Name: Eleni Liapi

Institute: Johns Hopkins University School of Medicine

Description of research training/ clinical externship: 15-months translational training (clinical + basic)

- Clinical sub-internship (3 months): Radiology, Internal Medicine
- Topic of basic science training (12 months): Magnetic hyperthermia for treatment of unresectable liver cancer

Description of clinical sub-internship:
Opportunity for sub-internship in Diagnostic Radiology and/or Interventional Radiology. Also, opportunity for weekly rotations in Internal Medicine (including Cardiology).

Description of basic science project:
This project spans from basic cancer cell cultures to large animal studies, exploring the effects of magnetic hyperthermia for treatment of unresectable liver cancer. One aspect of this project involves the effect of heat shock proteins 70 and 90 on immune system modulation and thermotolerance. Another aspect of this project involves imaging with US, CT and MRI, as well as simulations, for evaluating tumor perfusion changes in relation to hyperthermia.

Name: Antonis Armoundas

Institute: Massachusetts General Hospital

Description of research training/ clinical externship: 15-months translational training (clinical + basic)

Topic: Cardiac Electrophysiology

Description of basic science project:

The implantable cardioverter defibrillator (ICD) is the most effective means of detecting and treating arrhythmias, such as ventricular tachycardia (VT) or ventricular fibrillation (VF). However, the main limitation of the current ICD technology is that it aims to terminate an arrhythmia only after the arrhythmia has started. Given that failure, delay or false decision in detecting VT/VF are life-threatening concerns, the next generation of ICD technology should be able to prevent arrhythmias from starting, rather than terminating them after their initiation. Repolarization alternans (RA), a pattern of variation in the shape of electrocardiographic waveform that appears on an every other beat basis, has been associated with increased vulnerability to VT/VF and sudden cardiac death (SCD). In this paradigm shift grant application we propose to investigate the hypothesis that therapy application by an ICD before the abnormal heart rhythm develops will provide a significant improvement not only in preventing SCD, but also in patient acceptance of ICD therapy and quality of life. We have developed a prototype system that can both estimate RA in real-time from intracardiac electrograms and deliver electrical pulses that are timely coupled to cardiac electrical activity. In this proposal we will investigate the applicability of RA-triggered delivery of clinically appropriate electrical therapy to suppress/terminate RA and prevent the development of VT/VF in an animal model of ischemic cardiomyopathy in ambulatory animals. To achieve the aims of this proposal we will (i) determine the efficacy of timely delivered pacing pulses in reducing/suppressing repolarization alternans and preventing the onset of ventricular tachyarrhythmias; (ii) determine whether altered heart rate variability reduces/suppresses repolarization alternans and prevents the onset of ventricular tachyarrhythmias; (iii) determine whether RA-triggered therapy can reduce/suppress repolarization alternans and prevent the onset of ventricular tachyarrhythmias in ambulatory animals.

Name: Stefanos Kales

Institute: Harvard TH Chan School of Public Health

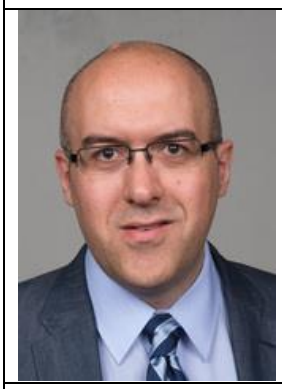
Description of research training/ clinical externship: 15-months translational training (clinical + basic)

Topics:

- Clinical sub-internship (3 months): Occupational Medicine
- Topic of basic science training (12 months): Occ Health / Cardiovascular / Mediterranean Diet

Description of basic science project :

Stefanos N. Kales MD, MPH, FACP, FACOEM, the principal investigator, is highly experienced in managing this type of project. He has participated in a wide range of research, advisory, and teaching activities on five continents, resulting in over 145 publications and wide recognition nationally and internationally. Dr. Kales' primary research focuses on the health of firefighters and other public safety professionals, and he has worked with the fire service in particular for over 20 years. He has received Massachusetts, US Federal, and Canadian funding with a proven record of success.



Name: Konstantinos Drosatos

Institute: Lewis Katz School of Medicine at Temple University

Description of research training/ clinical externship: 15-months translational training (clinical + basic)

Topics:

- Clinical sub-internship(3 months): Internal Medicine (1 mo) - Cardiology (1 mo)- Endocrinology (1 mo)
- Topic of basic science training (12 months): Interventions in cardiomyoctye metabolic pathways that are altered in cardiac stress

Description of clinical sub-internship:

Three monthly clinical rotations in Internal Medicine, Cardiology & Endocrinolgy will be available at the Temple University Hospital (TUH) under the broader supervision of the Department of Medicine. After acceptance, the selected applicant will need to comply with Temple University Hospital Administrative Policies And Procedures (health clearance, HIPAA compliance) prior to beginning of the training.

