

Changing Lives Together

IMPACT REPORT

For more than 125 years, The Wistar Institute — the nation's first independent biomedical research institute — has pursued discoveries that save lives and rechart the future of human health.

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Donors

With your help, we're pushing the boundaries of science and improving lives.



Over the last year, donors and funding partners have joined Wistar to advance a future for lifesaving, world-changing discoveries in science and medicine.

As this report demonstrates, your generosity fosters scientific potential, brings ideas to life, breaks down barriers and impacts lives around the globe. Your investment in Wistar science enables our scientists to address the medical needs of today and build a healthier world for tomorrow. Thank you.

The Power of Philanthropy in 2020



YOU WERE ONE OF

709
DONORS



TOGETHER YOU GAVE OVER

\$10.3
MILLION

Endowed Gifts

Your gift has an enduring impact. Donors to endowed funds provide the Institute with a steady, predictable and perpetual source of income.

\$192,549,000

Value of The Wistar Institute endowments
(at the close of 2020)

\$6,994,000

Made available in 2020 from endowment
funds to support research and training

Annual Gifts

Your gift had an immediate impact. Donors who give annually make an immediate difference and help address emerging and high-priority needs.

159

Loyal donors who have supported Wistar
each year for the past five years

144

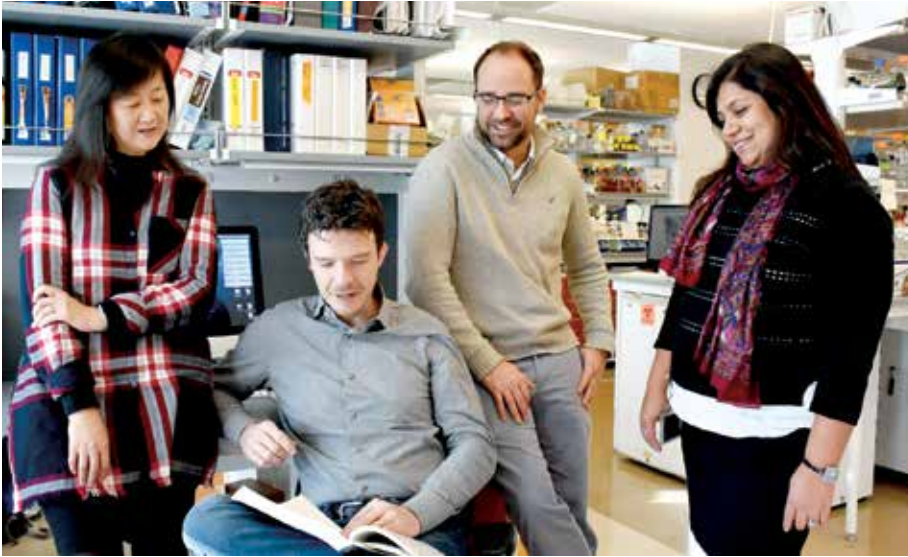
First-time donors

A photograph of a male scientist in a white lab coat and safety goggles, focused on his work. He is wearing blue gloves and holding a pipette. In the background, a female scientist is also working in a lab coat. The scene is brightly lit, suggesting a clean, professional laboratory environment.

The Power of Recruitment

Medical breakthroughs are realized in research labs, disseminated in impactful peer-reviewed journal articles and eventually transformed into life-changing therapies, vaccines and diagnostics. But those breakthroughs originate in minds: the creative, courageous minds of our research faculty. Expanding our scientific talent pool and enhancing its multidisciplinary expertise within Wistar's Cancer Center and Vaccine and Immunotherapy Center are focal points of our new strategic plan.

The Impact of Our Junior Faculty



Early-career investigators — those just beginning at the assistant professor level — are at the height of their scientific productivity and creativity, and often generate the bold sparks that lead to transformative scientific research. Therefore, attracting the most brilliant scientists and persuading them to launch their laboratories at Wistar positions the Institute ahead of a trend that is becoming increasingly popular in many research Institutions. But what sets Wistar apart is our commitment to mentor and support these early-career scientists, promoting and ensuring their success.

Over the last five years, we tracked five of our early-career faculty from the start of their careers at Wistar. Each one of them has secured significant federal and non-federal funding, published their work in leading peer-reviewed journals and made tremendous scientific impact.

BY THE NUMBERS

Federal Funding

\$27,622,676

Non-Federal Funding

\$5,646,392

Number of Publications

80



Mohamed Abdel-Mohsen, Ph.D.

Assistant Professor, Vaccine & Immunotherapy Center
Immunology, Microenvironment & Metastasis Program, The Wistar Institute Cancer Center



Qing Chen, M.D., Ph.D.

Assistant Professor, Immunology, Microenvironment & Metastasis Program, The Wistar Institute Cancer Center
Scientific Director, Imaging Facility



Alessandro Gardini, Ph.D.

Assistant Professor, Gene Expression & Regulation Program, The Wistar Institute Cancer Center



Kavitha Sarma, Ph.D.

Assistant Professor, Gene Expression & Regulation Program, The Wistar Institute Cancer Center



Zachary Schug, Ph.D.

Assistant Professor, Molecular & Cellular Oncogenesis Program, The Wistar Institute Cancer Center



To learn more about these early-career investigators visit wistar.org/our-scientists

Our Newest Recruits

This year, to further strengthen our benches, Wistar faculty and leadership worked collaboratively to recruit four new outstanding early-career faculty members.



Motivated by the Hard Questions in Cancer Research, Noam Auslander, Ph.D., Forges New Paths in Computational Biology

WRITTEN BY CARINA STORRS, Ph.D.

Many people unwind in front of the television after a long day. But **Noam Auslander, Ph.D.**, who joined The Wistar Institute Cancer Center in June as an assistant professor, often spends the evening glued to the screen of her MacBook Pro laptop instead, looking for new insights into how tumors progress and cause disease.

“Sometimes I enjoy my work so much that it is my hobby,” Noam said. The most exciting moments are when, by using innovative algorithms that she builds, she starts to see patterns emerge from a data set that hint at an answer to one of her questions. The question she’s beginning to explore at Wistar is complicated — why some tumors metastasize while others do not, but Noam thinks enough data may be available, from the growing number of cancer patients getting genetic testing, to tackle it.

JOINING THE COMMUNITY

Noam gravitated to Wistar because of its small environment, quite a contrast from the sprawling National Institutes of Health where she did her postdoctoral research. She felt Wistar would be the perfect place to foster opportunities to work with colleagues. “My work is dependent on collaborations,” Noam said. As a computational lab, she relies on data sets, and although many are publicly available, data that her colleagues have collected, both from patient samples and lab experiments, could greatly enhance her studies.

Collaborating with labs that conduct experiments, such as in cell lines and mice, is also critical for Noam to be able to test, and hopefully validate, what her algorithms show her in biological systems that mimic cancer processes. During her postdoc, for example, Noam and colleagues found that certain types of cancers harbor either high number of genetic mutations or aneuploidy, which is an abnormal

number of chromosomes, but never both. It was a finding ripe to explore in cells, as a separate research group did, to identify possible new treatment strategies for aneuploidy cancer cells, which are particularly untreatable.

BRINGING TOGETHER COMPUTERS AND BIOLOGY

Growing up in Israel, Noam got a head start in computers. She was only 12 when she took her first elective course in the subject, like many of her peers. By the time Noam finished high school, she had a strong enough foundation in coding that she focused on computers during her mandatory two-year military service. But the work nearly zapped her passion. “It’s nice when you’re learning something in the beginning, but then you’re just doing the same thing over and over again,” Noam said.

Fortunately, Noam sought the advice of a friend who was getting his M.D.-Ph.D. Although Noam’s father was hoping she would follow that path and become a medical doctor, her friend listened to her interests — which included biology but not working with patients! — and instead suggested she combine computer science and biology. It was a revelation to Noam, and she headed into a dual degree at Tel Aviv University. The first three years were a slog, as computer science and biology were taught separately, unlike at many schools where they are melded into some type of bioinformatics program, and it was hard to see how the two could fit together. But Noam

“My work is dependent on collaborations,” Noam said. As a computational lab, she relies on data sets, and although many are publicly available, data that her colleagues have collected, both from patient samples and lab experiments, could greatly enhance her studies.

stuck it out and she was rewarded with the joy of finally learning how to apply algorithms to answer biological questions.

During the years at university, and then carrying out her Ph.D. at the University of Maryland and postdoc at NIH, Noam has witnessed a coming of age of the application of algorithms and artificial intelligence (AI) in biomedical research. “In some aspects of cancer research, it is on the verge, like in radiology,” Noam said. For example, AI can now be used clinically to analyze images to detect certain tumor types.

