OMB No. 0925-0001 and 0925-0002 (Rev. 09/17 Approved Through 03/31/20)

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.  
Follow this format for each person. DO NOT EXCEED FIVE PAGES.

NAME: Shah, Amit Jasvant

eRA COMMONS USER NAME (credential, e.g., agency login): AJSHAH3

POSITION TITLE: Assistant Professor of Epidemiology

EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)

| INSTITUTION AND LOCATION | DEGREE  (if applicable) | Completion Date  MM/YYYY | FIELD OF STUDY |
| --- | --- | --- | --- |
| Princeton University, Princeton, NJ | BA | 05/02 | Physics Major, Biophysics Certificate |
| University of Pennsylvania, Philadelphia, PA | MD | 05/06 | Medicine |
| Montefiore Medical Center, Albert Einstein College of Medicine, Bronx, NY | Resident | 06/09 | Internal Medicine, Social Medicine Track |
| Emory University School of Medicine, Atlanta, GA | Fellow | 06/13 | Cardiology, Clinical Investigator Track |
| Emory University, Atlanta, GA | MSCR | 05/11 | Clinical Research |

1. Personal Statement

I am an Assistant Professor of Epidemiology in the School of Public Health at Emory University, with an adjunct appointment in Medicine (Cardiology) and clinical appointment in cardiology at the Atlanta VA Medical Center. My research focus in the evaluation of psychological stress and heart disease are closely aligned with Dr. Anish Shah’s proposed project. I have successfully received several awards to study related topics, and have a team of skilled engineers, study coordinators, data managers, and biostatisticians to offer support of Dr. Shah as needed. I already work closely with the other members of Anish’s mentorship team. I work closely with Dr. Vaccarino on nearly all of my projects, and work immediately next door with Dr. Alonso, with whom I am also closely working with on his R01 to study the effects of Mediterranean Diet on atrial fibrillation risk. I am also an actively participating faculty with the T32 on cardiovascular disparities (PI Vaccarino), and co-mentor several trainees in that program as well. Publications related to this application include:

1. **Shah, A.J.**, Lampert R.L., Goldberg J., Veledar E.V., Bremner J.D., Vaccarino V. Posttraumatic stress disorder and impaired autonomic modulation in male twins. *Biological Psychiatry* 2013; 73: 1103-1110. PMID: 23434412. PMCID: PMC3648627.
2. **Shah, A.J**., Ghasemzadeh N, Zaragoza-Macias E., Patel R., Eapen D.J., Neeland I.J., Pimple P.M., Zafari A.M., Quyyumi A.A., Vaccarino V.V. Sex and Age Differences in the Association of Depression with Obstructive Coronary Artery Disease and Adverse Cardiovascular Events. *Journal of the American Heart Association*. 2014 Jun 18;3(3). PMID 24943475.
3. **Shah, A.J**., Su S., Veledar E., Bremner J.D., Goldstein F.C., Lampert R., Goldberg J., Vaccarino V. Is Heart Rate Variability Related to Memory Performance in Middle Aged Men? *Psychosomatic Medicine*. 2011 Jul-Aug; 73(6):475-82. PMID: 21715297. PMCID: PMC3307789.
4. Vest AN, Li Q, Liu C, Nemati S, **Shah A,** Clifford GD. Benchmarking heart rate variability toolboxes. *Journal of Electrocardiology*. 2017. Epub 2017/10/03. doi: 10.1016/j.jelectrocard.2017.08.006. PubMed PMID: 28965961.
5. Positions and Honors

**Positions and Employment**

2013- Assistant Professor of Epidemiology, Rollins School of Public Health, Emory University, Atlanta, GA

2013- Adjunct Assistant Professor of Medicine, Division of Cardiology, Emory University School of Medicine, Atlanta, GA

2013- Staff Physician and Chief of Prevention, Division of Cardiology, Atlanta Veterans Affairs Medical Center, Decatur, GA

2014- Adjunct Assistant Professor of Medicine, Morehouse School of Medicine, Atlanta, GA

2014- NIH Loan Repayment Program recipient

2016- Director of Home-Based Cardiac Rehabilitation, Atlanta Veterans Affairs Medical Center, Decatur, GA

**Other Experience and Professional Memberships**

2009- Member, American Heart Association, American College of Cardiology, American Psychosomatic Society

2013- Member, Faculty Development Early Career Subcommittee, Emory University Department of Medicine

2014- Member, Mentorship Development Committee, Emory University Department of Epidemiology

