

MUSC employees step up to relocate babies before the storm

By MIKIE HAYES

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During Hurricane Hugo things were particularly precarious in the Neonatal and Pediatric Intensive Care units. The sheer force of the rain and 140 mph winds were so intense it caused some windows to leak and others to blow in completely or shatter. While medical staff quickly moved babies and children to safety early on, no one wanted a repeat of that event during Hurricane Matthew.

The Monday before the storm hit, leadership earnestly began campuswide preparations. While experts predicted that the storm could possibly brush the Charleston area sometime between late Friday and Saturday, leaders weren't waiting for Matthew to make up his mind whether or not he would make landfall in South Carolina or instead head inland.

As Children's Hospital leaders considered options to keep the tiny patients safe during the unpredictable weather, they took definitive action ahead of the storm, said Robin Mutz, RN, administrator of Women's Health and executive nursing director of the Children's Hospital.

"We decided that the most prudent thing to do would be to relocate the entire NICU, which on Wednesday, when we physically moved them, had a total of 31 babies. The PICU only had seven children at that time, but we knew

we could move them easily, if necessary."

"However," Mutz added, "there was no way to safely move 31 babies at the last moment."

"Everyone, from top to bottom offered to help us," Mutz said with praise. "We boarded up all the windows, secured the area and began to execute what we considered a well-constructed plan."

They set up a command post and deployed two teams – team orange and team purple – to move the infants to a location where they would be safe from the storm. They also evacuated 11 babies, who were nearing discharge, to the Midlands and Upstate by air transport.

It wasn't just the little patients who needed to be moved; they also had to move the unit's Acudose-Rx and Pyxis cabinets, very large electronic units that contained the patients' medications, medical supplies and items that supported their care.

The entire move took 4 ½ hours to safely relocate all the babies from the two NICUs on the eighth floor to the Level II nursery, the pediatric procedural area and Interventional Radiology on the fifth floor.

Both teams included a respiratory therapist, pharmacist, nurse, nurse practitioner and a physician. A representative from the Informatics Department was also on hand to ensure patient records, orders and notes for

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Photos provided

MUSC President Dr. David Cole checks on a young patient along with NICU nurse Kylie Hopkins just prior to the arrival of Hurricane Matthew. The NICU was temporarily moved from the Children's Hospital eighth floor to the fifth floor to ensure the babies' safety.

Mother safely delivers during hurricane

By MIKIE HAYES

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Imagine being at home hunkered down with your three young children during Hurricane Matthew – streets flooded, winds howling, rain pounding. Being pregnant, the one thing you'd hoped wouldn't happen for at least another two weeks does: You go into labor. And worse, the storm is so bad, an ambulance is not able to get to you to take you to the hospital.

Such was the experience of Leslie Matthews of Charleston, who walked the dangerously flooded downtown streets in an attempt to reach MUSC.

But that's only half the story. Twenty-seven years ago, in 1989, Leslie's mother, Rosalie Matthews, made her way to MUSC to deliver Leslie during

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Meet Lindsay

Opportunities with SC CHEC

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Cyber Security Awareness Month

October is Cybersecurity Awareness Month, and OCIO is providing education on cybersecurity issues. It is very important that each one of us does our part to ensure our patient and student data is kept safe and secure.

Attend one of the informative sessions listed below and learn what you can do to help protect MUSC's data.

LUNCH & LEARN SESSIONS

- ❑ Unsecured Devices and Systems – Find out why unsecured devices put our patients at risk and how OCIO is able to secure your devices. Thursday, Oct. 21, 11:30 a.m. to 12:30 p.m., 2W Amphitheater
- ❑ Passwords – Learn why they're necessary and how to create strong



Making IT Great

Melanie Richardson

passwords you can actually remember
Tuesday, Oct. 25 (Rm. 436) and Monday, Oct. 31 (Rm. 437), 11:30 a.m. to 12:30 p.m., MUSC Library

To sign up for a session, send an email to cyberschool@musc.edu. Drop-ins are also welcome.

WIN \$25 MEAL VOUCHER (MYQUEST)

Take the Cyber Quiz and see how much you know about information security for email, passwords and identifying phishing emails. Pass with 80 percent or better and be entered into a drawing for a \$25 meal ticket voucher. One name will be drawn on each Friday in the month of October.

To take the quiz by logging into MyQuest and self-enroll in Cyber Security Quiz 2016.

The Veterans Day Celebration

1:00 - 2:00 p.m. | Nov. 10, 2016 | Drug Discovery Auditorium

Interim Provost Lisa K. Saladin, Ph.D. and the Veterans Day Committee invite MUSC employees, students, faculty and staff to its annual Veterans Day Celebration

GUEST SPEAKER
Dr. Theresa S. Gonzales, Colonel, USA (Ret.)
Professor of Oral Pathology
MUSC

MUSC Public Safety Color Guard
Video in Celebration of MUSC Veterans | Presentation of Lapel Pins to All Veterans

THE CATALYST

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IMAGINE NATION

A MESSAGE FROM Darlene Shaw, Ph.D., Chief Instit. Strategy Officer

Welcome to our second installment of Imagine Nation, a monthly update with featured events and highlights related to Imagine MUSC 2020 – our strategy for the future – and its five goals of Commit First to Patients, Innovative Learning, Scientific Discovery, Diversity & Inclusion, and Healthy Communities.

