MARYLAND DAY

10 A.M.—4 P.M.  FREE ADMISSION AND PARKING

AGNR INVITES YOU TO UNLOCK A WORLD OF LEARNING, DISCOVERY, AND EXPLORATION AT MARYLAND DAY. EXPERIENCE LIVESTOCK SHOWS, INTERACTIVE EXHIBITS, GAMES, AND FOOD DURING A DAY-LONG FAMILY-FRIENDLY JOURNEY ACROSS OUR COLLEGE AND THE ENTIRE UMD CAMPUS.

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LIMITED LAND, UNLIMITED POTENTIAL
UMD Extension is Elevating Urban Agriculture

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A MESSAGE FROM DEAN BEYROUTY

A happy new decade to you all! I can’t believe we are in the year 2020. Time has certainly flown for me as I’m now entering my fifth year as dean of the College of Agriculture & Natural Resources. Our college has accomplished so much, but we are careful not to rest on our laurels—there is still much work to be done. As always, as the cornerstone of our land grant university, our primary focus is on improving the lives of the citizens of Maryland through teaching, research, and Extension.

We are currently in the midst of recruiting the next cohort of undergraduate students into our college, and we are honored and humbled by those prospective students that choose to join the AGNR family. Our commitment to recruitment and the overall student experience here on campus is greater than ever. Historically, we have stayed consistent with an overall undergraduate enrollment of about 1,200. We now have goals and strategies in place to elevate that number to 1,500 students. We take pride in the diversity of programs offered within the college, and we strive to attract students not just from select geographic locations, but from all across the state and beyond who represent the diverse pursuits and values inherent to our college. We have already cultivated outstanding talent, but we are passionate about broadening our reach with renewed efforts in recruitment and communication.

On that note, I’m particularly energized by the content within this issue of Momentum, as we dig into our strategic initiative, Advance Innovative, Profitable, and Sustainable Agricultural Production Systems. Ag production can have a very traditionalist connotation, but these stories and profiles paint a very modern-facing picture of the diverse systems, people, career fields, and issues that are associated with our work. You’ll meet Emma Mullineux, the first ever Marylander to compete in the Bassmaster College Series National Championship, and the ONLY female competitor in 2019. We introduce you to our research team working to determine the viability of hemp as a product and economic supplement for Maryland farmers. Our college’s focus on the urban sector is an increasing priority, which we explore through a glimpse into a new partnership between Extension and a burgeoning rooftop farm operation. We have much to celebrate in 2020, and we’re glad you’re along with us for the ride.

I wish you all the best as we start a new decade and we look forward to seeing you at our next alumni event!

Craig Beyrouthy
Dean and Director

ON THE COVER: Up Top Acres urban garden overlooking the Washington Nationals stadium in downtown Washington, DC.

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For information on how to engage with the AGNR alumni chapter, please contact Amanda Brown Clougherty at abrown@umd.edu.

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Ask Adel

DR. SHIRMOHAMMADI TALKS INNOVATION, DIVERSIFICATION, TECHNOLOGY, AND EMERGING MARKETS IN AGRICULTURE

How important is diversification for Maryland agriculture?
We have diverse land resource regions in Maryland, and that makes diversification a necessity. Different regions lend themselves to different agricultural systems based on geology, soils, and climate. AGNR has specifically established our Agricultural Experiment Stations across the unique regions of Maryland to meet the needs of our farmers and develop innovative technologies that boost our various production systems. From apples in the Western region to poultry on the Eastern Shore, agriculture is the number one industry in Maryland.

How does innovation play a role in diversification and new emerging markets in agriculture?
Farmers always diversify to provide society with what is needed while remaining economically sustainable. Hemp, which you will read about later in this issue, is an example of an emerging market that offers opportunities for diversification, but it is not a new phenomenon. Historically, it has been planted all over the world for fiber. Now, through technological advances, we can extract CBD oil and produce medical cannabis as policies allow. As science advances, we open up new markets to meet needs not just in food, but to improve health. We learn how to extract value-added products for the good of humanity.

How does urbanization factor into the future of agricultural production systems?
Innovation has been a constant in agriculture across its history. Now, we are using technologies like drones and automation to increase our yield per unit area, to respond to labor shortages, to improve animal welfare and reduce disease, to use our water more efficiently with sensor irrigation technology, to scout for pests, and even social impacts helping respond to food insecurity in our inner cities. We are producing locally grown food in urban settings, even on top of the same restaurants where the food is being served, like in the AGNR partnership with Up Top Acres.

What role will innovation continue to play in the future of agricultural production systems?
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On the Frontlines of the Rural Opioid Crisis

$1M FEDERAL GRANT WILL FUND EDUCATION AND TRAINING TO COMBAT GROWING PROBLEM

According to the National Institute on Drug Abuse, Maryland ranks in the top five in the nation for opioid-related overdose death rates. Substance abuse is not always considered a rural problem, but increasingly, rural Maryland communities are struggling to battle this crisis. The Substance Abuse and Mental Health Services Administration (SAMHSA) reports that misuse of opioids in metropolitan areas is at 4.5%, with rural areas close behind at 4.0%.

To address this need in the state of Maryland, UMD Extension (UME) and partners have been awarded over $1 million from SAMHSA to build capacity in rural areas. UME will use the successful Extension education model to deliver training to rural Maryland communities struggling with behavioral health and substance abuse issues.

