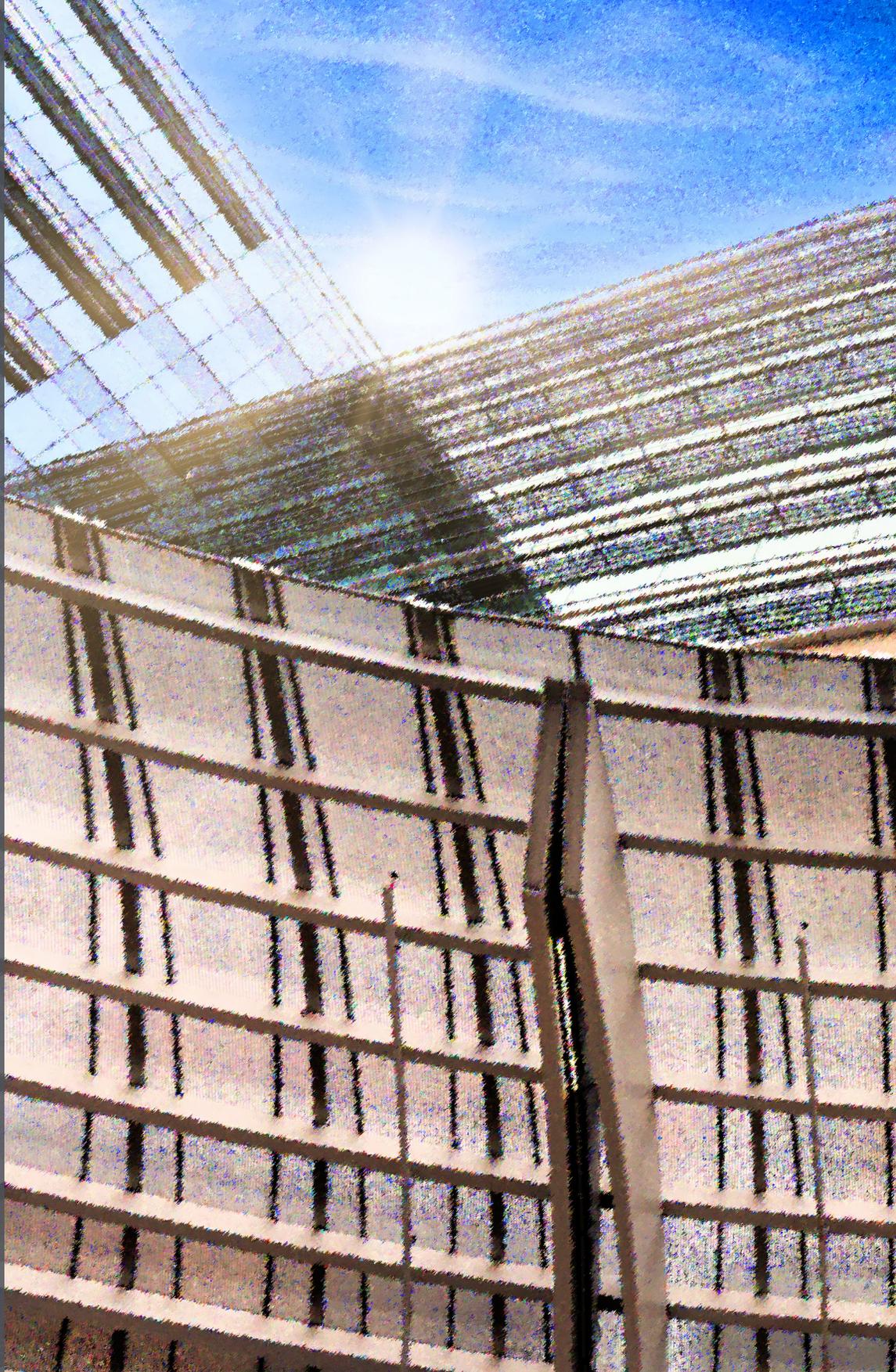


FACULTY FOLIO

BLUE SKIES



Anschutz



Vik Bebarta, MD

An introduction
and invitation

The Department of Emergency Medicine leads with purpose - advancing clinical care, research, education, and innovation that change lives and set new standards. We are driven by competence and character, uniting people around bold ideas and practical solutions - true blue-sky thinking.

In this issue, you will meet remarkable faculty shaping the future of emergency medicine. Each profile highlights two sides of their story: Inspired: what fuels their purpose, and Impact: the legacy they are building.

We begin with Dr. Richard Zane, my mentor and our outgoing Chair, whose vision brought me from the military to CU Anschutz. His relentless pursuit of evidence, data, and patient-centered care, and his willingness to challenge convention, have transformed emergency medicine here and across the country.

I invite you to share in our mission and future.

VS

Vik Bebarta, MD, FAAEM

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INSPIRED





Embracing Change

A lifelong journey in emergency medicine and leadership

As a medical student in Philadelphia in the early 1990s, Richard Zane initially had a “preconceived notion” that he would be a small-town physician. By his own admission, he then “wandered a bit” through various clinical rotations, unable to decide on his future path.

One day a random moment changed that. Zane was innocently walking through the hospital’s emergency department, on his way elsewhere, when an attending physician asked him what he was doing. During a brief conversation, the physician asked Zane a pointed question: What are you gonna be? When Zane expressed his indecision, the attending made a suggestion: Why not emergency medicine?

The blunt question set the stage for Zane’s career. He went on to complete his residency training and a fellowship in emergency medicine at Johns Hopkins University. He was

attracted to a specialty defined by change, he said.

“In emergency medicine, everything felt new,” Zane recalled. “It was the variety and constant intensity that I liked.”

SHAPING EMERGENCY MEDICINE

More than 30 years after the chance encounter in the ED, Zane is still ready for change. On August 1, he becomes the chief medical officer for UHealth, while continuing in his role as the system’s chief innovation officer. The new appointment is the latest stop in a career defined by Zane’s eagerness to take on new challenges, including becoming the inaugural chair of the Department of Emergency Medicine at the University of Colorado School of Medicine, a post he held for 13 years to the day.

He will also remain as a professor of Emergency Medicine with the



school and continue to practice, further reflecting his commitment to the discipline that opened his eyes to the complexities of health care.

“Emergency medicine lies at the fulcrum of inpatient and outpatient care. It allows one to see everything across the entire spectrum of the health care, from clinical care to hospital operations to finance,” he said.

Zane built his expertise in all those areas during a 14-year stint in Boston at Brigham and Women’s Hospital and the non-profit Partners Healthcare (now Mass General Brigham), a multi-hospital integrated system.

He broadened his perspective as an emergency medicine physician, from organizing bustling hospital EDs to developing emergency medical services and emergency preparedness programs to respond to local, national and international disasters. Those efforts included setting up a critical care transport program and patient transfer center while serving as medical director for emergency preparedness and biodefense for Partners Healthcare and vice chair of Brigham and Women’s department of emergency medicine.

Zane’s emergency preparedness work had great reach. For example, with a grant from the federal Agency for Healthcare Research and Quality (AHRQ), he led a team that produced the Hospital Evacuation Decision Guide in 2010. That grant and several others funded by AHRQ and another by the World Health Organization enabled Zane and his colleagues to “build tools used in real time in disasters globally,” he said.

LEADING THROUGH CHALLENGES

In 2012, it was time to “look for the next opportunity,” Zane said. What would it be? Chief medical officer? Position with a private equity firm? Work in research and consulting?

No.

Zane moved west for fresh challenges and stepped in to chair the newly created Department of Emergency Medicine, at that time a tiny new island on the burgeoning University of Colorado Anschutz Medical Campus.

The chance to be the first department chair was only one attraction, Zane said. The University of Colorado Hospital (now part of UHealth) was in the midst of a major physical enlargement of its

emergency department. Its aim was to address severe capacity problems that caused it to divert ambulances much too frequently, board patients who should have been sent to inpatient floors, send patients home without being seen, and leave tasks unfinished.

The “exhausting environment” of the hospital’s ED had discouraged many in 2012, Zane recalled. Asked about the problem shortly after he accepted the position, he was blunt.

“IF WE DON’T REDESIGN THE WAY WE DELIVER EMERGENCY CARE, A LARGER ED WON’T SOLVE ANYTHING. IT WILL JUST BE A BIGGER MESS.”

He didn’t shrink from the challenge, and his approach to addressing it provides a window into his inner drive. “It was a job that was, shall we say, fraught with opportunity,” he said. “There was lots of room for optimism and lots of chances to improve.”

That attitude defines Zane, said Steve Hess, chief information officer for UHealth. The two were to work closely in building UHealth’s nationally recognized Virtual Health Center, which delivers an integrated array of remotely delivered health care services to patients.

“Dr. Zane runs toward the disaster not away from it,” Hess said.

Zane led the charge that transformed the ED, but at the same time his years of innovative work in Boston had taught him that the effort would be fruitless without the support of physicians, nurses and staff who were willing to follow him. He found many who were “hungry for change,” Zane said.

“WE HAD GREAT PEOPLE,
AND WE RECRUITED OTHER
GREAT PEOPLE TO JOIN
US IN TURNING THE SHIP
AROUND.”

Zane hired an industrial engineer and set forth to deconstruct the way the ED delivered patient care. He and his team analyzed every task in terms of what it accomplished and how long it took to do it – not only in isolation but more importantly in the context of the tasks occurring in parallel at the front, main and back ends of the ED. They tested changes with tabletop exercises and live drills followed by critical evaluations to identify opportunities for further improvement.

PEOPLE AT THE CENTER

For every change made in the way the ED functioned, Zane said, the team applied a fundamental question: “What does it look like through the lens of the patient? Patients have to be at the center of everything we do. We don’t do things because they’ve always been done that way. We do what is the right thing to do.”

In addition, Zane recognized that for patients to fully benefit from a redesigned ED, every person providing care had to work at the top of their scope. Zane found that had not been the case before he arrived. Nurses spent less than half their time providing the patient care they had trained for. Instead, they often transported patients, cleaned rooms, and fetched equipment.

“It was not respectful, and it was not efficient,” Zane said. The redesign committed to creating an environment in which every person working there did the jobs that made the best use of their skills.



