Innovations in Cardiovascular Health
Leading in prevention and care

Year after year OHSU is ranked as Oregon’s top Cardiology and Heart Surgery hospital and among the best in the nation according to U.S. News & World Report.

We offer Oregon’s most comprehensive cardiovascular program — everything from helping prevent heart disease to cutting-edge clinical trials. At Oregon’s only academic health center, patients have access to the latest drug treatments, surgery techniques and some of the most advanced diagnostic tests available, as well as:

- More than 100 cardiovascular clinical trials, including treatments available nowhere else in Oregon.
- First-class programs for the placement and follow-up care of the most advanced heart valves and assist devices.
- A dedicated cardiovascular intensive care unit featuring 26 beds and a specialized team of cardiologists and intensivists providing care 24/7.

At the OHSU Knight Cardiovascular Institute, our experts are improving cardiovascular health and finding cures for cardiovascular disease through personalized care and research innovation.

Innovation at the institute

We believe that the integration of clinical care and research expands possibilities for cardiovascular health.

The OHSU Knight Cardiovascular Institute is an integrated center for translational research, clinical care, professional training and outreach in all aspects of heart and vascular disease. Areas of innovation include cardiovascular imaging, cardiovascular device design, cardiac surgery, and the study of fetal origins of chronic adult diseases.

Under the umbrella of a multidisciplinary institute, researchers and clinicians collaborate to bring the latest knowledge and cutting-edge care to our patients, including:

- National leadership in studying the developmental origins of disease, such as how certain factors in the prenatal environment can make people more susceptible to heart disease and obesity. Our experts work toward understanding the origins of cardiovascular disease and providing tailored treatments.
- Internationally respected imaging experts who collaborate to find faster ways to diagnose and treat heart attacks and cardiovascular diseases.
- Teams of researchers identifying the genetic and biochemical underpinnings of heart valve defects, vascular disease, rhythm disorders and other potential targets for drug therapies.
- More than 100 clinical trials studying the risk factors for heart disease, innovative treatments and prevention techniques, as well as the latest technology used to combat heart failure and genetic heart diseases.
Carrying the torch

Research
OHSU award dollars: $462 million
NIH funding ranking: 28th
Amount of funding focused on clinical trials: over $80 million in fiscal year 2018.
In 2016, OHSU disclosed 151 new innovations and filed 165 patent applications.
OHSU placed in the top 20 of the Nature Index 2017 Innovation ranking, which measures the quality and quantity of research by institutions and universities worldwide.

Community service
OHSU provides more than 200 community health programs in rural and urban areas across Oregon.
In fiscal year 2017, the value of OHSU’s contributions to the community totaled $437 million.

Facilities and employees
Employees: 16,478
OHSU occupies more than 7.9 million square feet of space on approximately 400 acres.

Education
OHSU helps educate more than 5,500 students and trainees each year.

Knight Cardiovascular Institute by the numbers

<table>
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A permanent solution to a failing heart

The device was originally designed by the now-retired Richard Wampler, M.D. He was inspired to help those experiencing heart disease when he was a surgical resident at OHSU under Albert Starr, M.D. Starr co-invented and successfully implanted the world’s first artificial heart valve in 1960 and now has emeritus status at OHSU.

OHSU’s total artificial heart is designed to permanently replace a failing heart for most adults and children aged ten or older. A permanent artificial heart could help fill the heart transplant gap. There are nearly 4,000 people in the U.S. currently waiting for a heart transplant and many more die while waiting, but only about 3,400 human donor hearts were transplanted in 2017.

The OHSU device has the potential to be a permanent replacement because of its simple design. It replaces two ventricles — the human heart’s lower chambers — with one titanium tube that contains a titanium alloy-coated hollow rod that shuttles back and forth. This to-and-fro motion moves blood to the lungs and then sends the resulting oxygen-rich blood throughout the body.

OHSU’s artificial heart is unique because it creates a blood flow that mimics a natural human pulse. Other artificial heart pumps send blood through the body in a continuous flow, without a pulse. Having a pulse-like blood flow minimizes blood damage, reduces the risk of blood clotting and some of the complications seen in devices that do not pulse, such as gastrointestinal bleeding and stroke.