However, in the areas that Noam studies, genomics and omics data in general, she explained that AI has a lot of room for improvement, in accumulating sufficient data sets, in determining how to best represent the biological language of DNA, RNA and protein sequences in algorithms, and in making the processes of machine learning models understandable to clinicians who may one day rely on them to make treatment decisions. Noam hopes to help overcome some of these challenges, such as by creating algorithms that rely on more interpretable methods.

As she builds her lab at Wistar, Noam will set her sights on another pillar of Wistar’s research: infectious disease. She plans to use a method she developed during her postdoc to identify bacterial viruses, or bacteriophages, to look for new viruses in tumor cells. She suspects that there are many unidentified viruses out there and some may be present in cancer cells, which could either spur cancer progression or serve as a biomarkers of disease. “The original bacteriophage project was easier, but this is more interesting. It is a stepwise process to get there,” Noam said.

ALREADY AT HOME

Noam will welcome the first postdoc and technician into her group this fall. They will work at stations in the lab with their own laptops — and the space will soon look like all the labs Noam has worked in over the years.

In her own office, Noam already feels settled in at her desk. The view from her windows is filled with lush trees. But as soon as those trees lose their leaves and it becomes winter, Noam looks forward to embarking on getaways for her second favorite activities after science: skiing and snowboarding. That is, if she can pull herself away from her laptop.



Bringing Together Cutting-edge Technologies, Daniel Claiborne, Ph.D., Charts a Course For Solving Puzzles About HIV Infection

WRITTEN BY CARINA STORRS, Ph.D.

Mice differ from people in many ways. But over the last decade, scientists have succeeded in engineering mice that are more humanlike in their ability to be infected with HIV, making it possible to study the disease, and develop vaccines and therapies, in these small animals.

As **Daniel Claiborne, Ph.D.**, a Caspar Wistar Fellow who started in August, gets his lab off the ground, these so-called humanized mice, which he worked to optimize during his postdoctoral research, will be central to his research goals. Dan will take advantage of two other technologies that have recently come of age: CAR T-cell therapy, which is used to treat certain blood cancers, and transcriptomics — or the large-scale study of gene expression, to tease apart how T cells function in these mice and, like in people, stop functioning during HIV infection. It was truly a trifecta — “none of these technologies existed, even in isolation, until fairly recently,” Dan said.

PERFECT TIMING

Dan clearly remembers the thrill of reading the email from The Wistar Institute inviting him for a job interview. “It felt good because I had a shot to talk about what I’m passionate about and to explain to people my vision,” Dan said. As soon as the interview was over, he had no doubt that Wistar was where he wanted to be.

In fact, the timing seemed perfect because, although the humanized mouse model has not been widely embraced, the Institute believes so strongly in its potential, as Dan does, that it is launching a research program around it. Since he has joined, Dan and his new colleagues have wasted no time discussing how they can collaborate together and capitalize on Dan’s deep experience working with the mice during his postdoc at the Ragon Institute of MGH, MIT and Harvard, and his understanding of which aspects of the immune system they recapitulate well and which they don’t. For example, Dan can help another lab take a small molecule they found has interesting properties in cells in a Petri dish and study it in these small animals.

Dan also looks forward to what he can learn and share with just the other new recruits, three assistant professors, who are also joining Wistar this fall. “You always have peers, but to have true peers that are just starting out is kind of amazing,” he said.

MINING THE DATA

Going into his interview, Dan already knew the Philadelphia area well. As a postdoc, he had been collaborating with James Riley at the University of Pennsylvania, combining his expertise with HIV-susceptible humanized mice and the Riley lab expertise making CAR T cells specifically designed to recognize and kill HIV-infected cells.

“I was so fascinated with immunology because it was so clear that we didn’t know anything, but the things that we did know were awesome.”

This collaboration will continue now that Dan is at Wistar. While the Riley lab is focused on developing CAR T cells as a potential cure for HIV, Dan sets himself apart by making use of these engineered T cells, which he calls an “untapped resource,” to tease apart how they become exhausted and lose their ability to fight off HIV, just like natural T cells do, during infection. Dan plans to use a host of molecular tools to try to prevent CAR T-cell exhaustion and then probe what the precise pathways and gene expression profiles are within these cells that allow them to retain anti-HIV activity. The experimental system is in place, Dan said, and now “we just need to mine it.” What they find could ultimately help his collaborators who are working toward a CAR T-cell HIV cure figure out ways to make the therapy more effective.

For Dan, collaborations are not just really fun but absolutely necessary. “I tend to take on more ambitious and risky projects that take a lot of labs working together. I think biomedical science has evolved into that, where the questions we are asking really involve a lot of expertise that rarely is contained in one lab.” He thinks Wistar is fertile ground for these relationships because the small private institution really embodies the spirit of partnership.

INSPIRED BY IMMUNOLOGY

For Dan, being easily bored has served him well. It made the idea of science, and constantly learning something new, seem very appealing to him as he was growing up. As much as Dan always knew he wanted to be a scientist — and counts himself in the lucky minority for figuring it out early, he recharted his course as an undergraduate at Florida State University. He started off focusing on organic chemistry, but soon decided the lab work was far too dull. Then Dan took an immunology course about halfway through his degree and he was hooked. He promptly started a project in the professor’s lab and never looked back. “I was so fascinated with immunology because it was so clear that we didn’t know anything, but the things that we did know were awesome,” Dan recalled. For the first time, he was motivated to go for his Ph.D., which he got at Emory University, instead of getting a job after college.

While being easily bored turned Dan on to science, being stubborn made him stick with it. Through what he calls the “fourth year grad school slump” and the ups and downs of his postdoc, he refused to quit. “It’s just part of how I’m wired, I keep after it until I get somewhere,” Dan said. “I have been lucky that I have not suffered from a lack of conviction.”

HAPPY HOMEMAKER

In addition to brainstorming about collaborations with his new colleagues, Dan’s first few weeks at Wistar have involved a lot of ordering lab supplies. Even though he oversaw a small team of scientists during his postdoc, it never really occurred to him that many of the reagents they used for experiments didn’t just come with the lab space. Nevertheless, he is enjoying the experience. “It is like Christmas, you get to go on a shopping spree.”

There is plenty for Dan to set up at in his new home, too. He and his wife moved to the Philadelphia area with their three-year-old son and their infant son, who was born about the same time that Dan started his own lab. He jokes that he will get back to his old hobbies such as lifting weights one day, once he gets a handle on some kind of work-life balance. “It is all good things, just smashed into a really small timescale,” Dan said.



Destined for Science, Amelia Escolano, Ph.D., Develops New Vaccination Strategies to Outsmart HIV-1, and Other Highly Mutating Pathogens.

WRITTEN BY CARINA STORRS, Ph.D.

Scientists developed COVID-19 vaccines in record time — less than a year after the genome of the virus was sequenced, countries started authorizing use of multiple vaccines. But the virus is rapidly changing, and new variants have been emerging that are more likely to overcome the protective barrier from vaccination.

Amelia Escolano, Ph.D., who became an assistant professor at The Wistar Institute in September, wants to help science regain the advantage. During her postdoctoral studies at The Rockefeller University, she pioneered a new form of vaccination against HIV. She proved that this type of vaccination regimen involving sequential immunization would be necessary to induce broad protection against HIV. At The Wistar Institute, one of her first research goals will be wielding what she learned in her postdoctoral work to develop universal vaccines against HIV-1, other viruses — including cancer-associated-viruses, and tumor neoantigens.

BRANCHING OUT

For Amelia, everything clicked about being at Wistar. “It is exactly the kind of place I was looking for,” she said. She thinks the size of the institute is just right for sparking discussion and collaboration. Amelia is already feeling the support of her new colleagues, and is excited about all the disciplines she will be exposed to through interactions with scientists at neighboring academic institutions, such as the University of Pennsylvania.

Although her postdoctoral project at The Rockefeller University centered largely around HIV, Amelia looks forward to casting a wide net in her own lab. “The fact that the Cancer Center is here is going to open up new avenues of research and synergies,” Amelia said. She is already brainstorming with several new colleagues at Wistar about how they could collaborate to design vaccination strategies against cancer-associated viruses and tumor neo-antigens.

A SCIENTIST IS BORN

Amelia cannot think of a time when she did not want to be a scientist. Both of Amelia’s parents were chemists so it would seem to be in her blood.

