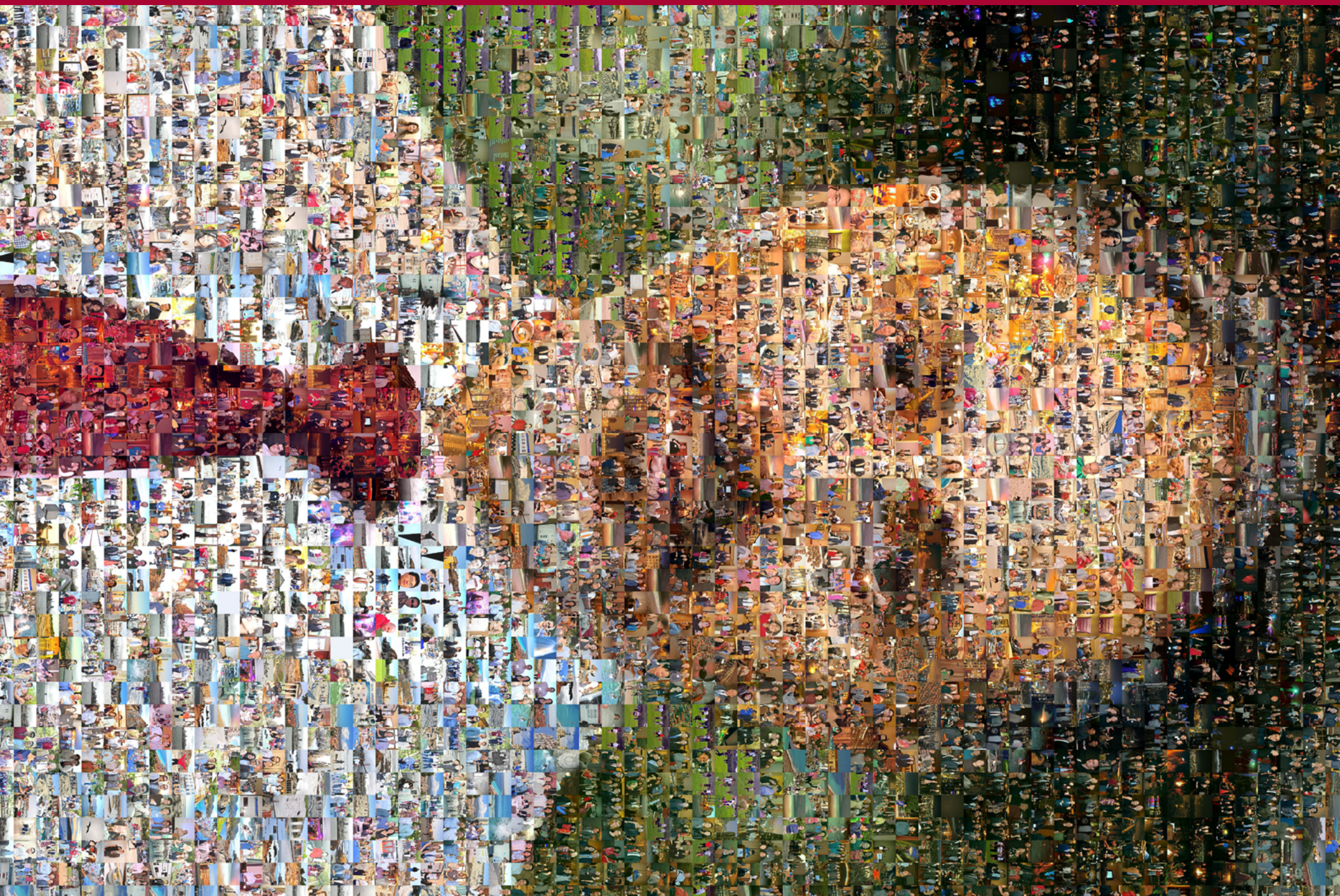
Nuclear Medicine and Molecular Imaging at Stanford

The Sanjiv Sam Gambhir Years (2003-2020)



Introductions

I. Ross McDougall

When Bill Strauss, Chief of the Division of Nuclear Medicine, decided to leave Stanford and return to New York in 2002, the late Gary Glazer was tasked with appointing a new chief. There were a number of extremely well qualified applicants, but the person who quickly rose above the others was Sanjiv Sam Gambhir. I had heard about Sam several years earlier, because his sister trained in Radiology at Stanford and frequently she discussed projects Sam worked on as a medical student, and trainee, in Nuclear Medicine at UCLA. I first met him when we were both invited speakers at a conference in Pasadena. His presentation was professional, his data new and exciting, the slides a model for trainees to emulate and the audience was most appreciative.

Our next meeting a few years later was in Sacramento at another conference. At that time Sam had interviewed with Gary Glazer and was wondering whether he should leave his professorial position at UCLA and sever his research connections there. He wanted to learn all the inside information about Stanford Nuclear Medicine. We had an in-depth conversation. I confirmed the division had an excellent record for clinical care, both diagnostic and therapeutic. Clinicians from all departments at Stanford relied on the services that were delivered speedily and accurately. We also had an excellent reputation with private physicians and even received referrals from the Kaiser Medical system. I assured him the educational program was very robust and had obtained full accreditation for 5 years consistently. The division was a very happy place to work and several technologists trained and then worked there for decades.

