

UNIVERSITY OF COLORADO SCHOOL OF MEDICINE

CUMEDICINE

Today

No More 'Manels'

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LISTENING TO EVERY VOICE

This issue of CU Medicine Today features several articles about women in medicine and science and administrative leadership, but it's not a themed issue. Rather it's a reflection of the talent we have here on the Anschutz Medical Campus and the contributions women are making in science and medicine.

Take the cover story about Liz McCullagh, PhD, who became weary of seeing so many all-male panels at scientific meetings. Women are leaders in science and medicine, yet conference organizers continue to overlook their contributions and consistently fail to make sure their voices were heard.

Liz and some friends decided to do something about it. In January 2018, they created the "Request a Woman Scientist" database. In just one week, 2,500 women joined. Now, the database has more than 11,000 women and it has been queried more than 100,000 times.

Leaders are taking notice. In June, Francis Collins, MD, PhD, director of the U.S. National Institutes of Health, posted on the NIH website that he would decline to participate in meetings if organizers failed to be inclusive. "If that attention to inclusiveness is not evident in the agenda, I will decline to take part," Collins wrote. "I challenge other scientific leaders across the biomedical enterprise to do the same."

At the School of Medicine, we have made advances in promoting women into leadership positions. This fall, we announced that Julia P. Cooper, PhD, will become next chair of biochemistry and molecular genetics. She is currently at the National Cancer Institute, where she heads the Laboratory of Biochemistry and Molecular Biology's Telomere Biology Section.

With her appointment, the School of Medicine will have nine women chairs among our 23 departments. At 39 percent, our School doubles the national average of women chairs at medical schools.

CU ranks among the top medical schools in terms of having women as department chairs, according to data compiled by the Association of American Medical Colleges. At year-end 2018, there were 618 women serving as department chairs out of 3,274 chair positions at all U.S. medical schools. Among the 152 U.S. medical schools, only seven have nine or more women department chairs.

While we are making progress, we must continue to ensure a level playing field where scientists, physicians, and all other leaders are evaluated fairly and their voices can be heard.

With warm regards,



John J. Reilly, Jr., MD
 Richard D. Krugman Endowed Chair
 Dean, School of Medicine
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Reporters locally and nationally turn to the School of Medicine for expertise and research news. Here are examples from near and far.

George Sam Wang, MD, assistant professor of pediatrics, addressed questions from Reuters news service in August regarding children exposed to marijuana that parents have not kept out of reach. “It looks like we could probably do a better job in even more secure storage to prevent unintentional ingestion and exposures,” he said.

Emmy Betz, MD, MPH, associate professor of emergency medicine, in August on Colorado Public Radio explained the Colorado Gun Storage Map, the first online map of its kind in the country, which provides a list of off-site storage options for firearms. “This project initially started because we know that when folks are at risk of suicide, it can be a good idea to either lock up the gun or ideally move it outside of the home until the person’s feeling better,” she said. “But there are other reasons, too. Let’s say the grandkids are coming to visit, or you’re going on an extended trip. Various reasons why someone might want to temporarily and voluntarily move a firearm out of their house.”

Joseph Simonetti, MD, MPH, assistant professor of medicine, was quoted in a report by the CBS affiliate in Baltimore in June about a study on U.S. Army soldiers dying by suicide. “The reality is that removing a firearm from a home is likely to be the safest thing someone can do to prevent suicide, but [the study] provides some support that for those only willing to make safety changes within the home, such as locking their guns and leaving them unloaded, that can also reduce their suicide risk.”

Cecilia Sorensen, MD, clinical instructor of emergency medicine, talked with National Public Radio in August about kidney failure cases among laborers in Nicaragua, El Salvador, and Guatemala. “We know that

climate change is exacerbating a lot of different human diseases. It exacerbates cardiovascular disease, respiratory disease,” she said. “But this is one of the first identified where we can say this disease probably wouldn’t have occurred if it weren’t for the extreme global temperatures that we’re seeing.”

Joy Hawkins, MD, professor of anesthesiology, told the Denver CBS affiliate in August that marijuana use by patients can have an impact in the operating room. “We are very willing to adapt to make the procedure safe for the patient,” she said, “but this has added another little twist to the things we think about and ask about.”

Prateeti Khazanie, MD, MPH, assistant professor of medicine in the Division of Cardiology, commented in August to Medical Xpress about a report that found women are prescribed statins less frequently than men. “If you can better understand reasons behind sex differences in care, you can target those issues to help decrease the sex differences in the future,” she said. “Understanding how therapies affect patients and how patients make decisions—and how providers make decisions—are going to be critical in future research.”

Carina Venter, PhD, RD, associate professor of pediatrics, was interviewed by National Public Radio in an August report about European restaurants’ vigilance about food allergies. “I don’t think the European system is necessarily flawless,” she said, “but it would be good if, in America, we could go toward a more European way, where it is mandated to provide more information.”

Margarita Saenz, MD, associate professor of clinical practice of pediatrics, discussed the case of a 14-year-old boy with a rare disease



Prateeti Khazanie, MD, MPH

that is causing his skin to thicken. “What’s happening is almost a scarring—a fibrotic change to the skin itself,” she said in an August issue of *People* magazine.

Elizabeth Wallace, MD, assistant professor of dermatology, explained eczema in an article in *Glamour* in August: “We don’t yet know all the factors leading to the development of eczema, but we do understand more and more that it’s a combination of several genetic and environmental factors. Eczema results from dysregulation of the immune system, which leads to inflammation in the skin.”

Benjamin Easter, MD, assistant professor of emergency medicine, described to *Wired* magazine the Martian Medical Analogue and Research Simulation, a continuing-education course for medical professionals, that he has helped develop to teach about health care in space. Through simulations, the participants practice providing care in extraordinarily austere conditions. “I have died a number of times on Mars,” he said in an article published in June.

Scott Laker, MD, associate professor of physical medicine and rehabilitation, was interviewed by WCPO, a Cincinnati television station, about the rising popularity of rugby and in a report that aired in August, he discussed sports injuries. “The biggest risks we’re seeing is when we look at elite players, collegiate players, and youth players is a risk to the head and neck and then ligament injuries are also pretty common as well,” he said.

D. Ross Camidge, MD, PhD, professor of medicine, wrote a *HuffPost* column in



James Maloney, MD



Nanette Santoro, MD



Steven Berkowitz, MD

June that described his experience with the Colorado Medical Aid in Dying law: “To put this in context, I am a medical oncologist. I treat cancer, specifically lung cancer, the most common serious cancer there is. I am proud of the achievements of the university program that I direct, where we have consistently pushed against the status quo, developing new treatments and new approaches to control this disease, and where our five-year survival rates for advanced lung cancer run up to four times the national average. As such, a process designed to actively end someone’s life to seem to be ‘giving in’ instead of fighting for every good day was different and unsettling.”

In a report on the Denver affiliate of CBS in July, **James Maloney, MD**, professor of medicine in the Division of Pulmonary Sciences and Critical Care, explained the impact of higher elevation to the actor playing Willy Wonka in a touring production of “Charlie and the Chocolate Factory the New Musical”: “You’re going to notice, I think, in your rehearsals you don’t quite have the ‘umph’ like you would have like in L.A. Your body’s going to get used to these slightly lower oxygen levels and make adjustments.”

Nanette Santoro, MD, chair of obstetrics and gynecology, offered advice in July in Prevention. “Sometimes there is a tendency to over-attribute everything to the onset of menopause.” Since perimenopause can last years, if your doctor seems to feel that perimenopause explains everything, she said, “you should be suspicious.”

Sharon Poisson, MD, associate professor of neurology, told the Fox affiliate in Denver in

July that strokes can affect a person regardless of age. “There really isn’t a youngest age cutoff where you can’t have a stroke below that age because we can see strokes across the entire age spectrum.”

Huntington Potter, PhD, professor of neurology and director of the Rocky Mountain Alzheimer’s Disease Center, was quoted in the Washington Post in July in an article about a clinical trial of Leukine. “This is really a completely different approach than anything that has been tried before,” he said. “It is one approach of many, and we’re hopeful. But science will tell.”

Andrew Monte, MD, associate professor of emergency medicine, in June described to The New York Times his research into the impact of pot use on human health. According to hospital data he analyzed, more people are arriving at emergency rooms for marijuana-related reasons. “There’s a disconnect between what was proposed as a completely safe drug,” he said. “Nothing is completely safe.”

Charles Dinarello, MD, Distinguished Professor of the University and professor of medicine, was quoted in June in a New York Times article, “How to Get the Best From Your Immune System.” “You need inflammation to protect against invaders. You need policemen. But if police are too rambunctious they can cause damage to innocent people.”

Steven Berkowitz, MD, professor of psychiatry, was quoted by the Colorado Sun in May discussing the effect of focusing attention on victims in school shootings when they fight back. “These individuals were heroic,

and there is nothing to take away from that. That is not the question at hand. The question at hand is the unintentional message we are giving to kids that if they don’t rush a shooter and put their lives on the line, they are not doing what they are supposed to do. They won’t get the attention. They won’t get acknowledged. They won’t get the accolades.”

Kristen Park, MD, associate professor of pediatrics, was quoted in May in The New York Times Magazine in an article about cannabidiol. “Because of all the hype, people somehow think this is a cure-all and a treatment that will fix everything,” she said.

Eric Campbell, PhD, professor of medicine and director of research for the CU Center for Bioethics and Humanities, commented in May in an article in the Minneapolis Star-Tribune about a part-time sheriff’s deputy who also works as head of paramedics at Hennepin County Medical Center (HCMC). Citing the opioid epidemic as one example where the roles of police and doctors conflict, he said, “It would seem reasonable to me that many patients may not go to HCMC if they knew that there was a doctor there who was also a police officer.”

Kenny Chan, MD, professor of otolaryngology, was quoted by National Public Radio in May in a report about a smartphone app that might help parents diagnose a child’s ear infections. Based on published data, he said, “It’s very promising, but it’s too early to tell how accurate it is. We will have to wait and see.”

GIVING FACULTY THE TOOLS FOR SUCCESS

Anne Libby uses her experience to teach others how to manage their careers

Interviewed by Mark Couch



Anne Libby, PhD, brings an academic's commitment to education and an economist's insight into building value in the careers of her colleagues at the University of Colorado School of Medicine.

With a PhD in economics and postdoctoral training in public health, she has studied how systems affect human lives, particularly those who are vulnerable or understudied such as the poor, children, and women.

Through her efforts to build her own research career, she also discovered an ability to assist the professional development and education of peers, especially junior faculty who are starting careers in research and health care.

Currently, Libby is professor and vice chair for academic affairs in the CU School of Medicine's Department of Emergency Medicine, where she has developed a system for helping faculty advance through the

academic ranks, yielding such impressive results that the Academy for Women in Academic Emergency Medicine this year bestowed its Outstanding Department Award for promoting the recruitment, retention, advancement, and leadership of women in academic emergency medicine.

Libby joined the CU faculty in 2000 and this year received the CU System's Elizabeth D. Gee Memorial Lectureship Award, which recognizes efforts to advance women in academia, interdisciplinary scholarly contributions, and distinguished teaching.

Tell me about your background. Where did you grow up and where did you go to school?

