Cardiology Fellowship Office
Contact Information:

Training Program in Cardiovascular Disease
1959 NE Pacific Street
University of Washington, Box 356422
Seattle, WA 98195-6422
Tel: (206) 685-1397
Fax: (206) 685-9394

Fellowship Director:
*Rosario Freeman, MD, MS*

Associate Fellowship Directors:
*Zachary Goldberger, MD*
*Eric Krieger, MD*
*April Stempień-Otero, MD (Research)*

Program Support:
Theresa Shugart, Program Administrator
Sally Habegger, Program Coordinator
Email us at: uwcardapps@cardiology.washington.edu
Overview

The Fellowship Training Program in Cardiovascular Disease is an ACGME-accredited program that is designed to prepare men and women for an academic career of excellence in Cardiology research, teaching, and patient care.

Cardiology trainees begin the program with 2 years of clinical training including rotations in cardiac catheterization, echocardiography, nuclear cardiology, electrophysiology, adult congenital heart disease, heart failure and transplantation, cardiac consultation, coronary care ICU, mechanical circulatory support (VAD), and outpatient ambulatory cardiovascular care. There are currently seven (7) trainees accepted into the program each year. After completion of initial clinical training, trainees will join either the Research Scholar track or the Master Clinician track. Participants in the Research Scholar track will complete 3rd and 4th years obtaining training in research in basic sciences, health services, population science or clinical investigation under the guidance of a research mentor. Participants in the Master Clinician track will complete an integrated 3rd year of advanced clinical and research training. Application to our training program is made via the ERAS online application system. All positions are filled via the National Residency Match Program.

Prerequisites

Prerequisites include completion of an ACGME accredited three-year residency in internal medicine, outstanding clinical skills, and demonstration of prior research interest and experience. Because of the critical role that research training plays in the formation of future academic cardiologists, close attention is paid by the fellowship selection committee to applicants’ aptitude for and experience in research. Moreover, all fellows are expected to conduct substantive research during their fellowship training, including participation in mentored research (such as research meetings and talks), with presentation and publication of the results of their work.
University of Washington Affiliated Hospitals

Fellows rotate through four affiliated University of Washington Hospitals.

The **University of Washington Medical Center** (UWMC) is a 450-bed hospital with a 46-bed medical/surgical critical care center. Cardiovascular services at the University of Washington Medical Center includes specialized units or clinical teams in cardiac catheterization, echocardiography, clinical electrophysiology, cardiac transplantation, nuclear cardiology, advanced cardiovascular imaging, adult congenital heart disease, and cardiothoracic surgery.

**Harborview Medical Center** (HMC) is a 413 bed, county owned institution managed by the University of Washington, with 65 critical care beds. An active coronary care unit service, cardiology clinics and consultation service, echocardiography, and cardiac catheterization laboratories are based at this Medical Center.

The **Seattle Veterans Affairs Medical Center** (VAMC) has 268 beds with 82 beds assigned to the medical service, including 18 medical intensive care/coronary care unit beds. The Cardiology service at the VA Medical Center maintains an active cardiac catheterization laboratory, inpatient and outpatient clinical cardiology, electrocardiography, and echocardiography services.

**Northwest Hospital & Medical Center** (NWH), a full-service community hospital, has 281 beds located just north of Seattle. The Cardiology service at NWH offers elective rotation experience in cardiac catheterization, cardiac rehabilitation, and peripheral artery disease management.
Clinical Training

Clinical rotations are scheduled over a 24-month consecutive time block and include:

1) Cardiac Catheterization and Angiography (UWMC, HMC and VAMC)
2) Echocardiography (UWMC and HMC)
3) Cardiac Critical Intensive Care Units (UWMC)
4) Nuclear Cardiology (UWMC)
5) Electrophysiology, Electrocardiography, and Device Follow-up (UWMC and VAMC)
6) Heart Failure and Transplant Cardiology, including Mechanical Circulatory Support (UWMC)
7) Cardiology Consultative Services and Cardiac Rehabilitation (UWMC)
8) Adult Congenital Heart Disease (UWMC)
9) Ambulatory continuity clinics (1/2 day per week) during all years of training, plus outpatient clinics in lipid management, congenital heart disease, and pulmonary hypertension.

Teaching Conferences

Cardiology Grand Rounds are weekly lectures on topics of current research and clinical interest. Grand Rounds are given in rotation by the Cardiology faculty, visiting lecturers, and Cardiology fellows.

Weekly Cardiology Tutorials provide a comprehensive introduction to cardiovascular disease with emphasis on pathophysiology, pathology, pharmacology, diagnostic imaging techniques, and research methods. Tutorial topics also include important aspects of cardiac surgery, pulmonary medicine and peripheral vascular disease.

A collaborative, multidisciplinary clinical case conference including Cardiology, cardiac anesthesia, and cardiac surgery service is presented weekly.

Other conferences include Cardiology Research Conference (monthly), Cardiology Journal Club (organized and presented by fellows), subspecialty weekly conferences in heart failure and transplantation, adult congenital heart disease, electrophysiology, interventional Cardiology, multimodality cardiac imaging, divisional QI meetings and other lectures/conferences scheduled throughout the year by the Department of Medicine and School of Medicine. In addition, fellows are encouraged to attend one national scientific meeting annually. Partial support for travel is provided.

Research

Cardiology Division faculty and staff carry out laboratory-based, clinical, and population-based research. Their projects are aimed at understanding the causes of cardiovascular diseases, evaluating current therapies, and developing new therapies as well as preventive strategies. Projects cover a broad spectrum of cardiovascular diseases including atherosclerosis, arrhythmias, heart failure, congenital cardiovascular disease, cardiovascular imaging, and valvular heart disease.

Research Training

The University of Washington is one of the largest, best supported, and most productive research universities in the world. Cardiology fellows have access to an extremely broad spectrum of outstanding research training programs at the University of Washington Medical Center and at affiliated institutions such as Harborview Medical Center, the VA Puget Sound Medical Center, the Fred Hutchinson Cancer Research Center, the Puget Sound Blood Center, the Institute for Systems Biology, and the Northwest Lipid Research Laboratory. Research opportunities are available in laboratory-based, clinical, and population-based research.

Many of our fellows pursue research training under the guidance of a member of the Cardiology Division. However, collaborations with investigators outside of the division are common. A list of Cardiology faculty research interests is available on our website, as is a listing of recent fellow research projects and fellow publications.
Fellows pursuing the Master Clinician pathway typically focus on scholarly work and clinical research within the area of their subspecialty interests. Fellows choose a faculty mentor during the first year and are provided QI/research elective time in their second year as well as during protected research blocks during the third year of fellowship training (~5 months).

Fellows who plan to pursue a significant research component to their careers apply to the Research Scholars Program at the completion of the first year of fellowship. With the assistance of a mentoring team, fellows accepted into the program apply to internal training grants during the second year of fellowship. These grants are predominantly through the Center for Cardiovascular Biology (http://depts.washington.edu/ccvb/index.php) for those interested in laboratory-based and genetics research or the Cardiovascular Health Research Unit (http://chru.washington.edu) for those focusing on training in epidemiology and cardiovascular disease prevention. Additionally, the University is the recipient of a NIH Clinical and Translational Science Award, which supports the University of Washington Institute of Translational Health Sciences. The Institute provides training opportunities in clinical and translational research to help investigators bridge the gap between training and securing independent funding.

Appointments/Stipends/Benefits

Details of the Fellowship Position Agreement for the University of Washington are available at:

http://uwmedicine.washington.edu/Education/Graduate-Medical-Education/Prospective-Residents-and-Fellows/Pages/default.aspx

After beginning training, most fellows will be reappointed to successive years of training, but this is not binding upon either the Fellow or the Program Director. Fellows in the general Cardiology training program will not be trained for board eligibility in interventional Cardiology, electrophysiology, adult congenital heart disease, or advanced heart failure/cardiac transplantation which all require a separate fourth (or fifth) year of clinical training. A fourth year of research training requires application or arrangement with the Research Scholars Program.

Stipends are reviewed annually and determined at the Institutional level. As of July 1, 2015, the monthly rate for an R4 (first year Cardiology Fellows) was $5,159. These salaries are adjusted annually. Medical insurance and basic life insurance are provided to all fellows and their dependents. Supplemental life insurance, disability insurance, and retirement benefits also are available. All Cardiology fellows receive three weeks of vacation per year.

Fellows organize evening and weekend call schedules throughout the three years of training. Currently, the first year fellows are on-call an average of every 4th night/weekend and second year fellows every 5th night/weekend. Cardiology fellows are entitled to staff privileges at the University, including use of the library, and membership to the Intramural Sports Activities Building.
Specific Guidelines for detailed University of Washington procedures and policies for fellows are contained in the Fellowship Position Appointment Agreement, which each fellow receives. This contract provides for a variety of procedures, should they be needed, including emergency or exceptional leave requirements, termination of contract, grievances, etc. The following Administrative Guidelines apply specifically to the Cardiology Fellowship Programs. Additional information is also available at the UW Graduate Medical Education website:

http://www.uwmedicine.org/education/gme/prospective-residents

1. Administration Office and Communication

All questions regarding fellowship issues should be handled by the Fellowship Office.

Fellowship Office Hours: Monday-Friday – 8:30AM – 5:00PM
Phone/Voice mail: 206-685-1397
Fax: 206-685-9394
Email: uwcardapps@cardiology.washington.edu

2. Evaluation of Clinical Performance and Documentation of Procedures

A description of each clinical rotation, including principal responsibilities for both inpatient and outpatient components, is provided at the beginning of the fellowship year and on the Cardiology fellowship website. Faculty provide feedback to each fellow at the end of the rotation regarding clinical performance and areas for improvement. Online evaluations of fellow performance are obtained after each rotation. Evaluations are reviewed by trainees with the Fellowship Director or Associate Fellowship Directors every 6 months.

The ACGME requires that fellows maintain records of procedures performed during their Fellowship Training. Records should include date, supervising physician, exact procedure performed, any complications and the fellow’s role. Procedure logs are maintained using the same online system used to complete and review evaluations. It can be accessed by going to https://uw.medhub.com/index.mh. Every 6 months, the procedure log and total numbers of procedures are reviewed with the fellowship Program Director or associate fellowship Program Directors

3. Participation in Program Development

Fellows actively participate in program development of the Cardiology fellowship program:

- Informal lunches with the program directors and selected faculty to discuss areas for improvement
- Online evaluations of faculty and rotations by the fellows
- Participation by Chief Fellows on the Fellowship Committee
- Annual confidential online evaluation of the Fellowship Program through MedHub
4. **On-Call Responsibilities**

On-call responsibilities are approximately every 4th night and every 4th weekend for the 1st year fellows, every 5th night/weekend for 2nd year fellows and approximately every 12th night/weekend for 3rd year fellows.

On-call responsibilities are divided as follows (with Attending coverage for each):

**General Cardiology** (Cardiology A) Two Fellows: The two fellows assigned to the Cardiology A rotation share in-house day call responsibilities (rounding with the attending, supervising housestaff admissions and managing inpatient care for the Cardiology A service) during the work week at UWMC from 8AM to 8PM. On alternate weekends, one of the Cardiology A fellows covers Cardiology A in-house day call (8am-8pm) and the UWMC consult service. In addition to in-house call responsibilities the Cardiology A fellows participate in night procedure call (see below). Night admissions to the Cardiology A service between 8PM to 8AM are supervised by a separate faculty in-house hospitalist/nocturnist.

**Heart Failure/EP** (Cardiology B) Fellow: The fellow assigned to the Cardiology B rotation covers in-house day call responsibilities (rounding with the attending, managing inpatient care for the Cardiology B service) during the work week at UWMC. On alternate weekends during the rotation, the Cardiology B fellow covers in-house day call responsibilities and the UWMC EP consult service. Night admissions to the Cardiology B service between 8PM to 8AM are supervised by a separate faculty in-house hospitalist/nocturnist. Fellows assigned to the Cardiology B rotation also provide at-home call for the Cardiology B service to answer clinical questions and maintain continuity of clinical care.

**Cardiology Procedures**: This fellow takes calls for general cardiology and consults, emergent cath lab procedures and echocardiography at UWMC and HMC.

5. **Hours of Duty**

Fellows must adhere to the ACGME requirements for hours of duty (mandatory):

- No more than 80 hours per week in house (averaged over 1 month).
- No more than 24 consecutive hours on duty (in house)
- At least 1 day in 7 free of duty, when averaged over four weeks.
- Fellows should have 10 hours free of duty, and must have 8 hours between scheduled duty periods
- Fellows must have at least 14 hours free of duty after 24 hours of in-house duty
- At-home call counts towards the 80-hour maximum weekly hour limit.

To effectively follow these rules requires efficiency, open lines of communication among members of all health care teams, the ability and willingness to effectively sign out pending tasks. Fellows also help ensure that the medicine residents meet the hours of duty rules and help them learn to work as a team so they can leave on time while still providing excellent patient care. All fellows are required to submit a record of their duty hours online in MedHub at least weekly. A greater than 85% submission rate is required by each fellow: [https://uw.medhub.com/index.mh](https://uw.medhub.com/index.mh) (UW NetID and Password required to access)
6. Lines of Supervisory Responsibility

On each clinical rotation, the fellow is supervised by the Cardiology Attending on that service both in direct patient care activities and in performing and interpreting diagnostic and therapeutic procedures.