OHSU created a spinoff company named OregonHeart in 2014 to focus solely on the development of the technology. The spinoff created two versions of the device. The first version was larger and demonstrated the design’s proof of principle when implanted in calves. The second is a smaller version meant to fit in humans. OHSU plans to implant the smaller version in sheep for short-term studies to understand its physiology, followed by three-month-long tests. If sheep fare well after implantation with the device, OHSU plans to request federal permission to run clinical trials in people.

“OHSU was the first to have an artificial heart valve, and now we are aiming to be the first to have a permanent, practical total artificial heart.”

Sanjiv Kaul, M.D.
OHSU Knight Cardiovascular Institute
An advance for precision medicine

OHSU scientists have for the first time developed a method to quickly and efficiently recognize the subtypes of cells within the body. Led by Andrew Adey, Ph.D., the discovery will improve understanding of disease at the molecular level.

This new technology ultimately could enable the development of precise treatments of conditions such as cancer, disorders that destroy neurons in the brain, and diseases that affect the heart and blood vessels. The findings were published in the journal Nature Biotechnology.

For his work Dr. Adey was awarded the prestigious 2018 Early-Career Award from the American Society of Human Genetics. The award recognizes the contributions of genetics and genomics scientists in the first ten years of their careers as independent investigators.

Funding for the research was supported by the Rett Syndrome Research Trust, the Knight Cardiovascular Institute, and the National Institute of General Medical Sciences, a branch of the National Institutes of Health, grant 1R35GM124704-01.

The new technology provides a method to scale up a previously known method for profiling cell types distinguished by the pattern of chemical markers studding their DNA.

All cells carry the same genome — the complete set of genes encoded within the cell. The pattern of which genes are expressed in a given cell is what distinguishes a neuron from, say, a liver cell. Even then, it turns out that there are distinctions between similar cells. In 2017, scientists demonstrated a way of discerning subtypes of neurons by measuring the chemical markers between them — the pattern of methyl groups connected to the cell’s DNA, known as its methylome.

The new research by Adey and co-authors develops a method for profiling the methylome of large numbers of individual cells at one time by adding unique DNA sequence combinations, or indexes, to each cell that are read out by a sequencing instrument. The scientists used the new indexing method on several human cell lines, and from a mouse brain, to reveal the methylome of 3,282 single cells. That's roughly a 40-fold increase in throughput from the existing method of single-cell sequencing. “We can profile thousands of cells simultaneously,” Adey said. “This technology reduces the cost to prepare single-cell DNA methylation libraries to less than 50 cents per cell from $20 to $50 per cell.”

“IT will be incredibly valuable in any environment where there is cell-type heterogeneity [diversity]. The major areas of interest will be cancer and neuroscience, but we are also applying it to cardiovascular disease.”

Andrew Adey, Ph.D.
OHSU
Cigarroa lends his voice to updated blood pressure guidelines

Nearly half of all adult Americans are now considered to have high blood pressure under updated guidelines issued in late 2017 by the nation’s top heart health organizations.

The new guidelines lowered the diagnostic threshold for stage one high blood pressure to 130/80, down from the previous level of 140/90, and identified this level as the new goal for therapy, according to the joint statement from the American Heart Association and the American College of Cardiology.

This change means that 103 million Americans are now considered to have high blood pressure, or about 46 percent of the adult population, which is a 14 percent increase from the previous guidelines, last revised in 2003. The latest medical evidence has proven that people with blood pressure in the 130-139 range carry a doubled risk of heart attack, stroke, heart failure and kidney failure, compared to those with lower blood pressure, according to Dr. Joaquin Cigarroa, head of the cardiovascular division within the Knight Cardiovascular Institute and a member of the clinical guidelines task force.

Cigarroa feels strongly that lifestyle changes should be the first line of therapy for this group of patients new to being categorized as at risk. Exercise and a healthy diet can be an essential step toward lowering blood pressure for this population and avoiding unnecessary blood pressure medications.