At the October meeting of the Strategy Advisory Council (SAC), we reviewed the progress of our 17 implementation teams and learned most are on track to meet key milestones. More than 200 employees are actively engaged on the implementation teams. As an example of our strategy in action, at the October Board of Trustees meeting, several leaders reported their work in the context of Imagine MUSC 2020, which tells me it is beginning to serve as a guidepost for our daily work and thinking. Details on the work of the implementation teams and meeting notes from the SAC are available on the Imagine MUSC 2020 intranet site at horseshoe.musc.edu/everyone/imagine-2020. You'll also find Imagine MUSC 2020 support materials (posters, PowerPoint templates, etc.) for your use.

Please share examples of people and programs aligning with our strategy by emailing imagine2020@musc.edu, and be sure to view the latest Imagine Minute video with President Cole and medical student Melissa Koci at <http://academicdepartments.musc.edu/musc2020/imagine-minute.html>, which highlights a new student wellness initiative supporting our goal of Healthy Communities.



IMAGINE WIN

MUSC was recognized as a "leader in innovative learning" and won a coveted Brandon Hall Group bronze award for excellence in the Best Launch of a Corporate Learning University category. Our award submission, "MUSC Creates a New Way to Explore Learning Opportunities," was entered in collaboration with NetDimensions, MUSC's new learning management platform. Albany Cromer, Learning Technologies manager for MUSC Health explains, "Our objective was not simply to replace our learning management system, but rather to foster rich learning experiences." Congratulations to everyone involved in a successful launch of a program perfectly aligned with our strategic goal of Innovative Learning!

IMAGINE CONNECTIONS

Kenneth Catchpole, Ph.D., professor and SmartState Endowed Chair will present, "Teamwork, Performance and Improving Patient Care: Science and Practice" at the November 2 SCTR Team Science Seminar. This talk is a great example of aligning with our Imagine MUSC 2020 goal of Commit First to Patients and provides the opportunity to view that goal through a "team-focused lens."

UPCOMING EVENTS

- ❑ SCTR Scientific Retreat on Health Disparities — Nov. 9, Drug Discovery Auditorium; Keynote Speaker Dr. Camara Jones, president, American Public Health Association
- ❑ MUSC Veterans Day Celebration — Nov. 10, 1 to 2 p.m., Drug Discovery Auditorium, Guest Speaker: Dr. Teresa Gonzales, Colonel, USA (ret.), professor, College of Dental Medicine

OUR STRATEGY *for the future*

MUWC awards student scholarships, celebrates 50 years service

BY OLIVIA FRANZESE

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Celebrating 50 years of supporting and encouraging students and their careers in the medical field, the Medical University Women's Club (MUWC) continued its good work by awarding scholarships totaling \$14,500 to 12 deserving MUSC students to help further their education. The scholarships were presented at MUWC's annual fall coffee event on Sept. 19 at the home of MUSC President David Cole, M.D., FACS, and first lady Kathy Cole.

The MUWC's impressive 50-year history shows that the organization has long been dedicated to furthering the education of aspiring medical professionals. According to Barbara Smith, scholarship chair of the MUWC, "The Medical University Women's Club is pleased to be able to recognize students' distinguished performance at the university by assisting with their immediate financial needs. Every

member of the club participates in the funding through dues and contributions, and we enjoy meeting the chosen recipients."

Scholarship recipient Meghan Mandel, a third-year student in the College of Pharmacy, feels that this scholarship is motivation for her to continue following her dreams of becoming a medical professional. "This will help me be able to continue on with my education and have a little less debt upon graduation. It will really help me to continue on with my program." Mandel came to MUSC from Chicago after completing her undergraduate program at the University of Illinois to continue on her path to a career in the medical field.

Smith and the MUWC Scholarship Committee chose from a pool of 38 applicants that included candidates from all six colleges. They ultimately made their selections based on academic achievement, financial need and community service. Members raise scholarship funds by selling roses at



Photo by Laura Patrick, MUWC

The 2016 MUWC Scholarship recipients are: Iesha Heyward, bottom row, from left, April Dawson; Bernadette Gaffney, second row, Stephanie Arredondo-Glacet, Meghan Mandel; Millie Thomas, third row, Constants Adams; Barbara Smith, top row, Dr. David Cole, Maria Petrie, Isabel Boersma and Julie Driscoll.

commencement as well as copies of their cookbooks.

