

Mathematics Department Newsletter

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Departmental Initiatives and Events Fall 2022 – Spring 2024

49th and 50th Annual Math Tournaments



(Left to right: Student Panelists TJ Sabau, Jeremy Maddox, Jacob Chardos, Felicity Acosta)

Since our last newsletter, the Math Department has hosted two annual CSU Math Tournaments. These two events could not have been much different, as the first, held in March 2023, was conducted entirely online, with

schools competing as teams on an extremely challenging test dispersed in three parts. This line format was adopted in 2021 as we all remained distanced, following a successful in-person event in early March of 2020 (just prior to the COVID-19 shutdown). While the tournament continued to draw in around ten schools from the Columbus and surrounding areas, reaching roughly 100 high school students each year it was conducted virtually, we transitioned back to in-person for our 2024 competition.

On March 9, 2024 several schools gathered with us on campus for the 50th Annual CSU Mathematics Tournament. The roughly 50 students in attendance competed individually on a 50-question test and in two-person teams during a lively ciphering session that afternoon.



(Left to right: Dr. Guihong Fan, Dr. Kristin Lilly, Ms. Elizabeth McInnis, and Dr. Yarber-Allen)

In the middle of the day, the high schoolers were treated to a CSU Student/Recent Graduate Panel. The panel was comprised of Math Major students Felicity Acosta (senior), Jacob Chardos (freshman), and Jeremy Maddox (senior), along with Data Scientist Minor (and current Data Scientist) TJ Sabau, who graduated in Spring of 2023 (see feature on the back page). These students spoke warmly of their experiences at CSU and in the Math Department, and shared meaningful advice with the high school student audience as they prepare for college.

The Math Department and other volunteers came together to welcome these competitors and provide a meaningful experience for them as they grow in their mathematical skills. Everyone was excited to be a part of this milestone 50th anniversary event, and we look forward to carrying the tradition on for many years to come.

Affordable Learning Georgia Grant Awarded to Dr. Ben Kamau and Dr. Nehal Shukla

In 2022, Dr. Ben Kamau and Dr. Nehal Shukla co-authored a grant proposal for Affordable Learning Georgia grants to support a Calculus Course redesign project. This proposal was funded for 2022-2023 at \$10,800. The project aims included identifying and promoting factors of student success via Project-based and Activity-based learning. They expanded the set of learning activities in two sections each of Calculus I offered in Fall 2022, Spring 2023, and Summer 2023 to include Calculus labs, Pre-Project, Post Project and problem/activity sessions. The redesign included creating and uploading OER (flexibility and (online) availability of free resources like class notes, videos, PPT, Practice Problems) in the CSU Learning Management System D2L. The project was successfully implemented in class in Fall of 2023 on two Calculus I sections, one face-to-face and the other online. Creation of these free resources involves a tremendous amount of effort and time, and benefits students directly with lowered/free course materials.

Math Connections: Math Games

What do Prime Club, Charty Party, Poker, Set, Murdle, Uno, Pentominoes, KenKen, Nerdle, Knights & Knaves, Sprouts, Nertz, Calico, and Hyperjumps have in



(Image: Students playing a Graph Theory Game in Spring 2023)

common? Aside from being tons of fun, they are all games that involve some level of mathematical reasoning. For the past two years, the Math Department has hosted bi-monthly Math Games events, open to all students. While math majors may be interested in these events as a way to build community with others in their area and play games related to their chosen focus of study, non-STEM students will find a relaxed and casual environment in which to ease a possibly fraught relationship with mathematics. These events are scheduled on a semesterly basis, and heavily advertised throughout the Math Department, so keep an eye out for dates, times, and games we'll be playing! Typically, we meet every other Thursday from 12:30pm to 1:20pm in University Hall, room 250. If you have any questions or suggestions of math or math-adjacent games, please reach out to Liz McInnis at mcinnis_elizabeth1@columbusstate.edu.

William Lowell Putnam Exam



(Image: Ari Betan-Snook, Thomas Merino, Felicity Acosta, Andrew Hardy, & Brady Hampel, during a Fall 2023 Putnam Exam training session)

Two students, Brady Hampel and Thomas Merino, took the 2022 Putnam Exam, and 6 students (pictured above), and Jonathan Dispain (not pictured) took the 2023 exam. The team performed admirably both years but slightly better in 2023. Dr. Ionascu has graded for Putnam each of the past 3 years. Of this work, he says, "It is an interesting experience since it is online now and you get to interact with 100 other graders". These faculty graders work diligently to review the submissions over the course of two months in the winter. Additionally, Thomas Merino and Dr. Ionascu worked together on a paper inspired by one of the questions on a recent Putnam Exam. The paper is currently being peer-reviewed. Training sessions for the Putnam Exam, usually held Friday afternoons, will resume in Fall 2024, please email Dr. Ionascu at ionascu_eugen@columbusstate.edu for more information.

