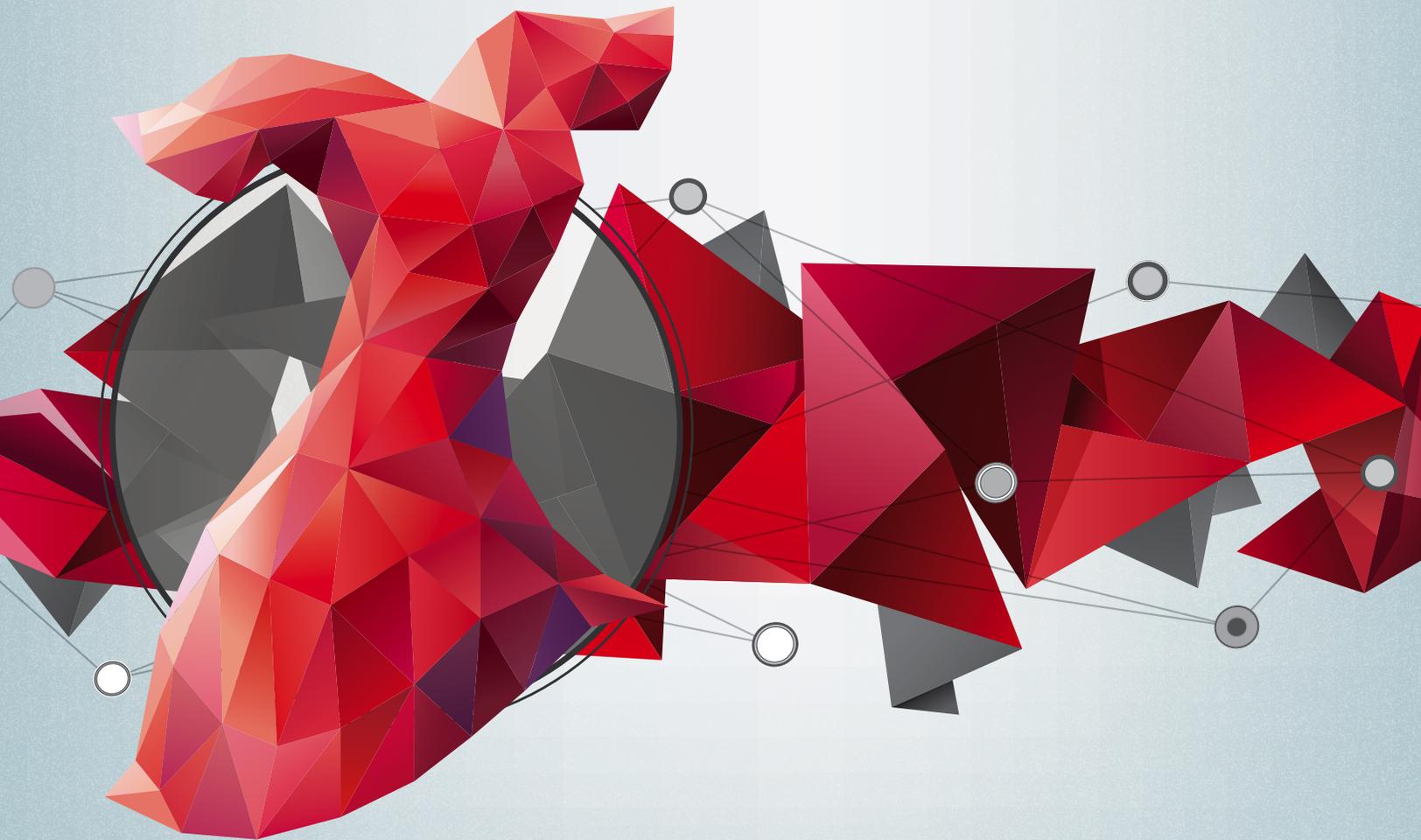




END OF NETWORK REPORT

GO RED FOR WOMEN



STRATEGICALLY FOCUSED RESEARCH NETWORK

For nearly 100 years, the American Heart Association has been dedicated to funding research into cardiovascular disease, which is a leading cause of death worldwide and the No. 1 killer of women in the United States.

An estimated 43 million women in the U.S. are affected by heart disease, and 90% have one or more risk factors for developing associated conditions. Despite this, however, many lifestyle, genetic and physical factors are not yet fully understood, and women often present with symptoms distinct from male patients.

To further investigate these disparities and explore preventive measures, the American Heart Association — the largest not-for-profit funder of cardiovascular disease and stroke research in the U.S. — focused on women's cardiovascular health for its recent Strategically Focused Research Network. These networks were established in 2014 to fund research, with \$20 million provided for the Go Red For Women SFRN launched in 2016 through funding from longtime donor Sarah Ross Soter and Bill Soter, with support from the AHA.

Five centers across the U.S. were chosen along with 17 fellows as researchers completed basic, clinical and population studies while promoting cross-collaboration and supporting the work of trainees. The projects focused on a range of topics addressing women's cardiovascular health and risk factors, including heart failure, pregnancy, sedentary behavior, sleep and stress.

