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ON THE COVER

New landscaping and sidewalk lead to the Walker Building.

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From the Head of the Department

A new normal with new horizons

I write my first column as the head of the Department of Geography at a moment marked by excitement and uncertainty. After more than a year of a primarily remote work environment, our department and

University are preparing for a return to a more typical residential experience. During these many months our community has persevered: we have taught classes, trained our students, held virtual receptions, and practiced flexibility and resiliency during challenging times. I am optimistic that as we approach this new normal we can re-engage with the many things we so highly value.

I must begin by recognizing outgoing Department Head, Dr. Cynthia Brewer, for all of her tireless leadership. We have grown our faculty and identified strategic areas of interest that intersect across the four subfields of the discipline. We have worked to integrate our residential and online teaching programs, which allows us to reach broader constituencies. Our graduate program remains one of the best in the country, and we celebrate the accomplishments of our outstanding undergraduate students.

In addition to Cindy's return to the faculty, there have been other changes within our community. We are deeply saddened by the sudden loss of Dr. Robert Brooks. Rob Brooks was a kind and thoughtful member of our community whose passion for nature inspired so many. We grieve his loss and send our support to his family and extensive network of friends.

Our department had three retirements with Dr. Alan MacEachren, Dr. Douglas Miller, and Dr. Robert Crane. As the included story on Alan demonstrates, he is a significant figure in so many research fields. Alan has had transformational impacts for the discipline of geography and in shaping future areas for both his colleagues and students.

Doug has been an invaluable presence in both our residential and online environments. Doug's infectious enthusiasm for GISc and other geospatial approaches spanned the subfields of our department. Many of my own advisees have benefited from Doug's expertise and generosity.

Rob Crane has similarly been incredibly active in the College of Earth and Mineral Sciences and University, and is retiring as the associate vice provost for Global Programs. I have worked closely with him over the years and can attest to the substantial footprint he has left on our campus. I will especially miss spending time with him in South Africa.

Yet, we also look ahead to celebrate new additions to our community. Dr. Marcela Suarez and Dr. Brandi Gaertner join us as assistant teaching professors who will support our newly established and highly successful online master's in spatial data science degree program. Their expertise will be invaluable to both our undergraduate and graduate students. Finally, Dr. Kim Van Meter joins us as an assistant professor after several years at the University of Illinois Chicago. Kim's expertise in water

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Brian King named head

Brian King, professor of geography and associate head for the department's resident graduate programs, has been appointed head of the Department of Geography. He began on Thursday, July 1.

King succeeds Cynthia Brewer, who will remain an active member of the faculty after serving as department head since 2014.

"Brian brings a wealth of experience and a vision for the department that builds on all the great work of his predecessors, especially that of Cindy Brewer, and takes the department to the next level," said Lee Kump, John Leone Dean in the College of Earth and Mineral Sciences.

King's research focuses on livelihoods, conservation and development, environmental change and human health. His work is centered in Southern Africa, where he has examined how environmental variability shapes demographic patterns in the Okavango Delta of Botswana and how social and ecological systems are being

transformed by HIV/AIDS.

"I accepted this position because I am passionate about the discipline of geography and what our faculty and students are able to contribute to the critical challenges of the twenty-first century," King said. "Geography is uniquely positioned to make distinct contributions in part because of its breadth across the social sciences, natural sciences, and humanities."

King earned a master's degree and doctorate in geography from the University of Colorado at Boulder and a bachelor's degree in environmental studies from Bucknell. He joined Penn State as an assistant professor in 2008.

"We are in an excellent position thanks to the hard work of outgoing department head Dr. Cindy Brewer and all members of our departmental community," King said. "We have grown our faculty and identified strategic areas of interest that intersect across the four subfields of the discipline. We

have also worked to integrate our residential and online teaching programs, which allows us to reach broader constituencies. Our graduate program is one of the best in the country, and I am excited to see where our department can go over the next five years."

The department recently conducted strategic planning to identify a central objective of building a resilient and just world by responding to the climate crisis, making data science spatial, and sustaining landscapes and livelihoods.

Building on that framework, King said he has identified three strategic areas for the department to concentrate on over the next five years.

"First, we should implement our strategic plan because it provides a clear framework to support current activities while engaging in some new and exciting initiatives," King said. "Second, I am committed to supporting and advancing research and teaching, especially as we transition out of the immediate COVID-19 environment. Third,

of the department

“I am committed to supporting all of us to achieve our individual and collective goals. I want to ensure that we remain a dynamic, inclusive, and collegial department in which people want to be part.”

I look forward to advancing diversity, equity, and inclusion within our community and the geographic discipline.”

King has served in a variety of leadership and service roles at the department, college, and University levels in preparation for his new position.

For the past four years he served as the associate head for resident graduate programs.

“That role gave me insight into both the undergraduate and graduate programs, and also budgetary opportunities and challenges,” King said.

Within the College of Earth and Mineral Sciences, King chaired the Faculty Advisory Committee, and was one of three tri-chairs of an ad-hoc committee in support of underrepresented minorities and gender diversity.

King also served on

the Penn State Faculty Senate for the past four years and chaired the Global Programs standing committee, taking on a number of service assignments in support of Penn State’s global mission, including serving on the search committee for both the vice provost and associate vice provost for Global Programs.

King was a faculty representative on the Provost’s Task Force in support of international students and he continues to serve as the College of Earth and Mineral Sciences representative on the recently established Faculty Affairs Advisory Council.

Thinking about his goals moving forward, King said he is cognizant of the challenges brought about by the COVID-19 pandemic.

“While our department is in a strong position both within the University

and the academy, it will be important for us to advocate for geography and higher education,” King said.

“The social and economic impacts from the COVID-19 pandemic are exacerbating existing inequities within the academy. It is important to articulate the many contributions that our department can bring to current and future research and teaching directions.”

King said he is looking forward to a return to more in-person interactions.

“We have increased the size of our faculty in recent years, and I am committed to supporting all of us to achieve our individual and collective goals, he said. “I want to ensure that we remain a dynamic, inclusive, and collegial department in which people want to be part.”

Geographic visualization trailblazer Alan MacEachren retires

Alan MacEachren, professor of geography and information science and technology and longtime director of the GeoVISTA Center from its formation in 1998 until 2020, retired in July after thirty-six years at Penn State and was granted emeritus status.