Constants Adams, a student from Columbia, South Carolina, who is currently in the fourth year of her

program in the College of Medicine, knows exactly how much this scholarship will help her with her career. "This year we are traveling around the country

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Researcher leading the field in cancer immunotherapy

BY MIKIE HAYES

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It's 3:30 in the morning and Immunologist Jennifer Wu, Ph.D., who will soon be a full professor in the Department of Microbiology and Immunology, is not sleeping. That is not an uncommon occurrence for her — sleep often eludes her these days. Her mind races with myriad thoughts and possibilities, and she just can't seem to turn them off.

There is a question that consumes her, and if she could, she would work 24/7 to solve it.

"I can't sleep anymore. I'm just too excited to sleep," she said, while her computer and cell phone persistently pinged, alerting her of incoming messages. "Sometimes I get in the car, and I'm not even sure where I've ended up. I constantly think about it. My mind races nonstop. I can't stop thinking about this."

What could be so important that she can't let her work go? It's not like she's trying to cure cancer — well, except for the fact that that is actually exactly what she's trying to do.

Wu believes the body should be able to heal itself of even the most aggressive and deadly tumors, and that it can be accomplished through a relatively new field of study called immunotherapy.

Cancer immunotherapy, harnessing the body's immune system so it recognizes cancer as a threat and attacks it, was considered science fiction barely a decade ago. Having been named Science Magazine's 2013 Breakthrough of the Year, cancer immunotherapy is a promising alternative or companion to traditional methods of fighting cancer: chemotherapy, radiation and surgery. A subject that was met with a healthy dose of skepticism has not only shot to the front of the class, it's the teacher's pet. And rightfully so; it offers a lot of hope.

"Early on," Wu said, "we couldn't figure it out — it's a very complicated system, and we had very limited understanding of how tumor cells and the immune system interact. But we knew we were on to something."

"At first, medical people were skeptical. They would ask, 'So you really think the



Photo by J. Ryne Danielson

Dr. Jennifer Wu, right, in her lab, leading a team of scientists. The team studies the relationship between cancer and the immune system.

immune system would attack a tumor?' Then they would say, 'No, we can just cut it out.'"

Today, cancer immunotherapy is perhaps the most exciting development in cancer research, as avant-garde researchers like Wu explore the possibility that it might very well be the solution to eradicating cancer. And with two recent National Institutes of Health R01 grants totaling \$3,419,810, along with a \$560,625 Department of Defense Research Award last year to combat deadly prostate cancer, and a separate nearly-\$300,000 NIH small business grant to fund the groundbreaking work of her startup company, CanCure, LLC, she's become a bit of a superstar in the cancer immunotherapy field.

A CALL TO ARMS

Wu describes the immune system as the body's defense system — a massive army of ground soldiers that defend the body against infectious organisms like bacteria, viruses and fungi that invade the body's systems and cause diseases. The immune system, a set of strategic reactions and responses, launches a complex defense plan known as the immune

response when the body comes under attack.

To carry out such a complicated mission, these defender cells, which consist of different types of white blood cells, charge into action and destroy the invaders as soon as they are detected. The body makes somewhere around a billion of these cells every day in the bone marrow. One single teaspoon of blood contains tens of millions of white blood cells.

The immune system consists of multiple battalions of cell types to sense and attack invaders. Among them, the natural killer (NK) cell and T cell are the ones that directly kill the invaders. B cells produce antibodies to attack the intruders. NK cells are armed with multiple sensors called receptors to directly sense abnormal cells and are naturally licensed to kill them. They are the first line of defenders of the immune system. T cells, B cells and the other immune troops then quickly assemble and rally on the battlefield. Together these immune defenders go into high gear and deliver lethal blows directly to the intruders and clear them out.

But sometimes the process goes awry. For some reason, the typically aggressive

patrols tend to ignore cancer cells, allowing them to hide from the immune system or even block its natural ability to attack. Rather than attack tumors, they retreat, and tumors are able to grow viciously and spread.

So exactly what happens to cause the immune system to stop doing its job? That is the question keeping Wu up at night.

"When we are born, we have a perfect immune system. When we're young, we do not develop cancer — well, rarely. When we start to develop cancer, we're aging. We catch colds very easily. So, what's wrong with the immune system — why is it not working anymore?"

When she was a postdoctoral trainee, her mentor discovered a tumor-specific molecule called "MIC" that was induced by cellular stress during mutation and only abundant in tumor cell surface, but not found in normal cells. The MIC molecule has a particularly important job — to rouse the immune system. It can be detected by the activating receptor or the immune sensor, NKG2D, which licenses NK cells to kill. NKG2D can also power up the capacity of T cells to kill tumor cells. "This molecule MIC is supposed to tell the immune system, 'Hey! I'm abnormal. I'm cancer. Come get me!'" Wu explained.

If working optimally, the immune system should recognize and fight cancer cells, killing them as they develop. "We asked a very fundamental question: Why? If the immune system is strong, and there are lots of mechanisms in place to identify and kill cancer cells, why did the tumor develop? That is the conundrum."