The AHA awarded 3.7 million to each of the following five institutions:

- **Columbia University Irving Medical Center** studied how sleep patterns, especially inadequate sleep, contributed to nutritional habits and disease, particularly in older and post-menopausal women.
- **Johns Hopkins Medicine** researched the differences and higher incidence of heart failure with preserved ejection fraction in older women as opposed to men, monitoring a variety of factors including heart wall thickness, enzyme function and hormones.
- **Magee-Womens Research Institute** investigated how pregnancy affects women's cardiovascular health and future risk of hypertensive disorder, heart disease, stroke and other conditions — whether or not these issues were present before or during labor and delivery.
- **New York University School of Medicine** investigated coronary heart disease differences between male and female patients, who often suffer heart attacks despite presenting with non-obstructed arteries.
- **University of California, San Diego** explored the harmful effects and how to combat sedentary lifestyle patterns among older female members of the Latina community, trialing different types of educational and behavioral interventions.



Dr. Kristin Newby

Researchers published more than 200 papers after recruiting patients, analyzing data and pursuing unique lines of investigation into risk factors, trends and therapies involving heart disease in women. Fellows and their mentors also presented study goals and findings to conferences and universities across the country.

"Heart disease in women, across the spectrum of heart disease, has been understudied," said Oversight Advisory Committee Chairperson **Kristin Newby, M.D.** "This network studied everything from heart failure in women who

basically have normally functioning hearts — what we call heart failure with preserved ejection fraction, it's much more common in women, very difficult to treat, few treatment options but particularly relevant to women — to diseases of pregnancy, which are unique to women and have numerous downstream health consequences from hypertension to delayed future cardiovascular disease; to coronary disease, which is the most common cause of death in Americans overall but presents differently in women both at a symptom level and also at an anatomic level."

The Go Red for Women SFRN, she said, "really covered the waterfront of heart disease in women at a level of depth that I don't think has been done to this point."

SFRN CENTERS: GO RED FOR WOMEN

Columbia University Irving Medical Center

Center Directors: Marie-Pierre St.-Onge, Ph.D.;
Lori Mosca, M.D., Ph.D., M.P.H

Sleep — or the lack thereof — was the focus of research at Columbia University Irving Medical Center, which recruited pre- and post-menopausal women to study how restricted vs. adequate sleep patterns can affect cardiovascular health.

“There’s very little information about the negative influence of poor sleep in older adults and women transitioning across menopause,” said **Center Directors, Marie-Pierre St.-Onge, Ph.D., and Lori Mosca, M.D., Ph.D., M.P.H.**

“We had done studies that showed that restricting sleep — very severely restricting sleep — increased food intake and could lead to obesity, which increases the risk of hypertension and cardiovascular disease,” St.-Onge said. “We thought, perhaps, there’s specifically in women, a link between poor, short sleep duration and cardiovascular disease.”

The study recruited 20 post-menopausal and 20 pre-menopausal women, excluding participants with underlying conditions such as depression or other factors that could influence sleep degradation. Once participants were selected, they were first studied during adequate sleep periods and then instructed to reduce their sleep nightly by an hour and a half for a six-week period. Monitoring included blood work, sleep diaries, tracking wristwatches and, at the end, ambulatory blood pressure monitors.

“What we did was restrict sleep but to a smaller extent than we had done in the past — but for a longer period of time, which reflects more closely what short sleepers actually do in the general population,” St.-Onge said.

Blood results and other data are still being analyzed, but findings so far can already teach lessons for the general population and health care professionals, St.-Onge said.



Dr. Marie-Pierre St.-Onge



Dr. Lori Mosca

Not only were blood pressure readings better when women received adequate sleep; stable schedules, including regular bedtime and rising times, also seemed to improve circadian rhythms and other markers.

“It’s important for the population and health practitioners to know that sleep quality is something that should be asked about in health encounters. Just as you would ask about diet, just as you would take blood pressure and weight, just as you would ask about a person’s mood, you should be asking about their sleep,” St.-Onge said.

Columbia University Irving Medical Center
at the Go Red SFRN Kickoff Meeting



Johns Hopkins University

Center Director: Pamela Ouyang, M.B.B.S., M.D.

Heart failure affects an estimated 6 million Americans each year. Nearly half of cases requiring hospitalizations are caused by heart failure with preserved ejection fraction, also known as HFpEF. This occurs when the left ventricle can contract or pump normally but is unable to relax between heartbeats, which can lead to higher pressure within the muscle.

Johns Hopkins used AHA funding to focus on HFpEF and why the condition is more common in older women, particularly African Americans. Despite the prevalence of HFpEF, there are no specific effective treatments. Johns Hopkins conducted studies to identify whether sex hormones are a significant factor in the problem and sought to identify potential solutions, tests and therapies.

Much of the study focused on cyclic GMP (cGMP), a signaling molecule, or “second messenger,” vital to organ function, that produces its effect through the enzyme protein kinase G (PKG).