In the end, Zane and his team met the challenge. Their work produced an ED that “sets the standard for emergency care,” he said. He proudly noted that there has not been a single ambulance diversion since the redesign.

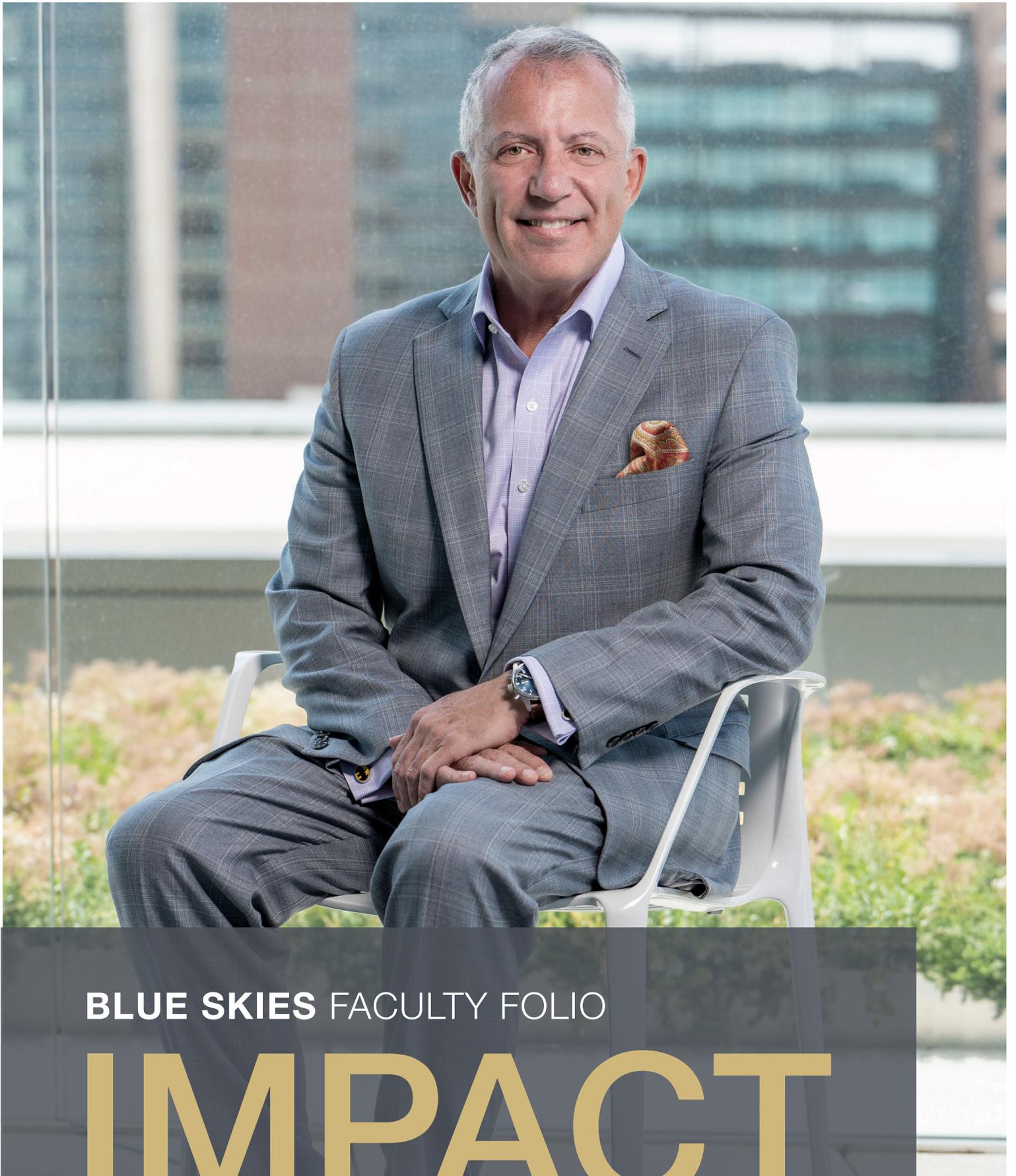
In the decade-plus that followed, Zane played a key role in helping the Department of Emergency Medicine and UHealth successfully meet many more challenges, including building a patient referral and transport system; using telehealth to address capacity problems and improve patient care; developing innovative responses to protect patients during the COVID-19 pandemic; and incorporating artificial intelligence into clinical care decisions.

Every project he has undertaken has involved change – a constant

in his professional life ever since his fortuitous trip through the ED as a medical student.

“A constant across everything I have done is change management,” Zane said. Asking people to think about and do things differently is nearly always uncomfortable, he added, but it can be accomplished through collaboration.

As he shifts from top academic emergency physician leader in the CU School of Medicine and takes over as the leading physician executive at the UHealth system, he will “engage people in change, so that they know they are not helpless, and that we are not doing things to them, but with them,” he said. “That applies to science, education, emergency care, virtual care and innovation.” ■



BLUE SKIES FACULTY FOLIO

IMPACT

Driving Impact

Transforming emergency medicine and virtual care with vision and collaboration

Dr. Richard Zane arrived on the University of Colorado Anschutz Medical Campus from Boston in 2012 eager to drive ambitious change. As a self-described “disruptor,” motivated by his early vow to “change the world,” he fit right in.

Zane became the inaugural chair of the Department of Emergency Medicine at the University of Colorado School of Medicine during a time that was rife with promise and possibility. The University of Colorado Hospital was expanding its capacity-challenged emergency department and constructing a new inpatient tower atop it. The hospital – the region’s only academic medical center – had recently joined with Poudre Valley Health System to form UCHHealth.

BUILDING A TEAM

Zane quickly became a key contributor to the changes, leading a process to transform patient care in the ED and organizing a systemwide patient referral and

transport system. That was only a start. Zane joined with likeminded colleagues to find and launch innovations in stroke care, virtual health, remote patient monitoring, clinical decision support, prescriptive analytics and more.

Each success was a waystation in a continual search for ways to improve patient care, said Zane, who becomes chief medical officer for the UCHHealth system August 1. He stresses that the advances were not one-man achievements but rather the product of amazingly hard work by talented people who shared his drive and vision from the day he arrived on campus and recruited others to join them.

“It became a self-fulfilling prophecy,” Zane said. “The more we set our vision, the more attractive we became, and the more smart, creative and innovative people we had come and stay. Our success was having smart people at the small table making big decisions.”

Zane said he is “exceptionally





proud” of leading a remarkable team who created a world class clinical, educational and research environment that encourages faculty and staff to take risk, think outside the box, thrive and lead.

“If I can take credit for anything, it is that we were able to grow, recruit and retain the right people, as well as support and empower them.”

“I DON’T HIRE SMART PEOPLE AND TELL THEM WHAT TO DO. I HIRE SMART PEOPLE SO THEY CAN TELL ME WHAT TO DO,” HE SAID.

RESEARCH AND RECOGNITION

Under Zane’s leadership, the Department of Emergency Medicine has become a top-10 producer of academic research, thanks to the steady flow of faculty his team recruited, encouraged and supported to build expertise in their chosen areas of interest.

A few examples stand out among many. Two faculty members, Dr. Jay Lemery and Dr. Marian (Emmy) Betz, have been elected to the National Academy of Medicine. Dr. Adit Ginde, in addition to

creating the strategy for building an emergency medicine research powerhouse, played a key national leadership role in the development and launch of Operation Warp Speed, which brought the COVID-19 vaccines to the public, and has been tapped to lead the School of Medicine in clinical research and pioneer adaptive clinical trials.

Dr. Vik Bebarta, who will succeed Zane as Department of Emergency Medicine chair, founded and directs the CU Center for COMBAT Research, whose team collaborates with the military on solving its highest-priority medical challenges. His work has been recognized by the White House, Congress and the highest levels of military leadership.

Lemery, professor of Emergency Medicine and chief of the Section of Wilderness and Environmental Medicine, noted that by “standard metrics, including patient outcomes, research dollars, and the palpable success of students, residents and Fellows,” Zane was a highly successful department chair. But Lemery noted several “unexpected, distinctive superlatives” that define Zane’s success.

These include building a department distinguished by:

- Earning national awards for the most full professors in the United States who are women
- Creating an ED whose novel clinical processes have been witnessed and emulated by numerous peer departments nationally
- Nurturing and facilitating faculty at all levels to develop as national and international leaders.

Don Elliman, who became chancellor of the University of Colorado Anschutz Medical Campus the same year Zane arrived, said Zane’s influence on his specialty and on the entire campus was and remains a powerful force.

“His passion for turning ambitious ideas into tangible results is unmatched, and those who have had the opportunity to work alongside him are better for the experience,” Elliman said.

“We have Rich to thank for his transformational leadership in emergency medicine, which has set a national standard for innovation in emergency care.”

Zane has also been a powerful proponent for change across the spectrum of health care delivery. For example, as the inaugural chief innovation officer and cofounder of the UHealth CARE Innovation Center, he teamed with UHealth Chief Information Officer Steve Hess and Amy Hassell to launch the UHealth Virtual Health Center.

Zane and Hassell, who is now chief nursing officer of the center, were among the co-authors of a 2024 article that summed up the need for virtual care. “In the face of formidable healthcare challenges, such as staffing shortages and rising costs, technology has emerged as a crucial ally in enhancing patient care,” they wrote.

VIRTUAL HEALTH SUCCESS

Today, health system leaders from all over the world visit the center to learn how to do what these leaders and their teams pioneered, but it started slowly, with three UHealth hospitals offering remote routine and urgent care patient visits, along with virtual telemetry and ICU

monitoring, to address increased capacity and staffing demands. In the first month, the center had fewer than 20 remote visits.

Zane said the numbers didn't discourage the team because the concept was sound.

“ANYTHING THAT EXISTS IN BRICKS AND MORTAR NEEDS TO EXIST IN THE VIRTUAL ENVIRONMENT,” HE SAID.

The team proved that true over the next several years. By 2023, the Virtual Health Center served a dozen UCHHealth hospitals and substantially expanded its services to virtual behavioral health visits and remote monitoring of patients with conditions like diabetes. Nurses and physicians with specialized expertise in a variety of conditions remotely monitor patients through an “eye in the sky” that helps bedside providers care for their patients.