“One of the things we noted while conducting a needs assessment was gaps in understanding the opioid crisis and available resources to help or get information,” said Jinhee Kim, principal investigator on the grant, professor, and Family & Consumer Sciences program leader with UME. “The opioid epidemic affects communities relatively equally, but access to healthcare and mental health providers is not equal at all.”

“Opioid addiction is a national public health concern that kills over 130 people every day nationwide. Our study team will collaborate with local partners that have the expertise and are trusted in the community,” said Ali Hurtado, co-principal investigator and assistant professor in the School of Public Health at UMD.

“The overarching goal of this grant is to strengthen the understanding of the epidemic and prevention strategies in rural Maryland, and to provide technical assistance with cutting-edge research.”

Ali Hurtado, UMD, School of Public Health

“Ideally, increasing their capacity will help them acknowledge, be aware of, and understand the mental and behavioral health issues impacting their community,” said Kim.

Over the next two years, UME will train 120 educators in the evidence-based program, Mental Health First Aid, as well as 500 community leaders and service providers within the identified rural regions.

“As educators, our goals are to raise awareness and build educational resources for communities struggling with mental and behavioral health problems,” said Shannon Dill, principal agent for UME. “There is a social stigma associated with mental health. We aim to break that down by encouraging conversations and connections, with the ultimate goal of increased well-being, profitability, and business sustainability for Maryland farm families.”

A second goal of the project is to deliver a proven prevention program, the Botvin LifeSkills curriculum, to middle-school aged children to decrease youth susceptibility to substance abuse. Over the next two years, 40 educators will be trained to administer the program for 650 students, as well as parents and caregivers.

The team will also increase community capacity for combating the opioid epidemic in rural Maryland by creating an advisory group, Rural Maryland Opioid Issues, and a virtual network of UME and community educators, partners, and local practitioners. Six online trainings will be available for educators and practitioners, and eight webinars will be produced for individuals to educate the whole community.

“UMEs role is very important because we are a trusted source of health and wellness information within our communities,” said Kim. “Great work has been and is being done on the opioid crisis here in Maryland, and were helping and supporting those programs by building out the capacity of rural Maryland for a comprehensive approach.” — LM.
coming from productivity growth, not economy in that most of our growth is "One thing to stress is that agriculture next 40 years of his career at UMD. He never thought he'd end up being an academic expert in agricultural productivity, training some of the most influential researchers and practitioners in the field. But, as he tells his students, the work sometimes guides you to places you don't expect.

"I do the work for the purpose of the work, and I love it," said Chambers. "Everybody who is in academics thinks what they are working on is the most important thing in the world, and I'm no different. But my career wasn't linear, and I'd like to think that made me more productive over areas that I might not have grown into otherwise."

One such area is agricultural productivity, a field in which Chambers is now renowned. After graduating from AREC in '75 and then getting his PhD at the University of California, Berkeley, Chambers briefly served as an assistant professor at The Ohio State University. As a new professor, he was asked to teach a class in agricultural productivity, which was a new field for him. But instead of perpetuating the status quo, he did extensive research into the topic to put together a cutting-edge course. When he left Ohio soon after and joined the AREC faculty in 1979, he brought this knowledge with him. He continued teaching the class, and his research went with it for the next 40 years of his career at UMD.

"One thing to stress is that agriculture is unlike most other sectors in the economy in that most of our growth is coming from productivity growth, not input growth," explained Chambers. "Inputs in agriculture have stayed basically the same since the late 1940s, but productivity has on average grown about 1.6% a year, and at this point has doubled."

But this is not the only thing that makes agriculture unique when it comes to calculating and assessing productivity. In other sectors, all inputs are controlled by the industry. But in agriculture, there are certain inputs provided by weather and climate that are not in the producer's control, but that have significant impacts on productivity year to year. "It is driven by Mother Nature," said Chambers, "and we want to be able to put those numbers into the calculations so that we can ultimately describe growth. It is hard to describe growth patterns when we haven't been able to sort out weather patterns to determine what is actually growth and what isn't."

With weather patterns noticeably changing across regions, these questions are becoming even more important. Incorporating this data into the calculations is something that hasn't been historically done and has been a focus of Chambers and colleagues he has worked with and trained. In a recent paper published in Science Advances, Chambers and his former student Ariel Ortiz-Boba, now an assistant professor at Cornell University, incorporated over 40 years of weather data into productivity calculations and found that the Midwest region is particularly at risk due to lack of water access in increasingly common drought conditions. Continuing this work, Chambers is involved in a new nearly $10 million grant to examine techniques to improve agriculture in the Southern Plains states, with Chambers making sense of the data and making predictions for future productivity.

Due to Chambers' involvement in this field, UMD hosted an Organization for Economic Cooperation and Development (OECD) working group meeting in agriculture, gathering international experts from around the world to discuss the standardization of global agricultural productivity numbers, including the importance of including inputs like weather that are unique to agriculture. Right now, only the United States, Canada, and Australia have standardized numbers that can be compared across countries, and this is in large part due to the work of Eldon Ball, a former student of Chambers and the pioneer of standardized productivity calculations in agriculture at the USDA.

"Our work with OECD is very exciting and all about getting agriculture on equal footing with other economic industries. I take great pride that there are people that have come out of this program that I've trained who have made a great impact."