**Honors**

1998 Best Student Poster Presentation Award, International Society for Biomechanical Engineering

1999 Presidential Award for Academic Achievement, Princeton University

2002 Kusaka Memorial Senior Thesis Award, Princeton University

2011 Council on Cardiovascular Nursing American Heart Association Travel Award

2013 Emory University KL2 Scholarship

2015 Finalist, Bell Labs Prize

2016 Best Abstract, American Heart Association, Nursing Council and Special Focus Category

2017 Young Investigator Award Finalist, International Society for Computerized Electrocardiography

2017 Award Finalist, Northwestern Young Investigator Forum

2018 Runner-up, Best Paper in the IEEE Conference on Body Sensor Networks (co-author)

C. Contributions to Science

1. My initial contributions to science consisted of experiments in the physical and computer sciences that involved using image processing and electrical manipulation to enable a more precise measurement of biological phenomena such as nerve growth and DNA replication. This helped to lay the groundwork for my subsequent efforts involving neurocardiology and digital signal processing.

1. Shah AJ, Sohn L. Analysis of the dielectric properties of DNA and other biological particles. Princeton University Senior Thesis 2002; No. 15721
2. Shah AJ, Fischer C, Knapp CF, Sisken BF. Quantitation of neurite growth parameters in explant cultures using a new image processing program. J Neuroscience Methods 2004;136(2):123-131.
3. Vest AN, Li Q, Liu C, Nemati S, Shah A, Clifford GD. Benchmarking heart rate variability toolboxes. J Electrocardiol 2017;50(6):744-747. PMCID: PMC5696039
4. Vest AN, Li Q, Liu C, Nemati S, Da Poian G, Shah AJ, Clifford GD. An open source benchmarked toolbox for cardiovascular waveform and interval analysis. Physiol Meas 2018;39:105004. PMCID: PMC6442742

2. I have also worked in health services research to improve the delivery of care, both in terms of training programs and in clinical settings. These studies are some examples of the work that I have done to better understand patient and provider attitudes as an important step for translating research knowledge into practice on a larger scale.

1. Shah A, Cabeza Y, Ostfeld RJ. Prevention information: patient perceptions regarding general and race-based instruction. Int J Cardiol 2008;130(1):72-74.
2. Quijano A, Shah AJ, Schwarcz AI, Lalla E, Ostfeld RJ. Knowledge and orientations of internal medicine trainees toward periodontal disease. J Periodontol 2010;81(3):359-363.
3. Shah AJ, Osfteld RJ. Attitudes of inner city patients with cardiovascular disease towards meditation. J Integr Cardiol 2016;2(2). PMCID: PMC4919998
4. Harzand A, Witbrodt B, Davis-Watts ML, Alrohaibani A, Goese D, Wenger NK, Shah AJ, Zafari AM. Feasibility of a smartphone-enabled cardiac rehabilitation program in male veterans with previous clinical evidence of coronary heart disease. Am J Cardiol 2018;122(9):1471-1476. PMCID: PMC6196098

3. I have also published numerous papers that demonstrated the cardiotoxic effects of depression and posttraumatic stress disorder, with a special focus on the autonomic nervous system. These papers have been published in high impact journals and have attracted attention from the press.

1. Shah AJ, Veledar E, Hong Y, Bremner JD, Vaccarino V. Depression and history of attempted suicide as risk factors for heart disease mortality in young individuals. Arch Gen Psychiatry 2011;68(11):1135-1142. PMCID: PMC3230326
2. Shah AJ, Lampert RL, Goldberg J, Veledar EV, Bremner JD, Vaccarino V. Posttraumatic stress disorder and impaired autonomic modulation in male twins. Biol Psychiatry 2013;73:1103-1110. PMCID: PMC3648627
3. Shah AJ, Ghasemzadeh N, Zaragoza-Macias E, Patel R, Eapen DJ, Neeland IJ, Pimple PM, Zafari AM, Quyyumi AA, Vaccarino VV. Sex and age differences in the association of depression with obstructive coronary artery disease and adverse cardiovascular events. J Am Heart Assoc 2014;3(3):e000741. PMCID: PMC4309058
4. Isakadze N, Soliman EZ, Vaccarino V, Whang W, Lampert R, Bremner JD, Shah AJ. [Association of positive well-being with reduced cardiac repolarization abnormalities in the First National Health and Nutrition Examination Survey.](https://www.ncbi.nlm.nih.gov/pubmed/29735423) Int J Cardiol 2018;265:246-250. PMCID: PMC5994381

4. More recently, I have worked more with electrocardiography to elucidate the importance of such low-cost diagnostic tools in epidemiology and risk prediction. The most significant paper with this regard is the one in which I developed the National Health and Nutrition Examination Survey (NHANES) ECG Risk Prediction Score.