“We were interested in the sex differences but also that the underlying mechanisms leading to HFpEF may be very heterogenous and maybe there are subgroups within that population, and, ultimately, therapy may need to be focused in different subgroups, as opposed to one-size-fits all — and maybe that’s why studies to-date have not shown particular therapies that have helped the overall population,” said **Center Director Pamela Ouyang, M.B.B.S, M.D.**

Patients were recruited from a heart failure pool for the clinical studies, and data was also analyzed from cohorts of participants that had already been studied for decades. The basic, clinical and population studies included biopsies, blood work, exercise tests and MRIs to look at muscle and fat distribution. A separate study in mice looked at the function of estrogen and ovaries when it came to heart pathway modulation.

Some findings have already been enlightening and, at times, surprising.

“What our team found was that many of the patients with HFpEF had a condition called amyloid,” said Wendy Post, M.D., M.S. “abnormal protein deposits in the wall of the heart — and that makes the heart stiff, makes the pressure go up and can cause HFpEF. So, with these biopsies, we saw a relatively high prevalence of amyloid in HFpEF. I think that’s leading to a greater awareness of the fact that, when we see older patients who are more likely to have amyloid who also have HFpEF and thick heart wall muscles, we should also do a complete work-up for amyloid, which is now treatable.”

When it came to heart wall thickness relative to cGMP, studies concluded the opposite of what researchers had expected, Post said. They had assumed lower levels of cGMP would be associated with thicker muscle — often a precursor or indicator of HFpEF. But it turned out that higher levels were a better predictor because the body was producing more as a “compensatory mechanism.”

“So, it appears that higher cGMP in the blood is a marker of future risk,” she said.

Johns Hopkins University Center



Dr. Pamela Ouyang



Magee-Womens Research Institute

Center Director: Carl Hubel, Ph.D.

The correlation between pregnancy complications and the risk of future cardiovascular disease is still largely a mystery and often overlooked by primary physicians, said Center Director Carl Hubel, Ph.D.

"We and others have been very intrigued, from the epidemiologic perspective, by the associations between pregnancy complications and risk of future cardiovascular disease, which includes hypertension, stroke and coronary heart disease," Hubel said.

Not all women who've had pregnancy complications will go on to have heart disease. Hubel wants to probe the mechanisms underlying these conditions for better clues to identify which women are at risk.

"So, we can better tease out which women really should be followed closely and monitored on the basis of their pregnancy history, and if we can get a better handle on mechanisms, we may be able to actually do things to intervene to change the trajectory that some of these women appear to be on," Hubel said.

Magee researchers studied women during pregnancy and a year after, particularly assessing microvasculature and placenta using everything from blood tests and imaging to electron

Magee-Womens Research Institute Center



Dr. Carl Hubel

microscopes. Another aspect of the population project studied women 8-10 years after giving birth to determine what might be hidden risk factors, conducting heart measurements that included 2-D echocardiograms and focusing on small vessel impairment.

The basic study focused on mice that developed a hypertensive syndrome during pregnancy — and whether that affected the animals' future health.

It did appear to increase the mice's susceptibility to cardiovascular problems down the road, Hubel said, with obvious implications for humans. The studies, he said, have led to a "virtual goldmine of data," much of which has yet to be analyzed and published.

Already though, the team is becoming more aware that there are subsets and subtypes of women who may go on to develop cardiovascular problems following pregnancy.

Microvascular tests of the placenta, heart and even under the tongue could give indications of a patient's future cardiovascular health, providing insights into previously hidden or overlooked risk factors, according to study findings.

"One of the ways the science really grew beautifully, with our three projects spanning basic to population, was that our five postdoctoral fellows were able to not only experience it, but sort of lead the science," Hubel said.

"So, we feel that we've done our part in training the future generation of scientists."

New York University School of Medicine

Center Directors: Harmony Reynolds, M.D.; Judith Hochman, M.D.

More women than men who suffer heart attacks tend to present with arteries that aren't blocked, raising questions about what led to the cardiovascular event in the first place. NYU's Heart Attack Research Program set out to investigate the factors behind these differences between the sexes.

"If the arteries are not badly blocked, then we have to work backward and decide: Was this a problem of blood flow to the heart muscle at all? Was it something else entirely?" said Center Director Harmony Reynolds, M.D.

After recruiting patients from 16 sites throughout the U.S. and Canada, NYU researchers employed blood tests, angiograms and platelet studies, as well as sophisticated imaging techniques to get to the bottom of what could be causing the heart attacks, called myocardial infarctions with non-obstructive coronary artery disease, known to the scientific community as MINOCA. This included optical coherence tomography, "which is basically taking a very clear picture from inside the artery to see the artery wall," Reynolds said.

"We then did cardiac MRI, which can beautifully highlight where damage has occurred, even if that damage is not permanent," she said. "MRI can show us traces of where injury was just starting to happen." Using both tests, the investigators were able to find the cause of these previously unexplained heart events in 85% of cases. "Most were true heart attacks and were caused by small cholesterol plaques or blood clots, but some were not heart attack at all, and were actually inflammation of the heart muscle that imitated a heart attack."

Dr. Harmony Reynolds



Dr. Judith Hochman

New York University School of Medicine at the SFRN Annual Meeting



The NYU team showed that platelets, cells that help the blood clot, also provoke plaque buildup. They are looking into whether platelets could explain why some women with smaller plaques have heart attack.