Description of basic science project:

The Drosatos Lab investigates cell signaling and transcriptional regulation mechanisms that link cardiac stress with altered myocardial fatty acid metabolism and applies interventions in metabolic signaling pathways that alleviate cardiac dysfunction in heart failure, diabetes and sepsis. The selected applicant will receive training in basic molecular biology methods that pertain to gene expression and cell signaling that affect metabolic pathways and cardiac function in diabetes mouse models. The trainee will be trained in existing in vitro and in vivo (mouse) models of the lab. The Drosatos Lab is part of the Center for Translational Medicine that fosters interaction with both basic scientists and physician-scientsts that pursue research in cardiovascular biology.

Name: Andrea Havasi-Cosmopoulos

Institute: Boston Medical Center/Boston University

Description of research training/ clinical externship: 15-months translational training (clinical + basic)

Topics:

- Clinical sub-internship (3 months): In-patient rounding and out-patient clinic related to amyloidosis and nephrology
- Topic of basic science training (12 months): Amylodosis Research

Description of clinical sub-internship:

The Amyloidosis Center at Boston University School of Medicine and Boston Medical Center is recognized internationally as a leader in basic and clinical research on amyloidosis and related diseases. The Center is unique in its approach, providing exceptional care for patients with all forms of systemic and localized amyloidosis through the support of laboratory and clinical research. Clinical sub-internship would involve (a) in-patient rounding and out-patient clinic related to amyloidosis (all sub-specialties: nephrology, hematology, cardiology, etc) , and (b) in-patient rounding and out-patient clinic related to nephrology. Specific ratio if time spent on amyloidosis and nephrology can be tailored to the interests of the successful candidate.

Description of basic science project:

The successful candidate will have the opportunity to work on exciting, groundbreaking research projects at the Amyloidosis Center at Boston University/Boston Medical Center that strive to further understanding of the basic mechanisms of amyloid diseases and to find a cure, focusing on organ trophism/toxicity and light chain pathobiology.

Name: Diomedes Logothetis

Institute: Northeastern University

Description of research training/ clinical externship: 15-months translational training (clinical + basic)

Topics:

- Clinical sub-internship (3 months): Through collaborations with labs at HMS
- Topic of basic science training (12 months): Drugs Targeting Ion Channels and GPCRs

Description of clinical sub-internship:

It is possible to work with physician scientists (at Harvard Medical School - HMS) who collaborate with the Logothetis lab to do a clinical 3-month sub-internship. Presently collaborations in Neurology and Nephrology are being established but additional ones will also be taking place, particularly since the Logothetis lab moved to Boston recently (January 2017).

Description of basic science project:

The Logothetis lab specializes in membrane proteins, with particular emphasis on Ion Channels and G Protein-Coupled Receptors (GPCRs). The lab uses theoretical (computational chemistry) and experimental (electrophysiology and molecular biology) approaches to tackle molecular mechanisms of function and malfunction. Drug action is studied in the context of structure (computational chemistry) and function (electrophysiology, high throughput fluorescence assays). The lab applies state-of-the-art biophysical approaches in physiology, pharmacology and computational modeling to produce pre-clinical leads and to work with start-ups and the pharmaceutical industry in Boston to take these leads to clinical trials. Current projects include a) drug design to produce allosteric activators or inhibitors of channel function targeting interactions that ion channels share with the signaling phospholipid PIP2; b) elucidation of the function of heteromeric GPCRs involved in schizophrenia and chronic pain and design of drugs to be used as diagnostic tools to quantify heteromers of interest in specific parts of the brain and potentially be modified for use as therapeutic agents.

Name: Theoklis Zaoutis

Institute: The Children's Hospital of Philadelphia/PENN

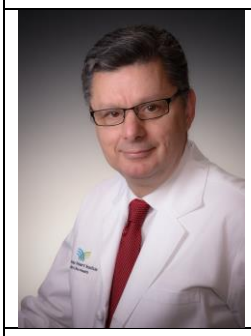
Description of research training/ clinical externship: 15-months translational training (clinical + basic)

Topics:

- Clinical sub-internship (3 months): Pediatric Infectious Diseases
- Topic of basic science training (12 months): Epidemiology
- Description of clinical sub-internship: Clinical training in pediatric ID

Description of basic science project:

The Pediatric Infectious Diseases and Antimicrobial Stewardship Research Group in an Epidemiology laboratory (dry lab) that is currently funded by the NIH, CDC, PCORI, Industry and Foundations. We currently have over 20 million in funding, 20 staff and over 40 active projects.