I was born and raised in the Midwest, in Cincinnati, Ohio. I went to undergrad at Xavier University where I was an economics major. At that time, I thought it was so powerful that you could completely rework the wealth distribution of a country with taxes. I knew the way to do that work was to get a PhD in economics, so I went to Washington University in St. Louis and earned my PhD in economics.

It was also the era of health care reform during the Bill Clinton presidency, and it was supposed to be the future for economists. The country was going to need to figure out how to pay for, organize, and finance health care in a new way and I thought that sounded very exciting, so I did my dissertation research on health. I got a postdoctoral fellowship at the University of California Berkeley in the School of Public Health and studied health economics and health policy.

How did you come to CU?

My postdoc advisor at Berkeley was the leader of a federally funded study to evaluate the Colorado mental health Medicaid capitation

experiment. I was flying here to do data collection and to interface with the local Colorado health leaders. And every time I'd go back, I would say to my husband, 'We should look at Colorado.'

I received a career development award from the William T. Grant Foundation, which funds most of your salary for five years. I was focusing on the intersection of mental health and other child-serving systems. To do that, you have to look at child welfare, juvenile justice, medical systems, and so I developed expertise in cross-system care for kids with mental health problems. There was a national network of mental health research centers. Ours was at Berkeley and UCSF, and one was at the University of Colorado School of Medicine, under Spero Manson. So I just called Spero and said, 'Don't you want me to work for you?' And he said yes.

What did you work on when you first came to Colorado?

At the time, Spero had the biggest shop on campus doing health policy research, and so I easily folded in there. We came to Colorado and I was an assistant professor in the Department of Psychiatry in the Division of American Indian and Alaska Native Programs. It fit for me because I've always studied vulnerable populations and American Indians are among the most vulnerable.

When the Colorado School of Public Health was formed, the school was being built from the bottom up, every single class had to be made, accreditation, everything. I was a full time researcher, 100 percent funded on grants, and I pretty much liked it that way. At the time, I had started collaborating with the outcomes research group in the School of Pharmacy. When Spero's group moved to the new public health school, I was recruited to join the pharmacy outcomes research group.

What kind of work were you doing there?

We studied antidepressants and the treatment of depression and the risk of suicide. We did some influential work that dispelled the myth that antidepressants were causing harm at a population level.

When I taught public health and health outcomes, I had students do a drug formulary review. We made up cases for real drug classes like anticoagulants or biologics. The students did the analysis for efficacy, safety, special populations, how easily should you make access to this, what should be the payment structure, how do you economically value treatments. We implemented several new community volunteer activities. We would have students sit with new Medicare Part D recipients, enroll them, and then put their drugs in the Part D calculator to figure out if they could safely save money by looking at the formulary structures they were enrolled in. It helped the patients and it helped the students as future health care providers.

Most people come into medicine and science because they don't want to deal with business. They want to heal, they want to study, derive knowledge. They don't want to do money stuff and it's shocking to realize that health care is a \$3 trillion [annual] business. If providers don't understand what it costs and what patients face, how can we together protect each other and make sure everybody gets what they need?

I like the way you said this. You can still do work that touches everybody's lives, even if you're not the person directly providing the patient care.

I was never called to be a direct care provider, but I appreciate those who do! I have also had a parallel path in my work. While I was trying to do my research and get my grants funded, I would meet other researchers who were doing

that too. There was a group putting together a training program, a mentoring program, for early career faculty trying to get their first grants. That was 16 years ago and it's still going strong.

We train, intensely mentor early career researchers who want to make their lives here on the medical campus doing externally funded research in clinical or outcomes research. It has been really transformative in my life because I think most physicians don't get extensive research training like a PhD does. Even if you have a PhD, it's usually as a postdoc that you learn how to be an externally funded researcher—you learn how to write grants, run a team, do it again, do it again, do it again. If you're lucky. I found a major partner in the Center for Women's Health Research whose missions match mine—mentoring, education and research. Judy Regensteiner, PhD, the center director, and I have multiple collaborative grants to mentor and train early career researchers.

So researchers often learn by osmosis rather than by actual mentorship?

Correct. Many of the absolute best researchers aren't teachers, so they can't say in words what their process is. It's an apprenticeship, just 'Do what I do. Watch me.' So I kept finding myself in this position where I can see the need and can explain it in words they understand. This process started with clinical faculty scholars, where we teach the art and science of getting grants, establishing scholarship, running projects, doing it again.

As we did that, it uncovered more needs because early on we could see that there's a set of missing skills. I would read a book like Jim Collins's *Good to Great* and I would teach it in words they would accept. Most physicians are totally put off reading examples of grocery stores, but if you explain it to them in terms of a clinic or a research team, then they

will listen. I started new training programs in mentoring skills and in leadership. My current chair, Richard Zane, MD, was enrolled in our advanced leadership program and recruited me to develop his faculty in emergency medicine. He is a visionary leader, and his support helped me take this work to the next level.

How do you help your colleagues?

New investigators make small, but extremely consequential mistakes. They might hoard the funds because they're trying to save for a rainy day. They don't know if they're going to get the next grant, so they don't spend and therefore they don't execute the scope of work. Or they overspend, don't quite keep track, and suddenly they're out of money and don't meet the scope. Or they spend in the right order, but on the wrong things, or the wrong people, or so many things that have nothing to do with their science. These mistakes threaten their ability to succeed in careers they've devoted many years to build. And for us as a society, this is a major loss to human potential and to the scientific workforce.

So that experience has turned into a major focus of my life: training people, mentoring people in all the professional skills they need to be successful to build research careers. Not just the science, not just the grants, but the management and leadership skills it takes to make it. It's never one big thing, but a thousand little things. The 'sink or swim' system leaves extremely talented people without the tools they need to succeed, tools that can be taught. We want these people to solve the most important puzzles in science and medicine. I want these people to take care of me and my family and make the world a healthier place, so I want to help them make it in academic medicine.

ENDING ALL-MALE PANELS IN SCIENCE

CU Anschutz researcher helps create database of women scientists

By Tonia Twichell



Elizabeth McCullagh, PhD, back row, third from right, with other members of the 500 Women Scientists leadership team.

When one of the world's most influential health research leaders announced this summer that he would eschew speaking on all-male scientific panels, Elizabeth McCullagh's first thought was "we need more men like him."

"The problem of ignoring women's expertise can be solved if men recognize that this is not just a women's issue," McCullagh, PhD, said of Francis Collins, MD, PhD, director of the National Institutes of Health, who has challenged other science leaders to join him in encouraging diversity.

"We need allies, and he really stepped up as any ally."

Amid growing concerns from women in science that their voices are underrepresented in the media and professional conferences, McCullagh, a postdoctoral fellow at University of Colorado School of Medicine Department of Physiology and Biophysics, and Kate Nowak, a scientist formerly with Colorado State University, launched the Request a Woman Scientist database in January 2018.

Sponsored by 500 Women Scientists, a Boulder-based nonprofit dedicated to making science more inclusive, the database contains the names of over 11,000 women who work in science, technology, engineering, math and medicine (STEMM) in 138 countries. All have agreed to be available to speak publicly about their expertise.

A paper co-authored by McCullagh and published in the journal *PLoS Biology* in April shows the database was accessed more than 100,000 times in the first year, and 11 percent of women who answered an online survey reported contact.

"I think the problem is so obvious when you see all-male panels," McCullagh said. "But some people are in denial of the inequity."

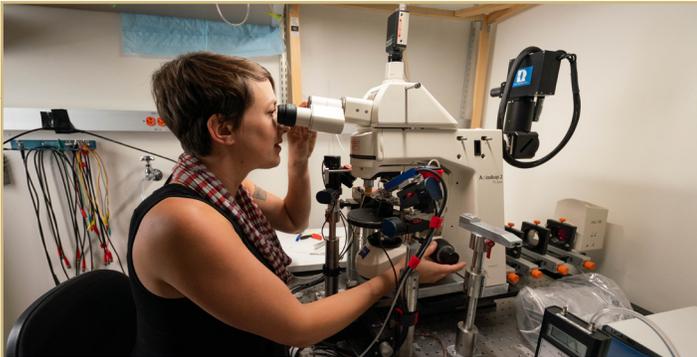
"People don't realize their own biases, and that's part of the problem. You may think you're asking the most experienced person, but is that true or is it just because you know them. Are they really the most qualified?"

With momentum building, McCullagh is encouraging organizers of large conferences to issue guidelines to help increase panel diversity to avoid what are colloquially called "manels."

"They need to step forward and amplify this message, and put in a real effort to make people aware of the problem."

THE SCIENCE MOM JOURNEY

Some conference organizers say they struggle to find qualified women for panels because there are fewer women than men in many science-related fields.



Women represent a large percentage of people earning degrees in many STEM professions—in some specialties, biology for example, more women than men earn bachelor's degrees—but 46 percent of women in science leave academia, McCullagh said, compared with 23 percent of men.

Since the birth of her first daughter, Adelaide, two years ago, McCullagh realizes why that might happen. She calls it the Science Mom Journey.

After struggling with infertility, McCullagh gave birth nine weeks early. McCullagh returned to work once her daughter came home from the hospital, but she needed frequent breaks to pump breastmilk.

“There are huge barriers to keeping women in science. Motherhood is incredibly difficult, but if you are dealing with infertility or a miscarriage or postpartum depression, or if you're going through IVF (in vitro fertilization), how in the world can you be productive? All this stuff impacts our lives, and we're not supposed to talk about it, but it does affect your career.

“You think you can jump back in and be fine. But you're just not going to do everything as well.”

Continuing to advocate for women in science, McCullagh has co-authored two articles in *Scientific American*: “Do Science. Pump. Repeat. How to improve scientist-moms' breastfeeding experience,” and “Infertility, and the Leaky Pipeline, Difficulty in conceiving a baby should not be allowed to wreck a woman's scientific career.”

On the Anschutz Medical Campus, she successfully lobbied to increase the number of lactation spaces. In Fort Collins, where she lives with her husband and two daughters, she started a 500 Women Scientists pod. Members have met with lawmakers to discuss parental leave and child-care policies, raised funds after Hurricane Maria for CienciaPR, a science, technology, engineering and math organization, and sponsored a get-out-the-vote effort.

The pod's main event each year is a one-day conference called Expanding Your Horizons for middle school girls interested in STEM fields.

“It's great for the girls to see women who are leaders in their field running workshops. In middle school girls often get discouraged that we're not smart enough or we're not driven enough. Our pod helps with that.”

REQUEST A WOMAN SCIENTIST

Sponsored by 500 Women Scientists, the Request a Woman Scientist database is posted online with the following statement of purpose.

WE NEED MORE WOMEN'S VOICES IN THE PUBLIC SPHERE.

Too often, high-profile articles, conference panels, and boards are filled with a disproportionate number of male voices. News stories are reported by more men by a huge margin, and this imbalance is reflected in how frequently women are quoted in news stories unless journalists make a conscious effort to reach out. Most keynote speakers at conferences are men. Panels are so frequently all-male that a new word evolved to describe the phenomenon: manels. These imbalances add up and reinforce the inaccurate perception that science is stale, pale and male. Even though women are a huge part of the scientific community and make up half of the population, women's voices have been historically low or entirely absent in public spaces. These imbalances ultimately deny leadership opportunities to women in science, especially women who face additional forms of discrimination. It is time for a change.