There were issues that I hoped Sam could address if he accepted the leadership. I urged him to do so. First Dr Glazer had invested much of the clinical and research strength of the department of Radiology into body imaging through CT and MRI. This included large clinical and research staff. Nuclear Medicine was the poor cousin in the department. Virtually all the clinical services, “bedside” and formal teaching were undertaken by 2 attending physicians. There was no designated research space and more importantly no basic scientists in the division.

After negotiations with Dr Glazer, Sam accepted the position as division chief. He arrived at Stanford at the end of 2003, bringing with him an army of associates, including a medical student who transferred from UCLA to complete his MD/PhD at Stanford. There were physicists, radiochemists, experts in PET and micro-PET, fluorescent optical imaging and other pioneering areas who migrated north to join the faculty and staff. Most important was the presence of Sam both physically and mentally. He worked around the clock and was an inspirational force who led by example. He bolstered the strengths of the division and added these new areas of research. What he achieved as Chief of Nuclear Medicine and Molecular Imaging and from 2011 when he replaced the late Dr Glazer as Chair of Radiology is best appreciated by the complete history of his works illustrated fully in the Departmental Legacy Newsletter of December 2020. How he achieved these with his quiet, composed, and organized personality should be an educational message to all trainees aspiring for a successful academic career.

Andrei Iagaru

Sam's vision for a new Nuclear Medicine and Molecular Imaging Clinic was many years in the planning and making. Originally scheduled for 2007, it opened for patients in October 2010. He included everyone in the process of designing and planning a state-of-the-art facility focused on patient care, excellence in clinical work and innovative research. Special emphasis was placed on transparency and access. Pictures of all technologists, trainees and faculty were placed visibly for all who walk the corridors. Attention to detail was paid in how patients and staff would interact, dedicated spaces for patients, learning area for trainees, conference room, satellite radiochemistry, cardiac stress testing, physics lab. For the first time all aspects of Nuclear Medicine from basic research to routine care were under one roof.

While some were disappointed when Sam asked us to cancel our presentations at the World Molecular Imaging Congress in Kyoto in September 2010 (we knew the opening would inevitably be delayed), in hindsight it was clear he did not want to take any risk. And the transition went without a glitch, including the installation of new PET/CT and moving some SPECT/CT scanners from the old facility.

We feel Sam's presence in every corner of our Nuclear Medicine and Molecular Imaging Clinic and sense his sparkling eyes and brilliant mind continuing to guide us. A decade after the 2010 Grand Opening, Stanford Nuclear Medicine is undergoing a major rejuvenation, with an all-digital PET/CT fleet, a robust PET/MRI program, the introduction of the next generation SPECT/CT and the opening of the Theragnostics space. We hope this is one of many examples of how the candles Sam lit in his many colleagues, trainees and friends will continue to shine brightly and carry on his legacy.

Garry Gold, David Larson, Brian Hargreaves & Yun-Ting Yeh

Less than a year ago, Dr. Sam Gambhir was taken from us, while he was still in his prime. To reflect on this loss is still difficult. And yet we are grateful for the memories we retain and the legacy upon which we will build.

Sam was a groundbreaking scientist, a brilliant clinician, and a true leader who was unafraid to make tough decisions. At the same time, he had an immeasurable capacity to be empathetic to each circumstance and person. Sam gave selflessly of himself in a way that was profound and genuine. He garnered the respect of faculty and staff across the Medical Center and the University.

With a combination of engaged intensity and reassuring wisdom, Sam cut through problems at all levels with clarity and insight. He commanded the room by his perceptiveness, his surprising quick and self-deprecating sense of humor, and the honesty and transparency of his message.

Sam brought the best out of everyone. He was demanding most of all of himself, and of everyone around him. Not only did he push himself harder than anyone else, he especially pushed people for whom he had the highest expectations. He had an incredible gift to focus on people; to make them want to become the best versions of themselves.

Sam Gambhir's departure from this world left us with deep sorrow yet profound gratitude for the vast impact he had on the world of science and humanity, to our school and department, and to us individuals.

We miss Sam, and always will. He left us an enduring vision that we will continue to build for years to come.

Why Nuclear Medicine?

Sanjiv Sam Gambhir

I went into Nuclear Medicine because I was very intrigued that disease could be diagnosed and managed by imaging biochemistry in humans. I always thought that imaging anatomy alone was a crude approach that would prove to be limiting in the long run. I also very much like that Nuclear Medicine has significant patient interaction and was a hybrid of Radiology and Medicine.

Why Nuclear Medicine?

Carina Mari Aparici

I had a hard time deciding what medical specialty I wanted to dedicate the rest of my medical career to, until I was introduced to Nuclear Medicine and Molecular Imaging. It was love at first sight. Ever since then, I am not shy at proclaiming my love, fulfillment with and support for this medical specialty.

Guido Davidzon

After my surgical internship I had doubts as to whether a career in clinical medicine was the right choice for me, reason why I chose to read a book called 'The End of Medicine'. It was there that I learned about Sam Gambhir's work and the field of Nuclear Medicine & Molecular Imaging. This re-ignited my curiosity and passion for clinical medicine and helped to shape the decision to apply for training in Nuclear Medicine, and later on to return to work at Stanford.