The NYU investigation also delved into how stress and environmental factors, in addition to plaque and platelets, could influence such cardiac events.

“The women were randomly assigned to two different interventions: an educational intervention, or training in stress management techniques. The stress intervention gave the women skills to use so they would be able to interrupt the physical consequences of emotional stress,” Dr. Reynolds said, because “stress is known to be associated with a poor prognosis after a heart attack.”

“Stress may promote heart events over the long term,” she said, adding that stress enhances platelet activity, making blood stickier and more prone to clotting. This may be the mechanism by which stress increases heart attack risk. “We know stress increases risk, but exactly how it does this has not been entirely clear.” The NYU studies found that stress increases platelet activity and makes platelets stick to, and stimulate, inflammatory cells called monocytes. This may represent a new pathway linked to stress-mediated heart disease.

University Of California, San Diego

Center Director: Matthew Allison, M.D., M.P.H.

At the University of California, San Diego — with a campus just over an hour north of the Mexican border in a city with a significant Mexican American and Latino population — researchers chose to study sedentary behavior among women of Mexican descent.

“Sedentary behavior, it’s not a new topic, per se, but it’s a relatively new area of research that’s unexplored, especially among women of Mexican descent and other Hispanic/Latino backgrounds,” said **Center Director Matthew Allison, M.D., M.P.H.**

“It’s important, because prior studies showed, in other populations, that being sedentary is associated with worse outcomes. That is, those who are more sedentary have heart disease and die earlier,” he said. “So, we proposed to study sedentary behavior in women of Mexican descent because this problem has been relatively understudied in this ethnic group and results from other studies have shown that they were more sedentary than their counterparts in the United States.”

Researchers focused on 400 participants with the help of South Bay Latino Research Center and existing community partners.

Dr. Matthew Allison



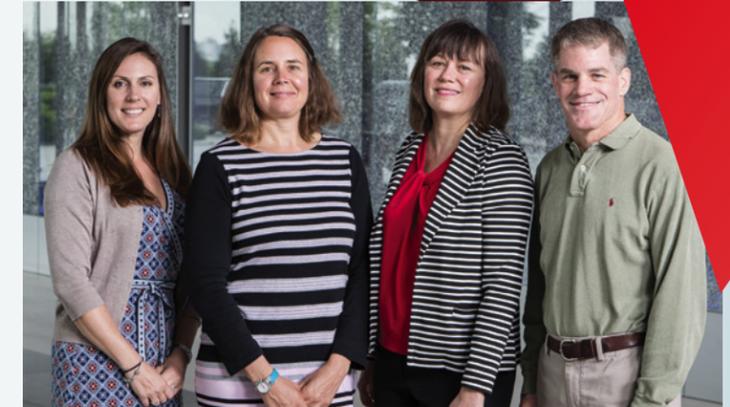
“In general, individuals of Hispanic/Latino descent have higher rates of obesity and higher rates of diabetes, but their blood pressure, by and large, is similar to non-Hispanic Whites,” Allison said. “Diabetes is definitely a big problem for this group, and they have problems with their lipid profile; both of which can predispose to heart disease.”

Sedentary behavior increases the risk for these conditions. Sitting for long periods of time, day after day, typically increases weight and the chance of developing obesity. It also increases the probability of developing high blood pressure or diabetes, significant risk factors for cardiovascular disease.

Key to the project was the question of just how much of a difference a behavioral intervention could make in reducing sitting time. For example, participants were regularly contacted by phone to encourage movement and even provided with standing desks.

“When it came to sitting time”, Allison said, “our goal was to reduce it by 20%, but we went past that.”

The University of California, San Diego researchers, he said, “were all really pleasantly surprised by the magnitude of the change” in women’s lifestyle choices and sedentary patterns.



University of California, San Diego Center

Monitoring of sitting time utilized a device called the activPal. Also, factors such as weight, cholesterol, blood pressure, and blood components were tracked. Allison said there had also been decreases noted in these biomarkers but data was still being evaluated before publication.

Decreases in those factors, he said, albeit preliminarily and over a relatively short period of time, “were not nearly as large as the sitting behavior.”

He said he hoped the study would help patients and health practitioners learn that people can improve their health, quality of life and longevity by not sitting as much.

“We hope to be able to translate these findings into something that can be used by clinicians for counseling their patients,” he said. “It’s really just standing up; there’s not a lot of thought process to it ... If you do that, that can lead to positive changes in your life and, I think, those things combined constitute a really simple intervention, which has potential.”

THE FELLOWS: A CLOSER LOOK

The Fellowship Program

The American Heart Association's Go Red SFRN recruited and trained 17 postdoctoral scholars, providing essential mentorship and interdisciplinary learning opportunities that will be a valuable investment in the future of women's health research. Collaborating with scientists and mentors across the five identified centers, these fellows gained incomparable, varied experience through basic, clinical and population research projects to further knowledge about how cardiovascular health uniquely affects women.

In line with the SFRN's goal of training the next generation of researchers and physician scientists, most of these fellows have chosen to continue their involvement with and investigation of women's heart conditions. They have published multiple papers, received awards from the AHA and other organizations and given enlightening presentations to scientists and clinicians from across the globe.