Student Highlights and Achievements

Data Science Updates Recent Internships

- TJ Sabau - Internship, "Data Visualization on Enrollment Numbers, Predicting Enrollment for Future Semesters, Identify Factors Influencing Retention and Progression Among CSU Students," (January 2022 - May 2022).
- Selina Budde - Internship, "Investigating Correlation Among Different Type of Students (Drop out, Changing Major, Student Type, Age) Statistically and with Data Visualizations.," (January 2022 - May 2022).
- Kiera King - Internship, "Investigating Business College Students Changes in Major, Status, Time to Graduate," (January 2022 - May 2022).
- TJ Sabau - Internship, "Identifying the Target Market and Population of CSU Students for Marketing Purposes," (August 2022 - December 2022).
- Rick Rodgers - Internship, "Analyzing Drop Out and Major Switches in the CSU Student Population," (August 2022 - December 2022).
- Manav Kotharia - Internship, "Identifying the Target Market and Population of CSU Students for Marketing Purposes," (August 2022 - December 2022).
- Angelica Tellez - Internship, "Foundations Office Internship," (January 2023 - May 2023).
- Alexander Swan - Internship, "CSU Applicant Precursor Tool," (January 2023 - May 2023).
- Justin Ludwig - Internship, "Prediction Student Drop Out Rates & Enrollment Trends," (August 2023 - December 2023).
- Michael Cotte - Internship, "Ongoing w/ Institutional Research," (January 2024 - May 2024).
- Katty Gomez - **External Internship**, "Ongoing w/ Battle Maneuver Lab at Fort Moore," (January 2024 - May 2024).
- Katherine Villapudua - Internship, "Ongoing w/ Foundations Office," (January 2024 - May 2024).
- Jonathan Dispain - Internship, "Ongoing w/ Enrollment Management," (January 2024 - May 2024).

Projects from Project Courses

- Justin Ludwig- Supervised Research, "Columbus Fire & Emergency Medical Services Data Dashboard," (August 2022 - December 2022)

Publications

- Tower Day 2022- Budde, S. (Author Only), King, K. (Presenter & Author), Lamorte, M. (Author Only), Lilly, K. L. (Other), Tower Day, "The Effects of Geography and Demographics on Financial Literacy," Columbus State University
- Tower Day 2023- Ludwig, J. (Presenter & Author), Seamon Lilly, K. L. (Author Only), Tower Day, "Data Analysis of Columbus Fire Department Call and Incident Logs," Columbus State University

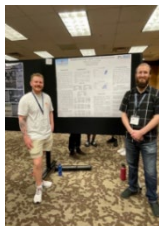
PIC Math Success- Troy University Presentation

"Multivariable Analysis on Popular Drugs" was presented by Anterious D. Ridley and Quynh La at CSU Tower Day in April 2023 as well as at MathFest Troy University in Troy, AL, funded by an SRACE grant. Supervised by Dr. Nehal Shukla.



Left to right: Quynh La and Anterious D. Ridley (Troy University MathFest)

"Variables Relating to Sports Teams Win/Loss Ratio" was presented by Gabriel K. William and Justin Ludwig at CSU Tower Day in April 2023. Gabriel presented their project at MathFest Troy University as well, funded by a successful SRACE grant for undergraduate research. Supervised by Dr. Nehal Shukla.



Left to right: Gabriel K. William and Justin Ludwig (CSU Tower Day)

Additional Research Done with Undergraduates

Mathematics student, Kayleen Linge, worked under the supervision of Dr. Carlos Almada on a Student Research and Creative Endeavors (SRACE) grant on the project "General Relativity: A Mathematical Overview" and presented her work at the 2023 Tower Day conference at CSU.

Dr. Almada also worked with the following students on the construction of the real numbers using Dedekind Cuts in Fall 2023: Kyler Wehrenberg, Ben Garret, Andy Hard, Felicity Acosta, and Emily Price.

At Tower Day 2024, Felicity Acosta presented her work with Ms. Liz McInnis on "Tiling Generalized Peterson Graphs with Cycles".

2024 CSU Scholastic Honors Convocation

At the 2024 Scholastic Honors Convocation, the following Math Major students were awarded.