Name: Konstantinos Plestis

Institute: Main Line Health / Lankenau Heart Institute

Description of research training/ clinical externship: 15-months translational training (clinical + basic)

Topics:

- Clinical sub-internship (3 months): Cardiothoracic Surgery-Aortic Disease Management
- Topic of basic science training (12 months): Impact of Individualized Heparin and Protamine Management on Perioperative Outcome in Adult Patients Undergoing Complex Cardiac Surgery With Cardiopulmonary Bypass

Description of clinical sub-internship:

The Lankenau Heart Institute was established in the Fall of 2013 with the goal of offering a unified system of cardiovascular care to better serve communities in the Philadelphia area. The Institute is proud to uphold the reputation for excellence, innovation and research in cardiac surgical care earned over the past 50 years by Lankenau Medical Center, which is ranked fifth in Pennsylvania and second in the region for overall heart surgery volume. 1,100 cardiac operations are performed, annually, spanning nearly every aspect of cardiac surgery and 70% of them are completed using a minimally invasive approach. Minimally invasive cardiac surgery has become the treatment of choice since it is associated with excellent outcomes such as reduction in hospitalization, less postoperative pain, decreased incidence of stroke, avoidance of blood products, decreased mortality, and the patient can return quickly to daily activities with improved quality-of-life. Aortic disease management has recently emerged as a distinct cardiovascular subspecialty. The Aortic Wellness Program, at Lankenau Heart Institute*, brings together a dedicated multidisciplinary team of cardiothoracic and vascular surgeons, cardiologists, cardiac imaging specialists and anesthesiologists who ensure the optimal management of patients at risk for aortic disease complications as well as, rapid, coordinated treatment of acute aortic emergencies. Under the leadership of cardiothoracic and vascular surgeon, Konstantinos Plestis, MD, the Stavros Niarchos Foundation fellow will have an opportunity to familiarize himself with the latest preventive, diagnostic, medical and surgical interventions for patients with coronary artery disease and structural heart disorders. He will be able to participate in all aspects

of patient care; preoperative outpatient evaluation, intraoperative observation of complex and hybrid surgical procedures for the treatment of aortic and valvular disease using state of the art, innovative approaches, and postoperative patient follow-up . Many of these procedures will be performed using a minimally invasive approach with a large proportion of patients having previously undergone significant cardiac surgery.

Description of basic science project:
Background Perioperative anemia results in increase in morbidity and mortality. Blood transfusion is a widely accepted and effective method to treat anemia. However, recent literature has demonstrated that extensive blood transfusion is associated with multiple adverse effects such as immunologic reaction including febrile non-hemolytic reactions, anaphylactic reactions, hemolysis, transfusion-related acute lung injury, nosocomial infections, decreased health-related quality of life, reduced early and long-term survival,and possible transfusion service errors as well as high cost of the transfusions themselves. The activated clotting time test (ACT) was developed to monitor the effect of heparin during CPB. The ACT test analyzes the effect of multiple variables including medications, heparin anticoagulation, temperature, and dilution. Based on the results of this test protocols have been established for optimization of utilization of blood products, heparin and protamine. The drawbacks of ACT and other similar tests include laboratory turnaround time and empiric application of heparin and protamine dosing during CPB. Measuring the length of the clotting time does not adequately assess the degree of heparinization or whether an appropriate antithrombotic state has been achieved. Studies conducted to assess the relationship between ACT and heparin concentration were inconclusive, however these studies demonstrated significant variability in patient's reaction to heparin. The HMS Plus system is an FDA approved device and is standard of care in many hospitals across the USA. It was first introduced in 2000 by Medtronic (Minneapolis, MN) and was designed to more precisely address anticoagulation monitoring in procedures requiring systemic heparinization. The HMS Plus system assesses a patient's specific response to heparin, thus allowing for more appropriate dosing. The HMS Plus system also measures the actual circulating heparin concentration, which allows for maintenance of the required heparin level and more appropriate protamine dosing. The HMS Plus also performs the ACT test. The HMS system, by more precisely controlling hemostasis and anticoagulation, may decrease the need for blood transfusion and reduce the complications of CPB including DIC, clot formation, reoperation for bleeding and the systemic inflammatory response to blood product transfusion. These should impact both the safety and cost of procedures requiring CPB. Introduction The Society of Thoracic Surgeons and the Society of Cardiovascular Anesthesiologists recognize the importance of the HMS for anticoagulation management for its ability to predict individual heparin dose response and perform a specific heparin assay thus conserving adequate heparinization, and heparin protamine titration guided protamine calculations for heparin reversal, and ACT. In patients requiring longer CPB times (2 to 3 hours), maintenance of higher and/or patient-specific heparin concentrations during CPB may be considered to reduce hemostatic system activation, reduce consumption of platelets and coagulation proteins,