MacEachren was hired from the University of Colorado by then-department head Greg Knight in 1985 to join the faculty and lead the Deasy GeoGraphics Lab. At the time, the focus of the lab was making custom maps to support research and teaching.

MacEachren spearheaded hiring David DiBiase to run the day-to-day operations. DiBiase eventually became the director of the lab, allowing MacEachren to lead a college-supported strategic initiative that became the Geographic Visualization Science, Technology and Applications

(GeoVISTA) Center.

Although he had just finished up his master's degree in cartography at the University of Wisconsin-Madison, DiBiase said MacEachren brought him in as an academic peer with the rest of the department faculty.

"That set the tone for my relationships with faculty members in the department and beyond for years to come," DiBiase said. "It created, as legendary Penn State professor Peter Gould used to say, the 'condition of possibility' for an entire career. Alan gave me more than advice; he gave me a future."

MacEachren said the center quickly evolved into a broad-based center focused on all aspects of GIScience.

"But we kept the title since it was already well established," he said. "Many GIScience research topics beyond ones focused on

Sven Fuhrmann, a visiting doctoral student and later postdoctoral scholar and research faculty member in the GeoVISTA Center, and now a professor of geovisualization and geoinformation at the University of Applied Sciences Munich, recalled how MacEachren's high standards and mentoring made an indelible mark on him. " 'This is really good work,' Alan said when he handed back my first manuscript, now significantly drenched in red ink from all his remarks and corrections," Fuhrmann said. "While one can quickly envision my facial expression, my immediate thought was: how can this be 'really good' work, when nearly everything, except my name—luckily I spelled that correctly—was marked in red? What I realized, not only on that day, but also for the last 25 years that I have known Alan, is that through outstanding mentorship, inspiration for the topic, and commitment to excellence, students and their work will become 'really good.' So, when I hand back papers or other work assignments to my students and say, 'this is really good work,' I always do this with a smile and reflect on the mentorship and friendship with Alan."



Alan MacEachren [center] shares best practices at a Supporting Women in Geography (SWIG) panel on grant proposal writing at the 2016 American Association of Geographers annual meeting.

visualization were pursued over time, including work on spatial-temporal databases, geographic information retrieval, spatial ontologies, spatial cognition, and others.”

Meanwhile, DiBiase transitioned the Deasy GeoGraphics Lab to have a bigger focus on supporting instruction. He later became founding director of the John A. Dutton e-Education Institute and the Deasy GeoGraphics Lab transformed into the Peter R. Gould Center for Geography Education and Outreach, which produced custom maps and the University Park campus map until around 2018.

Reflecting on his career, MacEachren points to two projects that were especially meaningful to him because they were fundamental to the research in geovisualization, for which the GeoVISTA Center is best known.

“One was my first National Science Foundation digital government grant on quality

graphics for federal statistical summaries,” MacEachren said. “I collaborated with statisticians Dan Carr at George Mason University, David Scott at Rice University, Leland Wilkinson who was then President of Systat, and Penn State geographic colleague Cynthia Brewer.”

Building upon that NSF project, the MacEachren embarked on a five-year National Institutes of Health grant on geovisualization and spatial analysis of cancer data. MacEachren led a Penn State team including Mark Gahegan (now at the University of Auckland) and Eugene Lengerich, professor of public health sciences and associate director, health disparities and engagement, at the Penn State Cancer Institute.

“Those two projects contributed to basic information science while having direct real-world applications related to the representation, analysis, and presentation of geographic statistical data,” MacEachren

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MACEACHREN from p. 7

said. Their impact continues and a scion of the NIH project is the LionVu cancer mapping tool.

MacEachren said his research interests evolved over his career, starting with an early focus on human spatial perception and cognition, the history of cartography, and analytical topics in cartography.

“Over time, my interest in history prompted me to read widely to trace current ideas back in time and build an EndNote bibliography that now stands at 23,000 references,” MacEachren said. “That helped me ground my research ideas in a broad base of existing knowledge.”

MacEachren’s interest in human perception and cognition encompassed all aspects of how people interact with maps and technology that represents geographic data.

“The interest in analytical methods was key to my core research, in what we now call geovisualization,” MacEachren said, “focused on developing and evaluating interactive, exploratory spatial data analysis tools that help people explore data, generate hypotheses, and make decisions.”

All of that led to MacEachren’s involvement in the emerging field of visual analytics.

“I was the only geographer invited to participate in the first visual analytics research workshop, which produced a report that has had a big impact on development of the field and my work since then,” he said.

That report, *Illuminating the Path: The Research and Development Agenda for Visual Analytics*, was published by the Institute of Electrical and Electronics Engineers (IEEE) Computer Society in 2005.

Alongside his own evolving interests, MacEachren has observed dramatic changes over

time in the discipline of geography and in higher education.

“Geographers are much more active in acquiring external funding for research, which has led to projects that have greater impact and are typically cross-disciplinary,” MacEachren said. “Penn State has been a great place to pursue interdisciplinary research since it has consistently encouraged and supported work across disciplines.”

Regarding higher education, MacEachren said it has become more competitive, with increasing expectations for faculty to get external funding and publish, making it more difficult to achieve work-life balance than when he started his career.

Although MacEachren is bringing his career to a close, he helped start the careers of many geographers.

“I will miss interacting with graduate students and postdoctoral scholars,” MacEachren said. “Over the years, I have really enjoyed mentoring and collaborating with many graduate students and postdocs, including those I advised directly, those advised by other colleagues in geography and other departments across Penn State, and those from other places who were GeoVISTA Center visitors over the years.”

His former students recall how he influenced them and how they try follow his example in their work, and with their students and junior colleagues.

“Alan’s 1995 book, *How Maps Work*, remains a flagship text in cartography and visualization, and undoubtedly is the most influential text on my own thinking,” said Robert Roth, professor of geography at University of Wisconsin-Madison. “That book is the reason I applied to Penn State for graduate school,

Recognition Reception virtual redux

Due to ongoing COVID-19 pandemic restrictions on gatherings, for a second year, students, faculty, staff, alumni, and friends of the department did not gather in Walker Building on the final day of spring semester classes. The annual event to recognize the accomplishments and contributions made throughout the year by Penn State geographers was presented virtually.

A website, <https://sites.psu.edu/geogrec21/>, showcases graduating students and awards for undergraduate students, graduate students, faculty, and staff. Student organizations and Undergraduate Research Opportunities Connection participants are also acknowledged.

and really the reason I wanted to pursue a Ph.D. in cartography.”

