The University of Texas Southwestern Medical Center

Cardiology Fellowship

Program Description
Advice in matters of the heart. UT Southwestern’s nationally renowned cardiology fellowship program combines outstanding clinical and research training within a unique environment of three vibrant and diverse training hospitals.
ABOUT UT SOUTHWESTERN

The University of Texas Southwestern Medical Center at Dallas (UT Southwestern) is one of the country’s leading medical research, education and clinical institutions. Part of the University of Texas System, UT Southwestern is governed by the UT Board of Regents. The president of UT Southwestern, Dr. Daniel K. Podolsky, leads the medical center, which includes three degree granting institutions:

1. UT SOUTHWESTERN MEDICAL SCHOOL
2. UT SOUTHWESTERN GRADUATE SCHOOL OF BIOMEDICAL SCIENCES
3. UT SOUTHWESTERN SCHOOL OF HEALTH PROFESSIONS

- The schools train nearly 4,400 medical, graduate and allied health students, residents, and postdoctoral fellows each year.
- Ongoing support from federal agencies such as the National Institutes of Health, along with foundations, individuals, and corporations provide more than $417 million per year to fund about 3,500 research projects.
- Faculty and residents provide care to nearly 100,000 hospitalized patients a year and oversee 2 million outpatient visits.
- UT Southwestern has approximately 11,400 employees and an annual operating budget of more than $1.74 billion.

UT Southwestern Medical Center ranks among the top academic medical centers in the world. Faculty members are responsible for a broad array of groundbreaking advances in biomedical research and are also well-respected for their dedication to teaching. UT Southwestern’s physicians provide patients with the highest quality care throughout the medical center’s outpatient clinics and affiliated hospitals.

AS ONE OF THE PREMIER ACADEMIC MEDICAL CENTERS IN THE NATION, UT Southwestern trains the physicians, medical scientists, and allied health care professionals of the future. UT Southwestern achieves excellence in education because its faculty of 2000 full-time and 640 part-time members is second to none. Our faculty includes six Nobel laureates, four of whom are active faculty members, 22 members of the prestigious National Academy of Sciences, and 18 members of the Institute of Medicine and 13 members of the American Academy of Arts and Sciences.

Nobel Prize Winners
1985 Michael S. Brown, M.D.
1985 Joseph L. Goldstein, M.D.
1988 Johann Deisenhofer, Ph.D.
1994 Alfred G. Gilman, M.D., Ph.D. (emeritus)
2011 Bruce A. Beutler, M.D.
2013 Thomas Südhof, MD

National Academy of Sciences
1980 Michael S. Brown, M.D.
1980 Joseph L. Goldstein, M.D.
1983 Jean D. Wilson, M.D. **
1984 Jonathan W. Uhr, M.D.
1985 Alfred G. Gilman, M.D., Ph.D. (emeritus)
1986 Roger H. Unger, M.D.
1992 Steven L. McKnight, Ph.D.
1994 Ellen S. Vitetta, Ph.D.
1997 Johann Deisenhofer, Ph.D.
2000 Eric N. Olson, Ph.D.
2003 Joseph S. Takahashi, Ph.D.
2004 Masashi Yanagisawa, M.D., Ph.D.
2005 Xiaodong Wang, Ph.D.
2006 Melanie H. Cobb, Ph.D.
2006 David W. Russell, Ph.D.
2007 Helen Hobbs, M.D.
2008 David Mangelsdorf, Ph.D.
2008 Bruce A. Beutler, M.D.
2011 Luis F. Parada, Ph.D.
2013 Beth Levine, MD
2014 Zhijian “James” Chen, PhD
2015 Lora Hooper, PhD
2015 Steven Kliewer, PhD
OVERVIEW of CARDIOLOGY TRAINING

The Cardiology Fellowship Training Program at the University of Texas Southwestern Medical Center at Dallas is a nationally renowned program that seeks to train leaders in cardiology for the future. Our program combines outstanding clinical and research training in cardiovascular disease within a unique environment consisting of three vibrant and diverse training hospitals, and a medical center with numerous opportunities and resources for basic, translational, and clinical investigation. In addition to training in General Cardiology, we have Advanced Training Programs in Interventional Cardiology, Electrophysiology, Cardiovascular Imaging, and Advanced Heart Failure and Transplantation, with over 35 outstanding fellows among these programs. All of our programs emphasize state-of-the-art clinical training with excellent volumes and faculty supervision, integrated with didactic instruction and innovative research.