"By incorporating the latest science, we recognize that risk is doubled. This now allows 14 percent of our population to understand that’s a call to action. We have to empower them with the tools to make a difference."

Joaquin Cigarroa, M.D.
OHSU Knight Cardiovascular Institute

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Antioxidant reduces risk for second heart attack, stroke

Doctors have long known that in the months after a heart attack or stroke, patients are more likely to have another attack or stroke. Research by OHSU scientists published in August in the Journal of the American College of Cardiology explains what happens inside blood vessels to increase that risk — and suggests a new way to treat it.

According to the paper, heart attacks in mice caused inflammatory cells and platelets to more easily stick to the inner lining of arteries throughout the body — and particularly where there was already plaque. As a result, these sticky cells and platelets caused plaque to become unstable and contribute to blood clots that led to another heart attack or stroke.

But the study found that treating mice that had experienced a heart attack or stroke with the powerful antioxidant apocynin cut plaque buildup in half and lowered inflammation to pre-attack levels.

“Knowing that newer forms of antioxidants such as apocynin can lower the risk of a second heart attack or stroke gives us a new treatment to explore and could one day help reduce heart attacks and strokes,” said the paper’s corresponding author, Jonathan R. Lindner, M.D.

Lindner wrote the research paper with colleagues from OHSU, Scripps Research and Bloodworks Northwest. The researchers discovered the sticky cells and platelets by using unique forms of ultrasound imaging they developed to view molecules on the lining of blood vessels.

Lindner and colleagues are further studying how the relative stickiness of remote arteries affects the risks for additional heart attacks and strokes, and are evaluating new therapies beyond antioxidants.
Dr. Kent Thornburg receives March of Dimes Agnes Higgins Award

OHSU’s Mitalipov among most influential people in health care

BDMS and OHSU collaborate to improve cardiovascular health in Southeast Asia

Kent L. Thornburg, Ph.D., M. Lowell Edwards Chair of Cardiovascular Research at the OHSU Knight Cardiovascular Institute is the 2018 recipient of the March of Dimes Agnes Higgins Award. Dr. Thornburg received the award for his pioneering research that has changed the way scientists view maternal-fetal nutrition and the risk of chronic disease later in life.

OHSU embryologist Shoukhrat Mitalipov, Ph.D., has been selected as one of Time magazine’s 50 most influential people in health care for 2018. Mitalipov, director of the OHSU Center for Embryonic Cell and Gene Therapy, was recognized for his work toward advancing the use of gene-editing tools to prevent inherited disease. The list recognizes 50 people who changed the state of health care in the U.S. in 2018, and bear watching for what they will do next.

Thailand’s largest health care network, Bangkok Dusit Medical Services, is partnering with the OHSU Knight Cardiovascular Institute to improve health in both countries through shared knowledge and skills, and the creation of centers of excellence focused on key cardiovascular challenges.

The collaboration between the institute and BDMS is focused on systems of care and clinical pathways for acute coronary syndromes and preventive cardiology.

Site visits at both institutions and teleconferencing is utilized to support ongoing discussions around integrating shared clinical evidence to drive practice patterns that improve cardiovascular health for patients in Southeast Asia and the U.S. Multiple hospitals in the BDMS network are implementing preventive cardiology programs modeled after OHSU’s Center for Preventive Cardiology, increasing the system’s emphasis on preventive care.
Research groups

**Adult Congenital Heart Disease**
Craig S. Broberg, Associate Professor
Abigail Khan, Assistant Professor
Adrienne Kovacs, Associate Professor

**Aortic Diseases**
Cherrie Abraham, Associate Professor
Amir Azarbal, Associate Professor
Cheryl L. Maslen, Professor
Lynn Sakai, Professor

**Artificial Heart**
Sanjiv Kaul, Professor
Richard Wampler, Adjunct Associate Professor

**Biostatistics**
Jessica Minnier, Assistant Professor

**Cardio-oncology**
Maros Ferencik, Assistant Professor

**Cardiothoracic Surgery**
Howard Song, Professor
Castiglione Bhamidipati, Assistant Professor
Danielle Smith, Assistant Professor
Fred Tibayan, Associate Professor

