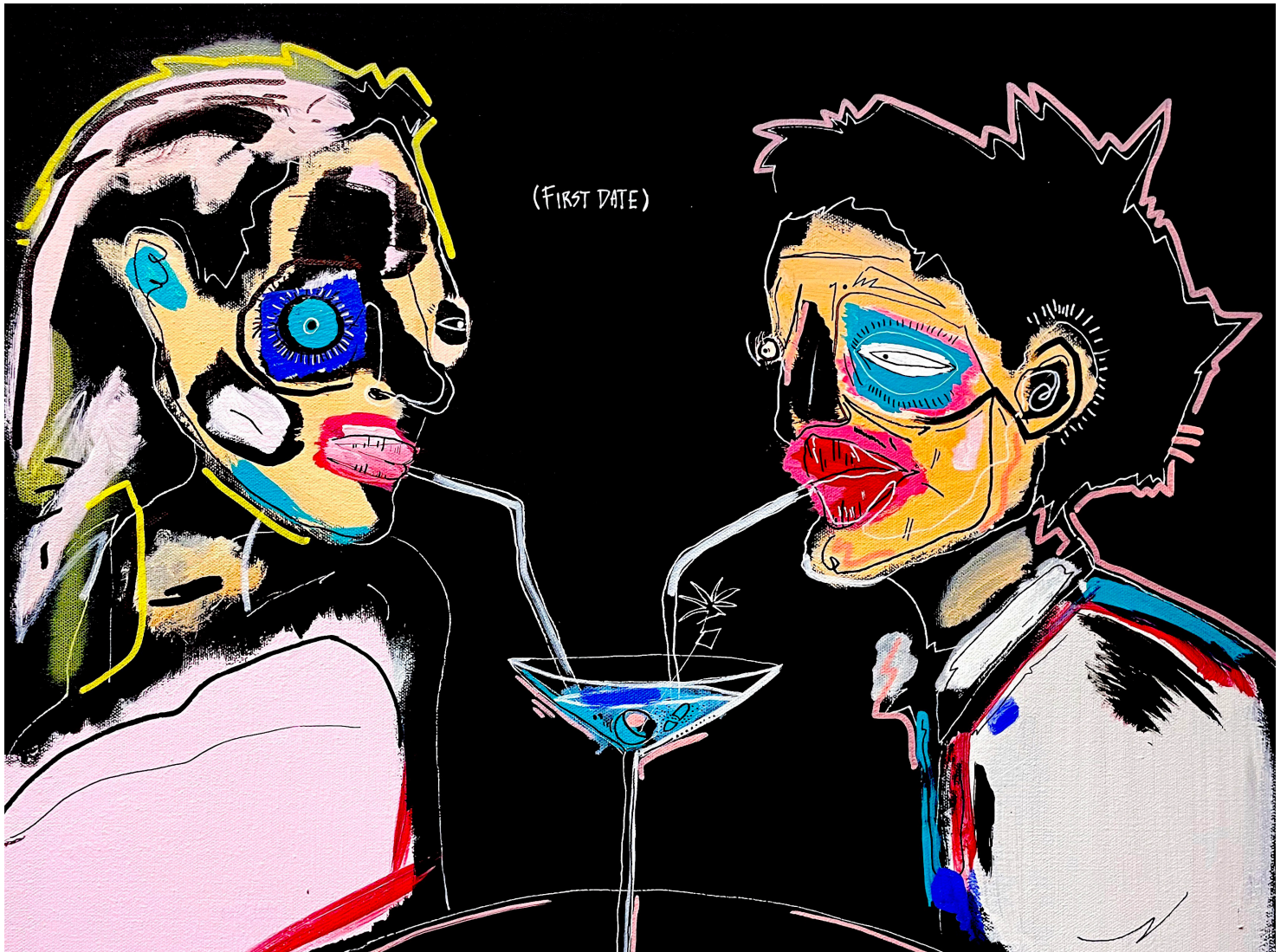


UCLA

RADIATION ONCOLOGY JOURNAL



"First Date" Eric White

2023 Residents

The newest faces in the Department of Radiation Oncology at UCLA.

Medical Student Preceptorship

The program and our two current medical students.

Erik White

His art and Venice revelry.

VALOR

An update with Dr. Drew Moghanaki.

5DCT: Clinical Experiences and Future Directions

The effort to replace 4DCT with 5DCT as the standard of care in radiation oncology.

True Grit: 1923 to Today

A woman through the eyes of her daughter and the meaning of "grit."

Erin Hoover

The author of two poetry collections, *Barnburner* (2018) and *No Spare People*, and our featured poet.

A Patient's Journey

Keith Payne gives a firsthand look into the patient treatment journey at UCLA Radiation Oncology.

At the Beam

The UCLA Radiation Oncology created podcast that you need.

Summer: Residency Update

The latest from our residents.

Awards, Grants, News

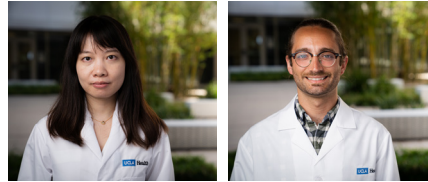
The latest in awards, grants, publications, and news.

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The newest faces in the Department of Radiation Oncology at UCLA.



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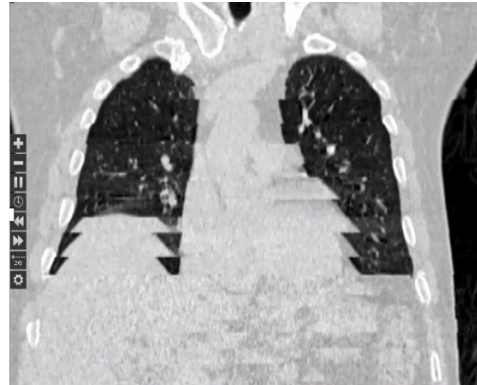
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5DCT: CLINICAL EXPERIENCES AND FUTURE DIRECTIONS

The effort to replace 4DCT with 5DCT as the standard of care in radiation oncology.



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Chairman's Letter

Dear All,

UCLA Health has long been a model for innovation and quality of care. It is no wonder that we consistently graduate exceptionally talented students, residents, and fellows as we endeavor to train and mentor the next generation of physicians and medical physicists through our residency programs.

In this issue of the *UCLA Radiation Oncology Journal*, we introduce our incoming class of brilliant Radiation Oncology and Medical Physics residents, as well as two talented medical students in our Medical Student Preceptorship.

Winston Churchill wisely shared an aspect of one's career journey that is often overlooked in the impatience of youth. He said, "The definition of success is going from failure to failure without significant loss of enthusiasm."

I agree with Churchill's sentiment, and I know our incoming class of trainees will take it to heart as they understand that from time to time the process of learning and discovery involves failure, little and not so little. It is through those failures that breakthroughs will come and they will come to know that it is the work that sustains you.

Be well and stay safe,

Michael Steinberg, M.D.
Professor and Chair



[@MSteinbergMD](https://twitter.com/MSteinbergMD)



NEW MEDICAL RESIDENTS





TRAVIS COURTNEY, MD, MS

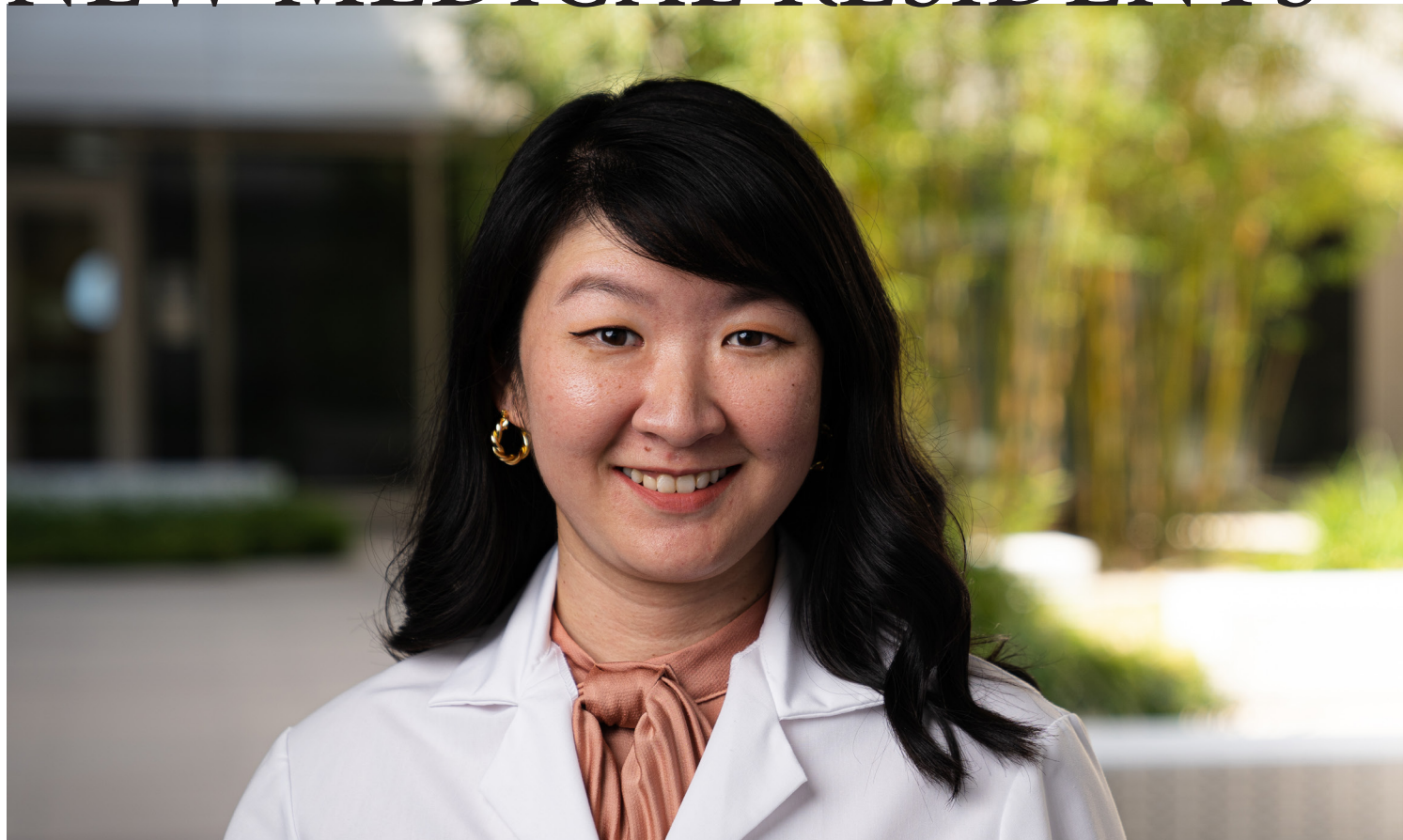
Dr. Courtney is originally from Cincinnati, OH. He attended Vanderbilt University in Nashville, TN, and received his bachelor's degree in Neuroscience and Spanish. Dr. Courtney attended medical school at the University of California, San Diego School of Medicine. Between his third and fourth years of medical school, he obtained a Masters of Advanced Studies degree in Clinical Research through UCSD. During this time, he also conducted research on clinical outcomes and racial disparities in prostate cancer, as well as cost-effectiveness analyses in a variety of cancer treatments. Prior to joining the UCLA Radiation Oncology Residency Program, he completed his preliminary year in Internal Medicine at Cedars-Sinai Medical Center in Los Angeles, CA.