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<thead>
<tr>
<th>Clinical Rotation</th>
<th>Supervising Attending(s)</th>
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<tbody>
<tr>
<td>VAMC cath/consult</td>
<td>VAMC Cath Lab attendings</td>
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<td>Card A</td>
<td>Card A attendings</td>
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<tr>
<td>Adv Cath</td>
<td>Cath Lab attendings</td>
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<td>UWMC Echo</td>
<td>Echo Lab attendings</td>
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<td>HMC Echo</td>
<td>HMC attendings</td>
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<tr>
<td>Electrophysiology</td>
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<td>UWMC Consults</td>
<td>Consult attending</td>
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<td>Card B</td>
<td>Card B attendings</td>
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<tr>
<td>Mechanical Circulatory Support</td>
<td>MCS attendings</td>
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<tr>
<td>HMC Cath/Consult</td>
<td>HMC Cardiology attendings</td>
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<tr>
<td>Adv Cardiac Imaging</td>
<td>Nuclear attendings</td>
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During the research month(s), each fellow has a designated supervisor.

A weekly Cardiology clinic is supervised by the clinic faculty mentor.

Evening and weekend on-call Attendings are designated for each cardiology sub-specialty. The Fellow calls the appropriate attending (Card A, Card B, HMC, VAMC, EP, Interventional, Echo) as needed. In the event it is unclear which service is most appropriate, the general Cardiology attending is notified.

7. Training for Conduct of Human Subjects Research

Training in the conduct of human subjects research is required for all fellows who plan to do patient based research and also is required for “key personnel” receiving funding from the National Institutes of Health (NIH). Education in the basics of human subjects research that meets the NIH requirement is available on a regular basis via In-Person Sessions, CITI Web-Based Training, and the Investigator 101 CD ROM. The Human Subjects Division also provides and coordinates other training opportunities related to human subjects research. A listing of in person and online training courses are available at: [http://www.washington.edu/research/hsd/training.html](http://www.washington.edu/research/hsd/training.html).

8. Vacation

Fellows have three weeks of vacation per year as stated in your Fellowship Position Appointment (15 business days and 6 weekend days). Vacations will be scheduled by the fellowship office with the schedule for the academic year completed by April 15 of the new year. Any changes to the vacation schedule must be approved by the Cardiology fellowship office and Program Director. Vacations are scheduled in one-week increments from Sunday through Saturday.

We try to limit instances of fellows missing more than one week of any given rotation and we try to ensure that multiple fellows are not on vacation concurrently. Notify your continuity clinical attending at the beginning of the year and your direct rotation supervisor at least four weeks in advance of your vacation plan. It is the responsibility of the fellow to ensure their continuity clinic attending is aware of any absences and to ensure they do not have any on-call responsibilities when vacation is used.

[http://www.uwmedicine.org/education/gme/residents-fellows](http://www.uwmedicine.org/education/gme/residents-fellows)

Vacation cannot be taken on months when the Fellow is assigned to the inpatient cardiology services. For all other clinical rotations, when fellows are on vacation, the attending is responsible for clinical services.

Fellows provide cross coverage between assigned rotations for urgent clinical issues as follows:
For all these cross-covering arrangements, only urgent issues are covered and these activities must not interfere with the educational component of training.

9. Travel to Scientific Meetings

Our fellowship programs allow time and funding for all trainees to attend 1 national scientific meeting in the US annually. Most fellows choose to attend either the AHA or ACC meetings, but other scientific sessions at which original research is presented (such as The Heart Rhythm Society, the Heart Failure Society, or the American Society of Echocardiography meetings) can be substituted with approval of the Fellowship Director.

All travel must be pre-approved prior to making any travel arrangements. Meeting assignments are made annually by the fellowship office as part of the rotation/vacation scheduling process. Any requests for change should be directed to the fellowship office as soon as possible. We encourage fellows to submit original research abstracts for presentation.

Travel funds are limited and are primarily supported by gifts from alumni of our Fellowship Program. Thus, we encourage you to keep your costs as low as possible and are only able to reimburse, per UW and Division Policies, for meeting registration, airfare and hotel to a maximal reimbursement over the course of the academic year of $1500.00.

1. **Registration:** Email a PDF of your online registration receipt.

2. **Airfare:** Once your travel has been approved by the fellowship office, you may proceed with making your arrangements. Your flights must be approved by the fellowship office prior to final booking. Do NOT pay for your airfare; we have a special account set up which gets charged.

3. **Hotel:** We will only reimburse for hotels assigned via the conference housing site or at the UW per diem rate. Please share rooms whenever possible and be sure to get a separate receipt for each person.

**Receipts are required for reimbursement for Registration and Lodging. Airfare will be approved and paid for by the Fellowship office when following the instructions above.**

To guarantee reimbursement, receipts must be submitted to the fellowship office within 30 days of completion of your trip. When administrative duties are repeatedly delinquent, fellows will not be allowed to attend the usual annual scientific conference, or receive reimbursement until all administrative tasks are complete.

The fellow should ensure appropriate on-call and clinic coverage during their absence.

10. Outside Professional Activities

Outside professional activities ("moonlighting") are discouraged, but not prohibited. If fellows engage in outside professional activities, these activities must not interfere with fellowship trainee responsibilities and duties or result in deterioration of the fellow's clinical or research performance. These activities generally are not permitted in UWMC, SCCA, HMC or the clinics associated with these institutions, with some exceptions. Involvement in Outside Professional activities must be consistent with ACGME policies and are included in hours of duty reporting. Malpractice coverage for outside activities is the responsibility of the fellow.

Advance written approval for outside professional activities is required. The fellow should submit the request form to the Program Director indicating the activity, the institution involved and the amount of time involved. If the Program Director approves of this activity, the paperwork will be forwarded to the Graduate Medical Education
Office for approval. This approval must be renewed annually. Please see the detailed policy and copy of the Moonlighting form on the following link:

http://www.uwmedicine.org/education/Documents/gme/Moonlighting-Policy.pdf

11. Housestaff Coverage

Every year there is 1 Housestaff event where overnight in-house patient care responsibilities are covered by fellows. Cardiology fellows are expected to provide such coverage for the Cardiology service of UWMC, HMC and the VAMC for this event, and will be compensated.

12. Parking

Fellows are responsible for their own transportation and parking arrangements, but are only responsible for paying one parking permit per day. In order to attend conferences and continuity clinics, paying double parking fees may be needed on some days. If reimbursement for the second payment is needed, printed documentation of two parking fees in one day must be brought to the fellowship office at the end of each rotation for reimbursement. We encourage everyone to utilize the Health Sciences Shuttle when travelling between UWMC and HMC.

There are 2 options for parking at the UWMC. 1) Purchase an entire year (and set this up as a payroll deduction) or a month at a time or 2) PPUP Program at Portage Bay Garage: RECOMMENDED. Located west of UWMC, if residents/fellows are not eligible for payroll deduction, a Husky Card Account may be used as a payment option. The Husky Card Account must be set up prior to signing up for PPUP. Once signed up with UW Commuter Services, you enter the garage by swiping your Husky Card. This parking program does allow in and out privileges (for single entry, not available for carpools) and must be renewed at the end of June each year.

For more information: http://www.uwmedicine.org/education/gme/residents-fellows/parking

There are no fees for parking at the VAMC. At Harborview you are required to either acquire a monthly parking permit or the HMC PPUP plan. You must obtain green & white liability waiver forms at the HMC Parking and Commuter Services Office. Pay the fee and a parking permit will be issued for the dates that you will rotate at HMC.

Escort services are available at the UWMC and at HMC for walking to your car late at night (598-7337, 685-9255).

13. Fellowship Application Process

Attracting the best candidates to our fellowship is essential for the continued success of the program. Current fellows play a key role in the application process. Fellows help review applications, decide which candidates to interview and are actively involved on interview days, providing information about the program to applicants and giving tours of the Cardiology facilities.

14. Appointment and Reappointment

Most fellows will be reappointed to successive years of training, but this is not binding upon either the Fellow or the Program Director. Fellows are eligible for the ABIM examination in Cardiovascular Disease following successful completion of 3 years of training in the general Cardiology fellowship program. Competency in cardiology subspecialties requires additional training. Subspecialty fellowship programs in adult congenital heart disease, advanced heart failure and cardiac transplantation, interventional cardiology and electrophysiology require participation in a separate ACGME-accredited training program following completion of the general Cardiology fellowship program. Participation in our general fellowship training program does not guarantee acceptance into our subspecialty fellowship training programs, but internal applicants are generally competitive for these positions. Fellows interested in pursuing subspecialty training beyond the general fellowship training are encouraged to apply. Additional years of research training beyond the standard general fellowship training period require special arrangement with a research mentor and the Program Director and usually are dependent on research funding.
15. ID Badges

All fellows are required to wear a current photo ID badge for each medical center at all times when in or entering the building. ID badges must be displayed above the waist and be clearly visible.

16. Radiation Safety

All fellows are provided with 1 Radiation Exposure Badge and a ring by the Radiation Safety Office, which are required whenever radiation exposure is likely. Fellows are required to wear lead aprons as instructed by the Cath Lab Attendings. Badges and rings are to be turned in monthly to the Fellowship Office. Instruction in basic radiation safety is provided annually. Additional information is available from the UW Radiation Safety Office.

17. Health

All fellows are required to have annual influenza vaccination, respiratory mask fitting and TB testing by the Employee Health Office (Room NN210).

18. Licensing

Each fellow’s Washington State Medical License must be current. A current copy of both the Washington State License and the DEA License must be on file in the Fellowship Office. Please note that if you are moonlighting at a non-University of Washington hospital, you are required to obtain and pay for your own DEA number. If you do not moonlight you may obtain your DEA license through the fee exempt protocol.

19. Learning Gateway

The e-Learning is developed by UW Medicine Learning Gateway as in previous years. Learning Gateway training focuses on safe patient care which has been standardized across UW Medicine based on state and national policies for safer patient care. The modules have been designed to help residency and fellowship programs meet certain of the ACGME competency education requirements.

Please refer to the GME website for additional information:

http://www.uwmedicine.org/education/gme/residents-fellows/online-training

All fellows are required to complete several online modules using the Learning Gateway prior to beginning training.

20. UW HIPAA Compliance Training (online module due within 30 days of start date)

21. VA Puget Sound Health Care System (VA Online Training due prior to start of rotation at the VA)

22. Clinical Documentation

The Cardiology Fellowship requires that all clinical care be documented concurrently with provision of care. Specifically, the medical record for all clinic visits, consults and procedures must be completed on the same day as the service was provided. In addition, any significant telephone or email contact with a patient should be documented in the medical record. All electronic notes must be signed as soon as possible and no longer than 1 week after transcription.
ESSENTIAL ABILITIES REQUIREMENTS FOR APPOINTMENT, REAPPOINTMENT, RETENTION AND CERTIFICATION

UNIVERSITY OF WASHINGTON CARDIOVASCULAR DISEASE FELLOWSHIP TRAINING PROGRAM

Essential abilities are academic performance requirements that refer to those physical, cognitive and behavioral abilities required for satisfactory completion of all aspects of a graduate medical curriculum, and the development of personal attributes required by the faculty of all fellows at certification. The essential abilities required by the curriculum are in the following areas: motor, sensory, communication, intellectual (conceptual, integrative, and quantitative abilities for problem solving and diagnosis) and the behavioral and social aspects of the performance of a physician. These are attributes each Cardiology Fellow must possess and the use of a third party for the fulfillment of these attributes is not adequate. Additionally, fellows must be legally authorized to practice in all healthcare clinical training sites.

Motor Skills
- Physical dexterity to master technical and procedural aspects of patient care.
- Adequate physical stamina and energy to carry out taxing duties over long hours.
- Bilateral upper extremity manual dexterity to perform complex diagnostic and therapeutic cardiovascular procedures.

Sensory Abilities
- Fellows must be able to gather information with all senses, especially sight, hearing, and touch, in order to gather a medical and psychosocial history, perform a physical examination, and diagnose and treat patients.

Communication Skills
- Fellows must be able to communicate effectively with patients, including gathering information appropriately, explaining medical information in a patient-centered manner, listening effectively, recognizing, acknowledging and responding to emotions, and exhibiting sensitivity to social and cultural differences.
- Fellows must be able to communicate effectively and work cooperatively with supervisors, other fellows, residents, health care team members and staff.

Intellectual Abilities
- Fellows must be able to comprehend and learn factual knowledge from readings and didactic presentations, gather information independently, analyze and synthesize learned material and apply information to clinical situations. Fellows must be able to develop habits of life-long learning.
- Fellows must be able to develop sound clinical judgment and exhibit well-integrated knowledge about the diagnosis, treatment, and prevention of illness within their scope of practice. They must be comfortable with uncertainty and ambiguity in clinical situations, and seek the advice of others when appropriate.