and to reduce blood transfusion. (Class IIb, Level of evidence B). There is substantial variability of heparin anticoagulant responsiveness, as illustrated by a wide range of Heparin Dose Response curves in patients undergoing cardiac surgery with CPB, when compared to normal volunteer. ACT measurements are affected by many variables other than heparin such as hemodilution and hypothermia, as well as decreased platelet function. It is an inadequate monitor of anticoagulation. The prolongation of the ACT during bypass may lead to misinterpretation that adequate anticoagulation is present even when heparin levels may be inadequate. Most importantly, studies have shown poor correlation between ACT values and plasma heparin concentrations in patients undergoing CPB. There are studies on the impact of individualized heparin/protamine management in routine cardiac surgical procedures but not a detailed study on complex and combined cardiac surgery with longer CPB times which could underline the impact clearly. The HMS Plus System may also play a significant role in emerging minimally invasive cardiac surgery. A smaller surgical field requires utilization of sophisticated devices, which are difficult to operate and thus, make it harder to control possible bleeding. Better hemostasis management can significantly shorten the duration of this type of surgery. Study Objective Demonstrate the safety and efficacy of individualized heparin and protamine management on perioperative outcome in adult patients undergoing combined CABG+valve; complex aortic and minimally invasive valve surgery with cardiopulmonary bypass. Study Design This is a prospective cohort study, which will be compared to a historical control group, designed to evaluate the impact of individualized heparin and protamine management on perioperative outcome in adult patients undergoing complex cardiac surgery with cardiopulmonary bypass. Following approval by the Institutional Review Board, a total of 600 patients will be included in the study. The Study group: will consist of patients prospectively monitored undergoing CABG+valve (N=100), complex aortic surgery (N=100) and minimally invasive valve surgery (N=100) with the use of a individualized heparin/protamine management system (HMS plus). The Control group: will enroll patients retrieved from the STS database who underwent CABG+valve (N=100), complex aortic surgery (N=100) and minimally invasive valve surgery (N=100) with the use of a conventional ACT follow-up system. Study procedure Anesthesia and Antifibrinolytic therapy : General anesthesia will be performed according to the routine clinical practice in the hospital. Extra corporeal circulation: All patients enrolled in the study group will utilize the HMS system (the standard of care) and will be administered heparin (Liquemine, Roche) based on the HMS protocol, but not less than - 4 mg/kg with a target activated clotting time (ACT) over 480 s and maintenance dose of 3.5 mg/kg. ACT will be measured by HMS Plus, Medtronic Inc. Arterial cannulation will be performed centrally or peripherally. Venous drainage will be achieved via a cannula that will be advanced in the superior vena cava via the right common femoral vein using the Seldinger technique under TEE guidance. Systemic hypothermia to 32 º C will be achieved on CPB. Following cross-clamping of the aorta, electromechanical arrest will be achieved by administering 2 liters of Custodiol-HTK or Del-Nido Cardioplegia in the aortic root. If the patient develops severe aortic regurgitation (AR), an initial dose of cardioplegia will be given in the root until the heart will stop, will develop ventricular fibrillation or if there will be significant left ventricular