We need more women's voices — in the media, at scientific conferences, at universities, in government. We, 500 Women Scientists, are creating a solution to this gender gap, from manels to largely male keynote speakers at scientific conferences to the prominence of males as policy makers.

The **Request a Woman Scientist** platform connects our extensive multidisciplinary network of vetted women in science with anyone who needs to consult a scientist for a news story, invite a keynote speaker or panelist for a conference or workshop, find a woman scientist to collaborate on a project, or serve as a subject matter expert in any capacity. Importantly, 500 Women Scientists is committed to diversity and inclusion, not just in our scientific fields, but in our society as a whole.

We are what a scientist looks like.

STUDYING GENE REARRANGEMENT IN TUMOR CELLS

First-year MD/PhD student awarded Hertz Fellowship

By Chris Casey



As a first-year student in the CU Medical Scientist Training Program, Jacqueline Turner was one of only 11 graduate fellows in the country to receive the Hertz Fellowship. Photo by Matthew Kaskavitch.

Many scientists and physicians at the CU Anschutz Medical Campus conduct cutting-edge research and they usually have a trail of degrees after their names.

And then there is Jacqueline Turner.

Turner is already doing bench-to-bedside research, which is extending the lives of stage IV melanoma patients, as a first-year MD/PhD student in the Medical Scientist Training Program at the School of Medicine.

Last April, Turner was selected as one of only 11 recipients of the prestigious Hertz Foundation Fellowship from a pool of more than 840 applicants. She is the first CU Anschutz awardee. Three students from CU Boulder previously have won Hertz Fellowships, with the last recipient being 15 years ago.

“I honestly didn’t think it was going to happen,” said Turner, who received a bachelor’s degree in biochemistry and integrative physiology at CU Boulder in 2017. “Historically, they fund a lot of engineers and students in the physical sciences. I’m not an engineer. As I learned more about the fellowship, they are interested in people in a variety of disciplines—people who are very creative, curious and innovative.”

As part of the extremely prized award, Turner will receive about \$250,000 in support toward her graduate-school ambitions and her interest in molecular oncology. The Fannie and John Hertz Foundation, based in Livermore, Calif, makes the awards to advance groundbreaking applied science with real-world benefits for all humanity.

Turner is a student in the National Institutes of Health-funded Medical Scientist Training Program, which is a multidisciplinary program educating students in clinical medicine and biomedical research. University of Colorado students receive financial support for their entire period of training.

KEY MENTORS

Turner’s interest in research began in the cardiac laboratory of Russell Moore, PhD, in the Integrative Physiology Department at CU Boulder. As an undergraduate, she joined the Robinson Melanoma Research Laboratory at CU Anschutz, working alongside William Robinson, MD, PhD, and Kasey Coutts, PhD.

“They are pivotal mentors in my life, helping to teach me and spark my interest in science,” Turner said. “Most importantly, I saw how my work can be translated to benefit patients.”

Recently, the team of researchers published the first report of any kind of gene fusion responding to immunotherapy in any kind of cancer. “Our studies demonstrate kinase gene

fusions have unique signaling mechanisms that can be targeted for treatment,” Turner said. “We show how understanding the physical properties of structural variation in the genome is important to identify and treat gene fusions.”

In essence, Turner and the team at the International Melanoma Biorepository and Research Laboratory at CU Anschutz have been working on gene rearrangement that translates into longer lives for cancer patients. “Having a stage IV melanoma patient survive for at least two more years based on our findings was really incredible,” she said. “That’s the kind of research I want to focus on.”

CLINICALLY TRANSLATIONAL RESEARCH

Along with Isabel Schlaepfer, PhD, assistant professor of medicine in the Division of Medical Oncology, and Raul Torres, PhD, professor of immunology and microbiology, Turner is now working to integrate genetics, immunology and metabolism to construct a better understanding of cancer.

As part of the Hertz Fellowship, Turner will attend workshops, retreats, and seminars, where she will meet and work with a wide network of scientists. “You get a scientific community and network to tap into,” she said. “They also give you financial freedom to seek out the mentors you want to work with, which is really cool.”

These experiences continue to fuel Turner’s interest in clinically translational research. She is especially interested in developing cutting-edge therapies for patients with limited treatment options or a poor prognosis.

“Throughout my career, I hope to work with patients, identify novel therapeutic targets, and develop new treatments for solid tumor malignancies,” Turner said.

PEW LATIN AMERICAN FELLOWSHIP AWARDED TO CU RESEARCHER

Candia uses light to explore protein activity

By Mark Couch

Carmen Hernández Candia was working on her PhD in Mexico when she attended a talk at a biophysics conference about using light to control the function of different proteins.

The speaker, Chandra Tucker, PhD, associate professor of pharmacology at the University of Colorado School of Medicine, made such an impression that Candia knew she wanted to come work with her.

“I was really surprised by the things she was doing and I really love her work, so I decided that’s where I want to go,” Candia said. “You know, it was instantaneous. I want to work with her. I want to go to that lab.”

So, as Candia was finishing her degree, she called Tucker, based on attending that talk. “I just contacted her and I said, ‘Hey, I’m Carmen and I would like to work with you.’”

A few Skype calls and interviews later, Candia arrived in Colorado to work in Tucker’s lab as a postdoctoral researcher. That was February 2018.

A little over year later, Candia became one of only 10 young scientists, and the first from the University of Colorado School of Medicine, to receive a Pew Latin American Fellowship in the Biomedical Sciences. The program gives recipients an opportunity to increase their scientific knowledge by promoting exchange and collaboration between investigators in the United States and Latin America.

The award provides an annual salary stipend for two years. In addition, award recipients who return to Latin America receive a grant for equipment to support establishing an independent laboratory.

Candia grew up in Mexico City. “When I was a kid, my mom is always telling me, I used to ask the weirdest questions, like ‘Why is the moon not falling up?’” Candia said. “I was always

really curious and I always loved to watch National Geographic programs and things like that. But it wasn’t always that clear to me that I was going to end up doing this kind of work.”

While Candia earned bachelor and master’s degrees in physics, her parents also went back to school to earn degrees. Her mother became a lawyer and her father completed an engineering degree and they traded talk about test scores.

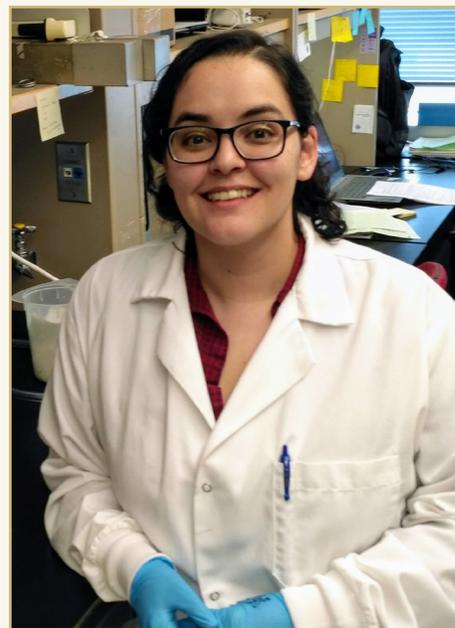
“We could play around,” Candia said. “I could say, ‘Hey, I have an A, and they would say, ‘I have an A+.’”

Candia pursued a PhD in molecular biology at the Instituto Potosino de Investigación Científica y Tecnológica in San Luis Potosí, Mexico, and, fusing her interest in physics and biology, she learned how to develop and work with “optical tweezers,” which use light to manipulate microscopic objects as small as a single molecule

As a postdoctoral researcher in Tucker’s laboratory, Candia is exploring how the formation of different types of cellular condensates influences protein activity. Inside cells, some proteins coalesce into clusters that perform a specific function—carrying out a particular metabolic reaction, for example. While assembling into fluid, liquid-like condensates can enhance enzymes’ catalytic capabilities, the formation of clusters that are more rigid and fibrous may hamper the activity of the proteins within them and impair the health of the cell.

Tucker has pioneered the use of molecular tools that can trigger the formation of protein condensates, and, since joining the lab, Candia has developed a companion method for disrupting these protein clusters.

“In the lab we have these tools, this protein and when we apply light, it’s forming droplets,” Candia said. “And then if you can keep adding



Carmen Hernández Candia

light, then these droplets start to form these other structures that are more rigid, so we think that we can use this tool to try to understand the functions of these droplets.”

Candia aims to determine whether inducing condensation can enhance enzymatic activity and then whether it’s possible to steer the metabolic reactions. Also, by exploring methods for manipulating protein condensates it might be possible to create new strategies for breaking up toxic protein aggregations associated with neurodegenerative disorders.

As Candia continues her research, she hopes the Pew grant will strengthen her ability to land a faculty position in Latin America.

“It’s not the same as going and knocking on doors and saying, ‘Hey can you hire me?’” Candia said. “Now I can say, ‘Can you hire me? And I have this money to start my lab.’ Definitely, I hope that’s going to change the story a lot.”

BUILDING THE PIPELINE OF FUTURE DOCTORS

New AHEC director aims to connect urban and rural communities

By Tonia Twichell

Josina Romero O’Connell, MD, remembers what people said when her grandfather got sick and started visiting a local clinic near his home in rural New Mexico.

Ya se murio.

He already died.

“Because if you went there, there was no hope,” she said. “You went there to die.”

Watching her grandfather’s health deteriorate, O’Connell made a decision about her future.

“I told my mom, ‘When I grow up I’m going to be a doctor. I’m going to open a hospital where sick people go to get well and they don’t die.’”

“My mother looked at me kind of strangely and said, ‘Don’t you mean a nurse?’ and I said, ‘No,

I want to be a doctor.’”

That year, Santa brought her a toy medical bag, and from then on relatives called her “Dr. Jo.”

In January, 10 years after graduating from the University of Colorado School of Medicine, O’Connell was named executive director of the Colorado Area Health Education Center (AHEC), which promotes careers in health professions in rural and medically underserved urban areas.

O’Connell, an assistant professor of family medicine and a clinician at Denver Health’s Montbello Family Health Center, is familiar with barriers rural community members can encounter when choosing to enter a health care field.

Although she was a child when she decided to become a doctor, O’Connell was 44 years old when she entered medical school.

TAKING THE LONG WAY

“I’m sure (the television show) *Marcus Welby, MD*, had a lot to do with it,” O’Connell said about her youthful desire to become a physician. “How else would I, growing up outside Española [N.M.], have known what a doctor was?”

O’Connell enrolled at University of New Mexico after high school. As a junior she transferred to Colorado College in Colorado Springs, a more rigid academic setting, to get serious about preparing for medical school.

Working as many as four jobs at once, she studied hard, improved her grades, and signed up for the Medical College Admission Test (MCAT), a standardized exam required for admission to medical school.

“I didn’t take any classes to prepare (for the MCAT). I thought, ‘I am learning what I need to learn in class. I’m going to do fine on the MCAT.’

“I remember sitting down and looking at the test and saying, ‘What is this? I don’t recognize this as anything I remotely know.’”

Her score was low, but O’Connell told her college advisor that she would hire a tutor and re-take the exam.

“But he said, ‘I don’t see that medical school is in your future with these kind of scores. Maybe nursing.’”

Her confidence plummeted. Instead of pursuing medical school, she graduated with a bachelor’s degree, married her college boyfriend, tried various careers, and eventually earned a master’s degree in secondary education. She taught anatomy, physiology, and biology to high school and middle school students in Colorado Springs.