Behavioral, Social and Professional Abilities
- Fellows must possess the emotional maturity and stability to function effectively under stress that is inherent in medicine and to adapt to circumstances which are unpredictable or that change rapidly. They must be able to interact productively, cooperatively and in a collegial manner with individuals of differing personalities and backgrounds, and be an active contributor to the process of providing health care by demonstrating the ability to engage in teamwork and team building. They must demonstrate the ability to identify and set priorities in patient management and in all aspects of their professional work. They must be punctual and perform work in a timely manner.
- Fellows must be capable of empathetic response to individuals in many circumstances and be sensitive to social and cultural differences.
- Fellows must exhibit an ethic of professionalism, including the ability to place others’ needs ahead of their own. They must exhibit compassion, empathy, altruism, integrity, responsibility and tolerance, as well as demonstrate the ability to exercise the requisite judgment required in the practice of medicine.
CURRICULUM

The Training Program in Cardiovascular Disease is designed to prepare trainees for an academic career of excellence in Cardiology research, teaching, and patient care. Our program’s educational goals and objectives reflect ACGME requirements for accreditation (www.acgme.org) that address each of the 6 competencies. In addition, our program is aligned with the COCATS Guidelines for Training in Adult Cardiovascular Medicine (www.acc.org).

The 6 ACGME Competencies are:
- Patient Care and Procedural Skills (PC)
- Medical Knowledge (MK)
- Practice-Based Learning and Improvement (PBLI)
- Interpersonal and Communication Skills (ICS)
- Professionalism (PROF)
- Systems-Based Practice (SBP)

The core of our program is an intense 24 month block of clinical rotations combined with a 12 month block of research and advanced clinical training. Our academic research training pathway offers 24 months of dedicated research training following the 24 month clinical rotation block.

Training in the competencies is provided through:

- Close one-on-one attending-fellow provision of patient care in inpatient and outpatient settings, with increasing levels of independence during the training period.
- Direct faculty teaching of cardiovascular procedures including indications, performance and study interpretation.
- A series of didactic conferences on core cardiovascular knowledge.
- Clinical and research conference presentations.
- Research training under the supervision of a faculty mentor, including dedicated research time, journal clubs, and training in research methods and ethics.
- A teaching curriculum that includes training in presentation of clinical cases, writing review articles, written and oral presentation of research data, and teaching medicine residents and medical students.
- Involvement in the quality improvement activities of the Cardiology Division for optimizing our patient care systems and participation in academic and clinical administrative functions of the Division.
- Responsibility for providing continuous care to our patients by implementation of appropriate call schedules and mechanisms for handling unexpected coverage issues.

Evaluation of trainee’s competency in each area is documented by:

- Direct one-on-one observation of patient care and procedures.
- Written (online) evaluations by supervising faculty for each month-long rotation using the ABIM evaluation form.
- Review of procedure logs.
- Procedural proficiency evaluations in echocardiography, nuclear cardiology and cardiac catheterization.
- Fellow self-evaluation narratives submitted every 6 months.
- 360 degree evaluations by academic, technical and nursing staff members.
- An updated CV including teaching conferences, presentations and publications.
- One on one meetings with each trainee and the Fellowship Program Director or Associate Program Directors every 6 months (with additional meetings as needed) summarized in a letter.
- Summary letter at completion of training documenting areas of clinical proficiency, final procedure numbers, average ABIM score, narrative comments on clinical performance and a synopsis of research experience. A passing score on the ABIM examination in Cardiovascular Disease.
EDUCATIONAL GOALS

Inpatient Cardiac Care

- To learn an efficient and accurate diagnostic approach to hospitalized patients with a wide range of cardiac diseases.
- To learn the basics of management of a wide range of acute cardiac diseases.
- To learn inpatient Cardiology consultation and the appropriate role of the consultant.
- To learn participatory and leadership skills as part of a team of professionals.
- To become more sensitive and skilled in interacting with patients and families.
- To develop communication skills with other health care providers, including referring physicians, cardiac surgeons, pharmacists, nurses, and cardiovascular allied health professionals.
- To integrate multiple clinical disciplines (cardiothoracic surgery, cardiothoracic anesthesia, critical care, etc.) in the collaborative inpatient care of patients with cardiac disease, including in the intensive care unit.

Adult Congenital Heart Disease

- To learn the anatomy and physiology of common congenital heart lesions and the types of repairs used to treat them.
- Learn the long-term complications of repaired congenital heart disease and the need for lifelong care.
- To coordinate care for complex patients across a multidisciplinary team including cardiologists, surgeons, interventionalists, anesthesiologists, obstetricians and geneticists in order to provide optimal patient care.
- To understand how to plan and interpret a complex congenital catheterization including the definition of cardiac anatomy, physiology and shunt physiology. To learn how to plan the catheterization with the interventional cardiologist.
- Learn the role of cardiac MRI in the evaluation of patients with congenital heart disease.
- Present patients in the monthly ACHD conference, including preparation of MRI images, and be able to communicate the reasons for surgical or procedural consideration.

Ambulatory Cardiac Care

- To learn the differential diagnosis for common presenting symptoms and signs and appropriate diagnostic testing strategies.
- To learn the appropriate management of cardiac disease in the outpatient setting including use of diet, pharmacological therapy, exercise, cardiac rehabilitation, and the appropriate timing of surgical or percutaneous interventions.
- To learn cardiac risk factor evaluation and modification in patients with or at risk for cardiac disease, including dietary and other life style modifications, smoking cessation therapy, lipid-lowering therapy, and other effective strategies.
- To learn the appropriate intervals for periodic evaluation and testing of patients with chronic cardiac disease.
To gain knowledge and experience in the diagnosis, evaluation, and management of patients with peripheral vascular disease, including physical examination, review of diagnostic testing, appropriate medical therapy, and indications for intervention.

To gain knowledge and experience about the role of cardiac rehabilitation in the management of adults with cardiovascular disease.

To gain a longitudinal perspective regarding the clinical course of patients with chronic disease.

To become more sensitive and skilled in interacting with patients and families.

To improve communication skills with referring physicians and other health care providers.

To seamlessly integrate inpatient and outpatient management of patients with heart disease, including incorporation of cardiac diagnostics in clinical decision making with appropriate involvement of subspecialists across multiple disciplines.

Electrocardiography and Cardiac Arrhythmias

To learn the diagnostic approach to and appropriate management of cardiac arrhythmias.

To learn the indications for, management, risks and follow-up of cardiac pacemakers, implantable defibrillators and cardiac resynchronization devices.

To learn the indications for, management, risks and follow-up of invasive diagnostic electrophysiologic testing and catheter ablation procedures.

To gain a basic understanding of device interrogation, threshold and sensing tests and to have the opportunity to evaluate device rhythm events and participate in decision making regarding those events.

To interpret at least 3,500 12-lead ECGs and at least 150 24-hour ECGs.

To be competent in the performance and interpretation of stress ECG studies (at least 200 cases).

To correlate ECG and stress test findings with clinical diagnosis, prognosis, and management.

To gain competency in performing DC cardioversion (at least 10 cases) and in insertion and management of temporary pacemakers (at least 20 cases).

Echocardiography

To learn normal and abnormal tomographic cardiac anatomy, physiology, and pathophysiology.

To comprehend the principles of echocardiographic instrumentation, fluid dynamics, cardiac hemodynamics, and imaging and Doppler artifacts.

To learn the indications for and limitations of echocardiography including appropriateness criteria.

To achieve competency in the performance and interpretation of transthoracic echocardiography by scanning at least 150 patients and interpreting at least 300 studies.

To learn the indications and risks of stress echocardiography and transesophageal echocardiography and participate in performing at least 100 stress echo studies, 20 contrast studies, and 50 transesophageal echo studies.
To correlate data from echocardiographic, physical examination and other diagnostic procedures.

To clearly articulate for the referring physician the clinical significance of the echocardiographic findings in the context of the patient’s specific disease process.

**Nuclear Cardiology & Advanced Cardiac Imaging**

- To learn the basic concepts of radiotracer delivery, uptake and release kinetics and their relationship to coronary anatomy
- To learn the basic operation of gamma cameras.
- To learn the principles of patient selection, performance, monitoring, interpretation, and reporting of exercise and pharmacological stress testing including appropriateness criteria.
- To learn how to acquire, reconstruct and analyze radionuclide ventriculograms and myocardial perfusion images including both SPECT and PET.
- To understand the indications and clinical utility of CT imaging for coronary, aortic and other cardiac disease.
- To perform and interpret nuclear cardiology studies, to integrate the results with other clinical parameters, and to assess the impact of the study on subsequent clinical management.
- To understand the indications and clinical utility of cardiac magnetic resonance images for assessment of anatomy and function in patients with both congenital and acquired heart disease.
- To correlate data from different cardiac imaging modalities, physical examination and other diagnostic procedures.
- To clearly articulate to the referring physician the clinical significance of cardiac imaging findings in the context of the patient’s specific disease process.

**Cardiac Catheterization**

- To gain experience in evaluating patients undergoing invasive procedures in the cardiac catheterization laboratory, understanding the indications/risks/benefits for the procedure, and reviewing potential alternate diagnostic approaches.
- To gain knowledge of normal and abnormal coronary artery and intracardiac anatomy, physiology, and pathology.
- To gain knowledge and understanding of intracardiac hemodynamics and its relationship to various pathophysiologic states.
- To participate in a team based clinical practice in evaluating, explaining and obtaining consent, and reviewing study results with the patient.
- To gain experience in arterial/venous cannulation from various anatomic sites, catheter manipulation, and image acquisition during diagnostic angiography procedures, including understanding image plane orientation, radiographic instrumentation, and factors that impact image quality.
- To demonstrate knowledge of radiation safety issues and techniques to minimize radiation exposure.
- To perform and interpret left heart catheterizations with coronary angiography, right heart catheterizations, pericardiocentesis and intra-aortic balloon pumps.
To correlate angiographic and clinical findings and formulate an appropriate therapeutic approach for each patient based on these findings.

To gain knowledge in the role of interventional cardiology, interventional radiology, and vascular surgery in various therapeutic approaches in caring for patients with peripheral vascular disease.

To gain knowledge and experience in the role of interventional cardiology and cardiac surgery in various therapeutic approaches. To learn about the factors important in the patient selection for such procedures and work collaboratively in determining clinical treatment plans.

Heart Failure and Cardiac Transplantation, and Mechanical Circulatory Support

To learn the appropriate diagnosis and treatment of heart failure in the acute care setting including use of invasive hemodynamic monitoring, use of continuous infusion intravenous medications and other acute care treatment options.

To learn the diagnosis and treatment of chronic heart failure in the outpatient setting.

To learn in detail the pharmacology of agents used in the treatment of heart failure.

To learn the indications for heart transplantation, the pre-transplant evaluation protocol, and post-transplant follow-up.

To learn the indications for ventricular assist device implantation, both pulsatile and continuous flow devices, and to work with the cardiac surgical team to provide longitudinal follow-up for these patients.

To understand longitudinal perspective regarding the clinical course of patients with advanced heart failure and understand indications for patient counseling regarding end-of-life decision making.

To understand the indications for mechanical circulatory support as a bridge to cardiac transplantation and as destination therapy.

To understand how patients should be evaluated for mechanical circulatory support, including the contraindications and comorbidities relevant to the decision to place a device.

To understand the immediate post-operative issues in managing patients with MCS and participate in the long-term management of patients with MCS with a focus on: management of right heart failure, anticoagulation, evaluation of VAD dysfunction/thrombosis, evaluation and management of infection and GI bleeding, management of ventricular and atrial arrhythmias.

To interpret VAD data from each device and understand the implications of data provided from each device.

Research

To identify a research problem, critically analyze the relevant literature and formulate a competitive research proposal.

To learn the benefits of peer review and constructive criticism during all phases of research.

To learn to formulate a testable hypothesis and describe how to test it.

To learn research methodologies specific to the individual research project.
To learn the basics of experimental design, including the appropriate use of control groups.

To understand and apply the concepts of sample size and statistical power to the design of experiments and interpretation of data.

To learn to collect, organize, and preserve experimental data.

To learn to analyze experimental and observational data objectively and evaluate the quality, impact, and limitations of the data.

To develop skills important in clear organization and presentation of research results.

To learn the strengths and weaknesses of basic, clinical, and health services research techniques.

To learn responsible conduct of research including general issues of scientific integrity as well as issues specific to the individual research product including animal care requirements, protection of privacy, informed consent, and institutional approval of human investigation.

To learn to evaluate the risks and benefits of a research project from the points of view of the research subjects and society.

**Teaching and Practice Based Learning**

To use recommended textbooks and online resources to develop effective self-study methods for continuing medical education.

To learn effective teaching and presentation skills.

To remain current regarding the research literature.

To learn to synthesize information from multiple sources, including print and electronic media.

To develop an approach to life-long learning.

**Areas beyond general Cardiology that require additional training:**

- Electrophysiology, including permanent pacer and ICD implantation*

- Interventional Cardiology*

- Advanced heart failure and cardiac transplantation*

- Adult congenital heart disease*

- Nuclear Cardiology**

* Formal training in a subspecialty ACGME fellowship program is available for these training pathways. Internal candidates are generally competitive applicants, but fellowship positions in the subspecialty programs are not guaranteed. Application is made early in the 2nd year of general cardiology training.