One of MacEachren’s first doctoral student advisees was Trudy Suchan, now overseeing communications for geography at the U.S. Census Bureau.

“I was incredibly lucky to have paired up with him,” Suchan said. “He was a remarkably attentive and non-judgmental listener. He was generously receptive to an interlude of qualitative research among the prevalent quantitative research.”

Former master’s student Martin von Wyss, founder and president of map publishing company vW Maps, shares his experiences with MacEachren.

“During much of my time at Penn State, I shared the office across the hallway from Alan with two or three other students for whom Alan was the adviser,” von Wyss said. “Despite our proximity, I didn’t learn much about Alan other than his good organizational skills, disciplined work ethic, and sharp academic intellect. But from Alan I learned a great deal, from critical thinking about map theory to writing code to produce a prize-winning visualization, and generally how to be a thoughtful, focused, and productive member of an

academic community. Getting to know him personally had to wait twenty-four years, by which point we lived 10,000 miles apart. On his visit to Australia in August 2018, Alan spent a few nights as my houseguest. We didn’t manage to find the superb lyrebird [an Australian songbird reputed to have the most sophisticated vocal skills in the animal kingdom] in the surrounds of Melbourne, but over our kitchen table I was glad to discover the amiable, kind individual from whom I learned so much.”

Eun-Kyeong Kim, who graduated in 2017 and now is a postdoctoral scholar at University of Zurich, recalled how her first impressions of MacEachren changed.

“When I just started my Ph.D., I was often nervous when approaching and talking to Alan because he is such a big name in the field of GIScience and known to be strict and scrupulous,” she said. “As I talked with Alan more often and regularly in the meetings and Coffee Hours, I found him so friendly and down-to-earth. In my experience, he always thinks from a student’s perspective and solidly supports them. I thank Alan for being the best adviser that I could have.”

MacEachren said he plans

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From student to professor, landscape scientist Douglas Miller retires

Douglas Miller, who earned three degrees from Penn State; worked as a research assistant, research associate, and professor in two colleges; and created and led the Center for Environmental Informatics for twenty years, retired in July and was granted emeritus status.

Miller first started working at Penn State as a work-study student in the Office for Remote Sensing of Earth Resources in 1978. While in graduate school he continued working with ORSER, a center within

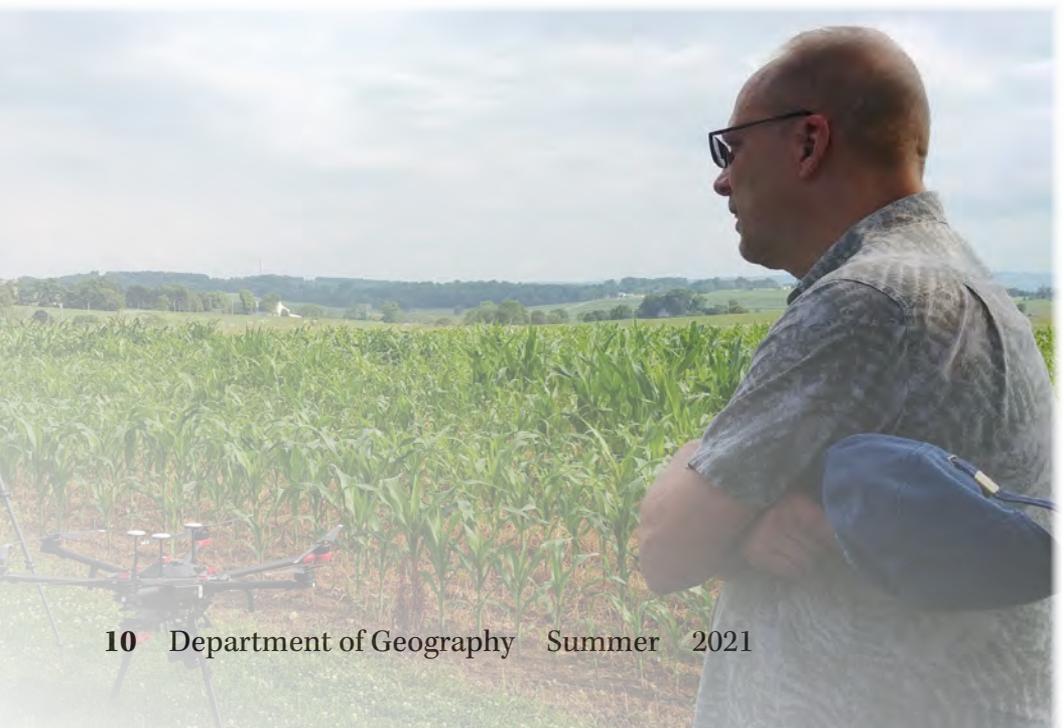
the Environmental Resources Research Institute, the forerunner to the Institutes of Energy and the Environment (IEE), as a research assistant until his Ph.D. in soil science in 1999.

“I feel like the luckiest person alive to have had the kind of support and mentoring that I have received at Penn State over the past forty-four years,” Miller said. “I’ve worked in two different colleges, three academic departments, two institutes, and had offices in nine different buildings on campus. I have enjoyed it immensely.”

Miller said that two achievements stand out as highlights in his career.

The first was the opportunity to develop what became the Center for Environmental Informatics.

“In 2001, I was given the chance by Dr. Barron and Dean John Dutton to start an outreach center in the College of Earth and Mineral Sciences’ Environment Institute,” Miller said. “That became the Center for Environmental Informatics, now part of the Earth and Environmental Systems Institute, and is still doing well



more than twenty-one years later.”

Then around 2003, Miller had the second highlight of his career. He had the opportunity to help build the new online professional master’s program, the MGIS, developed by the John A. Dutton e-Education Institute and delivered via Penn State World Campus.

“Seventeen years and more than 500 graduates later, we remain one of the very best online programs in the world,” Miller said. “It’s been an absolutely fantastic experience to work with colleagues from both of these groups.”

Miller said he has always thought of himself as a broadly trained earth scientist who leverages geospatial technology to understand the earth system.

“While my first love is geomorphology, I’ve lately begun to refer to myself as a ‘landscape scientist’ because soils, geology, topography, vegetation, and climate are inextricably linked in the landscape,” Miller said. “Understanding how humans interact with those components is a key to being able to manage our planetary future.”