The goal: alert those providers when the center's technology detects signs that a patient's condition is deteriorating so that steps can be taken quickly to stabilize it.

The care of patients with sepsis offers one nationally recognized example of the Virtual Health Center's success in helping to save lives. Sepsis occurs when the body launches an extreme inflammatory response to infection. It is vital that providers quickly detect its warning signs, such as rapid changes in breathing, blood pressure and temperature, and promptly begin administering a treatment protocol.

That's very difficult to do in a busy hospital environment, but the Virtual Health Center provides the vital assist through a combination of

artificial and human intelligence that sifts through the fluctuating stream of a patient's vital signs to find the true signals of sepsis.

“Sepsis is hard to detect, because it's subtle until it's not,” Hassell explained in the summer of 2024. “It is high consequence, and it has time consequence – typically, for every hour that you get antibiotics, your mortality improves by 10%. You want to find it as early as you can.”

By one estimate, the Virtual Health Center helped UCHHealth hospitals save 1,000 patient lives from sepsis and deterioration in a year. The combination of a sensitive algorithm and a concentration of people monitoring at-risk patients has created a system that is “highly sensitive, more specific and more timely,” Zane said.

The collaborative work on the Virtual Health Center paid off in another crucial way when the COVID-19 pandemic began its nationwide sweep early in 2020. While many hospitals and systems struggled to meet patient care demands in the new, isolating environment, UCHHealth and CU already had the infrastructure to provide remote patient care.

“During the pandemic, we didn't stand up anything new,” Zane said. “We added more people, chairs and monitors. We had the processes, technology and devices to increase capacity.”

VISION AND DISRUPTION

Bringing his many projects to fruition has required change, and Zane acknowledges that asking people to think and do things differently can lead to discomfort.

He calls himself a “disrupter” with



pride. But he credited his many collaborators for joining him in forging a new future for the health care system.

“Dr. Zane is a visionary,” Hess said. “The journey toward the vision doesn't always go as planned. The difference between Dr. Zane and other visionaries is that he can and will execute his plan.”

As Bebart becomes chair of the Department of Emergency Medicine, Zane urges him to look at the job with fresh eyes, just as Zane did for 13 years, vowing not only “to change the world,” but also to endlessly move “onward” to face new challenges.

“I hope he has sufficient freedom to change everything and take a new look at anything and everything,” he said. “I would love for him to take advantage of what is great while recognizing what needs to be changed, started, grown or made bigger or smaller. My wish is that he feels confident in defying convention and disrupting. Success is rented, not owned, and rent is due every day.” ■

BLUE SKIES FACULTY FOLIO

INSPIRED





World View

Dedicated work to improve the quality prehospital medicine through education and training

A couple of decades ago, a teenage girl in Niwot, Colorado, prepared to join her high school cross-country team. Her father pulled her aside for an unusual pep talk.

“You know, Angie,” he said, “you will always finish the race, but you may never finish it first.” Her father then added words that echo to the present day.

“You are going to work really hard, and you are going to do wonderful things, but you don’t have to be the first person across the finish line,” he said.

“That was one of the most formative moments of my upbringing,” Angela Wright says today. “It set up a tone of knowing that it was more important to know how I did with relationship to myself than it was how I did in relationship to all those around me.”

Wright has indeed been successful running her own races. She trained

in emergency medical services and as an emergency medicine physician and is now associate professor in the Department of Emergency Medicine at the University of Colorado School of Medicine.

Since arriving at CU, Wright has also been a powerful advocate for the workers who deliver lifesaving care to patients in the field. She is medical director of Emergency Medical Services (EMS) at UCHHealth University of Colorado Hospital and has spearheaded education programs open to EMS providers around the state – a key to building a resilient workforce committed to a challenging profession in communities large and small.

LEADING THE WAY

The task for her EMS program, Wright said, is straightforward but not simple. “How can we provide support as a healthcare institution



and a hospital and as a group of experts to deliver high-quality and consistent [EMS] care to our communities?”

Her work has not gone unnoticed. This spring, Wright was selected as EMS medical director for the state of Colorado. In one respect, her father’s wise words missed the mark. Wright is the first woman ever to hold the position.

The achievement reflects the challenging path she chose to pursue in healthcare.

“I knew, having started my career in EMS, that this was a traditionally male-dominated field,” Wright said. She recalled that when she attended her first national conference in 2017, only 6% of EMS Medical Directors in the nation’s 10 largest cities were women.

Wright, spurred by the example of “incredible women in medicine,” has helped to bring more women into the EMS workforce and leadership. She joined the National Association of EMS Physicians several years ago and now serves as chair of its Women in EMS Committee.

“IT HAS BEEN A REAL HONOR TO SERVE THIS GROUP OF INCREDIBLE EMS PHYSICIAN AND NON-PHYSICIAN MEMBERS, LOOKING TO CHANGE THE FACE OF PREHOSPITAL MEDICINE,” WRIGHT SAID.

INTERNATIONAL INFLUENCE

This trailblazer, however, was not immediately drawn to healthcare. After receiving a Boettcher Scholarship, Wright attended the University of Denver (DU), where she majored in International Studies. A few stints studying abroad opened her eyes to the richness of the wide world.

“I fell in love with traveling and cultures and became really interested in non-governmental organizations and all the hard work they do,” Wright said. During a stay in Costa Rica, she learned about that country’s political structure and how it supported the healthcare system.

The experience also made Wright look at her country in a new way. She noticed homeless

encampments and keenly felt the need to help if someone in her family fell ill. She saw that people in the United States were vulnerable to many of the same health challenges that she saw abroad.

“I started to realize through traveling that there were so many people in our own backyard that also needed help,” Wright said. “Global impact is important, but I thought that maybe I needed to make a local impact. That human touch was something I craved for purpose.”

By her own admission, she flailed for a time. She thought about working on public policy and interned for a couple of local politicians, but didn’t get the sense of fulfillment she sought.

“I wanted to save the world and work for non-governmental organizations and travel all over,” Wright said. Instead, she cast about for a direction in her life. “I started to feel a little lost.”

In her third year at DU, Wright made a rapid and ultimately decisive pivot. She decided to get her emergency medical technician certificate at Red Rocks Community College. The clinical training portion, which included transporting patients between nursing homes, opened her new possibilities.

“The one-on-one time and that human experience with the patients changed my whole trajectory,” Wright said. “I loved patient care. I loved feeling like I could help.”

DEDICATED PATH

Now convinced that her future was in healthcare, Wright scrambled to complete her International Studies degree and the prerequisites she needed for medical school. She also worked on an ambulance and as an

EMT at Children's Hospital Colorado before getting accepted for medical school at Loyola University in Chicago.

With only the "bare prerequisites" for med school, Wright spent an intense first year hitting the books while rotating through different hospitals. She saw a lot of trauma and observed wide disparities in access to quality care. In one hospital, most patients were insured and resources were plentiful. In another, she had to push her own patients to a CT scanner. Orders for tests could be turned down because of cost.

The four years at Loyola also confirmed a change in her outlook on the world. Wright had started her undergraduate studies with a global perspective and a desire to address the broad problems of society. As a physician, her concerns narrowed.

"I had ended up in a place that was very much about the person in front of me. I learned through my training in Chicago that we can make a huge difference by just impacting one person, in one moment," she said.

Initially, emergency medicine didn't strike Wright as the ideal field to make that impact. She was initially pulled toward OB/Gyn.

"But then I noticed that there was a lot of opportunity in the emergency room to have an impact on women's health," she said.

Wright returned with her husband to Denver to begin her emergency medicine residency at Denver Health, a safety-net hospital committed to serving every patient that comes through its doors.

"Denver Health's model is, you're going to get your experience



through patient care," Wright said. "So it was an incredible amount of shifts, rotations and patient interactions."

BUILDING PREHOSPITAL PROGRAMS

After residency, Wright completed a one-year fellowship at Denver Health, focusing on how to provide the medical direction and build the infrastructure for a 911 service. She used those skills as the foundation to create the EMS program at University of Colorado Hospital.

That program starts and ends with education for paramedics and EMTs, Wright said. Building coursework that can engage them

and enrich their knowledge is a way of honoring the people who helped her.

"I was fortunate to have incredible educational opportunities," Wright said. "For any sort of meaningful change, you have to start with education and training."

Years after her father's advice about races, Wright has also learned that one does not run races alone.

"I think one of the biggest themes through my training has been that you are nothing without a team," she said. "Finding the teammates and collaborators through these projects is the only way to be successful." ■



BLUE SKIES FACULTY FOLIO

IMPACT

Prehospital Care Focus

Advocating for Emergency Medical Services workers through teamwork and leadership

In her third year of International Studies at the University of Denver (DU), Angela (Angie) Wright had traveled many miles and soaked up many new experiences, both at home and abroad. She'd roamed northern Spain, learned about the healthcare system in Costa Rica, and worked with local politicians on policy issues after she returned to Colorado.

She enjoyed it all, but her youthful desire to “save the world” – her reason for getting into International Studies in the first place – was unfulfilled.

“I felt that the human touch was something that I craved for purpose,” she said, but she floundered in searching for the work that would satisfy her.

That summer, Wright abruptly decided to focus her lofty career considerations on something much more basic. She headed off to Red Rocks Community College

in Lakewood to earn her EMT (emergency medical technician) certification.

Wright saw the work as a low-risk but meaningful way to decide if she wanted to get into healthcare. “I thought, that’s a great way to spend the summer,” she recalls with a laugh.

CALL A MEDIC

Turns out, getting that EMT certificate launched her career, which has made a major mark on emergency medicine and emergency medical services (EMS). Wright is now associate professor in the Department of Emergency Medicine at the University of Colorado School of Medicine, medical director of EMS at UCHealth University of Colorado Hospital (UCH), and the recently named EMS medical director for the state of Colorado – the first woman to hold that post.