Amelia’s first hands-on experience happened when she was only about four years old and she received a little microscope as a gift. She dashed outside to collect bugs and puddle water from the backyard of her home in

“The satisfaction you feel when things finally work makes you forget all the failure the months before.” It is the thrill of knowing that “you had this important question and then your experiment gave an answer and nobody else at the moment knows it.”

a small village in northern Spain and then sprawled out on the floor to study the specimens using her new equipment. Amelia’s decision to focus on biology was also a no-brainer as soon as she started learning about the cell in school. “I was actually fascinated by the cell and the size of molecules, and how such tiny things could have such interesting functions,” Amelia said.

Amelia had some setbacks in her career and sometimes muses about why she has stuck it out in science. “I must really love it” is the only answer she can provide. “The satisfaction you feel when things finally work makes you forget all the failure the months before,” Amelia said. It is the thrill of knowing that “you had this important question and then your experiment gave an answer and nobody else at the moment knows it,” she explained.

NEXT STEPS

At the heart of the strategy to make a universal HIV-1 vaccine is injecting a series of different versions of a viral component, in this case part of the HIV-1 envelope protein. This strategy is believed to be necessary to induce a broadly protective immune response against HIV-1. Amelia showed during her postdoctoral studies that the first of these injections had to be with a highly engineered envelope protein and that using more natural versions of this component for subsequent injections helped achieve the desired result: broadly neutralizing antibodies that can protect against many different strains of HIV-1. She will continue animal studies at Wistar to optimize sequential immunization approaches.

When Amelia started hearing about COVID-19, she immediately thought that SARS-CoV-2, which causes COVID-19, could be a target for sequential immunization. She suspects this virus will be an easier target than HIV-1

because of the lower mutation rates. She thinks a series of injections with natural versions of spike from a range of newly emerging SARS-CoV-2 strains may lead to broad protection from multiple variants. Amelia sees no limit to the applications of this approach to viruses and bacteria. “The same approach can be translated for all types of pathogens in general that mutate over time,” she said.

BUILDING A PLATFORM

Amelia expected some challenges at the time of recruiting personnel as an early-stage investigator, however, she has been pleasantly surprised. “People are interested in the projects,” Amelia said. “My previous work on vaccine design was well timed so that I can now join the current research workforce aiming to develop new vaccines”.

As a Finalist in the prestigious Blavatnik Regional Awards for Young Scientists in 2020, Amelia has been more motivated than ever to use her special platform to push for the advancement of women in science and all STEM fields. In addition to trying to support and inspire the many female scientists she has mentored, Amelia speaks out to increase representation of women in different scientific environments. She hopes to continue these efforts taking advantage of her new position at The Wistar Institute.

As she grows her research program, Amelia has no shortage of hobbies to help take her mind off science’s many roadblocks. She loves running and just about all outdoor activities. She also disconnects from work by drawing cartoons of characters that live in her imagination. Amelia has even entertained the idea of illustrating books to promote science to help give the next generation of scientists the excitement she had as a young kid.



Studying Immunology and Cancer, Nan Zhang, Ph.D., Delves Into the Mysteries Of Ovarian Cancer Metastasis

WRITTEN BY CARINA STORRS, Ph.D.

Few biologists can say they saw a type of cells for the first time. **Nan Zhang, Ph.D.**, who started at The Wistar Institute in September as an assistant professor, became one of those biologists when, during his postdoctoral research at Washington University in St. Louis, he peered through a microscope into the abdomen of mice and spotted macrophages floating in the cavity. Before that moment, these immune cells had been seen in other compartments in the body, but they were always anchored to tissues.

Nan fondly remembers the day of that discovery, five years ago, and prizes the first video he took of the floating macrophages. “I’m putting this video on my website and trying to put it everywhere. I’m so proud of this, it is really the first of the first,” he said. Along with getting very cool images, Nan’s work shed new light on important functions of these so-called resident peritoneal macrophages. At Wistar, he will use this insight to explore how these cells influence the outcomes of a major disease of the peritoneum, or abdominal cavity: ovarian cancer.

FIRST AND LAST

It almost felt like a sign that Nan’s first job interview was at Wistar, the place he had his heart set on working. The Institute’s triple focus on cancer, immunology and virology aligned perfectly with Nan’s interests. Of course those kind of stakes only made the interview more stressful, but Nan laid it all on the line. He was shocked when he got an offer, and accepted it without waiting to look at any others.

Nan has trouble naming just one reason — or even three — that he is thrilled to be joining Wistar. He is excited that the small private institution will afford him the time to focus on his own research, without classes to teach, at least for the first several years. At the same time, he can get the feel of a larger research community when he wants it by attending seminars and conferences across the street at the University of Pennsylvania. Last but not least, Nan looks forward to the outstanding facilities at the ready for Wistar scientists, including the special two-photon microscope that will be key for his upcoming studies of peritoneal macrophages in living mice.

CHASING MYSTERIES

Growing up in China, there were two main influences that fostered in Nan a general interest in science: conversations with his dad, who is a professor of urban design, and children’s magazines about space science and

other areas of science. Astronomy was actually Nan's first real love in science, and he continues to watch videos and listen to podcasts about the topic. He also enjoyed courses in physics and chemistry, and the calculations behind them — basically anything but biology, which in his high school amounted to just a bunch of memorizations.

At Wistar, he will use this insight to explore how these cells influence the outcomes of a major disease of the peritoneum, or abdominal cavity: ovarian cancer.

One day, when Nan was about 16 years old, while waiting on their bikes at a red light, Nan and a friend embarked on a “what if” conversation that awakened in him a fascination with biology and set him on a new path. The pair mused about whether human beings could become immortal by transplanting the memories of one person into a younger person's body — a science fiction fantasy that Nan noted some people claim they can achieve. It left Nan inspired to ponder ways to improve human health and longevity. When it came time to declare his university major, which in China generally happens at the time of entry, Nan was split between biology and astronomy, but his parents urged him to think about career prospects. He picked biology, reasoning that there will always be jobs for people who study health and disease.

During his Ph.D. research at the University of Oklahoma Health Sciences Center, Nan was struck by another biological mystery, this one more solvable than immortalizing people. As inflammatory cells called neutrophils flood the peritoneal cavity in response to an insult, macrophages — which are immune cells that engulf and destroy invaders — disappeared from the cavity. Nan was so intrigued that he considered switching Ph.D. projects to study this strange phenomenon, which had first been documented decades before, but his advisor cautioned him to stay the course. Instead, Nan read all he could about macrophages in the peritoneum as well as subsets that reside in other tissues and organs, and their different gene expression profiles and characteristics.

By the time he was looking for postdoc positions, Nan had no doubt that he wanted to investigate what peritoneal macrophages were doing and whether they truly had different functions than other subsets of macrophages. What he discovered actually helped solve the puzzle of the macrophage disappearing act. When he injected agents that mimic infection in mice peritoneum, he realized the macrophages clump together, entrapping microbes and clearing them away. Now Nan plans to ask whether the same processes may allow these macrophages to aggregate around ovarian cancer cells, possibly either preventing or promoting metastasis. He will also explore the role of other macrophage subsets in the peritoneum in ovarian cancer progression.

LOOKING OUTWARD

Nan cannot get his research program at Wistar up and running fast enough. For that reason he is pleased that his lab space is right next to the building entrance, no need to climb stairs or wait for elevators. “If I could teleport to work, I would probably just teleport,” Nan joked.

Near the top of Nan's to-do list during his first weeks at Wistar is to apply for another big federal grant to fund his research. It will require a lot of writing, which Nan despised during school and his scientific training. It was actually the major reason he doubted his dream of becoming a professor. But the perfect score and enthusiastic feedback he got for his previous grant, which is supporting his transition to an independent scientist, infused him with the confidence that maybe he could make it in academic research.

In the second half of Nan's postdoc, he made another realization that bodes well for the path ahead: He really enjoys mentoring young scientists and watching them grow. He knows he will be giving them a lot of guidance and cheering along, like his advisors gave him during rough times when experiments did not work. He also looks forward to unleashing the members of his lab to be creative and think crazy thoughts, just as his postdoc mentor encouraged him to do.

As Nan and his wife settle into their new home, he looks forward to nurturing in his five-year-old son the love of science his own father shared with him. Their early discussions together will probably center around Nan's other science fascination, astronomy. As soon as he can, Nan is going to buy his son, and himself, the telescope he has always wanted.

Expanding the Caspar Wistar Fellows Program



L to R: Doug Briggs, Dr. Ami Patel, Dr. Rahul Shinde, Dr. Daniel Claiborne, Peggy Briggs

Two years ago, philanthropists Doug and Peggy Briggs established the Caspar Wistar Fellowship to attract the most talented junior scientists from across the nation and beyond.

ABOUT THE FELLOWSHIP

“If we can find the best and brightest junior scientists, I believe we can move their careers along much faster,” said Doug. “They have the potential, and we are giving them a leg up and hopefully more responsibility than even they think they are ready for.”