Each scholar not only garnered experience but brought their own expertise and areas of interest to the projects, allowing for interdisciplinary progress that continues to be developed. Alisse Hauspurg, M.D., for example, built upon her background in obstetrics/gynecology to start a program — which continues to expand — that allows for closer, more long-term monitoring of blood pressure for thousands of women after giving birth. She and several fellows have moved into tenure-track positions; others, such as Anais Hausvater, M.D., and Farik Zuraikat, Ph.D., have continued their research with additional fellowships focusing on the same areas they studied through the SFRN.

The unique, comprehensive and collaborative Go Red SFRN opportunity has fortified the strong ongoing clinical and research efforts of each one of its fellows, all of whom are committed to further advancement of women's cardiovascular medicine.

Here are the stories of five fellows on their experiences:

Faris Zuraikat, Ph.D.

Columbia University Irving Medical Center

Faris Zuraikat held a long-term interest in human behavior and diet choices, although he didn't initially intend to focus on research. That changed after he graduated from St. Bonaventure University with an undergraduate degree in psychology and pursued a Ph.D. at the University of Pennsylvania.

Zuraikat has been interested in factors that drive overconsumption of food, including triggers for eating and what people choose to eat.

"I was thinking about lifestyle behaviors, and sleep was one that kept coming up, being on a college campus and thinking about sleep deprivation and abnormal sleep times and how that might play into all this," he said.

He became fascinated by the research being conducted at Columbia and jumped at the chance to apply for the Go Red SFRN Fellowship with its multi-level approach.

Zuraikat principally worked to collect and analyze sleep and lifestyle data from more than 500 women with diverse backgrounds including following up with the women participating at their one-year follow-up appointment.

"My role in the AHA Go Red SFRN has been a huge benefit for a variety of reasons," he said. "I was able to develop a lot of new skills. It was my first exposure to observational research in a community-based cohort. It was my first exposure to sleep research in a clinical trial setting, as well. I have really benefited from working with my mentors."

"I've gained a lot of research skills, knowledge and even greater appreciation for women's health and the importance of studying determinants of health behaviors in women and consequences of those behaviors."

During his fellowship, he traveled to the University of California, San Diego to present to the SFRN team studying sedentary lifestyle modifications in older women. The two centers co-authored a paper on the influence of mealtimes on cardiometabolic health.

"By collaborating with other people from different fields and different spaces, you're able to bridge the gap between your work and theirs, and it brings up things that one might not have thought of," Zuraikat said. "I think that collaboration is hugely important to advancing science, and it's really nice that this network promoted collaboration both within the institutions and across institutions."

The focus on women's health is especially important, he said, and it amplified his interests in the area.

"A lot of science has focused on men, but there are really those psychosocial and biologic differences in men and women that may cause women to have different risks for adverse health outcomes," he said.

Following the AHA-funded fellowship, Zuraikat was awarded a Russell Berrie Foundation Fellowship in diabetes research at Columbia, securing funding for two years to primarily focus on obesity and diabetes in night-shift workers.



Dr. Faris Zuraikat

Wendy Ying, M.D.

Johns Hopkins University

After she finished her undergraduate studies at Harvard University and medical school at Johns Hopkins University, the Go Red SFRN fellowship attracted **Wendy Ying, M.D.**

“The SFRN fellowship seemed very education-centered — like it placed a big focus on not just the completion of the end point, but also making sure the trainee received a lot of exposure to mentors, as well as professional development and training,” she said.

Her goal was to become a clinical cardiologist, and the Johns Hopkins investigation into one of the more challenging questions surrounding heart failure both intrigued and challenged her.

“Interestingly, we actually have a lot of medications and understanding for the other type of heart failure, which is when your heart doesn’t squeeze normally enough. Heart failure with reduced ejection fraction was for the longest time the only type of heart failure that was known,” she said.

So, researching heart failure with preserved ejection fraction, or HFpEF, offered her a chance to truly further the understanding and treatment of a different type of heart failure that has “fascinated” cardiologists for years.

Ying was involved in both the population and clinical projects, which helped her “improve the understanding of research in both disciplines.”

As part of the clinical project, she assisted in cardiac MRIs and analyzing the images to determine tissue types and gender-based differences in fat and cardiovascular disease.

“We looked at fat around the heart and in the liver, and then we also looked at fat in the muscle,” she said, adding: “We know that having overall fat and being obese is one of the main predisposing factors to having HFpEF. But there’s been a lot of



Dr. Wendy Ying

research recently that it’s not just that your weight is high – it’s that, if you have specific fat in specific areas of the body, certain areas might be more predisposed to HFpEF.”

She and other researchers also did echocardiograms on participating patients at rest and while exercising to gauge changes in heart function.

“We wanted to see, do men and women have different changes during exercise? And is it that certain markers on the echo change and certain markers don’t change? And — in having other diseases that are associated with HFpEF, for example being overweight or having diabetes or high blood pressure — do they, in part, form an exercise intolerance? Do men and women differ in how much they’re able to exercise, or how much the heart changes during exercise?”