JESUS JUAREZ, MD

Dr. Jesus Juarez was born in Queretaro, Mexico, and raised in Northern California. He attended the University of California at Davis and received his bachelor's degree in Genetics. He then pursued his medical training at the David Geffen School of Medicine at UCLA and the Charles R. Drew University of Medicine and Science. While in medical school, Dr. Juarez completed his master's thesis in the Department of Immuno-Oncology at City of Hope National Cancer Center where he researched the immunosuppressive role of macrophages within the tumor microenvironment in triple negative breast cancer. He received a Conquer Cancer Foundation Fellowship to study disparities in prostate cancer among Black men. Dr. Juarez completed a year of preliminary training in Internal Medicine at Kaiser Permanente and is excited to be continuing his training in Radiation Oncology at UCLA.

NEW MEDICAL RESIDENTS

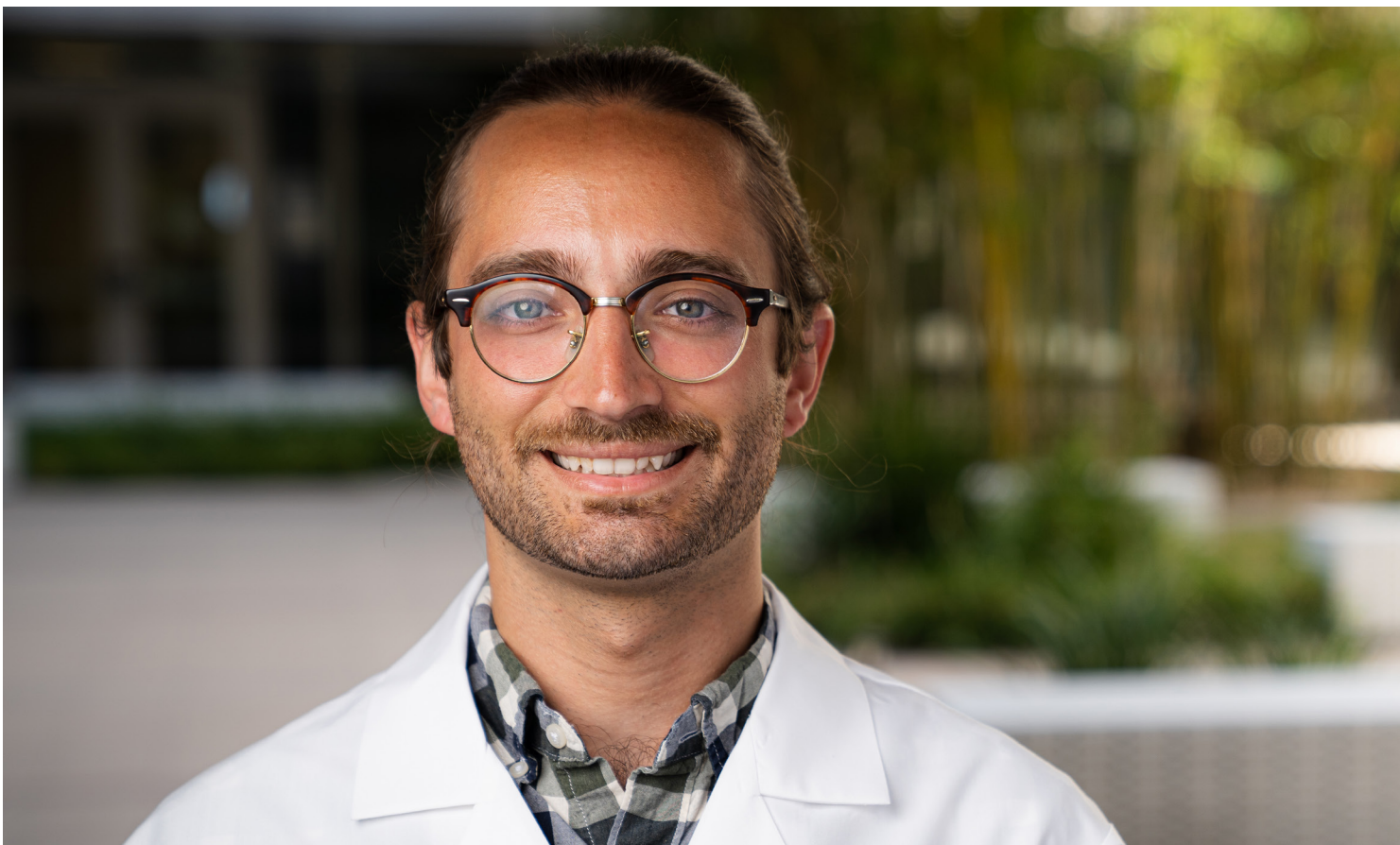




EULANCA Y. LIU, MD, PhD

Hailing originally from the San Gabriel Valley of Southern California, Dr. Liu received her Bachelor of Science in Chemical Biology from UC Berkeley, with a minor in Global Poverty and Practice from the Blum Center for Developing Economies. She then completed her medical training as part of the T32 Medical Scientist Training Program (MD/PhD) at UC San Diego. Her PhD work in the Neurosciences Graduate Program focused on testing noninvasive, quantitative functional neuroimaging methods to better understand the working human brain, and was in part funded by an NIH/NIMH F30 training grant. After completing her MD, she stayed in San Diego for her Transitional Year internship at Scripps Mercy Hospital, where she was elected to the Transitional Year Program Evaluation Committee and the Residency Advisory Committee. She is now most excited to be back in Los Angeles to start Radiation Oncology training at UCLA.

NEW PHYSICS RESIDENTS





YI LAO, PhD

Dr. Yi Lao completed her PhD in Biomedical Engineering at the University of Southern California. Her PhD work focused on developing mathematical and numerical tools for brain structural and diffusion MR imaging processing and applying these tools to analyze different types of brain abnormalities. After completing her PhD, she took her postdoctoral training in the Radiation Oncology department at Cedars Sinai medical center and UCLA. Her postdoctoral work involves a wide variety of research topics, including early cancer imaging biomarker development, quantitative tumor resectability and treatment response characterization, localized recurrence prediction, surface dose modeling, as well as automatic treatment planning.



MICHAEL LAURIA, PhD

Dr. Lauria, originally from Rochester, NY, earned his BS degree in nuclear engineering at Purdue University while researching bioelectrics. He joined the Physics and Biology in Medicine Graduate Program at UCLA to study medical physics. His PhD work under Dr. Low focused on fast-helical, free-breathing CT and its potential applications within radiotherapy and pulmonology, including motion compensation in cone-beam CT reconstruction, ventilation mapping, and computational fluid dynamics modeling. As a medical physics resident, Dr. Lauria's primary interests include motion management, adaptive radiotherapy, and helping to bring novel research topics to the clinic.

MEDICAL STUDENT PRECEPTORSHIP



Photo Credit: Kevin Shamugam

When Dr. Amar Kishan and the Department of Radiation Oncology created the Medical Student Preceptorship, the goal was to help address the persistent underrepresentation of women and racial and ethnic minorities in the field of Radiation Oncology. The program, in its second year, provides a mentored clinical and translational research experience, exposure to clinical Radiation Oncology as it is practiced at a tertiary academic center, and career development advice and guidance. Designed for US Medical School Students with a commitment to efforts fostering workforce diversity in healthcare, the UCLA Radiation Oncology Medical Student Preceptorship provides a support stipend with the expectation that the recipient will devote at least thirty-five hours per week to activities related to the preceptorship. All students must identify an attending physician in the Department of Radiation Oncology who will serve as a primary mentor during their preceptorship. Though the student may work with other mentors, the primary mentor is responsible for ensuring that the student has identified an appropriate academic project (commensurate with the timeframe of the preceptorship) and is responsible for providing sufficient guidance and supervision to allow completion of the project. It is required that the mentor and the applicant draft a research proposal, outlining clinical and academic activities, as part of the application for this preceptorship. The mentor is also responsible for facilitating clinical exposure for the student. Finally, the mentor is encouraged to provide career guidance. Our current two medical students for the Summer 2022 Medical Student Preceptorship are Nicki Karimi-Mostowfi and Wisdom Akingbemi.

NICKI KARIMI-MOSTOWFI

Q: When did you become interested in medicine?

N: My mom was the first person to get me involved in medicine. She was an Iranian foreign grad and had me around the time she was applying to residency, so I saw so much of the process from a young age. I would go to work with her and sit at her multi-headed microscope, listening to her describe slides to me and explain what I was seeing. Her love of medicine was a huge inspiration.

Q: Does your mom still work in medicine? What does she think about you picking up the baton?

N: Yes, she does. In some ways, it does feel like she is passing the baton. That said, I hope there's overlap between both of us being full-fledged physicians, but regardless I'll be using her as a guide for the rest of my life.

Q: How did your upbringing, if at all, influence your education/career path?

N: More than anything, education is something my family stressed. My parents, having come to the US with nothing but their education, believed that it was massively important for their children's future, and I agree. They never pushed me to go into medicine; they simply encouraged me to get a good education and follow my interests--a career path, they said, would follow that. And it did.

Q: You talked mom--what does your dad do and how did that influence your trajectory?