O’Connell liked teaching, but felt she was letting down her family by failing to become a physician.

“I come from a long line of educators. Teaching felt very natural ... But I don’t think there was a day when I didn’t think, ‘Gee, I want to go to medical school.’”

Medical school came back into focus several years later when she had an argument with her son about music lessons. O’Connell told him she wanted him to excel and meet his potential.

“He replied, ‘That’s a lot coming from you. You never went to med school.’”

That night, she told her husband that she would apply to medical school the following year.

O’Connell quit teaching and became a certified nursing assistant in a medical surgical unit. She joined MCAT study groups.

She applied at CU School of Medicine and was rejected, so she asked a pre-med advisor at Colorado College for advice. Because she

“I would like to make urban more woke to rural. There’s a richness in each of them and we need urban providers to do more outreach and education for their peers in frontier areas.”

was a minority candidate, but had applied under her married name of O'Connell, he recommended that she contact the CU Office of Diversity and Inclusion. She did, and was offered a spot in CU Denver's post-baccalaureate program.

One year later, O'Connell, the mother of three children ranging from third grade to college, entered medical school at CU.

It was hard, and she often questioned her ability and aptitude.

"I quit probably once a week," she said.

Being involved in extracurricular activities helped her focus on her goals and acclimate to being back in school. CU School of Medicine had no Spanish language classes, and O'Connell realized she would need to refresh her own language skills if she was going to help Spanish-speaking patients.

Shortly after matriculation, she and two fellow students created Spanish Acquisition Begets Enhanced Service (SABES). They recruited native Spanish-speakers to tutor students in medical Spanish, brought in community members to pose as patients, and found Spanish-speaking providers to help students practice caring for simulated patients and to use translator phones. In her second year of medical school, the school elevated SABES from an interest group to an elective.

Also in her freshman year, Rural Track Director Mark Deutchman, MD, invited O'Connell to join the school's new track.

"It was so amazing," O'Connell said. "I'd tell my peers who were not in the rural track, 'I'm going to suture lab today.' And they'd say, 'I want to go, too.' Or I'd tell them, 'I'm going to an ultrasound workshop.' They were always jealous."



Josina Romero O'Connell, MD, during a rural track workshop in eye care when she was a CU School of Medicine student.

O'Connell accepted a National Health Service Corps scholarship, and agreed to work in an area of need for four years after graduation. She was offered a job near her hometown in New Mexico, but didn't want to uproot her family, now living in Denver. The first year she worked at Salud Family Health Centers in Commerce City, then moved to Denver Health, where she was named director of the Healthcare Interest Program, a pipeline program for minority and underprivileged college students interested in health care professions.

BUILDING CONNECTIONS

"Mark (Deutchman) jokingly used to call me 'my failure' because I was in the inaugural class of the rural track, but I didn't go into rural care."

Deutchman, professor of family medicine and associate dean for rural health, who led AHEC for six years before stepping down this year, said O'Connell's professional and personal background make her a good choice to lead AHEC.

"She is dedicated to the missions of workforce diversity, workforce distribution, and practice transformation which are core to AHEC," Deutchman said. "And she brings a wealth of experience in collaborating with others and in running career development programs."

O'Connell is focused on expanding AHEC's current high school pipeline program to reach students in kindergarten through college, and she envisions a closer connection between rural and urban underserved health care providers because "we don't just want to attract providers, we want to keep them."

"I would like to make urban more woke to rural," she said. "There's a richness in each of them, and we need urban providers to do more outreach and education for their peers in frontier areas. Urban and rural don't always communicate."

O'Connell intends to visit each of the six AHEC districts in Colorado twice yearly to learn the needs of the community.

"I'd like to do whatever I can do—teach a lecture, help high school students dissect a frog, hold a community meeting on diabetes."

Immersed in caring for patients in urban Denver, she feels a pull to return to rural communities.

"Since I took this (AHEC) job I feel a tiny bit less guilty about not being in rural care, but I feel that my people are still out there, and I need to serve them."

MAPPING MOLECULES

The quest for precision exercise medicine

By Wendy S. Meyer

This summer, Wendy Kohrt, PhD, professor of medicine in the Division of Geriatric Medicine, launched an exercise study that could be called a summer blockbuster.

It is big—involving more than 2,300 individuals across the nation—and will result in voluminous information—tens of thousands of bio-specimens that will yield millions of data-points for future research.

The study is called MoTrPAC (pronounced motor-pack), which stands for Molecular Transducers of Physical Activity Consortium. Funded by the National Institutes of Health (NIH), this six-year program is the largest targeted investment into the mechanisms of how physical activity improves health and prevents disease.

“We have a lot of knowledge that exercise is good for many aspects of health,” said Kohrt. “It makes your heart and lungs healthy, your muscles and bones strong. It prevents obesity. It prevents many different health conditions and disease processes. Yet we know very little about how exercise does that—the molecular or cellular mechanisms that make exercise beneficial.”

Through MoTrPAC, researchers aim to develop a molecular map of tissue-specific and circulating signals produced by physical activity. This knowledge should allow researchers and physicians to develop individually targeted exercise recommendations for specific diseases and conditions, and better help those who are uncertain whether exercise may be as therapeutic as a medication.

“If we know, for example, that exercise turns on the same signal that a drug for diabetes turns on, we can prove exercise is a good therapeutic alternative for this process that is affected by drugs,” said Kohrt, who is also associate director of the Center for Women’s Health Research and director of the IMAGE (Investigations in Metabolism, Aging, Gender, and Exercise) research group. “This will stimulate the next wave of research to understand how exercise can be used as medicine.”

IMPACT FOR CU ANSCHUTZ

A study this large involves multiple investigators at many institutions. CU Anschutz is one of six clinical sites across the country that will be enrolling volunteers for the study. Kohrt is the principal investigator of CU’s portion of the grant, and she will be directing all of the activity in Colorado.

The study is complex not just because it involves a large number of volunteers but because of the many steps involved each time a study participant comes to the clinic for a research visit.

Kohrt’s MoTrPAC team consists of four full-time and three part-time professional research assistants, a site coordinator, an exercise supervisor, a bio-specimens manager, three physicians, two nurse practitioners, a biostatistician, a data manager, and five investigators.

Because MoTrPAC explores what happens to bodies on the molecular level before, during, and after exercise, blood and tissue samples must be taken before and after workouts. This means that a volunteer would come in and initially rest. Then a specially trained research nurse would take blood samples along with muscle and fat biopsies.

After that, the volunteer would engage in either aerobic exercise or weight lifting. The nurse would again take blood and tissue samples after the exercise. Some participants may be randomized into a group that does no exercise at all.

Professional research assistant Claire Newman, MS, described preparations to work with hundreds of study volunteers as “hectic” and requiring “a full team effort.” Each time a volunteer comes in for a visit, he or she likely will interact with a team of at least six people.

During its operation, MoTrPAC will rely heavily on the resources of the Colorado Clinical and Translational Sciences Institute (CCTSI) and its core laboratories, outpatient clinical and translational research clinic, and a state-of-the-art exercise research facility on the third floor of the Leprino Building on the Anschutz Medical Campus. When the Anschutz Health Sciences Building, which is currently under construction, is complete in 2021, the CCTSI and MoTrPAC will move onto the sixth floor of that building.

“We developed our comprehensive set of research resources for initiatives exactly like this one,” said CCTSI Director Ronald Sokol, MD. “We are looking forward to supporting MoTrPAC in whatever way we can.”

“Our setup is ideal,” said Kohrt. “When we had our site visit from the NIH, they were so impressed that we have a one-stop shop for everything related to this protocol, all on the same floor.”

IMPACT FOR RESEARCHERS EVERYWHERE

A distinguishing characteristic of MoTrPAC compared with other NIH-funded research is that it is a so-called exploratory study.

“In other words, we have not identified specific aims or goals,” said MoTrPAC Site Coordinator Ellie Gibbons. “We do not have a hypothesis. We are gathering information in order to create a molecular map of tissue-specific and circulating signals produced by physical activity.”

We don't know what is going to happen, and that is what makes this different and exciting.”

MoTrPAC is also unusual in terms of the breadth of science involved. In addition to the six clinical trial sites, MoTrPAC will include:

- seven chemical analysis sites;
- three preclinical animal study sites, which will conduct physical activity studies in animal models;
- a bioinformatics center to disseminate data and tools to the entire research community; and
- a coordination center to harmonize activities across the consortium.

A novel aspect of MoTrPAC is that the information gathered will be stored in a publicly accessible database that scientists can use to study almost every organ and tissue in the human body.

“The other part of the consortium is to be a new kind of data access plan where anybody who has got a good idea about what is going to be a pretty large dataset can start to sort it through and see what we can learn about those molecules, how they work and what we can do to improve the way in which we advise people about exercise,” said Francis Collins, MD, PhD, director of NIH, when the first MoTrPAC awards were announced.

In this way, MoTrPAC will be a resource today and for years into the future for researchers everywhere. Ultimately, the research findings from this program could help scientists and clinicians define optimal physical activity recommendations for people at various stages of life. It may also allow the development of precisely targeted regimens for individuals with particular health needs.

IMPACT FOR VOLUNTEERS

This path-breaking science will depend on the participation of thousands of volunteers from across the nation.

“A study of this magnitude has never been done, which means we need a lot of research participants to help us answer our important questions,”



Above: MoTrPAC team members: Claire Newman, MS, Daniel Bessesen, MD, Andrew Hepler, Ellie Gibbons, Kathleen Gavin, PhD, Catherine Jankowski, PhD, Bryan Bergman, PhD and Terry Witten MS-MPH. Photo by Wendy S. Meyer

Right: MoTrPAC's Claire Newman (left) with volunteer Tyson Marden. Photo by Wendy S. Meyer



said Renee J. Rogers, PhD, an investigator on the national MoTrPAC consortium and assistant professor at the University of Pittsburgh.

Kohrt is hoping that Colorado, with its healthy citizens and lovers of the outdoors, will be the perfect place to find volunteers. Researchers are seeking healthy individuals of all ages. They also are seeking participants who are sedentary, but who have the capacity to exercise. They will look for volunteers who routinely exercise.

Volunteers who are part of the MoTrPAC study will receive a 12-week exercise program and access to state-of-the art gym facilities. They will also receive information about their fitness level and their body composition. In addition, all volunteers will be compensated for their time.

“This is our first step into precision exercise medicine,” said Kohrt. “We are looking for people who want be on the leading edge of the wave to develop this incredible knowledge base.”

If you are interested in learning more about how to volunteer for the study, go to the MoTrPAC website.

BACK ON HER FEET

Custom-designed ankle repair is perfect fit for Colorado woman

By Todd Neff



Kenneth Hunt, MD, and the carbon-cobalt talus with before (left) and after X-rays of Deanne Carlson's left ankle. Carlson's previous ankle replacement had failed due to the collapse of the talus bone. Photo by Todd Neff for UHealth.

If the ankle is a lever, the talus is its fulcrum. It's an oddly shaped lump onto which the bones of the lower leg drive the body into the bones of the foot. By late 2018, the fulcrum in Deanne "Dee Dee" Carlson's left ankle had long since given in to the punishments its owner had imparted upon it, and it was dead and crumbling. Until recently, the best option was to fuse the ankle with enough screws to build a deck, which would leave ankle about as flexible as a deck.