Chambers added, "I was lucky enough to come to AGNR at a time when there were a lot of younger and highly motivated faculty working to improve AREC, and after eight or nine years we had become one of the top programs in the country. UMD made it so I never wanted to leave." — SK

"Inputs in agriculture have stayed basically the same since the late 1940s, but productivity has on average grown about 1.6% a year, and at this point has doubled."

BOB CHAMBERS, PROFESSOR, AGRICULTURAL & RESOURCE ECONOMICS (AREC)
Everything is a Study of Behavior

EARLY IN HER CAREER as a veterinarian, Marsha Reich, DVM ’85 met Rocky, an anxious German Shepherd at the College Park Animal Hospital. Going to an exam room was a no-go for the perturbed pup, and Reich had to repeatedly attend to Rocky in the waiting room.

Now she looks back on the experience as a call to action to learn more about why animals exhibit certain stresses and behave the way they do. “That experience was a huge catalyst for me,” said Reich. “Rocky led me to immerse myself in research, attend conferences, and become a board-certified veterinary behaviorist in 2001.”

Soon after, she launched her own business as a veterinary behavior consultant. Similar to treating Rocky, she works with pets on their turf, only making house calls.

“I go to the home of the pet exhibiting behavior challenges so that I can observe them in their environment with their owners. Fear and anxiety are the basis of many pet behavioral problems; however, each pet is an individual and can manifest these problems differently. Medical disorders can also influence behavior,” said Reich. “Through listening and observation, I can create a treatment plan to help the pet and the owners.”

Over her years of professional experience, she has realized that odd behaviors like a dog chasing its tail could be due to an underlying cause or medical issue. In humans, for example, if our foot falls asleep, we will stand up and shake it around to get the blood flowing. A cat batting its tail constantly could be due to an underlying cause or medical issue.

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Reich has seen the mentality shift from “pets are pets” to people regarding them as “fur babies.” With decades of experience studying animals and their owners, Reich has seen the mentality shift from “pets are pets” to people regarding them as “fur babies.”

“Pets contribute to emotional and mental health of their owners,” she said. “Helping to improve the lives of two-leggeds and four-leggeds at the same time brings me the most satisfaction.”

These days, she focuses on geriatric behavioral problems and how to improve the lives of older animals. Recently, she co-authored a chapter on animal repetitive disorders in *Decoding Your Dog*, a book by the American College of Veterinary Behaviorists.

Aside from helping animals one-on-one, Reich travels nationally and internationally to give lectures on animal behavior as the field’s popularity has grown, while racing sailboats on the Chesapeake Bay and making chocolate in her free time.

While her career has taken her around the world, she said she doesn’t forget her days as an active undergrad in the Block & Bridle, Pre-Vet, and Ag Student Council clubs at UMD. — A.C.

Reel Accomplishments

“People say all the time that bass fishing is what sets the men apart from the boys,” said Emma Mullineaux, a Fall ’19 graduate now with her degree in Agricultural Science and Technology. Mullineaux is neither, but she is used to being one of the only women in a male dominated sport, competitive bass fishing. As president of the two-and-a-half years young UMD Bass Fishing Club for the past two years, she has grown the club to include 25 active members and three boats, representing the state of Maryland this summer as the first ever Marylander to compete in the Bassmaster College Series National Championship. While women have occasionally competed in the past on the national level, this year among 227 participants, Mullineaux was the only female competitor.

Bass Anglers Sportsman Society, or B.A.S.S., hosts the national championship each year, and they were thrilled to have Mullineaux, not only as a female, but as a Marylander. “Bass fishing is big in Maryland, and we actually have two of the best bass fisheries in the country, but the sport of bass fishing is not big here,” said Mullineaux. “When we told B.A.S.S. I was coming, they were ecstatic because Maryland has never sent anybody before.”

The sport garners a lot of attention in competitive fishing for its complexity and fast pace, with the collegiate championships broadcast on ESPN each year. “My ultimate dream would be to get paid to fish, to one day jump on a pro circuit,” said Mullineaux. For now, however, Mullineaux is already working as head agronomist for Madtech Agronomy Services, a company that flies drones for agricultural surveying and consulting.

Mullineaux will be competing this year at the first national trial event in the Toledo Reservoir, Louisiana, to try to qualify for nationals again one last time this summer. — S.W.

UMD is the first & only Maryland university or college with a bass fishing team competing nationally.
Conserving Komodos
A HANDS-OFF APPROACH TO ANIMAL WELFARE

ON A CHILLY MONDAY MORNING at the National Zoo in Washington, DC, senior Bailey Clark looks through a glass pane at Murphy, a rather intimidating looking seven-foot Komodo dragon. Her eyes soften, she flashes a wide smile, and a doting expression fills her face.

“Isn’t he cute?” she exclaims.

This is precisely the Bailey Clark the college has known since she arrived as an aspiring veterinarian in the fall of 2016. She harbors no pretense or judgement about any animal, opting instead to see the beauty and value in all living creatures. She is the proud owner of a baby ball python and a hedgehog. Well, there is one exception. “I don’t like centipedes,” she admitted.