FELLOWSHIP TRACKS

Combined Clinical and Research Training in Cardiology
Candidates for this program should hold the M.D. or M.D. /Ph.D. degrees and have completed an internal medicine residency at the time of enrollment. This program meets all the requirements of the American Board of Internal Medicine (ABIM) for subspecialty certification in cardiovascular disease. Completion of the program requires demonstration of competence in general cardiology, including invasive and non-invasive procedural skills. The primary goal of the training program is to prepare fellows for careers in academic cardiology. There are two distinct tracks within this track: 1) Clinical Investigator, and 2) Physician Scientist.

Clinical Investigator (three to four years)
Fellows on the Clinical Investigator track complete at least three years of training which will include one or more years of research training. The first two years are devoted to the core curriculum in clinical cardiology. The third training year is dedicated to research, with an optional fourth training year devoted to an additional year of research or a combination of research and subspecialty clinical training. At the end of the fellowship, the Clinical Investigator is well-prepared for the practice of general cardiology and will be competitive for a faculty position at a major academic medical center.

Physician Scientist (four to five years)
Fellows on the Physician Scientist track complete four or five years of training, which includes two or three years of basic research following the two-year core curriculum in clinical cardiology. Upon successful completion of training, the Physician Scientist will be competitive for a career combining basic research with general clinical cardiology at a major academic medical center.

“Research First” Training
Fellows on either the Clinical Investigator or Physician Scientist pathway may elect to do the research component of the fellowship first, followed by the two year core curriculum in clinical cardiology. In this program, fellows complete either 2 or 3 years of research before beginning clinical training. The outpatient continuity clinic begins during the final research year, so that the fellow is board eligible following the two clinical years. Fellows interested in this pathway should have a clearly defined research program and mentor identified, and should communicate in advance about their interest in this pathway.

An NIH sponsored T32 training grant is available to support fellows committing to two or more years of research on any of the pathways described above.
TRAINING SITES

Parkland Health and Hospital System


Parkland Memorial Hospital is a nationally recognized, iconic, and exemplary county hospital where our faculty and fellows have the privilege of providing care for the most vulnerable patients in Dallas County. The new Parkland Hospital opened in August of 2015 and is a 2.8 million-square-foot facility with 862 beds, and is one of the largest and most modern county hospitals in the nation. Serving as one of our continuity clinic sites, the fellows have the valuable experience of serving as the primary cardiologist for many of these patients. One of the distinguishing features of the Parkland population is the high proportion of previously undiagnosed complex cardiovascular disease. For example, patients with complex valvular and adult congenital heart disease commonly presents to Parkland for their initial diagnosis and management, providing cardiovascular fellows a unique opportunity to see a diverse spectrum of cardiovascular disease not commonly seen in contemporary training hospitals. They are also able to accomplish this care in a contemporary care environment, with state-of-the-art equipment and facilities designed for patient care in the modern era.

William P. Clements Jr. University Hospital

Clements University Hospital, which opened December 2014, is largest single building project in the history of the University of Texas System. It is a 460-bed state-of-the-art facility that uses innovative design, advanced technology, and best practices to provide excellence in care. It includes 72 ICU beds, six cath/EP labs with cutting edge technology, and numerous attributes of a modern, academic teaching facility. Education attributes include several conference rooms on each floor with whiteboard and videoconferencing technology, simulation room in the ICU for medical training, and “touch down” areas for informal case and data review. Each patient room is also equipped with teleconferencing capabilities and each floor has space to support clinical research. Fellows have the opportunity to care for patients with a range of cardiovascular conditions, including tertiary and quaternary referrals, advanced heart failure/transplantation and mechanical support, adult congenital heart disease, and patients being managed for advanced coronary and structural procedures.