N: My dad is a computer scientist, and while my mom was the first to get me involved in medicine, my dad was there encouraging me

every step of the way. Me getting into medical school was as much my accomplishment as his--he would spend hours researching medical schools, looking at what they were looking for in an applicant, and compiling everything in numerous excel sheets. I can never thank him enough for everything he did to help me with the process. While he himself didn't go into medicine, it was always something that he regretted, so when I showed interest, he backed me full force.

Q: What do you hope to glean/gain from the UCLA Radiation Oncology Medical Student Preceptorship?

N: To learn more about the specialty of Radiation Oncology and see if it's something that I could pursue after medical school. I'm also excited for the two projects I'm currently working on, as well as writing whole papers/chapters from start to finish. The work is challenging but will help me grow as a scientist.

Q: What are the topics of the papers/chapters you are writing? Do you plan on submitting them to any journals?

N: I'm writing a paper that examines racial/ethnic disparities in older adults pre and post breast cancer diagnosis with respect to their Health-Related Quality of Life. The chapter I'm writing is a review/guide on MR-guided radiation of the liver--a technology that has been used more and more in the last few years but is still a relatively novel treatment. And, yes, I plan on submitting both for publication.

Q: Who are you most looking forward to training with while in UCLA Radiation Oncology?

N: My preceptor, Dr. Ann Raldow. She's a great teacher and collaborator. Her guidance has been instrumental.

Q: Dr. Raldow is fantastic. How did you two connect? Was there a pivotal moment that determined this connection.

N: She truly is. I had heard that she worked with medical students on projects and connected over Zoom to see if this was something we could do. Her passion regarding Radiation Oncology and her willingness to be a mentor is so encouraging. She was integral in my pursuit of this program.

Q: What diagnosis/treatment site and/or treatment technique are you interested in learning more about?

N: One of the projects I'm working on is a chapter regarding MR-guided radiation of the liver. Last week, I knew literally nothing about that, and it's been so interesting reading about it and the other technologies that have evolved to lead way to that. Radiation therapy has come such a long way and seeing where we came from, what the treatments currently are, and what is being worked on for the future is fascinating.

Q: What do you think you will carry from UCLA Radiation Oncology back to your program in Pennsylvania?

N: The skills I'm learning--how to review literature, write papers, create figures, and analyze data-- are important for any physician to know, seeing as medicine is a field that's always evolving and one that requires us to stay up-to-date on new studies and data that are being published. I also know for sure now that

I want to shadow more Radiation Oncologists at Temple and look into it as a specialty. □



Photo Credit: Kevin Shamugam

WISDOM AKINGBEMI

Q: Are you the first member of your family to wade into medicine or is there a family member either in Nigeria or here in the U.S. who works in the industry?

W: Growing up in Nigeria, I had an incredible example in a cousin who trained in Nigeria. Unfortunately, he had to start medical school all over when he eventually moved stateside. His persistence to pursue his dreams provides me with little excuse no matter how tough things may seem.

Q: What do you hope to glean/gain from the UCLA Radiation Oncology Medical Student Preceptorship?

W: With the Summer Preceptorship, I am hoping to get valuable experience in research and clinical medicine from the residents and attending. I want to gain the ability to determine when to apply different treatment options—radiation, surgery, and chemotherapy.

Q: A requirement of the Preceptorship is pairing with a physician mentor within the department prior to application. How did you pursue this mentorship? Who did you match with?

W: I was able to meet with Dr. Raldow and Dr. Kishan prior to my application. While I was open to research in any cancer site, I was drawn to the different natures of the projects they both had in mind. I am currently working on a quality of life/patient-reported outcome data research with Dr. Raldow as well as a dosimetry project with Dr. Kishan. I have learned so much and hope to continue learning as I work with them.

Q: What diagnosis/treatment site and/or treatment technique are you interested in learning more about?

W: I have already gotten to see the SBRT and IMRT in use. I do hope to see a Brachytherapy session while I'm here.

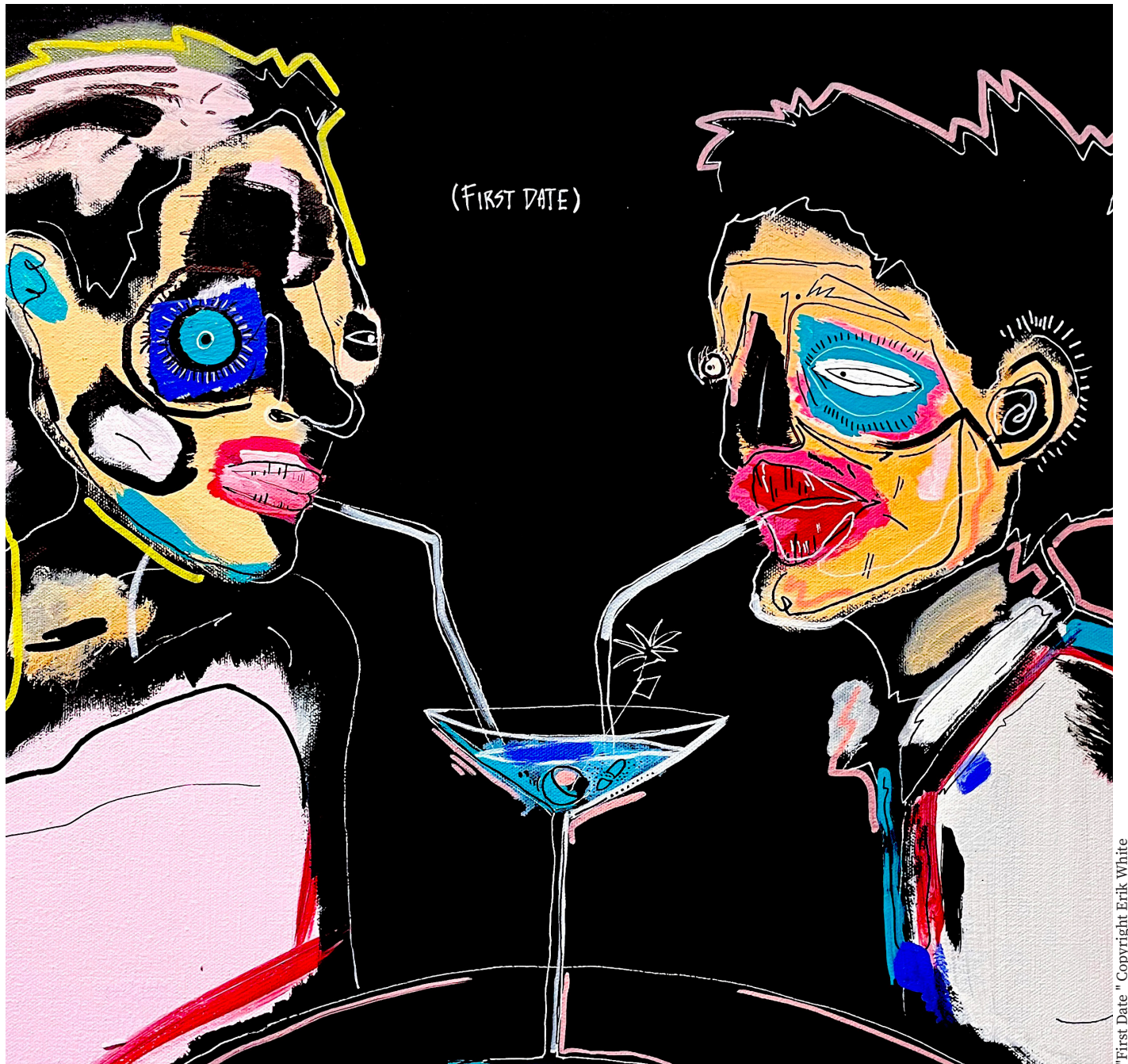
Q: Dr. Albert Chang is the Director of Brachytherapy Services. Dr. Chang and his team do exciting work. I'm sure observing one of their cases will be a signal experience.

Do you foresee a future in Radiation Oncology?

W: I do see myself in Radiation Oncology. I'm starting to differentiate between the big three divisions in oncology: radiation, medical, and surgical. A lot of things about radiation oncology are compatible with what I want in medicine—the capacity for ground-breaking research, the opportunity to positively impact the treatment of patients, and the chance to be a member of a comprehensive cancer team. □



Photo Credit: Kevin Shamugam



ERIK WHITE'S VENICE REVELRY

“Just because I’m Black, have long hair, and paint doesn’t mean I’m like Basquiat,” Erik White says. “Don’t forget the modeling,” I add. He stares at me with his innocent babe-in-the-woods openness for a moment before he laughs.

We are talking about Jean-Michel Basquiat, the French-Haitian Neo-Expressionist who electrified the New York art scene in the early-1980s. And while White's "graffiti cave paintings" seem similar at first blush, and while he has been called "the new Basquiat," White wasn't aware of Basquiat's work until he was in his 20s and his mentor, the Maryland scenic painter Patrick Henry, pointed out the similarity by introducing White to his work. While White could recognize Basquiat's seemingly cool lifestyle and appreciate the Black culture issues Basquiat painted within, White has never seen his race or gender as important to his identity or art (for example, White did not create a single painting about Black Lives Matter). Like many of White's generation, he has turned his back on labels and norms, on politics, and the way he paints reflects the Neo-Utopian hope his generation holds for social and polyamorous acceptance on a universal scale. Plus, White was more interested in skateboarding than art until he was in his late-20s.

Born in Salisbury, Maryland, in 1988, his Polish mother was a social worker while his Black father was a Frito Lay driver/stocker. His siblings and he were athletes, and White took to skateboarding at a young age. A high school teacher enrolled him in the Visual and Performing Arts (VPA) High School Program where his sense of visual play and experimentation was fostered and enhanced. College wasn't a viable option beyond two years of community college; the expense seemed absurd and selfish. Instead, he picked up tips from every artist he met. By his mid-20s, his most relevant artistic influence had become Ralph Steadman, the gonzo artist widely known for his works in and on the covers of Hunter S. Thompson's books. White loves the looseness of Steadman's work, but most enthralling is to be able to visually read the meaning or story behind each piece of Steadman's documented moments and journeys.

