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MAXIMA: News and Highlights from the UTEP Department of Mathematical Sciences

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FALL 2023

From the Chair (Dr. Cristina Mariani)

Dear Alumni and Friends:

I hope you and your families are doing well. I am very happy that it is the time of the year to be writing to you again, after another great year for our Mathematical Sciences Department. The Department continues to grow, with the last 5 years yielding nearly 300 peer-reviewed publications and books, and \$38 million in grants.

In spring 2023, the Department graduated a record number of 21 students with master's degrees: 12 from the new M.S. in Statistics and Data Science, 6 from the M.S. in Mathematics and 3 from the Master of Arts in Teaching Mathematics. In addition, 5 Computational Science students graduated under mathematical sciences faculty dissertation advisors. The new undergraduate course SCI 1301 Data Science and Society was successfully launched with 50 students, which will attract additional students into our Data Science programs. The Data Science Ph.D. program currently has 47 students, with the first graduates expected in fall 2023 (see story on page 1). As UTEP has a distinctive Hispanic population, our new Ph.D. and other programs in Data Science will play a crucial role in closing the gap for a population currently underrepresented in the field.

Our Alumni and Friends have been especially supportive of our new programs. In March 2023, Gold Nugget Award recipient Dr. Frank Hsu visited UTEP and met with College of Science junior faculty (see story on page 4). During 2023 Homecoming Week, my faculty and I met with Enrique Gómez (M.S., Mathematics, 1978, and 1999 Gold Nugget) to plan my department's presentations and activities for the El Paso Science Festival that will be held on April 6-7, 2024 at the El Paso Convention Center. This event will greatly help promote the Department, our programs and our field, and is expected to draw 20,000+ people and feature 70+ Interactive demonstration experiences, speaker series and other activities for K-12 students. Enrique is a member of the College of Science Advisory Board, and is a founder and coorganizer of this event (see story on page 1).

In September 2023, scholarship donors Mr. Ron Hagquist (also a College of Science Advisory Board member) and Ms. Yvonne Lanelli met and mentored our Data Science students who presented their research at a conference thanks to their generous support (see story on page 3).

This year I am delighted to welcome several important hires: Assistant Professor Dr. **Nilotpal Sanyal** (a hire that will support our Data Science and Statistics programs), Assistant Professor Dr. **Peimeng Yin** (a hire that will support our Applied and Computational Math program and Computational Science program) and Research Assistant Professor Dr. **Cai Xu**, who will support the BBRC program in the College of Science. *Continued on page 5*

In This Issue ...

- · Chair's Column
- · Data Science Ph.D. Program
- El Paso Science Festival
- Student News
- Dr. Sewell Retires
- Student Organizations
- Students Present Research
- Largest Course Revamped
- Hsu Mentors New Faculty
- Regional Meetings
- New Year Cookout
- Inflection Points
- Alumni News

DATA SCIENCE Ph.D. PROGRAM TO GRADUATE ITS FIRST STUDENTS

UTEP's first Ph.D. program housed in our department has been thriving since its January 2021 launch, with 8 doctoral students advancing to candidacy within 2.5 years and 3 students on pace to graduate this December! From July 2021-July 2023, 15 data science Ph.D. students have collectively generated 33 conference presentations and 3 peer-reviewed journal articles. In another type of productivity, DS students Robert McCreary, Hortencia Hernandez and Tolulope Adeyina created an app in collaboration with College of Education faculty and students to quantify changes in key markers for science identity for students at UTEP undergoing research training.

Other measures of growth for the program include very significant increases in external funding, such as Schneider Electric funding a new Research Assistant position to help analyze efficiency of production and automate orders for production. For more information, contact program director Dr. Amy Wagler at awagler2@utep.edu or associate director Dr. Azucena Zamora at azamora3@utep.edu or visit www.utep.edu/science/math/academic-programs/graduate/datascience.html.