North Texas Healthcare System (DVAMC)

The Dallas Veterans Affairs Medical Center is located twenty minutes (13 miles) from Parkland. It operates 720 beds, including a 16 beds coronary care unit. The hospital serves the populous North Texas area, including Dallas and Fort Worth, and a number of small VA hospitals and outlying community hospitals who refer patients to the VA Medical Center for advanced care of complex cardiac disease. The Dallas VA has the busiest cardiac catheterization laboratory in the Veterans Hospital system and is a leader in VA sponsored multicenter clinical trials. Moreover, it has one of the largest electrophysiology referral bases in the VA system, with high volumes of complex ablations as well as standard EP procedures. In addition, the Dallas VA serves as another one of our key continuity clinic sites.
CURRICULUM AND CONFERENCES

Training in Clinical Cardiology
Two years are devoted to a core curriculum in clinical cardiology with rotations through the clinical units at Parkland Memorial Hospital (PMH) (862 beds), Clements University Hospital (460 beds), and the Dallas Veterans Affairs Medical Center (720 beds). These three distinctive clinical settings provide a rich mixture of patients with diverse cardiovascular problems. This core curriculum includes rotations on the cardiology consultation service, coronary care unit, noninvasive laboratory, cardiac rehabilitation service, nuclear cardiology, cardiac MRI, cardiac catheterization laboratory, cardiac electrophysiology, and congestive heart failure/cardiac transplantation. In addition, each fellow is assigned a continuity clinic which meets one morning or afternoon per week throughout the three year training period. Completion of the core curriculum satisfies certification requirements of the ABIM, as well as those of the ACC/AHA Task Force on Clinical Privileges in Cardiology. After completion of the two-year core curriculum, an individualized plan is created for each individual fellow for subsequent experiences in clinical and research training depending upon their unique career goals.

Acute Coronary Care
The CCU service at Parkland Memorial Hospital, the major county hospital for Dallas County, occupies a 35-bed intensive care unit shared with the MICU service and an adjacent 18-bed sub acute cardiac care floor. All patient rooms in the hospital have telemetry capabilities. Approximately 1500 patients annually with diverse cardiovascular illnesses are served by four teams of housestaff and students, supervised by two cardiology fellows and two attending cardiologists. Patients with acute coronary syndromes or other cardiovascular emergencies are also managed in a combined medical-surgical cardiovascular ICU at Clements University Hospital. At the Dallas VA medical Center, the CCU occupies 16 beds and serves approximately 1,300 patients annually. The unit is equipped with state-of-the art data managing and monitoring systems.

Noninvasive Imaging
Both Parkland Memorial Hospital and the VA Medical Center maintain high volume noninvasive laboratories that offer a wide range of diagnostic tests, including resting and ambulatory ECG, exercise testing, transthoracic and transesophageal echocardiography, Doppler color flow mapping, and nuclear perfusion imaging. Both Parkland Memorial Hospital and Clements University Hospital are also large volume centers for cardiac MRI imaging and have growing programs in cardiovascular CT. Fellows on the noninvasive rotations are assisted by skilled technicians and supervised by faculty members with a goal of attaining proficiency in the performance, interpretation, and clinical application of these procedures.

Cardiac Catheterization and Interventional Cardiology
The Cardiac Catheterization Service at Parkland Memorial Hospital currently performs 1,500 procedures annually, of which approximately 350 are interventional procedures. Approximately 65 percent of patients present with coronary artery disease, while the remainder have primary myocardial, valvular, peripheral arterial or congenital heart disease. Fellows serve as the primary operators on all cases, with faculty supervision. At least one to two hours daily are devoted to a didactic session in which cases are discussed in depth by faculty and fellows. Fellows also rotate through the catheterization labs at the Clements University Hospital which performs 1,700 cases annually (250 interventional procedures including congenital cases) and where they will also gain experience with TAVR and MitraClip cases as well other structural heart disease interventions. The VA Hospital which performs 1500 cases annually, including >150 peripheral arterial cases and >600 interventional procedures, with a robust clinical research program and particular expertise in complex coronary interventions including one of the largest chronic total occlusion (CTO) programs in the country.
**Cardiac Electrophysiology**
The Clinical Electrophysiology Service cares for patients with cardiac rhythm disturbances at Parkland Memorial Hospital, Clements University Hospital, and the VA Medical Center where full-time faculty actively participate in all aspects of clinical electrophysiology, including ablation of supraventricular tachycardias, ventricular tachycardias and atrial fibrillation and implantation of cardiac pacemakers and defibrillators. Approximately 900-1000 cases each year are performed in these institutions. Cardiology fellows spend two months of their core curriculum on the electrophysiology service. Fellows with plans to specialize in clinical cardiac electrophysiology spend two years training in an ACGME-accredited advanced fellowship in electrophysiology.