The influence is evident, and White's travails through his 20s are a bit gonzo. While living in Florida, he traveled to New York City's Museum

of Modern Art, his first time in a museum. He was influenced by the work of Jackson Pollock and TAFE, by Ed Templeton's Toy Machine and other skateboard artists. He moved to San Francisco to work in the marijuana industry while continuing to make art, but was arrested while visiting family in Maryland; marijuana wasn't yet legal in Maryland and he was carrying. But this, like a novel's plot twist, was how White's life began to revolve solely around his art.

While White was serving jail time for the aforementioned arrest, his mother happened to attend an art exhibition. She showed the curator images of his work that she had on her phone. The curator encouraged White's mother to have him submit work for a juried exhibition, which he won. The prize was a solo exhibition, his first. By this time, he was on probation and required to work full time, but no one would hire him unless he cut his dreadlocks. His father suggested that he focus on selling more of his paintings, that making art could be his full-time job as long as he was reporting all of his earnings to the IRS.

Finding Venice, California, in his late-20s is what solidified White as a working artist. After a stint of couch surfing, he began to make a decent living painting. Finding Venice was finding his muse, finding the epiphany moment. For White, everything is part of his art: his skateboarding, friends and strangers, the modeling he does when he needs to step away from painting for a bit to recharge, and visiting his seven-year-old son in Maryland, dreaming of the day when his son is old enough to spend an extended period with White in Venice, learning to skateboard and to love the eclectic.

Each element of White's life comes into focus when he paints. As yet, he does not have gallery representation, so he relies on his 19K Instagram following as well as nearly-daily networking in person in Venice and Los Angeles. The networking has become another element in his art; it is common to see revelry in his work, painted both as a fun activity and as a dark excessive pastime a character may wish to exit.

I Can't Wait For the Weekend to End is an example of the dark side of revelry, how the workweek can become a respite from the weekend, how there are those who feel pressured to continue to be out or fear missing out. He will often write down snippets friends say or that he overhears, knowing the inclusion of a voice in a painting will make more imperative that moment. Because that is what White does: he documents, as Steadman did, the lives around him, the moments those not of the Millennial Venice culture might not know about.

First Date is the dichotomy of shallowness and intimacy a polyamorous and Millennial Venice embodies; everyone is always on a first date. White admits this isn't a 100% accurate statement; several of his closest friends balance revelry and skateboarding with raising families and working more traditional jobs or owning high-end artisan companies. But even White's largest and most intricate works aren't able to encompass all of Venice, which is what drives him to continue to document, to paint.

Venice, viewable on White's Instagram, is one of his truly "Venice Muse" works. Lines represent the sun's blinding glow off the tops of buildings, a palm tree represents what is most visually stimulating and important, and the combination of Pollock-style drips/splatters and his use of hyper-colors blended, marked, and marred in his "graffiti cave painting" style on his oft-used black background elicit the electricity and eccentricity he is living while documenting.

His works sell from \$100 to \$9,000. The large gap is due to making simple 16x20" of palm trees and other simpler imagery so that even college students might afford his work for their dorms. He calls these pieces his "print paintings," made very much in an Andy Warhol Factory style of creating multiples simultaneously. The majority of his work, however, is in the \$2,000-5,000 range. He can be found on Instagram @lurker_ □

Contributed by: Ciara Shuttleworth

Ciara Shuttleworth is an alumnus of the prestigious San Francisco Art Institute. She has worked for three prominent San Francisco fine art galleries. Additionally, she has provided art consulting for private and corporate collections, including Google. She is also a published writer with works in the *Norton Introduction to Literature* and *The New Yorker*. Her most recent book is the poetry collection, *Rabbit Heart*.

Artwork © 2022 Erik White



"I Can't Wait for the Weekend to End." Copyright Erik White

OPTIMAL TREATMENT FOR STAGE I LUNG CANCER

“This may be one of the most difficult and most important clinical trials in lung cancer”

A clinical trial comparing treatments for stage 1 lung cancer, the largest lung cancer treatment study ever, has enrolled its 200th participant.

The Veterans Affairs Lung Cancer Surgery or Stereotactic Radiotherapy (VALOR) trial aims to discover whether traditional lung-resection surgery or Stereotactic Body Radiation Therapy (SBRT) is best for treating stage 1 non-small cell lung cancer.

“This may be one of the most difficult and most important clinical trials in lung cancer,” says study co-chair Drew Moghanaki, MD, MPH, Chief of Thoracic Oncology in the Radiation Oncology Department at UCLA Health. “We feel that the data from this study will inform practice for many decades to come as new treatments continue to be discovered that can be combined with either surgery or radiation.”

The difference between the two

Surgery has long been standard care for the treatment of lung cancer, but SBRT has also shown promising results, says Dr. Moghanaki, who also directs care and research for patients with lung cancer at the Greater Los Angeles Veterans Affairs Medical Center.

“These treatments are very similar. They just have different journeys,” he says.

Both procedures take three to five days to complete, whether a patient comes into the hospital for surgery or radiation treatment.

Because surgical treatment samples lymph nodes, it can reveal whether the cancer has spread, Dr. Moghanaki says. With SBRT, the diagnosis of spread to the lymph nodes would be identified through follow-up scans.

“It’s unclear whether knowing earlier can make a difference,” he says.

The VALOR study, which is recruiting 670 veterans with lung cancer, is the first to compare surgery and SBRT survival outcomes, pulmonary function, and patient quality of life. Participants are randomly assigned to receive either surgery or radiation treatment and will be followed for a minimum of five years after treatment.

People with a stage 1 lung cancer diagnosis who aren’t participating in the trial could choose between surgery or SBRT.

Sponsored by the VA Cooperative Studies Program, the study opened at six sites in 2017 and has expanded to 21 sites to date.

Dr. Moghanaki credits the recruitment success to “helping people understand the value of enrolling in a clinical research study” and the

altruism of veterans.

“Our veterans have been amazing in their desire and willingness to participate in a trial that will help another veteran,” he says.

Quest to cure lung cancer

Dr. Moghanaki hypothesizes there will be little, if any, measurable difference between the two treatment methods when it comes to overall survival for people with early-stage lung cancer.

“One of the most promising things is, if this study shows that patients who opt for SBRT do just as well as those who choose surgery, that opens up even more opportunities for research and discovery,” he says. “This helps the field move forward.”

He and study co-chair David H. Harpole Jr., MD, of Duke University are inspired by emerging treatments for lung cancer, including

immunotherapy and new ablation techniques that can be administered percutaneously (through the skin) or endobronchially (through the throat) with robotic bronchoscopy machines, and are eager to see how they might work alongside surgery or SBRT.

“Our quest to cure and eradicate lung cancer forever will require local and systemic therapy,” Dr. Moghanaki says. “I’m optimistic that, regardless of the results of the study, we will have findings that expand options for patients.”

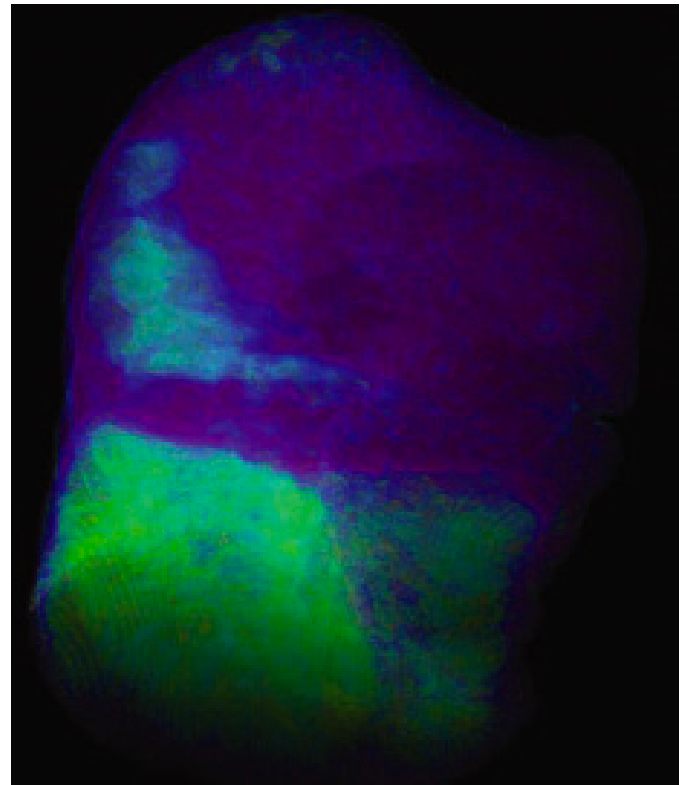
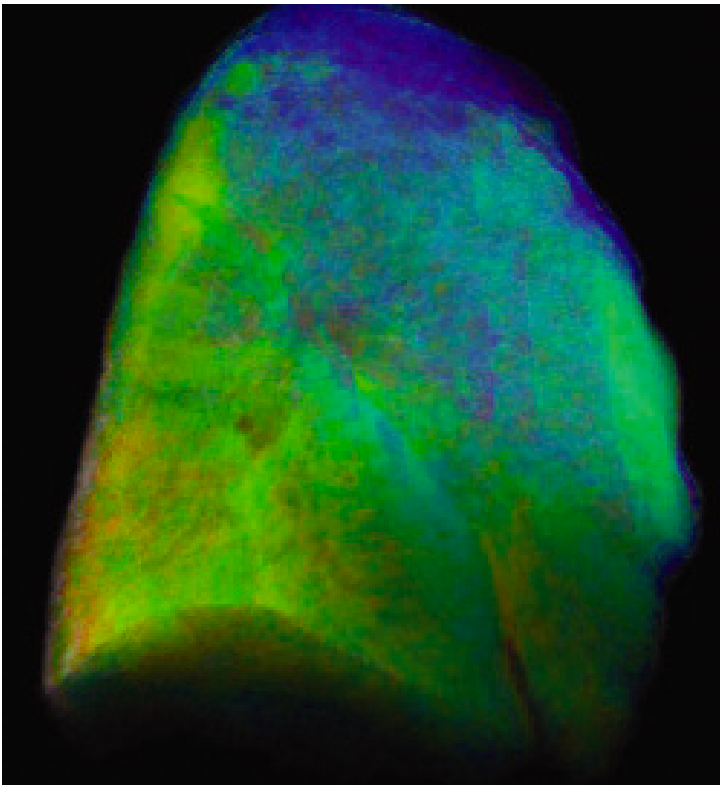
The study is expected to continue through 2027.