** Training may be achieved within the context of the general cardiology fellowship if additional coursework and laboratory sessions are completed, along with the requisite number of clinical studies and demonstration of competency.
**ROTATION GUIDELINES**

**General Cardiology (Card A, UWMC)**

1. Supervise the Medicine R1s for patient admissions including the initial evaluation, plans and orders
2. Work closely with the Attending Cardiologist in decision-making and patient management.
3. Evaluate patients with acute cardiac disease (heart failure, arrhythmias, chest pain) in the Emergency Department and on other inpatient services.
4. Facilitate communication with primary providers and outpatient physicians regarding inpatient patient status and hospital course.
5. Read and study the ACC/AHA guidelines for patient management of common cardiac diagnoses including acute myocardial infarction, acute coronary syndromes, atrial fibrillation, congestive heart failures, etc.

**Clinical Cardiology and Catheterization (HMC)**

1. Supervise the inpatient Cardiology Consult Service.
2. Evaluate (with the housestaff) and perform acute interventions in unstable patients (right heart catheterization, vasopressor or inotropic support, temporary pacers, unstable arrhythmias, thrombolytic therapy, urgent cardiac catheterization, emergency echocardiography or pericardiocentesis).
3. Present case-oriented didactic presentation to medical housestaff and students at one noon hour conference per month.
4. Evaluate patients for cardiac catheterization and participate in performance and interpretation of the catheterization procedure.
5. Read and study recommended textbooks and articles on ECG interpretation and clinical cardiology.

**Cardiology Consults (UWMC)**

1. Perform cardiology consults and appropriate follow-up with the Consult Attending.
2. Teach medical students on the consult rotation.
3. Perform DC cardioversions on inpatients and outpatients including pre-procedure evaluation, the cardioversion procedure, TEE if needed and coordinating post-procedure medical therapy and follow-up.
4. Review at least ECGs daily with the medical students and the Consult Attending.
5. Read and study the ACC/AHA guidelines for management of conditions commonly encountered on the consult service.

**Nuclear Cardiology Imaging (UWMC)**

1. Develop skills in serving as a consultant to multiple non-cardiology clinical services that are requesting advice on appropriate study.
2. Participate in performance and interpretation of nuclear cardiac studies including exercise stress perfusion imaging, pharmacologic perfusion imaging, and radionuclide ventriculography. Studies will include both SPECT and PET/CT.
3. Correlate results of noninvasive imaging with coronary angiography and clinical outcomes.
4. Participate in reading sessions of other thoracic and cardiac imaging modalities including chest tomography (CT), magnetic resonance imaging (MRI) and positron emission tomography (PET).

**Cardiac Catheterization I (VAMC)**

1. Evaluate and develop the initial management plan on patients admitted for cardiac catheterization.
2. Perform and interpret diagnostic catheterization with the attending cardiologist.
3. Perform post-procedure patient evaluation and discuss results with the housestaff. Maintain communication with the physicians on the Cardiology service and the Catheterization Lab.
4. Correlate angiographic and clinical findings. Discuss impact of angiographic findings on patient management.
5. Plan and participate in the Friday VAMC Cardiology Conference.
6. Read and study recommended textbooks and articles on cardiac catheterization and clinical cardiology.

**Cardiac Catheterization II (UWMC)**
1. Evaluate, write a brief H & P, and develop the initial management plan on patients scheduled for cardiac catheterization.
2. Perform and interpret diagnostic catheterization with the attending cardiologist. Participate in or observe percutaneous coronary and other interventions when time allows.
3. Perform post-procedure patient evaluation and discuss results with the housestaff. Maintain communication with the physicians on the Cardiology service and the catheterization lab.
4. Correlate angiographic and clinical findings. Discuss impact of angiographic findings on patient management.
5. Read and study recommended textbooks and articles on cardiac catheterization and clinical cardiology.

**Echocardiography I and Exercise Testing (UWMC)**
1. Know the indications and potential risks of echocardiographic procedures and exercise stress testing. Provide patient counseling regarding testing, including consent, where needed for medical procedures.
2. Perform echocardiograms under the supervision of a qualified sonographer.
3. Interpret echocardiograms under the supervision of the echocardiography attending.
4. Perform scheduled treadmill exercise and stress echo tests and review the results with an attending.
5. Read and study recommended books and articles on echocardiography.
6. Correlate echocardiographic findings with physical examination findings and other clinical data. Interact with referring physicians when echocardiograms are requested and when further interpretation of echocardiographic results is needed.

**Echocardiography II (HMC)**
1. Perform echocardiograms under the supervision of a qualified sonographer.
2. Interpret echocardiograms under the supervision of the echocardiography attending.
3. Evaluate patients for whom a transesophageal echocardiogram has been requested.
4. Interpret and review electrocardiograms with rotating medical students, residents and consult service attending.
5. Attend Lipid Clinic ½ day/week.

**Advanced Echocardiography III (UWMC)**
1. Participate in the performance and interpretation of complex transthoracic echocardiography studies.
2. Perform and interpret pharmacologic stress echocardiographic studies
3. Evaluate patients for transesophageal echocardiography, participate in patient management, performance of the procedure and interpretation
4. Perform contrast echocardiographic studies when needed.
5. Participate in intraoperative transesophageal studies and observe cardiac surgical procedures in patients with a range of cardiac diseases.
6. Read advanced textbooks and article on echocardiographic diagnosis.
Electrophysiology and Cardiac Arrhythmias (UWMC)
1. Attend 2 outpatient EP and pacer ½-day follow-up clinics per week.
2. Perform DC cardioversions on inpatients and outpatients who have an implanted pacer or defibrillator.
3. Perform temporary pacer insertions under the supervision of an attending cardiologist. (Temporary pacer insertions may occur on other rotations, depending on clinical indications.)
4. Interpret 24 hour ECGs and event monitors with attending supervision.
5. Participate in EP and/or operating room procedures for diagnosis and treatment of arrhythmias.
6. Perform consults on patients needing device implantation or with refractory arrhythmias.
7. Assist in management of inpatients on the nonresident arrhythmia service.
8. Read and study recommended textbooks and articles on electrophysiology and arrhythmias.

Heart Failure and Cardiac Transplantation (Card B, UWMC)
1. Participate in admission and day-to-day management of patients on the inpatient service in collaboration with the ARNPs on the service. Work closely with the attending on patient management including leading daily work rounds.
2. Consult upon and follow CT surgical patients following VAD insertion or cardiac transplantation.
4. Attend the weekly multidisciplinary cardiac transplant recipient selection committee meeting; presenting patients for initial transplant consideration and providing follow-up on hospitalized patients.
5. Provide weekend daytime (8AM to 8PM) coverage (on-call) for the inpatient service under the supervision of the inpatient attending.
6. Read and study recommended textbooks and articles on heart failure, pharmacology, and heart transplantation.

Adult Congenital Heart Disease (UWMC)
1. Perform inpatient cardiology consults in conjunction with the Congenital Heart Disease attending.
2. Provide appropriate comprehensive outpatient management in patients with congenital heart disease utilizing multiple clinical disciplines (~two ½ day per week clinics in Congenital Heart Disease, ½ day per week EP clinic, alternating ½ day per week genetics and high risk obstetrics clinic).
3. Reviewing and integrate results from various cardiac imaging modalities and diagnostics in the care of patients with congenital heart disease (echocardiography, cardiac MR, CT, catheterization laboratory).
4. Understand the systems-based multidisciplinary approach to comprehensive care of patients with Congenital Heart Disease (obstetrics, genetics, electrophysiology, heart failure/transplant, cardiothoracic surgery). Attend and participate in the multidisciplinary Congenital Heart Disease conference (once monthly).
5. Read and study the ACC/AHA guidelines for management of Congenital Heart Disease.

Cardiac Critical Intensive Care (UWMC)
1. Participate in admission and day-to-day management of patients on the inpatient CCU ICU service. Work closely with the multidisciplinary attendings on patient management including daily work rounds.
2. Patient management integrating medical management, cardiac diagnostics, and appropriate consultation of other clinical services.
3. Provide weekday daytime coverage for the CCU ICU inpatient service under the supervision of the inpatient attending.
4. Read and study recommended textbooks and articles on heart failure, pharmacology, critical care, and heart transplantation.
Northwest Hospital Cardiac Diagnostics and Rehabilitation (NWH) elective

1. Evaluate, write a brief H & P, and develop the initial management plan on patients scheduled for cardiac catheterization.
2. Perform and interpret diagnostic catheterization with the attending cardiologist. Participate in or observe percutaneous coronary and other interventions when time allows.
3. Perform post-procedure patient evaluation. Maintain communication with referring providers and the catheterization lab.
4. Perform and interpret diagnostic evaluation in patients with suspected peripheral vascular disease. Participate in or observe peripheral vascular percutaneous interventions when time allows.
5. Correlate angiographic and clinical findings. Discuss impact of angiographic findings on patient management.
6. Supervise cardiac rehabilitation and review referrals for adults with cardiovascular disease.
7. Read and study recommended textbooks, articles, and ACC/AHA guidelines on cardiac catheterization and clinical cardiology.

Continuity Clinic

1. All fellows are assigned a 1/2 day per week continuity clinic that extends over the 24 months of clinical training at the UWMC or HMC, with 12 months of continuity clinic at the VAMC.
2. In each clinic session, the fellow will typically see 1-3 new and 3-6 return patients.

ACLS

All fellows are required to have completed ACLS training during Medicine Residency. During fellowship, advanced discussions of ACLS are provided during tutorial sessions. All fellows must complete an online simulation training course in ACLS with specific cases assigned each year from ACLS Simulator CD at:

http://depts.washington.edu/anesth/tips/simulation.shtml

Conscious Sedation

Advanced training and documentation of competency in conscious sedation is required during the first 6 months of fellowship, per UW Medicine requirements.

Central Venous Catheter Training
CONFERENCES: All Fellows are excused from clinical duties to attend conferences. Attendance of at least 80% of conferences is required. Fellows are responsible for documenting their attendance by signing in on the conference attendance sheet.

1. **Division of Cardiology Grand Rounds** on Fridays from 7:30 to 8:30 AM (September – June). Grand Rounds include at least 1 research conference per month, regular clinical-pathologic correlation conferences, and topics of clinical interest. Each fellow presents at least once with other presentations by Cardiology faculty, faculty from related disciplines, and visiting speakers.

2. **Cardiology Tutorials** on Fridays from 8:30 to 9:30 AM. (All year, with conferences from 7:30 to 9:30 AM during the summer when Grand Rounds are not held.) These conferences cover the range of topics listed in the ACGME requirements including clinical and research topics. Tutorials are scheduled by the Fellowship Program Administrator and Fellowship Program Assistant, and are coordinated with systematic readings from a major cardiology textbook.

3. **Cardiac Multi-disciplinary Clinical Case Conference**, Wednesday’s, 7:30 to 8:30 AM, weekly, with collaboration of Cardiology, CT-Surgery and Cardiac Anesthesia in these discussions. The cases and background information are presented by the Cardiology Fellows on a rotating schedule.

4. **Journal Club** is a monthly dinner meeting arranged by the Cardiology Fellows. Fellows present recent journal articles of general interest, describing the content of the article and directing a brief discussion of its strengths and weaknesses. All fellows are strongly encouraged to pre-read the selected articles and provide an interactive dialogue on current cardiology topics. Attendings with an interest in the area of the articles are invited to share their perspective and experience.

5. **Fellows’ Research Conference** is held once monthly. Fellows present ongoing work in a venue that is relatively informal, non-threatening, and interactive. Constructive dialogue and questions are encouraged and suggestions regarding research directions and approaches are solicited from the attendees. Presentations are substantially forward-looking, including presentation of new hypotheses as well as plans for acquiring grant funding that would allow the hypotheses to be tested. A **Faculty Research Conference** also is presented monthly. Opportunities for collaborative work are emphasized and suggestions for fellow involvement in faculty projects are particularly welcome.

6. Fellows may attend other conferences, such as Cardiovascular Biology Breakfast Club and Medicine Grand Rounds, as their rotations and schedules allow.

7. Subspecialty weekly conferences in a variety of areas of expertise such as multimodality cardiac imaging, interventional Cardiology, electrophysiology, and heart failure and cardiac transplantation, and adult congenital heart disease. Fellows are encouraged to attend as their schedules permit. Participation in various didactic courses, CME courses and lecture series are encouraged as long as they do not interfere with other required assignments and clinical duties.

8. Fellows on VAMC rotations participate in the weekly Friday VAMC Cardiology Conference and fellows on HMC rotations participate in the first/third Friday conferences at HMC.