**Cardiovascular Imaging**
Scott Chadderdon, Assistant Professor
Elizabeth Le, Associate Professor
Jonathan R. Lindner, Professor
Hind Rahmouni, Assistant Professor
Diana Rinkevich, Associate Professor
Shimoli Shah, Assistant Professor
Xubo Song, Professor
Kevin Wei, Professor
Qi Yue, Research Instructor

**Center for Developmental Health**
Kent Thornburg, Professor
Natasha N. Chattergoon, Assistant Professor
George Giraud, Professor
Sonnet S. Jonker, Associate Professor
Samantha C. Louey, Senior Research Associate
Alina Maloyan, Assistant Professor

**Electrophysiology**
Charles A. Henrikson, Associate Professor
Thomas Dewland, Assistant Professor
Qiuming Gong, Assistant Professor
Beth Habecker, Professor
Jared Miller, Assistant Professor
Babak Nazer, Assistant Professor
Eric C. Stecker, Associate Professor
Zhengfeng Zhou, Associate Professor

**Embryonic Cell and Gene Therapy**
Shoukrat Mitalipov, Professor

**Genomics/Genetics**
Lucia Carbone, Assistant Professor
Andrew Adey, Assistant Professor
Meghan Chirpich, Instructor
Cheryl Maslen, Professor
Dhandspany Perundurai, Assistant Professor

**Hypertrophic Cardiomyopathy**
Stephen B. Heitner, Assistant Professor

**Interventional Cardiology**
Joaquin Cigarroa, Professor
Yen Tibayan, Assistant Professor
Firas Zahr, Assistant Professor

**Preventive Cardiology**
Sergio Fazio, Professor
P. Barton Duell, Professor
Tina Kaufman, Assistant Professor
Nathalie Pamir, Assistant Professor
Jonathan Q. Purnell, Assistant Professor
Michael Shapiro, Associate Professor
Hagai Tavori, Assistant Professor

**Center for Radiochemistry Research**
Jeanne Link, Professor
Kenneth Krohn, Professor
Dexing Zeng, Assistant Professor

**Vascular Biology**
Nabil Alkayed, Professor
Joseph Aslan, Assistant Professor
Anthony Barnes, Assistant Professor
Jeffrey Iliff, Associate Professor
Steven Mansoor, Assistant Professor
Anusha Mishra, Assistant Professor

More than 100 scientists throughout OHSU are researching new treatments for heart and vascular conditions.

The Knight Cardiovascular Institute has been recognized as a top performer in more than a dozen industry-sponsored clinical trials, including the first in the nation to implant an early feasibility device.
In March, the Knight Cardiovascular Institute announced the launch of the OHSU Multidisciplinary Ventricular Arrhythmia Program, a combined inpatient/outpatient effort to improve care and address the unique challenges of patients diagnosed with this condition.

At OHSU, we are pioneering the latest advances in ablation for ventricular arrhythmias, including ventricular tachycardia, or VT, and premature ventricular beats. Our team-based evaluation brings together electrophysiologists, psychologists, advanced heart failure cardiologists and surgeons for a thorough evaluation.

In addition to standard ablation approaches, OHSU offers other advanced technologies such as epicardial ablation (from just outside the heart) and Stereotaxis (a technology that uses magnets to remotely control and move the catheters). We also offer several novel, experimental VT ablation techniques.

Living with an ICD, an implantable cardioverter defibrillator, and the experience of ICD shocks can lead to anxiety and other psychosocial symptoms in patients. Recurrent ICD shocks can be particularly stressful.