ALUMNI, FACULTY HELP LAUNCH EL PASO SCIENCE FESTIVAL

The inaugural El Paso Science Festival will be held April 6-7, 2024 at the El Paso Convention Center. This free event aims to let the general public delve into the realms of science, technology, engineering and mathematics (STEM), transforming learning into an engaging and interactive hands-on adventure.

This event is presented by the El Paso Community Foundation in collaboration with UTEP and includes organization or participation of many people with connections to our department. Enrique Gómez (a 1999 Gold Nugget) is a Founder and Co-Chair of the event and Allen Gilmer (a UTEP Distinguished Engineer who established the UTEP Data Science and Informatics Gift Fund) is on the Board of Advisors. *Continued on page 5*

STUDENT NEWS

Amanda Bataycan (CPS doctoral candidate) had work under Dr. Ming-Ying Leung earning the prestigious Blue Ribbon Award for (top 10%) poster presentation at the Research Centers in Minority Institutions Consortium (RCMI) National Conference this past April.

Md Easin Hasan, **Jazmin Quezada** and **Clarissa Reyes** are expected to graduate in December 2023 and become the first graduates of the Data Science Ph.D. program.

María Aleida Ramírez Vega and Denisse Urenda (DS doctoral students) were two of 16 UTEP students awarded a prestigious scholarship from Consejo Nacional de Ciencia y Tecnología (CONACYT), or the Mexican National Council of Science and Technology, an agency that supports Mexican citizens pursuing graduate studies abroad. UTEP received about half of the awards across the UT System and over 5% of the awards worldwide for doctoral studies in science and humanities.



Left to right: Dr. Sharma, DoE mentor Dr. Gillette, Cobbinah. Photo courtesy of Dr. Gillette

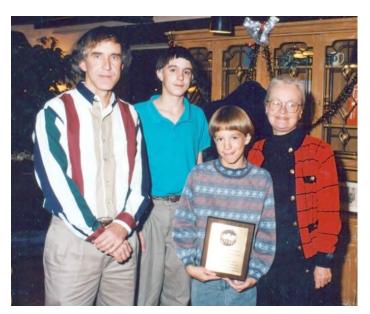
Abigail Cobbinah (M.S., Mathematics, 2023; CPS doctoral student) and her advisor Dr. Natasha Sharma were selected to work this past summer at Lawrence Livermore National Laboratory (LLNL). See Inflection Points on page 6.

DR. SEWELL CONCLUDES DISTINGUISHED CAREER

Thanks to Dr. Son-Young Yi for her help with this story

Dr. Granville Sewell bid farewell to an illustrious career in January, marking 39 years of dedicated service to the department, including 8 as Associate Chair. His impact went well beyond UTEP because he has also had notable semester- or year-long academic engagements at many other institutions: the UT System Center for High Performance Computing, UT Austin, Texas A&M, Visual Numerics (Houston), Universidad Simón Bolívar (Venezuela), Universidad Nacional de Tucumán (Argentina) on a Fulbright grant and UNAM Querétaro (Mexico) on a UNAM PREI grant. He has taught mathematics courses in Spanish in Argentina, Venezuela and Mexico, as well as at UTEP. Dr. Sewell is expected to receive the honor of Professor Emeritus sometime in 2024.

Much of Dr. Sewell's work involved the development and application of his general-purpose partial differential equation solver, PDE2D and 250+ papers and books used his software to generate numerical results. Dr. Sewell also wrote four books in numerical analysis, most recently the 2018 Wiley book *Solving Partial Differential Equation Applications with PDE2D* and two books (*Computational Methods of Linear Algebra* and *The Numerical Solution of Ordinary and Partial Differential Equations*) he originally wrote as textbooks for MATH 5330 and 5343 are now in their third edition (with World Scientific). Dr. Sewell also wrote a book beyond mathematics – *In the Beginning and Other Essays on Intelligent Design*, published by Discovery Institute Press.