Murphy may not be objectively cute, but he is quite impressive, representing one of the largest and heaviest lizards in the world, weighing in the vicinity of 150 pounds, and packing a dangerous and potentially lethal venomous bite. As part of Clark’s year-long internship through the Smithsonian’s Wildlife Health Office, affording her the prestigious opportunity to work directly under the head of wildlife and conservation for the Smithsonian, she is working to enhance Murphy’s quality of life and reduce his stress levels through careful monitoring and analysis of Komodo dragon blood values.

“My supervisor wanted me to help assess an underlying health problem with Komodo dragons here at the zoo,” explained Clark. “I was able to solve the issue by looking at a paper for the same type of disease in sloths. Both animals share the same affliction due to similar living circumstances and husbandry methods, so I was able to offer a solution through blood sample analysis and comparative research.” Clark is producing a formal paper on her work which precludes her from sharing her findings prematurely.

Clark’s work at the zoo isn’t limited to Komodo dragon research, however. She is also contributing to the conservation practices of mountain gorillas, native to Central Africa. She is helping to analyze blood samples sent directly from wild populations in order to map biomarkers in the blood, allowing the ability to track and better predict and prevent disease and mortality.

“Primarily I am working at the intersection of gorilla’s stress levels and associated blood values,” offered Clark. “I examine behavior notes of the animals and try to quantify their stress levels. If there are elevated values of something in their blood caused by a certain behavioral pattern, it means they might be at greater risk of heart disease. Looking at the blood values is easier and less invasive for the animals than anesthetizing them and conducting an evaluation.”

Clark’s internship is a shining example of opportunities afforded to AGNR undergraduates, underscoring the advantages of UMD’s close proximity to our nation’s capital. While the bulk of her previous experience has revolved around direct interactions with animals, Clark is grateful that this internship helped her realize that being more hands-off can still translate into impactful conservation work.

“I’ve really enjoyed conducting the research and focusing on the analytics. It’s been sort of like working on a really complex puzzle by putting all of the data pieces together,” said Clark. “I still want to work with animals, but this internship has given me a different perspective on things.”

Clark has applied to veterinary school and plans to become a veterinarian with a focus on wildlife conservation and rehabilitation, research, and community-based conservation education. In the meantime, maybe she’ll carve out some time for a pilgrimage to the island of Komodo in Indonesia. — A.B.
AGR and AGNR Joined at the Hip
Fraternity Member Receives Two of the Chapter’s Four National Awards

ALPHA GAMMA RHO (AGR) is a professional and social fraternity for students who have a history with or plan to work in agriculture. As such, AGNR and AGR are very integrated, with the success of the college and the success of the fraternity chapter going hand in hand. Last year, the achievements and growth of the chapter over the last decade shone brightly at the National AGR Awards, with the Maryland AGR chapter winning four major distinctions, including two going to our own senior in Landscape Management, Zachary Jones.

“Our leaders are absolutely leaders within the college—we are joined at the hip, and that’s the way it should be,” said Logan Yearsley, the Maryland AGR chapter house director. As the leader of philanthropy in the Maryland AGR chapter, director of planning for the Green Roots hydroponics club, and the secretary for the AGNR Student Council, Jones is a prime example of that bond.

Jones was recognized as one of only three Outstanding Undergraduates of the Year across 70 chapters nationally, averaging about 50 students per chapter. This is the highest honor bestowed on an AGR student, and it is the second year in a row that Maryland has received this distinction, with former chapter president and Spring ’19 graduate Michael Wijesinghe winning the year before. “To have two Undergraduates of the Year in a row from the same chapter is a tremendous accomplishment...it’s a big deal and shows the strength of the chapter and college,” said Yearsley.

In addition to receiving second place for alumni leadership and second place in social and cultural leadership development (awarded to Yearsley as house director), the Maryland chapter also received third place nationally for its efforts in philanthropy, further recognizing Jones’ leadership as Vice Noble Ruler of philanthropy.

The philanthropic spirit in Jones shows not only in his work with AGR on suicide prevention and awareness through events like Mitch-a-palooza (honoring a student that took his life in 2014), but in his personal life and professional aspirations. He has always known he wanted to work with his hands, give back to others, and exemplify the “good old-fashioned country boy” mentality that AGR promotes. “Respect is always the first on our list at AGR, and I think it always will be,” said Jones.

“Ever since I was little, I just knew that I wanted to work outside. I was cutting lawns when I was 10, and I got my first job in landscape management as a junior in high school. The number one thing I like about the industry is that you are having an immediate impact on somebody’s life because they genuinely care about their landscape. They want to make their oasis and enjoy the outdoors, and that excites me.”

Personally, Jones volunteers regularly for his local church in Denton, Md, and has reported at 6 AM every Thanksgiving morning since he was in middle school to put together and deliver meals to those in need. “I’ve always felt that you should give back to people who don’t have what you do,” said Jones.

“[Jones] is the type of leader we are looking for,” said Rex Martin, national CEO of AGR. “He’s making a difference at the university and is certainly making a difference in his AGR chapter, but he’s probably going to make a difference in the world because he’s not scared of challenging the status quo. He wants to give back, and he deserves a lot of credit for what Maryland is doing.”

LOGAN YEARSLEY, DIRECTOR
MARYLAND AGR CHAPTER

“To have two Undergraduates of the Year in a row from the same chapter is a tremendous accomplishment...it’s a big deal and shows the strength of the chapter and college.”