So she and the team set out to answer the question. They took plasma from various cancer patients and ran tests to see if they could figure it out. "Surprisingly," she said, "we found the molecule MIC in the circulation, just wandering around the body." At that time, they thought that the "wandering" molecule (named soluble MIC or sMIC) was the culprit that made T cells not function to their maximum power.

After completion of her post-doctoral training, Wu led her own research team to

See **IMMUNE** on page 10

MEET LINDSAY



Lindsay Williams

Department; How long at MUSC
*Office of Communications and Marketing;
 less than a year*

How you are changing what's possible at MUSC

I bring fresh ideas, creativity and innovative thinking to the Web Resources and Digital Strategy team.

Pets

Dogs, Gracie, Maizie, Ramone and Sally

What music is in your player right now

A mix of country, indie rock and pop

A unique talent you have

I can juggle a soccer ball.

Last book read

Gone Girl by Gillian Flynn

Best thing about living in Charleston

The weather and the people

Your idea of a dream vacation

A beach, a book with family and friends



MUSC Domestic Violence Committee

Domestic Violence Awareness Rally

Danielle Richardson - Goodbye Abuse Inc. - Keynote Speaker
 Alan Wilson- South Carolina Attorney General
 Gregory Mullen- Chief of Police, City of Charleston
 Doug Warner- Liza's Lifeline

10/26/2016

11:30 a.m. to 12:30 p.m.

MUSC Horseshoe

MUSIC Selections, Vendors and MORE

All are welcome!



Changing What's Possible



MUSC CELL THERAPY ADVISORY PANEL

OCTOBER 25, 2016

Engage with industry experts

MUSC Foundation for Research Development (FRD) invites you to hear from cell therapy industry experts Ian Harris, PhD, Product Development Team Leader at Cell Therapy - Janssen Pharmaceutical R&D; Paul Williamson, MD, formerly of Johnson & Johnson, Therakos, and Centocor; Kathy Tsokas, JD, Sr. Director Regulatory Affairs - Johnson & Johnson; and representatives from Cook Regentec.



Industry experts in cell therapy will present on the following:

Preclinical Product Development

Clinical Product Development

Regulatory Considerations

Translation and Commercialization

Bioengineering Auditorium - BE110

October 25th
 8:00 AM - 12:30 PM

Please RSVP to Christine Dixon Thiesing at dixonthi@musc.edu

Sponsored by MUSC
 Foundation for Research Development (FRD)

Storm flooding challenges infrastructure, facilities' team response

By OLIVIA FRANZESE

franzese@musc.edu

As Hurricane Matthew descended on Charleston Oct. 8, no one could have predicted what havoc the storm would wreak. For MUSC Engineering & Facilities manager Ignacio "Iggy" Pla, havoc came in the form of unprecedented flooding on the ground floor of the Ashley River Tower (ART).

"This is the first time we've ever had the ground floor of the ART building flood in my eight years here," said Pla. As the water continued to rise throughout the building in the aftermath of the storm surge, it became alarmingly apparent to Pla — who was on call and in the building at the time — more trouble was on the horizon.

Early Saturday morning, Pla's fears were confirmed. The water on the ground floor of ART reached a level of about 1 ½ feet, according to Pla, causing the elevator pits for the garage to fill with water. The heat detectors located in these elevator pits — designed to alert personnel in the event of a fire on the ground floor — were shorted out by the flooding.

That's when Pla and his team from the Physical Plant sprang into action.

As fire alarms blared around them, Pla, along with Seth Elliot, supervisor of the alarm shop, rushed to the



Photo provided

A man wades through waist-high water on Courtenay Drive across from MUSC's Ashley River Tower the morning of the storm on Oct. 8.

command center to identify the problem and disable the alarms. But it didn't end there.

Pla had to implement a "fire watch" until the alarms could safely be enabled again, meaning that technicians had to become human fire alarms in the absence of technology. Every hour on the hour, a technician had to walk the ground floor of ART and document that there was no fire.

Pla and his team stuck it out until the end to ensure the safety of the building and those inside it. "I stayed until the issue was resolved — 96 hours straight," recalled Pla.

According to Pla, this was the first time that a fire watch had been implemented due to an emergency. In the past, they used this manual human fire alarm system only during construction, which was scheduled in advance.

In the end, the flooding and heat detector issues were resolved Monday. After several long days and nights, the heat detectors were enabled, relieving the Physical Plant crew assigned to ART of their fire watch rotations. Although storms and other natural disasters are unpredictable, quick thinking on the part of Pla and other MUSC Physical Plant employees helped protect patients, staff and the building itself during the course of the crisis.

MATTHEW *Continued from Page One*

each child went to the right location and were properly accessible.