Dr. Sewell with sons Chris and Kevin and then-President Diana Natalicio at 1995 dedication of the Melissa Wehmann Sewell Endowed Scholarship Fund to support an undergraduate engineering or science student in honor of his wife who passed away in 1991. Photo courtesy of Dr. Sewell

ACADEMIC AND RESEARCH EXCELLENCE AWARDS AT COLLEGE OF SCIENCE PRE-COMMENCEMENTS

Fall 2022:

Mathematics - **Liliana Maynez-Anchondo** (undergraduate) Computational Science - **Laxman Bokati** (graduate)

Spring 2023:

Mathematics - Alyssa Martinez (undergraduate)

CoS Undergraduate Marshal of Students

Teaching Mathematics - Patricia Barrientos (graduate)

Mathematics - **Eugene Agyei-Kodie** (graduate)
Statistics - **Duodu Gyamfi Kwabena** (graduate)
Computational Science - **Andrews Anum** (graduate)

STUDENT CHAPTERS/CLUBS UPDATE

See more information on these student organizations at utep.edu/science/math/forstudents/student_orgs.html

American Mathematical Society UTEP Student Chapter – The AMS student chapter has many activities this semester, including SQL Challenge – Real Project as well as Community Service at El Paso Mathematics Sensitization and Seminar. Advised by Dr. Suneel Chatla, the chapter is currently led by Ebenezer Nkum (President), Nathaniel Sakyi (VP), Solomon Amoo (Organizer), George Ekow Quaye (Treasurer), and María Ramírez Vega (Secretary).

Club Zero Mathematics – Club Zero organized several gatherings featuring mathematical fun and games including Trivia Night and Movie Night and sponsored Math Olympiad and Math Jeopardy friendly competitions. The club's faculty advisor is Dr. Hamide Dogan and officers are Omar Salsa (President), Brando Paez (VP), Michelle Ortiz (Secretary), Emilia Tadeo de la Rocha Galan (Treasurer), Leonith Rodríguez (Historian), Federico Alvidrez (Social Media Chair), and Devin Gill (Events Chair).

Computational Science Students Association - The CPSSA had a busy and exciting year, including hosting the talk "Simulation, Modeling and Informatics: The Transformation of Materials Development and Foundation for Delivering Materials that Enable Customers' Next Generation of Devices" by Dylan Cosgrove and Dr. Jialin Liu from the 3M Company. Gratefully building on the years of dedication and momentum of former president Dr. Andrews T. Anum and former faculty advisor Dr. Michael Pokojovy, are new faculty advisor Dr. Anass Bouchnita and officers Amanda Bataycan (President), Augustine Twumasi (VP), and Ranit Debnath Akash (Secretary). Future chapter plans include welcoming the five new CPS program students, identifying common career interests, hosting presentations from both academic and industry perspectives, expanding the community towards similar interdisciplinary fields to form a larger network and extending meeting invitations to Bioinformatics and Data Science students.

Society for Industrial and Applied Mathematics Student Chapter - The chapter is organizing a career seminar this fall. The chapter's faculty sponsor is Dr. Natasha Sharma and its officers are Augustine Twumasi (President), William Agyapong (VP), Patricia Dobos (Secretary), Abigail Cobbinah (Treasurer), and George Quaye (Webmaster).

Student Chapter of American Statistical Association – UTEP's ASA student chapter organized a internship talk and partnered with the university's Career Center to provide employment and internship opportunities for Math, Data Science and Statistics majors. Future plans include a Tableau workshop. The chapter is advised by Dr. Amy Wagler and led by Kwesi Ohene-Obeng (President), Patricia Dobos (VP), Willilam Agyapong (Treasurer), Ashley Obeng (Secretary), and Andrés Monsalve Salazar (Public Relations).

Ph.D. STUDENTS PRESENT RESEARCH AT HAWAI'I CONFERENCE

Data Science Ph.D. students Jazmin Quezada and Prince Appiah presented their research at the 2023 STEM/STEAM & Education Conference in Hawai'i with support from the College of Science Excellence Gift Fund for Data Science established by Ms. Yvonne Lanelli. Jazmin and Prince expressed deep gratitude to Ms. Yvonne Lanelli for making possible what their advisor Dr. Mariani described as a milestone trip this past June. They published in the conference proceedings their papers



Left to right: Quezada, Lanelli, Appiah, Hagquist. Photo: CoS CAO Berenice Herrera

"Machine Learning Methodologies with Applications to Medical Diagnosis" and "A Methodology to Transform Non-image Data to Image for Convolutional Neural Network Architecture", respectively.

