the next available spot. If a preference vector allows all cars to park, we call it a parking function. In 1974, Henry O. Pollak proved the total number of parking functions of length n, meaning there are n parking spots and n cars, to be (n+1)^{n-1}. In this presentation, we describe a recursive formula and explicit formula for classical parking functions, define and explicitly enumerate interval parking functions, and define unit interval parking functions (proposed by Dr. Shanise Walker, University of Wisconsin-Eau Claire) before enumerating them via a bijection with Fubini rankings. We conclude with a discussion of other parking function generalizations.

Student Poster Abstracts

The Poster Session is Saturday, September 24, 4:00--5:00 PM in Room 316

1. Hunter Shepard (Southern University and A&M College)

Characteristics of Orthogonal Projection to Global Positioning System (GPS)

The purpose of this research was to find the orthogonal projection in relation to Global Positioning System (GPS). An orthographic projection is a process of prediction in which an object is characterized or surface mapped using parallel lines to project its shape onto a plane. In this research an orthographic projection method was used to project a three-dimensional plane in two measurements. Orthographic projection is a type of equal projection, where all the projection lines are symmetrical to the projection plane, bringing about each plane of the scene showing up in relative change on the review surface. The orthographic projection method was used to arrange the framework and the information on a level surface. Numerical figures were utilized to change over to arrange the framework to utilize the GPS. These projections help to navigate the coordinates of the GPS.

2. Amber C Hickman (Southern University and A&M College)

Louisiana Standardized Test Scores and its Effects on Education Attainment for Minority Learners

The purpose of this work is to observe the mathematics and science LEAP Test scores of students from sixth to twelfth grade and draw conclusions based on concrete data retrieved from the Louisiana Department of Education. Louisiana is the last state in education which can be observed by the creative mind that is unbound by systematic teaching styles and the socioeconomic status of the students (NAEP 2019). Interpreting the data, one must also consider the circumstances of life and both the physical and mental development of each age, as well as opportunity and propensity factors (Byrnes and Miller 2007). There are so many components to be examined when accounting for the test scores of the youth. Aside from studying student's raw intelligence, we should also examine the competency of the test and the judgment of students' gained intelligence based on standardized tests such as LEAP.

3. Brandon Causing (University of Florida)

Pandemic vs. Epidemic: A Statistical and Spatial Analysis of the Relationship Between HIV and Socioeconomic Indicators With Respect to COVID-19

In 2020, the introduction of the coronavirus disease (COVID-19), an infection caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), to the United States had greatly impacted social interactions and the economic sphere, as substantial amounts of public health efforts have gone towards fighting the pandemic. This combat continues to complicate already existing public health issues, one of which is the human immunodeficiency virus (HIV) epidemic, but little research seeks to confirm the significance of the effect. The current study employs regression modeling to investigate the statistical relationship between state-level HIV rates and COVID-19 rates in conjunction with select socioeconomic measurements described by previous literature to be greatly related to the prevalence of HIV. Moreover, the study explores the correlation of HIV and COVID-19 rates between states from a spatially analytic perspective by observing the geographic clusters of the two viruses. Results suggest that COVID-19 rates are important in predicting HIV rates, the considered socioeconomic factors are confirmed to be highly associated with HIV, and rates of both HIV and COVID-19 display strong evidence of the existence of regional trends, all of which indicate that the COVID-19 pandemic has indeed significantly contributed to reports of HIV prevalence.

4. Dirk Antony Tolson III (Sonoma State University)

Red-tide Foam Analysis at the Santa Cruz Wharf in Monterey Bay, California

In the study of oceanography, red-tide foams have had many effects on coastal areas. Red tides are discolorations of the water typically caused by dinoflagellates, and many of these produce Harmful Algae Blooms (HABs). A common characteristic of red tides are the production of foam, which provides a mechanism for aerosolization or direct contact with algal chemicals, including toxins. There are certain toxins like brevetoxin, domoic acid, and okadaic acid that are produced when red-tide foam events occur and this can cause some detrimental effects to the environment and the animals in the ecosystem during and after the red-tide event. We ask the question “Is there a statistical correlation with pollutants and red-tide foams, determined using remote sensing?” There are possible events and variables that can help with predictions of red-tide and create changes to stop the red-tide events from happening. We look into the red-tide foam events from March 2019, August 2020, and August 2021 and look at Chlorophyll, Sea Surface Temperature, Absorption of Phytoplankton, and Carbon as our main variables of interest. With the collection of data over the years, it is possible to create statistical tests and a statistical model in order to identify interactions and correlations of these variables and parameters. Therefore, we can statistically identify if there are certain conditions that lead to foam events. Remote sensing can help with

identifying in space and time which areas experience the most of the red-tide foam events, and the data can be used to identify underlying patterns.