9. Fellows are encouraged to attend the Ethics in Medicine lecture series.

10. Conferences are regularly scheduled during Grand Rounds or Tutorial on the following topics: OSHA and radiation safety regulations, continuous quality improvement, risk management.
USEFUL WEBSITES

University of Washington
University of Washington Department of Medicine (DOM)  www.depts.washington.edu/medweb
University of Washington Graduate Medical Education (GME)  
http://uwmedicine.washington.edu/Education/Graduate-Medical-Education/Pages/default.aspx
University of Washington Regional Heart Center (RHC)  
http://www.uwmedicine.org/services/cardiology
MedHub  
https://uw.medhub.com/index.mh
ACLS Simulator  
http://depts.washington.edu/anesth/tips/simulation.shtml

Training Requirements
Accreditation Council for Graduate Medical Education (ACGME)  www.acgme.org
American Board of Internal Medicine (ABIM)  www.abim.org

National Professional Organizations
American College of Cardiology (ACC)  www.acc.org
American Heart Association (AHA)  www.americanheart.org
American Society of Echocardiography (ASE)  www.asecho.org
American Society of Nuclear Cardiology (ASNC)  http://www.asnc.org/
Heart Failure Society of America (HFSA)  http://www.hfsa.org/
Heart Rhythm Society (HRS)  http://www.hrsonline.org/
Society for Cardiovascular Angiography and Interventions (SCAI)  http://www.scaionline.org
Society of Cardiovascular Magnetic Resonance (SCMR)  http://www.scmr.org/
Society of Cardiovascular Computed Tomography (SCCT)  http://www.scct.org/

Other Useful Sites
National Center for Health Statistics (NCHS)  http://www.cdc.gov/nchs/index.htm
National Institutes of Health  www.nih.gov
NIH Loan Repayment  www.lrp.nih.gov
Teaching Curriculum

**Goal:** Teaching skills are essential for a successful academic career. During your fellowship training there will be opportunities to improve your teaching skills in various formats with supervision and feedback from faculty, peers and students.

**Specific Teaching Requirements:**

**Cardiology/CT Surgery Clinical Conferences:** All fellows present clinical cases with presentation of diagnostic studies and a concise review of the relevant literature. Each fellow presents between 10 and 15 times (30 minutes each).

**Cardiology Grand Rounds:** These 1 hour formal presentations provide an opportunity for fellows to present a rigorous review of the literature on a focused topic or present their own research results. Each fellow works with a faculty mentor on selection of a topic, preparation of slides and presentation style. Overall supervision is provided by Dr. Kevin O’Brien. Each fellow presents at Grand Rounds between 1 and 3 times.

**Resident Teaching:** Cardiology Fellows provide both bedside teaching and didactic sessions to the Medicine Residents during rotations on inpatient Cardiology at both UWMC and HMC (4 months total). Fellows also teach medical students on the VA ECG and UWMC Cardiology Consult service.

**Medical Student Teaching:** Cardiology Fellows participate in Team Teaching of the small group sessions for the Cardiovascular Core Course (Human Biology 540) for 2nd year Medical Students. These interactive 2 hour sessions occur 3 times a week for one month with the fellow and a faculty member working together on teaching in this format. In addition to teaching skills, this experience provides an intense review of cardiac anatomy, physiology, pharmacology and pathology. Cardiology Fellows also provide bedside teaching and didactic sessions for 3rd and 4th year medical students on the Cardiology Consult rotation at UWMC (2 months).

**Cardiology Fellows:** Cardiology Fellows will be given a specific assignment, under the supervision of a faculty member, to develop or update teaching material for each clinical rotation (for example, a cardiac cath workbook or echo workshops). This may include QA or developing approaches to measuring competency.
RESEARCH TRAINING

All fellows are expected to conduct substantive research during their fellowship years and publish the results of their work. Our fellowship research requirement is based on our belief that research is a critical component of a program that prepares trainees for a science-based career such as modern medicine and is consistent with the recommendations of the Core Cardiology Training Statement (COCATS) 4 (J Am Coll Cardiol 2008; 51: 380-383). In addition, the ACGME requires that all accredited Cardiology training programs:

- Ensure a meaningful, supervised fellowship research experience with appropriate protected time.
- Provide fellows with training in the design and interpretation of research studies, responsible use of informed consent, research methodology, and interpretation of data.
- Ensure that fellows are advised and supervised by faculty members who are proficient in the design and conduct of research.

The University of Washington is one of the world’s largest, best supported, and most productive research universities. We offer a broad spectrum of research experiences, many of which are described elsewhere in this brochure or via links from the Division website. All applicants are encouraged to evaluate research opportunities during their initial visit and follow up with potential faculty mentors whose research is of interest.

Fellows explore research opportunities after acceptance into the fellowship program and initiation of their clinical training. A timeline of expectations helps ensure a productive research experience.

**Year 1**

Fellows meet with the Associate Program Director for Research, who helps the fellow to define research interests and explore opportunities. By the end of the first year, all fellows are expected to identify a faculty research mentor with whom they will work and begin discussion of possible research projects. Research mentors may be in the Division of Cardiology, but fellows can potentially work with any University of Washington faculty member. Approval to work with a faculty mentor is contingent only on the fellowship committee’s assessment of the excellence of the mentor and the suitability of the project. Fellows with an interest in the Research Scholars Program should apply to this program by the end of the first year.

**Resources:** University of Washington faculty and departmental web sites
- Fellowship booklet and web site
- Faculty, including Drs. Rosario Freeman, April Stempien-Otero, Michael Chin, David Dichek
- Other fellows

**Dates:**

July-December: Fellow should research potential projects/mentors areas of interest either clinical or research, in consultation with the fellowship directors, select a research planning adviser and meet with the adviser to discuss areas of interest.

December: Fellow should have a short list of possible topics/projects. The project can be a stand-alone project or it might be a part of a larger project carried on by the research mentor.

December – January: Associate Director for Research meets with fellow to help identify research and career goals. A preliminary list of potential research mentors should be formulated. Meetings with these potential mentors should be scheduled over the next few months.

By July 1 (first day of second year): Research proposal (1 page) with your name, date, research mentor (and contact information), and, paragraph description. Approval by Fellowship Director and Associate Fellowship Director for Research required.

July-August (first 2 months of 2nd year): Present research plan to Division faculty and fellows (10 minutes plus 20 minute discussion). Research mentor should attend.
Year 2

During the second year, fellows will be given a QI/Research block to begin their research project. Fellows committed to the Master Clinician track will assess the need for human subjects approval for their projects, design data collection forms, and develop a timeline for data collection and publication prior to completion of fellowship. QI projects will also be initiated during this rotation and may overlap with research projects.

Fellows admitted to the Research Scholars track are expected to develop a mentoring committee and apply for research fellowship grants during the second year research elective block. Current institutional training grants support fellows working in basic and applied cardiovascular biology, imaging, health care outcomes, bioengineering, and epidemiology. External fellowship grant applications are typically submitted to the American Heart Association, the American College of Cardiology, the National Institutes of Health, and other professional societies, private agencies, or corporate foundations. By writing grant applications, fellows begin to define the specifics of their research experience, learn how to prepare a competitive research proposal, and establish a working relationship with their research mentors. Note that clinical training time during fellowship training must meet ACGME requirements for 24 months over the course of a three year fellowship so this time must be “paid back” during the third year.

Resources: Available primarily through the research mentor. There are also University-sponsored courses on grant writing and career planning.

Dates: At the 6- and 12-month reviews with the Fellowship Director, fellows must submit brief reports on their research progress.

Year 3: Master Clinician

Five months of time is dedicated to research and QI in the third year. Fellows will complete research projects under faculty mentor guidance and prepare manuscripts for publication. If continuing on in a sub-specialty abstracts should be prepared for submission to national meetings the following year to maintain their academic trajectory. In conjunction with research, fellows may choose clinical electives during their 3rd year to augment their clinical training such as in diagnostic angiography and intervention, advanced cardiac imaging (CMR or CT angiography), nuclear cardiology, or critical care. It is recommended that research projects and clinical interests be tightly aligned to be competitive for a position as an academic clinician.

Years 3-4: Research Scholars

The third and fourth years are devoted primarily to research under the guidance of a faculty mentor and mentoring committee. Fellows are expected to complete a substantive cardiovascular disease research project. Fellows also present interim results at laboratory meetings and cardiology conferences, submit abstracts, and prepare manuscripts for publication. In addition to the training provided by the research project itself, fellows also receive training in the scientific and practical “survival skills” that are required for success as an independent investigator. These skills include writing manuscripts and grants, speaking, biomedical ethics, financial management, job finding, and mentorship. Training in these areas is provided by formal courses and by the research mentors on an informal basis. Research Scholars in epidemiologic and population sciences will be required to complete Masters level training in these skills.

Resources: Training occurs under the direct supervision of the research mentor in their laboratory or other facilities. Fellows also may attend UW seminars/lecture series, biostatistics courses, the K12 program, etc.

Dates: Note ACC and AHA abstract deadlines; Grand Rounds presentation.

After Year 4

Fellows who intend to become independent principal investigators in laboratory-based, clinical, or population-based research need to extend their research training beyond the fourth year of fellowship. Research mentors guide fellows whose aptitude and interest for research remain high towards submission of faculty transition grants such as the NIH K08 or K23, and the American Heart Association Scientist Development Grant or Fellow to Faculty Award. The University of Washington is a recipient of a NIH K12 award, which provides up to 5 years of faculty-level salary support and a mentored training environment for fellows who wish to develop a career in clinical research. K12 support is awarded through a competitive process.
**Resources:**
Departmental and Divisional web sites usually provide lists of faculty and research interests. Access Departmental web sites (e.g., Physiology, Epidemiology, Biochemistry, Bioengineering, Immunology) through:  

Within the Department of Medicine, Division web sites are accessed through:  

The Institute of Translational Health Sciences  
[https://www.iths.org/ED](https://www.iths.org/ED)

Many cardiovascular investigators are listed and their programs described on training grant web sites:  

The Cardiovascular Pathology Training Program:  

Fellows interested in epidemiology and population science should become familiar with the Cardiovascular Health Research unit:  

Fellows interested in outcomes research should become familiar with the Northwest Center for Outcomes Research at the VA Puget Sound Medical Center:  

Those interested in clinical research should become familiar with the KL2 program, which can be pursued after fellowship is completed:  
[http://www.iths.org/education/kl2](http://www.iths.org/education/kl2)

“Survival Skills for the Research Years” course. This 3-day course, offered annually during the summer, covers topics of particular interest to fellows interested in research careers. These topics include writing manuscripts, giving oral presentations, grant writing, funding, and job negotiations. For more precise information on the course, and to sign up for it, see [http://depts.washington.edu/flworien/](http://depts.washington.edu/flworien/).

All Departments and most organized research units present seminar series during the academic year. The list is not meant to be exhaustive and you should check web sites of other Departments and Research Units of interest:

1. Cardiovascular Breakfast Club (Tuesday 9:00 am UW SLU):  
[http://slubio.blogspot.com/?view=classic](http://slubio.blogspot.com/?view=classic)
2. Institute for Stem Cell and Regenerative Medicine Research Update (Tuesday 4pm UW SLU):  
3. Medical Genetics journal club (Wednesday 8:30 am, K250)
4. Medical Genetics Seminar Series (Friday 12:30):  
5. Genome Science Seminar Program:  
6. Biochemistry Seminar Series (generally Thursdays at 4:00):  
7. Immunology seminar series (generally Mondays at 3:30): see  
8. Pathology Seminar Series (generally Wednesdays at 4:30)  
[http://www.pathology.washington.edu/PathNews/seminars/](http://www.pathology.washington.edu/PathNews/seminars/)
9. Fred Hutchinson Cancer Research Center Current Biology Seminar Series (Tuesdays at 12:00)  
10. Bioengineering weekly seminars (Thursdays 12:30):  
[http://courses.washington.edu/bioetalk/](http://courses.washington.edu/bioetalk/)

Also check the Department of Genome Sciences web site for a list of biomedical research-related seminars:  

A mentoring guide is found in the HHMI publication “Making the Right Moves: a Practical Guide to Scientific Management for Postdocs and New Faculty” available at:  
[http://www.hhmi.org/resources/labmanagement/moves.html](http://www.hhmi.org/resources/labmanagement/moves.html)
Fellow Bios

Katie Benziger
I grew up in Arden Hills, Minnesota and studied neurobiology at Macalester College for undergraduate and then attended the University of Minnesota Medical School. In June 2011, I left behind the snow in Minnesota in exchange for a little rain (definitely a good choice) to start internal medicine residency at UW. My husband, son and I love Seattle and all of the outdoor activities nearby – camping, hiking, snowboarding, biking, etc. It is a very family friendly place to live. I am interested in global health and cardiovascular disease epidemiology and I will complete my Masters in Epidemiology as part of my fellowship. I was a Fogarty International Clinical Research Scholar in 2009-10 in Lima, Peru and have continued to collaborate with my colleagues in Peru as part of the Global Health Pathway in residency. The UW is an excellent place to train and the has not only an excellent Department of Cardiology but an outstanding Department of Global Health as well, which is why I chose to stay here for my fellowship.