At OHSU’s Multidisciplinary Ventricular Arrhythmia Program, we provide integrated behavioral health care for our VT patients in addition to high-quality cardiac care. We assess patients’ psychosocial symptoms and quality of life using patient-reported outcome measures, or PROMs. We integrate the results of PROMs with behavioral health and cardiac clinical assessment and data from ICD testing to guide a shared decision-making approach between the patient and our team. We believe that attention to behavioral health needs leads to superior patient adjustment, adherence and quality of life as well as improved clinical outcomes.
First Oregonian receives artificial mitral heart valve without open-heart surgery

In February, OHSU was the third institution nationwide to perform a transcatheter mitral valve replacement as part of the APOLLO Trial, which is evaluating the safety and efficacy of Medtronic’s Intrepid™ Transcatheter Mitral Valve Replacement, or TMVR, system. “Until now, the only way to replace artificial mitral valves has been invasive open-heart surgery, which can be grueling and even dangerous for patients with severe co-morbid conditions,” said Firas Zahr, M.D., co-director the OHSU Knight Cardiovascular Institute’s Complex Heart Valve Program.

Zahr co-led the replacement procedure with Howard Song, M.D., Ph.D., a cardiothoracic surgeon and other co-director of the OHSU Complex Heart Valve Program.

“The OHSU Complex Heart Valve team is delighted to be able to offer trial participants a cutting-edge option for mitral regurgitation that offers potential for a safer, quicker recovery,” Song said. “The world’s first successful mitral valve replacement was performed at OHSU in 1960 and this procedure follows in our tradition of developing new treatments for heart valve disease.”

The participant, Dennis Troxel, had the procedure after he was thought to be too sick to undergo open-heart surgery. He has had at least five heart attacks and severe, long-term mitral regurgitation. He decided to participate in the trial after a doctor told him he might have just one to five years left to live. “I’d like other heart patients to know that there are options,” Troxel said. “There’s more than just living with what’s put before them.”

Troxel underwent the minimally invasive surgery after his own mitral valve – one of four valves in the heart – deteriorated and caused mitral valve regurgitation, which affects about 4.1 million people in the U.S.

OHSU also performs transcatheter aortic valve replacements, or TAVR. However, Zahr describes the mitral valve as being more delicate and therefore more challenging to replace.

OHSU welcomes new Multimodality Imaging Center

In August, the Oregon National Primate Research Center and the Knight Cardiovascular Institute celebrated the opening of the Primate Multimodality Imaging Center, or PMIC.

This one-of-a-kind facility, under the direction of Dr. Jonathan Lindner, is dedicated to state-of-the-art multimodality imaging of non-human primates. The center is located in a new 7,700-sq ft building that was designed specifically for primate in vivo imaging and includes a wide variety of imaging systems, protocols, and support services.

The PMIC is designed to not only augment existing non-human primate research, but to promote the use of imaging in private-public partnerships in order to establish more meaningful partnerships with industry. It will also provide the resources necessary for the clinical translation of new imaging technologies or tracers developed at OHSU or elsewhere using human-relevant non-human primate models.
Clinical programs

Shimoli Shah, M.D., clinical director of the Knight Cardiovascular Institute, section chief of General Cardiology.

Aortic conditions
Nationally and internationally recognized clinicians and researchers in vascular surgery, cardiothoracic surgery, interventional radiology, cardiovascular medicine and related disciplines partner to provide consultation, treatment and comprehensive surgical and medical management for any aortic condition. Services include the latest multimodality aortic imaging, medical monitoring, aneurysm repair, endovascular surgery, hybrid open/endovascular surgery and minimally invasive vascular surgery such as EVAR and TEVAR.

Cardiogenetics
This multidisciplinary team of experts provides personalized care and support to patients and families with hereditary cardiovascular diseases such as familial hypercholesterolemia, Marfan syndrome, familial amyloidosis, dilated and hypertrophic cardiomyopathy, and Long QT syndrome, among others. Genetic counselors, cardiologists, electrophysiologists, surgeons, neurologists, primary care providers, nephrologists, nurses and other health care providers work together to ensure patients receive precision health care tailored to their genetic diagnosis. Genetic counselors consult with patients and families to understand the hereditary nature of cardiovascular diseases, provide genetic testing, address the physical and emotional implications of having an inherited cardiovascular condition, and connect patients to research opportunities.