**Consultative Cardiology**
Active consult services at each of the three teaching hospitals permit trainees to be involved in the care of patients with an extraordinary diversity of cardiovascular diseases. Fellows supervise the activities of housestaff in conjunction with senior cardiology faculty. Special experiences also are available in postoperative management of patients undergoing cardiac surgery, cardiac rehabilitation, and pediatric cardiology.

**Congestive Heart Failure and Cardiac Transplantation**
Special training in the diagnosis and management of patients with advanced heart failure is available in the context of a specialized heart failure service. In addition to participating in the CHF clinic at Parkland Memorial Hospital, fellows will spend at least one month on the heart failure/transplant/device therapy service at Clements University Hospital which is staffed by heart failure/transplantation faculty member, a senior and junior cardiology fellow, as well as a team of medical residents. Fellows have the opportunity to participate in the care of patients with advanced heart failure, perioperative, and long-term management of patients receiving left ventricular assist devices or transplants, and an active clinical and basic research program.

**Preventive Cardiology**
The Preventive Cardiology Program offers exposure to diverse areas in the field of preventive cardiology such as complex dyslipidemias, metabolic syndrome, premature and familial coronary artery disease, exercise and nutritional counseling, cardiac rehabilitation, and atherosclerotic imaging. Additional exposures to preventive care are available through the Division of Hypertension, the Center for Human Nutrition, and McDermott Center for Human Genetics at UT Southwestern.

**TWO YEAR CORE CLINICAL TRAINING**
Our curriculum meets all requirements of the ACC COCATS recommendations for training in clinical cardiology. It is *graded* and *adaptive* to meet the individual needs of our fellows and the changing practice of cardiology. The first two years of fellowship training is dedicated towards acquiring the core clinical and procedural competencies in cardiology. The first year generally comprises of CCU, cath, echocardiography and consults. The second year provides exposure to more advanced clinical training including rotations in heart failure/transplantations, cardiac MRI, transesophageal echo, and additional exposure to inpatient and consultative cardiology in different clinical environments. Fellows will designate an imaging or invasive (ie: diagnostic cardiac catheterization) pathway for their second year and flexible rotation assignments will be weighted towards one or the other of these areas according to their personal preferences and career goals. The second year includes an elective month which is designed for the specific needs of the fellow including additional research time, more indepth exposure to specific procedural or imaging rotations, or experiences in diverse areas such as pulmonary hypertension, pediatric cardiology, or vascular surgery. In the second and third years, fellows have the opportunity to do a 1 or 2 month elective in the Seton Medical Center in Austin, TX where they will get exposure to a large, dynamic, multispeciality private cardiology practice with additional exposure to subspeciality areas and to health care delivery in a large, integrated healthcare system.

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ADVANCED CLINICAL TRAINING PATHWAYS

All fellows will complete at least one year of dedicated research after the initial two years of core clinical training. Numerous options for subsequent advanced clinical training in subspecialty areas of cardiology are available, and individualized training pathways are designed to meet the training needs and career goals of each fellow. Advanced clinical training pathways include:

- Adult Congenital Heart Disease
- Advanced Heart Failure, Left Ventricular Assist Devices, and Cardiac Transplantation (ACGME Accredited Fellowship leading to board eligibility)
- Advanced Cardiovascular Imaging
- Clinical Cardiac Electrophysiology (ACGME Accredited Fellowship leading to board eligibility)
- Interventional Cardiology (ACGME Accredited Fellowship leading to board eligibility)
- Preventive Cardiology
CONFERENCES

A comprehensive conference schedule is provided weekly for formal didactic instruction and case discussions, and is one of the major strengths of our program. Fellows participate in all educational conferences, and these can be categorized into those targeted towards entire division, those targeted specifically for the fellows, and those organized by subspecialty disciplines. Faculty members actively participate in all fellow conferences.