These supremely driven and curious scientists have a lot on their shoulders, but have the focus, education and courage to become our next generation of scientific leaders.

Dr. Daniel Claiborne, Wistar’s newest Caspar Wistar Fellow, joins the Fellowship from the Ragon Institute of MGH, MIT and Harvard where he is trying to better understand T cells and CAR T cells for the treatment of HIV. CAR T cells, called chimeric antigen receptor T cells,

are patient-derived T cells that have been engineered to target and destroy a specific antigen on the surface of a cancer cell. They are considered “super charged” immune cells that act like a living drug, latching onto a tumor cell to terminate it. CAR T cells have been developed as an immunotherapy for cancer, but Dr. Claiborne wants to explore their potential against HIV.

“This is a huge opportunity to start my own lab so there is some trepidation, but it’s what I’ve been working towards for 13 years, so I’m also very motivated as well,” says Dr. Claiborne. “The recent publications I worked on were not the end, but the beginning in our effort to understand the hurdles in repurposing CAR T cells for HIV. We learned a lot about what these cells can and cannot do. The big question in the field is, ‘Why do CAR Ts stop working?’

It's an open-ended question and a ton of research has already been done."

Dr. Claiborne brings an entirely different perspective to CAR T research that will enhance our basic understanding of CAR T cells and help inform their use in oncology and immunotherapy.

"The thing we do differently is use a humanized mouse model that carries a functional human immune system," said Dr. Claiborne. "This is a malleable small animal model with actual human cells and T cells so we can learn more about what makes our CAR T therapies fail. And that's largely translatable to more than just HIV infection. It informs basic T cell biology and illuminates what makes T cells do their job or not in many chronic disease states. The ability to do that in a small animal model with a human immune system is powerful and one step closer to the question we all think is important: What causes T cells to lose their function."

Dr. Ami Patel became Wistar's second Caspar Wistar Fellow in 2020 and has lived a pretty incredible year with lots of big changes. Since the start of the pandemic, Dr. Patel has been a key leader in the SARS-CoV-2 vaccine and immunotherapy efforts at the Vaccine & Immunotherapy Center.

"In September, I became a Caspar Wistar Fellow and then a week later, I went on maternity leave," said Dr. Patel. "I truly appreciate this opportunity and it's exciting to pursue my own independent research. I have multiple new experiments in which to design and develop new ideas. And I'm at the early stages building my lab and getting it up and running."

Dr. Patel was recruited to the program after shining in the lab of Wistar's Dr. David Weiner, first as a postdoctoral fellow and associate staff scientist. She was appointed as research assistant professor in 2019.

"As a Caspar Wistar Fellow, my new independent research program is focused on understanding the cellular and immune mechanisms associated with vaccine and immunotherapy delivery and using this information to improve the next generation of vaccines against emerging pathogens that could be tomorrow's next major outbreaks. This is a great opportunity to explore new strategies," she says.

As she is establishing her research program, Dr. Patel is hiring her own team to manage projects that run the gamut of emerging pathogens.

"Now is the time to put my new ideas to the test and drill down on key independent experiments that will lay the foundation for my research," Dr. Patel added.

For **Dr. Rahul Shinde**, Wistar's inaugural Caspar Wistar Fellow, this stage of independence has brought a myriad of research collaborations. His work focuses on pancreatic cancer and how cancer hijacks immune cells called macrophages, which normally stimulate the immune system and destroy cancer and pathogen invaders. Dr. Shinde is trying to elucidate when and how macrophages shift their function from fighting cancer to doing cancer cells' bidding in the tumor microenvironment. He is also interested in the gut microbiome and its connection with modulating tumor progression.

"It has been great at Wistar, and such a positive feeling setting up my lab and working to publish," said Dr. Shinde. "I feel lucky to collaborate with Wistar principal investigators across research fields including autoimmune diseases such as lupus. I'm also exploring pancreatic cancer's tumor microenvironment that fosters cancer growth and therapy resistance. I've been part of several projects making interesting observations."

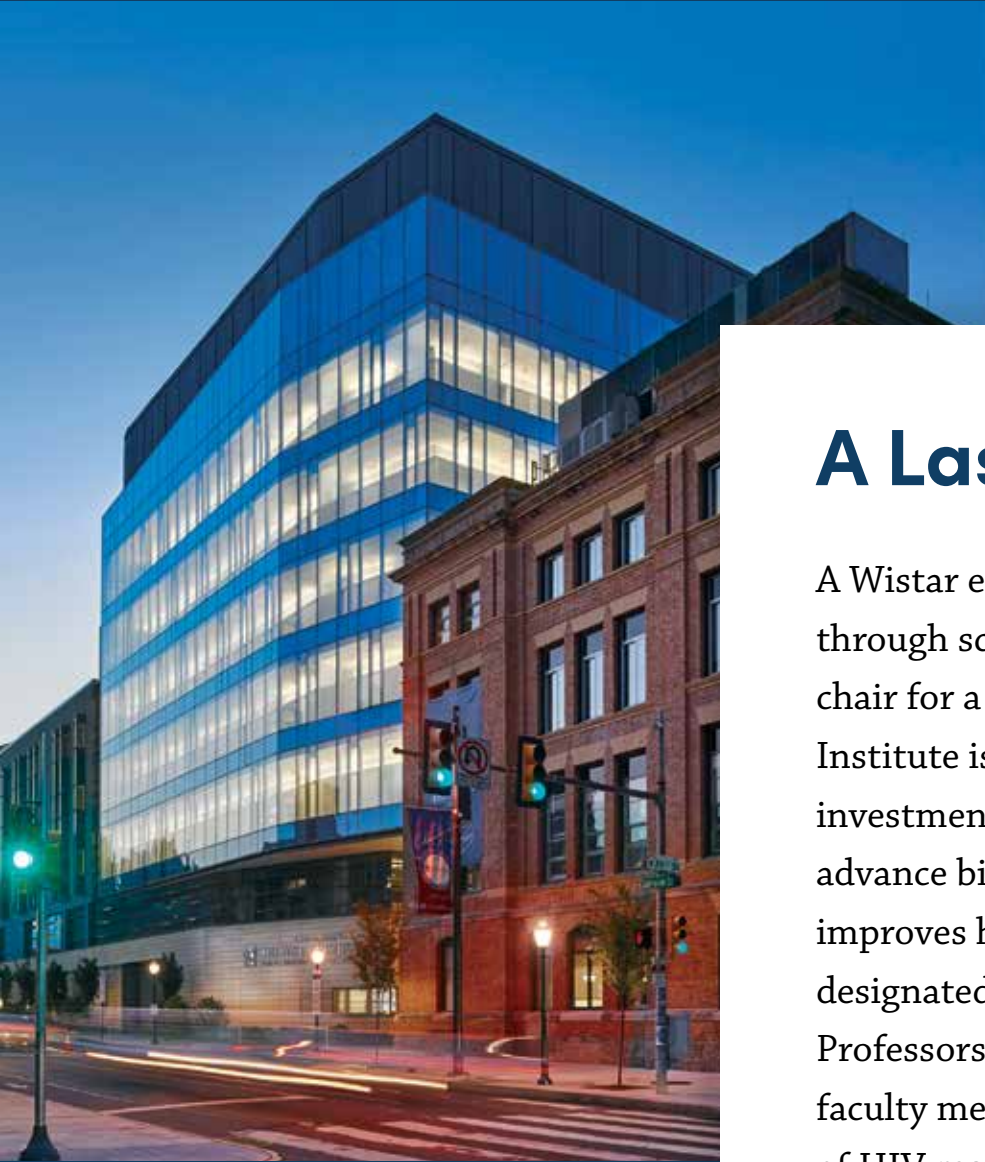
Doug Briggs believes giving strong, sharp-minded scientists a platform to launch their careers is most important.

"Bringing these early-career, star scientists along faster in their careers is helping push the biomedical research dial forward. There are big up sides — for us all — with more and faster success in science," says Doug.

"For Doug and Peggy Briggs to stand up and create this opportunity is very motivating, especially for scientists who do high-risk and out-of-the-box research," said Dr. Claiborne. "It's a huge deal. Pursue your ideas and see where they take you."

The Caspar Wistar Fellowship will continue to boost the potential in early-career scientists it brings to Wistar. With each new Fellow who calls Wistar home, Doug and Peggy's straightforward belief becomes a more powerful engine for expanding research and pushing the Institute to succeed.

Stay tuned for the fourth Caspar Wistar Fellow to be recruited very soon!