Cardio-oncology
This unique program specializes in the cardiovascular care of patients currently undergoing or previously treated with chemotherapy, radiation therapy or bone marrow transplantation. To ensure long-term health and overall survival from cancer, experts provide care for prevention of chemotherapy-induced cardiotoxicity and radiation-induced heart damage. They also provide management of existing heart conditions during cancer treatment and cardiac complications after cancer treatment, and assessment of long-term cardiovascular risk with optimization of preventive treatments for cancer survivors. The multidisciplinary program brings together cardiologists with a special interest in the cardiovascular effects of anti-cancer therapies and oncologists to provide comprehensive and personalized care for our patients.

Cardiothoracic surgery
We are a regional resource for patients with advanced heart diseases that require complex treatments. OHSU’s cardiac surgery team cares for adult patients with congenital and acquired heart diseases, including coronary artery disease, valvular heart disease, aortic aneurysms and heart failure, using innovative surgical techniques. Minimally invasive approaches are used whenever possible to give patients the best outcomes while minimizing discomfort and recovery time.
Center for Preventive Cardiology
For patients with increased risk of heart disease (e.g., dyslipidemia, diabetes and hypertension), the Center for Preventive Cardiology offers a combination of advanced medical intervention and lifestyle modification. We work with genetic counselors, behavioral health experts and lipid experts to offer specialized care for patients with complex lipid abnormalities such as familial hypercholesterolemia, intolerance to statins, and early family history or premature coronary artery disease. Our multidisciplinary team includes endocrinologists, cardiologists and nutritionists, who together offer a team approach to managing other high-risk factors. The center also includes OHSU’s three-phase inpatient/outpatient cardiac rehabilitation program, which is nationally certified by the American Association of Cardiovascular and Pulmonary Rehabilitation.

Congenital heart disease
A full-service team of adult, pediatric and interventional cardiologists, geneticists, psychologists, and heart surgeons specializes in the inpatient and outpatient care of adults with congenital heart disease, including the full spectrum from undiagnosed lesions to complex palliated patients. OHSU offers state-of-the-art diagnostics, catheter intervention, electrophysiologic study and surgery, and patients have access to congenital heart disease clinical trials not available elsewhere in the state.

Heart failure
OHSU is the first hospital in the Pacific Northwest to receive The Joint Commission’s Advanced Certification in Heart Failure. A multidisciplinary team of cardiac surgeons, cardiologists, intensivists, clinical coordinators, advanced practitioners and social workers specializes in the care of patients with advanced heart failure and works together to provide the most appropriate advanced therapies available, including augmented medical therapy, inotropes, ventricular assist devices and other forms of mechanical circulatory support.

Heart rhythm disorders
We offer a full range of electrophysiology procedures, including pacemaker and defibrillator implantation; electrophysiology study and ablation of supraventricular tachycardia, atrial fibrillation and ventricular tachycardia; laser lead extraction; and epicardial access and ablation. OHSU is the first hospital in the region to offer a cryoballoon procedure to isolate, freeze and ablate the pulmonary veins, and is the only hospital in the region with a research protocol that permits safe MRI scans on patients with a permanent pacemaker or implantable cardioverter defibrillator.

Hypertrophic cardiomyopathy
The first program of its kind in Oregon, this multidisciplinary team from cardiology, medical genetics and pediatric cardiology provides expert care for a condition characterized by abnormal thickening of the left ventricular muscle. The program is registered with the Hypertrophic Cardiomyopathy Association and provides treatment that includes medical therapies (beta blockers, certain calcium channel blockers, disopyramide), septal reduction therapies (surgical or catheter-based), implantable cardioverter defibrillators and advanced heart failure therapies.

Ischemic heart disease
Advanced medical, interventional, diagnostic and surgical procedures to manage diseases of the coronary arteries, including percutaneous coronary intervention and coronary artery bypass grafting. OHSU is home to Oregon’s first accredited chest pain center and is one of the few hospitals in the country to offer myocardial contrast echocardiography to quickly and accurately detect decreased blood flow in arteries.

Maternal cardiac
Unique to the region, this clinical partnership between cardiology and maternal fetal medicine at OHSU provides comprehensive care for women with diagnosed or suspected cardiac disease who are pregnant or planning for a pregnancy. The program offers preconception counseling, cardiac monitoring during pregnancy, and early postpartum follow-up. Wherever possible, the program partners with local providers to give the best ongoing care available to our patients.