(LV) dilation noted during simultaneous assessment using TEE; the remaining cardioplegia solution will then be directly instilled in the coronary ostia after the root will be opened. Prime for CPB will be identical for all patient groups. HMS testing will be performed by Main Line Health perfusionist, assigned to the case. All of the MLH perfusionists have been trained and certified by Medtronic to use the HMS device. The HMS device is currently used in Main Line Health for cardiac cases. Heparin concentration measurement in the study group: The HMS Plus Hemostasis Management System (Medtronic Inc., Minneapolis, Minnesota) is an automated protamine titration method of anticoagulation management. It provides both whole blood heparin concentration measurements and ACT. The principle of HMS management is based on the heparin dose-response test that measures the in vitro anticoagulation response of the patient's blood to a known concentration of heparin and calculates the estimated heparin dose required to achieve the desired target ACT. This response is used to determine the whole blood heparin concentration necessary to achieve and maintain adequate anticoagulation during CPB. The concentration of circulating heparin is monitored during CPB using the heparin protamine titration test. Each channel of the heparin protamine titration test cartridge contains a known quantity of protamine with a constant amount of thromboplastin for activation of the blood. The channel that most closely neutralizes the heparin in the sample will be the first to clot. In this channel, the protamine-to-heparin ratio is nearest to the neutralization point. The heparin concentration is also used to calculate the protamine dose required for neutralization of heparin after CPB. Heparin and protamine management: The HMS is going to be used to guide heparin requirements before and during bypass. The HMS plus will be used for heparin and protamine management. Blood samples will be drawn every 30 minutes and heparin dosing & protamine reversal will be administered based on the results of the HMS plus, with the exception of obtained ACT values below 480, at which point 5000-10000 Units of heparin will be given. Protocol of Heparin Administration: 1) The HMS system will guide Heparin administration while going on the Cardiopulmonary bypass. However if Heparin is less than 400 U/Kg, then Heparin will be administered. 2) During Cardiopulmonary bypass, the HMS system will be followed. However, if the ACT will be below 480, Heparin will be administered regardless of HMS indications. 3) Coming off Cardiopulmonary bypass, Protamine will be given solely based on HMS indications. Blood transfusion protocol: Blood transfusion protocol will be standardized throughout the study. Packed red blood cells (PRBCs) will be added to the prime to achieve and maintain patient hematocrit at 24% during CPB. Operative Course: The operative course will be similar in both groups, representing routine surgical practice. Cross clamping of the aorta will performed and cardioplegia will be given for cardiac arrest. The ECC will be terminated following reperfusion and re-warming of the patient. Patient assessment Prior to the procedure the following parameters will be recorded: • Age • Gender • Date of Admission • Date of Informed Consent Signed • Date of Procedure • Height, Weight, Body Mass Index (BMI) • Blood pressure (BP) • Heart rate (HR) • Medical history and co-morbidities (smoking history; history of diabetes/therapy; history of hypertension/therapy history of supraventricular arrhythmia; hypercholesterolemia, renal disease, liver disease, chronic heart failure, cancer, chronic

lung disease, peripheral vascular disease) • History of myocardial infarction • History of coronary Intervention (Previous Percutaneous Coronary Intervention - PCI/CABG) • Anticoagulation therapy • Anginal Status (Asimptomatic/Unstable/Stable) • Medication (cardiac/non cardiac) • Antifibrinolytic therapy • Angiographic findings o Number of diseased vessels oLVEF • Echocardiogarphic findings • Laboratory parameters: • Hematocrit, Hb, RBC, WBC (differential formula), platelets • Creatinine, Urea, LDH • Coagulation Parameters – INR, PTT,ATIII, Fibrinogen, baseline D-dimer • Inflammation - CRP • Myocardial ischemia and myocardial tissue injury assessment : as indicated, • Date and type of operation (pre-operative diagnosis) • Hemodilution will be assessed by Hematocrit measured before surgery and subsequent to cardioplegia application. Intraoperative Data: •Details of actual procedure performed • Infusion volume (crystalloid solutions, albumin, cell saver, and blood transfusion including Fresh Frozen Plasma, Packed Red blood Cells, platelet concentrates and Autotransfusion) • Anaesthesia (total volume during the entire operative period including introduction to anaesthesia) • PT/ PTT, TEG, Platelets, Protamine • Fibrinogen • Use of Intra-aortic balloon pump • Bypass time, X-clamp time, total length of operation • Any intra-operative complication • Revascularisation completeness • Number of distal anastomoses • Success of valves repair/replacement • Surgeon • Perfusionist • Anesthesiologist • Cardioplegia type and total volume Postoperative Evaluation: • Duration of mechanical ventilation • Inotropic therapy and circulatory support • Length of ICU stay, (any paramedical reason should be documented) • Hospital stay, (any paramedical reasons should be documented) • Atrial fibrillation (ECG would be done daily at POD 1-3 and on discharge and when symptomatic i.e on clinical detection of an arrhythmia, documentation of treatment strategy and success) • Bleeding complications (requires re-operation or not) • Blood loss (6, 16 hrs after the chest closure) • Urine output and total fluid balance (crystalloid and colloid at 6 and 16 and 24h postoperative) • Body weight at POD1 and 2. • Drainage volume (chest tubes) during 24 hours following surgery • Transfusion of blood products and o time points, o name of prescribing physician, o indications. Note: The packed red cell transfusion trigger should be set at 8g/dL of haemoglobin postoperatively and 8 g/dl on CPB, and an explanation should be provided when administering a transfusion to the patient with Hg higher that 8 g/dl postoperatively or on CPB respectively. Before considering blood transfusion the first step would be conservative treatment of bleeding (for ex: Protamine / PEEP 10, etc.). If blood loss in the first 1 h is less than 200 ml, FFP is not recommended and it should not be given (except when clearly clinically indicated) If PLT count is not less than 100 000x109/L, PLT transfusion should not be given (except when clearly clinically indicated). Standard laboratory measurements (post-operative at 6h and 16h -the morning after): • Complete blood count (Red blood cells, white blood cells, WBC with differential formula, hemoglobin, hematocrit, platelets) • Renal function (creatinine, BUN) • Coagulation status (Prothrombin time, INR, PTT,ATIII, Fibrinogen • Inflammatory status (CRP) preoperative, 6h and 16h post operatively Other parameters to be recorded: Total CPB time Min Total aortic X-clamp time Min Reperfusion time Min Total length of operation Min Total Cardioplegia given mL Total