A Lasting Legacy

A Wistar endowment saves lives through science. Establishing a chair for a professor at The Wistar Institute is one of the most valuable investments someone can make to advance biomedical research that improves human health. The newly designated Martha Stengel Miller Professorship will support a Wistar faculty member working in the area of HIV research. This planned gift spans three generations of Wistar engagement, tracing all the way back to Dr. Alfred Stengel, Wistar's fifth president/board chair.



L to R: Ken Nimblett, Martha Stengel Miller, Rusty Miller (photo by Paul Meyer)

Multi-Generations of Supporting Wistar Science

Ken Nimblett remembers well the harrowing work that he did to support AIDS services and education in the early days of the epidemic, where he met his future husband Rusty Miller who was also working in the cause.

“It was a scary time. People called the HIV-AIDS hotline in all stages of emotional distress—they were frantic, angry, scared and in need of information and support—and not only gay people,” recalled Ken. “People from all walks of life were calling for more information on this devastating disease.”

As it would turn out, the efforts of Ken and Rusty had impacts that lasted well beyond those calls and the Boston area where they lived. Rusty’s mother, Martha Stengel Miller, who had been deeply involved in service in her hometown of Philadelphia, was so inspired by her son’s commitment to the HIV cause that in 1995 she joined forces with bold, fresh-faced scientist Dr. Luis Montaner at The Wistar Institute.

They were a powerful duo—Martha was a connector and Dr. Montaner was eager to connect the Philadelphia community of people living with HIV to the HIV clinical trials he was advancing. Before she passed away in 2008, Martha played a critical role in the startup funding of Dr. Montaner’s community outreach, and her contributions opened the door to attracting additional funding for HIV research. Together with Rusty and Ken, Martha was also a leading supporter of Dr. Montaner’s global HIV work.

“Martha’s relationship with Luis fostered and funded some of the original Wistar programs,” said Ken. “A whole new piece of her life came alive when she got involved with Wistar. She linked Philadelphia FIGHT Community Health Centers with Wistar and was a part of creating the Jonathan Lax Lectures [a memorial lecture series hosted by Wistar that brings leading HIV researchers to speak to the Philadelphia community]. Martha had a strong affinity to matters that dealt with caring and the health of people. That was her nature; she was that kind of soul.”

Her relationship with Wistar was almost meant to be: Martha’s father **Dr. Alfred Stengel** had been elected to Wistar’s Board of Managers in 1931 and went on to serve as the Board president until his death in 1939.

Thus, Dr. Stengel represents the start of a three-generation lineage that has supported Wistar research. During the last two decades, the Stengel-Miller family has provided essential funding to HIV cure research, thereby paving the way for Wistar innovation.

After Martha passed away, Rusty and his husband Ken continued to carry the philanthropic torch. In 2016, Dr. Montaner was awarded a nearly \$23M National Institute

“Martha’s relationship with Luis fostered and funded some of the original Wistar programs. A whole new piece of her life came alive when she got involved with Wistar.” –KEN NIMBLETT

of Health grant to advance HIV cure research with a dream team of top HIV researchers. Dr. Montaner was to tell Rusty of the exciting major grant in person at that year’s Jonathan Lax lecture, but tragically Rusty died unexpectedly that afternoon of acute cardiac arrest.

“When Rusty died suddenly on the day of the Lax lecture, my world fell apart in the way anyone’s would when one’s spouse dies. We had been a team and I knew I would need to carry on this legacy from his grandfather and mother. To me, continuing to support this work is moving closer to a cure,” Ken said. “Being acquainted with Luis and learning how his work in South Africa and Vietnam became a global endeavor has been inspiring. Wistar is a leader on the forefront and to me that’s worth its weight in gold.”

Following Rusty’s passing, a unitrust that was initially set up by his mother Martha was bequeathed to The

BENEFITS OF ENDOWING AND RECRUITING A DISTINGUISHED PROFESSOR

The most valuable assets in science are the scientists themselves, the people whose creativity, energy, intelligence and insights lead to the discoveries that fuel research progress. The Wistar Institute recruits scientists of the highest caliber who are able to choose where they want to work from among the most prestigious research institutions in the world. Furthermore, the highest recognition the Institute can bestow on a faculty member is the creation of a professorial chair, named in perpetuity in accordance with the donors wishes.

Wistar Institute to support its HIV programs. The gift supported the recruitment of Dr. Mohamed Abdel-Mohsen and allowed Wistar to purchase a cutting-edge digital PCR machine as part of the recruitment offer to Dr. Mohsen. Funds from the Miller Estate were also used to support collaboration and operation of Wistar's participation in the HIV-1 Patient Partnership with Philadelphia clinical care providers, such as Philadelphia FIGHT's Jonathan Lax Treatment Center. One of the strongest and most distinctive features of this program is that it provides patient donors with information on the type of research carried out on the samples they provide.

In early 2021, Ken furthered the commitment started by Martha and Rusty by establishing his own legacy. He pledged an irrevocable estate gift in his will for \$1.5M to name an endowed professorship in memory of his mother-in-law. The Martha Stengel Miller Professorship will support a Wistar faculty member working in the area of HIV research. In the event that HIV research is no longer needed due to a cure, the professorship will be directed to a faculty member working in infectious disease research, including pathogens that are emerging or that continue to plague our society. It is in line with the steadfast support that Martha, Rusty and Ken have provided to the Institute over their long tenure as friends of Wistar.

"I fully embrace the establishment of the professorship in Rusty's mother's name, which I know would please Rusty greatly and would create a lasting acknowledgement of her, her father's and of course Rusty's commitment to Wistar, particularly for the HIV research program headed by Luis," said Ken. "As we know, Martha and Luis developed a firm and fast relationship when she embraced and supported the programs he came to build and oversee. That it falls now to me to further this vital work is something I do not shy away from."

"This will secure the prominence of infectious disease research at Wistar into the future - as well as honor the commitment from Martha in helping jump-start the HIV program back at its start," said Luis. "It is fitting that as she trusted in Wistar back then, this Professorship now expands this trust and vision into the future."



GROSS CLINIC

Philadelphians proudly tout a rich history of firsts: The nation's capital, the first hospital, medical school, zoo, library, to name a few, and *Wistar—the first biomedical research institute*. And driving these historic achievements, are amazing thinkers, movers and shakers who innovated.

Wistar claims many famous minds, and one in particular is **Dr. Alfred Stengel**. Born in Pittsburgh in 1868, Alfred Stengel attended the University of Pennsylvania medical school. A gifted student, he was also a leader, and it was his class that commissioned a celebrated Thomas Eakins' painting *The Agnew Clinic*, honoring the retirement of his medical professor D. Hayes Agnew. In fact, Dr. Stengel is in the painting.

In 1889, Stengel became a doctor, went on to a Philadelphia General Hospital residency, and then an illustrious career at Penn Medical School and Lankenau, and then returned to Penn as assistant to Dr. William Pepper, professor of medicine and provost at University of Pennsylvania. In 1930, Dr. Stengel was elected to Wistar's Board of Managers and served as the Board president from 1931 until his death in 1939.