Mended Hearts Survivorship Group
For women survivors of cardiac events, support to make lifestyle changes has an incredible impact.

The OHSU Knight Cardiovascular Institute partners with OHSU’s Center for Women’s Health to host Mended Hearts, a monthly survivorship group for women. Women who take part share their experiences, learn from health care professionals, and support each other.
**Structural heart disease**

A multidisciplinary team, including imaging specialists, interventional cardiologists, nurses, advanced practitioners and surgeons, provides a comprehensive approach to valvular heart disease, congenital defects and acquired cardiovascular conditions. Catheter and surgical approaches are available to patients with all types of valvular heart disease, hypertrophic cardiomyopathy, coronary arteriovenous fistulae and other acquired heart defects. For patients with a patent foramen ovale, joint evaluation by neurologists and cardiologists determines whether closure might reduce the risk of future stroke. Active clinical trials are available to patients for the treatment of many of these conditions.

**Vascular disease**

OHSU’s vascular disease program includes nationally renowned experts specially trained to diagnose and treat the entire spectrum of arterial, venous and lymphatic disorders. A team of providers, including vascular, cardiothoracic and endovascular surgeons, treats the carotid artery and extracranial cerebrovascular system, aneurysms of the thoracic and abdominal aorta, intestinal and kidney arteries and veins, upper and lower extremity arteries and veins, patients with Raynaud’s syndrome, those requiring vascular access for hemodialysis as well as patients with varicose veins, venous thrombosis, lymphedema and vascular malformations.

**Women’s heart**

In collaboration with the OHSU Center for Women’s Health, the women’s heart program focuses on primary prevention to reduce risk in women without known cardiovascular disease, secondary prevention to improve the health of women diagnosed with disease, and cardio-oncology to manage heart risks in women who have undergone breast cancer treatment. By understanding the differences in how heart disease manifests in women and studying the disparities in treatment and response to medication, this program aims to provide a forum for providers to improve care and health outcomes using the most current evidence-based information.
Anesthesiology
and Peri-operative Medicine
Mark Baskerville, M.D., J.D., M.B.A.
Tonya Miko Enomoto, M.D.
Ryan Fink, M.D.
Alan J. Kovar, M.D.
Matthias Johannes Merkel, M.D., Ph.D.
Peter M. Schulman, M.D.
Michael Wollenberg, M.D.

Cardiovascular Medicine
Shaun Ageno, M.D.
Reyhaneh Akhavein, M.D.
Bassel Beitinjaneh, M.D.
Craig Broberg, M.D.
S. Albert Camacho, M.D.
Scott Chadderdon, M.D.
Joaquin Cigarroa, M.D.
Thomas Dewland, M.D.
P. Barton Duell, M.D.
Sergio Fazio, M.D., Ph.D.
Maros Ferencik, M.D., Ph.D.
Harsh Golwala, M.D.
Gary Greenberg, M.D.
Allan Harrelson, D.O., Ph.D.
Stephen Heitner, M.D.
Charles Henrikson, M.D.
Peter Jessel, M.D.
Sanjiv Kaul, M.D.
Abigail Khan, M.D.
Adrienne Kovacs, Ph.D.
Elizabeth Le, M.D.
Jonathan Lindner, M.D.
Steven Mansoor, M.D., Ph.D.
Jared Miller, M.D.
Edward Murphy, M.D.
Shashima Nakahara, M.D.
Babak Nazer, M.D.
Jonathan Purnell, M.D.
Hind Rahmouni, M.D.
Diana Rinevich, M.D.
Shimoli Shah, M.D.
Michael Shapiro, D.O.
Eric Stecker, M.D.
James Suero, M.D.
Sahar Taqvi, M.D.
Yen Tibayan, M.D.
Kevin Wei, M.D.
Catherine Wong, M.D.
Chi-Gang Yen, M.D.
Firas Zahr, M.D.