“With every baby, the team would determine and announce if a particular move was a ‘go’ or ‘no go,’” Mutz said. “The receiving team would say, ‘We are ready for baby one and call the baby’s name.’ Team orange would then roll. We would get a radio communication from them that said, ‘The baby has arrived, send the next baby,’ then team purple would roll. We did that over and over and over again.”

Both the orange and purple teams transported the babies to a receiving team comprised of NICU and PICU nurses, a respiratory therapist and a physician, who oversaw the move. Some babies were bagged while being transported, which provided oxygen to the babies through a special resuscitation bag that was connected to a mask over their mouths or to a tube in the trachea and lungs. “This added an extra degree of complexity to the move, particularly considering some of the babies were only about two pounds,” Mutz explained.

Mutz couldn’t speak highly enough of how well-orchestrated the plan was. “The two teams were amazing – in fact, everyone was. Security held the elevators for us and cleared the path. Facilities provided us with radios and support and cleared every barrier. Environmental Services covered both ends of the move, ensuring the rooms were safe and ready upon arrival and return.

“Any time we needed anything, they came immediately. Unit secretaries moved supplies. Pharmacists moved Acudose machines. Everyone did what needed to be done, wearing multiple hats at any one moment. Everyone was involved, committed and demonstrated the true spirit of being part of a team,” added Mutz, proudly.

Julie Ross, M.D., an assistant professor in the Department of Pediatrics and medical director of the Neonatal Nurseries, served as the incident commander, and Mutz assisted her.

On Monday, days after the storm had moved east into the Atlantic, the teams re-transported 33 babies, including two who were born during the storm, back to the NICU – this time in four hours and



Photo provided

NICU’s Team A worked tirelessly throughout Hurricane Matthew.

10 minutes. “The babies did well in both directions,” reported Ross, adding that it was truly a remarkable feat.

“It was flawless, like watching a symphony in slow motion,” Ross said. “Everyone was focused. They knew what they were supposed to do and why they were doing it. I’ve never seen a team so committed to the safety of our children. I’m incredibly proud to be part of a team that exhibited such exceptional teamwork and collaboration to successfully move over 30 of our most critically-ill infants without a single incident.”

RESIDENTS FROM HAITI VISIT MUSC



Drs. Jean Jacques Walter, center, and Orelus Jaslin, right, resident physicians from Haiti, apply a cast to MUSC patient Nikola Kamentschuk. The pair visited MUSC for a week in July to learn how medicine is practiced in the United States and adapted some of those techniques to their home country. Walter and Jaslin observed operations, toured MUSC's sports medicine lab, and worked one-on-one with patients. In turn, they hope to educate faculty and residents at their institutions on the similarities and differences between practicing medicine in the U.S. and Haiti.

Photo by J. Ryne Danielson

BABY *Continued from Page One*

Hurricane Hugo. Lestlie had to laugh thinking of the coincidence that led to both her and her son, Messiah, being born in the middle of hurricanes.

Lestlie was one of 10 moms who delivered at MUSC during Matthew, three of whom braved the storm to get there. Her entire family had begged her to evacuate to North Carolina, calling her stubborn when she wouldn't leave. Though she wasn't due for two more weeks, she didn't want to risk having a baby while on the road. Her mother said, "What do you expect — she's a Hugo baby!"

On the morning of Oct. 8, Lestlie was at home with her children and her sister and her daughter. Rosalie was downtown stuck at her house in some of the worst flooding, unable to get to her daughter to help. Her father was in Charlotte, North Carolina, and Messiah's father was in Lumberton. When Lestlie woke up that morning, she had butterflies in her stomach and a funny feeling this could be the day. Her intuition was right: Her water broke at 9 a.m.

She knew she needed to get to the hospital, but when her sister called the 911 Emergency Dispatch Center, she was told that ambulances were not being dispatched because of the flooding and winds. They offered to send a firetruck. Lestlie opted for her sister's friend to come pick her up and take her. But when that seemed impossible, she set out on her own.



Charleston mom Lestlie Matthews holds her son, Messiah Matthews, born Oct. 8 at MUSC, the same day Hurricane Matthew passed through the Tri-county area.

Photo provided

"I couldn't just sit around," she said. "I knew anything could happen quickly. I wasn't having any contractions or pain, but I didn't think I should wait."

Living not far from Memminger Auditorium, Lestlie felt she could safely make it by foot. What would normally be a 15-minute walk quickly became an obstacle course for the 4-foot-11-inch mother to be,

with rushing water hitting her above her knees.

It took her 30 minutes to make the walk to Calhoun Street, and during that time, her phone rang constantly: Her sister, mother across town, father in Charlotte — all were panic stricken and making sure Lestlie was OK. But the most emotional call of all was from her other half who was in tears that he couldn't be there for the birth of their child.

With MUSC in sight, her friend finally pulled up behind her in his car. They spotted an EMS worker and flagged him down. He took her to the Horseshoe via Bee Street, as Ashley Avenue was completely impassable.