1. Ravichandran L, Harless C, Shah AJ, Wick CA, McClellan JH, Tridandapani S. Novel tool for complete digitization of paper electrocardiography data. IEEE J Transl Eng Health Med 2013;1. PMCID: PMC4652928
2. Qureshi W, Shah AJ, Saluhuddin T, Soliman EZ. Long term mortality risk in individuals with atrial or ventricular premature complexes (results from the Third National Health and Nutrition Examination Survey [NHANES III]). Am J Cardiol 2014;114(1):59-64. PMCID: PMC4334655
3. Soliman EZ, Shah AJ, Boerkircher A, Li Y, Rautaharju PM. The interrelationship between electrocardiographic left ventricular hypertrophy and QT prolongation as predictors of increased risk of mortality in the general population. Circ Arrhythm Electrophysiol 2014;7(3):400-406. PMCID: PMC4314284
4. Shah AJ, Vaccarino V, Janssens AC, Kundu S, Veledar E, Wilson PW, Soliman EZ. An electrocardiogram-based risk equation for incident cardiovascular disease from the National Health and Nutrition Examination Survey. JAMA Cardiol 2016;1(7):779-786. PMCID: PMC5881386

5. My most recent contributions to science discuss the application of mobile health technologies as they pertain to health. This includes both development of algorithms for wristband wearables, as well as evaluation of smartphone tools for diagnosis and treatment of cardiovascular disease.

a. Nemati S, Ghassemi MM, Ambai V, Isakadze N, Levantsevych O, Shah A, Clifford GD. Monitoring and detecting atrial fibrillation using wearable technology. Conf Proc IEEE Eng Med Biol Soc 2016;2016:3394-3397.

b. Cakmak AS, Reinertsen E, Taylor HA, Shah AJ, Clifford GD. Personalized heart failure severity estimates using passive smartphone data. Paper presented at: 2018 IEEE International Conference on Big Data (Big Data); 10-13 Dec. 2018.

c. Shashikumar SP, Shah AJ, Li Q, Clifford GD, Nemati S. A deep learning approach to monitoring and detecting atrial fibrillation using wearable technology. Conf Prof IEEE Eng Med Biol Soc 2017;2017:141-144.

d. Harzand A, Witbrodt B, Davis-Watts ML, Alrohaibani A, Goese D, Wenger NK, Shah AJ, Zafari AM. Feasibility of a smartphone-enabled cardiac rehabilitation program in male veterans with previous clinical evidence of coronary heart disease. Am J Cardiol 2018;122(9):1471-1476. PMCID: PMC6196098

D. Research Support

**Ongoing Research Support**

K23 HL127251 Shah (PI) 01/15/16-12/31/19

NIH/NHLBI

**Emotional Stress as a Risk Factor for Arrhythmia: Ischemic and Genetic Mechanisms**

Psychological stress is common amongst patients with coronary heart disease (CHD), and may be a major risk factor for ventricular arrhythmias and death. Psychological stress may have significant autonomic effects (sympathetic arousal, vagal withdrawal) and lead to ischemia, electrophysiologic instability, and ultimately increased risk of arrhythmia and death. Some patients may also have a genetic predisposition for arrhythmia, and based on this, qualify for certain therapies. Elucidation of the mechanisms by which psychological stress may lead to arrhythmia is an important step towards risk stratifying CHD patients and finding effective treatments.

Role: PI

R03 HL146879 Shah (PI) 04/15/19-03/31/21

NIH/NHLBI

**Cardiac Electrical Instability in Posttraumatic Stress Disorder: A Twin Study**

Posttraumatic stress disorder is a common and debilitating psychiatric condition that is associated with increased heart disease risk. Whether or not this means that it increases the risk of ventricular arrhythmia is not known, but important for clinical management. To study this, we aim to examine the risk of PTSD and its symptoms on electrocardiographic markers of sudden cardiac death.