Cardiothoracic Surgery
Castigliano Bhamidipati, D.O., Ph.D., M.Sc.
Robert Dubose, M.D.
Ashok Muralidaran, M.D.
Irving Shen, M.D.
Danielle Smith, M.D.
Howard Song, M.D., Ph.D.
Frederick Tibayan, M.D.

Vascular Surgery
Cherrie Abraham, M.D.
Amir Azarbal, M.D.
Leo Daab, M.D.
Enjae Jung, M.D.
Gregory Landry, M.D.
Timothy Liem, M.D.
Robert McLafferty, M.D.
Amani Politano, M.D., M.S.

Locations
OHSU Locations
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Center for Health & Healing
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503-494-1775
Beaverton Cardiology Clinic
15700 S.W. Greystone Court
Beaverton, OR 97006
503-494-1775
Adventist Health Portland
10123 S.E. Market St.
Portland, OR 97216
503-257-2500
Tuality Healthcare
335 S.E. 8th Ave.
Hillsboro, OR 97123
503-681-1111

Community Collaborations
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1615 Delaware St.
Longview, WA 98632
360-414-2730
PeaceHealth
Southwest Medical Center
200 N.E. Mother Joseph Place
Vancouver, WA 98664
360-514-4444
Columbia Memorial Hospital
2095 Exchange St., Ste. 301
Astoria, OR 97103
503-338-4087
Mid-Columbia Medical Center
551 Lone Pine Blvd., Ste. #303
The Dalles, OR 97058
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Prefontaine Cardiovascular Center
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Providers by department

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Robert Dubose, M.D.
Ashok Muralidaran, M.D.
Irving Shen, M.D.
Danielle Smith, M.D.
Howard Song, M.D., Ph.D.
Frederick Tibayan, M.D.

Vascular Surgery
Cherrie Abraham, M.D.
Amir Azarbal, M.D.
Leo Daab, M.D.
Enjae Jung, M.D.
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Timothy Liem, M.D.
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Ashok Muralidaran, M.D.
Irving Shen, M.D.
Danielle Smith, M.D.
Howard Song, M.D., Ph.D.
Frederick Tibayan, M.D.

Anesthesiology
and Peri-operative Medicine
Mark Baskerville, M.D., J.D., M.B.A.
Tonya Miko Enomoto, M.D.
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Alan J. Kovar, M.D.
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2019 Flagship Conferences

29th Annual International Symposium on Congenital Heart Disease in the Adult
May 29 – June 1, 2019
Skamania Lodge
Stevenson, Wash.
www.ohsuheart.com/congenital-cme

2019 Multidisciplinary Aortic Dissection Symposium
June 21 – 22, 2019
OHSU Robertson Life Sciences Building
Portland, Ore.
www.ohsuknightheart.com/aorticsymposium

5th Annual Pacific Northwest Cardiovascular Summit
Sept. 6 - 7, 2019
Portland, Ore.
www.pnwcvsummit.com

National leadership

Joaquin Cigarroa, M.D.
FDA Circulatory System Devices Panel

Sergio Fazio, M.D.
President, American Board of Clinical Lipidology

Maros Ferencik, M.D.
Director, Board of Directors, Society of Cardiovascular Computed Tomography

Stephen Heitner, M.D.
Guidelines Review Committee, American Society of Echocardiology

Charles Henrikson, M.D.
Science and Quality Oversight Committee, National Cardiovascular Data Registry

Adrienne Kovacs, Ph.D.
President-Elect, International Society for Adult Congenital Heart Disease

Elizabeth Le, Ph.D.
Women in Cardiology Councils, American College of Cardiology and the American Heart Association

Jonathan Lindner, M.D.
President, American Society of Echocardiology

Jeanne Link, Ph.D.
Editor, Nuclear Medicine and Biology

Alina Maloyan, Ph.D.
Chair, Committee, American Heart Association Career Development Award

Cheryl Maslen, Ph.D.
Scientific Advisory Board, Bicuspid Aortic Valve Foundation

Michael Shapiro, M.D.
Chair, Dyslipidemia Work Group, American College of Cardiology

Kent Thornburg, Ph.D.
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Academic Council Leadership, American College of Cardiology