Miller said his forty-

plus year career at Penn State was also shaped by changing technology.

“I’ve seen the infusion of technology into every facet of our daily experience as researchers and instructors—from the introduction of the personal computer to now using unmanned aircraft systems (UAS) commonly known as drones,” he said.

Those interests also led Miller to form the Mobile Geospatial Systems Group whose members use drones to image the land surface for a variety of ecosystem management applications.

“We were among the first in the University to get started with UAS and helped to develop the University’s safety protocols,” he said.

Alongside the technology, Miller said he has also observed the growth of the student population and bureaucracy at the University.

“Penn State now has nearly twice the number of students than when I was a freshman in 1977. We’re very big and we can be very bureaucratic,” Miller said.

Research and engaging with colleagues and mentoring graduate students are the

things Miller said he will miss.

“Doug is probably the most influential and best mentor I have ever had,” said Nooreen Meghani, who worked at the Center for Environmental Informatics.

“He recognized very early on my passion for teaching and learning and invited me to be a part of his research group where I got to learn about remote sensing, lidar, and all kinds of GPS units. Doug encouraged me to learn to fly drones and get my remote pilot license. Working for and with Doug allowed me to recognize a passion that is shaping my life—I’ve gone back to school for my Ph.D., something I don’t think I would have done without Doug’s encouragement and trust.”

Miller said in retirement he plans to learn to fly fish, travel, and spend time with his grandchildren.

“I’ve been here at Penn State almost continuously for nearly forty-four years,” Miller said. “I’ve been a faculty member for over half my life and, while I’m still in relatively good shape, I want to spend time with my family, travel, and just enjoy life.”

New associate head for DEI's mission: To foster a sense of belonging



Lorraine Dowler, professor of geography and women's, gender, and sexuality studies was named the associate head for diversity, equity, and inclusion for the geography department this spring. Associate heads were named for each department in the College of Earth and Mineral Sciences as part of an ongoing initiative to build a more diverse, equitable, and inclusive department and college environment. The program was launched in January 2021, and Dowler was among the first appointed.

"This innovative new role is meant to deepen the infrastructure around diversity, equity, and inclusion work by focusing within each specific department," said Victoria Sanchez, associate dean for educational equity for the college.

The idea came to the college executive council from the

department heads, departmental DEI committees, and graduate students. Sanchez said she was happy to work with those stakeholders to develop a shared vision for the position.

"Taking me out of the equation, the creation of this position is extraordinary," Dowler said. "To put this position on par with the department's associate heads of the undergraduate and graduate programs not only speaks truth to power but puts truth on par with power."

Dowler also noted that the creation of this position takes the DEI work done by so many people in the department and the college and makes it more visible.

The associate head of DEI is a new role, so the responsibilities are evolving, however, Dowler said her aim is, "for no one in the department to feel out of place and not survive but thrive."

Dowler's scholarship is rooted in a feminist approach to geopolitics that enables more fluid conceptualizations of compassion, identity, and individuality as related to understanding everyday life, private spaces, and the lives of women and other vulnerable groups, she said.

In many ways, Dowler said she feels like he has been preparing for this position for her entire career.

"And yet I have so much to learn," she said. "I draw from my past service experiences as the head of the Department of Women's, Gender, and Sexuality Studies, as chair of the American Association of Geographers Harassment-Free

New AHDEI responsibilities

- Leading and engaging department faculty, staff, and students in DEI activities and initiatives to build community and enhance a sense of belonging.
- Cultivating and increasing departmental capacity for DEI and social justice.
- Supporting and amplifying the work of the EMS Office of the Associate Dean for Educational Equity and serve as a departmental point of contact.
- Serving as a centralized connecting point and resource for DEI efforts and communication within the department.
- Advocating for underrepresented faculty, staff, and students in the department.
- Implementing action items from EMS and department strategic plans, ALLWE, and other recommendations to foster a strong sense of belonging.

Task Force; my research on gender and race; and teaching social justice issues.”

Dowler observed that when the dean first created these associate head positions, there was a worry that the result would be one person charged to do all the DEI work.

“Instead, this position opened the flood gates to advocate, enhance, and implement the thoughtful responses I have received from department members,” Dowler said. “The real challenge will be to figure out pathways that represent the entire department. Meeting this challenge will require a vision, but it will also need outside funding sources to make meaningful change.”

Dowler has the department’s DEI committee to help set goals. The members of the committee during the 2020–21 academic year were Emily Rosenman, Louisa Holmes, Alexander Klippel, Erica Smithwick, and Bradley Hinger.

Some of the DEI committee’s goals are:

- To build a structure of engagement, including planning an initial department retreat focused on DEI.

- To ensure the department uses its resources wisely including patronizing Black- and minority-owned local businesses for catering, real estate, departmental supplies, etc.

- To recruit and retain more underrepresented minority students and faculty into the department.

- To assess graduate and undergraduate curricula to make sure they are addressing both belonging and justice.

“As educators, it is vital that knowledge is co-created, is place-specific, acknowledges prior experiences, and should be a shared practice between all people in the classroom,” Dowler said.

“This type of pedagogy means we need to constantly reframe the geography curriculum to make sure it is inclusive and anti-racist.”

To hold the department accountable, Dowler said she intends to conduct annual assessments of the DEI initiatives.

“This will promote change rather than simply saying we want to change,” Dowler said. “I am deeply committed to the University as a site of education to inform social change. I believe that education is a process where students can

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Seed grants support interdisciplinary

Geographers whose work crosses the subfields of human, environment, and society and geographic information sciences received seed grants for their research projects.



Enhancing weather data collection

Helen Greatrex received a Research Innovations with Scientists and Engineers (RISE) seed grant from the Institute for Computational and Data Sciences (ICDS) for the project “Standardizing Satellite Weather Analysis.”

While Greatrex describes her project as primarily, “back-end computing,” the purpose is to facilitate more efficient analysis of satellite weather data.

“At the heart of remote sensing is the idea of combining photographs from space in different wavelengths to tell us something about the Earth,” Greatrex said. “There are many different ways to estimate something like rainfall, so there are many products out there—each with their own combination of algorithms, satellites, and cameras. The needs of users are equally diverse, so there is no perfect satellite product—instead you have to work out the best one for you.”

For example, Greatrex said, the best rainfall product for daily malaria forecasting in Uganda will be different than the best one for drought monitoring in Vietnam.