- Outstanding Mathematics Student Award- Felicity Acosta
- Calculus Award- Aaron Riley
- Student of Excellence Award (Mathematics)- Jonathan Dispain
- Student of Excellence Award (Data Science)- Emily Turner
- Student of Excellence Award (Applied Mathematics)- David Pifer



Departmental Updates

Dr. Timothy Howard's Upcoming Retirement



Though his role has changed many times over the years, Dr. Tim Howard began his journey at Columbus State in September of 1995 in the Mathematics Department. While he hasn't been a regular fixture around the halls of the department since 2016 when he began as Associate Dean of the College of Letters and Sciences, his two terms as Mathematics Department Chair left a lasting impact here. His ongoing support of the Mathematics Department in subsequent roles has been greatly appreciated, as he often participated in our Annual Math Tournament and encouraged and uplifted individual faculty through regular communication. Dr. Howard moved into a new role as Vice Provost in the summer of 2019, wearing many hats during his five-year tenure in that position. Over the years, changes in personnel within the Provost's Office led to shifts in his responsibilities. These ranged from overseeing SACSCOC accreditation, the Office of Sponsored Programs, Momentum Approach, Learning Support, and CSU Advise, to supporting the Tutoring Center, Online Education, Institutional Research & Effectiveness, as well as the CSU catalog & curriculum. It seems that there aren't many areas of CSU's academic operations in which Dr. Howard hasn't been involved. His interest in administrative roles was sparked by projects undertaken during his time in the Math Department, such as preparing a Comprehensive Program Review, and collaborating with the COLS Curriculum Committee to shift from quarters to semesters. Clearly, he has been able to leverage his administrative skills and thoughtful, open and trustworthy personality into a fruitful and meaningful career at Columbus State.

Dr. Howard hasn't had the flexibility in his schedule to teach in many recent semesters, however he does reflect back on his teaching with a great deal of enthusiasm. His favorite classes to teach were Differential Equations, Calculus 1 (which he was developing as a flipped class in the last sections he taught), and MATH 2008 - Foundations of Numbers and Operations, a course required for Elementary Education students. In it, students explored elementary Number Theory. Dr. Howard emphasized the importance of fostering a positive attitude toward math in these future teachers. He regularly incorporated active learning into this class in the hope of providing a meaningful experience that would alter perceptions and impact not just his own students, but their future students as well. He specifically mentioned an icebreaker activity he performed with this class, called "The Handshake Problem," in which the students in this class (many of whom were self-described math-averse) developed a formula for counting the number of handshakes necessary for every pair of students in the class to shake hands one time. This is meaningful because this formula is generally useful in higher mathematics - and it tends to appear intimidating when presented in the context of Summation Formulae in Introduction to Discrete Mathematics, for instance.

While Dr. Howard will officially retire from Columbus State University and relocate to be near family in Florida during the summer of 2024, he remains hopeful about maintaining his relationship with CSU and his colleagues. He offers some perspective for the Math Department to continue adapting and developing ways to remain current and relevant as we move forward in the ever-shifting landscape of higher education and advancing technology. One of Dr. Howard's many skills (and a skill that no technology will ever replace) is making personal connections - he remains as willing to sit down for a two-hour chat today as he was when I met him during my interview for a lecturer position in the Math Department nearly ten years ago. This time, it was I who interviewed him about his career and future plans, but both conversations will remain important to me for years to come. Join me in congratulating Dr. Tim Howard for a successful career at CSU, and on his upcoming retirement.



2022 CSU Teaching Excellence Award Winner

Student success is Dr. Nehal Shukla's primary focus and as such, she continuously readjusts and redesigns her courses based on current research in teaching and learning. She's worked diligently on two Affordable Learning Georgia (ALG) grants to create and implement Open Educational Resources (OER) in her classes (Quantitative Skills and Reasoning, as well as Calculus. She has made consistent efforts to promote High Impact Practices (HIPs) to CSU faculty and uses them throughout her own courses. With all of this, it is no surprise that she was nominated and won the 2022 CSU Teaching Excellence Award! Dr. Shukla was also nominated for the Felton Jenkins Hall of Fame Faculty Award in 2022. Congratulations Dr. Shukla!



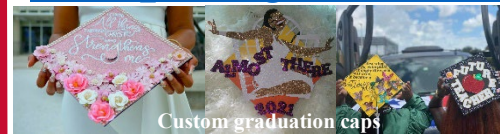
(Image: Dr. Shukla with former CSU President Dr. Chris Markwood)

Welcome Ms. Bernesia Duroseau

Bernesia Duroseau joined CSU in November 2023 as the Academic Support Assistant for Mathematics and Earth and Space Sciences.