Robin Brusen
I was born in Chicago and, after several years in Iowa, my family moved to Minnesota. I went back to Chicago for my undergraduate degree in biomedical engineering at Northwestern University. For medical school, it was back to the Twin Cities for a 5-year combined MD/MS in biomedical engineering. After that I spent the next three years at Columbia Presbyterian in New York City and am now excited to have the next phase of my career in Seattle. I have always been fascinated by Seattle (it's like my home town but with better weather!) and when I interviewed it just seemed like the perfect fit. It has a three-hospital system for a diverse patient population, one of the premier research institutions in the country, particularly for biomedical engineering and innovation, and a cosmopolitan city that offers any cultural or outdoor activity you could want year around.

Selma Carlson
I spent my childhood living on the Adriatic coast in Dubrovnik, Croatia until my family moved to chilly Minnesota in middle school. I went to Brown University for undergrad, and majored in International Relations and Public Health. I spent the following two years as a Fulbright Scholar in Vienna, Austria before starting medical school at the University of Minnesota. During medical school, I did an internship at the World Health Organization in Switzerland studying global health and cardiovascular disease epidemiology. The UW has been an excellent place to train for residency, with great mentors in Medicine, Cardiology and Global Health through the IHME. I have a strong interest in medical education and have appreciated the innovative opportunities for clinical education and teaching. My husband and I have made wonderful friends in the area, and enjoy hiking, biking, cooking, and spending time with family and friends.

Billy Chen
Billy grew up in Los Angeles before finding his way to Boston for medical school at Boston University. There, he completed his MD/PhD with brief stints at Vanderbilt and the National Institute of Health in Bethesda. His PhD focus was on sarcomere homeostasis, studying Ankrd1/CARP and its role in doxorubicin induced sarcopenia and cardiomyopathy. At the NIH, he helped with MRI validation studies looking at regions-at-risk post myocardial infarction. Prior to fellowship, he trained at Boston Medical Center in Internal Medicine, where he was active in Resident/Fellow advocacy as part of Massachusetts Medical Society and American Medical Association. After training, he worked as an ICU hospitalist at University of Washington Medical Center while doing research in the Murry Lab, focusing on stem cell therapies in post infarct models.

Tiffany Chen
I grew up in Hershey, PA (aka Chocolatetown, USA), before going off to college at MIT, where I majored in Electrical Engineering & Computer Science as well as Biology. I returned to Hershey to attend medical school at Penn State and joined the rest of my family in becoming a Nittany Lion. For residency, I wanted to move back to New England and trained at Brown, where I subsequently stayed for a hospitalist year before bidding farewell to Little Rhody. I decided to come to UW for fellowship because of the balance of unique research opportunities and excellent clinical training. I felt the training at UW is especially strong in adult congenital heart disease and echo imaging, which are my current areas of interest. I am excited to discover new eateries in Seattle and continue my hobbies of playing piano, tennis, skiing, traveling, and enjoying the outdoors. Go Seahawks.
Amy Cheney
I grew up on beautiful Lake Whatcom, in Bellingham, WA. My involvement in competitive soccer and interest in
the liberal arts led me to Whitman College in Walla Walla, WA. While acclimating to the more extreme
temperatures of eastern Washington, I pursued a degree in piano performance, and completed premedical
studies. I then spent a year living in Philadelphia, PA, after which I attended the University of Washington School
of Medicine. I migrated south to complete Internal Medicine residency at UC Davis in Sacramento, CA, where I
rediscovered my love of skiing at South Lake Tahoe (with variable amounts of snow), developed a taste for
microbrews, and spent an amazing year as a chief resident. I chose to return to the University of Washington for
cardiology fellowship because of the phenomenal clinical training, extensive research opportunities, emphasis on
echocardiography, and commitment to medical education. I am greatly looking forward to reconnecting with
friends and family, and to once again calling Seattle and the Pacific Northwest home.

Katie Dawson
I grew up in Reno, NV and went to college at the University of Nevada, Reno where I obtained a degree in
biochemistry. Upon completing my degree I decided to stay in Reno and attend medical school at the University of
Nevada. Having spent the majority of my life in Reno, I decided it was time to see the world (or rather, 1-2 states
west) and moved to Portland, OR to attend Internal Medicine residency at Oregon Health and Science University. I
couldn't be more pleased to be coming to the University of Washington for cardiology fellowship and to finally be
living in the same city as my fiancé who works in Seattle. My clinical interests are in advanced heart failure and
transplant cardiology and I hope to complete advanced training after completing fellowship.

Patrick Goleski
I was raised in Detroit, Michigan and completed my undergraduate training at the University of Michigan in
mechanical engineering before heading to Chicago to teach high school math through Teach for America. I
returned four years later to Ann Arbor to begin my medical training. It was there I met my wife, Tiffany. We came
to Seattle for residency training after which I worked as a hospitalist/nocturnist at UW prior to beginning
cardiology training. I am generally interested in the application of mechanical engineering to solve cardiology
problems. More specifically I am interested in device design and complex modeling of cardiac function. In my spare
time, I enjoy hiking, traveling, cooking and most especially fly fishing.

Mariko Harper
Hometown: Nanaimo, Vancouver Island, British Columbia. I went to undergraduate and medical school at the
University of British Columbia in Vancouver. I met my husband when I was a graduate student in NYC and thus
ultimately decided to pursue my graduate medical education in the US. I have loved my time as a resident at UW
and am very excited to continue my fellowship training at this institution — I love the diversity of the patient
population, the outstanding faculty mentorship and teaching, and the plethora of research opportunities. My
research interests include electrophysiology and echocardiography. I love the Pacific NW and in my free time I
enjoy running, trying out new restaurants, and spending time with my family.

Hans Huang
I was raised in Northern California and attended the University of California Santa Cruz for my undergraduate
training in molecular and cellular biology. I moved to the Midwest for medical school at the Medical College of
Wisconsin where I met my wife, and together we completed our residency training at the University of Minnesota.
I am excited to be returning to the West Coast and look forward to the outdoor activities the Pacific Northwest has
to offer. In my spare time I enjoy spending time with my family, hiking, snowboarding, tennis, and trying out new
restaurants.

Tara Jones
I was born and raised in Mitchell, SD. Initially upon graduation from high school I attended the University of
Minnesota in Minneapolis as a pre-med major. Being young at the time, I was not entirely certain of where my
career in healthcare would take me, and I decided to transfer to South Dakota State University to complete a
PharmD program, as I have a long family history of pharmacists. During that time, I moved to Orlando, FL to intern
with a pharmacy corporation there. Ultimately, upon graduation from the PharmD program, I decided that my
passion did indeed lie in becoming a physician. I attended the medical school at the University of South Dakota,
and continued my education in an internal medicine residency at the University of Nebraska Medical Center in
Omaha, NE. I am excited to further my education and career in the cardiology fellowship program at the University
of Washington! Having never lived on the west coast, I am looking forward to the change in atmosphere, and it seems Seattle has a lot to offer!

David Lam
I was born in Hong Kong. My family immigrated to Canada when I was five years old and I spent my childhood in Toronto. I attended college at the University of Pennsylvania where I majored in bioengineering. I completed medical school at the Geisel School of Medicine at Dartmouth in New Hampshire. My residency training was at Beth Israel Deaconess Medical Center in Boston. I met my fiancée at Dartmouth and am getting married prior to fellowship. I have lived on the east coast for almost my entire life, and am excited to head west to UW for cardiology fellowship. Outside of work, I like to run, hike, explore, eat, and spend time with family and friends.

Julio Lamprea
I was born and raised in Ibague, Colombia. I finished medical school in Bogota at Javeriana University, and then moved to Baltimore to complete an MPH in biostatistics and epidemiology and subsequently a PhD in cardiovascular epidemiology at Johns Hopkins. I stayed in Baltimore for my residency in internal medicine at University of Maryland. I’m really excited to start my fellowship in cardiology at the UW. I believe the program offers great clinical training as well as outstanding opportunities in clinical and epidemiological research within the cardiology department and with the School of Public Health. I’m also looking forward to initiate a career in global health and explore opportunities to collaborate with IHME.

James Lee
I was born and raised in Midland, Michigan and then went to the University of Michigan where I graduated with a degree in Cell and Molecular Biology. I completed medical school at Wayne State University in Detroit, Michigan where I was active in a variety of community development projects. I finished residency in Atlanta, Georgia at the Emory University School of Medicine. I am currently in a fellowship program in advanced cardiovascular imaging with CT and MRI at the Piedmont Heart Institute also in Atlanta. The University of Washington appealed to me due to its strengths in clinical care, research, and cardiology imaging. I am excited to be moving to Seattle where I can pursue great food, an active lifestyle, and enjoy time with my family.

Song Li
I grew up in China and came to the U.S. as an AFS exchange student when I was fifteen. I went to high school in Ann Arbor, Michigan, followed by undergrad in Iowa at Grinnell College. My major was biochemistry, which inspired my interest in medicine. I went to medical school at Dartmouth in New Hampshire, and upon graduation moved to Atlanta for internal medicine residency, followed by a chief resident year at Emory University School of Medicine. Having lived in the Midwest, the Northeast, and the South (plus a few months of away rotations in California), I am really looking forward to moving to Seattle to complete my “tour” of the U.S. I am interested in many areas of cardiology and have done research mostly in Heart Failure. In my spare time, I enjoy watching movies, cooking, and tennis.

Vidang Nguyen
I was born in Denmark and grew up in the Danish countryside, becoming quite skilled in both the art of LEGO building and ping pong. I moved to Seattle when I was 17 and did my undergrad at the University of Washington. I went to medical school at Tulane University in New Orleans, which was an amazingly colorful experience. I decided to return to the Pacific Northwest for my residency training and came back to the University of Washington. I am ecstatic to stay at UW for my cardiology fellowship. The mentorship and support from the department has been outstanding, and I am excited to continue building on the foundation that I have here. I am interested in advanced heart failure and clinical outcomes research. I like to run, hike, bike and eat brunch – all of which Seattle is perfect for.

Charles (Rick) Rossow
I was born in Tacoma, Washington and am a native of the Pacific Northwest. I completed medical school, residency and a 4-year post-doctoral fellowship in cardiac ion channel physiology at the University of Washington, investigating the signaling pathways leading to remodeling of repolarizing potassium currents after injury. As a physician and a basic scientist, my goal is to work at the interface of science and medicine. I chose to stay at the UW for my fellowship training because I have seen firsthand the excellence of both clinical medicine and research. The mixture of clinical training and basic science research at UW is second to none. Seattle is a great place to raise a family with all the offerings of a major city mixed with easy access to the outdoors. I enjoy spending time with my
wife and our young daughter. I have been active in the local climbing community as a member of the Olympia and Tacoma Mountaineers. In my free time I enjoy skiing, climbing, mountain biking, fly fishing and sailing.

**Jill Steiner**

I grew up in East Brunswick, NJ, and then attended college at Penn State, graduating with a degree in Biobehavioral Health and a minor in Spanish. I completed medical school at the Penn State College of Medicine, and then moved to Washington, DC for my residency at Georgetown. I am married to my partner of 14 years, and together, we enjoy cooking, hiking and travelling.

**Karman Tandon**

Go Huskies! My wife Danielle and I are very excited to be back in Seattle for Cardiology Fellowship. I initially moved to the Seattle area in grade school, after living in Mumbai, Madras, Los Angeles, San Francisco, and Princeton. I was a Husky for my undergrad in Biomedical Engineering and for Medical School, then briefly at Johns Hopkins for an MPH in Biostatistics, and most recently at the University of Michigan for residency (Go Blue!). While in Ann Arbor, we had our son Copen, who is growing up way too fast. My research interests are in engineering and in clinical trials. My hobbies include travelling, wakeboarding, snowboarding, camping, and eating and drinking all the great cuisine Seattle has to offer.

**Dennis Wang**

For my father’s work, I was born and raised in a hospital-subsidized compound in Taipei where all of my neighbors were physicians, nurses, or dentists. Such an early exposure to the hospital setting later inspired me to consider medicine as a career option. My family immigrated to the San Francisco Bay Area when I was 10. While I enjoyed the biological sciences in high school, I contemplated between pursuing medicine and computer science, latter a popular career choice in the Silicon Valley at the turn of the century. For this reason, I decided to attend UC Berkeley, which is known for its strengths in both biology and engineering. Over the next few years through volunteering at a local hospital and working in research labs, I finally decided to go into medicine despite already having finished the course requirements for computer science. For my love in both basic science research and clinical medicine, I subsequently pursued a combined MD/PhD training at UC Irvine. For my PhD training, I chose to work in a rigorous molecular biology/biochemistry lab because I believed that a solid training in laboratory sciences would enhance my understanding of the intricacies of human physiology at the molecular level, an instrumental factor in making important medical discoveries. Under the guidance of the world-renowned molecular biologist, Dr. Wen Hwa Lee, I undertook a thesis project to elucidate the molecular mechanisms that fine-tune the rate of aerobic cellular respiration via the regulation of a mitochondrial protein complex. Following medical school, I did my internal medicine training at Baylor College of Medicine, where I became interested in cardiology because the associated diseases are extremely common yet often difficult to treat let alone cure. Furthermore, the heart serves as an excellent model for me to continue pursuing my interest in mitochondrial biology, cellular energetics and regeneration. During my free time, I enjoy travelling, reading, and spending time with my family.