To support her work with different users, she is developing a standardized set of methods for storing and analyzing satellite weather data, using the Penn State supercomputer Roar to speed up the analysis.

“Then we can spend our time analyzing and understanding what the results show, rather than reinventing the wheel each time to download and format,” Greatrex said.

RISE is a team of ICDS computational scientists, data scientists, and software engineers who help researchers leverage advanced techniques and skills for their research projects. The grant provides access to the team to complement and enhance computationally intense projects.

Investigating health in fenceline communities

Louisa Holmes received an Institutes of Energy and the Environment (IEE) seed grant for “Engaging Underserved

Communities in Environmental Assessment for Healthy Living.” Her co-investigators are Mallika Bose, professor of landscape architecture and



ary applied research in geography

Melissa Bopp, associate professor of kinesiology.

The aim of the project is to empower underserved and racially diverse neighborhoods in the Pittsburgh area to improve their local environments leading to improved health outcomes.

Holmes said the project will build on existing relationships they have in the Monongahela Valley using a community-based participatory research approach to meet three objectives.

“First, we will obtain baseline information on nutrition, physical activity, and air quality in fenceline communities, such as Clairton, Pennsylvania,” she said.

Previous research has shown that fenceline communities, or neighborhoods adjacent to industrial facilities, are exposed to more pollution.

“Second, we will work with local community organizations and Penn State Greater Allegheny faculty to craft community-based policy approaches that will help alleviate health disparities related to those factors,” Holmes said.

“Third, we will pilot innovative methodological approaches to community-based research in this area, for example using body cams and ecological momentary assessment.”

Holmes said the research team is in the process of meeting with community members “to establish the way forward that works best for them, while also allowing us to gain academic utility from the project.”

Assessing energy equity and housing

Emily Rosenman received an IEE seed grant for the project “Energy Retrofit Policy and Programs in Low-Income Housing Markets: Implications for Energy Equity in Cleveland, Ohio.” Her co-PI is Esther Obonyo, associate professor of architectural engineering and

director of the Global Building Network in the College of Engineering.

The purpose of the project is to assess energy retrofit programs in low-income housing markets by mapping and analyzing programs in Cleveland as a case study.

The knowledge may then be adapted for Pennsylvania cities and other places with older housing stocks, historical legacies of racial segregation, and high numbers of low-income renters, Rosenman said.

“There are a lot of incentive programs for affordable housing developers and landlords to retrofit units and we’re investigating how and whether these are used and who they benefit in Cleveland,” Rosenman said.

“We are doing an assessment of policies and programs around energy retrofits, especially how they are financed and who benefits from reduced energy costs. We are also looking at displacement and will be interviewing people in the affordable housing and energy retrofit industries.”



Van Meter seeks solutions to historical water quality challenges

Kimberly Van Meter joined the department this summer as an assistant professor of geography specializing in water systems. She is a co-hire with the Earth and Environmental Systems Institute (EESI).

Van Meter takes an interdisciplinary approach to her work, drawing on her training in chemistry and environmental engineering.

“The diversity of my background has allowed me to develop as a geographer, as I think about the different interacting systems across the landscape that create the complex environmental challenges that we face today,” she said.

Van Meter said her interest in studying climate, land use, and management practices that impact water quality and ecosystem dynamics came from her experiences growing up in Iowa, where about 86 percent of the land is used for farming, according to the USDA Agricultural Research Service.

“Such intensive agriculture brought many negative impacts on water quality, both within the state itself and in downstream waters like the Gulf of Mexico, where we have an aquatic dead zone each year approximately the size of New Jersey,” Van Meter said. “I grew up drinking well water in Iowa, wading the streams, and learning to canoe in the highly polluted Des Moines River. Water quality is a personal issue to me, and in my work I am deeply

interested in better understanding of how overlapping activities in the agriculture and energy sectors, in the context of a changing climate, are shaping our current water landscape.”

In her research on how agricultural practices have impacted water quality, Van Meter reveals how understanding the history of a landscape can provide important context for the current challenges.

“For example, in the Mississippi River Basin, where nitrate runoff from agriculture is creating problems like impairing drinking water quality and large aquatic dead zones, scientists predict we need to reduce nitrate by about 60 percent to reduce the size of the Gulf of Mexico dead zone to a manageable area,” Van Meter said. “But looking at the history, we can see that means reducing runoff to approximately 1930 levels—before farmers were even using nitrate fertilizers.”

Despite the challenges, Van Meter said she is excited about ongoing wetland preservation work as one way to address those water quality problems.

“Wetlands provide such a large range of environmental benefits, from provision of aquatic habitats for birds and other animals, to the filtering of contaminants from polluted water, it is difficult to overstate their importance in landscape restoration efforts,” Van Meter said. “While efforts to restore wetlands could certainly use more funding, one of the most important results from my recent

work on wetlands and water quality is to show that targeted restoration efforts can give us the best bang for the buck. If we work to restore the wetland landscape strategically in some intensively farmed areas, we can achieve large improvements in water quality as well as a host of other environmental benefits.”

Building upon her research, this fall, Van Meter will teach a special topics course, GEOG 497 Human Impacts on Aquatic Ecosystems.

“In the class, we will focus on key aquatic ecosystems, from small wetlands and ponds to large coastal systems such as the Chesapeake Bay and Gulf of Mexico,” she said. “An important goal will be to better understand how those ecosystems function in the landscape and how human activity is changing this functionality.”

In the spring, Van Meter will teach a geomorphology course emphasizing the development of river and coastal systems, and how climate change is affecting those systems.

For future research projects, Van Meter said she is interested in exploring the effects of dams and reservoirs on water quality.

“We live in an era where many new dams are being built, particularly in Asia and South America,” she said. “At the same time, there is increasing interest in removing small, older dams that have become unsafe or that



no longer serve a current purpose. It is still not well understood, however, how dam building and dam removal change downstream water quality.”

Van Meter said she is planning a new study to quantify the effects of dams across the Chesapeake Bay Watershed on riverine nitrate loads. Later she will expand the study to include old mill dams—and mill dam removal—in the region.

“We have many tools at our disposal to improve environmental outcomes,” Van Meter said. “I am increasingly heartened to see an emphasis on solutions to water quality and other environmental problems, and a growing chorus of voices demanding that we do what is needed to make these solutions a reality.”