Benjamin Franc

It was a little mouse who convinced me to go into Nuclear Medicine. Really! I was a surgery resident doing tissue engineering research and needed a way to identify the exact timing of apoptosis within a mouse disease model. A colleague introduced me to a radiolabeled marker of apoptosis that, when administered to my mouse model and imaged with SPECT, showed me the power of molecular imaging and reignited my passion to blend medicine with chemistry, physics, and biology, paving my path to Nuclear Medicine as a career.

Elizabeth Hawk

During my final years of residency, I had already chosen a Neuroradiology fellowship. My residency had a newly established dual Radiology / Nuc Med training pathway. One of my attendings who knew me quite well came to me one day and told me he thought I should transfer into the program. I said I would think about it- he said he had already signed me up! It sounded like a wonderful academic adventure, so I completed the dual training program and absolutely fell in love with Nuclear Medicine.

Andrei Iagaru

I almost quit medical school but was lucky to have a great mentor teaching anatomy and physiology who rekindled my interest. Both are critical to practicing Nuclear Medicine, at the intersection of several disciplines. To keep this brief, a couple generous mentors (Ross and Sam) down the line, and adding to the mix the exciting technology, computers and software, Nuclear Medicine made the perfect match to accidentally tumble into. I love it and would not pick anything else!

I. Ross McDougall

I was in my second year of training in internal medicine and cardiology in the Victoria Infirmary in Glasgow. My father was chief of orthopedics in the same hospital and one of his medical school classmates was my "boss". I envisioned after several more years of training being appointed a consultant there and as was the case spending the rest of my medical career there.

Out of the blue I received a phone call from Professor Edward McGirr, the Muirhead Professor of Medicine at Glasgow University who was based in the Glasgow Royal Infirmary. McGirr was also President of the Royal College of Physicians, Dean of the medical school and a Member of the British Empire (MBE). He said "McDougall I want you to join my faculty can you meet with me on Monday at 1.00 p.m to discuss your future." I explained the situation to my chief and he advised me it would be very unwise to turn down the offer.

The meeting on Monday went as follows.

McDougall, I want you to join my faculty as a lecturer in medicine
Very good sir
In addition to general medicine, you need a specialty. You can pick kidney or thyroid
Thyroid sir.
Good, then I want you to get into this new field of isotopic medicine
Very good sir.
Can you start on the first of the month?
Yes sir

The decision was made in about 20 seconds and I loved the next 45 years. After a few years McGirr advised me to get a fellowship to do research in US and that is how I came to Stanford. Thus, McGirr recruited me to Glasgow Royal Infirmary and ended up recruiting me to Stanford.

Farshad Moradi

I was always interested in probing and measuring physiological and functional changes at the cellular and molecular level. When I was looking at fellowship options, Nuclear Medicine was not only matching my interests perfectly, but it had become the most exciting and promising field in radiology…and it continues to be so.

Helen Nadel

It is all about people and timing. When I was beginning residency, I met a Nuclear Medicine physician who was the role model I wanted to emulate-a practice that allowed true hybrid imaging. So, in my career I worked to become a "triple threat".

Judy Nguyen

Finding the right specialty had been a struggle for me. Up until I discovered Nuclear Medicine, nothing had fit quite right – I enjoyed patient interaction, but wanted to have more meaningful impact; I enjoyed working with technology, but didn't want to always be stuck in front of a computer screen in a dark room; I wanted mental stimulation, but also needed to feel excited and passionate about what I was doing. I was terrified of falling into a rut. All the bits and pieces I had acquired through years of education and training, were strewn before me like a giant, imposing jigsaw puzzle. Although I could snap together a few pieces here and there, I couldn't figure out how to fit all the puzzle pieces into one cohesive picture…that is until I stumbled onto Nuclear Medicine. Everything I had learned and absorbed up to that point started quickly clicking into place. To do Nuclear Medicine well, you had to grasp how things worked, from a molecular level all the way up to the whole patient. The very core of Nuclear Medicine is based on how disease begins at the microscopic level. We try to target these microscopic changes and follow these pathways out to a variety of pathologies from cancer to cardiac disease to brain abnormalities and so much more. There is a dizzying array of disease processes that we can follow now and it requires the ability to synthesize a lot of information and collaborate with a variety of colleagues. I was certainly not going to be bored in Nuclear Medicine. The technology also stunned me. By identifying these microscopic changes sooner, we could figure out ways to intervene sooner, at a more easily treatable stage. Oftentimes, we can locate disease before conventional imaging modalities or other tests. We can also help direct, or even avoid, more invasive procedures like surgery or biopsy. This was a paradigm shift for me: I realized that in Nuclear Medicine, I had the ability to be proactive, rather than reactive to disease. This was the kind of impact I wanted to have on my patients. Since entering this field, there has been an explosion in Nuclear Medicine research and technology, leading to not only improved equipment and software for diagnosis, but also leading to scientifically advanced, targeted therapies that are changing the face of medicine as we speak. It is not an exaggeration to say that Nuclear Medicine offers a constant stream of innovation: new radiotracers, new therapies, new cameras, new collaborations and new research that keeps us all on the edges of our seats, eager to learn more and explore different ways to help our patients. I consider myself fortunate to have found a field so perfectly suited to me in every way.