Jazmin said the conference "was nothing short of a transformative experience. From the moment I stepped onto the vibrant shores of Honolulu, I was immersed in a world of cuttingedge science, technology, mathematics and educational development ... The conference provided an unparalleled platform for networking with like-minded individuals, listening to inspiring keynote speakers and engaging in groundbreaking discussions that expanded my understanding and sparked new ideas. This trip allowed me to expand myself as a brown woman in science. I am profoundly grateful to the generous sponsor Ms. Lanelli, whose support made this trip possible, and to the College of Science and Math Department for their unwavering encouragement and belief in my potential. This experience has not only enriched my academic pursuits but has also instilled in me a renewed sense of purpose and a deep appreciation for the boundless possibilities that STEM offers."

Prince described his participation as "a thrilling and enlightening experience. I extend my heartfelt gratitude to my supervisor Dr. Mariani and the generous support from Ms. Yvonne Lanelli for making this journey a reality. The conference itself was a remarkable experience, allowing me to connect with fellow students and esteemed professors from diverse universities. We established meaningful connections and exchanged contact information, fostering valuable networking opportunities. Furthermore, my presentation at the conference was met with success and I was pleased to make a positive impact." Prince and Jazmin were able to share their conference experience (and discuss their present and future research) with scholarship donors Mr. Ron Hagquist and Ms. Yvonne Lanelli at a September meeting arranged by the College of Science Dean's office (see photo above).

LARGEST COURSE REVAMPED

The department's ongoing commitment to improving its courses (e.g., see *MAXIMA* 2022 story about implementing WeB-WorK in Discrete Mathematics, Calculus II, Matrix Algebra and Differential Equations) most recently extended to its largest course, MATH 1320 (Mathematics for Social Sciences).

As Fellows of the Reimagining the Core project funded by the Office of Academic Affairs, Dr. Larry Lesser and Course Coordinator Samantha Patterson have worked since early 2022 to create innovations that did not increase instructor load or lower standards while accomplishing many goals, including: (1) improving alignment of topics with Texas Core Curriculum and with needs and backgrounds of major stakeholder populations served by the course, (2) optimizing topic sequence, (3) optimizing course policies to support equity and student success, (4) improving relevance of content to students' real-world lives (e.g., financial literacy), (5) offering students varied supporting resources, including practical videos, technology guides, concept maps, overviews, and even games and songs. A paper on the redesign process was presented at the 2023 conference of the American Association for Teaching & Curriculum (AATC) and journal articles are expected to be accepted or published in 2024.

NEW YEAR COOKOUT

Organized by Laura Olivas, the department celebrated the launch of the new school year with a September 8 cookout, attended by over 50 faculty, staff, TAs and RAs. Because it was one of El Paso's record 69 days this year that hit triple-digit temperatures, the cookout was moved indoors to the corridors adjoining the data science computer lab.







Photos: Drs. Cristina Mariani (top) and María Barraza

JUNIOR FACULTY MEET WITH DR. FRANK HSU

Junior faculty in the college received great food for thought from Dr. Frank Hsu at a mentoring lunch sponsored in April by the College of Science Dean and organized by Dr. Mariani. An alumnus of our department, Dr. Hsu is the Clavius Distinguished Professor of Science at Fordham University in New York. He gave attendees advice and answered their questions at the lunch, continuing his ongoing generosity of time and wisdom, such as his visit last year that included a colloquium talk and mentoring our graduate students.