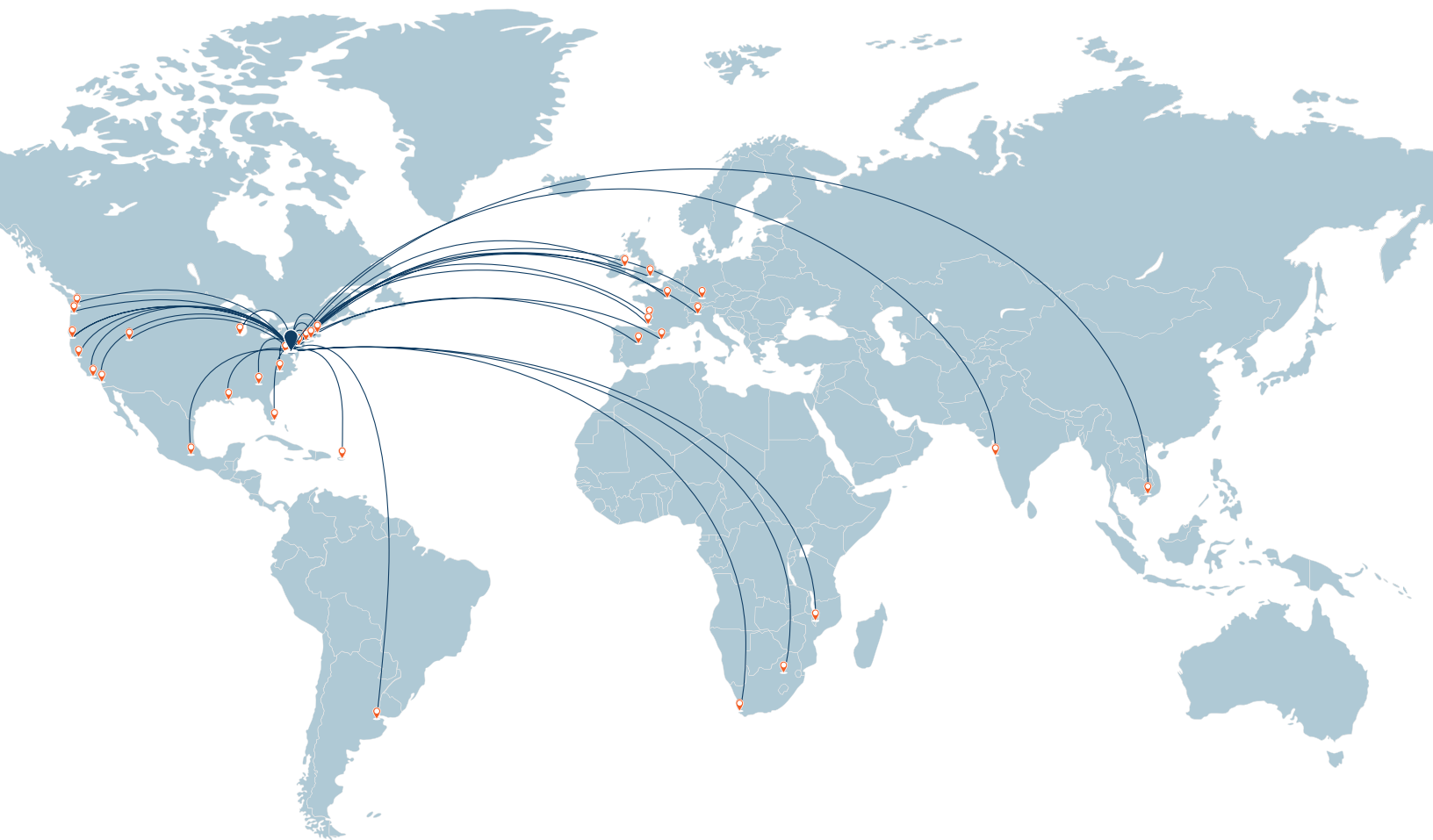


Global Health & Partnerships

Leading from its core values of determination, daring and humanity, The Wistar Institute fosters a local and global community that is unified by bold scientific thinking, leadership and a collaborative spirit. Thought leaders from nonprofits, healthcare, pharmaceutical and biotechnology companies, governments and other agencies of influence choose to work collaboratively with Wistar scientists to accelerate the creation of new therapies for patients worldwide.

Throughout its history, Wistar has been known as a value-adding partner that collaborates with people from diverse geographies, research areas and backgrounds to solve problems. Wistar's advantage as a nimble, transparent and small research institute, with little bureaucracy, promotes collaboration and engagement with a wide audience.

We are committed to leveraging our international experience and engaging our partners to accelerate a path to therapeutics, vaccines and diagnostics. This map illustrates Dr. Luis Montaner's collaborative local and global network that is advancing research toward a cure for HIV-1.



Local and Global Research Collaborations in the Montaner Lab



Progress Toward an HIV Cure

Dr. Luis Montaner is a transformative leader in HIV research. Throughout his tenure at Wistar, his discoveries to find an HIV cure have elevated both the prestige and scientific prowess of the Institute while most importantly, helped inform the treatments for people around the globe suffering from HIV.

Montaner has spent the last 26 years at The Wistar Institute researching HIV infection and how to boost the immune system to fight the disease. With the goal of advancing treatment strategies toward HIV eradication, his research combines virology and immunology to study the mechanisms of HIV virus infection. Montaner is also involved in overseeing patient enrollment into innovative clinical trials through advocacy partners such as Philadelphia FIGHT, and this summer, he and his partners were awarded a \$29.15 million Martin Delaney Collaboratories for HIV Cure Research award to the

BEAT-HIV Martin Delaney Collaboratory to advance combination immunotherapy research towards a cure for HIV. This funding extends a grant originally awarded in 2016 based on research progress to date.

Dr. Luis Montaner joined Wistar in 1995 as an assistant professor and was promoted to professor in 2007. He holds many positions at Wistar including vice president, Scientific Operations; Hebert Kean, M.D., Family Endowed Professor; associate director for Shared Resources, The Wistar Institute Cancer Center; and director, HIV-1

Immunopathogenesis Laboratory and leader, HIV Research Program. Since his arrival, Luis has been a proponent of the power of scientific collaboration. He believes that by joining intellectual and resource strengths with partners, he can advance research faster and achieve better outcomes. As illustrated in the map, the Montaner lab collaborative studies extend from Philadelphia across the United States and Puerto Rico to Mexico, Europe, South America, Southern Africa, and Asia.

His work relies on laboratory models of viral infection, such as animal models, together with clinical cohort studies, to provide a clinic-to-bench research program. This approach informs new strategies to combat HIV that may also change how we think about prevention and treatment of other infectious diseases and cancer.

“Research moves faster and with greater impact when you bring together several experts with different knowledge and areas of discovery,” said Dr. Montaner. “Just like an orchestra conductor can draw different sounds to support the execution of a symphony, the ability to draw from basic researchers, animal model experts, clinicians, industry experts, international advisors, and community members under a common shared effort helps us accelerate progress towards an HIV cure.”

Nothing exemplifies the power of collaboration more than the incredible progress the HIV research field has enabled over the last forty years in diagnosing, treating, and preventing HIV. Even recently, from 2010 to 2017, the rate of HIV-related deaths among people 13 years and older in the United States fell by nearly half according to a study from the Center for Disease Control and Prevention.

Much has been accomplished in the HIV research field, however there is still so much more to do, including the continued pursuit of a successful HIV vaccine and ultimately a cure for HIV. In this pursuit for a cure, Dr. Montaner currently leads one of the largest coalitions of NIH-funded, HIV cure-directed research under the BEAT-HIV Delaney Collaboratory. This enormous consortium

brings together more than 70 top HIV researchers from academic research institutions around the world working with government, nonprofit organizations, and industry partners to test combinations of several novel immunotherapies under new preclinical research and clinical trials. The common goal of the Collaboratory is to achieve an accessible and safe strategy that can either sustain control of HIV without the continued use of current therapies and/or eradicate HIV.

While global collaborations are important, Luis has always been a huge proponent of the power of local collaborations. Within Philadelphia, his lab has a long-standing partnership with Philadelphia FIGHT, a comprehensive health services organization providing primary care, consumer education, research and advocacy for people living with HIV/AIDS and those at high risk. Representing an academic-community partnership that is unique in HIV research, Philadelphia FIGHT and the University of Pennsylvania along with the Robert I. Jacobs Fund of The Philadelphia Foundation, developed the HIV-1 Patient Partnership Program to provide clinical material for basic research and to sponsor the Jonathan Lax Memorial Lecture. Research with clinical material obtained from this Program is focused on mechanisms of AIDS immunopathology. This collaborative link between Montaner’s research team and more than 5,000 people living with HIV/AIDS in the Philadelphia region has led to the largest HIV Cure clinical trial to date — the BEAT-HIV Study. Their partnership with Philadelphia FIGHT strives to develop trusted relationships and maintain meaningful, bi-directional lines of communication between scientists and communities most affected by HIV. HIV Social Science has been a recent addition to the Montaner lab program to enhance both their preclinical and community engagement efforts.

Opportunity for progress is unique and unparalleled at present but so is Wistar’s collective responsibility to deliver.

Making Vaccines More Accessible to Improve Global Health

Combining Expertise

The Wistar Institute and Batavia Biosciences Partner to Expand Rubella Vaccine Manufacturing Around the World

WRITTEN BY CARINA STORRS, Ph.D.

Companies that make rubella vaccines have been getting harder and harder to come by. The global production of the rubella vaccine, supplied in combination with measles, mumps and varicella vaccines, which is the typical route for rubella immunization, is limited to a small number of manufacturers, which could threaten the ongoing global supply of these critical medicines.

This situation is exactly what The Wistar Institute wants to avoid. In the 1960s at Wistar, Stanley A. Plotkin, M.D., now a professor emeritus, developed the rubella vaccine that put an end in much of the world to the epidemics that caused infants to be born deaf and have other defects. Dr. Plotkin's vaccine strain is used today in most of the 173 countries that include rubella in their national immunization programs. "As the originator of the rubella vaccine, Wistar has a mission to protect its longevity," said Heather Steinman, Ph.D., MBA, Wistar's vice president for business development.