LOGAN YEARSLEY, DIRECTOR
MARYLAND AGR CHAPTER
Spend any significant amount of time in the DMV region these days, and you’ll likely notice that land is in short supply. Housing and commercial development is spreading across Washington, DC, stretching out into the suburbs in an effort to accommodate the 6.2 million people and growing that occupy the Washington metropolitan area. Demand is tipping the scales against supply, pricing small business owners and prospective homebuyers out of their target neighborhoods. Compromising on location or pivoting your business model to start smaller and scale up (for example, food trucks versus brick and mortar restaurants) are everyday occurrences. Cost prohibitive land also affects the agriculture industry, a profession where land availability is one of the most critical measures of success.

Kristof Grina is the co-founder and farm director of Up Top Acres, a small team of DC residents that manage and operate a network of urban farms across DC and Maryland. They have a two-fold mission to grow high quality food for their neighbors and act as stewards of the environment. Grina sees a number of issues in play as barriers to success for urban food production.

“Land is tough to come by on the ground. Oftentimes, there isn’t a space large enough, or it’s contaminated with arsenic or lead, and also the price could be prohibitively expensive,” said Grina during a conversation at Pike and Rose in Bethesda, Md, where he operates a 40,000 square-foot rooftop farm. “Despite these roadblocks, I love growing food, and want to grow it closer to where it’s consumed. The goal of Up Top Acres is to find innovative ways to create an urban agriculture industry. Our aim is to convert underutilized rooftop spaces into vibrant, productive growing spaces.”

Grina is breaking down these barriers by identifying rooftops as an untapped resource for growing food. At the Pike and Rose location alone, Grina’s team is growing arugula, lettuce, radishes, turnips, beets, cilantro, tomatoes, eggplant, kale, cut flowers, and much more. Their produce is the epitome of locally grown, with CSAs available for pickup in the Pike and Rose lobby, and delivery service to a restaurant only an elevator ride away.

UMD Extension (UME) faculty John Lea-Cox, Andrew Ristvey, and Neith Little are helping urban farmers like Grina to be successful on several levels. Their work is centered around identifying some of the primary challenges that urban farmers face. In the case of Up Top Acres, Grina and his team were interested in an agricultural soil or substrate that promotes high fertility rates, but also maintains its stormwater holding capacity to reduce runoff and nutrient leaching from their roofs into local waterways.

“I love growing food...our aim is to convert underutilized rooftop spaces into vibrant, productive growing spaces.”

Kristof Grina harvesting at an Up Top Acres urban farm in Washington, DC.
Neith Little (left) and Drew Schiavone (right) of UME Baltimore City, coordinate programs for urban entrepreneurs. Here they hold a workshop with Denzel Mitchell (center) of the Strength to Love 2 program at an urban farm in Baltimore.

“We really wanted to tie our farm system into the existing stormwater regulatory network. UME has been instrumental in helping us craft a nutrient management plan to further our dual goals of producing healthy food and reducing stormwater and nutrient runoff,” explained Grina. “They’ve also helped us better monitor the water content of our soil substrates to help inform our irrigation schedules.”

“We don’t want the nutrients leaching from these urban farms, primarily because they become point sources for nutrient pollution, the exact reason why we have these nutrient management programs for the Chesapeake Bay,” said Ristvey.

“Increasing our ability to produce food within cities is therefore vital to increasing the resilience of our urban existence and the health and well-being of our urban folks.”

But this work extends beyond their relationship with Up Top Acres. The UMD team is currently expanding their work with substrates, nutrient and stormwater management, and sensor irrigation technology to other urban farms across Maryland.

“Through an AGNR seed grant and by collaborating with Neith Little in Baltimore City, we are also targeting urban farmers who use a variety of substrates and production methods at grade, or ground level. Many of these farmers are underserved and grow produce in raised beds using composted organic substrates that may have nutrient and water-holding issues,” shared Lea-Cox. “Neith is helping to coordinate our programs to meet the needs of these urban entrepreneurs, to improve their production methods and profitability, and to reduce any potential impacts of their runoff to local streams and the Chesapeake Bay.”

As urbanization expands and land availability contracts, urban farms seem to have a very bright future. At the Pike and Rose farm alone, Grina produces close to 10,000 pounds of agricultural products per year. Grina and the UME team view this as an endeavor that can be replicated in community gardens, housing projects, university campuses, and municipally-owned buildings where farms or gardens are accessible to the public and can be established as a source of food and education for urban residents.

“Cities are inherently fragile systems for food production, as they have large populations that are reliant on food mostly produced in rural areas, trucked in on a regular basis. Many urban residents are also situated in food deserts where fresh, unprocessed food is hard to find and expensive to purchase,” said Lea-Cox.

“There is also an inherent beauty in urban farming that adds value to urban sectors. For the most part, rooftops occupy completely unused space. This work focuses on reversing that practice and adding green space as part of the built environment.

“I love the idea of rooftops as we’re not taking away any other green spaces, but rather we’re adding green space,” said Lea-Cox. “That’s what I think is unique about this particular environment. It’s amazing!”

“Extension has been instrumental in helping us craft a nutrient management plan...to produce healthy food and reduce stormwater and nutrient runoff.”

KRISTOF GRINA

JOHN LEA-COX
ed by Andrew Ristvey, commercial horticulture specialist at the Wye Research & Education Center, AGNR, began its Hemp Pilot Program in 2019, bringing together academics, research, and UMD Extension (UME) to determine the viability of hemp as an economic resource for Maryland farmers.