Wright and her team at CU are tireless advocates for innovations that support education and services for EMS workers and agencies around the state. For example, the MEDIC (Medical Education on the Delivery of Innovative Care) Program, which launched in 2023, offers training and certification on the Anschutz Medical Campus for paramedics, EMTs and emergency responders from around the state. The program graduated its first class in May 2024, and began its second in late June.

THE MEDIC PROGRAM AIMS TO PROVIDE THE MOST ADVANCED EDUCATION POSSIBLE FOR EMS WORKERS “IN FRONTIER, RURAL, AND FRONT RANGE COMMUNITIES” IN COLORADO, WRIGHT SAID.

“When you call 911 on the eastern Plains, it’s very different from when you call 911 from Sixth and Bannock [in Denver],” she said. “So how can we provide support as a healthcare institution and hospital to help EMS systems deliver consistent and high-quality care?”

The MEDIC program also addresses the crucial need to build and retain Colorado’s EMS workforce, Wright said.

“We have a sustainability problem in healthcare, and EMS is no exception to that,” she noted, adding that the average career in prehospital care is only about five years. Building a strong and accessible education foundation is a key to changing that, but Wright doesn’t downplay the challenges of doing so.

“It’s not fun for people to work and go to school at the same time. In

fact, it is extremely challenging,” she acknowledged. Recognizing that, Wright and her team worked to customize courses to meet the students’ scheduling needs, beginning with the first class of mostly firefighters from the Aurora Fire Department.

“One of the things we really wanted to focus on with MEDIC was meeting the students where they are and then bringing them into the workforce,” Wright said. “By doing that, we are hopefully showing them that it’s okay to stick around and maybe we can get them to stay a little longer [in the profession].”

TEAMWORK TO PROGRESS EMS

Wright has also forged partnerships with EMS agencies around the state through the Integrated Medical Direction (IMD) program. Thirteen agencies, most of them in rural and mountain communities, work to address important elements of an evolving EMS environment, including technology-assisted care, protocol review and revision, and training.

The IMD program is the product of many hours of preparation. Wright hit the road to explain the strategy, often with UCHHealth Senior Director for Prehospital Care Marc Scherschel. She met with county commissioners, city managers and EMS providers, listened to them and answered questions about their resource needs and challenges, such as barriers to providing quality care. The process could be bumpy.

For example, Wright said she heard community leaders protest that as an academian from an urban area, she didn’t understand their problems. She countered that she grew up in Niwot, a small town in

Boulder County. Scherschel is from Conifer. Her entire team has both extensive prehospital care training and experience in the field.

“One of the big challenges to overcome in the EMS field is to make sure you taken seriously when speaking with stakeholders, agency leaders, and professionals,” Wright said.

“I learned early on that the way to do this, to overcome the preset stereotypes that may exist, is to make sure I did all of my homework, knew the topic at hand inside and out, studied the nuances and details of the particular situation, and listened more than I spoke.”

SHE ALSO PUT HER EMPHASIS ON FINDING AREAS OF AGREEMENT AND IDEAS FOR SOLUTIONS TO COMMON PROBLEMS. “ONE OF THE BIGGEST THEMES OF MY TRAINING HAS BEEN YOU ARE NOTHING WITHOUT A TEAM,” WRIGHT SAID.

“Knowing how to get the right people with the right resources and with the same passion around the table is one of the biggest hurdles to program development. It’s all about people and relationship-building.”

SHINING A LIGHT MENTAL HEALTH

EMS community leaders also frequently expressed a need for mental health resources, which was no surprise to Wright. She noted that EMS workers face the same dangers of repeated exposure to trauma – including increased suicide risk – as do police and firefighters. Left unaddressed, both individuals and the profession will suffer.

“Part of our sustainability problem is that [EMS] is an incredibly stressful and traumatic job,” Wright said. “We are expecting our people to provide top-of-the-line care in terrible situations. We haven’t realized until recently that that takes a toll that is profound.”

To address the challenge, Wright joined forces with Emergency Medicine colleague Dr. Ian Stanley, who also serves as Psychological Health Lead for the CU Center for Combat Medicine and Battlefield (COMBAT) Research. Together with eight EMS providers representing diverse Colorado communities, Wright and Stanley created a community advisory board that crafted recommendations for addressing the mental health risks for first-line responders.

The collaboration leveraged Stanley’s training in clinical psychology – he’s previously studied the burden of trauma on firefighters and military members – with Wright’s EMS experience, relationships, and operational skills. They have a common goal: help the EMS workers who save so many lives squarely address their own risks and build resilience.

“We have to normalize the conversation [about mental health],” Wright said. “I think one of the biggest barriers is culture. [The job] doesn’t lend itself to being open to having that conversation.” Once again, Wright wants to confront the mental health challenges of EMS work with primary education.

“You start the conversation, and it’s uncomfortable, but by the time they are five years in and have experienced a lot of trauma, they are more comfortable seeking care,” Wright said.



The brief summer detour Angie Wright took to Red Rocks College a couple of decades ago was actually a fork in the road. She is a leading spokesperson and advocate for the prehospital community and is now working with Emergency Medicine Department colleagues Drs. Vik Bebarta and Adit Ginde (profiled in prior Blue Skies issue), to strengthen her program’s research infrastructure.

“Prehospital care has often been an understudied space,” Wright said. “A lot of the big themes – mental health, firearm storage and safety, and trauma best practices – start at the doors of the hospital. My area of expertise is all the stuff that leads up to that. I try to provide the context and the expertise for the prehospital aspect of the initiatives that are coming out of our campus.” ■

BLUE SKIES FACULTY FOLIO

INSPIRED





Childhood Motivation

Experiences in Sub-Saharan Africa spawned a career focused on alleviating trauma-caused death and disability

Back in the 1990s, a 10-year-old girl visited her cousin's house in Accra, the capital city of Ghana in West Africa. Somehow, the girl crashed through a window and badly lacerated her arm. In this time before cellphones her young cousin picked up the telephone and called multiple times for emergency care without a response while his cousin continued to bleed.

"I ultimately had to figure it out myself and get a taxi and get her to care," Nee-Kofi Mould-Millman recounted, years later. His cousin's experience with getting emergency care in a resource-challenged healthcare system matched his own.

"Being a typical rambunctious boy, I would not infrequently find myself in the emergency room with my own injuries," he says. "I would see people getting dragged in, looking lifeless, but not much getting done. It was very obvious to tell from an early age that something was wrong

with the emergency care system."

LOYAL FOCUS TO IMPROVE ACUTE CARE

That early awakening and a penchant for solving complex problems led Mould-Millman into medicine. He devoted himself to finding ways to improve acute care in Sub-Saharan Africa and other low-income areas and countries and continues that work as professor with the Department of Emergency Medicine at the University of Colorado School of Medicine.

Reflecting his worldwide healthcare perspective, Mould-Millman is also principal investigator for the department's C3 (Cape-Colorado-Combat) Global Trauma Network, which conducts varieties of research internationally in an effort to improve trauma care and patient outcomes, especially in areas with the greatest need.

His current research focuses on the Western Cape of South



Africa, where he has led studies of interventions to save patients with life-threatening bleeding as well as strategies for delivering timely care to trauma patients. Prior to that work, Mould-Millman worked to improve medical care capacity in Ghana, Kenya, Tanzania, and Zimbabwe.

“Ninety percent of the burden of trauma across the world happens in low- or middle-income settings,” Mould-Millman said. “So if your career goal is to help alleviate death and disability from trauma, then it is natural that you will be drawn to global health.”

His training didn’t point in that direction. With an undergraduate scholarship to Tufts University in Medford, Massachusetts, he began pre-med coursework. But those studies became a “side hustle” after he found greater interest in biomedical engineering and pursued his degree in the field.

Biomedical engineering appealed to his love of designing and building in the service of solving practical problems that directly benefited human health. It was the need he had seen in under-resourced healthcare facilities in Ghana.

“It was the area where I wanted to dedicate my life,” Mould-Millman said.

His commitment to biomedical engineering was so strong at that time that after graduating from Tufts in 2002, he took a “gap year” to move to Silicone Valley to “chase a career” in the field. Unfortunately, he arrived a year after the so-called dot.com bubble burst. Thousands of tech jobs vanished.

With the market depressed and employment opportunities scarce, Mould-Millman’s gap year became “a life lesson in practicality.” The only job he could find was a research job in medicine at Stanford – not what he wanted, but necessary to pay for his medical school applications and everyday survival.

He drew a career-defining lesson from the difficult year: engineering jobs may become scarce, but healthcare will always be in demand. He realized that a research team could gather data from patients, synthesize and analyze the information and from that draw conclusions that could improve health – a new route toward his problem-solving goal.

“I thought that was quite powerful,”

Mould-Millman said. The year that had started unpromisingly turned into one of his “first forays into public health and broad health applications.”

THE JOURNEY BEGINS

He left the West Coast for Northwestern University Feinberg School of Medicine to earn his medical degree. He originally aimed to become an orthopedic surgeon, which appealed to his engineering and mechanical sensibilities.

“Emergency medicine was not at the top of my list,” he confessed. But as he moved through his medical school rotations, he realized that a career repairing bones and joints didn’t mesh well with his commitment to return to Ghana to help fix the poorly resourced healthcare system he had experienced as a young man.

“A surgical skill set was very difficult to travel with,” he said. “One needed a lot of equipment and resources.” Working in Africa would require flexibility and ingenuity, he realized.

“You need to take what you have and twist it and make it work,” Mould-Millman said.

HE WANTED TO BECOME A VERSATILE PHYSICIAN WITH A WIDE RANGE OF KNOWLEDGE AND SKILLS. EMERGENCY MEDICINE CHECKED THOSE BOXES, HE SAID.

He then began his residency at Emory University in Atlanta.

“The body of knowledge and the breadth and depth of emergency medicine really appealed to me,” Mould-Millman said. “I realized

this was sorely missing in most of Sub-Saharan Africa.” Perhaps, he thought, a better-equipped healthcare system could prevent the avoidable deaths that marred his youthful memories.

“As a child and still today, hearing that a friend or loved one had a medical emergency and died needlessly is still a painful story,” Mould-Millman said. “Those moments really transformed the way I saw the world.”