A BETTER WAY

Deep in Dee Dee Carlson's ankle now resides a roughly two-pound, polished nugget of shiny cobalt chromium. It was 3D printed by New Jersey-based Additive Orthopaedics, based on a mathematical mirror image of CT scans of her healthier right ankle.

In November 2018, Kenneth Hunt, MD, a University of Colorado School of Medicine surgeon specializing in foot and ankle orthopedics and the medical director of the UHealth Foot and Ankle Center in Denver's Stapleton neighborhood, installed the metallic talus in Carlson's ankle. He also redid the failed ankle replacement during the procedure at UHealth University of Colorado Hospital on the Anschutz Medical Campus. The personalized-medicine talus replacement was the first such surgery done at UHealth and among the first in Colorado. It won't be his last, Hunt says.

"I think it's a much better solution than previous approaches," he said.

ANKLE BASHER

You can't blame Carlson's talus, really. She may stand just five feet tall, but the 63-year-old has been a bona-fide ankle basher for decades. The Durango resident was a soccer player in her youth, a tenacious wing defender at Colorado College, and then on several competitive teams into her forties. She dribbled and kicked through more ankle sprains and strains than she can count. The pounding didn't abate much as she transitioned to trail running as her career as a veterinarian progressed.

By her mid-fifties, the cartilage in Carlson's ankles had worn away. She had her left ankle surgically replaced in April 2012; the right was done a year later. She stopped trail running, but biking the roads and hiking the trails of southwestern Colorado remained passions, and she skied all winter at Purgatory Resort, both for fun and as part of her duties as a ski-patrol emergency medical technician.

Her right ankle replacement held firm. But with time, the talus in the left ankle died of avascular necrosis, in which bone damage stopped already limited blood supply to the talus, killing the bone. It collapsed, shifting the titanium base plate of the ankle replacement down and toward her midline (technically speaking, medially). Things that were supposed to glide now grinded and clattered against each other.

The pain was such that, by last fall, her hikes in search of mushrooms, which might have otherwise brought hours of mycological meandering among the lodgepole pine, ended abruptly.

"I'd be pretty much in tears by the time I was out for 20 minutes," Carlson said. "Every step hurt, and there was huge swelling on the medial side of my ankle."

PERSONALIZED METAL

She was referred to Hunt, who recognized that ankle fusion would seriously limit someone as active as Carlson, Hunt said. They agreed that a new 3D-printed talus was the most promising option.

Additive Orthopaedics created three versions of Carlson's talus: one sized exactly like the one in her right ankle, one slightly smaller, and one slightly larger. Hunt would use the one that fit best. Typically, the shiny metal talus, once inserted, fits in like a puzzle piece and is held in place by the neighboring bones. In Carlson's case, because of the shifting that had happened before the surgery, the new talus also had a titanium baseplate that Hunt screwed into Carlson's heelbone (calcaneus). The base of the new ankle replacement hardware sat on the metal talus, and Hunt also replaced the portion drilled into Carlson's tibia. The surgery went well; now it was a matter of rehabilitating the ankle.

On April 29, Carlson was back for a periodic visit with Hunt and colleagues at the UHealth Foot and Ankle Center – Stapleton.



Just over three months after Hunt performed the talus surgery on her ankle, Carlson was back skiing at Purgatory on February 28. She had 16 ski days by April 29. Photo courtesy Deanne Carlson.

The 11 a.m. appointment started with a walk across force plates and pressure-tracking mats in the center's clinical motion and performance laboratory. Eight cameras tracked reflective spheres the size of cereal puffs that UHealth athletic trainer Danielle Lewis and biomedical engineer Sara Andrews had painstakingly adhered to Carlson's feet, ankles, legs, knees, and hips. The idea is to assess how the kinetic chain, as it's called, from Carlson's feet on through to her waist, was faring five months post-surgery. To the casual observer, she walked normally; the fusion of the lab's various inputs would conclude much the same.

BACK TO THE MOUNTAINS

In the exam room, Carlson told Hunt that she had been skiing since February 28. She reminded him that, shortly after surgery, he had told her that, if she rehabbed vigorously and the ankle progressed, she might even get a few runs in by the spring. It had given her a goal toward which she diligently rehabbed. She had since been out skiing another 15 days, she added.

"You took some liberties there, which I appreciate," Hunt said. "And that's more days than I've got."

Carlson still has work to do. Hunt is looking for a few more degrees of motion in the ankle, so he wrote up instructions to Carlson's physical therapist in Durango for more stretching and strengthening. Hunt reminded Carlson that it usually takes about a year to fully strengthen and heal after such a surgery, although additional, incremental gains can



Deanne Carlson and Kenneth Hunt, MD. Photo by Todd Neff for UHealth.

happen after that. She's on track for a great outcome, he told her.

"I think we'll get many years of activity, and you're doing really well," he said.

Carlson says she's walking almost completely pain-free.

"I had expectations, but they weren't this high," she said.

Carlson planned stay in Denver with sister Lisa Carlson for the next couple of days, but her mind was already on the mountains.

"I'm thinking of going up to A-Basin on Wednesday morning," she said.

This article originally was published in UHealth Today.

“EVERYTHING SHIFTS A LITTLE AFTER SURGERY”

CU Denver student's recovery from cancer shows great heart

By Taylor Abarca

Daniel De Leon may seem like your typical 25 year-old. He loves to go out with his friends, is a full-time student at the University of Colorado Denver, and works out a few days a week. But his story is anything but typical. Not only was he diagnosed with testicular cancer at 23, but when a lung tumor resisted treatment, De Leon needed total lung removal surgery.

“I felt a bit of a lump but didn't think much of it,” said De Leon. “But then it started to grow and I was losing weight. That is when I started thinking it may be cancer.”

A trip to the local urgent care confirmed his fear. Alone in the exam room (his family lives in Chihuahua, Mexico), De Leon was diagnosed with testicular cancer and it needed to be removed as soon as possible.

“I sent a message to my mom and told her what was going on,” he said. “It was really terrifying and overwhelming.”

CANCER HAD SPREAD

Three days later, he went in for surgery to remove the tumor. Unfortunately tests after the surgery revealed that tumor markers had not gone down as expected and when his team looked closer, they found that the cancer had spread, metastasizing to De Leon's left lung. His oncologists determined that he would need additional treatment.

“That was probably the hardest part of the entire process,” said De Leon. “You look frail, you lose your hair, and your mood is terrible. It is hard to stay strong through it.”

“After the program, my lifestyle changed,” said De Leon. “My mental and physical state improved and I became more aware of how important it is to take care of my health.”

Despite the negative side effects of chemotherapy, De Leon continued to go to school full time.

“I would go to treatment and then head to class,” he said. “It was the best choice that I made because I was able to have something to distract me from everything that was going on.”

CHEST PAIN

One night, De Leon was in an evening class and began to experience severe chest pain. Thinking that it was a side effect of the previous treatments, he went to the emergency room at the UHealth University of Colorado Hospital. He was shocked to learn that the tumor in his lung had not disappeared, but instead it had grown.

“When I read the report I was shocked. I truly believed that I was clear because my tumor markers had come down,” De Leon said.

De Leon's oncologist referred him to the University of Colorado Cancer Center for additional consultation. Elizabeth Kessler, MD, CU Cancer Center member and assistant professor of medicine in the Division of Medical Oncology, took over his care.

“We had a sense that he had something called a growing teratoma syndrome, which means that some tumor cells are resistant to any type of chemotherapy or radiation,” explained Kessler. “The only way to get rid of the tumor is surgery. What was tricky in De Leon's case is that the location of the tumor was in such a place where we couldn't just take a portion of the lung. We ended up having to remove his left lung.”

After his surgery De Leon was left with just one lung but was finally cancer free. Just a couple weeks after surgery he decided that it would be a good idea to sign up for the BfitBwell program at the Anschutz Health and Wellness Center. BfitBwell is a three-month long cancer exercise program that is individually tailored to the participant's specific needs.

“For me, it was reassuring to know that the trainers were working with my medical team and work with cancer patients,” said De Leon. “The program is excellent. The entire team is so positive and makes the exercise experience much less intimidating, especially for someone with one lung.”

ONE MORE SURPRISE

That one lung had a surprise in store. Consequent x-rays after surgery showed that De Leon's lung was expanding in size and capacity. As his lung grew, other organs shifted – now De Leon's heart is a few inches to the left of where it normally would be.

Below: Daniel De Leon was diagnosed with testicular cancer when he was 23 years old. He later had his left lung removed due to tumor cells that were resistant to chemotherapy and radiation.



Above: Daniel De Leon and his mother, Rosario De Leon.

“The body compensates,” said Kessler. “Everything shifts a little after surgery. If you were to listen to his heart sounds you wouldn’t hear them as well as the same places we do in other patients.”

“It was super interesting to watch the growth,” said De Leon. “As the lung got bigger I also felt better. I didn’t need as much time to recover and I wasn’t out of breath all the time.”

De Leon continues to go to the Anschutz Health and Wellness Center a few days a week and even runs into members of his care team there.

“After the program, my lifestyle changed,” said De Leon. “My mental and physical state improved and I became more aware of how important it is to take care of my health.”

Now cancer free, De Leon is excited (and expectedly anxious) about what comes after graduation in May.

“Because of how crazy this last year was, I haven’t had a lot of time to figure out what comes next,” De Leon said. “I am really happy that I am healthy and finally have the mental capacity to think about the future. Ultimately, I feel grateful that I am in a situation where I can focus on the normal, everyday 25 year old things.”

This article originally was published in February on Colorado Cancer Blogs.

SAVING A PATIENT'S VOICE

A team approach to laryngeal cancer

By Tyler Smith



Michael Rector finds an additional voice through music on the cello and other instruments. Photo courtesy of Michael Rector.

Michael Rector was hoarse but was sure he knew why.

It was November 2016 and Rector, then 39, had just spent a few days at a Microsoft conference he attended with fellow information technology specialists. The toll of working hard and playing hard was a raspy voice, he thought.

"I talked too much with colleagues, drank a little too much, ate rich food, and stayed out late," Rector recalled.

Rector thought he'd be back to normal in a couple of weeks, but his mouth and throat remained stubbornly dry. He finally decided to see an ear, nose and throat specialist near his home in Parker. The physician used a laryngoscope to examine Rector's vocal cords (larynx) and the area around them and prescribed steroids and antibiotics to reduce inflammation.

But the hoarseness persisted, and two weeks later, Rector was back in the ENT's office. A second laryngoscope exam brought news he wasn't prepared for: his physician had seen nodes on Rector's vocal cords and wanted to schedule surgery as soon as possible.

"It was a level of urgency that was completely unexpected," Rector said.

DISEASE JOURNEY, PART ONE

A biopsy ultimately revealed that a malignant tumor called spindle cell carcinoma had invaded Rector's vocal cords—two folds of tissue less than an inch long whose vibrations produce speech and other sounds. From a disease standpoint, Rector was breathing some unwanted rarified air: spindle cell carcinomas make up a tiny fraction (1 percent to 3 percent) of all laryngeal cancers.

"I was thinking, 'What a way to go into the holidays,'" Rector said.

The emotional twists and turns of November 2016 grew sharper for Rector over the next two years. He faced difficult clinical and emotional decisions that produced a gamut of emotions and insights.