Using data from her fellowship, Ying published a dozen papers — some co-authored with other SFRN fellows — and gave almost the same number of presentations of her research. She continues her training and research as a cardiology fellow at Johns Hopkins and said the SFRN has proven invaluable to her career, particularly when it comes to diversified research experience.

“I got a lot of training in terms of having the opportunity” she said, “I think, being able to form a network of all these mentors I suddenly had, from day one of this fellowship, was really helpful.”

Equally beneficial, she said, was “meeting people from different institutions who could help in a collaborative effort with projects and moving forward toward our shared goal of seeking knowledge and improving care.”



Dr. Alisse Hauspurg

Alisse Hauspurg, M.D.

Magee-Womens Research Institute

With a background in obstetrics and gynecology, **Alisse Hauspurg, M.D.**, took a relatively unusual route to the Go Red SFRN fellowship.

“Traditionally, the funding and the opportunities that are available to a resident or a fellow within obstetrics and gynecology are from the American College of Obstetricians and Gynecologists or funding sources that are specific to OBGYN,” she said. “The AHA is not a traditional track that people who finish OBGYN residencies would find.”

Hauspurg — who majored in biology with a minor in sociology at the University of Pennsylvania and graduated from Yale Medical School and completed her residency at Brown University — had already been awarded a fellowship in maternal fetal medicine at the University of Pittsburgh when she heard about the Go Red SFRN opportunity. Since it perfectly aligned with her interests, she decided to pursue both.

“There’s so much about pregnancy and about the pathologies that develop during it that we just don’t understand,” she said. “I felt like it was an area that really had a lot of unanswered questions that I was interested in.”

Both the science and the interpersonal sides spurred her interests, noting that women are the family caretakers, but may not prioritize their own health.

Hauspurg developed a particular interest in the transition from having a hypertensive disorder during pregnancy to longer-term cardiovascular risk and the persistence of hypertension afterward.

“In my role as a maternal fetal medicine fellow, I was very much enmeshed in the functioning of labor and delivery,” she said. “I became particularly interested in new-onset postpartum pre-eclampsia, which is an extremely understudied disease entity. We added that cohort of women as one of our groups that we recruited, either at the time of diagnosis or a subset of them that we recruited a year postpartum.”

Hauspurg finished both fellowships in 2019 and received a NIH Building Interdisciplinary Research Careers in Women’s Health (BIRCWH) Career Development Award and was appointed to Assistant Professor tenured track at University of Pittsburgh in OBGYN and Reproductive Sciences.

Building on her work she began during the SFRN fellowship, she collaborated with a cardiology colleague to develop a multidisciplinary clinic for women with hypertensive disorders, enrolling 3,000 women so far and sending them home after birth with blood pressure cuffs.

“The opportunity to start asking those questions, to think about working in a multidisciplinary space, really was born out of me doing the AHA fellowship,” she said, adding that it opened doors that might have been inaccessible as an obstetrician.

“The opportunity to collaborate within a multidisciplinary research environment was really invaluable in helping me to think about some of the research questions that I wanted to answer such as how to care for the patient population that I’m specifically interested in — and gave me fantastic mentors.”

Anais Hausvater, M.D.

New York University School of Medicine

Growing up with a sister who had congenital heart disease, **Anais Hausvater** became fascinated by cardiology at an early age. She went on to become the first doctor in her family.

As she completed medical school at McGill University and her residency at Tufts Medical Center, Hausvater also became more resolute that she “didn’t want to be a doctor who just treats patients; I also wanted to be advancing the science.”

So, the SFRN opportunity to study with NYU Center Director Harmony Reynolds, M.D. seemed like a perfect fit, combining her interest in research with her dedication to women’s cardiovascular health. She was involved in all three projects of the center — basic, clinical and population — to further knowledge about female heart attack patients presenting with open arteries.

“I had encountered these patients already in residency, and I’ve continued to encounter them in fellowship,” Hausvater said. “Oftentimes they are women who have all the presenting signs and symptoms of a heart attack, and they are sent to the cath lab, which is standard care. They’re found to have open arteries, but I kept seeing that most of the time, they were told that they did not have a heart attack.”



Dr. Anais Hausvater

She added: “I was finding a lot of patients who were asking me, ‘Well, what happened? I don’t understand.’ And we really didn’t have the answers.”

Hausvater joined researchers in using advanced imaging technology which assisted to get tests done on patients sooner for more accurate results — to answer those questions, informing treatment and better educating doctors.

“I had the opportunity to use a lot of our data to create abstracts, and I went to every American Heart Association conference as well as the American College of Cardiology,” Hausvater said. “And I had the opportunity to present at both of those each year using our data.”

She’s continuing her research right now, still alongside Reynolds, as a second-year cardiology fellow at NYU Langone Health.

“For me, the absolute best part of the research fellowship was the mentorship that I got,” she said, adding that she tells potential candidates, “that mentorship in medicine is one of the most valuable things you can have, especially as a woman in medicine.”

Melawhy Garcia, Ph.D.

University of California, San Diego

As a psychology major at California State University, Long Beach, **Melawhy Garcia** decided to take a Latino health class as an elective, but she fell in love with public health. She went on to pursue a masters in the field and, after hands-on internships and a decision to earn her Ph.D., heard about the AHA SFRN fellowship.