WORLD-WIDE FOCUS

As a third-year resident, Mould-Millman put his commitment to global emergency medicine to the test. He sacrificed a month of his salary to return to Ghana to help support a new national ambulance service, train EMTs to improve trauma care, and write a portion of the law codifying it.

“It solidified my thought that I can take an emergency medicine skill set and travel to Sub-Saharan Africa to try and impact change,” he said.

After finishing his residency, Mould-Millman completed two fellowships at Emory. The first, in Emergency Medicine Services, built on his residency efforts to strengthen ambulance services in Ghana. The second, in Global Health, was vital to bolstering his knowledge of international healthcare.

“I KNEW THAT MY CAREER WAS GOING TO LAND AT THE INTERSECTION OF BOTH OF THOSE [FIELDS], WHICH IS EXACTLY WHAT HAPPENED.”

During the fellowships, Mould-Millman did a variety of project work, including evaluations of prehospital care and ambulance



services in Ghana. At their conclusions in 2013, he joined the University of Colorado Department of Emergency Medicine, where his career took yet another turn.

At the time he joined the faculty, Mould-Millman was in the midst of applying for a grant to study whether ambulance services could be used to save mothers suffering post-partum hemorrhaging. Recognizing he needed stronger research skills, he completed two nationally competitive emergency medicine research and career development awards (both between 2016 and 2020), then earned a Master of Science in Clinical Science from CU in 2021 and a PhD

in emergency care research from the University of Cape Town (South Africa) in 2022.

For Mould-Millman, the degrees are not ends, but a continuation of a life journey toward helping low- and middle-income countries around the world make the best use of the resources on hand.

“Discovering the interventions that are most effective in resource-constrained settings to avert and minimize mortality and morbidity in trauma patients is the goal and spirit of the C3 Global network,” he said. “That knowledge travels nicely [from South Africa] to Sub-Saharan Africa and across the world. Frankly, it even travels to the United States.” ■



BLUE SKIES FACULTY FOLIO

IMPACT

Triangle of Trauma

World-wide pursuit to improve trauma care

A triangle on a map that extends from Ghana in West Africa to Aurora, Colorado at the foot of the Rocky Mountains to Cape Town, South Africa, at the tip of the continent represents a span of tens of thousands of miles. But for Nee-Kofi Mould-Millman, the far-flung locations are united by a single word: trauma.

The word has been the focus of Mould-Millman's professional work and research for more than a decade and a presence for much of his life. Today he is the founder and principal investigator for the CU Department of Emergency Medicine's C3 (Cape-Colorado-Combat) Global Trauma Network, which participates in international research projects focused on improving trauma care in populations worldwide, including injured US military service members.

Mould-Millman's daily experiences as a young man planted the seeds that led to his current position.

Growing up in Accra, Ghana, he witnessed and experienced the damaging consequences of a healthcare system that was poorly prepared to treat the badly injured.

He left Ghana to pursue his post-secondary education in the United States, but always with the idea of returning to contribute to building a more effective system. Around 2011, during his third year of residency in Emergency Medicine at Emory University School of Medicine in Atlanta, Mould-Millman returned to Ghana to help train emergency medical technicians to staff the country's fledgling national ambulance service.

He pursued his commitment to improving emergency care for people in low-resourced countries with fellowship training at Emory in Emergency Medical Services and Global Health. After joining the Emergency Medicine faculty at the University of Colorado School of Medicine in 2013, Mould-Millman





broadened his expertise with additional training in research (he earned a Master of Science in Clinical Science from CU, and a PhD in emergency care research at the University of Cape Town in South Africa).

IT BEGINS IN AFRICA

Mould-Millman has centered his recent research on the Western Cape of South Africa, a province created 30 years ago that includes Cape Town. There is good reason for that, he noted.

“South Africa is the trauma epicenter of Africa and frankly of the world,” Mould-Millman said. “It has among the highest rates of mortality from trauma, and it is one of the most violent places, unfortunately.”

Mould-Millman said his fellowship work at Emory and as a junior faculty member at CU helped to fire his interest in addressing the problem of trauma in South Africa. During committee work with the advocacy group the African Federation for Emergency Medicine, he became close with two members from South Africa. They invited him to do some project work to bolster

the country’s trauma care and emergency medical services.

“That just drew me in more and more as I realized the magnitude of [South Africa’s trauma] problem,” Mould-Millman said. At the same time, he learned that South Africa has the longest-running specialty in emergency medicine and is viewed by countries across the continent as a healthcare leader and innovator.

In addition, the country’s large and diverse patient population and its mix of high- and low-functioning healthcare facilities made it a rich location for research that might be broadly applied, he said.

“[Providers in South Africa] are forced to think about what the most essential interventions are to sustain life and avert disability,” Mould-Millman said. That challenge made him think about healthcare inequalities he had seen throughout his life.

“THINGS YOU STUDY IN SOUTH AFRICA COULD BE RELEVANT TO AMERICA AND TO GHANA,” HE SAID. “SO I SAW THIS OPPORTUNITY TO STUDY TRAUMA IN A WAY THAT WOULD BE GENERALIZABLE TO MUCH OF THE WORLD.”

MILITARY INSIGHTS

Since 2018, the United States Department of Defense (DoD) has funded trauma research in South Africa by the C3 Global Trauma Network, Mould-Millman said. The focus areas have been dangerous bleeding, traumatic brain injuries, and complex wounds.

The initial DoD grant enabled Mould-Millman and colleagues to conduct interventional clinical trials

of a bundle of five EMS-delivered trauma interventions aimed at improving ambulance patients’ survival until they reached the hospital. The 2,000-provider system adopted the changes.

Encouraged by the success of that first study, the DoD invested further research in the Western Cape, starting with an epidemiologic study of trauma termed “EpiC” (the Epidemiology and Outcomes of Prolonged Trauma Care).

Mould-Millman noted that literature from the DoD, produced after studying injuries from bomb blasts and other violent attacks, demonstrates that for major trauma patients, mortality rises with every minute that passes. The U.S. military has already anticipated that timeliness of care will be a major issue in future battlefield planning, Mould-Millman added.

While insights from the DoD literature shows that “trauma is a disease of time,” Mould-Millman said, a large knowledge gap persists on the civilian side. “What about civilians who are shot or stabbed or have bad car wrecks? What is the effect of delays to care?” he asked. “In South Africa and many low-income settings around the world, that is just a daily reality. There isn’t quantitative data to help inform our thinking and decisions.”

CIVILIAN LESSONS

Lessons learned from civilian trauma care in South Africa could also prove valuable for U.S. soldiers, Mould-Millman said. Epic

EpiC aimed to help quantify the benefit of various life-saving interventions, and also describe how delays to trauma care impact

survival in a resource-constrained high-trauma setting. To answer those questions, C3 researchers are following 30,000 Western Cape patients enrolled in the EpiC study from the point of injury through a 12-site care network of hospitals, ambulance bases and mortuaries. Along the way, researchers capture all the interventions performed on patients – resuscitations, vital signs, and surgeries, for example – until they have a final outcome, he explained.

THE ANSWER IS IN THE DATA

With “millions of data points” gleaned from thousands of trauma cases, Mould-Millman believes providers will be able to draw conclusions about the most effective and timely treatments – and the best use of resources – for particular wounds and injuries.



“EPIC LAID AN IMPORTANT KNOWLEDGE FOUNDATION AND ALSO PAVED THE WAY FOR A MYRIAD OF DETAILED SUB-STUDIES INTENDED TO ANSWER MANY DIFFERENT GLOBALLY RELEVANT RESEARCH QUESTIONS,” MOULD-MILLMAN SAID

In one sub-study, for example, researchers looked at the effects of administering tranexamic acid (TXA) to critically injured and heavily bleeding patients. The relatively inexpensive drug blocks clots from breaking down to slow dangerous bleeding.

“It’s not used much in the U.S., except for postpartum hemorrhage and surgeries with heavy blood loss,” Mould-Millman said. “But it is widely used in [South Africa], especially in trauma.”

The sub-study showed that TXA administered to critically bleeding patients reduced mortality between 26% and 30% compared to comparably injured patients who did not receive it, Mould-Millman said.

“That’s a staggeringly high survival benefit from a drug like this,” Mould-Millman said. As a result, the Western Cape statewide emergency medical services system adopted TXA as a standard part of their procedures. The findings were later supported in a similar analysis of TXA used to treat U.S. military combat casualties with traumatic brain bleeds, a report Mould-Millman and colleagues published in 2023.

The C3 Network has also conducted studies of debated trauma care issues, such as use of freeze-dried plasma to treat life-threatening injuries and the effects

of delays to emergency surgical care. The common thread is a bid to find strategies to save critically injured persons in resource-limited settings, especially those who have incurred long delays prior to final care.

In general, providers in the United States and other high-income countries don’t have to think about using scarce medical resources as judiciously as possible, Mould-Millman concluded. But for much of the rest of the world that is often a life-and-death consideration.

“That is the world that military providers and providers in low-income settings have to deal with every day,” he said. “That is the space I function in and that is the mission of the C3 lab, to discover those interventions that are most efficacious in resource-constrained settings.” ■

BLUE SKIES FACULTY FOLIO

INSPIRED





Family Influence

Life experiences sparked a passion for geriatric medicine

As a young girl growing up in Berlin, Germany, Elizabeth (Liz) Goldberg decided she wanted to enter the world of medicine. It would not be long before that world entered hers.

The daughter of an Austrian mother and American father, Goldberg recalls attending a German-American school, where she befriended a girl in first or second grade whose mother was a nurse. Liz was fascinated by the stethoscopes and other “medicine-related stuff” lying around the nurse’s home and settled on a faraway goal.

“I think that’s when I realized this is something I could really see myself doing, like really helping people,” Goldberg says.

The early insight later aligned with her natural affinity for science, statistics and problem-solving. She has applied all these skills to helping people with illness and injury – especially older adults – as

Associate Professor of Emergency Medicine at the University of Colorado School of Medicine.

Beyond her childhood aspiration, there were other powerful influences, born of adversity and tragedy, that spurred Goldberg toward medicine and service to others.