intubation time Hours Coordination, Data Collection and Monitoring Coordination: All personnel involved in the procedure and the follow up of the patients in this study must be familiarized with the protocol. The patients' treatment should be undertaken in accordance with the protocol. Case Report Forms Study data should be collected on the Case Report Forms (CRFs) provided. Filled out CRFs must be copied. CRF remains at the site. Data is to be kept for 3 years after termination of the study. Patient Data Protection A patient identification number or case code will identify patients on the CRFs. The investigator will maintain a confidential patient identification list (separate from investigational files) to link medical records and patient identification numbers. The patient shall be informed that the data will be stored and analyzed by computer,that local regulations for handling computerized data will be followed, and that identification of individual patient data will only be possible for the investigator. Serious Adverse Events An Adverse Event is considered serious if the event: • Leads to death; • Leads to a serious deterioration in the health of the patient that: oResults in life-threatening illness or injury; o Results in a permanent impairment of a body structure or a body function; o Requires patient hospitalization (within 30 days post study) or prolongation of existing hospitalization; o Results in medical or surgical intervention to prevent permanent impairment to body structure or a body function; All SAEs need to be followed until the event is resolved (with or without sequelae). Use of Information and Publication All information and data generated in association with this study will be held in strict confidence until the completion of the study. At the conclusion of this study, an abstract reporting the primary results may be prepared and presented in an appropriate international forum. A peer-reviewed manuscript may also be prepared for publication in a reputable scientific journal. REFERENCES 1. Manlhiot C, Gruenwald CE, Holtby HM, Brandão LR, Chan AK, Van Arsdell GS, McCrindle BW. Challenges with heparin-based anticoagulation during cardiopulmonary bypass in children: Impact of low antithrombin activity. J Thorac Cardiovasc Surg. 2016 Feb;151(2):444-50. 2. Machovec KA, Jooste EH, Walczak RJ, Homi HM, Jaquiss RD, Lodge AJ, Ames WA. A change in anticoagulation monitoring improves safety, reduces transfusion, and reduces costs in infants on cardiopulmonary bypass. Paediatr Anaesth. 2015 Jun;25(6):580-6 3. Hofmann B, Bushnaq H, Kraus FB, Raspé C, Simm A, Silber RE, Ludwig-Kraus B. Immediate effects of individualized heparin and protamine management on hemostatic activation and platelet function in adult patients undergoing cardiac surgery with tranexamic acid antifibrinolytic therapy. Perfusion. 2013 Sep;28(5):412-8. 4. Gruenwald CE, Manlhiot C, Chan AK, Crawford-Lean L, Foreman C, Holtby HM, Van Arsdell GS, Richards R, Moriarty H, McCrindle BW. Randomized, controlled trial of individualized heparin and protamine management in infants undergoing cardiac surgery with cardiopulmonary bypass. J Am Coll Cardiol. 2010 Nov 23;56(22):1794-802. 5. Garvin S, FitzGerald DC, Despotis G, Shekar P, Body SC. Heparin concentration-based anticoagulation for cardiac surgery fails to reliably predict heparin bolus dose requirements. Anesth Analg. 2010 Oct;111(4):849-55. 6. Slight RD, Buell R, Nzewi OC, McClelland DB, Mankad PS. A comparison of activated coagulation time-based techniques for anticoagulation during cardiac surgery with cardiopulmonary bypass. J Cardiothorac Vasc Anesth. 2008 Feb;22(1):47-52. 7. Gruenwald CE, Manlhiot C, Crawford-Lean L, Foreman C, Brandão LR, McCrindle BW,