It was “the perfect fit for me,” Garcia said. She already had worked with South Bay Latino Center, which was collaborating with University of California, San Diego to study the effect of sedentary lifestyles on the cardiovascular health of Latina women.

Before securing the fellowship, Garcia said, “I worked on other studies looking at Latino obesity, and I saw how those high rates really can lead to heart-health issues.”

She had an integral role in the population study, helping to craft and research questionnaires, analyze data and tailor the project to the targeted community, which was largely unaware of the negative effects associated with lack of exercise.

“It has to start with awareness,” she said. “There was no questionnaire related to sedentary knowledge available to us when we started the study.”



Dr. Melawhy Garcia

Convincing women to participate, she said, was helped by the fact that they were “being recruited by an established research center like the South Bay Latino Center, with culturally competent staff and bilingual research assistants.”

Study results shed light on how to encourage women to be more active within and outside their homes, she said.

“There were significant findings related to the neighborhood environment; women who perceived that their neighborhoods were safe were less likely to have high rates of sedentary time,” she said. “There is more work that can be done around promotion of places to walk and support for increases in activity among older Latina women.”

Since 2017, Garcia has presented at several AHA and other conferences, authored five papers, co-authored five more and currently has two manuscripts under review.

Now an assistant professor at California State University, Long Beach, she is pursuing research through two grants from the U.S. Department of Agriculture, primarily focusing on combating childhood obesity within the Latino community and has received about \$1.4 million in funding.

Grants and opportunities from organizations such as the AHA, she said, “increase interest both in community health and also in training individuals that are first-generation college graduates like myself.”

COLLABORATIONS

Through the Go Red SFRN, the five centers aimed to identify risks, signal markers and underlying conditions that may influence one another in previously unrealized ways. They accomplished this by communicating and collaborating to form a more synergistic picture of how different aspects of cardiovascular health in women can be related.

“The AHA very cleverly designed these networks to have, really, a snowball effect. The emphasis on collaboration between centers has resulted in us going and getting funding for directions that we probably wouldn’t have anticipated if left to our own devices — and that’s been a beautiful thing to see,” said Carl Hubel, Ph.D., Center Director at Magee Womens Research Institute.

The research has “launched” fellows “who are now doing groundbreaking work,” he said.

“That’s been really exciting. To learn from other groups — for example experts in heart failure or biochemical pathways — it was really a no-brainer for us to collaborate with them,” added Hubel, whose team co-published with the Center at Johns Hopkins University.



Dr. Marie-Pierre St.-Onge and Dr. Pamela Ouyang, Strategic Collaborative Grant Awardees

Columbia fellow Faris Zuraikat, who spent time at University of California, San Diego — where research into sedentary lifestyle and nutrition coincided nicely with his studies into women’s sleep and behaviors — said he felt the collaboration was critical.

“We all have different expertise within the centers and certainly, across centers, collaboration allows us to develop relationships and learn from investigators who have similar interests but either a slightly or vastly different expertise than we do,” he said.

The OAC Chairperson, Kristin Newby, M.D., said the Go Red SFRN was “uniquely set up to foster cross-institutional collaboration within the network and the opportunity to share and apply tools to another Center’s project.

“Having the investigators working in a network and with an emphasis on collaboration really fostered the team science and strengthened all the individual projects.”

RENEWAL AWARDS

The comprehensive research and diverse findings from the Go Red SFRN are already being furthered — through ongoing work and new projects from fellows and through renewal awards.

Johns Hopkins University received funding from the AHA Strategic Renewal Grant to delve further into heart failure with preserved ejection fraction, with research ongoing through June 2022. **Magee-Womens Research Institute** was also awarded an AHA Strategic Renewal Grant to study the effects of perinatal stress-related mood disorders on cardiovascular health through June 2022.

Additionally, **New York University** received \$4.4 million over the next five years from generous donor Sarah Ross Soter to continue its center’s mission to better understand gender differences in heart attacks, particularly focusing on psychosocial stress factors and higher platelet activity in women.

While female patients have been the primary focus of the center’s studies, the research can have long-term implications for the understanding of heart attack in men, as well, said Harmony Reynolds, M.D.

The original SFRN funding at NYU primarily focused on studying why women suffer heart attacks despite unclogged arteries, but the preliminary findings and ongoing research can contribute to preventing and treating heart attacks in all people, she said.

“We will never really understand why this type of heart attack is more common in women until we compare the findings in women and men. Doing studies only in women is a really important first step, but if we don’t compare it to men, it’s incomplete,” Reynolds said.

“We’ll have started by learning whether there are differences in platelet activity or genetics within women who have different types of heart attack. Then we really need to understand how that relates to men with different types of heart attack — because maybe that will give us insight not only into why women are more likely to have heart attack with open arteries, but why men are more likely to have heart attacks at younger ages and overall,” Reynolds said.

“Maybe there’s something we can learn that’s really a fundamental form of prevention.”