By the time they admitted her, she was already dilated three centimeters. A healthy baby Messiah was born that evening. She said she felt great and was being discharged, but the baby would spend a couple of extra days in the Level II nursery. According to Lestlie, her 6-pound, 11-ounce little one had a bit of trouble at first with his blood sugar and iron level, but he was doing well and would be coming home on Friday.

"I had a wonderful experience," she said. "The nurses were the sweetest. They were amazing, and they treated me so well. Everything worked out for the best."

Even though Lestlie shared the name of the storm, many suggested she name her baby Matthew. That was too much Matthew she told them. "I actually wanted to name him Josiah, but my sister suggested the name Messiah since it started with an M." Messiah it was.

SCHOLARS *Continued from Page Three*

applying for residency programs. This scholarship is really going to take a huge burden off of me in terms of being able to fund my travel expenses," Adams explained.

The scholarships awarded this year make a statement to the 12 hardworking recipients that the MUWC cares about their continued education and well-being. "I really appreciate the investment they have in my education, because right now every little bit helps," Adams said.

The sense of community and network of support that the MUWC helps to foster is exactly the kind of thing that President Cole wants to promote. "The strength of MUSC is what makes us special — the connectivity and the bond among all of us as we work to have impact on people's lives," he said during his speech at the fall coffee. "MUSC is a family. This group represents its heart."

President of the MUWC, Tiffany Takacs, knows the financial burden that pursuing a medical career places on students. "Medical school now is such an expense — any way we can help out, especially through these scholarships, helps the student tremendously." She added, "We want to help change the face of medicine. It is amazing to see how far it has come."

Takacs also reflected on changes in the medical field

in general over the past several decades. "I look back and think about how far medicine has come in 50 years — not just in terms of technology, but research and development as well."

The 50th anniversary of the MUWC is indicative of the dedication of its members and gives cause for reflection on how the club has evolved and expanded since it was founded in 1966. The MUWC's mission is to promote interest in and support of MUSC and to provide fellowship activities for its members. The club was originally only open to wives of MUSC staff, but it is now open to all female faculty, professional staff, affiliated board members and spouses of staff. In addition to their annual fall coffee, the club offers numerous special interest clubs to provide additional ways for its members to get involved with the MUSC community.

Peggy Underwood, a current member and former president of the MUWC, is amazed at the club's progress over the years. "When I was president in '74 and '75, almost everything was just about entertaining. We had parties and that kind of thing, and it was mainly just a fellowship. But now we have so many clubs, like the bridge club, book club and investment club — we have increased it to be so much more."

The MUWC plans to celebrate many more anniversaries to come and continue with its mission of supporting and contributing to the MUSC community by giving back to students.

IMMUNE *Continued from Page Four*

further understand how this sMIC molecule was actually moving freely around a patient's body, undetected, seemingly invisible, with no attackers on its heels. Then they realized some cells are smarter than others – so smart, in fact, they'd developed covert ways of operating – from hiding, to hibernating, to actually outright fooling and disabling the immune system.

"How do these smart cancer cells go undetected?" she asked. "We hypothesized that the 'not smart' tumor cells get killed because they tell the immune system, 'I'm here, come kill me.' They're not very bright. However, the smart cells, the ones that kill people, they take off their coats and say, 'Let me get rid of this thing, so I can run around and not be seen by the immune system.' That was our initial hypothesis, 12 years ago."

For the last 12 years, five of them spent running her laboratory at MUSC, Wu led her team and dug deeper to more fully understand how tumor cells manage to trick the very powerful immune system by hiding or changing their appearance and viciously sabotaging the immune system.

The sMIC released by tumor cells, she explained, disarm the soldiers in the body in multiple ways. "The NK cell – which is the frontline defender that has the ability to kill tumor cells – it's as though sMIC make them disappear. They've been disarmed, disabled, and even disappeared from the force."

She further explained that the molecule sMIC can also make the overall climate unfavorable for immune attack, encouraging tumor cells to thrive.

"You wonder," she continued, "is this what's happening to make the immune system not work? If this is the reason, how can we make it work? How can we reverse it? That's my question. How can we overcome cancer? How can we catch the smart cancer cells?"

Wu's team discovered a way.

Immune cells have accelerators and brakes that speed up or slow down the cell's ability to combat intruders. What if there were a treatment that removes the brakes and fuels-up the accelerator from these cells on patrol and deploys them to do their job?

DISABLING THE BRAKES

For decades, clinicians and scientists assumed that cancer was beyond the reach of the body's ability to use its own natural defenses to fight. But research like Wu's demonstrates the immune system is indeed capable of identifying and killing cancer cells, along with a new class of drugs called checkpoint inhibitors, which harness the immune system's own ability to fight off cancer cells. These emerging sciences are indeed the revolution to traditional medicine. While traditional cancer drugs like chemotherapeutic agents act with foreign chemicals to attack cancer cells, immunotherapies also called "biotherapies" instead stimulate the body's own immune cells to kill the cancer.