After receiving his initial diagnosis, Rector and his wife Abbey searched for cancer specialists and ultimately decided to get their care at the University of Colorado Cancer Center on the Anschutz Medical Campus. He received six weeks of radiation treatments at the UCHealth TomoTherapy Cancer Clinic in Lone Tree with David Raben, MD, and Ryan Lanning, MD, PhD, radiation oncologists and professor and assistant professor, respectively, in the Department of Radiation Oncology at the University of Colorado School of Medicine. The treatments used 3D imaging to precisely target the tumors with radiation and spare healthy tissue to the greatest extent possible.

Rector, a self-described "horrible workaholic," got his treatments first thing in the morning, then headed straight to his job. The radiation put his voice out of commission, but he worked from home and used email and instant messaging to communicate. Rector finished his radiation treatments in February 2017, and four or five months later, his voice had recovered and he was "talking up a storm."

DISEASE JOURNEY, PART TWO

The seemingly smooth recovery derailed in spring 2018, both clinically and personally. Rector's follow-up care included monthly laryngoscopies to look for signs of his cancer returning. He worked with John Song, MD, and Daniel Fink, MD, of the UCHealth Ear, Nose and Throat Clinic and respectively, associate professor and assistant professor of the CU School of Medicine Department of Otolaryngology, hoping to improve his voice even further through laser surgery to remove tissue scarred by the radiation treatments.

Fink said he uses laser technology in laryngeal cancer surgery because of its precision in cutting away diseased tissue and minimizing bleeding.

“You can see planes of tissue and can see when you’ve gotten through the tumor and into healthy tissue,” Fink said.

“I was ready to push the envelope and clean up the scarring,” Rector said. Fink did so, but after the surgery, biopsies of the tissue showed that Rector’s cancer had come back.

He faced the prospect of a total laryngectomy – daunting enough, but there was an added twist. He and Abby had recently learned she was pregnant for the first time. An avid musician and singer, Rector had thought with pleasure of strumming his ukulele and singing to his baby. Losing his vocal cords would put that dream to rest, as well as any thought of scuba diving, which he pursues avidly. But those thoughts only scratched the surface of his fears.

“More than anything, I want to be around for my baby, but what does that look like?” Rector wondered. “What is the impact on my day-to-day life and work? I’m very social and talk a lot to friends. Am I going to run into depression and become a hermit because I’m embarrassed to be in society?”

He found he didn’t have to confront his anxiety alone. He visited Juliana Litts, a speech-language pathologist with the ENT Clinic at UCHHealth and assistant professor of otolaryngology, who offered him support and explained how he could learn to use his esophagus to speak if he lost his vocal cords.

“She let me know I wouldn’t have to give up being a functioning member of society,” Rector said.

SAVING THE VOICE

Meanwhile, Fink and Song took his case to a tumor board at the CU Cancer Center to consider the options.

“The knee-jerk answer was a total laryngectomy,” said Fink, who wasn’t satisfied with that solution. He and his colleagues decided instead to recommend using surgery to aggressively remove the cancer from the framework of the voice box, while saving as much of Rector’s vocal cords as possible.

The decision wasn’t an easy one. Speaking of laryngeal cancer generally, Fink said surgeons cannot provide one-size-fits-all solutions for patients.

“If the cancer is in the vocal cords themselves, the issue is that the more tissue we take to be sure the patient is cancer-free, the worse the voice may end up afterwards.”

Fink said he considers the size of the cancerous lesion and the clarity of its boundaries in the tissue. Other factors include how much a patient relies on speaking, age, and risk of the cancer spreading. Patients like Rector who have had one round of radiation generally aren’t candidates for another because the treatment can tighten muscles with fibrous tissue.

There is also the inherent uncertainty of how cancerous cells insinuate themselves in the vocal cords.

“Once we are in there, we have to cut until we are around the tumor,” Fink said. “Sometimes it can be deeper than you think. If somebody needs their voice for living, then I may be less inclined to offer surgery if I’m not confident that I can cut around the tumor in a very limited fashion. We take an individualized approach to lesions.”

In Rector’s case, images of his larynx, the tissue above it known as the false vocal cords, and the ventricle separating the two convinced Fink and his colleagues that surgery to remove the tumor while sparing part of both vocal cords was a viable choice.

A LONG ROAD

Rector consented to the salvage-surgery approach, which meant multiple procedures. “I said let’s do a little bit at a time. I’m willing to go down that path before doing an all-out cutting out my larynx,” he said.

Continued on page 20



Michael Rector and his son Theodore. Photo courtesy of Michael Rector.

Continued from page 19

The work resulted in two additional surgeries. Fink first lasered away cancerous tissue in the front half of the left vocal cord. After about three recovery weeks for Rector, Fink cut cancer from the front half of the right vocal cord.

The surgeries wrapped up at the end of July 2018, and Rector got monthly imaging tests to monitor the repaired area. There remained a couple of questionable areas involving radiated tissue, so he elected to undergo yet another procedure to retrieve a sample for biopsy. Rector endured an anxious wait before he got Fink's call: the biopsy showed no recurrence of the cancer.

The news was an obvious relief for Rector, but he also immediately thought of Fink, who had put so much painstaking effort into clearing the cancer and saving as much of Rector's vocal cords as he could.

"I didn't want the cancer to come back for my sake," Rector said. "But I didn't want it to come back for his sake as well."

STILL SPEAKING

What of his voice? It's raspy but perfectly understandable. And the fact that he produced it surprised Fink and Marie Jetté, a UHealth speech-language pathologist and assistant professor of otolaryngology, during a follow-up visit at the UHealth Lone Tree Medical Center.

When Rector told them he felt his voice was making a strong comeback, Jetté told him he was vibrating his false vocal cords in order to speak—despite the fact that neither she nor anyone else had taught him how to do it.

"I have been pleasantly surprised by Michael's finesse with using ventricular phonation (vibration of the false vocal folds as a sound source)," Jetté said in an email. "People who have had such extensive laryngeal surgery and radiation like Michael do not often have the excellent voice communication outcomes that he has achieved completely of his own accord."

For his part, Rector only can guess that his untrained facility comes from learning to manipulate his breathing as a flute player and as a vibrato-generating singer before the cancer diagnosis.

"I learned to make my throat do various things," he said. "My throat might be more malleable than the average person's."

His throat is also capable of doing that thing Rector imagined when he learned he was a father-to-be. On November 2, 2018, he and Abby welcomed son Theodore into the world. Rector can whisper his way through "The Itsy-Bitsy Spider" and a few others to a tiny listener who knows nothing of cancer, only the soothing sounds of a familiar voice.

"I went from being a tenor with close to a three-octave range to something that can't be described as a tenor with about a one-octave



Michael Rector sees a bright future with son Theodore, born last November, after surgeries tamed his cancer and salvaged part of his vocal cords. Photo courtesy of Michael Rector.

range," Rector said. "I won't be singing Paganini any time soon."

He doesn't sound concerned. He's got his family and can still make music with his ukulele and flute, as well as guitar, piano, and cello, his current favorite.

NEW PERSPECTIVES

For now, Rector remains cautiously optimistic that the radiation and surgeries have banished the disease for good. "We'll continue to watch and wait and hope that the insidiousness of the cancer doesn't rear its head at some point," he said.

Yet he knows that cancer has had a permanent effect on his life. There is his voice, of course. But the lessons go deeper. He talks of gaining a fuller appreciation of his mortality and feeling a connection with others who have faced the same fears he did when confronted with cancer.

"Until you've tasted what it feels like to not know if this is going to be thing that kills [you], you don't know how to talk about that to people," he said.

"From a faith perspective and from a societal perspective [cancer has] given me knowledge that I wouldn't have wanted to have, but I'm glad that I have it now," he added. "I'm a totally different person and better for it. It destroys ego. Ego and cancer are incompatible."

This article originally was published in UHealth Today.

MEDICAL SCHOOL BRANCH IN FORT COLLINS

CU School of Medicine teams with CSU to expand

By Mark Couch

The University of Colorado School of Medicine is in the planning stages of establishing a medical school branch in Fort Collins in partnership with Colorado State University.

The partnership aims to create a training program that builds on the strengths of both universities, joining CU School of Medicine's leading medical education and research programs with CSU's expertise in human, animal, and public health. The partners expect to enroll the first students in the program in 2021.

"We are pleased to forge this partnership with CSU to expand the opportunities for medical education in the state of Colorado," said Donald Elliman, Jr., chancellor for the University of Colorado Anschutz Medical Campus. "Together, we are able to offer an education based on outstanding programs at both campuses and to improve the quality of health care for all in Colorado."

CSU President and Chancellor Tony Frank, PhD, said: "As university leadership, we have long contemplated and discussed bringing together our two world-class medical education programs at CSU and CU. In the last year and half, our teams have worked together on this project, and I am enormously proud of everyone who has worked so diligently to make it a reality."

The CU School of Medicine, based on the University of Colorado Anschutz Medical Campus in Aurora, already has a branch campus in Colorado Springs, where about 24 students per year participate in their third- and fourth-year rotations and education. Each year, the School of Medicine matriculates 184 students into its MD program.

Initial plans for the new branch call for maintaining current enrollment levels in the CU School of Medicine, with the possibility of expansion of the class size in the future.

The first class in the CSU program would include about a dozen students, who would be conducting all four years of their studies on the Fort Collins campus. Eventually, the branch could enroll as many as 48 students per year. Students at the branch would earn medical degrees from the CU School of Medicine.

One of the first tasks is for the CU School of Medicine to hire an assistant dean for its Fort Collins branch. The School also will recruit faculty and prepare the documentation required by the School of Medicine's accrediting body, which must approve the branch before it can open.

Suzanne Brandenburg, MD, professor of medicine at the CU School of Medicine, is coordinating the process of establishing the medical school branch. She has already been working to recruit providers in the Northern Colorado medical community because a successful medical education program will depend on outstanding clinical learning opportunities.

"At the new medical school branch, students will learn in and from the local community alongside other health professionals," Brandenburg said. "With this expansion, we hope to capitalize on the diverse expertise at CSU, to frame health care broadly, instilling in medical students a comprehensive view of our impact on society, considering not just the patient but also communities, populations, and the planet."

Brandenburg also serves as director of interprofessional education on the Anschutz Medical Campus, focusing on educating students across health professions to effectively work in teams and tackle the complex health care problems of patients and society.

CSU and CU have collaborated for many years on health education and research, with partnerships in the Colorado School of



Suzanne Brandenburg, MD

Public Health, the CU Cancer Center, and the Colorado Clinical and Translational Sciences Institute. In addition, several graduates from CSU each year matriculate to the CU School of Medicine.

Mark Stetter, DVM, dean of the College of Veterinary Medicine and Biomedical Sciences at CSU, said: "We're looking forward to working even more closely together to help train physicians for Colorado through this collaboration. There are still an incredible number of details to be worked out, from building out our facilities here in Fort Collins to hiring faculty and assuring that all the programs are accredited and aligned. It's a complex process, but I'm excited to be a part of it."

The process of building out the fourth floor of the CSU Health and Medical Center, opened at the corner of College Avenue and Prospect Street in Fort Collins in 2017, to accommodate classrooms and administrative offices is underway, while the medical school has begun creating the new curriculum. Existing faculty from both CSU and CU will be teaching at the branch and new positions will be hired as needed.