George Segall

I remember when I became interested in Nuclear Medicine. I was a young internist at the time. A cardiologist showed me a myocardial perfusion phantom on his computer. People didn't have personal computers in those days, and computers in medicine were still uncommon. It opened up a whole new world.

Reflections About Sam

Carina Mari Aparici

I had the great honor of meeting Sam about 20 years ago at an SNMMI meeting. I was still living in Europe. He was known for his revolutionary reporter gene studies. What I remembered the most at that time was his spirit. It was obvious that he was extremely intelligent, but he also seemed to have a very kind soul and an approachable personality. Since then, I started following his luminous ideas and publications. It was not until years later that I had the opportunity to work with him, as he became the Division Chief of Nuclear Medicine at Stanford and I was starting my residency at the same institution. Working with him was one of the best things that has happened to me in my career. Not only was it obvious that he loved what he was doing for a living, but his excitement was contagious, his brilliance overwhelming, his care for the people around him pure, his vision unprecedented, his leadership skills outstanding and his limits the sky. Although he was very busy building a new Division within the Department of Radiology at that time, he made every minute with him or around him worth your time from a scientific or human perspective. He was a great mentor, friend and colleague. After residency, I joined another institution as faculty, but we stayed in touch. I very much continued to respect him, his work and his vision. I looked up to him as a person and as an expert in the field. The day I was asked to join the faculty at Stanford with him as the Chair of Radiology was my lucky day! I couldn't wait to work with him again and share with my colleagues the satisfaction of helping him fulfill his unique vision, ideas and future with fairness, respect, and gratitude for the well-being of humanity. Humanity lost a genius the day Sam passed away, as well as a great human being. I lost a friend, a colleague, a mentor and one of the few persons I've looked up to. It feels somehow unfair that despite how much Sam did for modern medicine, modern medicine didn't do much for him in return.

Paulo Castaneda

Many have written about Sam's impact on Nuclear Medicine, and it is hard to overstate how much his vision drove the direction that our specialty has gone to and the growth in our field. Sam was as big picture as you can be. And yet somehow, he was one of the most personal leaders I have worked with. He knew everyone's name, specific details of their life and thought about job opportunities for people he'd run across. Even though he had the busiest schedule, he would take time to help whenever and wherever he could, answering emails at all hours. He treated front line technologists with the same thoughtfulness as he would any of the physicians.

When we were moving our department, Sam spent multiple weekends working with technologists to help us through issues coming up with the move. Sam showed me that you can be an effective leader on a large scale and yet never lose the personal touch. He lived as an example of what the best kind of leader can be.

I know the field of Nuclear Medicine will miss Sam because of his incredible impact, but I will miss him because he was kind, caring, and used his formidable skills to enrich the lives of everyone he worked with.

Edison Chiu

I first met Sam in 2004 when I started my Nuclear Medicine residency. Sam had just recently joined Stanford and as Nuclear Medicine residents, we had the fortunate opportunity to work directly with Sam. Sam would read out studies with us at least once a month and also give us a talk with homework assignments. Sam's genius was not only in his breadth and depth of knowledge, but his ability to simplify complex subjects and communicate this to his students. I recall fondly when Sam walked us through how to derive and prove natural log.

Sam's work ethic was incomparable. My experience with Sam one late call evening sums up his dedication. A late VQ scan was completed near midnight and a final over read from an attending was needed before I could sign off on the report. Sam was the attending on call. I gave him a call and his reply was, "Edison, give me five minutes, I'm just going to walk over from my office." Sam was always the first one there and last to leave. His work ethic was unmatched and inspiring to all.

Personally Sam contributed greatly to my career. Beyond the teaching and experiences with him, Sam took a personal interest in bettering each and every one of us. Although I was not interested in an academic career, Sam had the dedication and generosity to include me in a research project that led to my first article publication in a journal. He also shared this pearl of wisdom with me that I remember to this day - "Innovation is not always a new device or technology, but simply finding a new/novel way to use an existing technology."

Beyond Sam's incredible intellect, was his humanity and kindness. Above all, this was what made Sam so unique and loved. Despite all the accolades, honors, and titles, at the end of the day, Sam was always approachable and such a genuine human being. He always had or made time for you. He was just that giving.

I will miss Sam.

Guido Davidzon

Sam has always been extremely influential in my life. I first learned about Sam at a time when I had many questions regarding my future in clinical medicine. I was reading a book called "The End of Medicine" by Andy Kessler, were there was a chapter dedicated to Sam's research, which I found fascinating. I researched and read more about the impressive career of Sam Gambhir, and this eventually convinced me that I needed to return to clinical medicine, and specifically, led me to apply to a residency position in Nuclear Medicine & Molecular Imaging at Stanford.

During my residency training, I had the privilege to meet regularly with Sam in his office at the Clark Center. I loved to interact with him, tried to memorize his constant wise advice, both professionally and personally. These meetings were one of the fondest memories I cherish from my training in general.