Working with co-principal investigator Nicole Fiorellino, assistant professor and UME specialist, Ristvey partnered with 11 growers in Maryland, focusing on nitrogen levels in soils to assist the Maryland Department of Agriculture (MDA) in developing fertility recommendations for CBD hemp, processed for its medicinal oils.

“The majority of growers that were partnering with us were growing CBD hemp,” said Ristvey, “and the majority of growers in Maryland—over 65 growers in Maryland are partnered with various institutions—most of them are doing CBD because that’s where the money is.”

To partner with AGNR, growers were required to perform soil fertility research, which entailed providing enough plants and land for replicated nitrogen studies. “Outside of that, growers could grow as much as they wanted under whatever conditions they wanted,” he said.

While statewide preliminary data and results are currently unavailable, Ristvey and Fiorellino were able to glean insights from the hemp test plots regarding nitrogen fertility, pests and diseases, and potential commercial viability, especially for the coming years.

Pest and Disease Management

Emily Zobel, UME agent and entomologist, surveyed the Wye hemp test plots for pests weekly.

“For the most part, I was finding a handful of small pests, but nothing that would reduce the yield until the very end of the season,” Zobel said.

While early pest pressure was low, evidence of corn earworm and European corn borer became apparent in September. But because the increase occurred at the end of the growing season, the damage wasn’t detrimental.

“Which is good, because up to this point, there are no pesticides approved for use in Maryland on hemp.”

Organic pest controls have been found ineffective, but Zobel suspects chemicals will be approved by the state by next year.

“The first thing we need to do once we get chemicals approved is to figure out the thresholds,” Zobel said. “When do you need to control for pests, and do you even need to control for them?”

Like pesticides, fungicides and herbicides to control plant diseases are also not yet approved by the MDA for hemp. Fusarium crown rot was identified in the test plots by plant pathologist Karen Rane, director of the UMD Plant Diagnostic Laboratory with the Department of Plant Science and Landscape Architecture.

“We started getting crop collapse immediately,” said Ristvey. “We probably lost between 5 and 10% of the plants we were growing.” Other farmers reported crown rot as well, and at least one farmer experienced leaf spotting, Ristvey said. In addition, grey mold was identified after a wet spell during October. These findings are just preliminary, but more time is needed to see what pests and diseases need to be considered for hemp and how we can go about controlling them.
**The Economics of CBD**

Early analysis of the Wye test plots indicate a good biomass yield with CBD concentrations averaging 15% by dry weight, which the team began tracking at the end of July, along with THC content to ensure it did not rise above the 0.3% regulated by law.

While these results are promising for Maryland growers, who are paid market value by the percentage point, new regulations could affect harvesting, which will change the market value of the plant.

In 2020, growers will be required not only to test for Delta-9 THC, the psychoactive content of cannabis which must remain below 0.3%, but they will also be required to test for potency. This includes the addition of the phytochemical THC-A, a precursor cannabinoid of Delta-9 THC, Ristvey said.

Tracking the CBD and THC content in the Wye plots, Ristvey discovered that once plants transitioned from vegetative growth to flowering, the THC-A increased in conjunction with the CBD. By harvest time, the THC-A content was at 0.6%.

“Because of the new law, you’re going to have to harvest a lot sooner than you want to,” said Ristvey, making CBD content lower, as well as the biomass weight from which CBD oils are extracted.

“It keeps it from being another viable source crop for Maryland if you have to harvest early,” Ristvey said. “I want all my growers to go into this with a lot of caution. I want them to understand what they’re buying, what they’re growing, and what they’re going to be selling.”

**Future Fieldwork**

Although Ristvey and Fiorellino have some doubts about the potential of CBD, there may be some options to diversify smaller farms. As next steps, they will evaluate incoming data to make fertility recommendations and begin working with fiber hemp varieties.

“Hemp as a fiber has a lot of potential,” Ristvey said, citing its use in construction materials and flooring, among a variety of other products.

Additionally, fiber hemp varieties could serve to remediate high phosphorus levels in soils, which has implications for nutrient management in the Chesapeake Bay. “We would like to determine the potential of phosphorus removal from fiber hemp; then we may have an additional crop-rotation option for farmers who need it while possibly having the option of growing a valuable crop,” said Ristvey.
EVENTS AND CELEBRATIONS

**Ag-Tober Tailgate**
**WELCOMED OVER 300 TERPS AND FRIENDS**

Lower Eastern Shore won the Giant Pumpkin Contest with a 239 pounder!

Dr. Puneet Srivastava

ASSOCIATE DEAN FOR RESEARCH AND ASSOCIATE DIRECTOR OF MARYLAND AGRICULTURAL EXPERIMENT STATION (MAES)

The college is pleased to welcome Dr. Puneet Srivastava as the associate dean for research and associate director of Maryland Agricultural Experiment Station (MAES). Puneet comes to AGNR from Auburn University, where he served as the director of the Water Resources Center and Butler-Cunningham Eminent Scholar in Agriculture and the Environment in the College of Agriculture since 2015. In this role, Puneet greatly expanded the research portfolio of the Center, led the development of the National Integrated Drought Information System’s (NIDIS) drought early warning system for the Southeast US, and provided leadership to interdisciplinary outreach water programs, including the Alabama Water Watch and Global Water Watch citizen-based water stewardship and monitoring programs.