Visit the VALOR clinical trial site for additional information and enrollment. □

Contributed by: Sandy Cohen



Photo Credit: Joshua Sudock

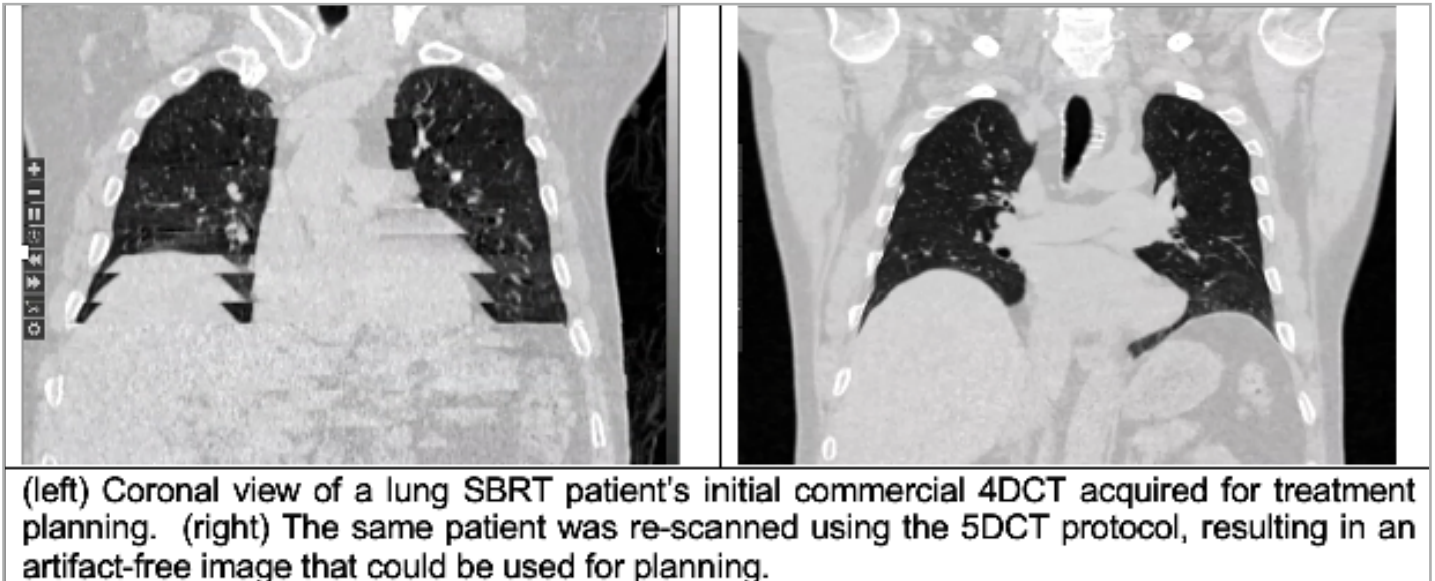


5DCT: Clinical Experiences and Future Directions

Our group has led the effort to entirely replace 4DCT as standard of care in radiation oncology with an alternative approach which we term model-based 5DCT

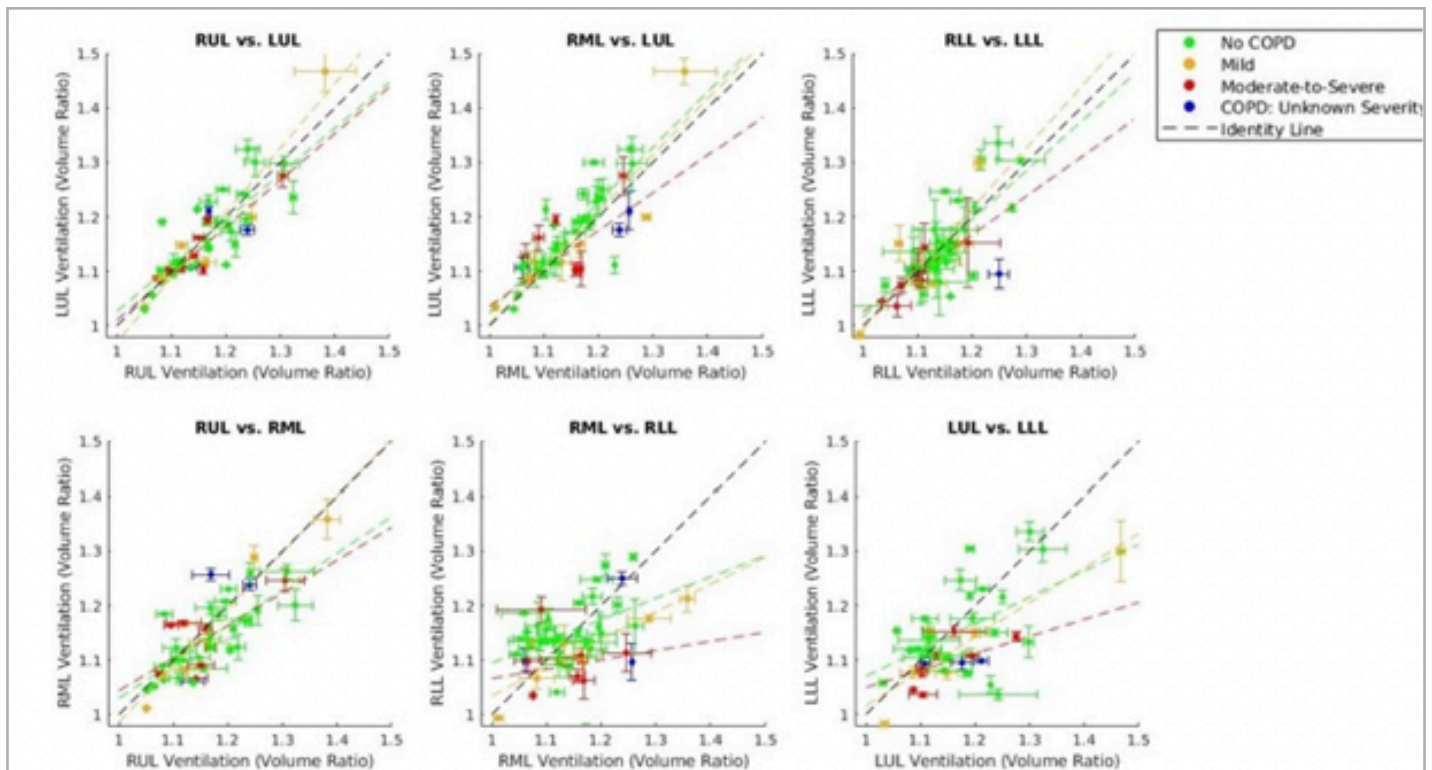
One of the most inaccurate and unpredictable processes in radiation therapy is the measurement and modeling of breathing motion for treatment planning and its associated tumor delineation. These errors are mostly due to the commercial imaging process known as 4DCT, which was developed by vendors in the early 2000s to provide respiratory amplitude- or phase-gated images for radiation oncology. They developed 4DCT as a modification of cardiac-gated imaging, which on the surface would provide the desired temporally resolved images, but in effect often provided artifact-ridden images and only qualitative motion assessments. Our group has led the effort to entirely replace 4DCT as standard of care in radiation oncology with an alternative approach which we term model-based 5DCT that fundamentally changes the CT acquisition method (using multiple fast-helical free-breathing CT, FHFBC, scans) and replaces the assumption of temporal regularity with an assumption of proportionality between breathing motion and real-time acquired breathing surrogates.

In March of 2019, the first UCLA Radiation Oncology patient was scanned using the 5DCT protocol for treatment planning purposes. This initial clinical scan was the culmination of years of research and development, beginning with a widely cited 2005 Red Journal publication by Dr. Low and colleagues, describing a “Novel breathing motion model for radiotherapy.” Extensive work at UCLA was done to validate the technique before employing it clinically, including an animal study and a comparison against commercial 4DCT in a cohort of patients on an IRB-approved imaging study. To date, over 200 UCLA Radiation Oncology patients have been scanned using the 5DCT protocol. Since its clinical rollout, the increased accuracy and image quality afforded by UCLA’s 5DCT technique has contributed to the success and growth of the department’s thoracic SBRT program.



In addition to bringing tangible improvements to our clinical workflow, the adoption of 5DCT has enabled our group to pursue multiple new avenues of research. One of the greatest failures of 4DCT has been the impact on scientific studies of free-breathing patients. 4DCT uses significant assumptions and approximations when analyzing images. These create well-established sorting artifacts. Our current work in pulmonary biomechanical modeling and ventilation, as well as in model-based cone-beam CT (CBCT), would be infeasible or greatly hindered with access to only artifact-prone commercial 4DCT images.