**Enrique Zolezzi**

I was raised in Matamoros, a small Mexican town bordering Brownsville, Texas and then went to high school in Monterrey. Afterwards, I moved to Boston where I obtained a degree in Computer Science and Engineering from MIT. I spent several years in New York City working in investment banking before pursuing my dream of becoming a doctor at the Mount Sinai School of Medicine. I completed my internal medicine residency at Northwestern, and I’m now excited to be in Seattle where my sister, brother-in-law and 3 year old nephew are living. I enjoy playing the guitar, outdoor activities, good restaurants and home barbecues.
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<th>Year Graduated</th>
<th>Name</th>
<th>Training - Post Cardiology</th>
<th>Current Activity</th>
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<tbody>
<tr>
<td>2016</td>
<td>Sophia Airhart</td>
<td>AHFTC Fellowship</td>
<td>HF Fellow - Allegheny Health</td>
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<td></td>
<td>Jason Huang</td>
<td>CCEP Fellowship</td>
<td>EP Fellow – Penn</td>
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<td></td>
<td>Kate Kearney</td>
<td>ICARD 2017 UW</td>
<td>Sr. Fellow/Acting Instructor, University of Washington</td>
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<td>Juan Ortega-Legaspi</td>
<td>AHFTC Fellowship 2017 – Penn.</td>
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<td>Shalin Patel</td>
<td>Private Practice</td>
<td>Hudson Valley Heart Center, New York</td>
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<td>Nina Rashedi</td>
<td>Cardiac Imaging Fellowship</td>
<td>Columbia University</td>
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<td>Daniel Yang</td>
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<td>2015</td>
<td>Paco Bravo</td>
<td>Imaging Fellowship</td>
<td>Boston, MA</td>
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<td>Christopher Greenman</td>
<td>2016 ICARD, UCLA, Harbor</td>
<td>Everett Clinic</td>
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<td>Ivan Medvedev</td>
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<td>Aneet Patel</td>
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<td>Private Practice, The Polyclinic, Seattle</td>
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<td>Andrea Vitello</td>
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<td>Private Practice, Western Washington Cardiology</td>
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<td>2014</td>
<td>Steve Farris</td>
<td>Interventional Fellow</td>
<td>University of Washington, Attending Physician</td>
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<td></td>
<td>Joanna Ghobrial</td>
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<td>Beth Israel Deaconess, Boston, MA</td>
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<td>Oscar Gonzalez</td>
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<td>Private Practice, Evergreen Hospital</td>
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<td>Matthew Hartman</td>
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<td>Jehu Mathew</td>
<td>Electrophysiology Fellow</td>
<td>University of Colorado</td>
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<td></td>
<td>Zachary Steinberg</td>
<td>Interventional Fellow (2014-2015); ACHD Fellow (2015-2016)</td>
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<td>Gregory Wood</td>
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<td>2013</td>
<td>Andrew Cheng</td>
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<td>Todd Dardas</td>
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<td>Sunil Dhar</td>
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<td>Todd Goldman</td>
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<td>University of Wisconsin, Clinical Ass’t Professor,</td>
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<td>Manoj Kesarwani</td>
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<td>VA System, Chicago, IL</td>
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<td>John Mignon</td>
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<td>Farid Moussavi-Haram</td>
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<td>Elisa Zaragoza-Macias</td>
<td>ACHD Fellowship</td>
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<td>2012</td>
<td>Jaekyoung Hong</td>
<td>Interventional Fellowship, University</td>
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<td>Steven Bradley</td>
<td>University of Colorado, Denver, CO, Faculty</td>
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<td>Joshua Busch</td>
<td>Southlake Clinic/Valley Medical, Renton, WA</td>
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<td>Rose Do</td>
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<td>Ramy Hanna</td>
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<td>Alec Moorman</td>
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<td>Eric Pacini</td>
<td>Oregon Cardiology Group, Eugene, OR</td>
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<td>Ramin Shadman</td>
<td>Assistant Professor, Kaiser/UCLA, Los Angeles, CA</td>
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<td>Christopher Kurtz</td>
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<td>Luis Muñoz</td>
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<td>Abhishek Sinha</td>
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<td>Joan Susie Woo</td>
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<td>2009</td>
<td>Pierre S. Aoukar</td>
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<td>Joshua M. Buckler</td>
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<td>Elizabeth Chan</td>
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<td>Jordan Prutkin</td>
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<td>Jefferson Baer</td>
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<td>Creighton Don</td>
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<td></td>
<td>Ryland Melford</td>
<td>Pacific Cardiovascular Assoc, Costa Mesa, CA</td>
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<td>2007</td>
<td>Joseph Blatt</td>
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<td>Peter Cawley</td>
<td>Pennslyvania</td>
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<td>Kent Chen</td>
<td>HeartCare, Scottsdale, AZ</td>
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<td>Joshua Scholnick</td>
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<td>Justin Strote</td>
<td>UW Interventional</td>
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<td>Wai Shun Wong</td>
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<td>Grace Chen</td>
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<td>Peter Sutcliffe</td>
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<td>University of Washington, Seattle, WA Faculty</td>
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<td>Gretchen Crittenden</td>
<td>Washington Heart Care, Bellevue, WA</td>
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<td>Elizabeth Gauer</td>
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<td>Pathmaja Paramsothy</td>
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<td>Kara Ursnes</td>
<td>Olympic Medical Physicians, Sequim, WA</td>
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<td>Andrew Frutkin</td>
<td>Oregon Cardiology, Eugene, OR</td>
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<td>Philip Massey</td>
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<td>Brian Keefe</td>
<td>Cardiovascular Assoc. of Marin and San Francisco, San Francisco, CA</td>
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<td>Jeanne Vesey-Phillips</td>
<td>The Oregon Clinic, Portland, OR</td>
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<td>Dariush Mozaffarian</td>
<td>Harvard School of Public Health, Boston, MA Faculty</td>
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<td>Audrey Wu</td>
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<td>James Willems</td>
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<td>Keiko Aikawa</td>
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<td>Michael Caulfield</td>
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<td>Elizabeth Gold</td>
<td>Sr. Scientist, Institute for Systems Biology, Seattle, WA</td>
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<td>David Shavelle</td>
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<td>Hennessey Tseng</td>
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<td>2000</td>
<td>Michael Brown</td>
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Beth Karolle  
Clackamas, OR  
Kelly Kim  
EP Cedars-Sinai  
Wheat Ridge, CO
# FELLOW RESEARCH PROJECTS 2001-2017

## 2016-2017

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<tr>
<td>Steiner, Jill</td>
<td>2/29/2016 – 2/28/17</td>
<td>Palliative care of ACHD patients</td>
<td>James Kirkpatrick, MD</td>
<td>T32 – Pulmonary</td>
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<td>Airhart, Sophia</td>
<td>7/1/15 – 6/30/16</td>
<td>Novel Nutritional Therapy for Mitochondrial Dysfunction in Systolic Heart Failure</td>
<td>Kevin O’Brien, MD</td>
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<td>Huang, Jason</td>
<td>7/1/15 – 6/30/16</td>
<td>AF Burden Before and After LVAD Implantation</td>
<td>Kristen Patton, MD</td>
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<td>Kearney, Kate</td>
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<td>1. PCI Operator Attributable Harm in the NCDR CathPCI database</td>
<td>1. James McCabe, MD</td>
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<td>2. Coronary angiogram findings in post-cardiac arrest patients</td>
<td>2. Francis Kim, MD</td>
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<td>Ortega, Juan</td>
<td>9/2015-6/2016</td>
<td>Development of a Universal Donor Embryonic Stem Cell for Cardiac Regeneration</td>
<td>W. Robb MacLellan, MD</td>
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<td>Patel, Shalin</td>
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<td>1. Dr. Patton</td>
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<td>2. Implementation of appropriate discharge planning for post ACS Low LVEF patients</td>
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<td>Rashedi, Nina</td>
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<td>Aortic Valve Stenosis and Outcomes in the Cardiovascular Health Study</td>
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<td>Bravo, Paco</td>
<td>7/1/14-6/30/15</td>
<td>Etiology of Sudden Circulatory Arrest and the Impact of Early Comprehensive Computed Tomography on Post-Arrest Management and Outcome: A Pilot Study</td>
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<td>Greenman, Chris</td>
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<td>Determinants and Significance of Left Ventricular Systolic Dysfunction in Acute Myelogenous Leukemia Patients.</td>
<td>Pamela Becker, MD, PhD</td>
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<td>Patel, Aneet</td>
<td>7/1/14-6/30/15</td>
<td>Knowledge based 3D right ventricular ejection fraction versus standard echocardiographic function assessment to predict right ventricular failure after left ventricular assist device implantation</td>
<td>Florence Sheehan, MD</td>
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<td>Vitello, Andrea</td>
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<td>Clinical and Pathologic Predictors of Ventricular Arrhythmias in Advanced Heart Failure Patients Requiring Left Ventricular Assist Device Support</td>
<td>Mentor: April Stempien-Otero Co-Mentor: Melissa Robinson</td>
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<td>Willcox, Mark</td>
<td>7/1/14-6/30/15</td>
<td>Additive Utility of Makers of Cardiac Calcification in Cardiovascular Risk Assessment and Prediction: Beyond Framingham Risk Factors</td>
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2014