Sam was the reason I later returned to Stanford as an attending. He helped shape my research career, prioritizing our protected research time. Sam was a visionary in many ways, and this both stimulated and supported us to help continue to grow and expand the field of Nuclear Medicine & Molecular Imaging.

As if his presence in our professional lives wasn't strong enough, he also somehow managed to be present for us when important personal decision/moments occurred. He made time to talk to me about loans and finances at the time of buying my first home. He was there for me and my family when one of our children suffered an accident. He was extremely warm and empathetic as a human, often understanding our needs/questions before we even formulated them.

To find all these attributes in a leader is extremely rare. I will forever be grateful and humbled by my time at Stanford under his leadership. Throughout his illness, and despite his personal hardship, he was always a pillar of strength, positivity, and optimism in our department. I will deeply cherish all the memories I have of him as my mentor, role model, leader, doctor, researcher, and human.

David Dick

I am a physicist and radiochemist, not a physician. Yet Sam Gambhir had me attend the Nuclear Medicine Faculty meetings. Why? Sam realized that a Nuclear Medicine clinical trial or clinical study begins with the manufacturing of the radiopharmaceutical. Thus, Sam thought it critical to have all parts of the team at the Nuclear Medicine Faculty meetings in order to discuss any and all issues pertaining to the clinical trials or clinical practice. Those meetings were invaluable for me as a young scientist, learning the ins and outs of a Nuclear Medicine department as well as having face time with the prominent Nuclear Medicine legends Drs. Michael Goris and Ross McDougall. One of the most important lessons that I learned is to always talk to clinicians about what they need in the clinic so that radiopharmaceuticals can be developed to meet the clinical need, rather than finding a clinical need for developed radiopharmaceuticals.

On a personal note, I will always remember Sam Gambhir's kindness and compassion. Despite how busy he was, he would always carve out a few minutes to meet with me when I needed some time with him. He would always ask about my health and how my family was doing. After leaving Stanford I would occasionally bump into Sam at conferences or MIPS reunions. Sam would always take the time to ask how I was doing and how my family was doing as well. This wasn't small talk, Sam truly cared. On top of being a brilliant scientist he was more importantly a wonderful human being.

Ben Franc

I first heard Sam speak about molecular imaging when I was a first-year resident in Nuclear Medicine at Stanford. Sam's vision and his ability to weave seemingly disparate fields of science together had an instantaneous effect on me; I broadened my studies in residency to include peptide and antibody engineering, immunology, and bioengineering. Sam used to like to joke that I left Stanford because of him; it's true that my last day of residency was followed by Sam's first day as the Chief of Nuclear Medicine at Stanford. Although the various forces in life would ultimately keep me from returning to Stanford for 15 years, Sam's vision and his genuine caring nature were forces as powerful at that point as they were that first time I heard Sam speak. I will remain forever grateful for having spent the short time I did witnessing the personal touch that Sam left on Stanford.

Sherief Gamie

I had the great pleasure of meeting Sam for the first time in 2005 in his extremely busy Lab on the Stanford campus. A lab that was bustling with people interacting, analyzing and running numerous ground-breaking projects. At the time I was the most junior staff Faculty member that had just joined. Sam had recently assumed the role of Radiology Department Chairman at Stanford University and was well under way putting together the illustrious MIPS program at Stanford University. Sam was recognized at one of the pillars of Nuclear Medicine and Molecular imaging, and his research and Lab were recognized not just nationally, but world renown. Naturally, I had heard many great things about his ingenuity, character and great work ethic and was eager as a new Faculty member to try to impress. That meeting was in and of itself ground-breaking for me. I met an extremely humble man with bright gleaming eyes full of ideas and thoughts. He was extremely down to earth making small talk and light conversation to help me feel more comfortable. Any time he spoke of the MIPS program he described it as "our program" in a very inclusive demeanor. That day we spoke about current projects currently running in the lab. He was keen to learn of my interests and inquire more in a very casual manner my previous training and experiences. He had a great talent for making people feel welcome and included. We talked for at least 90 minutes that day and by the end of that meeting, I felt that I had a new friend in the Department. At Department Christmas parties, he would come over to different people gathering and introduce himself and get acquainted with our accompanying Family members and introduce his lovely wife. It is with great sadness I write these words, as I feel we've lost a great soul. I cannot say enough good things about a man who is truly already missed by everyone who knew him, and our specialty has lost a guiding light.

Henry Guo

Kindness. Is the first word when I think of Sam, but which competes with many other adjectives like: brilliance, determination, humorous, optimism...it is kindness that compels Sam to help to give advice to my friend with an incurable brain tumor who is trying to decide between different clinical trials. It is the kindness that Sam gently offers help whenever we ran into each other, a constant support that encourages great work from those around him. It is the inspiration that Sam provides added meaning to our work, whether by treating patients as members of our families, or developing new treatments for people who we will never meet. It is Sam's encouraging note and recognition when we have accomplished something, oftentimes however small-seeming as compared to what Sam has achieved.