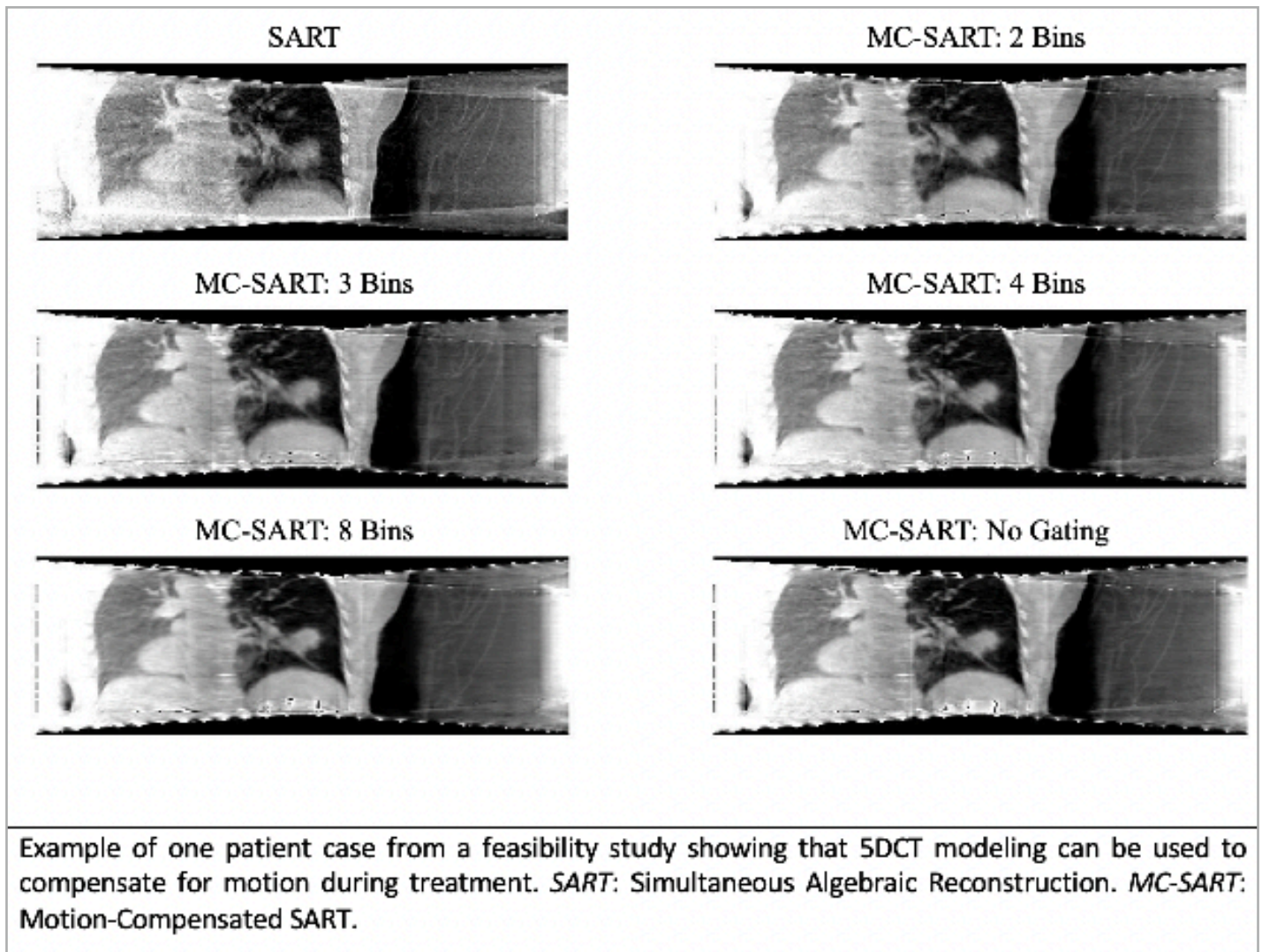
Biomechanical models of human anatomy are critical in understanding physiology and have been developed for applications ranging from deformable image registration to image-guided treatment planning. We can use the motion characterization provided by 5DCT to calculate ventilation regionally throughout the lungs. Using the 5DCT model, we can generate motion vectors from exhalation to inhalation and calculate the Jacobian determinant, which measures the expansion of the vector field. This can be used to define functional regions of the lungs for applications such as function sparing treatment planning or COPD diagnosis. A second biomechanical property that can be calculated from 5DCT is tissue elasticity. Using the motion vectors provided from 5DCT, we can obtain elasticity with an iterative model. Tissue elasticity is also promising for functional sparing treatment planning and disease characterization, and combining ventilation and elasticity could provide a powerful, comprehensive tool.



Example result from a study using ventilation mapping derived from 5DCT to evaluate the heterogeneity of lung function across lobes of patients with varying COPD severity. Scatter plots show lobar ventilation for different combinations of lobes divided into different COPD severity groups and coded by color. Ventilation mapping was used to quantify the asymmetry between lobes within the same lungs and show the similar ventilation in lobes across the lungs.

Another important downstream application of 5DCT is translation of the motion model across imaging sessions to provide motion compensation for CBCT. Using the 5DCT model can replace current 4D-CBCT efforts that suffer from artifacts due to under sampling of projections in each phase bin. Current research has been dedicated to first communicating the model from simulation to CBCT by calibrating the breathing amplitude signals. Then, using the scaled motion model after calibration, we can correct for motion during CBCT reconstruction. The feasibility of this approach has already been shown by demonstrating that increasing the motion information from the 5DCT model can lead to a sharper diaphragm during reconstruction, and thus accurate motion compensation. In the image below, the first reconstruction was performed using SART, a technique with no motion compensation. In the other reconstructions, the amplitude of each projection was binned differently, and as the number of bins increased, the diaphragm sharpened. “No Gating” indicates that the exact amplitude of each bin was used. This technique will greatly reduce motion artifacts in CBCT to enable better target alignment and potentially aid in adaptive radiotherapy.

The principal motivations for 5DCT have remained constant since its inception: firstly, to provide the field of Radiation Oncology with a straightforward, quantitative, accurate, and efficient method of imaging tumors that move due to respiration to better inform clinical, and additionally to provide high-quality imaging data that facilitates scientific studies that would otherwise be greatly hindered by the limitations of commercial 4DCT technology. To these ends, we look forward to continuing the development of our solution here at UCLA as well as advocating for more widespread adoption. □



Contributed by:

Dylan O'Connell, PhD
Assistant Professor, Department of Radiation Oncology

Dr. O'Connell received his bachelor's degree in Physics from Tufts University in 2013, and his Ph.D in Biomedical Physics from UCLA in 2018. Subsequently, he completed the medical physics residency program at UCLA before joining the faculty in 2020. His research interests include improving 4DCT reconstruction using a respiratory motion model, motion compensated cone-beam CT reconstruction, online adaptive therapy, and in-house clinical software safety.

Daniel Low, PhD, DABMP
Professor and Vice Chair of Physics

Dr. Low joined UCLA Radiation Oncology in 2010 as the Vice Chair and Director of Medical Physics. Dr. Low is board certified by the American Board of Medical Physics in Therapeutic Medical Physics and by the American Board of Radiology and is a fellow of the American Association of Physicists in Medicine. He has published nearly 300 peer-reviewed articles, including the most cited article in Medical Physics Journal's history. His research interests include modeling of human breathing motion, radiation therapy safety, quality assurance methods, and image-guided radiation therapy including magnetic resonance-image guided radiation therapy.

Michael Lauria, PhD
Medical Physics Resident PGY-1

Dr. Lauria earned his BS degree in nuclear engineering at Purdue University while researching bioelectrics. He joined the Physics and Biology in Medicine Graduate Program at UCLA to study medical physics. His PhD work under Dr. Low focused on fast-helical, free-breathing CT and its potential applications within radiotherapy and pulmonology, including motion compensation in cone-beam CT reconstruction ventilation mapping, and computational fluid dynamics modeling.



TRUE GRIT

1923

TO TODAY

For nearly a century, she has gone to bed each night saying her prayers. For at least the last 2 decades, she has added wondering what will hurt the next morning. My mom is a contradiction, full of despair and hope. A worrier and a warrior. I am blessed to have her genes. Anyone would be blessed to have even half her grit.

She is a middle child, born to German immigrants, as Joyce Mary on December 20, 1923. She was reared, along with her older brother and two younger sisters in a small house in a suburb of Detroit. The house had no hot water and the only toilet was in an out building in the back. Her father was a mail carrier and an alcoholic. Her mother was a hardworking homemaker. Joyce was only six when the Great Depression gripped the United States, and while her family was poor, they made do. Her father was lucky to have a job and a steady income. Many of her neighbors were not so lucky and her mother and father showed compassion, feeding neighbors during those tough times when they could not feed themselves. My mom tells stories of putting cardboard in her shoes to cover the holes she had worn in them so that she could continue to wear them to school, and of her allotment of only 2 new dresses per year. This humble beginning forged a real steeliness in my mom.

A little over a year after the attack on Pearl Harbor, Joyce turned 19, and took a job with International Telephone & Telegraph as a telephone operator. She moved to San Francisco where she was housed with several hundred other young women, all employed

as operators for ITT. It was there, in San Francisco, where she met my father who was working for the United States Navy Shore Patrol and assigned the patriotic task of walking the female operators from their place of work to their hotel when their shifts ended. That was the proverbial hen guarding the chicken coup and is a story in and of itself.

But the focus here is on my mom and her grit. She lost my dad in 2007 (they had been married for 62 years) and for the first time in her life, had to learn to navigate the world on her own. Now at 98 ½ she has crippling arthritis in her knees and uses a walker to ambulate. She has Non-Hodgkins Lymphoma, diabetes, hypertension and myriad other problems, and while she complains about it all, she knows how lucky she is to be here, greeting me every day with “good morning.” She loves to have an audience and to tell her life-stories. She never wants to go to bed if there is something fun or interesting to do, whether it is playing Bananagrams or just socializing.

I have worked as a coordinator in clinical trials at UCLA for many years. The last 10 of these years has been at UCLA Radiation Oncology and I love what I do. I have seen patients with various cancers, through many different kinds of treatments and research protocols. I am reminded daily of the importance of attitude in healing. A glass half-full means there is hope, maybe just one last game of Bananagrams or cards, or one last story to be told. □

Contributed by: Carol Felix, Clinical Trials Network Operations Manager



ERIN HOOVER

Erin Hoover is the author of two poetry collections, *Barnburner* (2018) and *No Spare People* (forthcoming in 2023, Black Lawrence Press). She is an assistant professor of English at Tennessee Tech.

IF I WEAR GLASSES, WILL YOU BE ABLE TO SEE ME?

When I was a child, always my aunt stood in the center of rooms, buttoned into tennis whites or an off-the-shoulder dress, her red-tipped fingers tilting back a long-stemmed wine glass, her laughter a hoot. I thought instead of working, she chose long hours at the gym or shopping, driven from place to place by my uncle in their luxury American car. My aunt listened to books on tape from the library and signed birthday cards with erratic loops. She made her way past the room's furniture without help and looked in the direction of the person speaking. My brother told me she was reading lips, a transposition. I haven't inherited her condition, which runs in families, but even so, I strain with lenses and I have almost no night vision at all. Labs precisely calibrate my glasses, a costly process taking months. When technology dulls a problem, it isn't a problem. "I've never seen a prescription like yours, har-de-har-har!" People imagine I'm curious, squinting at hello, leaning in as if to kiss the document in my hands. A doctor once diagnosed me as 'clumsy,' not a medical condition but a scold. At night, I've pointed my car at a direction I believed to be a road, just as my aunt used to turn toward my voice. When I truly can't see, I cry out. Since I watched my aunt I've learned some cries are like talismans, some kinds of laughter, too. They guard against all the ways it can get worse. You learn to feel your way: a page of text, a conversation, a city, a museum of impressionist paintings. I'm more attentive to shifts in shadow and light than I used to be, when my eyes were better. My mind performs the calibrations now. Are you still having trouble? Maybe I'm not recognizable at all.