To that end, Wistar has made strides over the years licensing the rubella vaccine to companies in developing countries. But that approach has downsides. It can take companies many years to bring the vaccine, which Wistar supplies as research-grade seed stock called RA 27/3, through the many stages of testing, manufacturing and clinical development that are required before the rubella

vaccine can be administered to people. It is a substantial investment of resources for vaccine manufacturers, and at the end of it, there is little to no profit for the vaccine manufacturers, noted Heather.

A new partnership that Wistar announced in April 2020 with Batavia Biosciences, based in the Netherlands, is poised to overcome these hurdles and quickly expand access of this critical vaccine in developing countries. Together the non-profit and industry pair can deliver new vaccine manufacturers all the resources to get up and running. Wistar will provide its vaccine seed stock while Batavia will rely on its extensive vaccine production expertise to support technology transfer and assist vaccine manufacturers throughout the preclinical and clinical development processes. "Public-private partnerships are critical to fixing global problems, it just made sense for Batavia and Wistar to work together," Heather said.

This international academic-industry collaboration would not be possible without funding from a non-profit partner, the Bill & Melinda Gates Foundation. Wistar received a \$1M grant at the end of 2019 to allow the institute to archive its RA 27/3 seed stock and transfer the necessary supplies to Batavia. “The generous support from the Gates Foundation, which like us has a mission to address some of the world’s most pressing global health challenges, has had a tremendous impact on our partnership with Batavia and has allowed us to advance the work on rubella vaccines beyond Wistar,” said Anita Pepper, Ph.D., Wistar’s vice president for institutional advancement.

PACKAGING EXPERTISE

The Wistar-Batavia partnership means that vaccine manufacturers that license the rubella vaccine from Wistar will receive a “complete starter kit” of information to speed their entry into the market, said Christopher Yallop, Ph.D., chief operations and scientific officer of Batavia Biosciences. The package, which should be ready by the first half of 2022, will include the production methods that Batavia developed, as well as the virus stock and cells that the company can grow in their facility to propagate more virus. And because Batavia will provide the virus produced using GMP (good manufacturing practice), companies can use it to start clinical trials immediately, as they will have to do to validate the vaccine’s effectiveness and safety in their region.

On top of the one-stop-shop nature of the package, vaccine manufacturers may choose to further benefit by receiving methods that Batavia developed to make rubella vaccine production more efficient. By using new approaches to manufacture the vaccine and new types of equipment, Batavia managed to intensify the process to propagate virus by about 20-fold, which in turn reduces the number of people involved, the overhead and materials costs, reducing the overall cost of the vaccine.

“Many of the vaccines that have been around since the 60s and 70s are made with technologies that were developed in the 60s and 70s so they are not really up-to-date,” Chris said. By increasing production efficiency, “companies can sell the vaccine at a price that the world can pay while being sustainable for them.” Batavia has been involved in collaborations with other academic partners, which were supported by the Gates Foundation, to improve efficiency of production of many global health vaccines including polio, measles & rubella and rotavirus vaccines.



ROLLING OUT

Now that the Wistar-Batavia collaboration has hit its major milestones, it is ready to set up licensing agreements with interested vaccine manufacturers and ship out the package. Both partners expect this step to be an easy one, with the extensive networks of vaccine manufacturers they each have in developing countries. Wistar is already working with vaccine manufacturers in underrepresented countries, Heather noted. India is one of a growing number of countries to add the rubella vaccine to its childhood immunization program, which it did in 2017.

As companies work to join the rubella vaccine market, they will invariably encounter technical issues and require support. Batavia will be the main go-to for addressing these issues, although Wistar will also be involved if they can offer guidance based on their decades of experience growing and studying the rubella vaccine strain, Chris noted.

Speaking to the unique strengths of the academic-industry partnership, Chris highlighted the extensive and complementary skill sets of Wistar and Batavia. No academic research center, whether a small private institute such as Wistar or a large university, can invest the time to develop the vaccine production conditions as Batavia and other life sciences can. On the other hand, Batavia does not have Wistar’s long history of discovery and study of the vaccine. The two are already discussing how they can apply the model for rubella vaccine production to other vaccines and medicines.

“From discovery of the vaccine to licensing, it is almost like Wistar is the beginning and the end of the rubella vaccine chain,” said Anita.



Training the Next Generation of Scientists

The goals of The Wistar Institute's education and training programs are twofold: First, to create a rigorously trained and sustainable workforce for the life sciences in our region and beyond; and second, to create a diverse talent pipeline that advances groups traditionally underrepresented in biomedical research. Wistar laboratories have long been beacons for education and training in our region and around the world. Our Institute hosts the entire continuum of research training, from high school students, to undergraduate and graduate students, to postdoctoral fellows. Wistar education and training programs are numerous, impactful and highly regarded nationally and internationally, providing a foundation for further expanding our educational mission. The future is bright as we expand and scale our successes, due in part to generous foundation and individual donor funding.

1



Ebony N. Gary, Ph.D.
Postdoctoral Fellow

Through her work with DNA vaccines, Gary hopes to find new ways to improve vaccine efficacy and solve challenging global health issues

 Watch her story at wistar.org/ebony

2



Pratik Bhojnarwala
Predoctoral Trainee

After losing two family members to the disease, Bhojnarwala is working to design personalized cancer vaccines for all patients.

 Watch his story at wistar.org/pratik

3



Michael Zhu
Predoctoral Trainee

Zhu is employing next generation technology in his work to create a COVID vaccine that uses nanoparticles.

 Watch his story at wistar.org/michael

“If there is one thing that we learned from the tragedy of the COVID-19 pandemic, it is that we need more science, more scientists and more innovators in STEM careers and the life sciences. Like we always say at Wistar, science is the answer.”

Dario Altieri, M.D.

President and CEO, director of the Cancer Center, and the Robert and Penny Fox Distinguished Professor of The Wistar Institute



The Expansion of Wistar Training Programs

The Wistar Institute Receives Transformative National Science Foundation Grant to Expand and Accelerate STEM Training Program

The Wistar Institute received a \$599,969 grant from the National Science Foundation (NSF) to scale up its Biomedical Technician Training (BTT) Program to train more students in a condensed timeline with a direct path to employment.

“The new NSF award will be truly transformative for supporting innovation in education and training, fulfilling our goal of creating a unique framework that merges teaching and job creation in the life sciences in a single, seamless continuum in our region and beyond,” said Dario Altieri, M.D., president and CEO, director of the Cancer Center, and the Robert and Penny Fox Distinguished Professor of The Wistar Institute.

Since 2000 The Wistar Institute’s BTT Program, a two-summer, hands-on, mentored technician training program, has prepared Community College of Philadelphia (CCP) students for positions in academic and biotechnology laboratories. This NSF grant will support a substantial expansion of this program with innovative curricula and the inclusion of additional community colleges.

During the new NSF-supported program, named Expansion, Curriculum Evolution, and Enhancement during BioTechnician Training (ExCEED BTT), students will follow an accelerated, one-summer pre-apprenticeship training including a hands-on orientation at Wistar and two full-time, mentored laboratory experiences in academia and industry. Program graduates will be prepared for immediate employment as laboratory technicians and may also continue training through Wistar’s registered Biomedical Research Technician (BRT) Apprenticeship.

The BTT and BRT Programs will continue to provide training and research experiences not typically available to associate degree students, a segment of the workforce that is indispensable to support the success of an ever-expanding biotechnology sector. ExCEED BTT



“The most effective way to increase diversity in research is to provide training opportunities for everyone and to support students from underrepresented groups to meet their full potential and access career paths in the life sciences.”

Kristy Shuda McGuire, Ph.D.

will allow Wistar to continue to train a diverse and underrepresented student population not generally included in life sciences research.

“The most effective way to increase diversity in research is to provide training opportunities for everyone and to support students from underrepresented groups to meet their full potential and access career paths in the life sciences,” said Kristy Shuda McGuire, Ph.D., Wistar associate dean of biomedical studies and principal investigator on the grant. “For 20 years, our educational programs have moved in that direction, and we are thrilled to be able to enhance our training thanks to NSF support. We hope this program will also serve as a model for other community colleges and scientific research partners.”

ExCEED BTT has three primary goals: expand the program to recruit more students from additional community college partners, while developing collaborations that make ExCEED BTT credit-bearing; develop a project-based curriculum specifically tailored to teach biotechnology research skills and engage students from underrepresented groups; and enhance the existing two-summer program as a one-summer pre-apprenticeship training experience with full-time internships in both academic and industry labs.





Cheyney University Students Kick Off Their Biomedical Research Journey at Wistar

Last February, Wistar welcomed the inaugural group of Cheyney University students enrolled in the biomedical research and training program co-developed in 2020 by the nation's first biomedical research institute and the nation's first historically black college and university.