Division Conferences

• Cardiology Division Case Conference (weekly)
• Cardiology Grand Rounds (monthly)
• Cardiology/Fellows Research Conference (weekly)

Fellows Conferences

• Fellows didactic lecture (weekly)
• Journal Club (weekly)
• Fellows Cath Conference (weekly)
• ECG Conference (bi-weekly)
• Hemodynamic Conference (monthly)
• Fellows Adult Congenital Heart Disease Conference (monthly)
• Fellows Case Conference (monthly)

Subspecialty Conferences

• Cardiothoracic Surgery/Cardiology Combined Conference (weekly)
• Adult Congenital Heart Disease Multidiscipline Conference (monthly)
• Non-invasive imaging conference (weekly)
• EP Journal Club/Research Conference (weekly)
• Interventional Cardiology Conference (weekly)
• VA Combined Cardiology/Cardiothoracic Surgery Conference (weekly)
• Preventive Cardiology Conference (bi-monthly)
RESEARCH TRAINING

A wide range of clinical and basic research opportunities are available for trainees. The specific research interests of our faculty encompass a large variety of subjects, ranging from fundamental studies of gene regulation using model systems in lower eukaryotic organisms, to clinical trials of new pharmacologic agents or interventional devices to large epidemiologic and database studies. Fellows are exposed to research from the beginning of the fellowship program, and research training is integrated throughout the course of fellowship training.

At the beginning of the academic year, a formal didactic program covers principles of epidemiology, biostatistics, molecular biology and research study design. After the completion of the didactic series, fellows and faculty members present and receive feedback on their ongoing or evolving research projects at a weekly Cardiology Research Conference which is lead by Dr. James de Lemos. Fellows also receive instruction on biostatistics and study design via the weekly journal club, which follows a Socratic educational model. Additional formal training in clinical research methods are available through the Department of Clinical Sciences, as part of a degree program, a certificate program, or as individual courses. Additional, short courses in biostatistics, experimental design, medical and scientific writing, grant strategies, and experimental methodology are offered on a periodic basis. Practice sessions for fellows presenting at national meetings are scheduled to provide the opportunity to hone skills of scientific communication in a collegial, constructive atmosphere.

The Cardiology Physician Scientist Training Program (CPSTP) is clearly delineated path for ensuring the success of our physician scientist trainees with assigned advisors, advisory committees, benchmarks, and milestones, and is lead by Dr. Nik Munshi. Basic science investigations in our division are based in the Simmons Biomedical Research Building on UT Southwestern's North Campus. The basic laboratories occupy approximately 30,000 square feet of research and office space and are equipped to perform cutting-edge investigation utilizing molecular and cellular approaches. The fundamental biology of the cardiac myocyte is an area of particular emphasis. Other areas of focus include stem cell biology, molecular cardiac electrophysiology, chemical screening for cardiovascular drug targets and molecular pathways of cardiac development. Special note should be made of the extensive and close relationships between the Division of Cardiology and other research units within The University of Texas Southwestern Medical Center. These include the McDermott Center for Human Growth and Development (Helen Hobbs, MD, Director), Department of Molecular Biology (Eric N. Olson, PhD, Chairman), the Department of Biochemistry (Steve McKnight, PhD, Chairman), Molecular Genetics (led by Drs. Joseph Goldstein and Michael S. Brown), the Department of Physiology (James T. Stull, PhD, Chairman), the Department of Pharmacology (David Mangelsdorf, PhD, Chairman), the Department of Cardiothoracic Surgery (Michael Jessen, MD, Chairman), the Center for Human Nutrition (Scott Grundy, MD, PhD) and much more.