Holtby H, Richards R, Moriarty H, Van Arsdell G, Chan AK. Management and monitoring of anticoagulation for children undergoing cardiopulmonary bypass in cardiac surgery. J Extra Corpor Technol. 2010 Mar;42(1):9-19. 8. Ferraris VA, Ferraris SP, Saha SP, Hessel EA 2nd, Haan CK, Royston BD et al. Perioperative blood transfusion and blood conservation in cardiac surgery: the Society of Thoracic Surgeons and The Society of Cardiovascular Anesthesiologists clinical practice guideline. Ann Thorac Surg. 2007; 83(5 Suppl): S27-86. 9. Ferraris VA, Brown JR, Despotis GJ, Hammon JW, Reece TB, Saha SP et al. 2011 update to the Society of Thoracic Surgeons and the Society of Cardiovascular Anesthesiologists blood conservation clinical practice guidelines. Ann Thorac Surg 2011;91(3):944-82.

Name: Dimitra Skondra

Institute: The University of Chicago

Description of research training/ clinical externship: 15-months translational training (clinical + basic)

Topics:

- Clinical sub-internship (3 months): Ophthalmology/Retina/ Advanced Retinal Imaging
- Topic of basic science training (12 months): Role of gut microbiome in Age Related Macular Degeneration (AMD)/Rapid Endophthalmitis diagnosis with MALDI TOF Mass Spectrometry

Description of clinical sub-internship:

In my role as retina faculty at The University of Chicago, I am committed to providing the best possible care to patients with complex retinal disorders and actively pursuing new ways to improve early identification, better management and better outcomes. My research focuses on retinal diseases, encompassing both clinical and translational research. As the Director of J. Terry Ernest Ocular Imaging Center, my research in retinal imaging aims to provide a better understanding of the pathogenesis, early detection and identification of prognostic information for to enable more targeted intervention and treatment in common diseases like diabetic retinopathy, age related macular degeneration (AMD), retinal vein occlusions.

Description of basic science project:

As a clinician-scientist with previous experience in translational research projects and being part of a leading academic institution with excellent resources, expert physicians and scientists and state of the art equipped laboratories on gut microbiome and molecula microbiology, I am dedicated to pursue a multidisciplinary team approach of innovative research for retinal disorders investigating the role of high fat diet and gut microbiome in AMD, developing new preventative startegies and developing new molecuar methods for rapid diagnosis of endophthalmitis that could revolutionalize current management strategies.

Name: Paraskevi (Evi) Giannakakou

Institute: Weill Cornell Medicine

Description of research training/ clinical externship: 15-months translational training (clinical + basic)

Topics:

- Clinical sub-internship (3 months): Breast Cancer, Prostate Cancer, Gastric Cancer, Pancreatic
- Topic of basic science training (12 months): Molecular oncology, mechanisms of drug resistance, liquid biopsies in precision oncology
- Description of clinical sub-internship: Clinical subinternships can be coordinated with Weill Cornell Medicine/ Hem/Onc Division in collaboration with my clinical oncology colleague

Description of clinical sub-internship:

It is possible to work with physician scientists (at Harvard Medical School - HMS) who collaborate with the Logothetis lab to do a clinical 3-month sub-internship. Presently collaborations in Neurology and Nephrology are being established but additional ones will also be taking place, particularly since the Logothetis lab moved to Boston recently (January 2017).

Description of basic science project:

My lab studies the biology of the microtubule cytoskeleton and the molecular mechanisms of action and resistance to drugs that target microtubules (e.g. taxanes) and are used in cancer chemotherapy. We use functional cellular and molecular biology assays coupled with high-resolution microscopy and live-cell imaging to decipher the molecular basis of clinical response and resistance to taxanes and other widely used microtubule inhibitors. We study cancer cell cytoskeletal dynamics and microtubule-dependent cell signaling and trafficking pathways –to decipher the molecular basis of clinical response and resistance to taxanes and other widely used microtubule inhibitors. To translate our basic science discoveries into the clinical setting, we have developed expertise in the isolation and molecular characterization of patient-derived circulating tumor cells (CTCs), which we use as a source of liquid biopsy to study the molecular basis and evolution of clinical drug resistance. We employ multidisciplinary approaches in collaboration with investigators with computational modeling/bioinformatics, biomedical engineering, structural biology and clinical translational trials expertise

Name: An Massaro

Institute: Children's National Health Systems

Description of research training/ clinical externship: 15-months translational training (clinical + basic)

Topics:
-Clinical sub-internship: Neonatology
- Topic of basic science training (12 months)

Description of clinical sub-internship: Shadowing in a level-4 neonatal intensive care unit

Description of basic science project: Involvement in studies evaluating blood-based and physiological biomarkers of neonatal brain injury.