His research interests include climate variability and climate change impacts on water resources and agriculture, surface and groundwater quantity and quality, monitoring and modeling of hydrologic and nonpoint pollutants (nutrients and sediment), transport and transformation processes from point to regional scales, and application of geographic information and artificial neural network systems for water resources management.

Puneet has authored or co-authored more than 200 peer-reviewed articles, book chapters, conference papers, and abstracts, and has given over 200 technical presentations at scientific conferences, industry meetings, research institutes, and universities worldwide. His research has been supported by over $27 million in grant funding from numerous federal agencies. He is a Fellow of the American Society of Agricultural and Biological Engineers (ASABE) and a Fellow of the Alabama Academy of Science (AAS).

William Bowerman

INDUCTED AS 2019 FELLOW IN THE EXPLORERS CLUB

The college is proud to celebrate William (Bill) Bowerman, professor of wildlife ecology and toxicology and chair of the Department of Environmental Science and Technology, for his 2019 induction into the prestigious Explorers Club as a Fellow. The Explorers Club is an international multidisciplinary professional society dedicated to the advancement of field research and the ideal that it is vital to preserve the instinct to explore. Bill was recognized for his extraordinary commitment to the preservation of bald eagles, and his dedication to empowering the next generation of students and researchers through mentorship and education.

Bill was also recognized in 2019 with the National Eagle Scout Association’s Outstanding Eagle Scout Award for his commitment to mentoring scouts.

THE AGNR ALUMNI NETWORK cheered on the Maryland Terrps on Saturday, October 19, 2019 vs. the Indiana Hoosiers. We kicked the day off with a fun and festive tailgate with 300 folks in attendance. We launched a brand new tradition this year with a Giant Pumpkin Contest, with entries from each of our research and education centers across the state. Our Lower Eastern Shore Location secured victory with a massive 239 pound pumpkin! Attendees enjoyed a delicious mac & cheese bar, chili, Maryland crab soup and all the sides. And our tailgates would not be complete without buckets of beers from our friends at Flying Dog brewery. A big thank you to all of our AGNR Alumni, students, families, faculty and staff.

**SAVE THE DATE: October 24, 2020 for Ag-tober Tailgate, MD vs Wisconsin!**
Ensuring a Clean and Healthy Chesapeake Bay

AN AGNR STRATEGIC INITIATIVE AND FOCUS OF THE COLLEGE’S 2019 ANNUAL SUMMIT

AGNR HOSTED ITS SECOND ANNUAL CORNERSTONE EVENT, a nod to the college’s history as UMD’s founding college. On October 29, 2019, the Stamp Student Union was packed with nearly 700 faculty, staff, students, and government and public stakeholders at a major summit with a focus on Ensuring a Clean and Healthy Chesapeake Bay. The event featured experts on stormwater management, water use and reuse, our living natural resources and Chesapeake Bay aquatic life, water quality and safety, and much more. As keynote speaker, the college was humbled to welcome world-renowned expert in global water quality and infectious diseases, Dr. Rita Colwell. Distinguished UMD professor and 11th director of the National Science Foundation.

The October 2020 AGNR Cornerstone event will feature the college’s strategic initiative: Improve human, animal, and environmental health.

Winter 2019 Commencement

ON DECEMBER 19, 2019, 85 AGNR undergraduate students and 20 graduate students entered a new chapter in their lives at Dekelboum Concert Hall at the Clarice Smith Performing Arts Center, celebrating their new degrees during commencement ceremonies. The hall was packed as Dr. William E. Kirwin, Chancellor Emeritus of the University System of Maryland and former UMD President, welcomed and inspired graduates and guests with his commencement address. Kerrin Massarueh, undergraduate in Environmental Science and Policy, delivered the student commencement address, discussing her humanitarian work in the Caribbean and the importance of the next generation in the resilience of agriculture around the world.

AGNR Spring 2020 Commencement is scheduled for May 21 at 3:30 PM.
V. Allan Bandell

On November 2, 2019, V. Allan Bandell, 82, passed away. A native Marylander who lived his entire life in Howard County, Dr. Bandel attended UMD, earning a PhD in Soil Fertility in 1965. His roots at UMD ran deep, and after graduating, he accepted a full-time position overseeing the Soil Testing Lab for the Cooperative Extension Service. He remained at the university his entire professional career, and as an Extension soils specialist, distinguished himself as an authority and early proponent of no-till, a farming technique which was regarded by many as a radical concept when first introduced in the 1960s. It has since been proven to improve crop yields, conserve topsoil, and to be stewards of the environment. “The combination of small, day-to-day practices with other long-term investments in our facilities help us continue our farm business into the future while minimizing our impact on the environment.”

Ellen Larrimore

Ellen Denise (Brown) Larrimore, 56, of Rising Sun, Md passed away on November 2, 2019. Ellero earned a BS in Agriculture Education from the UMD. She volunteered countless hours as a 4-H volunteer in Cecil County 4-H and across the state. Ellen’s volunteer work included club leader, county fair volunteer, and county and state horticulture judging coach. Most importantly, she was a mentor, friend, and role model to countless 4-H youth. Her family received Maryland 4-H Family of the Year in 2009 and Ellen was inducted into the Maryland 4-H Hall of Fame in 2016. She lived the “make the best better” motto everyday by encouraging youth to use their Head, Heart, Hands, and Health to better living for their club, community, country, and world. She operated her business Buttercups & Fireflies, a cut flower operation. Ellen loved growing flowers, tending to her cattle, and her golden retrievers Casey & Chip. She also loved being the leader of the Calvert Boys & Girls 4-H Club for over 17 years. Ellen was active in Farm Bureau, Calvert Grange, Rose Bank & Zion United Methodist Churches, and the Oxford Produce Auction.