Diverse opportunities are available for clinical and translational investigation in the Cardiovascular Division. The Dallas Heart Study provides trainees access to a rich multi ethnic population based cohort with an extensive database including comprehensive sociological and behavioral surveys, genetics and biomarkers, and detailed cardiovascular imaging and body composition phenotypes. The Cooper Clinic Longitudinal Study provides a huge database containing information on cardiovascular fitness, risk factors and long term outcomes. The Institute for Exercise and Environmental Medicine (led by Benjamin Levine, MD) studies the adaptive cardiovascular and autonomic changes that accompany exercise training, bedrest, space flight, and aging. Investigators at the VA Hospital conduct a wide array of studies focused in interventional cardiology, including leading clinical trials of therapies for saphenous vein graft atherosclerosis, studies of novel imaging and interventional technologies, and translational studies of endothelial progenitor cells. Opportunities for outcomes research are available via leadership roles at UTSW in the ACTION-GWTG Acute Coronary Syndromes registry (James de Lemos, MD). Additional research units include Heart Failure (Mark Drazner, MD), Diabetes and CVD (Darren McGuire, MD), the Center for Advanced Imaging (Craig Malloy, MD), large animal electrophysiology (Jose Joglar, MD) and clinical cardiac MRI (Ronald Peshock, MD). All fellows in either the combined clinical/research
or the dedicated research training programs will identify a mentor from within the cardiology faculty or from other university faculty, subject to the approval of the director. While all fellows on the Clinical Investigator and Physician Scientist tracks will devote at least one year to investigation, a serious commitment to a research career in almost any discipline will require additional training. Such additional training will be planned in concert by the trainee, research mentor, and divisional director and may extend past the fellowship to a junior faculty appointment.
LIVING IN DALLAS

WELCOME TO THE DALLAS-FORT WORTH AREA, HOME OF UT SOUTHWESTERN. We’re a richly diverse metropolis, the largest metropolitan area in Texas and the 4th largest in the country. Dallas offers all the amenities of a large urban city and a population drawn from all walks of life, living and working together in a thriving economy. Dallas is consistently a destination of choice for young professionals, having one of the most stable housing markets, a strong public and private school system, and a low cost of living. With a diverse community over two million strong, Dallas benefits from rich ethnic inspirations that infuse the neighborhoods, street festivals, food, and culture of the city. This national and international spirit is furthered by the close proximity to one of the largest airports in the nation—DFW International Airport.

What you’d have to earn elsewhere to enjoy the same quality of life you’ll have in Dallas

Food and culture feed Dallas, with dozens of world-class restaurants. Dallas boasts the largest urban arts district in the country. It includes world-class art museums such as the Nasher Sculpture Center and the Dallas Museum of Art. The world-renowned Kimbell Art Museum and the Modern Art Museum are located in Ft. Worth. The area also offers a top 10 ballet company (Texas Ballet Company), a top 10 opera company (Dallas Opera Company), the Dallas Theatre Company and the Dallas Symphony Orchestra, led by the internationally renowned Jaap van Zweden.

If the visual and performing arts are not your scene, pop culture is all around, too. Dallas has a vibrant night life with live music at intimate venues like the House of Blues and the Granada Theatre and at large amphitheaters like Nokia Theatre and the Superpages.com Center. Adding to this plethora of activities are movie theaters like AMC Northpark and the Cinemark IMAX showing the nation’s leading first-run movies. Small movie theaters like the Angelika and Magnolia show independent and foreign pictures.

And then there are the malls—many in Dallas believe that shopping is the city’s official sport. Even so, that’s not the only sport in Dallas. In fact, Dallas is one of only 13 cities in the country with all four major professional sports teams, including football, baseball, ice hockey, and basketball, not to mention soccer. We also host the Byron Nelson Classic drawing the nation’s best golfers, and welcome auto racing’s top drivers several times a year for NASCAR races in Fort Worth.

For the family, the Dallas-Ft.Worth area boasts zoos, aquariums, children’s museums, and botanical gardens. And if you want an escape from urban living, the area offers running, biking, camping, fishing, and hiking trails at White Rock Lake, the Katy Trail, and Joe Pool Lake at Cedar Hill State Park, among other choices.