CU ANSCHUTZ MEDICAL CAMPUS LAUNCHES MARKETING CAMPAIGN

Effort features breakthrough achievements of School of Medicine faculty



This fall, the University of Colorado Anschutz Medical Campus begins to tell its story on a national stage.

CU Anschutz and its campus hospital partners, Children's Hospital Colorado and UHealth University of Colorado Hospital, have launched a regional and national marketing campaign titled This Is Breakthrough. The campaign highlights the cross-campus collaboration that improves lives and drives innovation and showcases the physicians and scientists who make the University of Colorado Anschutz Medical Campus one of the country's premier medical destinations.

Chancellor Donald Elliman, Jr., touts the research, innovation, education, and clinical care delivered by the seasoned experts and talented trainees based on the campus. Ensuring the continued growth and success of CU Anschutz depends on cultivating an ecosystem where dynamic collaboration and discovery thrive and in increasing recognition of their accomplishments.

"Here on campus, we know that CU Anschutz is the place to go for the highest-quality health care and health sciences education, delivered by

the best minds in science and medicine," Elliman says. "For more than a decade our campus has been breaking ground on new buildings and recruiting top talent to address the most pressing health issues facing the world. It's high time we share our discoveries and breakthroughs in ways that attract wider public attention to these achievements.

"With this marketing effort, we aim to make the University of Colorado Anschutz Medical Campus name renowned from coast to coast, and our brand synonymous with world-class health science and care," Elliman said.

This Is Breakthrough will spotlight people and stories behind the extraordinary research, education, innovation, and treatments that power the campus. Examples include:

- Evalina Burger-Van der Walt, MD, chair of orthopedics, for her groundbreaking development of new metal-alloy compositions to improve orthopedic implants;
- Terry Fry, MD, professor of pediatrics, hematology, and immunology, and director of cancer immunotherapy, for his work with CAR-T cell



therapy, a process by which a cancer patient's immune cells are extracted, genetically modified and stimulated to recognize tumors and to fight cancer when reinfused them into the patient's body; and

- Naresh Mandava MD, chair of ophthalmology, for his work to cure blinding retinal diseases in conjunction with the department's CellSight collaborative research teams.

The new marketing campaign integrates advertisements in print publications, digital and social media, and television, with outdoor advertising, and a dedicated campaign website where viewers can dive deeper into the passion and tenacity propelling campus discoveries: ThisIsBreakthrough.com.

This Is Breakthrough was developed based on data from brand recognition research, and tailored to bolster CU Anschutz Medical Campus brand

awareness in the general public and with physicians throughout the country.

"We have a remarkable story to tell about the research, education, and care we provide on the Anschutz Medical Campus," said John J. Reilly, Jr., MD, dean of the CU School of Medicine. "This is Breakthrough shares the powerful and inspiring work of our colleagues and serves as an invitation to visionary leaders to join us in developing the innovative care and research that will improve the lives of individuals and communities across the country and around the world."

This Is Breakthrough launched September 30. To learn more about the campaign and the talented members of the CU Anschutz Medical Campus community, visit ThisIsBreakthrough.com.

ALUMNI CORNER

ALUMNI AWARD RECIPIENTS

The School of Medicine honored four distinguished alumni at the Silver & Gold Alumni Banquet during alumni reunion events in May.



Helen Morris, MD '56

Helen Morris, MD '56, received the **Distinguished Achievement Award** for work benefiting the community, the practice of medicine, and the provision of health care, and the CU School of Medicine and Medical Alumni Association.

During medical school, Morris conducted research on starting cultures from single human cells, a key step in subsequent genetic research. As a postdoctoral fellow, she extracted growth hormone from the pituitaries of human cadavers, years before it became

possible to synthesize. This work led to a focus on growth hormone in dwarfism, particularly in asthmatic children treated with corticosteroids.

When Morris attended the CU School of Medicine, she was one of only five women in her class. After graduation, she established herself as a highly sought leader. She served as a member of National Institutes of Health and U.S. Food and Drug Administration advisory panels, was published in books and peer-reviewed journals, and spoke at conferences. She served on the editorial board of the *Journal of Allergy and Clinical Immunology*. As an alumna, Morris supported the School through mentorship and financial support. She established the Helen G. Morris, MD, Endowed Scholarship Fund. CU President Emeritus Bruce Benson named a presidential scholarship in her honor.



Dennis Battock, MD '64

Dennis Battock, MD '64, received the **Richard Krugman Distinguished Service Award** for a career of leadership in cardiology and service to the medical community.

Battock began a longstanding relationship with CU in 1955, after the Denver native's father, CU alumnus Benjamin H. Battock, MD '29, died at age 50 of a heart attack.

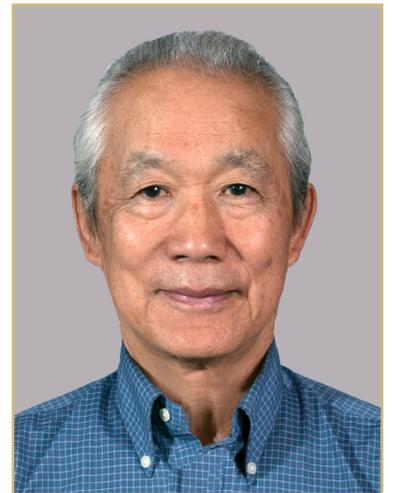
Dennis Battock earned his bachelor's degree from CU Boulder and his medical degree at the CU School of Medicine in 1964. After residency, he completed fellowships at CU in clinical pharmacology and cardiology. He joined the Army, and again returned to Denver to join the CU cardiology faculty.

Battock served at the VA and the CU School of Medicine, and four decades of private practice, before retiring in 2011. In 1987, he formed a cardiac catheterization lab at the Medial Center of Aurora, which performed over 55,000 cases in 30 years. He founded and was president of Aurora Denver Cardiology Associates and the Colorado Heart Institute.

Battock remained involved with the CU Division of Cardiology and has been a director of the Medical Alumni Association Board since 2013 and a leader in his 50th reunion class gift. He and his wife, Jo, established the Dr. Dennis and Jo Battock Endowed Scholarship Fund.

Theodore Ning, MD, was honored with the **Humanitarian Award** for lifelong service to society, extraordinary service to the community, and leadership through global and local service.

Ning completed his urology residency at the CU School of Medicine in 1975. Ning was drafted into the Army and served in Vietnam. He and his wife, Connie, adopted a daughter from Vietnam, and helped found a Colorado adoption agency. During his chief residency year, Ning was involved in Operation Babylift, helping organize 4,000 Denver volunteers to care for 600 Vietnamese orphans evacuated to Denver.



Theodore Ning, MD

In 1988, the Nings created Friendship Bridge, which started as an exchange program for medical and nursing education programs. Eventually, they shifted focus to childhood malnutrition in the rural areas, which then led to women's microcredit paired with education. In 1995, Ning left private practice to devote energy to Friendship Bridge.

He and Connie visited Guatemala and, in 1998, created another women's microcredit and education program that currently serves 25,000 families.

Ning served as a founding board member of the Center for Global Health and was awarded the 2016 Excellence in Global Health Award by the Colorado School of Public Health. He continues to work part-time, and to teach and volunteer.

Kjell Lindgren, MD '02, was honored with the **Silver & Gold Award** for humanitarianism, citizenship, professionalism, outstanding service to the community, and contributions to the art and science of medicine.

Lindgren has had a remarkable career as an emergency physician, flight surgeon, and a NASA astronaut. While he and his family live in Houston, Texas, he remains involved with the CU School of Medicine as volunteer clinical faculty in the Department of Emergency Medicine. In 2018, he

delivered the keynote address at graduation and spoke to incoming medical students at the matriculation ceremony.

Lindgren served as a flight engineer for Expeditions 44 and 45 on the International Space Station in 2015, logging 141 days in space and two space walks totaling more than 15 hours, and taking part in hundreds of experiments. He took his CU School of Medicine white coat with him to space, wore it aboard the International Space Station, and presented it as a special gift to the School, where it is now on display.

In 1998, Lindgren matriculated to the CU School of Medicine, and authored two peer-reviewed articles, two book chapters, and five abstracts during his tenure.



Kjell Lindgren, MD '02

HOST PROGRAM

The Medical Alumni Association's **HOST (Help Our Students Travel) Program** invites alumni to host fourth-year medical students for a night or two during residency interviews. Alumni volunteers may offer advice to students about residency training, prospective medical centers, and the communities in which students are interviewing.

If you would like to host a medical student, please contact the Office of Alumni Relations at 303-724-2518 or email healthalumni@cuanschutz.edu.

FLORENCE RENA SABIN AND JOSEPH ADDISON SEWALL AWARDS

The Medical Alumni Association congratulates two CU alumni awardees honored during commencement activities in May.

Lilia Cervantes, MD '05, received the Florence Rena Sabin Award, which recognizes individuals outside of the university who have made exceptional contributions to the CU Anschutz Medical Campus or the health of the citizens of Colorado. Cervantes was recognized for her health policy research, which prompted state leaders to change policy allowing undocumented immigrants access to scheduled dialysis when suffering from end-stage kidney disease.

Mark Earnest, MD, PhD '01, received the Joseph Addison Sewall Award, which recognizes exceptional contributions of leadership and vision to the CU Anschutz Medical Campus. Earnest was recognized for founding the Leadership, Education, Advocacy, Development and Scholarship (LEADS) track of the medical training program, and founding the nationally renowned Interprofessional Education Program, recognizing that the best patient care is provided by teams of collaborating professionals.

MATRICULATION & WHITE COAT CEREMONY

On Friday, August 9, the 184 members in the medical school class of 2023 received white coats and stethoscopes at the annual Matriculation and White Coat Ceremony. Alumni and Medical Alumni Association board members distributed Littman Cardiology IV stethoscopes to the incoming students. If you are interested in donating and handing out a stethoscope to incoming first-year medical students, please contact Vanessa Duran at 303-724-2517.

ALUMNI REUNION CELEBRATES THE CLASS OF 1969

The CU School of Medicine Alumni Association hosted the annual Alumni Celebration and Reunion for class years that ended in a 4 or 9. Alumni connected with each other and the university in events including tours of campus, the 1883 Society Breakfast, 50-year class breakfast, and class dinners and receptions at the Denver Country Club and Halcyon Hotel.

Twenty-four members of the class of 1969 attended. As part of its 50th reunion celebration, classmates raised more than \$70,000 to support scholarships for incoming medical students.

Nearly 300 guests attended the annual Silver & Gold Alumni Banquet at the Hyatt Regency Aurora-Denver, across Colfax from the CU Anschutz Medical Campus.

Save the date: The Medical Alumni Association will host the 2020 Alumni Reunion and Celebration May 21-22, featuring events on and off campus for all CU School of Medicine alumni, residents, interns, fellows, and faculty.

Class years ending in 0 or 5 will celebrate class reunion dinners for classes through the year 2000. A separate event in the fall will bring together members of the classes of 2005, 2010, and 2015. If you are interested in helping with the reunion, please email healthalumni@cuanschutz.edu.

FORMER DENVER BRONCO BECOMES HEALER

David Bruton wants to help young athletes get back in the game

By Chris Casey



David Bruton enjoys a conversation with a classmate while eating lunch at the start of one of his physical therapy courses in Education 2. Photo by Chris Casey.