Left to right: Drs. Anass Bouchnita, Abhijit Mandal, Asim Kumer Dey, Jonathon Mohl, Cristina Mariani, Ritwik Bhattacharya, Frank Hsu and Jorge Muñoz (physics). Photo: María Marín Becerra

UTEP WELL-REPRESENTED AT REGIONAL MAA/NMMATYC

Department faculty, students and alumni played major roles in this past April's annual conference of The Southwestern Section of the Mathematical Association of America (MAA), held this year in El Paso in conjunction with the New Mexico Mathematical Association of Two-Year Colleges (NMMATYC). The conference, co-chaired by MATM student and EPCC instructor Pat Barrientos, included plenary talks by Dr. Larry Lesser and MAA President Dr. Jennifer Quinn. About half of the program's breakout session talks were given by department faculty/instructors (Rocio Bishop, Dr. Helmut Knaust, Vital Martinez, Melisa Meza, Jeremy Ramirez), graduate students (Eugene Agyei-Kodie, Viridiana Fernandez) and alumni (Edith Aguirre, Ruben Carrizales, Fan Chen, Sandra Cuevas, Benjamin De Los Reyes, Adrian Delgado, Raul Holguin, Alberto Isassi, Veronica Murga).

Locals who weren't able to attend are in luck: the two organizations agreed for next year's conference (April 5-6, 2024) to also be in El Paso.

Our faculty have also been active in organizing and presenting in multi-institutional workshops, including the 30th Joint UTEP/NMSU Workshop on Mathematics, Computer Science and Computational Sciences (co-organized by Dr. Ming-Ying Leung) and the 9th UTEP/EPCC Teachers Teaching Teachers (TTT) Workshop (co-organized by Dr. Kien Lim and Ms. Martha Delgado).

ALUMNI, FACULTY HELP LAUNCH EL PASO SCIENCE FESTIVAL from page 1

As Gómez elaborates, "El Paso will proudly join San Diego, Philadelphia, New York, and other major cities as we launch the annual Science Festival. These festivals are a catalyst that spark our youth's and passion for science and technology. By inspiring the children and providing their parents with the tools they need to nurture and support these aspirations, we aim to cultivate a generation that dreams of becoming scientists and engineers."

Also, several faculty, instructors and students are expected to participate or contribute to some of the 70 interactive exhibits or main stage presentations or lectures. Experiences and resources will be provided to inspire students to aspire to become UTEP students and consider STEM careers. Check www.elpasoscience.org for more information and updates to the schedule.



From the Chair (from page 1)

Also, MATM alumna Ms. **Martha Delgado** started in January as our new Administrative Services Coordinator to support the MaRCS tutoring center and the Department.

All these achievements are possible only with the hard work of our faculty and staff, the strong support from our administration and the generosity of Alumni and Friends like you.

As you know, this support has often included the establishment of crucial sources of funding. During the last few years, the UTEP Data Science and Informatics Gift Fund (see story on p. 1 of MAXIMA 2018) was established by UTEP Distinguished Engineer Allen Gilmer and Math Department alumnus Frank Hsu, Ph.D., Clavius Distinguished Professor of Science at Fordham University in New York, a 2019 Gold Nugget Award recipient and a founding father of Big Data. Terry L. Henderson, Ph.D. established the Professor Eugene Alan Dean Memorial Endowed Scholarship, and Ron Hagquist and Yvonne Lanelli established the Hagquist-Lanelli Student Success Scholarship. Other recently established funds are the Hagquist-Martinez Student Excellence Fund, the College of Science Excellence Gift Fund for Data Science (established by Ms. Yvonne Lanelli) and the Carmen and Agustin Flores Morales Student Excellence Endowment.

Please take the opportunity to increase the impact on student success and contributions to our field as well as to society. I encourage you to make your contributions to any of these recently-established Scholarship Funds and our other Scholarship funds benefitting our students listed on page 7. Your donation will greatly help support our programs, including the recently-launched Ph.D. program in Data Science and our Excellence Fund that supports student travel to meetings (e.g., story on page 3) and other items not covered on our budget. There are numerous existing funds available for additional support, or you can easily establish your own fund or endowment by contacting **Annaelisa Holguin**, College of Science Director of Advancement, aholguin33@utep.edu. As a former student, you will always be part of our heritage and you can also be part of our future through your participation and collaboration. Feel free to contact us with your ideas at mathdept@utep.edu, 915-747-5761.