New York University School of Medicine Center



CONCLUSION

The Go Red for Women SFRN is one of 12 multi-center, multi-disciplinary research efforts created since the AHA established its first SFRN in 2014. Other targeted topics include Prevention, Hypertension, Disparities, Heart Failure, Obesity, Children, Vascular Disease, Atrial Fibrillation, Arrhythmias & Sudden Cardiac Death, Cardiometabolic Health with a focus on Type 2 Diabetes, Health Technologies and Innovation and Disparities in Cardio-Oncology.

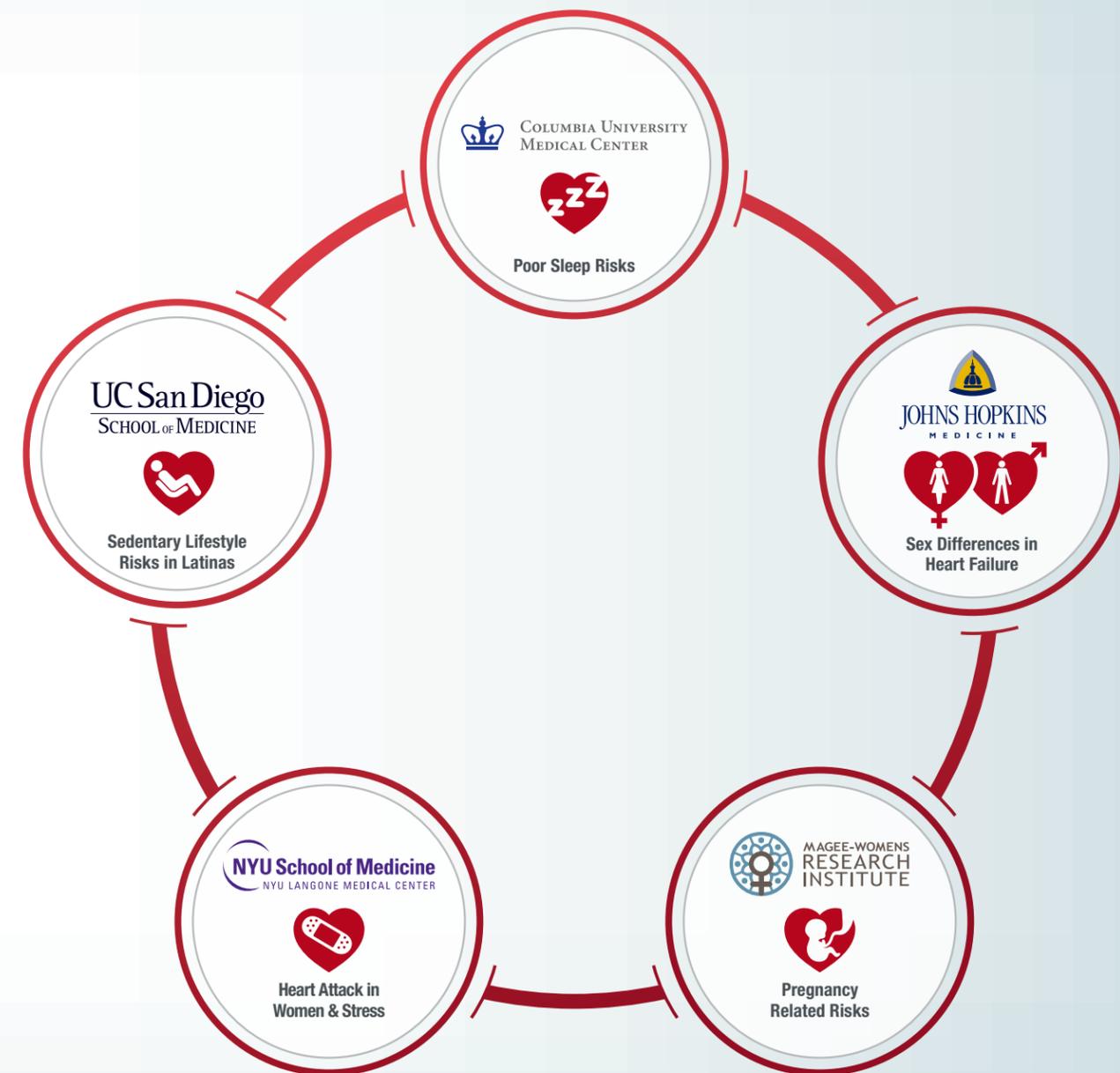
The varied, in-depth and innovative research conducted through the network is already being furthered across the country. Fellows and new research projects are building upon the collected data and using funding from not just the AHA but an array of nonprofit and government grants.

The Go Red SFRN is leading to revelations about biochemical markers for heart disease specific to women, who were

previously understudied. This has prompted the implementation of more widespread blood pressure monitoring among new mothers in the weeks immediately following births — and beyond.

“There’s been a lot of output and a lot of potential projects from the data and the efforts funded by this grant,” Johns Hopkins University fellow Wendy Ying, M.D., said. “I foresee that the data we generated through these last few years can actually support more ideas for other fellows, not just me.”

One of the “most important” aspects of the Go Red SFRN, said OAC Chairperson Kristin Newby, M.D., was that “trainees were getting exposed to the various aspects of basic, clinical and population research, and had the opportunity to cross collaborate — and that’s essential to building young people’s careers and creating future research networks and engagement.”





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