F. Colson “Cole” Taylor

F. Colson, “Cole” Taylor, age 89, passed away on October 31, 2019. He was born in Lutherville, Md August 7, 1930, the son of James E. and Daisy Genevieve Taylor. He attended Lutherville Elementary, Towson High (Class of ’48), UMD (Class of ’52) and received a degree in Veterinary Medicine from the University of Georgia in 1956. He served in the US Army Veterinary Corps from 1956-1958. He married Janice Waltz on June 20, 1959. He operated a small veterinary hospital in Aberdeen, Md, was briefly employed by the USDA and ultimately worked at Vinson Animal Hospital in Baltimore, Md. He became a partner in the practice and later opened a second office in Towson, Md with his partner. Dr. Taylor was a cofounder of the Emergency Veterinary Clinic of Catonsville and served on the board for many years. He retired from practice in December, 1995. Dr. Taylor was a member of AVMA and MVMA during his professional career.

Andrew Griffin

Andrew has been hired as the senior policy analyst for government affairs at the Maryland Chamber of Commerce. He is responsible for managing advocacy and policy development efforts covering areas such as business tax, energy and environment, labor, employment, and education and workforce development. The Chamber is the leading voice of the Maryland business community. It works to develop and promote policies that ensure a future of strong economic growth for Maryland businesses, employees, and families. Andrew is continuing the Terp pride of “Doing Good” by volunteering for the annual holiday share program, a meal delivery program reaching over 500 families for the holiday season, which is run by St. Mary’s Parish of Annapolis and the St. Vincent de Paul Society.

Andrew Griffin (BS AREC, 2011)

And, F . Colson “Cole” Taylor

Edwin “Ed” Fry of Fair Hill Farm in Kent County, Md received the honorable mention award from the Maryland 4-H Hall of Fame in 2009. He has been a fixture in the community for many years, volunteering countless hours as a 4-H leader, 4-H All-Star who strives to have a positive impact on the youth and adults with whom she interacts. Recently her 4-H Club has started an Interactive Learning Farm for the Queen Anne’s County Fair. This educational exhibit shares agriculture education with over 1,500 fair visitors annually. Lori believes giving back to the community is one of the greatest gifts one can give, and that it is very rewarding to be able to change the life of one or many members of the community by volunteering one’s times and talents.

Lori has been involved with 4-H since she was 8 years old and is now a 4-H Club leader and active Maryland 4-H All-Star who strives to have a positive impact on the youth and adults with whom she interacts. Recently her 4-H Club has started an Interactive Learning Farm for the Queen Anne’s County Fair. This educational exhibit shares agriculture education with over 1,500 fair visitors annually. Lori believes giving back to the community is one of the greatest gifts one can give, and that it is very rewarding to be able to change the life of one or many members of the community by volunteering one’s times and talents.

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REBECCA CREIGHTON

(Continued)

Dr. Ray Weil

INTERNATIONALLY RENOWNED SOIL SCIENTIST DONATES $1M TO ESTABLISH NEW PROFESSORSHIP, UNLOCKING FUNDS FOR RESEARCH, TEACHING, AND STUDENT OPPORTUNITY

In August 1979, when Dr. Ray Weil traveled halfway across the globe from the University of Malawi to College Park, MD, he was beginning what would become a long, successful career in teaching, research and service at the University of Maryland spanning four decades. Weil regards his tenure as a professor in the Department of Environmental Science and Technology (ENST) to be the best job in academia, having offered him both the intellectual freedom and flexibility to pursue research in soil science. His renowned work has had global and local reach, enabling Weil to realize his dreams of helping smallholder farmers in Africa while developing more sustainable and profitable soil management systems for use here in Maryland.

Reflecting on his life passions and wanting to make a difference in his area of expertise, in 2017 Weil donated a $1 million gift of securities from his retirement portfolio to establish the Dr. Ray R. Weil Endowed Professorship in Soil Science. His inspiration to create the endowment stemmed from often seeing well-qualified graduate students in financial difficulty as they pursued their advanced education. His renowned work has had global impact, providing academic and local reach, enabling Weil to realize his dreams of helping smallholder farmers in Africa while developing more sustainable and profitable soil management systems for use here in Maryland.
AGNR INVITES YOU TO UNLOCK A WORLD OF LEARNING, DISCOVERY, AND EXPLORATION AT MARYLAND DAY. EXPERIENCE LIVESTOCK SHOWS, INTERACTIVE EXHIBITS, GAMES, AND FOOD DURING A DAY-LONG FAMILY-FRIENDLY JOURNEY ACROSS OUR COLLEGE AND THE ENTIRE UMD CAMPUS.

MARYLAND DAY

APRIL 25
10 A.M.—4 P.M.
FREE ADMISSION AND PARKING

MARYLANDDAY.UMD.EDU

#MARYLANDDAY