Bernesia is also a current student at CSU, double majoring in Art Education and Psychology (check out some of her work below). Bernesia can be found in the Mathematics Department Office (University Hall 238) daily from 1:30pm - 5:30pm. Bernesia looks forward to assisting the department faculty, staff and students in any way she can. She can be reached at (706) 507-8240 or duroseau_bernesia@columbusstate.edu



Recent Promotions & Tenure



Dr. Guihong Fan,
Promotion to Full
Professor



Dr. Houbin Fang,
Promotion to Full
Professor



Dr. Kristin Seamon Lilly,
Tenure and Promotion to
Full Professor



Ms. Elizabeth McInnis,
Promotion to Senior
Lecturer

Recent Graduates & Alumni Spotlight

Recent Graduates

Fall 2022

Anthony Pritchett, B.S. Actuarial Mathematics

Spring 2023

Anterious D. Ridley, B.S. Applied Mathematical Sciences

Alexander Swan, Certificate in Data Analytics

Gabriel Williams, B.S. Applied Mathematical Sciences

Summer 2023

Kenya Isler, B.S. in Mathematics Education

Kayleen Linge, B.S. in Mathematics

Fall 2023

Quynh La, B.S. Applied Mathematical Sciences

Justin Ludwig, B.S. Applied Mathematical Sciences

Spring 2024

Jonathan Dispain, B.S. Mathematics

Nicholas Dunn, B.S. Mathematics

James East, B.S. Applied Mathematical Sciences

Elizabeth Hedrick, B.S. Mathematic Education

Yelena Labat, B.S. Actuarial Mathematical

Charlotte Lyda-Turner, B.S. Actuarial Mathematics

Jeremy Maddox B.S. Applied Mathematical Sciences

Aaron Riley, B.S. Mathematics

Skylar Smith, B.S. Mathematics

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@CSUMathDept



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Alumni Spotlight: TJ Sabau

TJ Sabau was once my student, fairly early in his time at CSU. He was a Political Science major with what he calls a preference for "math-lite" over hard formulas, taking the first of the two or three math courses required for his program. He tells me it was a conversation we had that sparked his interest in pursuing more math in his course of studies- and all I did was mention the Data Science Minor the Math Department was a semester or two into piloting at the time. TJ took it from there and began work on the minor, and once again made the most of this experience. He took every opportunity offered to explore and connect with others in the field. TJ and I sat down again as his time as a CSU student was drawing to a close, back in the spring of 2023. It was then that he told me about his already impressive pursuits.

During his time as a full-time student at CSU, TJ worked at the Institute for Youth In Policy, starting in 2021. He developed a civics curriculum and served as the Assistant VP of the Education Department, which ran through March of 2023. TJ ran workshops of high school students aimed at reducing polarization, engagement with the lesson, and knowledge retention, all of which showed promising statistically significant improvement in every measured area. His role developed into a VP position, and He worked simultaneously as the Chief Human Resources officer for the Institute.

Concurrently, TJ completed two back-to-back on-campus internships in the Office of Enrollment Management at CSU. He served as this area's "amateur" Data Analyst, looking at "massive mountains" of data. In the spring of 2022, he worked on a predictive model for retention that was department specific. He was also drafted into other projects, including looking at data from other comparable universities and analyzing trends in enrollment pools. In the fall of 2022, TJ focused on targeted marketing for Enrollment Management, determining a target demographic based on the areas of Traditional Freshmen, and Transfer, Transient, and Non-Traditional Students - broken down by Age, County, High School, HS GPA, and Test Scores, among others. This work gave the university information about who to approach with more targeted marketing and information. He was able to present his findings to the Executive Leadership Team using pivot tables and roughly 200 graphs based on the data.

During all of this, he also found the time to complete an Honors Thesis called "Navigating the AI Ascendancy: Evaluating U.S. Policies in the Sino-American AI Race," and present his work at the Georgia Undergraduate Research Conference and the Midwest Political Science Association Conference in Chicago. TJ is not a person who misses an opportunity to develop his skills. TJ graduated with his degree in Political Science and a minor in Data Science in May of



"The statistical aspects of the internship were absolutely huge when it came to not only doing my job but also landing the job in the first place."

-TJ Sabau

2023. It wasn't long before he'd accepted a job working as a "Modeling and Simulations Analyst" at the Maneuver Battle Lab. He's employed through the defense contractor SAIC as a Data Scientist.

I recently asked TJ what percentage of his job involves Data Science. He enthusiastically responded, "I'd say 95% of my job revolves around data science. The only part of my job that isn't data science is prepping for presentations and talking to clients, but even then, it's in an analyst capacity, so it usually involves mostly data science [...]. Statistical testing, correlation matrices, and unhealthy amounts of Excel are things that come up daily." When asked how well his internships prepared him for his current career, he said they "helped a ton with what I'm doing now [...]. The statistical aspects of the internships were absolutely huge when it came to not only doing my job now but also landing the job in the first place." The Data Science Minor program in the Math Department here at CSU offers guaranteed internships to each of its students - and they often lead to connections and skills that generate employment opportunities.

TJ's advice for current CSU students is to make connections with students in other disciplines and at other universities. He emphasized the importance of "who you know" when seeking out new opportunities. His enthusiastic appreciation for the internships he participated in is a clear indication that he'd recommend them to others as well!