5. Dissandou Becolli (Phillips Exeter Academy)

The Evolution of Trust

An applet titled “The Evolution of Trust” (https://ncase.me/trust/) analyzes a prisoner’s dilemma type of game by investigating different fixed strategies to that game and how their players interact with one another in an iterated, evolutionary setting through simulation. I want to explain my reflections about - (1) what happens when miscommunication is involved in the evolutionary tournament and (2) which strategies tend to win and whether the answer to this mathematical question can turn out to justify moral and philosophical statements pertaining to self-interest. In the former I will explore intersections with sociology and in the latter, philosophy’s intersection with mathematics (Ethics <-> Game Theory).

6. Serina Cabrera (Sonoma State University)

SEAIRV Model for COVID-19 for Sonoma State University

A simplified differential equations-based model for Covid-19 infection on a closed population of students, faculty, and staff at Sonoma State University (SSU) in Rohnert Park, CA is proposed. Positive cases at SSU were tracked and a visualization of the prevalence of Covid-19 over the Fall semester was created. An SEAIRV model which includes both vaccinated and unvaccinated individuals, as well as, asymptomatically and symptomatically infected individuals is proposed. Simulations were conducted in R to explore the effectiveness of higher or lower vaccine uptake in the SSU community. Continued use of masks and social distancing is recommended and increasing the proportion of vaccinated individuals on campus to 100%, which is a stated goal of the university, would serve to reduce the total number of cases in the population.

Graduate Fair Exhibitors

The Graduate Fair is Saturday, September 24, 4:00—5:00 PM, Room 315

American Mathematical Society
Dezmarie Doyle
ded@ams.org

Montana State University
Ryan Grady
Ryan.grady1@montana.edu

Morgan State University
Asamoah Nkwanta
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San Francisco State University
Luella Fu
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University of California Irvine
Adam Marks
ajmarks@uci.edu

University of Florida, Department of Mathematics
Miklos Bona, Chair of Graduate Admissions Committee
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https://math.ufl.edu/graduate-studies-in-mathematics/

University of Michigan
Ben Hansen
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West Virginia University
Cory Hood
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Wake Forest University
John Gemmer
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Thank You

We thank Morgan State University, The Simons Foundation, and
The American Mathematical Society (AMS) for their support of NAM MATHFest XXXII.

Previous NAM Undergraduate MATHFests

- MATHFEST XXXII: October 1-October 2, 2021 (Virtual)
- MATHFest XXX: October 9 - October 10, 2020 (Virtual)
- MATHFest XXIX: September 27 - September 29, 2019 at Southern University of New Orleans (Region A)
- MATHFest XXVIII: September 28 - September 30, 2018 at Spelman College (Region A)
- MATHFest XXVII: September 29 - October 1, 2017 at Medgar Evers College (Region B)
- MATHFest XXVI: November 10-12, 2016 at Morgan State University (Region B)
- MATHFest XXV: October 29-31, 2015 at Morgan State University (Region B)
- MATHFest XXIV: Cancelled
- MATHFest XXIII: November 8-9, 2013 at Texas State University (Region C)
- MATHFest XXII: November 1-3, 2012 at Morgan State University (Region B)
- MATHFest XXI: November 3-5, 2011 at Dillard University (Region C)
- MATHFest XX: November 18-20, 2010 at Miami Dade College (Region A)
- MATHFest XIX: November 12-14, 2009 at the University of District of Columbia (Region B)
- MATHFest XVIII: November 13-15, 2008 at Texas Southern University (Region C)
- MATHFest XVII: November 8-10, 2007 at Spelman College (Region A)
- MATHFest XVI: November 9-11, 2006 at Howard University (Region B)
- MATHFest XV: November 10-12, 2005 at Texas Southern University (Region C)
- MATHFest XIV: October 7-9, 2004 at Morehouse College (Region A)
- MATHFest XIII: October 20 - November 1, 2003 at Delaware Statue University (Region B)
- MATHFest XII: October 2002 at Southern University of New Orleans (Region C)
- MATHFest XI: October 4-6, 2001 at Florida A&M (Region A)
- MATHFest X: October 26-28, 2000 at Morgan State University (Region B)
- MATHFest IX: October 21-23, 1999 at Texas Southern University (Region C)
- MATHFest VIII: October 21-23, 1998 at Benedict College (Region A)
- MATHFest VII: October 23-25, 1997 at Elizabeth City State University (Region B)
- MATHFest VI: October 24-26, 1996 at Xavier University (Region C)
- MATHFest V: October 26-28, 1995 at Clark Atlanta (Region A)
- MATHFest IV: October 13-15, 1994 at North Carolina A&T (Region B)
- MATHFest III: October 21-23, 1993 at Southern University (Region C)
- MATHFest II: March 18-20, 1993 at Spelman College (Region A)
- MATHFest I: November 1991 at Hampton University (Region B)