HoD from p. 3

systems science aligns with our department and college, and shows that geography remains well-positioned throughout the University.

As we prepare for the fall semester, it is fitting to look both back and forward, to feel saddened by loss and departures but also hopeful for new beginnings. I am confident that our community is well positioned to navigate a new normal while also pursuing new horizons.

Sala Kahle (Stay well),
Brian



Take her to climate ch

Brandi Gaertner joined the department this summer as an assistant teaching professor of spatial data science in the online geospatial education program.

She earned her doctorate in forestry and natural resources from West Virginia University.

Gaertner is a climate change hydrologist, GIS analyst, and is also working on a master's degree in instructional design and online technology.

"Climate change hydrology is the study of changing temperature regimes on surface water availability," Gaertner said. "In response to climate change, some regions—like West Virginia and Pennsylvania—are becoming wetter while others—such as the southeast U.S.—are becoming drier."

Gaertner said she was inspired to bring together the disciplines of climate change hydrology and GIS while she was conducting fieldwork for her first master's degree.

Her recently published research looked at changes in growing season length and freshwater availability, focusing on the West Virginia Appalachian Mountains region.

"West Virginia is one of the most heavily forested states in the country, which acts as a natural filtration system and can help stabilize water supplies," Gaertner said. "Due to its location along the spine of the Appalachian Mountains, it is the headwater catchment for many different large river systems including the Potomac, Monongahela, and Mississippi, and

provides upward of 30 percent of its clean and stable water supplies to downstream communities in Washington D.C., Pittsburgh, Ohio, and communities further downstream the Mississippi River."

In a 2019 study on how climate change is affecting the region's growing season, Gaertner used both satellite and historical data on spring bloom dates to calculate the change in the growing season. She found that a longer growing season has implications for water supply and biodiversity.

"Because trees use water in the process of evapotranspiration, a longer growing season could lead to reduced surface water, which could lead to reduced water availability for domestic water supply, industry, or agriculture," Gaertner said. "Secondly, as the trees begin to bloom and temperatures rise earlier in the spring, insects respond by eating and pupating earlier. However, birds migrate on a biological clock

to the river: Gaertner reads change warnings in water

and may miss this important meal supply on their migration north in the spring, which could lead to reduced avian biodiversity.”

In a 2020 study following up on climate change implication for freshwater availability, Gaertner found that both increased flooding in some areas and increased drought in other areas were likely to become more common, presenting challenges for water management.

“Climate change is currently a very contentious issue, but everyone notices water, especially natural disasters such as floods and droughts,” Gaertner said. “Individual citizens recognize the importance of having water available for drinking and agriculture. By showing the impact of climate change on surface water hydrology, my studies can help water and climate change managers, while also appealing to the citizens to recognize current national and global water

concerns.”

As a teacher, Gaertner said she wanted to learn more about how to develop effective online courses so she could provide more flexibility for her students, so she enrolled in a master’s program in online technology and instructional design after earning her doctorate.

“I consider myself a lifelong student and enjoy the opportunity to continue to develop my professional craft,” she said, adding that being an adult online learner herself helps her to be a more effective instructor

Gaertner will be teaching GEOG 484 GIS Database Development, GEOG 487 Environmental Applications of GIS, and GEOG 583 Geospatial System Analysis and Design this academic year.

“My training in instructional design has impacted my teaching in many ways including online feedback and communication, online technology, course development and design,

and teaching philosophies,” Gaertner said. “I like to use scaffolded course design and project-based learning which allows the students to develop their own project, choose their own data, or adjust the course to their interests or learning styles.”

Gaertner said she is looking forward to working with students to continue growing-season research in different ecosystems.

After she completes her master’s degree in online technology and instructional design in spring 2022, Gaertner said she plans to continue to pursue a master’s degree in lifelong learning and adult education and diversity studies certificate through Penn State World Campus.

“Since so many of the students in the GIS program are adult learners, it’s important to understand how to communicate, motivate, and mentor students from underrepresented groups,” she said.

Suarez teaches students to harness the power of geographic information

Marcela Suarez joined the department as an assistant teaching professor of spatial data science in the summer of 2021. She will teach GEOG 586 Geographic Information Analysis, GEOG 486 Cartography and Visualization, and GEOG 583 Geospatial System Analysis and Design in the online geospatial education program during the 2021–22 academic year.

Suarez earned her doctorate in geography in 2020 from the University of California, Santa Barbara. While at UC Santa Barbara, she developed and taught in-person, hybrid, and fully online courses.

“As an instructor I had to think about new ways and activities to achieve our learning goals,” Suarez said. “For example, online class interaction and participation tend to decrease compared to that of a regular in-person lecture. For in-person courses, I used to include activities such as peer discussion when walking them through a lab exercise, whereas for the online version, I have relied more on the tools such as discussion forums provided by the learning platform.”

Suarez also made changes to the lab requirements for online classes.

“Unlike completing an assignment in a computer lab where we know which software, versions, and libraries are installed, online students need to complete the work using their own computers,” Suarez said. “I added more instructions to guide them through the process

of setting up their own laptops or using cloud-based versions of the software.”

Suarez said her teaching approach has been informed by her research.

“Since there are new technologies and novel ways to acquire, contribute, and share new data, we now need to think about new methods and tools to analyze these new datasets, as well as on how to update and leverage the already existing methods in geography,” she said. “That is very important to consider when we are thinking about teaching and educating the new generations of GIS professionals.”

Her interest in using spatial data to understand natural hazards, disasters, risk management, and emergency response came from her experiences growing up in Colombia, Suarez said.

“I grew up witnessing how floods and landslides affected the same regions over and over,” she said. “So when I learned in college about the power of geographic information, these were the core questions that I really wanted to answer. For example, I wanted to understand why these events happen where they do, their patterns of recurrence, and why some communities are more vulnerable than others.”

By the time Suarez was considering graduate school, she already felt geography was the natural home discipline for her.

“It is a broad and fascinating discipline that is pretty much related to everything around us, which of course includes natural

hazards and disasters,” she said.

Her dissertation, “Tweets as Information for Emergency Response During Weather-related Disaster Events: Methods, Constraints, and a Geographical Perspective,” pointed out that despite the potential of crowdsourced Twitter data to contribute timely on-the-ground information, tweets are neither used by emergency responders in a systematic fashion, nor integrated into their tools for decision making.