-Erin Hoover

A PATIENT'S JOURNEY



Photo Credit: Keith W. Payne

I was recommended to UCLA by Dr. Puja Venkat who took my information and within hours requested that I send her my medical history, which was a radical prostatectomy with no follow-up treatment to date. Dr. Venkat was the reason that we found Dr. Kishan's program. I had been actively searching for the next step, consulted with Mayo Clinic in Scottsdale, MD Anderson in Houston, Mayo Clinic in Jacksonville, Florida (near our home), and Moffitt Cancer Center in Tampa, I also considered individual clinics that offered radiation therapy with androgen deprivation therapy (ADT) in Florida.

When consulting with each of these facilities and their doctors, I never felt a sense of confidence to proceed. Dr. Venkat referred me immediately to Dr. Amar Kishan who she felt would be the best fit for me. She shared my information with him and we made an appointment for the same week.

From my very first contact with Dr. Kishan I felt his explanation of the range of treatment options and the feeling of organization and follow-up were far superior to anywhere I had consulted. The respect for the individual and professional presentation of all the protocols were a much higher standard. My interaction was beyond excellent with any questions I posed, and Dr. Kishan or his office responded immediately to my inquiries.

After consulting with Dr. Kishan, we felt that the best course of treatment was five sessions of radiation with ADT (orgavyxx and casodex) for six months, which was fortunately offered as a trial with Dr. Kishan.

My wife and I live in Colorado, and we met with Dr. Kishan online after he reviewed my medical history and my current health. I had my first meeting, and I came away with a sense of confidence that Dr. Kishan was in fact the best in the field. I have had the privilege of consulting with many of the country's finest doctors and facilities, and I can without any reservation say that UCLA and Dr. Kishan and his team are far and away the finest health care team in the nation.

When my dates were set in July to begin treatment, we were contacted by UCLA Radiation Oncology's hospitality team who gave us information about the area and lodging options, which helped us find the condo we rented during our stay. It was a five-minute walk to your campus in Westwood and worked perfectly.

From my first contact all the way through treatment, I had a sense of safety and well-being, which was created by the competence and professionalism of Dr. Kishan and his team in the Radiation Oncology Dept.

Kevin Cazares and Emil Hightower were my contacts who scheduled my preliminary tests and kept in touch throughout the treatment with answers to my questions. The speed and quality of responses to my questions was exceptional.

I began my radiation sessions with technicians, Dana, Miguel, Nam, and Hussen, who made me feel like I was part of the team and, by the end of treatment, part of the UCLA family. They were patient and caring, gave me an overview of what my treatments would be like, and made my experience much better than I expected. Knowing the process and being able to discuss my treatment made me less apprehensive and more comfortable with the radiation process.

Their professional expertise is unrivaled in my experience.

During my journey with prostate cancer there have been many uncertain and confusing times. Some were created by the amount of information about conflicting options and statistics on outcomes, and some were created by a less than optimal health care experience, even in the exceptional facilities I consulted. Because of this I feel I have a unique overview of what is offered in Radiation Oncology today, and I know I found the best team in the country and beyond. I completed my five treatments with very little discomfort and no long-term side effects, and I left UCLA in August 2021 with confidence that not only did I get the best all-around care, but that I was fortunate to have participated in Dr. Kishan's trial. I completed my ADT treatment in December of 2021 and have had several PSA tests that show my PSA serum numbers are undetectable. Dr. Kishan's recommendation to go with Orgovyx instead of Lupron for my ADT treatment was brilliant and effective.

I know there is much uncertainty with cancer outcomes long-term, but my wife and I have no uncertainty that UCLA's exceptional and professional care has restored our confidence in health care. It is hard to put into words the difference Dr. Kishan and UCLA has made in our state of mind. □ Contributed by: Keith W. Payne

AT THE BEAM

***At the Beam* is a medical education podcast focused on high-yield oncology and radiation oncology.**

Dr. Trudy Wu, a PGY-4 in the UCLA Department of Radiation Oncology, recently created, *At the Beam*, a podcast aimed at helping learners, in all stages of their training, master high-yield oncology and prepare for the oral boards. The podcast, a first of its kind, is directed toward Radiation Oncology Residents, those right out of training preparing for their boards, and medical students.

Dr. Wu and her co-host, Dr. Josh No, a PGY-4 at Stanford, recently released the first two episodes, which focus on prostate cancer. As with these first two, all episodes will be vetted and backed by a leading expert who specializes in the diagnosis and disease site. In addition to serving as a learning resource, we hope this podcast will help increase medical student exposure to the field of Radiation Oncology.

At the Beam is available for listening on a variety of platforms, including Apple Podcasts, Spotify, and Google Play.

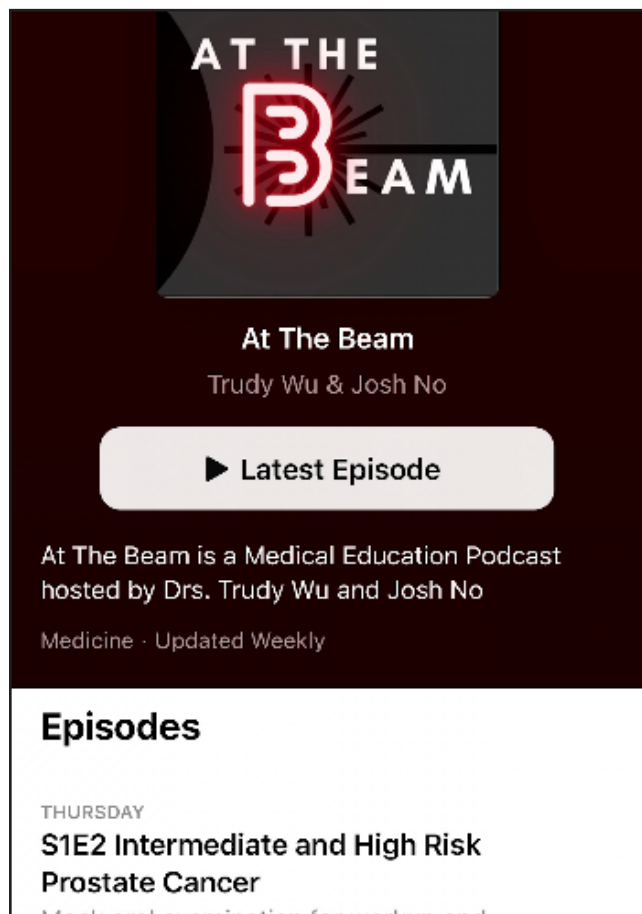


Photo Credit: Kevin Shanmugam

photo Credit: Jonathan Farber



RADIATION ONCOLOGY RESIDENCY

SUMMER UPDATE

PRESENTATIONS & ASTRO 2022 ABSTRACTS

Ma TM, et al. Local Failure and Distant Metastatic Events in Prostate Cancer Treated with Radiotherapy: A Meta Analysis of 18 Randomized Trials from the MARCAP Consortium (LEVIATHAN). ARS 2022 Oral.

Ma TM, et al. First Toxicity Results of a Prospective Single-Arm Phase 2 Trial (SCIMITAR). ACRO 2022 Summit Oral.

Ma TM, et al. Dosimetric Impact of Interfraction Prostate and Seminal Vesicle Volume Changes and Rotation: A Post-Hoc Analysis of Phase III Randomized Trial of MRI-Guided versus CT-Guided Stereotactic Body Radiotherapy. RSS 2022 Oral.

Savjani RR, et al. Building a generative thoracic motion model for radiotherapy with an interpretable latent space. NVIDIA Global Technology Conference Oral.

Savjani RR, et al. Gastrointestinal Radiation Oncology Teaching Cases. LARS 2022 Oral.

Neilsen BK, et al. Dosimetric impact of interfractional bladder and trigone deformations: A post-hoc analysis of a phase III randomized trial of MRI-guided versus CT-guided stereotactic body radiotherapy. ASTRO 2022 Poster.

Nikitas J, et al. Dosimetric Implications of Margin-Reduced MRI-Guided Stereotactic Body Radiotherapy to the Prostate Bed Following Radical Prostatectomy: Post-hoc Analysis of a Phase II Study. ASTRO 2022 Oral.

Smith CP, et al. Incidence of Radiation Pneumonitis among Patients Treated with Concurrent Thoracic Radiotherapy and Osimertinib for Metastatic Non-Small Cell Lung Cancer. ASTRO 2022 Poster.

Wu TC, et al. Patterns of Recurrence and Progression for Unresectable Cholangiocarcinoma on Orthotopic Liver Transplant Protocol. ASTRO 2022 Poster.

Benitez CM, et al. Safety and efficacy of MR-guided re-irradiation in patients with GI malignancies. ASTRO 2022 Poster.

RECENT PUBLICATIONS

Woods K*, Ma TM*, et al. A Prospective Phase II Study of Automated Non-Coplanar VMAT for Recurrent Head and Neck Cancer: Initial Report of Feasibility, Safety, and Patient-Reported Outcomes. *Cancers*. 2022 Feb 14;14(4):939.

Ma TM, et al. Dosimetric impact of interfraction prostate and seminal vesicle volume changes and rotation: A post-hoc analysis of a phase III randomized trial of MRI-guided versus CT-guided stereotactic body radiotherapy. *Radiotherapy & Oncology*. 2022 Feb;167:203-210

Wu TC*, et al. Prostate-Centric Versus Bony-Centric Registration in the Definitive Treatment of Node-Positive Prostate Cancer with Simultaneous Integrated Boost: A Dosimetric Comparison. *Adv Radiat Oncol*. 2022 Mar 16;7(4):100944. doi: 10.1016/j.adro.2022.100944. PMID: 35521072

Duvall E, Benitez CM, et al. Single-cell transcriptome and accessible chromatin dynamics during endocrine pancreas development. *Proc Natl Acad Sci*. 2022. 119 (26):e2201267119

Savjani R, Singh P. How To Successfully Build and Run AI Competitions for Medical Imaging: Insights from the PANDA Challenge. *Radiol Imaging Cancer*. 2022 May;4(3):e229010. doi: 10.1148/rycan.229010. PMID: 35593717

Rizzo A, Savjani R. The Current Landscape of Clinical Predictions from Brain Tumor Imaging. *Radiol Imaging Cancer*. 2022 May;4(3):e229011. doi: 10.1148/rycan.229011. PMID: 35621523

Savjani RR, et al. Automated Tumor Segmentation in Radiotherapy. *Seminars in Radiation Oncology*. (In press).