One of the most exciting advances in cancer immunotherapy involves releasing the innate brakes that keep the immune system from running rampant. This approach, called checkpoint blockade or inhibitors, relies on the fact that the immune system already knows how to fight cancer – it just needs a little boost.

T cells have receptors on their surface that accomplish different things. Some act like a gas pedal on a car telling them to go. But because they are so powerful, they also have a built-in brake system that tells them to stop, so they don't attack normal cells or tissue, accidentally causing an autoimmune disease like rheumatoid arthritis or lupus. Many cancers, however, have learned to step on the brakes and use them to suppress the immune system's response to disease to avoid destruction. Checkpoint inhibitors are able to block that action, thereby depriving cancer of an all-important protective defense. Several checkpoint inhibitors are FDA-approved, and fortunately, many cancers have responded to them.

While ecstatic about these new pharmaceutical advancements, Wu looks at it more like a one-two punch. "What we're trying to do right now, is not only release the immunological brake with an FDA-approved drug, we are also trying to power up the immune system. If the accelerator or the engine is broken, releasing the brake won't go too far. That is why only a subset

of patients responded to releasing the brakes alone. We are working on fixing the broken engine and also fueling-up the accelerator to make a majority, if not all, patients respond to immunotherapy. We have a great solution to it."

STEALTH MODE

So a cancer cell is able to disable the immune system? "Yes, we believe it can disable it," Wu said. "For example, the sMIC, a soluble protein released by cancer cells, gets into your bloodstream, disables the immune system by multiple approaches, and allows cancer cells to thrive – that's what we found."

Wu's work was the first ever to show that tumor cell released sMIC makes tumor-killing NK cells disappear or dysfunctional and creates a hostile environment to hamper T cell function, thus allowing tumors to enter a dormant stealth mode to metastasize, or spread. Immune cells, including NK and T cells, normally should recognize these faulty cells and eliminate them in a process termed immunosurveillance.

Wu's research team was the first to demonstrate that antibody targeting sMIC protein can repair the damage to the immune system, and even more impressively, to revive and refuel the immune accelerator. An antibody is a blood protein produced in response to a specific antigen – a toxin or other foreign substance that induces an immune response in the body – which it works to counteract.

"Over the last couple of years, we developed a therapeutic antibody, and we tried to determine if we could target the immune system. It worked out great. We showed that we can target this molecule

to actually restore the immune system and use a body's own ability to fight cancer. That is a great success."

It's nearly impossible for Wu to contain her excitement, and she can hardly wait to get this development to the point where it can help patients, which she believes will happen in the very near future. That day can't come soon enough for her.

"I can't stop thinking about the hope this could offer to patients. Patients are always at the forefront of my mind. I just want to tell cancer patients, 'This is a great hope – our recent advances in the cancer immunology field offer great hope.' I want them to know, we don't just work 9 to 5. We aren't just working with test tubes. It's about them. Finding a solution for them is our lives, our passion. We live in it. We always look at the patient and ask, 'What is wrong with the patient?' If we understand that, we can come back and address that question. This question drives our lives."

THE NIH: JOINT CHIEFS OF HEALTH CARE

Wu's two recent prestigious NIH grants, totaling nearly \$3.5 million, will help her to lead her team to bring clarity to these questions and drive innovation and cures. Highly competitive in nature, these grants underscore the significance and importance of her work.

The first grant allows her team to study how tumor-released sMIC makes NK cells, the first-line defenders, disappear or malfunction in cancer patients and to find ways to restore NK cell immune defensive power. NK cells control the spread of cancer cells and recently have

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Summer program gives students cancer research opportunities

By OLIVIA FRANZESE

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Conducting cancer research is not the way most college students spend their summers, but for NiAsia Hazelton, a senior at the University of South Carolina Beaufort, that's exactly what she did. Hazelton's summer consisted of delving into cancer research and conducting experiments in MUSC's state-of-the-art laboratories, along with 17 other students. She was part of the first South Carolina Cancer Health Equity Consortium (SC CHEC) undergraduate summer program offered at MUSC for students who are interested in a career in the biomedical field.

Undergraduate juniors and seniors like Hazelton participate in a 10-week inter-institutional summer program designed to attract new and diverse biomedical students who are interested in cutting-edge cancer research to the field. During the program, students engage with investigators at the Hollings Cancer Center, a National Cancer Institute designated cancer center, to gain insight into recent medical advancements in biomedical research, specifically focusing on cancer disparity dynamics across South Carolina.

Hazelton's focus was cervical cancer and its correlation to HPV vaccination levels. "This opportunity has been great. I've learned a lot about cancer — cervical cancer and HPV specifically. I didn't know anything about HPV before this internship," said Hazelton. "After this program, I'll have a better understanding of what I want to do when I graduate."