Finally, I thank our Dean, Dr. Kirken, for his invaluable and continuous support to our Data Science programs and for helping the College and the Department achieve excellence in research and teaching to support the new strategic plan for America's leading Hispanic-Serving University, and helping UTEP become and remain one of the most successful Hispanic-serving Institutions with the R1 designation by the Carnegie Classification of Institutions of Higher Education.

Go Miners!



(See math.utep.edu for other accomplishments too numerous to list!)

Dr. **Fariba Ansari** obtained (as PI) a grant from the Tensor SUMMA program of the Mathematical Association of America. The grant is supporting 20 students at El Paso Community College for the 2023-24 year in the "Why Math? Circle" program. Ansari also chaired the March 24, 2023 Border Learning Conference.

Drs. Francisco Avila, Maria Pia Beccar Varela, Louise Guthrie and Julio Urenda were promoted to Professor of Instruction.

Dr. **Ritwik Bhattacharya** obtained as PI a \$240K 2-year National Science Foundation LEAPS grant for the project "Prediction issues in progressively censored life-testing experiments: New ideas and applications".

Dr. **Larry Lesser** gave a keynote at the 2023 United States Conference on Teaching Statistics and won recognitions in national STEM education competitions (including the 2022 STEM Art and Film Festival and the 2023 CAUSE A-mu-sing Contest).

Dr. **Abhijit Mandal** was promoted to Associate Professor with tenure. He was named Graduate School Faculty Marshal of Students for the 2023 Spring Commencement. Dr. Mandal is one of 13 UTEP instructors named as a 2023-24 UTEP Edge Curriculum Fellow.

Ms. Samantha Patterson was promoted to Senior Lecturer.

Dr. **Michael Pokojovy** accepted an Associate Professor position in the Department of Mathematics and Statistics at Old Dominion University.

Dr. **Natasha Sharma** and her student Ms. Abigail Cobbinah were among the few selected to spend 10 weeks this past summer at Lawrence Livermore National Laboratory (LLNL) to work with Department of Energy mentor Dr. Andrew K. Gillette in the Sustainable Research Pathways Program funded by the Sustainable Horizons Institute and U.S. Department of Energy and the LLNL-LDRD Program. The work on time adaptive reinforcement learning techniques applied to sixth-order phase field models and yielded not only Cobinnah's research project but also continuing Sharma/Gillette work.

Dr. Xiaogang Su was named Faculty Marshal of Students for 2023 Spring Commencement.

Dr. **Amy Wagler** obtained as co-PI a \$7M 6-year grant from the National Science Foundation for the project "Network Opportunities for Developing Equitable and Effective Evaluation."

Dr. **Son-Young Yi** obtained as PI a \$4.9M 3-year grant from the Department of Energy for the project "Advanced Multi-Physics Machine Learning for Subsurface Energy Systems Across Scales."

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ALUMNI NEWS



Dr. **Andrews T. Anum** (Ph.D., CPS, 2023) received the CPS Academic and Research Excellence Award for his dissertation and began a tenure-track position as an Assistant Professor of Data Science at the University of New England, an R2 University.

Dr. **David Dampier** (B.S., Mathematics, 1984) became Dean of College of Engineering and Computer Sciences at Marshall University in 2020 and reports "Still working and enjoying my job. Hope to have a PhD program soon in the college."

Dr. **Brisa Sánchez** ((B.S., Mathematics, 2000; M.S., Statistics, 2001) is a new member of UTEP's College of Science Advisory Board. Her first Board meeting was on November 3rd during Homecoming week. The Department will greatly benefit from her participation.

MAXIMA Staff

Editor: Larry Lesser

Typesetting, MAXIMA logo: María Barraza

Alumni Data Update Form - Keep in touch!

Online form at www.utep.edu/science/math/foralumni/

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