Optimism. To be a scientist or engineer is to be inherently optimistic, believing that through creativity, thinking, initiative, and work, we can discover the workings of the world and develop new tools to advance the abstract idea of making the world a better place; and not to succumb to nihilism. In this sense, Sam had optimism in spades. But Sam also combined optimism with determination, as the first rush of excitement over a new idea need to be followed by steady work that is often laced with frustration in order to bring the idea to fruition. Through all of his difficult times, certainly with loved ones' and his own health, and undoubtedly the seemingly crushing responsibilities and decisions that comes with advancing a world class lab and department, Sam has provided a voice of optimism for the future, cajoling us to do our best work and to treat each other kindly. We probably all remember his wry smile, sometimes a smirk, when he came up with an observation that points out the sometimes absurd or ironic situations that life presents, and ways to move past them.

Brilliance. Probably no need to broadly expand on that topic here, as we've all seen examples of this. But on a personal level, I came across Sam's work toward the end of my time in PhD training when I was deciding on what field of medicine to go into. My background was in basic molecular biology of DNA repair and early carcinogenesis, and medical imaging and early detection of cancers sounded much more elegant and impactful than treating late stage disease. This was during the mid 2000s, with the early trials of lung cancer screening CTs, and the rise of deep sequencing and detection of oncogenic driver mutations from minimally invasive sampling. In researching residencies and reading Lee Hartwell and discussions with my PhD advisor Lawrence Loeb, I came across Sam's work using reporter genes, and saw that he was translating the biochemical tools that were familiar to me in molecular biology to medical imaging. This is brilliant! This allows for the combination of what I love about anatomical imaging with molecular tools. And Sam's accomplishments and impact have continued to expand over the next decades. Today, I am incredibly fortunate to be drawn to Sam's orbit to work in fields using these approaches, and in helping to teach and advance these fields.

The best tribute to Sam's legacy, of course, is to carry on his work. We are helping to translate just one of the many tracers to come from Sam's lab, to quantify pulmonary fibrosis and as a molecular reporter for in vivo medication effect in pulmonary fibrosis, which is a major advancement in lung imaging. Sam has made this possible, among his many, many contributions, through his brilliance, optimism, determination, and kindness.

Nora Gurevich

When Sam first came to Stanford, he was the Nuclear Medicine department chief. How fortuitous that was for our group! He brought a breath of fresh air to our dept. Not long after he arrived, Sam organized a department meeting on a Saturday so we could all discuss his new vision for our department going forward. We discussed problems and explored ways to build our cardiac business. He respected every person's ideas and comments, either positive or negative. He would ask questions to define things. Respect. That was one of the major tenets of who Sam was. I feel fortunate that I could work closely and learn from Sam as our dept chief.

In 2013, I had abdominal surgery for a benign condition. Unfortunately, my life took a curve. I had a leiomyosarcoma. When Sam heard the news, he quickly offered his help. He told me if I want a second opinion as to treatment options, he would find the best oncologist specializing in my cancer. I will always remember his words to me in that moment. He told me with a smile that he was very well connected in the oncology world! Every time I would run into Sam, he would ask me how I was feeling and did I need anything. With Sam he extended his friendship, you became part of his work family. He truly cared about his work friends. When I was at the memorial reception following the service for his beloved son, when Sam saw me, he asked me how I was feeling. Amazing, in their darkest hour, he still reached out to see how I was doing.

Shortly after Sam and Aruna arrived from LA, Aruna told me that the great majority of his research staff opted to move to Stanford to continue to work under his guidance. She told me she needed to find places for his students to live. The Gambhirs became surrogate parents to his lab group. They both have hearts of gold.

My final memory brings me back to Nuclear Medicine. When I first heard Sam's lecture on the future of Nuclear Medicine, I was amazed. He envisioned a future where medicine could be customized to the individual. Totally amazing that he could envision a future where diagnoses and treatments can be customized to the individual. I left the lecture totally excited about being a part of this new future.

Thank you, Sam for a glimpse of an exciting future. Thank you for your wonderful friendship! We all miss your brilliant presence in our lives.

Andrei Iagaru

Sam's reputation as a brilliant and innovative mind, as a founding father of Molecular Imaging was well known to me when I arranged to take an elective rotation at Stanford in January 2004, away from the internship in Philadelphia. What I did not know was how influential these few weeks will be for the rest of my life. I learned that Sam was covering the clinical service and reading with trainees, so I had a good plan (I thought) for how to introduce myself. But my first encounter with him was much unplanned: I ran into Sam as he was turning from the hallway to enter the reading room in the old Nuclear Medicine space in the basement of 300P building and I was exiting the restroom. He said "Hi, I am Sam"…this was so disarming…the most brilliant scientist in our field was so humble and knew how to make you feel comfortable and his equal.

I was fortunate as a resident to work with Sam staffing the clinic and reading out with us. His clinical skills were on par with his research strengths, another reason he was so special. He would go around the reading room asking questions until we ran out of answers, all with anecdotes and a hint of irresistible humor. Although at times humbling, there was no shortage of audience since everyone wanted to learn from Sam. I do not like math or statistics, yet one of the fondest memories from the residency is Sam teaching us kinetic modeling and how to solve integrals. Home assignments were tough, but what a joy when able to solve and show him the results!