FORMATIVE PERSONAL EXPERIENCE

At 13, she fell critically ill from a ruptured appendix, which led to pancreatitis, IV-administered nutrition, a central line and a month-long hospital stay that included a week and a half in the ICU. During that unhappy time, she found an unlikely source of inspiration: a diary written by an 18th century ancestor on her father’s side who was a midwife in Germany before immigrating to America and settling in Shelby County, Ohio.

Her paternal grandfather, who had a keen interest in the history of



the county, unearthed the book. In it, Goldberg's midwife ancestor recounted how she applied self-taught medical skills she learned in Germany to helping the fledgling New World community. The book included practical insights about caring for people, including the importance of wound care and hygiene.

Lying in a hospital bed more than 200 years later, Goldberg seemed to feel her ancestor speaking to her. "I was like, 'Wow, this is meant to be. I need to become a physician,'" Goldberg recalls.

She ultimately stuck to that intention, but a formative personal experience awaited her. She was just 16 when her mother was diagnosed with breast cancer. As the oldest daughter of three, Goldberg helped to relieve pressure on her father, whose work required frequent travel. She became her mother's primary caregiver during an arduous course of treatment.

"I was her constant companion for all of her appointments," Goldberg says. She drove, communicated with providers and took detailed notes to shield her mother from being overwhelmed by the

barrage of information about her chemotherapy and other treatments.

The final chapter of that care came near the end of Goldberg's undergraduate work at Miami University in Oxford, Ohio. She was preparing to apply for medical school in 2005 when cancer brought her mother near death. Goldberg withdrew from school, returned home to be by her mother's side during the last six weeks of her life. The loss was painful, but eventually helped to fuel an ongoing interest in and commitment to geriatric emergency medicine that has made Goldberg an innovator in the field.

"A LOT OF THE REASON THAT I WAS ATTRACTED TO [THE DISCIPLINE] WAS BECAUSE I HAD THESE EARLY LIFE EXPERIENCES WITH COMPLEX COMORBIDITIES, END OF LIFE, AND DYING," GOLDBERG SAID.

After finishing medical school in 2009, Goldberg began her residency in Emergency Medicine at Brown University in Providence,

Rhode Island. The seeds of that choice were planted years before, during her undergraduate years at Miami University. She worked in a research lab, where an emergency physician she met agreed to let Goldberg shadow her during a solo shift in a tiny emergency department in Oxford.

Goldberg was supposed to spend two hours there but was enthralled and stayed the whole night, watching the physician confidently treat patients with nose bleeds, abdominal pain, leg fractures and anything else that came up. Goldberg decided she wanted to be that kind of physician.

"I said, 'I want to be able to treat everything and have a solution for everything at hand,'" she said. "I liked that kind of inventive spirit."

NARROWING FOCUS FOR BROADER EFFECT

The diverse patient population in Providence, which included many Spanish speakers and people of Portuguese descent, gave Goldberg plenty of opportunities to hone her emergency medicine skills. She also built her administrative acumen as chief resident. But during a two-year stint in clinical practice that followed, she concluded that while her residency training had made her confident in her skills as a physician, many of her patients faced broader challenges that she couldn't fully address at the bedside.

"Many people have completely uncontrolled blood pressure and then they come to us with a stroke," Goldberg said. "Wouldn't it have been wonderful if we could have picked up on that 10 years earlier and started them on the right medications and nutrition and things like that? There were these big

questions in public health and injury and prevention that need a more systematic approach.”

That realization led her to pursue a Master of Science in Epidemiology degree at Brown’s School of Public Health, beginning in 2015. The program offered rigorous coursework in statistical methods – skills Goldberg knew she was lacking and that were essential if she wanted to design systems and tools that would help to detect and prevent common issues, like hypertension and diabetes, before they cascaded into even more serious health issues.

At the same time, another door opened: fellowship work at Brown’s Center for Gerontology & Healthcare Research that not only offered her access to mountains of medical information from the Medicare database and other electronic health records, but also sparked what became her career-long passion: improving care for and protecting older people.

“THAT’S WHEN EVERYTHING REALLY TOOK OFF BECAUSE I REALIZED, ‘OH, I REALLY LOVE AGING,’” GOLDBERG SAID. “THERE ARE SO MANY OPPORTUNITIES WITHIN EMERGENCY CARE TO IMPROVE HOW WE CARE FOR OLDER ADULTS, AND NO ONE IS REALLY FOCUSING ON THIS POPULATION OF COMPLEX PATIENTS THAT OFTEN HAVE REALLY POOR OUTCOMES.”

Her interest in the personal and professional commitment to those patients became the driving force of Goldberg’s career. She has



served on the Academy for Geriatric Emergency Medicine since 2019 and is currently its past president. She arrived at CU’s Department of Emergency Medicine in 2022 with the goal of exploring innovative ways to protect older patients from their greatest health risks, especially falls, with notable success.

Goldberg’s past ultimately shines a powerful light on her professional path. In addition to youthful memories of glimpsing nurse’s equipment in Berlin, she fondly recalls summers spent with her siblings on her grandparents’ farm in Sidney, Ohio. It was treasured time, especially with her history- and

civic-minded grandfather, a World War II veteran who died recently at 99, leaving her with a sharp appreciation of the past.

“We had really good summers with him,” Goldberg said. “He influenced me a lot.”

While her mother passed away at just 51, the years Goldberg spent caring for her also helped to nurture an appreciation for those in the waning years of life.

“I think both of those factors really played a role in my career,” she said. “And I’ve always enjoyed the older patients I’ve cared for.” ■



BLUE SKIES FACULTY FOLIO

IMPACT

Golden Years

Combining practical methods and emerging technology to improve geriatric healthcare and prevent falls

During her emergency medicine residency at Brown University, Elizabeth (Liz) Goldberg recalls working 24-hour trauma shifts at Rhode Island Hospital in Providence. People with varieties of injuries and illnesses came through the doors, but one group stood out.

“I might see 30 people and often two-thirds of them were there because of falls,” Goldberg recalled. The most frequently and badly injured were from Rhode Island’s large older adult population, she added.

“The worst were the ones that couldn’t get up off the floor and spent the whole night there on their own,” Goldberg said. “They came in delirious, dehydrated and critically ill.”

The experience helped to spark in Goldberg a commitment to improving care for older adults. She went on to complete a fellowship at Brown’s Center for Gerontology &

Healthcare Research, and ultimately focused her research – which continues today as Associate Professor of Emergency Medicine at the University of Colorado School of Medicine – on fall prevention.

The human and financial toll of falls is considerable, not only for the injured, but also for their caregivers and the healthcare system, Goldberg emphasized.

“Falls are hands-down the number-one reason for injury-related visits to the ED among older adults,” she said. “We often have to admit them to the hospital because they have a head bleed or a hip fracture. And falls are one of the leading reasons why people have to leave their own homes [for nursing homes].”

RESEARCHING FALLS

Goldberg’s current research, funded by a five-year Paul B. Beeson Emerging Leaders in Career Development Award from the National Institute on Aging (NIA),



tests an interdisciplinary intervention called GAPcare to prevent future falls while using wearable devices to determine fall risk and outcomes. That award sprung from an initial clinical trial during her fellowship at Brown that tested the GAPcare concept.

The six-month study enrolled patients who came into the ED after a fall, Goldberg explained. Half of them received standard care, while the other received an intervention that included patients meeting with a physical therapist (PT) and a pharmacist. The goal: identify and collaboratively address the reasons for the fall.

For example, PTs might notice a weak or deconditioned patient struggling to steady their gait, maintain their balance or use their walker correctly. With just a few observations and questions, PTs could suggest practical solutions – exercises, equipment adjustments, or small changes at home, for example – to protect against another fall, Goldberg said.

Meanwhile, pharmacists reviewed the number and type of medications patients were taking, with an eye toward flagging potentially harmful drug interactions, as well as drugs that slow cognition or cause dizziness. Pharmacists identified the medications that posed the greatest fall risks for people 65 and older using the Beers Criteria, compiled and maintained by the American Geriatrics Society, Goldberg said.

THE GAPCARE INTERVENTION ALSO RECOGNIZED THAT FALL RISKS MOUNT AS PEOPLE ARE PRESCRIBED MORE AND MORE MEDICATIONS, GOLDBERG SAID.



“There are too many people in this country on too many medications,” Goldberg said. “It’s not only the amount of medications that you’re on that is problematic, it’s the type of medication.”

The GAPcare team helped patients consider whether they really needed to be on a medication, and if they were taking the right dose as prescribed, she explained.

With that relatively short medication review in the emergency setting, pharmacists could then recommend medication changes to the patients’ primary care providers for a final decision, Goldberg said.

The trial, which showed that GAPcare was successful in reducing the number of subsequent fall-related and overall ED visits, helped Goldberg secure her Career Development Award funding, which is now in its final year.

INCORPORATING NEW TECHNOLOGY

For this phase of her research, Goldberg drew on both her

memories of the past and her ideas for the future. At about the time that she submitted her grant application in 2019, Goldberg considered that the Apple Watch had developed a new fall-detection feature the previous year. The idea: if a person took a hard tumble, the watch would sense it and allow the person to request emergency services. If the person were unconscious, the watch would call for help itself.

Goldberg recalled her days on the trauma shifts in Rhode Island, treating badly injured fall patients who had lain for hours on floors, unable to reach the help that an Apple Watch could have provided. But she saw new possibilities for preventing falls.

First, a watch and phone app could provide a reliable record of falls – a valuable alternative to the standard method, which required patients, most of them 80 years and older, to maintain a calendar log of their mishaps.

“They have other stuff going on. They don’t want to fill out

calendars,” Goldberg said. “So that was one of our problems in the first trial. We couldn’t get an accurate measure of falls.”

Second, Goldberg saw that in addition to collecting user data passively – think heart rate, blood pressure and step count – a phone app could also involve users in “active tasks,” such as taking tests to measure cognition and reaction time and analyze their walking gait.

“There were all these new digital measures coming out that I thought were relevant to falls, and I incorporated them into the grant,” Goldberg said.

Patients in the current study still meet with a PT and pharmacist after an ED visit for a fall, and all receive digital tests of cognition and function. Goldberg’s research staff makes home visits to help them learn the technology and use the cognition tests and other potential measures of fall risk.