“As a biomedical research instructor and someone who loves science, I firmly believe that the way to teach it effectively is to have the students do science. I am really excited to give these students an authentic research experience at Wistar.”

This statement by Dr. Kristy Shuda McGuire, dean of Biomedical Studies at Wistar, summarizes this initiative, which was recently launched to provide students with

hands-on, real-world experience in the lab and introduce them to the many career paths in biomedical research.

To maximize the potential of the Wistar – Cheyney alliance in research and business development and support other Wistar workforce training programs, the Institute has assembled a Workforce Advisory Council including experts from the local biotech arena and academia. The Council helps forge and oversee new connections, match students with internship opportunities, and advertise the programs, expanding Wistar's presence in the Philadelphia life sciences community.

The strategic collaboration between Wistar and Cheyney will provide career development opportunities, preparing students for future jobs in science while they earn their degrees.

“At Cheyney University, we constantly look for new partnerships that can create more opportunities for our students,” said Dr. Nicole Santerre, assistant professor of biology at Cheyney and one of the instructors of the course. “Wistar seemed like it was a partnership that was meant to be. It was very exciting to work on this project because it was built with our students in mind the whole time.”

The Cheyney students were the first to learn in Wistar's brand-new teaching and training lab, a 1,500-square-foot education suite featuring open bench space, a tissue culture room and an instruction area equipped with smart TV access.

In this setting, students have taken the Biomedical Research Methods course, which represents the first half of the curriculum, learning cutting-edge techniques under the mentorship of Drs. McGuire and Santerre.

“Our approach to training the students is to let them work independently to learn how to follow a protocol, while we are there to answer questions, give directions and correct any techniques,” said Dr. McGuire.

Whether hard-core science enthusiasts with a future in the lab or aspiring physicians who want to learn more about research, all the students were excited to be part of this program and think it has made a difference for them, each in a unique way.

Abimael Bellinger, a sophomore in biology, has been attracted to science since he was a child. He thought he wanted to go to medical school; but his experience at Wistar is helping him see that research is an area he wants to explore as a career, and he's now considering taking the M.D./Ph.D. route.

“Undertaking lab work at your college is not the same as actually performing the experiments in a real lab. At Wistar, we had an opportunity to connect what we read in books with how to apply it,” said Abimael. “I also love that we’ve been taught independence: We learned together and worked side by side but each of us did our own experiments — it was a very individualized experience.”

Amber Young is a senior in biology and in the pre-medicine track. She wants to be a psychiatrist and realized that she needs to be in the know on the latest research, so the Wistar course gave her a chance to explore the scientific world.

“I learned that I could go into research, not just work on the floor with patients. This experience revealed to me that I would be very well suited to work in a lab and that I also have other options besides becoming a nurse.”

Jamila Roper

“Every student should take this course to get one-on-one experience and find out their capabilities in science,” Amber said. “I’ve always been fond of science because I love exploring and there’s always something new to discover,” she added. “I know there’s a world full of opportunities for me in science but I was nervous about working in a lab. I thought I was going to mess something up, start a fire... Until I came to Wistar and the instructors patiently encouraged me, made me feel comfortable and pushed me forward.”

“When I teach students science in the classroom, I try to talk the least amount possible and instead to ask questions to get them talking and engaged,” said Dr. Santerre. “This approach works in the lab as well. When students ask questions, we ask back: What do you think you are supposed to do? What are you trying to achieve? They eventually come up with answers on their own.”

“I had never had lab experience before and was anxious,” added Lauren Ballard-Coleman, also a biology major in the pre-medicine track. “But I realized I shouldn’t be nervous because this course takes an intimate approach

and lets everyone move at their own pace. I really appreciate that and I can now breeze through a protocol on my own!”

Lauren wants to be a physician. It’s her drive and passion and what she feels is meant for her. She knows that the experience at Wistar gave her useful knowledge and will help her stand out on her application to go to med school.

Zainab Sulaiman, a junior majoring in biology, will honestly say that she wasn’t cut out to do research in a lab but to instead work with patients. Yet, she welcomed the opportunity to participate in this course because she’s interested in learning more about research and thinks it’s important to enhance her knowledge on how to work in a lab.

“I learned that I could go into research, not just work on the floor with patients,” said Jamila Roper, a senior biology major in the pre-nursing track. “This experience revealed to me that I would be very well suited to work in a lab and that I also have other options besides becoming a nurse.”

Students did not just learn techniques, they explored real research taking place now in the lab of Dr. Maureen Murphy, who studies the impact of some p53 genetic variants on cancer risk in people of African descent. Working with normal cells and cells that contain one of these variants, students were tasked with investigating the differences at the DNA, RNA, protein and cellular levels.

“Wistar also arranged to have guest speakers of African descent talk about their own journey, how they got where they are, some of the hardships students may encounter both academically and socio-economically, and how they can overcome and succeed,” said Dr. Santerre.

“I’m very excited that some of the students will pursue 12-week research internships in Wistar labs this summer,” said Dr. McGuire. “Some will come back to Wistar in the fall, joined by new students, for the Life Science Innovation course, where they will explore key concepts related to intellectual property, regulatory affairs, and commercialization.”

“Some of the students in this inaugural group had been in a lab before and were more confident; some had never been and were not. It’s been amazing to watch them learn and see how much confidence they’ve gained in just a few weeks. At the end of the course, you couldn’t tell who was who,” Dr. Santerre added. “They were all very excited to be at Wistar and can’t wait to take the knowledge they are acquiring onto wherever they go in the future.”



Our Educational Partnership with Leiden University Medical Center



Dr. Pancras Hogendoorn, dean of the Leiden University Medical Center, and Wistar's Dr. Anita Pepper at the official ceremony to sign off on the Wistar-Schoemaker International Postdoctoral Fellowship.

Throughout its history, Wistar has successfully cultivated strategic relationships to accelerate the development of its discoveries toward the clinic. Recognizing that the potential of scientific discovery in biomedical research extends well beyond our borders, The Wistar Institute has recently expanded our international graduate student and post-doctoral training programs in immunology, cancer research and vaccine biology.

In the fall of 2019, the **Wistar-Schoemaker International Postdoctoral Fellowship** was launched in partnership with Leiden University Medical Center (LUMC) in the Netherlands. This postdoctoral training program brings LUMC graduates to Wistar for their postdoctoral training under the mentorship of a Wistar faculty member. The Wistar-Schoemaker Postdoctoral Fellowship builds upon the legacy of the late Hubert J.P. Schoemaker, Ph.D., a visionary pioneer in biotechnology and a native of the Netherlands, who was the co-founder of Centocor, now Janssen Biologics. Centocor engaged in an auspicious collaboration with Wistar to advance the Institute's seminal research in monoclonal antibodies into a commercial platform. More importantly, Schoemaker believed in mentoring the next generation of innovative scientific leaders, which is the inspiration behind this program.

Together with Wistar's work with Batavia Biosciences, the Wistar-Schoemaker Postdoctoral Fellowship is set to reprise the historical collaboration between Wistar and the Dutch biomedical research arena, expanding Wistar's international partnerships in research and education and promoting scientific exchange between investigators in the Netherlands and the United States.

Due to the COVID-19 pandemic, a hold was placed on international travel and students were unable to begin their training at Wistar in 2020. However, designed with training in mind, the program also created a connection to establish new scientific collaborations between the two institutions that share several areas of research interest. Eager to begin the partnership, Wistar and LUMC came together for virtual seminars between the scientific leaders and faculty from both institutions to highlight potential collaborative avenues.

It is exciting to think of all of the potential scientific, cultural and commercial collaborations that are possible between the Philadelphia region and the Netherlands. Wistar is proud to play a small role in this developing relationship and looks forward to more partnerships in the future.



VISIT FROM THE NETHERLANDS

In June, 2021, Wistar leadership met with the Consul General of the Kingdom of the Netherlands, Mr. Herman Quarles van Ufford and team to discuss our joint missions, exciting scientific collaborations and contributions to the life science community, including the Schoemaker International Fellows Program with Leiden University Medical Center, to our work on rubella with Batavia, to our interest in advancing multi-investigator research collaborations and corporate partnerships. There is a great deal to be excited about – and so much more that we can do that would benefit both the Philadelphia region and the Netherlands.

“Building more opportunities for international exchange in the training of junior scientists benefits all those involved. International mobility offers invaluable opportunities for personal and professional development for students and trainees. At the same time, they enrich the host institution with their scientific and cultural background and, when they return to their home countries, they propagate the knowledge they’ve acquired and the scientific approach they have been exposed to. Last but not least, exchange programs create new opportunities for research collaboration.”

–DR. DARIO ALTIERI, WISTAR PRESIDENT AND CEO.

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