Time after time since then, Sam continued to be the most supportive, patient and encouraging person. He had a way to give you wings and let you fly on your own like no other. Sam always knew how to help one move (things) forward. He was the one to secure a soft landing for us all in hard times, to provide resources when he recognized a good idea and to celebrate success giving everyone the credit deserved. It was always about the team, not a single individual, although personal encouragements (and a card) followed.

Sam was an amazing listener who made one feel the most important person in the room. He genuinely cared not about just your well-being but also your family, taking time to meet and talk to your spouse, children and parents. Every moment spent with Sam was memorable and I wish there were many, many more. He could be equally charming and connected to a young child and a Nobel prize winner…an award I am convinced he would have received one day if he was not gone so untimely.

Sam was brilliant, warm, kind, modest, thoughtful, gracious and generous. We all loved and admired him for the wonderful human being that he was. There will not be another one like him in our lifetime. Humanity lost a giant who had so much more to contribute towards a better world, which only makes it a tragedy more difficult to comprehend.

I sorely miss Sam and will always keep him in my heart.

Christine Keeling

Regarding my thoughts about Sam, I remember being excited when he was recruited from UCLA because it soon became apparent that he was an extraordinarily brilliant man who would benefit Stanford Nuclear Medicine and later radiology and the Medical School as a whole enormously. He was incredibly dedicated, hard working and creative. He was also very personable and had a real talent as an MC at the annual parties with a genuine ability to amuse and entertain.

I felt very honored that he was present on Zoom at the final Faculty meeting when I retired, and he said some very kind words about me. That was only a few weeks before he died and I will never forget it. What an amazing legacy he has left with many he mentored inspired to continue his phenomenal work.

David Larson

It is impossible to put into words the impact that Sam Gambhir had on my career and on my life. Moving from the Midwest to Palo Alto required a significant sacrifice for me and my family. For all of his brilliance and all of his accomplishments, in the end, it was Sam's compassion and integrity that won me over to make the move. I am so happy I joined Sam's team.

Like for so many others, he supported me far more than any leader has ever done for me. He challenged me and sometimes critiqued me, but I knew it was always done from a place of support. Learning from his leadership firsthand was among the greatest privileges of my career. His focus, drive, and brilliance sprang from his intense desire to cure, heal, prevent disease, and engender health. He translated these aspirations into conducting and inspiring innovative research and clinical care. Few faculty will ever know how much he thought about, advocated for, and paved the way for them behind the scenes—and I just saw a small fraction of his efforts.

There will never be another Sam Gambhir. I miss him dearly, as we all do, but I cherish the lessons he taught, the values he instilled, and the relationships he cultivated. His legacy will live on in the science, the organizations, and the people he nurtured.

Iain Ross McDougall

I still have visions of Sam and have difficulty believing we shall not be sitting down together to discuss Nuclear Medicine, the faculty, his research and many other topics. Sam was a true gentleman and scholar. He always treated everyone like royalty no matter who they were or how busy he was. His academic achievements were colossal in quantity and quality. The number of young scientists and clinicians he nurtured and launched into important careers defines that as well. As to his character apart from being a gentleman, he was always calm, organized and prepared, never hurried or rattled. Next to gentleman scholar I believe equanimity defines him best.

I believe it is very important that Stanford, in particular the Department of Radiology makes every effort to ensure he is remembered. We shall only encounter one person with the talent, work ethic and personal characteristics of Sam once in a lifetime. Please ensure there is a definitive memorial in his name.

I consider myself greatly privileged to have worked with Sam and he always will have a large spot in my heart.

Erik Mittra

My strongest memories about Sam are regarding two somewhat opposing aspects of his personality. In a room full of very smart people, I always felt that Sam was two log orders smarter than everyone else. When listening to people, especially in a small group, he was so focused and I repeatedly saw him anticipate and/or state what the other person was trying to say better than the person saying it! Also, he could always be counted on to ask the most perceptive questions and have the most interesting insight regardless of the topic! How he did that in all situations was remarkable. On the other hand, he is also one of the most empathetic, humble, down-to-earth, and funny people I've ever known. It's so rare to find someone with all these attributes combined. My biggest homage (and I'm sure many others do this as well) is that whenever I'm faced with a difficult situation at work, I ask myself, "What would Sam do?"

Judy Nguyen

Sam was a brilliant man with pages and pages of accomplishments with which he could have built a wall around himself. He could have sequestered himself in an ivory tower and gone about his days furthering his prestige and career as we marveled at his successes…but he did not. He considered everyone his colleague, from administrators, to technologists to collaborators in non-medical departments; every person was a crucial cog in the machinery of academic medicine. His goal at the end of the day was just to help people, in whatever form and capacity he could facilitate. He always acknowledged that any successes he had, or that someone in Radiology had, was due to a much larger team effort at every single level. He made sure everyone was seen and heard from. His gratitude and humble nature has made him not only a more effective leader, but a beloved one. Sam was also surprisingly disarming, able to sit and relate to anyone, from raving about the music of Metallica to discussing Vietnamese recipes. He always made the effort to connect to people because he was genuinely interested and invested in people. He loved to hear about what drove us, what our passions were and what sorrows we carried; this was how he educated himself about the world and beyond, by just sitting with us and asking us questions. Out of a very busy day, he always found those few minutes to sit and listen to these real human stories; and when he could, he earnestly sought ways to help lighten whatever burdens we bore and would downright create paths for us to accomplish our dreams. Sam will be sorely missed but one of his greatest legacies that he leaves behind is instilling these core values into our department: ingenuity, collaboration, compassion, humility, and respect.