“There are two main things to consider when working with Twitter data. First, it is uncertain, since people can tweet anytime, anywhere, and about anything in an unstructured text and second, there is a lack of credibility associated with it,” Suarez said.

In order to solve that problem, Suarez’s research has focused on understanding how spatiotemporal information embedded in tweets can be leveraged to identify and summarize relevant, reliable, and actionable information for emergency response, and exploring how geographic information related to hazards and validated citizen reports can be used for assessing tweets reliability.

She has found three results that have practical implications for how tweets sent during weather-related disasters can be used for emergency response.

“The first and probably most obvious one is that Twitter data needs extensive cleaning and preprocessing in order to offer meaningful insights for public policy,” Suarez said. “For this, natural language processing tools and data mining techniques play a key role. The second finding is that official geographic data and hazard information play an important role in defining the spatial and temporal filters for data classification. Finally,



regarding content analysis, it is not the bigger the dataset, the better. Rather, it is the better filtered the dataset, the more meaningful the insights.”

In future research Suarez said she would like to explore data reliability, representation of data quality, and representation of reliability in maps as well as how geographic information can help identify misinformation and rumors spread via social media platforms.

She said she would also like to develop a course on the foundations of spatial data science.

“I want this course to offer students with little or no prior coding experience or GIS knowledge an overview of the main methods and tools available to the GIS and spatial data science community,” she said.

Suarez said she most enjoys teaching courses that students enjoy taking.

“Usually those include a final project,” she said. “In those courses students not only grow confident about applying concepts learned in lectures but also get more actively involved in lab sections and discussions. I have also noticed that students appreciate having a final result to share, be it a portfolio of maps, a web-based geovisualization, or the outcome of an analysis.”

Community Updates

Retires and Hires

Rob Crane, associate vice provost for Global Programs and professor of geography, retired in August 2021 from the University after 36 years as a faculty member and administrator.

William Easterling returned to the department after concluding his term as assistant director of the National Science Foundation in charge of the Geosciences Directorate.

Brandi Gaertner joined the department this summer as an assistant teaching professor of spatial data science in the online geospatial education program.

Tatiana Gumucio joined the department as a post-doctoral scholar working on Helen Gretrex's AXA-XL grant on humanitarian weather response in Somalia.

Alan MacEachren, professor of geography and

information science and technology and longtime director of the GeoVISTA Center from its formation in 1998 until 2020, retired in July 2021 after 36 years at Penn State.

Research Professor **Douglas Miller**, who created and led the Center for Environmental Informatics for 20 years, retired in July 2021.

Marcela Suarez joined the department this summer as an assistant teaching professor of spatial data science in the online geospatial education program.

Kimberly Van Meter joined the department this summer as an assistant professor of geography specializing in water systems. She is a co-hire with the Earth and Environmental Systems Institute (EESI).

Faculty and Staff

Todd Bacastow, teaching professor in the College of Earth and Mineral Sciences

at Penn State, was appointed to the board of directors of the United States Geospatial Intelligence Foundation (USGIF) for a three-year term.

Jennifer Baka, Gregory Jenkins, Alexander Klippel, Louisa Holmes, and Emily Rosenman are among the 22 groups of interdisciplinary researchers to receive Institutes of Energy and the Environment (IEE) seed grants for the 2020-21 award cycle.

Trevor Birkenholtz was appointed associate head for resident graduate programs.

Guido Cervone was elected president of the Natural Hazards section of the American Geophysical Union.

Lorraine Dowler was appointed as the department's first associate head of diversity, equity, and inclusion. She began her new role in January 2021.

Roger Downs continues in his role as the associate head for the undergraduate program.

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Helen Greatrex received a Research Innovations with Scientists and Engineers seed grant from the Institute for Computational and Data Sciences for the project “Standardizing satellite weather analysis.”

Louisa Holmes received funding from the Penn State Population Research Institute Emergency Grant Fund for the project “Bay area young adult health panel survey” and an IEE seed grant for “Engaging Underserved Communities in Environmental Assessment for Healthy Living,” with co-investigators Mallika Bose, professor of landscape architecture and Melissa Bopp, associate professor of kinesiology.

Joshua Inwood was promoted to professor of geography and was quoted in the article, “Don’t Move On Just Yet: Could a truth and reconciliation commission help the country heal?” in *The Atlantic*.

Beth King received the 2021 Carolyn Merry Mentoring Award from the University Consortium for Geographic Information Science.

Anthony Robinson participated in the panel discussion “Social Engineering with Data - Disinformation and Destabilization of Geo-Political Order” at the Institute for Computational Data Sciences’ virtual symposium, *The Data Deluge: Opportunities and Challenges*, on October 22–23, 2020.

Emily Rosenman received an IEE seed grant for the project, “Energy retrofit policy and programs in low-income housing markets: Implications for energy equity in Cleveland, Ohio.” Her co-PI is Esther Obonyo, in the College of Engineering.

Erica Smithwick was awarded the title of distinguished professor and was selected as an Administrative Fellow for 2021–22. Her mentor will be Lora Weiss, senior vice president for research.

Students

Rising second-year undergraduate **Rylie Adams** was awarded placement in the NASA PA Space Grant Research Internship Program with **Alexander Klippel** as her mentor.

Ph.D. student **Megan Baumann** was awarded the Best Paper Award for 2021 from the Latin America Specialty Group of the American Association of Geographers (AAG) for her paper titled, “‘No es rentable’: Land rentals as a form of slow exclusion and dispossession in Colombia’s irrigation megaprojects,” and she also received the 2021 Mountain Geographies Specialty Group Mauna Kea Student Presentation Award.

Undergraduates **Hannah Schreck** (fall 2020) and **Amanda Byrd, Shane Leister, Talia Potochny, Jenna Pulice, Harman Singh, and Sophie Tessier** (spring 2021) were named College of Earth and Mineral Sciences Academy for Global Experience (EMSAGE) Laureates.

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COMMUNITY from p. 23

Ph.D. students **Connor Chapman** and **Ruchi Patel** were named EMS Graduate Council representatives for the Department of Geography. They began their term in January 2021 and serve for the 2021 calendar year.

MGIS student **Amy Farley** won first place in the Engineering category of the Graduate Exhibition for her research project, “Open-source, serverless web-mapping: A case study for the agriculture industry.”