The bottom line for the research, of course, is to reduce the number of falls and injuries in older people and increase providers’ understanding of why they happen, their effects on the brain and body, and how to prevent them, Goldberg said. But she also sees new technology as vital to helping bridge care gaps for an aging population.

“PART OF THE REASON I GOT INTO WEARABLES AND TELEHEALTH IS BECAUSE WE CAN ACTUALLY DO QUITE A BIT FOR PEOPLE IN THEIR HOMES – ESPECIALLY OLDER FOLKS THAT HAVE MOBILITY AND TRANSPORTATION CHALLENGES,” SHE SAID.



MENTORING WITH PURPOSE

Goldberg advocates not only for patients but also for the young physicians and – particularly those of underrepresented in science and medicine – who are vital to strengthening and diversifying the profession that has fulfilled her.

“That’s another piece of my identity,” she said. “We know that in medicine that we all benefit if our workforce is diverse. We need to be champions for them because their path is often harder.”

Goldberg noted that she began her mentoring work in the Providence Public Schools system in 2020 and has been a guiding light for more than one student since joining the CU faculty in 2022.

For example, she met Johnny Gomez Picazo, a senior at University of Colorado Denver, while he was working as a scribe in the ED at UCHealth University of Colorado Hospital. After Picazo

– who is first in his family to attend college – described to Goldberg his goal of getting to medical school, she offered him a position with her research team.

“[Liz] made med school feel attainable,” said Picazo. He helps to recruit patients for Goldberg’s current GAPcare study, assists in writing papers, and analyzes qualitative research. He recently led a presentation explaining a digital pill designed to help patients with dementia comply with their medication plans.

“She has been a very important figure in helping me to build [my skills],” Picazo said. That includes not only the clinical but also the human side of patient care, he added.

“Working as a scribe with Liz, it just seemed like she cares for her patients,” Picazo said. “Something that I would take from her that I would use if I become a doctor is her patient interaction.” ■

BLUE SKIES FACULTY FOLIO

INSPIRED





Triumph over Terror

How the 9-11 attacks led to the study of PTSD and the reduction of suicide risks

Tuesday, September 11, 2001, was a warm, clear morning in Basking Ridge, New Jersey, a quiet town of fewer than 30,000 people about 40 miles west of New York City. Many of its residents worked in the city and had left for or arrived at work when, at 8:46 a.m., American Airlines Flight 11 crashed into the North Tower of the World Trade Center. Seventeen minutes later, United Airlines Flight 175 smashed into the South Tower of the Center.

The planned attacks killed thousands that day and the history of the United States and the world were forever changed. So too were the lives of innumerable people left to mourn and ponder the meaning of the disaster. Back in Basking Ridge, one of those was 11-year-old Ian Stanley, the son of bankers. His father worked on Wall Street, about a mile from where the towers

collapsed into swirls of choking dust and mounds of smoking rubble.

“IT WAS A WATERSHED MOMENT,” STANLEY RECALLED. “I LIVED IN A TOWN WHERE MANY OF MY CLASSMATES’ PARENTS WORKED IN NEW YORK CITY AND ON WALL STREET.”

The human and emotional losses of the 9-11 attacks were not abstractions for Stanley. He estimated that his father, who had once worked in the towers, lost 75 friends and former coworkers who were in the buildings that day. One of them was his father’s best friend, someone Ian considered an uncle. He remembers attending several funerals of family friends in the aftermath of the deadly day and



seeing the numbing emotional toll the losses took on his parents.

ECHOS OF 9-11

More than 20 years later, the reverberations of the tragedy still influence Stanley's life. But the haunting experience of the 9-11 shock and other brushes with trauma have spurred him to find effective ways to help others – especially military members, firefighters, emergency medical services workers and others – address the potentially crippling emotional consequences of repeated and unaddressed exposure to stress, most notably post-traumatic stress disorder (PTSD).

CONNECTING FIREARMS, PTSD AND SUICIDE RISKS

Stanley is associate professor in the Department of Emergency Medicine at the University of Colorado School of Medicine and Psychological Health Lead for the CU Center for Combat Medicine and Battlefield (COMBAT) Research, a

collaboration between the university and military stakeholders that aims to find solutions for the biggest medical challenges faced by the Department of Defense (DoD).

Chief among those is preventing suicide by service members. "It's a top priority of DoD," Stanley said, noting the suicide rate rose sharply among active-duty military members after the 9-11 attacks and the years of overseas war that followed.

"Up until that time, the suicide rate was much lower among active-duty service members. Now it's comparable to the general population," Stanley said.

The availability of firearms adds a layer of suicide risk for members of the military, he added. An estimated 50% of suicides in the general population involve a firearm, compared with up to 80% among military members, he said. Finding ways to reduce that risk, such as secure firearm storage, is one of his key areas of research.

The damaging effects of trauma

are not confined to the military or others in high-stress jobs, Stanley emphasized. From a personal perspective, he is among those who have seen and experienced the blunt effects of trauma. He lost a cousin and a high school friend to suicide.

"Most people have had the awful experience of knowing someone who has either died by suicide or has struggled with suicidal thoughts or mental health challenges, whether that is depression, PTSD, bipolar disorder, addiction or alcoholism," Stanley said. "A lot of times these challenges happen behind the scenes, and we might not know it, but they affect families and communities."

By contrast, as a young man he witnessed the strength of a neighbor who shared his story of alcoholism and recovery. Stanley joined his parents at the man's 10th anniversary sobriety celebration.

"It was him and others sharing their stories of open recovery, which I found remarkable," Stanley said. It also was another early influence on his interest in psychology.

"I LEARNED WHAT IT'S LIKE TO BE HIJACKED BY A DRUG BUT ALSO THAT WITH THE RIGHT TREATMENT, FAMILY AND SOCIAL SUPPORT, PEOPLE CAN PUSH THROUGH HELL AND GET TO THE OTHER SIDE," HE SAID.

The experience indirectly helped lead him toward a career in psychology. He was a freshman at the University of Rochester and undecided on a field of study – although he knew he didn't want to be a banker, much to his

parents' delight – when he got an assignment to do a research project. He chose to explore anonymity in drug and alcohol recovery programs and “got really intrigued by it.” A bachelor's degree in psychology followed, in 2012.

That degree eventually led to a master's degree and PhD in clinical psychology at Florida State University, but in between he took important detours that helped to define and strengthen his research. He spent a year as a research assistant at the National Institute of Mental Health studying suicide prevention and another year at Johns Hopkins, where he focused on the psychology of older adults.

His interest in suicide prevention was cemented at Florida State by his PhD advisor, Dr. Thomas Joiner, whom Stanley described as a “luminary” in the field. Joiner's father's suicide led him to take a “compassionate approach” to the difficult subject, Stanley said.

“What Thomas taught me was that science is a great vehicle for change and for making the world a better place,” he said.

In addition, Joiner at the time was funded by the DoD to co-direct the Military Suicide Research Consortium, leading Stanley into research work in suicide prevention among military service members. He also explored suicide and PTSD risk among firefighters and ways to address firearm storage and reduce the risk of harm among gun owners. He was to frame his PhD dissertation around that topic.

Before arriving at CU's Department of Emergency Medicine in 2022, Stanley wove the interests he developed at Florida State together with a post-doctoral research



fellowship and full-time position as a clinical psychologist at the National Center for PTSD, which is part of the U.S. Department of Veterans Affairs.

“I STUDIED THE INTERSECTION BETWEEN PTSD AND SUICIDE RISK,” STANLEY SAID. “IN MANY WAYS IT SHAPED MY [PRESENT] RESEARCH PROGRAM, WHERE I HAVE INCORPORATED FIREARMS, TRAUMA, THREAT SENSITIVITIES AND PTSD [AS RISKS].”

He also currently works with his former fellowship advisor, Dr. Brian Marx, on adapting a PTSD treatment to prevent suicide in the military.

As Psychological Health Lead with COMBAT, Stanley continues to work with DoD to confront the factors that increase the risk of suicide, including PTSD. But he emphasizes that PTSD is not inevitable. People are exposed to trauma every day, often en masse, as was true on 9-11. Stanley strives in his work to help people build resilience and connections with others that can shield them from the damaging effects of long-term stress.

“We know people are going to be exposed to trauma. That's life,” he said. “But how do we prevent that progression from trauma to developing PTSD? That is where a lot of our work is going. You can prevent the grasp that trauma has on someone's life.” ■



BLUE SKIES FACULTY FOLIO

IMPACT

Quest to Understand Trauma

Research to help identify the link between trauma and PTSD behavioral responses

Ian Stanley was a graduate student in psychology at Florida State University in Tallahassee in 2015 when a clinical rotation sent him about an hour west along the state's northern panhandle to see patients at a Veterans Affairs community-based outpatient clinic (CBOC). The short trip proved to be an important leg of his path to personal and professional development.