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<td>Dardas, Todd</td>
<td>7/1/13-6/30/15</td>
<td>Priorities for Resource Allocation among Patients with Advanced Heart Failure</td>
<td>Wayne Levy, MD</td>
<td>ACCF/Daiichi Sankyo Fellow to Faculty transition</td>
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<td>Farris, Steve</td>
<td>7/1/13-6/30/14</td>
<td>Specific Pathways and the Role of Plasmin in Cardiac Macrophage-Induced Fibroblast Activation in Human Cardiac Fibrosis</td>
<td>April Stempien-Otero, MD</td>
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<td>Ghobrial, Joanna</td>
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<td>Sudden Cardiac Death in African Americans</td>
<td>Nona Sotoodehnia, MD</td>
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<td>Mathew, Jehu</td>
<td>7/1/13-6/30/14</td>
<td>Altered Mineral Metabolism and Incident Atrial Fibrillation</td>
<td>Ian deBoer, MD</td>
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<td>Steinberg, Zachary</td>
<td>7/1/13-6/30/14</td>
<td>Comparison of Early Outcomes in Patients Undergoing Transcatheter vs. Surgical Pulmonary Valve Replacement</td>
<td>Karl Welke, MD</td>
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<td>Goldman, Todd</td>
<td>7/1/12-6/30/13</td>
<td>Can an aerobic exercise training program in patients with ICDs for secondary prevention of sudden cardiac arrest improve cardiac autonomic activity and reduce the frequency of ventricular arrhythmias?</td>
<td>Cynthia Dougherty ARNP Wayne C. Levy, MD Jordan Prutkin, MD</td>
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<td>Kesarwani, Manoj</td>
<td>7/1/10-6/30/13</td>
<td>Evaluation of Plaque Morphology by Optical Coherence Tomography and Serum Markers in Non-Occlusive Segments of Coronary Arteries</td>
<td>Kelley Branch, MD Creighton Don, MD Xue-Qiao Zhao, MD</td>
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<td>Mignone, John</td>
<td>7/1/08-6/30/13</td>
<td>Transcriptional profiling of human embryonic stem cells undergoing cardiac directed differentiation</td>
<td>Charles Murry, MD</td>
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<td>Zaragoza-Macias, Elisa</td>
<td>7/1/10-6/30/13</td>
<td>Risk stratification of Adults with Congenital Heart Disease and Heart Failure using the Seattle Heart Failure Model</td>
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<td>Dardas, Todd</td>
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<td>Improvement in skeletal muscle mitochondrial function following left ventricular assist devices</td>
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<td>Hong, Jaekyoung A.</td>
<td>7/1/09-6/30/12</td>
<td>Evaluation of gender difference in atherosclerotic plaque composition by MRI. A sub-study of the Carotid Plaque Composition (CPC) Study.</td>
<td>Xue-Qiao Zhao, MD</td>
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<td>Le, Steven K.T.</td>
<td>7/1/09-6/30/12</td>
<td>Will Carotid Intima-media Thickness (CIMT) Continue to Improve after Long-term Lipid Therapy? – A Carotid Ultrasound Study in FATS 20-year</td>
<td>Xue-Qiao Zhao, MD</td>
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<td>Linefsky, Jason</td>
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<td>Association of mineral metabolism biomarkers with aortic valve sclerosis and mitral valve calcification</td>
<td>Stephan D. Fihn, MD</td>
<td>Department of Veterans Affairs, Health Services Research and Development</td>
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<td>Madan, Pankaj</td>
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<td>Effect of Intensive Lipid Modification Therapy on Carotid Atherosclerotic Plaque</td>
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<td>Roth, Gregory</td>
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<td>A Pharmacokinetic Approach to Measuring Treatment Disparities in Heart Failure</td>
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<td>Thomas, Christopher D.</td>
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<td>The Seattle Heart Failure Model: Predictive Value and Application in the Acute Heart Failure Setting</td>
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<td>Bradley, Steven L.</td>
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<td>“Appropriateness of Percutaneous Coronary Interventions”; &quot;Missed Opportunities for Pharmacologic Risk Reduction in Ischemic Heart Disease&quot;</td>
<td>Stephan D. Fihn, MD</td>
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<td>Busch, Joshua L.</td>
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<td>Cardiac Computed Tomography, Integrated Perfusion and Angiography</td>
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<td>Do, Rose Q.</td>
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<td>Defining the Role of Nitrite in Resuscitation from Cardiac Arrest</td>
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<td>Hanna, Ramy L.</td>
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<td>Repolarization Parameters and Arrhythmia Vulnerability in the Sudden Cardiac Death in Heart Failure Trial</td>
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<td>Moorman, Alec J.</td>
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<td>The Seattle Heart Failure Model and Geographic Variation in Heart Failure Hospitalizations</td>
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<td>Pacini, Eric L.</td>
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<td>Non-invasive guidance of catheter ablation of atrial flutter utilizing the surface electrocardiogram</td>
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<td>Shadman, Ramin</td>
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<td>The Prognostic Value of Electrocardiographic Parameters in Congestive Heart Failure: Analysis of the SCD-HeFT Trial</td>
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<td>Kurtz, Christopher</td>
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<td>Characterizations of right ventricular shape and function in pulmonary hypertension with 3D – Echocardiography.</td>
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<td>Muñoz, Luis</td>
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<td>Lp-PLA2 as a marker for high risk coronary plaques and increase risk for cardiovascular events post PCI</td>
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<td>Sinha, Abhishek (Abhi)</td>
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<td>Comparing carotid MRI to carotid ultrasound in assessment of atherosclerosis change in response to lipid therapy</td>
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<td>Aoukar, Pierre</td>
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<td>Effects of Long-term Therapy with LDL-lowering plus HDL-raising on Carotid Intima-Media Thickness (CIMT) – Familial Atherosclerosis Treatment Study 20-year Observational Study (FATS-OS)</td>
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<td>Buckler, Joshua M.</td>
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<td>Chan, Elizabeth</td>
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<td>Insulin Sensitivity and Vascular Reactivity in Oral vs. Patch Hormone Therapy</td>
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<td>Krieger, Eric</td>
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<td>The effects of omega-3 fatty acids on exercise efficiency in the metabolic syndrome: A randomized double blind placebo controlled pilot study</td>
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<td>Phan, Binh An P.</td>
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<td>Woo, Joan Susie</td>
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<td>Baer, Jefferson T.</td>
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<td>Mechanistic Evaluation of the Anti-Inflammatory Properties of HDL as Assessed by Shotgun Proteomics</td>
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<td>Blatt, Joseph A.</td>
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<td>Utility of Defibrillation Threshold Testing in the Sudden Cardiac Death in Heart Failure Trial</td>
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<td>Don, Creighton W.</td>
<td>7/1/04-6/30/08</td>
<td>Clopidogrel Dosing for NSTEMI Patients and Radial Versus Femoral Access for PCI in ACS Patients</td>
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<td>Huehnergarth, Kier V.</td>
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<td>Comparison of Coronary Calcium Scoring Between Non-Contrast and Contrast-Enhanced Coronary Computed Tomography Images</td>
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<td>Krishnan, Ranjini</td>
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<td>Role of uPA in Accelerated Atherosclerosis</td>
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<td>Electrocardiographic Predictors of Mortality in the Sudden Cardiac Death in Heart Failure Trial</td>
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<td>Ravindran, Bipin K.</td>
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<td>Positron Emission Tomography Imaging of Atrial Muscarinic Receptors</td>
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<td>Strote, Justin A.</td>
<td>Interventional 7/1/07-6/30/08</td>
<td>Role of Urgent Angiography in Patients with Sudden Death</td>
<td>Leonard Cobb, MD, Francis Kim, MD</td>
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<td>Cawley, Peter J.</td>
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<td>Utilization of Magnetic Resonance Imaging for Coronary Artery</td>
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<td>Chen, Kent Y.</td>
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<td>Cellular Therapies for Myocardial Infarct Repair</td>
<td>Charles E. Murry, MD, PhD</td>
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<td>Scholnick, Joshua D.</td>
<td>7/1/04-6/30/07</td>
<td>MRI Surveillance of Coronary Bypass Graft Stenosis</td>
<td>Chun Yuan, PhD</td>
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<td>Strote, Justin A.</td>
<td>7/1/04-6/30/07</td>
<td>Role of Urgent Angiography in Patients with Sudden Death</td>
<td>Leonard Cobb, MD</td>
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<td>Wong, Wai Shun</td>
<td>7/1/04-6/30/07</td>
<td>Effect of Multiple ICD Shocks on Mortality in the Sudden Cardiac Death in Heart Failure Trial</td>
<td>Jeanne E. Poole, MD</td>
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### 2006

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<tr>
<td>Chen, Grace P.</td>
<td>7/1/03-6/30/06</td>
<td>Global and Regional Sympathetic Nervous System Function Before and During Left Ventricular Assist Device Placement</td>
<td>James H. Caldwell, MD</td>
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<td>Crittenden, Gretchen L.</td>
<td>Interventional Fellow 7/01/05-6/30/06</td>
<td>Use of the COAP Data Base for Quality Improvement</td>
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<td>Lee, Justin C.</td>
<td>7/1/03-6/30/06</td>
<td>Development of Magnetic Resonance Imaging for Ex Vivo Tissue Characterization of Aortic Valve in Aortic Stenosis</td>
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<td>Schaefer, Benjamin M.</td>
<td>7/1/03-6/30/06</td>
<td>Inheritance of Bicuspid Aortic Valves: Phenotypic and Genotypic Classification</td>
<td>Peter H. Byers, MD, Catherine M. Otto MD</td>
<td>American College of Cardiology/Merck Research Fellowship</td>
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<td>Sutcliffe, Peter D.</td>
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<td>Changes in LDL Heterogeneity and Carotid Atherosclerotic Plaque Characteristics in Response to Aggressive LDL Reduction</td>
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<td>Chen, Michael A.</td>
<td>7/1/02-6/30/05</td>
<td>Perioperative Beta Blockade in Patients Undergoing Surgery for Acute Hip Fracture</td>
<td>Itamar Abrass, MD</td>
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<td>Chung, Kiyon</td>
<td>7/1/02-6/30/05</td>
<td>Prevention of Sudden Cardiac Death</td>
<td>David S. Siscovick, MD</td>
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<td>Paramsothy, Pathmaja</td>
<td>7/1/02-6/30/05</td>
<td>The Effects of Omega-3 Fatty Acids on Endothelial Function in the Metabolic Syndrome</td>
<td>Robert H. Knopp, MD</td>
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<td>Tabibiazar, Ramin</td>
<td>7/1/02-6/30/05</td>
<td>The Effects of Beta Blockers on Regional Pre- and Post-Synaptic Sympathetic Nervous System in Patients with Congestive Heart Failure</td>
<td>James H. Caldwell, MD</td>
<td>American Society of Nuclear Cardiology</td>
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<td>Urnes, Kara K.</td>
<td>7/1/02-6/30/05</td>
<td>Use of a Three-Dimensional Cardiac Imaging Simulator for Training and Competency Assessment in Echocardiography</td>
<td>Florence Sheehan, MD</td>
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<tr>
<td>Branch, Kelley R.</td>
<td>7/1/01-6/30/04</td>
<td>Systemic and Myocardial Sympathetic Nervous System Function with Biventricular Pacing</td>
<td>James H. Caldwell, MD</td>
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<td>Frutkin, Andrew D.</td>
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<td>Transforming Growth Factor Beta 1 and Atherogenesis</td>
<td>David A. Dichek, MD</td>
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<td>Keeffe, Brian G.</td>
<td>7/1/01-6/30/04</td>
<td>Collaborative Care Model versus Standard of Care in Treating Chronic Stable Angina</td>
<td>Stephen D. Fihn, MD</td>
<td>Department of Veterans Affairs, Health Services Research and Development</td>
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<td>Massey, Philip G.</td>
<td>7/1/00-6/30/04</td>
<td>Role of Urokinase Plasminogen Activator in Vascular Remodeling</td>
<td>David A. Dichek, MD</td>
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<td>Vesey, Jeanne M.</td>
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<td>Development of a Cardiovascular Educational Curriculum for Medical Residents</td>
<td>Catherine M. Otto, MD</td>
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<td>Genetic Predisposition to Sudden Cardiac Death</td>
<td>David S. Siscovick, M.D</td>
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<td>Stout, Karen K.</td>
<td>7/1/00-6/30/03</td>
<td>Functional Mitral Regurgitation: Does Form Follow Function?</td>
<td>Florence J. Sheehan, MD</td>
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<td>Willems, James P.</td>
<td>7/1/00-6/30/03</td>
<td>Cholesterol Management Among VA Patients with Coronary Artery Disease</td>
<td>Nathan Every, MD</td>
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<td>Aikawa, Keiko</td>
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<td>The Effects of Natural Progesterone versus Medroxyprogesterone Acetate on Endothelial Function and Serum Lipoproteins</td>
<td>Robert H. Knopp, MD</td>
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<td>Caulfield, Michael T.</td>
<td>7/1/99-6/30/02</td>
<td>Lipoprotein/Proteoglycan Interactions in Restenosis</td>
<td>Kevin O’Brien, MD</td>
<td>American Heart Association</td>
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<td>Gold, Elizabeth S.</td>
<td>7/1/97-6/30/02</td>
<td>Macrophage-Mediated Immunity to Salmonella Infection</td>
<td>Alan A. Aderem, Ph.D.</td>
<td>American Heart Association NIH: Cardiovascular Research Training Program</td>
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<td>Minami, Elina</td>
<td>7/1/99-6/30/02</td>
<td>Myocardial Infarct Repair: Effects of Stem Cell Grafting and Accelerated Angiogenesis</td>
<td>Charles E. Murry, MD, PhD</td>
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<td>Mozaffarian, Dariush</td>
<td>7/1/98-6/30/02</td>
<td>Cardiac Effects of Fish Consumption</td>
<td>David S. Siscovick, MD</td>
<td>Department of Veterans Affairs, Health Services Research and Development</td>
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<td>Wu, Audrey H.</td>
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<td>Predictors of Repeat Revascularization within One Year after Initial Percutaneous Coronary Intervention</td>
<td>Xue-Qiao Zhao, MD</td>
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<td>Shavelle, David M.</td>
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<td>Lipid Retention and Inflammation Play a Role in the Pathogenesis of Aortic Sclerosis</td>
<td>Kevin D. O’Brien, MD</td>
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<td>Tseng, Hennessey</td>
<td>7/1/98-6/30/01</td>
<td>Beta-Receptor Imaging</td>
<td>James H. Caldwell, MD</td>
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2015

**Sophia Airhart**


**Kate Kearney**


2014

**Sophia Airhart**


**Katie Benziger**


**Patrick Goleski**


**Jason Huang**


**Nina Rashedi**


When Should We Operate in Asymptomatic Severe Aortic Stenosis Feb 2015; Nina Rashedi, Catherine Otto; http://www.acc.org/latest-in-cardiology/articles/2015/02/04/14/49/when-should-we-operate-in-asymptomatic-severe-aortic-stenosis


Outcome of Asymptomatic Mixed Aortic Valve Disease; A Follow-Up Study of 524 Patients May 2014; Nina Rashedi, Zoran Popovic, William Stewart, Thomas H Marwick (Manuscript-published at Journal of the American Society of Echocardiography).
Jason Huang

Ivan Medvedev


Juan Ortega-Legaspi

Shalin Patel


Nina Rashedi

Rashedi, N, Majdalany, David; Fever of Unknown Origin Post Percutaneous Coronary Intervention Case Presentation submitted to American College of Cardiology, 2013 Nov.


2012

Paco Bravo, MD


Oscar Gonzalez, MD


Christopher Greenman, MD

Aneet Patel, MD

Andrea Vitello, MD

2011

Stephen Farris, MD

Joanna Ghobrial, MD


Jehu Mathew, MD

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**Zachary Steinberg, MD**


**2010**

**Todd Dardas, MD, MS**


**Sunil Dhar, MD**


**Todd Goldman, MD**


**Matt Hartman, MD**


**Manoj Kesarwani, MD**


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**Elisa Zaragoza-Macias, MD**


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**Gregory Roth, MD**


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Rose Q. Do, MD


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Jason Linefsky, MD


**Alec Moorman, MD**


**Eric Pacini, MD**

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**Ramin Shadman, MD**


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**Steven M. Bradley, MD**


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**John Mignone, MD**


**Luis D. Muñoz, MD**

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**Joan Susie Woo, MD**


2006

**Pierre S. Aoukar, MD**


**Jay Chen, MD**


Chen J, Naseem RH, Joglar JA. Prior Cocaine Use is Associated with a High Defibrillation Threshold During ICD Implantation. Heart Rhythm, 2006; 3:162,70.


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**Eric Krieger, MD**


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**Joshua M. Buckler, MD**


**Kier V. Huehnergarth, MD**


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Jordan M. Prutkin, MD, MSc

Caldwell Visiting Professor, March 2016
Dr. Muriell Jessup pictured with Dr. James Caldwell and Fellows