Savjani RR, et al. Radiotherapy for Mantle Cell Lymphoma with Orbital Involvement. *Radiol Imaging Cancer*. (In press).





AWARDS AND GRANTS

Conquer Cancer ASCO Young Investigator Award (Dr. Jie Deng)

Tumor Immunology Training Grant (USHHS Ruth L. Kirschstein Institutional National Research Service Award #T32) (Dr. Jie Deng)

JCCC Fellowship Award (Jie) • Kate Farms Trial Grant (Dr. Jie Deng)

ASTRO 2022 Annual Meeting Basic Translational Award (Dr. Jie Deng)

ARS Early Career Oncologist Award (Dr. Martin Ma)

ACRO/Novocure Travel Grant (Dr. Martin Ma)

ACRO Best Abstract Award (Dr. Martin Ma)

Google Cloud Research Innovator (Dr. Ricky Savjani)

Google Cloud Platform - Academic Research Program (Dr. Ricky Savjani)

Amazon Web Services - Cloud Credit for Research (Dr. Ricky Savjani)

Institute for Digital Research & Education Post-doc Scholar (Dr. Ricky Savjani)

NVIDIA Applied Research Accelerator Grant (Dr. Ricky Savjani)

UCLA Health Resident Informaticist Program Winner (Dr. Ricky Savjani)

AAPM John Cameron Early-Career Investigator, 1st Place Stanford ViewRay Plan Challenge, 1st Place AAPM S. CA Chapter Norm Baily Awards, 1st Place AAPM 2022 BEST Award (Dr. Qihui Lyu)

AAPM S. CA Chapter Norm Baily Awards, 2nd Place (Dr. Michael Lauria)

AAPM Science Council Mentorship Program Selectees (Drs. Qihui Lyu, Yu Gao, and Lauren Smith)

PROFESSIONAL SOCIETY ACTIVITIES

Moderator for ARS/ARRO/ACRO “Finalizing Your Rank List” Webinar (Dr. Trudy Wu)

Moderator for “Big Data in Medicine.” Biotech Connection (Dr. Ricky Savjani)

ACRO Mentorship Chair (Dr. Cecil Benitez)

Radiosurgery Society White Paper committee members (Dr. Jie Deng, Dr. Martin Ma)

AACR 2022 Molecular Biology in Clinical Oncology Workshop (Dr. Jie Deng)

SNO Introduction to Clinical Trial Design Workshop (Dr. Ricky Savjani)

PRO- Reviewer Apprenticeship Program (Dr. Ricky Savjani)

IJROBP- Resident Peer Review Training Program - RePRT (Dr. Ricky Savjani)

RSNA Radiology: Imaging Cancer - Editorial Trainee Board (Dr. Ricky Savjani)

UCLA TEACHING AND SERVICE

Internal Medicine Noon Conference Didactics (Dr. Matt Farrell, Dr. Clayton Smith, Dr. Trudy Wu)

VA Thoracic Tumor Board Didactics (Dr. Trudy Wu)

UCLA Pediatric Oncology Fellows Didactics (Dr. Ricky Savjani)

UCLA Health Resident Informaticist Program (Dr. Ricky Savjani)

“How to...” Research Scholarship Series (Dr. Jie Deng)

“Radiate Light” Team Captain for “Light the Night” Fundraiser (Dr. Beth Neilsen)

JCCC Pre-Med Summer Scholar Program Panelists (Dr. Jie Deng, Dr. Trudy Wu)

UCLA Minority House Organization (MHO) Executive Board (Dr. Cecil Benitez) □

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AWARDS, PUBLICATIONS, AND GRANTS

Recent wins from the UCLA Department of Radiation Oncology

Nzhde Agazaryn, PhD, DABR, FAAPM
The Academic Senate's Committee on Committees (ConC) has nominated Dr. Nzhde Agazaryan to serve on the Academic Senate's standing committee of the Council on Academic Personnel, ClinCAP.

Anusha Kalbasi, MD has four new publications:

[*Spatial profiling reveals association between WNT pathway activation and T-cell exclusion in acquired resistance of synovial sarcoma to NY-ESO-1 transgenic T-cell therapy.*](#) published in the *Journal for Immunotherapy of Cancer*.

[*Retrospective analysis of adjuvant treatment for localized, operable uterine leiomyosarcoma,*](#) published in *Cancer Med*. *Co-Corresponding Author

[*Potentiating adoptive cell therapy using synthetic IL-9 receptors,*](#) published in *Nature*.

Engineered IL13 Variants Direct Specificity of IL13Ra2-Targeted CAR T Cell Therapy, to be published in *PNAS*.

Amar Kishan, MD has published a large meta-analysis in *European Urology*.

Drew Moghanaki, MD has been invited as the Keynote Speaker at the ASCO Annual Meeting for a lecture entitled, "Mitigating Racial Disparities for Veterans with Cancer through Equal Access Healthcare."

Sang-June Park, PhD, DABR and his team recently won 2nd Place in a

competition for "Brachytherapy in 2030" Shark Tank Edition sponsored by Varian in the American Brachytherapy Society (ABS) 2022 Annual Meeting.

Amar Kishan, MD, received a KureIt Foundation Grant to support his radiorecurrent prostate cancer research.

Drew Moghanaki, MD has received a \$50,000 Program Vision Leader Award from the JCCC for his project, "Understanding Barriers to Lung Cancer Screening in an Academic Healthcare System."

Amar Kishan, MD, secured a contract with Point Biopharma to lead the first trial of Lu177 PSMA + SBRT (the phase II randomized LUNAR trial).

Ke Sheng, PhD, DABR, FAAPM, will be receiving a new R01--

Title: Precision breast radiotherapy with the soft robot and supine CT

Abstract: In the proposed project, a novel soft robot will be developed and optimized to improve the individual patient breast setup. A dedicated breast CT will be synergistically developed to provide the needed image guidance for precision breast radiotherapy

Grant #1R01EB031577

Dates: 9/1/2022-8/31/2026

Total award: \$2,142,325

PI: Ke Sheng; Co-PI: Lihua Jin (UCLA Mechanical Engineering); Co-I: Susan McCloskey

□

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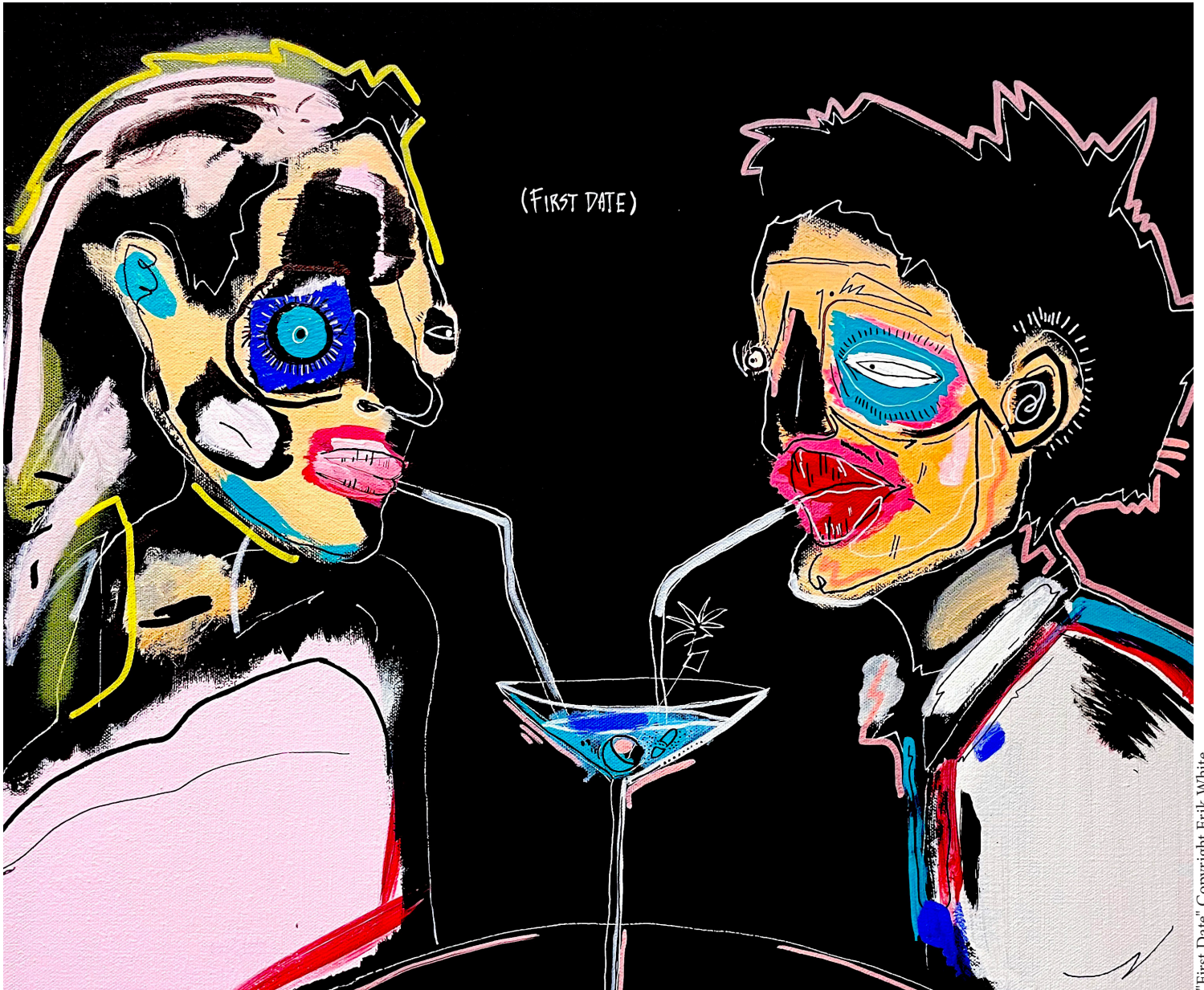
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The UCLA Department of Radiation Oncology pushes back the boundaries that limit ordinary clinical cancer treatment through the application of thoughtful discovery-based, novel treatment strategies.