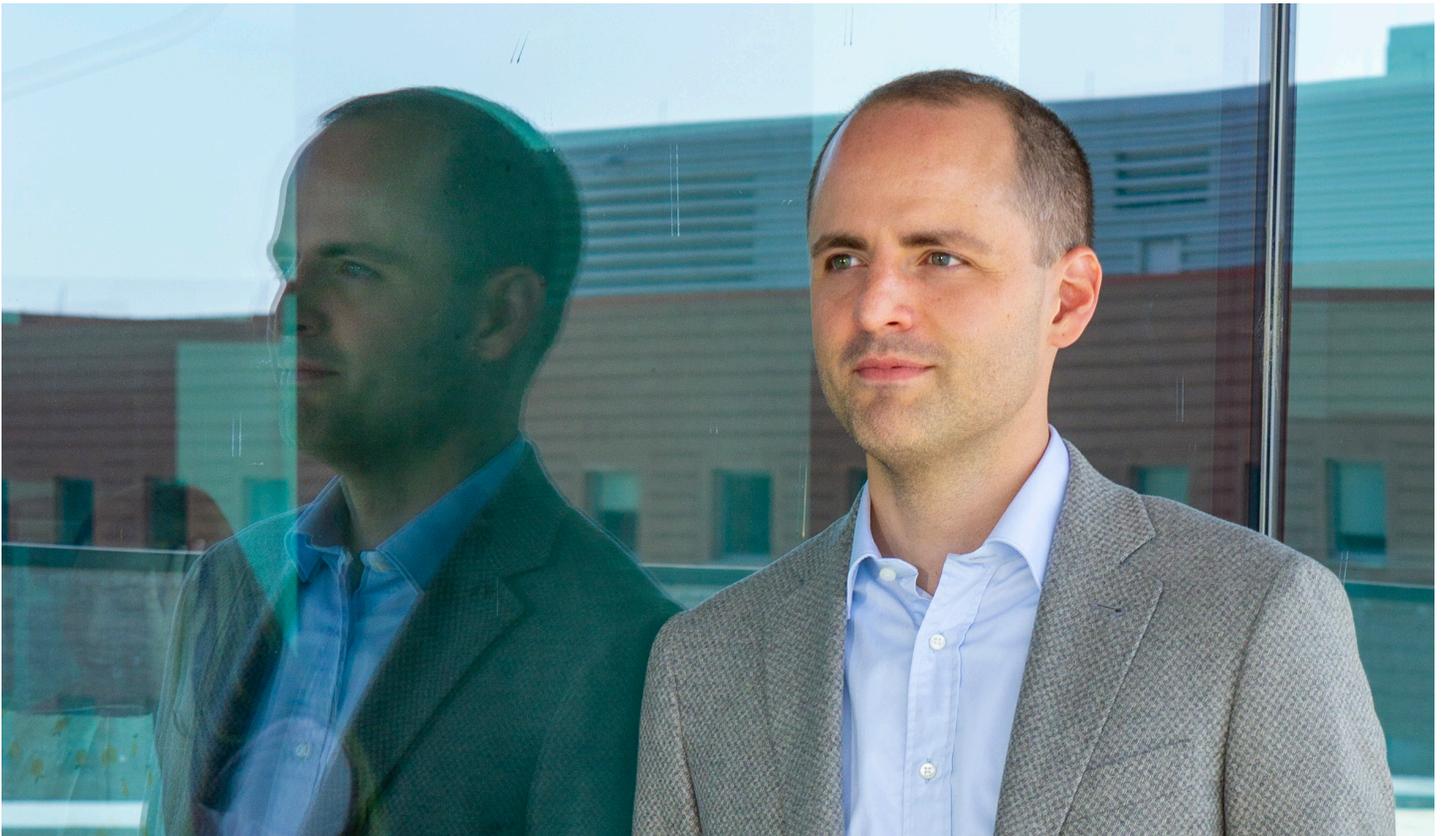
In Tallahassee, Stanley was already geographically, culturally and politically distant from his hometown of Basking Ridge, New Jersey, a New York City suburb. Driving deeper into the panhandle took him even farther from his upbringing but also expanded his view of the world.

FIREARM OWNERSHIP CONNECTION

During risk assessments with patients, Stanley was surprised to learn that most of them owned

large numbers of guns – a major concern because firearms are used in the vast majority of suicides in the United States. Stanley realized that his life in New Jersey had given him very little experience with firearms. He was unprepared to talk productively with patients – particularly those struggling with mental health challenges and suicidal thoughts – about secure firearm storage and other risk-reduction measures.

Around that time, Stanley read a highly influential editorial published in the Journal of the American Medical Association by Dr. Emmy Betz, professor of Emergency Medicine at the University of Colorado School of Medicine and director of the Firearm Injury Prevention Initiative (FIPI) on the University of Colorado Anschutz Medical Campus (profiled in prior Blue Skies issue).





In the editorial, Betz argued for clinicians to develop the “cultural competency” necessary to listen openly to their patients’ real-life experiences, values and issues while also asking them about their firearm ownership and helping them to understand their injury risks and ways to prevent them.

“I was enthralled by the article,” Stanley said. Betz’s observations dovetailed perfectly with his experience at the Florida CBOC, he added.

“IT TAUGHT ME THAT AS A CLINICIAN, I DON’T ALWAYS NEED TO KNOW THE ANSWERS BECAUSE IN MANY WAYS MY PATIENTS [DO],” HE SAID. “IT’S A MATTER OF SUPPORTING THEM AND HELPING THEM TO IDENTIFY THEIR OPTIONS WHILE STAYING HUMBLE.”

Stanley not only built his PhD dissertation around Betz’s major concern – the importance of

addressing secure firearm storage with gun owners – he became her colleague when he joined the CU Emergency Medicine faculty in 2022. He also collaborates with Betz as Military and Veteran Lead for FIPI.

Firearm safety remains a focus of Stanley’s research, but it is one piece of his larger effort to address the damaging impact of repeated trauma, especially among military members, emergency medical service (EMS) workers, firefighters, law enforcement and others performing high-stress jobs.

LINKING TRAUMA EXPOSURE

That work also began during his graduate work in Florida. Stanley led a study funded by the National Fallen Firefighters Foundation (NFFF), a congressionally chartered nonprofit that develops programs to recognize firefighters who died during service and to support their families.

The 2015 grant charged researchers with probing suicidal thoughts and behaviors among firefighters, said Stanley. He led a study of more than 1,000 of these workers, whose reputed stoicism often masked the psychological effects of seeing catastrophic damage, injury and death.

A key conclusion of the grant research was that repeated exposure to trauma increased the risk of suicide for firefighters, Stanley said.

The work with the NFFF helps to inform Stanley’s present role as Psychological Health Lead for the CU Center for Combat Medicine and Battlefield (COMBAT) Research, a collaboration between the university and military stakeholders.

COMBAT researchers confront major medical challenges faced by the Department of Defense (DoD), including suicide among service members.

Stanley currently leads a four-year, \$3 million DoD initiative to provide specialized secure firearms storage counseling to individuals with post-traumatic stress disorder (PTSD). The intervention, Firearm Safety and PTSD (FaSP), builds on the elements of Project Safe Guard, an approach developed by Dr. Michael Anestis of Rutgers University to provide such counseling to military members.

A clinical trial led by Anestis of the Project Safe Guard strategy with members of the Mississippi National Guard in 2020 showed some success in changing firearm storage practices. Anestis, Stanley, Betz and others then led a Project Safe Guard intervention at Buckley Space Force Base in Aurora that tested a peer-delivered adaptation of the intervention in a military context.

The Buckley project also reinforced his formative experience in the Florida panhandle. “For so long [firearm safety information] has been thought of as exclusively a clinician-delivered intervention,” Stanley said. “But what we’re hearing from service members is that some may be more likely to listen to a buddy than a clinician.”

PTSD COMPLEXITY

During studies of Project Safe Guard, however, Stanley and Anestis noticed a weakness: the one-on-one approach did not work as well with individuals with PTSD. These people, they found, often have a “threat sensitivity” that produces a “hypervigilance” and the need to keep loaded firearms at the

ready to guard against perceived threats.

“I’ve found that a lot of times, following a traumatic exposure, people change the way they store their firearms, because they give them an outsized sense of security,” Stanley said. The close presence of loaded firearms is a major problem for people with PTSD, which is a major suicide risk, as well as for family members and others who might be harmed by unsecured weapons, he added.

The FaSP program includes the elements of Project Safe Guard, but adds “trauma-informed” psychological education that “helps people to become more aware of their behavioral responses to their PTSD,” Stanley said.

Stanley emphasized that while there are effective treatments for PTSD and other mental health issues, they are lengthy and difficult for patients to maintain. His ultimate goal is to find strategies that prevent problems from progressing to PTSD in the first place. He said, for example, that those who learn to build emotional resilience – an area of work by another Emergency Medicine and COMBAT colleague, Dr. Kathleen Flarity (profiled in prior Blue Skies issue) – can more successfully endure even the most serious emotional and mental challenges.

“Trauma exposure itself doesn’t inherently lead to bad outcomes,” Stanley said.

“PEOPLE SAY YOU CAN NEVER PREVENT TRAUMA, AND THAT’S TRUE. BUT YOU CAN PREVENT THE GRASP THAT TRAUMA HAS ON SOMEONE’S LIFE.”

COLLABORATING ON EMS RESEARCH

Another recent area of attention and collaboration for Stanley has been investigating the psychological health of emergency medical technicians and paramedics in Colorado. He works in that area with Emergency Medicine faculty colleague, Dr. Angela Wright, who is also medical director of Emergency Medical Services (EMS) at UCHHealth University of Colorado Hospital and EMS medical director for the state of Colorado (profiled in this issue).

Stanley and Wright united their respective training and field work in clinical psychology and EMS operations to create a community advisory board that included eight EMS clinicians from around the state. These clinicians also represented different areas of EMS delivery, including flight, fire, hospital, and volunteer. The goal: develop recommendations from these first-line responders to address their job-related mental health challenges.

The recommendations spanned increasing funding for EMS-specific research and mental health resources; distributing information on secure firearm storage; developing peer support teams, and more.

“We wanted to make sure all their voices were heard,” Stanley said. “We in the [Emergency Medicine] Department at CU have the capabilities to do this research. The job of the EMS folks is to respond to emergencies, so we wanted to figure out how can we help meet these needs for them.”

Working with Wright and the EMS representatives has helped to expand his view of mental health,



Stanley added.

“This is an opportunity to hear from folks on the ground,” he said. “And the collaboration with Angie is so helpful because she has the trust of the community, being a member of it herself. This is how we conduct practice-changing research.” ■



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DEPARTMENT OF EMERGENCY MEDICINE



#12

Top Research
EMED in US
2024



185K

Total ED
Visits



\$40M

2025 Grant
Funding

3,500
sq miles

Medical Direction
for Prehospital
Transport



333

Employees
Working Towards
Our Missions



99th
percentile

Timeliness
of Care

SCHOOL OF MEDICINE AT CU ANSCHUTZ



\$910M

In Research
Funding



2,061

New
Benefactors



32%

Increase in
Research Funding
2022 to 2025



4.5k

Degree-Seeking
Future Health
Professionals



#1

Adult Hospital in
Colorado



Educators

Training
Health Care
Professionals