Lu Nguyen

In 2003, I was a traveling Nuclear Medicine technologist. My contract was ending, and I was at a crossroads. Should I look for another assignment, or was it time to settle down and take a full-time position at Stanford? Dr. Sam Gambhir had just been announced as the new head of the new Molecular Imaging Program at Stanford (MIPS) which included Nuclear Medicine.

As an introduction, Sam arranged a meeting with the technologists where he would give a presentation on the plans he had for our department. During this meeting, Dr. Gambhir mapped out new equipment, new tracers, and new procedures that we would be implementing. A few years later some of those ideas would be published. A few more years and some of those ideas would get FDA approval and become standard practices. All this time, Sam had kept us at the forefront of ushering in new technology and pharmaceuticals.

Looking back, that was what was amazing about Dr. Gambhir. He had his finger on the pulse of all the new concepts, not just in molecular imaging but in patient care overall. Sam had an enthusiasm for the frontiers in our field. He showed great excitement in being on the forefront of a new revolution in healthcare, and he wanted all of us to be a part of it with him. Even when his son, Milan, was sick, Dr. Gambhir would continue to explain the intricacies of PET/CT physics to him. As Sam himself became ill, he always took the time to explain the new drugs that were on the horizon. He never stopped discovering.

This passion helped a travel technologist make up his mind to stay at Stanford back in 2003. And it was the best decision I ever made.

Ryan Niederkohr

I will always remember how kind, accessible and humble that Sam was in every encounter that I had with him. Despite his immense stature and reputation as a visionary leader in our field, I remember how Sam always treated the clinical trainees (residents, fellows) as if we were "equal" – no question was ever too basic, no request ever too unimportant for his time. Sam consistently responded to my emails (which were by no means urgent) unbelievably rapidly and with such thoughtfulness and care. When covering the clinic, Sam was literally available 24/7: I remember once completing a complex GI bleeding scan in the middle of the night, and hesitating to call Sam as my supervising attending at 2am, yet he answered immediately and reviewed the images with me on the spot. Sam truly cared for all those with whom he worked: even long after I left Stanford, when I'd see Sam at SNMMI meetings, he was so cordial and would take the time to chat with me – and his remarkable ability to remember details (both personal and professional) of our previous conversations clearly demonstrated the value that Sam placed on his relationships with colleagues. In short, Sam was truly the consummate leader, teacher and mentor, and he is greatly missed.

Andy Quon

Sam was one of the most down to earth and genuine people I ever met. I'll remember and cherish the times we enjoyed outside of the hospital as much as our working relationship. He always had a beautiful engagement and joy in his eyes when we spoke. Whether it was the latest research project, big future plans for the department, AC/DC (yes, he loved classic rock and hard rock), or our kids we always had good laughs to go along with the focus and intensity he approached everything in life. I miss him dearly.

George Segall

Those of us who worked with Sam knew how special he was. He was not only brilliant, he was also a visionary. I wasn't sure what to think when I first heard Sam speak about continuous health monitoring technologies like smart toilets that could monitor changes in our chemistry. It sounded like science fiction, but Sam had a relentless dedication to thinking collaboratively and outside the box. He brought together researchers from different fields to work together to advance medical imaging. He talked about injecting "molecular spies" that could look for molecular errors and send signals that we could image with molecular tools. He was a pioneer in reporter PET imaging strategies. He was always thinking ahead, way ahead.

He was very supportive of everyone in the department, and empowered individuals. He had a genuine love and respect for colleagues. He went to great lengths to provide assistance in times of personal need, including being at your bedside if you were hospitalized. He was universally loved and admired for his hard work and dedication.

We were like his family. For his students he was a caring father figure who inspired them to be the best they could be. He likened students to candles and taught us that it was our responsibility to light those candles. Sam's last public gathering was the annual department holiday party on December 9, 2019. Although it was a festive occasion, we knew that Sam and Aruna had painful memories, and were facing an uncertain future. So, when Sam told us that nothing is more important than our patients, and that we were here to relieve suffering and help people, we understood he was speaking from a deep and private place. He showed us that tragedy could only be endured with purpose. Those words echo even more loudly now.

Life moves on, and memories of Sam both sadden and console us. We try to live up to his ideals and honor his memory. The world has lost a great scientist and physician. We have also lost our friend and leader.

Minal Vasanawala

I had the great privilege of being a part of Dr. Gambhir's tenure at Stanford. He arrived from UCLA as the new Chief of Nuclear Medicine in the middle of my residency at Stanford. Remarkably, his team of 35 scientists working in his Multimodality Molecular Imaging Laboratory moved up with him to Stanford; this spoke volumes of his team, his inspiring leadership, Dr. Gary Glazer (then chair of Radiology), and Stanford University's faith in this 41 year-old young man's vision. As he grew a small clinical division into a research and clinical powerhouse, he always kept "caring of the whole person" center stage. May his spirit guide us in doing the best for our patients and their families.

Always in Our Hearts

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