Name: Stavros Stavrakis

Institute: University of Oklahoma Health Sciences Center

Description of research training/ clinical externship: 15-months translational training (clinical + basic)

Topics:
Clinical sub-internship (3 months): Cardiology/Electrophysiology
Autonomic neuromodulation

Description of clinical sub-internship:
Clinical rotation in the inpatient arrhythmia service, the electrophysiology lab (where procedures such as catheter ablation of arrhythmias and implantation of pacemakers and defibrillators takes place) and outpatient clinics. Subinterns will gain insight into the clinical presentation, mechanisms, evaluation and management of arrhythmias in the inpatient and outpatient setting, as well as observe invasive treatment of arrhythmias using catheters in the electrophysiology lab. Finally, they will be taught the fundamentals of clinical trial research.

Description of basic science project:
Over the last 7 years, my research has focused on autonomic neuromodulation for the treatment of atrial fibrillation and atrial-fibrillation-related inflammation. Our next endeavor is to examine the effects of autonomic neuromodulation on diastolic dysfunction, exercise capacity and inflammation in patients with heart failure with preserved ejection fraction (HFpEF) and determine whether these effects are mediated by suppression of inflammation and fibrosis in a well-established rat model of HFpEF. It is anticipated that this translational project will contribute to the broader understanding of the role of inflammation in the pathogenesis of HFpEF and how its inhibition can be used to provide therapeutic effects. Moreover, it is anticipated that a better understanding of how modulation of inflammation affects one of the hallmarks of HFpEF, diastolic dysfunction, will lead to the development of novel pharmacological and non-pharmacological approaches to treat this disease.

Name: Stavros Drakos

Institute: University of Utah School of Medicine & Univ. of Utah Healthcare

Description of research training/ clinical externship: 15-months translational training (clinical + basic)

Topics:

- Clinical sub-internship: Cardiology, Cardiovascular Medicine, Cardiothoracic Surgery
- Topic of basic science training (12 months): Understanding cardiac recovery utilizing human and animal myocardial tissue

Description of clinical sub-internship:

The selected applicants will perform their internship at a top-notch Cardiovascular Center in one of the most historic academic medical institutions in the United States. Specifically, they will rotate through all sections of the divisions of cardiology and cardiothoracic surgery: heart failure and transplant, interventional cardiology, electrophysiology, advanced cardiac imaging (echocardiography, MRI, CT), congenital heart disease and others: http://medicine.utah.edu/internalmedicine/cardiovascular-medicine/ http://medicine.utah.edu/surgery/cardiothoracic/ In October of 2016, U of U Hospitals & Clinics received the #1 ranking for Health Care Quality among all major University Hospitals in the United States (including the Mayo Clinic, NYU, University of Michigan and others), marking seven years in the top ten: https://healthcare.utah.edu/quality/ This is the second time University of Utah Health has achieved the No. 1 ranking — we also claimed the honor in 2010. Dr. Drakos is the Co-Chief of Heart Failure and Transplant Section and Medical Director of the Mechanical Circulatory Support (MCS) Program/U of Utah Healthcare. He is a Nora Eccles Treadwell Scholar Associate Professor of Cardiology and Director of Cardiovascular Research for the Division of Cardiovascular Medicine.

Description of basic science project:

This translational project is focused on cardiac recovery associated with unloading and mechanical circulatory support in the chronic heart failure setting. Dr Drakos's team is utilizing clinical and cardiac metabolism biological information derived from studies in heart failure patients and small animal HF models to understand and manipulate myocardial recovery. Dr. Drakos's NIH-funded laboratory is housed at the Nora Eccles

Harrison Cardiovascular Research and Training Institute-CVRTI: http://www.cvrti.utah.edu/~drakos/Site/index.html Dr. Drakos has published original work generated both in his lab and in the clinical arena which led to the establishment of the award-winning Utah Cardiac Recovery Program (UCAR). Dr. Drakos is co-chairing the NIH/NHLBI Working Group on Myocardial Recovery: its executive summary and member list can be found at http://www.nhlbi.nih.gov/research/reports/nhlbi-working-group-advancing-science-myocardial-recovery-mechanical-circulatory-support . Along the same lines Dr. Drakos is co-directing the Annual International Utah Cardiac Recovery Symposium (UCARS) - for more info http://medicine.utah.edu/cardiacrecoverysymposium/ For Info regarding life in scenic Utah please visit: http://healthsciences.utah.edu/living-in-utah.php and http://healthsciences.utah.edu/why-utah.php