Role: PI

Emory University Synergy Award Shah (PI) 10/01/18-09/30/20

**Unravelling the Electrophysiologic Effects of Diabetes with Novel Risk Prediction Tools: A Global Collaborative Study in South Asians**

The effects of diabetes on cardiac repolarization are unknown. Diabetes is a surging epidemic in South Asia, and the impact of diabetes on this population as it pertains to risk of arrhythmia and sudden cardiac death are not known. In this study, we examine the impact of diabetes on repolarization heterogeneity in a South Asian cohort with the Global Electroheterogeneity Score, which is based on a 12-lead resting electrocardiogram.

Role: PI

R01 HL136205 Vaccarino (PI) 03/17/17-02/28/21

**Sleep Disturbance as a Mechanism for Ischemic Heart Disease in PTSD**

Ischemic heart disease (IHD) continues to be the leading cause of disability, hospitalizations, health care expenditures, and death in the United States. Identification of pathways of risk through which PTSD affects IHD risk is important in order to understand of IHD pathophysiology and develop effective interventions. Our rigorous twin study will elucidate whether abnormal sleep and nighttime autonomic nervous system imbalance represent interrelated biobehavioral pathways linking PTSD to IHD.

Role: Co-Investigator

R01 HL137338 Alonso (PI) 05/01/18-04/30/22

**Effect of an Intensive Lifestyle Intervention on the Atrial Fibrillation Substrate**

This proposal will determine the efficacy of an intensive lifestyle intervention on the structural and functional substrate of atrial fibrillation, a common cardiac arrhythmia. The proposed studies have the potential to inform approaches for the primary prevention of atrial fibrillation, its substrate, and other cardiac conditions.

Role: Co-Investigator

R01 HL109413 Vaccarino (PI) 8/15/2019-7/31/24

**Mental Stress and Myocardial Ischemia After MI: Sex Differences, Mechanisms, and Prognosis**

This study aims to understand sex differences in psychophysiological and cardiovascular phenotypes after MI. We also explore immune mechanisms and long-term outcomes.

Role: Co-Investigator

**Completed Research Support**

Emory University Synergy Award Shah (PI) 10/01/17-09/30/19

**Smartphone-Enabled Supervised Exercise Therapy for the Treatment of Symptomatic Peripheral Arterial Disease**

Structured exercise therapy is a first line treatment for symptomatic peripheral artery disease, but compliance is poor. Coaching programs may help but requires significant resources. Smartphone programs may increase the efficiency of such efforts. The study aim is to evaluate the effectiveness of a coached, smartphone-enabled exercise program versus physician directed exercise therapy (usual care) in patients at Grady Memorial Hospital's vascular clinic.

Role: PI

Veterans Affairs Center for Innovation Shah (PI) 04/01/18-09/30/18

**Smartphone-Enabled, Home Based Cardiac Rehabilitation**

Smartphones may facilitate the delivery of home-based cardiac rehabilitation. This study is a non-randomized evaluation of smartphone enabled, home-based cardiac rehabilitation in which veterans are offered the program, and their willingness to try the program, as well as the health efficacy of the program are evaluated.

Role: PI

University of Alberta Shah, Quyyumi (PIs) 10/01/16-09/30/18

**Randomized Controlled Trial of Biofeedback on Myocardial Blood Flow**

Acute stress may decrease the blood flow to the heart. In this pilot randomized controlled trial, we measure the effects of biofeedback (vs. waitlist control) on myocardial blood flow during stress, as measured by positron emission tomography.

Role: Co-PI

1 R01 HL125246 Vaccarino (PI) 07/15/15-04/30/19

NIH/NHLBI

**PTSD and Ischemic Heart Disease: A Longitudinal Twin Study**

Although we have gained considerable knowledge on the determinants and treatment modalities for heart disease, this condition continues to be the leading cause of disability, hospitalizations, health care expenditures, and death in the United States. Posttraumatic Stress Disorder (PTSD) is a common chronic psychiatric condition which has been linked to increased risk of heart disease but data are limited. Our rigorous longitudinal twin study will clarify the connection between PTSD and heart disease, and examine if immune and vascular reactivity during trauma reminders play a role.

Role: Co-Investigator

Defense Advanced Research Projects Agency Bremner (PI) 10/01/16-08/30/19

**Closed Loop Vagal Nerve Stimulation in PTSD**

Posttraumatic stress disorder is a phenomenon in which sympathetic overactivation occurs, leading to both psychiatric and physiologic effects. We examine the neurobiology and autonomic physiology associated with non-invasive vagal nerve stimulation (vs. sham) in individuals with and without PTSD.

Role: Co-Investigator