Ph.D. student **Mikael Hiestand**, was quoted in the article, “Introducing Students to Scientific Python for Atmospheric Science,” in the September 2020 issue of the *Bulletin of the American Meteorological Society*. He also spoke at the fall 2020 virtual Climate Dynamics Seminar Series, on the topic, “Annual variations in latent and sensible heat fluxes under differing synoptic regimes in the U.S. Corn Belt,” on September 30, 2020.

Ph.D. students **Bradley Hinger**, **Gillian Prater-Lee**, and **Jacklyn Weier** were elected as department graduate student representatives, serving from spring 2021 through fall 2021.

M.S. student **Matt Bauerlin** and Ph.D. student **Ruth Buck** were elected as department graduate student representatives, serving from summer 2021 through spring 2022

Ph.D. student **Jaiwei Huang’s**, article, “Walking through the forests of the future: using data-driven virtual reality to visualize forests under climate change,” was recognized for receiving an Altmetric score of 120, placing it in the top 5 percent of all research outputs scored by Altmetric.

Ph.D. student **Susan Kotikot** received an Early Career Award from the National Geographic Society.

Ph.D. student **Chanel Lange-Maney** received the Nancy Brown Community Service Award from Supporting Women in Geography (SWIG).

Undergraduate student **Alexandra Lister** won first place in the AAG Undergraduate Student Affinity Group Poster Competition. The poster, “Rattlesnake safety on the Black Forest Trail” was based on her final project in GEOG 260 last semester.

Undergraduates **Chris Long** and **Talia Potochny** were EMS Benefiting THON dancers for Virtual THON Weekend held February 19–21, 2021.

Ph.D. students **Arif Masrur**, **Jamie Peeler**, and **Julie Sanchez** represented the department at the fall 2020 Virtual EMS Graduate Research Showcase held on November 13.

Ph.D. student **Tara Mazurczyk** had two pieces of artwork featured in Penn State Creates, a virtual exhibition of design, craft, and makery, hosted by the Palmer Museum.

Ph.D. student **Ruchi Patel** received a Fulbright U.S. Student Award to support her dissertation research in El Salvador for the project, “Development, conservation, and change on El Salvador’s Balsamo Coast.”

Jamie Peeler, who graduated with her doctoral degree in 2021, was named a NatureNet Science Fellow with The Nature Conservancy. She is currently a postdoctoral scholar

at the University of Montana.

Ph.D. student **Saumya Vaishnav** received the Harold F. Martin Graduate Assistant Outstanding Teaching Award.

Alumni

Joel Burcat, who earned his bachelor of science degree in geography in 1976 and went on to become a multi-time winner of Pennsylvania's "Best Lawyer" designation for Environmental Litigation, has written his second novel in the Mike Jacobs series after *Drink to Every Beast*, titled *Amid Rage* (Headline Books; February 2, 2021).

Wayne Brew, who earned his bachelor of science degree in geography in 1981, has published three photo essays in *PAST*, the online journal for the International Society for Landscape, Place & Material Culture.

Sheryl Kron Larson-Rhodes, who earned a bachelor of science in 1985, received a State University of New York (SUNY) Chancellor's Award for Excellence in Librarianship.

Elizabeth W. Boyer, professor of water resources, who earned her bachelor of science degree in geography in 1990, is among seven Penn State faculty members named Fellows of the American Association for the Advancement of Science (AAAS).

Martin von Wyss, who graduated in 1994, launched World Wine Regions, worldwineregions.com, an interactive atlas of the world's wine regions.

Colonel Brett DeAngelis, USAF, who earned his bachelor of science in geography in 1999, graduated from the U.S. Naval War College with distinction. His essay "B-25 Gunships in the Pacific: Lessons in Innovation, Risk, and Failure" won the General George C. Kennedy Award for Writing on the topic of Airpower.

Lettice Brown of York, Pennsylvania, who earned her bachelor of science in geography in 2006, was recently featured in an Allegheny Front story, "Nature Groups Address Environmental Justice in Pennsylvania."

Jessica Whitehead, who earned her doctorate in 2009, was named the Joan P. Brock Endowed Executive Director of the Institute for Coastal Adaptation and Resilience (ICAR) at Old Dominion University.

Emily Klipp, who earned a postbaccalaureate certificate in GIS in 2010, was promoted to associate in Dewberry's geospatial and technology services group.

Megan Ruffe, a Schreyer Scholar who graduated in 2013, earning degrees in film production and geography, has been working at Florentine Films for eight years. She is currently producing and editing for Ken Burns's archive website project, UNUM, and launching a web series called "UNUM Shorts."

Sid Pandey, who graduated in 2014, was selected as a member of URISA's Vanguard Cabinet for their 2021-23 cohort, was selected by Geospatial Media as one of their Geospatial World 50 Rising Stars for 2021, and was promoted to senior associate at Dewberry.

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MACEACHREN from p. 9

to pursue his professional research interests, unburdened by teaching and service obligations.

“Now, it is time to move on and make space for others,” MacEachren said, “A year with a global pandemic also put things in perspective,

prompting the specific decision to retire this year. I plan to stay professionally active, focusing on research and writing that most interest me. “As the pandemic abates, I hope to have opportunities to travel both for professional events

and for birding, (my primary non-academic avocation). The rest of this year, I plan to put more focus on birding than on research and writing—to start balancing out the life-work equation.”

DEI from p. 13

be empowered to act for social justice.”

Sanchez said all the newly appointed associate deans for DEI meet regularly as a group with her office.

“Geography offers disciplinary expertise in DEI issues and the department has for some time been actively working in this arena,” Sanchez said. “Lorraine

has been able to contribute a depth of experience to our discussions. She is wonderful to work with. Already our group has had rich exchanges of ideas and discussions on initiatives underway in each department. I’m excited about the possibilities that these positions offer and I’m glad that Lorraine is among the inaugural group.”

COMMUNITY from p. 25

Rachel Passmore, who earned a bachelor of science degree in geography in 2014, published, “Needs Assessment of Integrative Health Services at School-Based Health Centers,” in the November 2020 issue of *Alternative Therapies in Health and Medicine*.

Li San Hung, who earned his doctorate in 2016, published,

“Comparing the effects of climate change labelling on reactions of the Taiwanese public,” in the November 2020 issue of *Nature Communications*.

Nathaniel Geyer, who completed his MGIS in 2020, published his capstone paper in the *International Journal of Geo-Information*.



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