An important part of the SC CHEC program is matching each student with a particular MUSC mentor. Hazelton was matched with Marvella Ford, Ph.D., associate director of cancer disparities at Hollings Cancer Center, who served as her advisor as she conducted research, worked on various projects and performed complex experiments to further biomedical research.

Another MUSC mentor, Steven Rosenzweig, Ph.D., a professor in the Department of Cell and Molecular Pharmacology, said, "This is a really important opportunity for undergrads to understand what's going on at the university with respect to cancer research and with respect to disparities research. All of these things come at a very opportune time."

Rosenzweig's mentee, Daniel Patterson, a student at the University of South Carolina and 2016 SC CHEC participant, felt that the program challenged him to translate his knowledge into real-life applications. "This experience has been really eye opening — I've never had such an intensive lab experience like this before. It was really good to put into practice all the protocols and things I've been learning in class, and it's just been a great experience overall. I've had great oversight from Dr. Rosenzweig and other people who work in the lab."

Encouraging a new generation of diverse biomedical students to pursue careers in the field is essential to the success of biomedical research. Research in the SC CHEC program focuses on four of the most disparate cancers both nationally and in South Carolina, based on rates of incidence, morbidity and mortality: breast,

prostate, head and neck and cervical cancer.

Students are exposed to top leaders in biomedical research, health statistics, cancer disparities and hands-on experience in laboratories where important and innovative cancer research and experiments are breaking ground in the field.

All components of the SC CHEC program are designed to provide students with useful resources they can utilize on their journey to a career in biomedical research. In addition to providing hands-on experience with experts, SC CHEC's summer program offers a GRE prep course, cancer health equity course, cultural awareness activities, housing, competitive salary and transferable credit hours.

Ford, Hazelton's mentor, believes that the transferable credit hours are invaluable to any junior or senior student pursuing a medical career. "The curriculum is approved by MUSC's College of Graduate Studies curriculum committee, and so the students' immediate benefit is they will walk away with 15 credit hours from MUSC."

The GRE prep course is included to encourage these students to attend graduate school and further their education. "We have built in funding to cover the

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IMMUNE *Continued from Page Ten*

been found to control the way stubborn cancer stem cells thrive. The loss of NK cell defense caused by sMIC may contribute to cancer cell spreading and also evolving into a deadly disease.

The second grant will delve into supercharging the cancer-killing T cells to attack cancers. In most immune responses, the activation of T cells requires the presence of an additional stimulus. Wu has a solution to supercharge the cancer-killing T cells and make them produce the maximum response — more than ever.

The third NIH grant Wu received this year supports the work of her startup company, CanCure, LLC, which she launched in 2015. CanCure is an anticancer drug development company that aims to bring to fruition cancer treatment drugs that can restore the patient's own natural immune function to fight cancer and to shepherd them through FDA approval. Wu secured CanCure with the NIH small business grant, the largest amount offered during Phase I development, to advance

an antibody-based cancer immunotherapy she's developed to use in humans. This therapy targets all cancer types, at all stages, including metastatic cancers — cancers that have spread to other organs and failed to respond to current standard care. It is a first-in-class cancer immunotherapy in that the therapy not only showed great efficacy by itself in shrinking tumors that are non-responsive to current FDA-approved immune checkpoint inhibitors, but also generates synergistic therapeutic effect when used in combination.

Wu is extremely optimistic.

"Why am I so passionate?" she asked. "Ultimately I want to understand, because I want to help people. I'm a cancer immunologist, and I love it. The bottom line is, I'm trying to understand how cancer develops in patients, so we can develop therapies to fight cancer and help patients."

She needs to do this, she said, to help humanity. "The most exciting part of this, you see, is we are just about to walk to the end of the tunnel, and we see the light at the end of that tunnel. There is hope. We must have that. We must have hope."

SC CHEC *Continued from Page Eleven*

costs of the Kaplan Center's GRE test preparation course. We wanted to take away the fear and intimidation of the GRE, so when students actually take it, it will be very familiar, and they will do well," explained Ford.

The SC CHEC summer program acquired funding from the National Cancer Institute in 2015 to make the program a reality, and it was launched this summer. The program is open to students from four S.C. colleges: South Carolina State, Claflin University, Voorhees College and the University of South Carolina. But according to Ford, SC CHEC will convert the course into an online version that will be available to all institutions across the state during its third year. Program coordinators and mentors of SC CHEC want these opportunities to be widely accessible to any student who has an interest in the biomedical sciences.

For students like Hazelton and Patterson, the value of the SC CHEC summer program extends far beyond academic benefits. They benefit from



Mentor Dr. Steve Rosenzweig, right, and mentee James Patterson in the lab. an inter-institutional network of connections and support among fellow participants. It was also rewarding to be a part of the program during its inaugural year, which set the standard for each class moving forward.

"Every student feels valued and respected. They are so kind to each other and so helpful," said Ford. "Their participation identifies them as more than a gender or race or school. We could not have asked for a better inaugural class – this class has exceeded our expectations."