In many ways, the current chapter of David Bruton, Jr.'s, life runs counter to his first career as a strong safety and Super Bowl 50 winner in the National Football League.

Where he once suited up in raucous NFL stadiums, Bruton now practices massage techniques in serene settings. Where he played a violent game on rapid-fire instinct, he now takes a thoughtful, analytical approach to evaluating the varying needs of each individual. Where his former employer, the Denver Broncos, expected him to dish out punishment, Bruton's new mission is to become a licensed physical therapist so he can relieve pain and help young athletes get back in the game.

Bruton spent two years completing prerequisites at CU Denver and is now in the second semester of the Doctor of Physical Therapy Program in the CU School of Medicine. The 32-year-old Ohio native played for the Denver Broncos and a final season with the Washington Redskins; the eight-year span was four times longer than the average NFL career.

Bruton frequently volunteers to be the "patient" in class or lab – offering up his shoulders or triceps for exam and evaluation.

Michael "Mac" Mundie, a classmate of Bruton's, enjoys having the former pro athlete in the 69-member PT cohort. "It's definitely interesting working with him—just seeing what his body has gone through in all those years with the Broncos. It makes labs more interesting," he said.

Bruton sat down for an interview in Education 2, his home away from home these days.

"A contributing factor was the relationship I built with UHealth during my tenure with the Broncos. I knew about their state-of-the-art facilities as well as the different professional disciplines that are on the CU Anschutz Medical Campus, and how we would basically be learning from different professionals. That was a big driving force."

Your physical therapy program at CU Anschutz is a departure from playing football. Did you have a turning point where you realized you wanted to retire from pro football and pursue a new career?

In high school, I thought about becoming a physical therapist. Having multiple encounters with different PTs throughout my football career ... kind of drove it home. I definitely had my share of concussions ... I don't remember having them at all. The last concussion (with the Redskins) was definitely like an 'a-ha' moment. I realized I have so much more to look forward to ... and I didn't want to worry about hurting myself to the point where I couldn't pursue another career.

Pro football takes a physical toll, and the unexpected retirement of Andrew Luck, the Indianapolis Colts quarterback, is another example of a star player stepping aside to avoid further injury. What were the physical demands like in the NFL?

In my rookie year, I felt like I was in the training room 24-7. When I started in the league, we didn't have limitations on training camp; they could have us out there for two-a-days in full pads. Nowadays, you have a padded practice, and then your second practice is a walk-through type of thing. They've made some strides ... Still, I definitely had bumps and bruises—just constantly waking up and having to find a way to grind out every single day.



David Bruton plays Spike Ball with classmates, from left, Spencer Frenchman, Michael Mundie and Tanner Whaley at Boettcher Commons.

You just started your second semester in the CU Physical Therapy program. What are you currently studying?

Now, compared to the prerequisite courses, it's more focused on what I want to do. Anatomy took up basically all of our lives in the first semester this summer. This semester, the classes, like neuroscience and human growth development, build on that and pertain to my second career.

What do you enjoy about the program?

I enjoy how we get to problem-solve on a daily basis. No matter the class, we have to use some form of clinical reasoning as to how we arrived at prescribing a certain treatment, or why we'd use a certain modality, or what muscle tests we'd recommend. Of course, there's a lot more to learn here. They do a great job of making sure that what we're learning in one class is being reinforced in another class.

What's the hardest part of your studies so far?

I struggle a bit with the ICF model (International Classification of Functioning, a framework for describing functioning and disability in relation to a person's health condition). You're interviewing a patient, but also remembering that you have all these different components to try to pull out (about their unique environment, activities, etc.) in a certain amount of time.

Why did you choose CU for your academic program?

A contributing factor was the relationship I built with UHealth during my tenure with the Broncos (UHealth is the official health care partner of the Denver Broncos). I knew about their state-of-the-art facilities as well as the different professional disciplines that are on the CU Anschutz

Medical Campus, and how we would basically be learning from different professionals. That was a big driving force. I also have to think about my family (a fiancée and three children), and having the campus closer to home is a bonus.

Also, the professors are very welcoming. They have an open-door policy. They'll dive into any type of question we have during class. We get to learn a lot more than just what's in the textbook—it's very engaging. Also, the second- and third-year (students) are helping to guide us. Everyone is invested in you. They care about you and your well-being and your success.

You were a three-year captain of the Broncos' special teams and winner of the team's Walter Payton NFL Man of the Year Award in 2015. Have you found an outlet for your leadership skills here at CU Anschutz?

I haven't run for any class council because I have to give time to my family. There are instances in my classes or study groups where I do take the leadership role. We found out what our learning styles are, and mine is an initiator. So when we have an ICE (Integrated Clinical Education) clinical—our first one is coming up, and we're in a group—we're going to see how our different learning styles interact and see who's going to take the leadership on certain things.

What do you envision for your career after graduation in December 2021?

I want to focus on concussion and vestibular rehab, but in a sports-type setting, tailored toward young athletes. I'd like to bridge that gap between the whole family—the child athlete and their parents—and a neurologist or whatever specialist they may get referred to.

THANKING THE BEST TEACHERS – PATIENTS

By Kyle Leggott, MD



Kyle Leggott, MD

In June, I graduated from the University of Colorado Family Medicine Residency program. As those years of training came to an end, I began a process that every doctor goes through at some point: saying goodbye to my patients.

Unexpectedly, this was one of the most difficult experiences of residency for me. Some of my patients had been with me since my first few days after medical school. For many of them, being their primary care physician meant I had been their main connection with the health care system for three years.

When I let the first few patients know I was leaving, I told them that it had been a pleasure to take care of them and that they would be in good hands when the next resident took my place. Some thanked me, others were upset I was leaving, and some were worried about what would happen to them once I left.

I left those encounters feeling emotionally exhausted and unsatisfied with the exchanges. I couldn't put my finger on why, but I knew I hadn't conveyed my thoughts and emotions when saying those first few goodbyes. After seeing two of my oldest patients, a medically and socially complex couple I had taken care of for three years, it clicked. I told them thank you.

Thank you for smiling with me and letting me share in your success when you overcame an illness or disease.

Thank you for crying with me when sometimes that illness or disease got the better of us.

Thank you for sharing your most intimate fears and worries in the office and hospital.

Thank you for understanding when I didn't know an answer or needed help.

Thank you for trusting me to make decisions and recommendations on your health and well-being.

Thank you for teaching me how to navigate difficult conversations and talk about life and death.

Thank you for letting me place my stethoscope on your chest and hear a murmur for the first time.

Thank you for allowing me to perform invasive and uncomfortable procedures, sometimes for the first time.

Thank you for helping me grow as a physician and healer for the past three years. There was no better teacher than you, my patients.

The road to becoming a practicing physician is long: four years of medical school followed by at least three years of residency training. We spend countless hours in lectures, read innumerable textbooks and research articles, and take myriad exams.

Throughout our medical education, we have amazing physicians who act as educators, mentors, and supervisors. But it is our patients who are the best teachers. They help us take all our book knowledge and put it into context with what we experience in the exam room. It is through their shared experiences, their illnesses and their diseases that we become physicians.

During the course of three years, every family medicine resident will see at least 1,650 patients in clinic, 750 patients in the hospital, 250 patients in the ER, 250 children in the hospital, 250 children in clinic, and many more. We see thousands of patients in three years; this is how we learn.

There is no lecture that will teach you how to feel whether an anterior cruciate ligament is torn, but after working in a ski clinic for a month and taking care of dozens of patients with knee injuries, the exam maneuvers become muscle memory.

You cannot learn from a book how to talk to a patient and their family during their darkest moments when their health is failing.

There is no substitute for caring for patients and learning from them.

So, for every patient who has been a part of my medical training for the past seven years, thank you. You've taught me more than I could have imagined and made me into the physician I am today.

Kyle Leggott, MD, is a family physician doing a fellowship in health politics and policy at the University of Colorado.

This column was originally posted in the AAFP Fresh Perspectives blog in August 2019.

GUN VIOLENCE: WHAT ARE WE TO DO?

By Shale Wong, MD, MSPH

In the United States, a gun is used to kill a person every 14 minutes. This means 100 people every day die from gunfire including four children under the age of 17. We've experienced more than 250 mass shootings in 2019. Most recently, 31 lives were lost in two separate tragic events in El Paso and Dayton just 13 hours apart. With statistics like these and the frequency of media reports, there is a growing normalcy to this violence that is numbing. We defend ourselves from the sheer horror and also turn our backs feeling incapacitated to respond.

But as health professionals, the action of turning away defeats the oath that we have taken to heal and do no harm. While perhaps understandable that an event occurring outside our own neighborhood is beyond our reach for immediate response, we have too frequently been the first responders and we are the community who stands at the ready for the next horrific event. And there will be a next event, especially if we are passively waiting and steadying ourselves rather than taking steps to prevent another tragedy.

I, for one, have grown tired from the tears, nausea, and nightmares I experienced after Newtown, as well as the anger and utter frustration at the lack of Congressional action in the wake of every subsequent tragic event. Rather than malaise, I am fueled with motivation to do everything that can be done to change this course of events. I am a pediatrician, a policy researcher, and physician advocate. I am a mom, a mentor, and a neighbor. And I am not alone, for there is much to be done.

Earlier this year, the Farley Health Policy Center published a policy brief, *Protecting Colorado Youth from Gun Violence*, focusing on the protection of our youth through strengthening gun safety legislation. The brief articulates Colorado's gun violence problems and solutions within the broader national

context. Our brief does not argue for an individual policy change but rather advocates for a package of policies that present imminently doable actions to be taken at the state level that together will increase safety and decrease deaths without impacting lawful gun ownership.

In the simplest of terms, there are many policy options available, each intended to achieve different, impactful outcomes. Banning assault weapons and eliminating sales of bump stocks that weaponize guns into high capacity firearms are methods of decreasing the potential and potency of mass shootings. Background checks are intended to monitor and limit gun possession from those who may be deemed unsafe to responsibly handle a lethal weapon, thus decreasing suicide and homicide—risk to self or others. Safe storage laws protect curious children from accidental injury and adolescents from high-risk or impulsive behavior, and in each case, potential deaths.

Discussing these potential solutions with policy makers, community leaders, and other decision-makers is just one way to face gun violence head on. It offers an entry point to collaboration and an opportunity to inform and take action.

The Farley Center is positioned on the Anschutz Medical Campus to translate and help researchers bring their data and evidence into actionable steps and to influence policy development. We drill down and analyze data to understand the impact of current policies

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and better understand the disparities across populations that are a result of structural and systemic inequities. Our mission is to inform evidence-based policy development that promotes integrated care to achieve whole health—physical, behavioral, and social. Urgent issues require timely, thoughtful, and impactful action. We are eager to organize and support campus-wide efforts to lead policy and systems reform. Firearm research and policy is but one social issue that we prioritize.

Gun violence is only worsening with daily inaction. As health professionals, together we are stronger when we channel the science and our experience into workable, evidence-based solutions. It is our collective professional and community responsibility to act.

Shale Wong, MD, MSPH, professor of pediatrics and family medicine, is the director of the Eugene S. Farley, Jr. Health Policy Center and serves as the vice chair for policy and advocacy in the department of pediatrics.

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- Robert A. Rymer, MD, & Marilyn M. Rymer, MD



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