

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors in the order listed on Form Page 2. Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME Emelia J. Benjamin, MD, ScM, FACC, FAHA	POSITION TITLE Professor of Medicine and Epidemiology
eRA COMMONS USER NAME (credential, e.g., agency login) Emelia	

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

INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
Harvard College, Cambridge, MA	AB	06/1979	Psychology/Social Relations
Case Western Reserve University, Cleveland, OH	MD	06/1983	Medicine
Harvard School of Public Health, Boston, MA	ScM	06/1990	Epidemiology

A. Personal Statement

I am a cardiovascular genetic epidemiologist with research expertise in atrial fibrillation, inflammation, vascular function and echocardiography. I co-lead the international CHARGE genetics consortia in atrial fibrillation, inflammation markers, and endothelial function. My research passion focuses on the epidemiology and genetics of atrial fibrillation. Increasingly, I am pursuing translational research by collaborating with basic scientists, geneticists, statisticians, and health outcomes experts. I have three multi-PI grants focused on the genetics of atrial fibrillation; health outcomes in atrial fibrillation; and a Challenge Grant to develop an atrial fibrillation risk prediction model with participant-specific data from 3 US cohort studies (ARIC, CHS, and FHS), with validation in 3 European cohorts (AGES, MONICA/KORA, Rotterdam). I am an Associate Editor for Circulation. Service commitments include serving on study sections as Chair for the AHA Genetic Epidemiology, and member NIH, Cardiovascular and Sleep Epidemiology. In July 2010 I will serve as Chair for the Functional Genomics and Translational Biology Council for AHA. In addition, I have the honor of serving as Vice Chair for Faculty Development and Diversity in the Department of Medicine, Boston University School of Medicine, and am chairing the Boston University Medical Campus Mentoring Task Force. Hence, I have a fundamental commitment to mentoring early career investigators in epidemiology and genetic epidemiology.

B. Positions and Honors

Professional Training/Experience

1983-86 Internal Medicine, Intern and Resident, Boston City Hospital, Boston, MA
 1986-88 Cardiology Fellow, University Hospital/Boston City Hospital, Boston, MA
 1988-90 Echo Fellow, Brigham & Women's Hospital; Cardiology Research Fellow, Framingham, MA
 1993-02 Co-Principal Investigator, Framingham Heart Study, Framingham, MA
 1990- Director, Echocardiography Laboratory, Framingham Heart Study, Framingham, MA
 1996- Joint Director, Medical Endpoints Committee, Executive Committee, Framingham Study, MA
 1998- Director, Framingham Heart Study Vascular Testing
 2004- Associate Editor, *Circulation*
 2007-08 ELAM - Executive Leadership in Academic Medicine, Drexel University, Philadelphia, PA

Academic Appointments

1990-97 Assistant Professor of Medicine, Boston University School of Medicine, Boston, MA
 1998-04 Associate Professor of Medicine, Boston University School of Medicine, Boston, MA
 2004- Professor of Medicine, Boston University School of Medicine, Boston, MA
 2006- Professor of Epidemiology, Boston University School of Public Health, Boston, MA
 2008- Vice Chair, Faculty Development & Diversity, Medicine Department, BUSM, Boston, MA

Certification & Honors

1979	Phi Beta Kappa, Harvard College, Cambridge, MA
1988	Certificate, American Board of Internal Medicine
1989	Diplomate, Cardiovascular Disease
1992	Fellow, American College of Cardiology
1995	Gender Equity Award, American Medical Women's Association, B.U. School/Medicine
2000	Fellow American Heart Association, Epidemiology & Prevention & Clinical Card. Councils
2001	Wendy Kline Memorial Award for Outstanding Volunteer Leadership, Boston Division AHA
2002	American Heart Association, New England Affiliate, Great Communicator Award
2008	Association of University Cardiologists, Elected Member

Activities and Committees, Recent Selected

2003-04	AHA National Conference, Co-Chair, Addressing Ethnic Disparities
2005-11	ACC Prevention of Cardiovascular Disease Committee, Member
2006-09	ACC/AHA, Primary Prevention of CVD Performance Measures committee
2007-11	NIH Study Section: Cardiovascular and Sleep Epidemiology, Chartered Member.
2008	NIH/NHLBI, Co-Chair, Workshop on the Prevention of Atrial Fibrillation
2008-10	AHA, Interdisciplinary Council on Functional Genomics & Translational Biology, Vice-Chair
2009	FDA, Review AstraZeneca drug application, prevention CVD, JUPITER, Temporary member
2009-12	AHA, Science Advisory & Coordinating Committee, Member-at-Large (2009-10); FGTB (-2012)
2010-2012	AHA Study Section, Genomics & Translational Biology & Epidemiology Research, Chairperson
2010-2011	AHA, Manuscript Oversight Committee
2010	AHA, Summit on Atrial Fibrillation, Chair

C. Peer-reviewed Publications Selected: 243 Original; 36 Review/Science; 5 Editorials; 5 Book Chapters

Most relevant to the current application

1. **Benjamin EJ**, Levy D, Vaziri SM, D'Agostino RB, Belanger AJ, Wolf PA. Independent risk factors for atrial fibrillation in a population-based cohort. The Framingham Heart Study. *JAMA* 1994; 271:840-4. [PM:8114238](#)
2. **Benjamin EJ**, Wolf PA, D'Agostino RB, Silbershatz H, Kannel WB, Levy D. Impact of atrial fibrillation on the risk of death: the Framingham Heart Study. *Circulation* 1998;98:946-952. [PM:9737513](#)
3. Wang TJ, Larson MG, Levy D, Vasan RS, Leip EP, Wolf PA, D'Agostino RB, Murabito JM, Kannel WB, **Benjamin EJ**. Temporal relations of atrial fibrillation and congestive heart failure and their joint influence on mortality: the Framingham Heart Study. *Circulation* 2003;107:2920-2925. [PM:12771006](#)
4. Wang TJ, Massaro JM, D'Agostino RB, Levy D, Wolf PA, Kannel WB, Larson MG, Vasan RS, **Benjamin EJ**. A Risk Score for Predicting Stroke or Death in Individuals With New-Onset Atrial Fibrillation in the Community. The Framingham Heart Study. *JAMA* 2003;290:1049-1056. [PM:12941677](#)
5. Fox CS, Parise H, D'Agostino RB, Lloyd-Jones DM, Vasan RS, Wang TJ, Levy D, Wolf PA, **Benjamin EJ**. Parental atrial fibrillation as a risk factor for atrial fibrillation in offspring. *JAMA* 2004;291:2851-2855. [PM:15199036](#)
6. Lloyd-Jones DM, Wang TJ, Leip EP, Larson MG, Levy D, Vasan RS, D'Agostino RB, Massaro JM, Beiser A, Wolf PA, **Benjamin EJ**. Lifetime risk for development of atrial fibrillation: the Framingham Heart Study. *Circulation* 2004;110:1042-1046. [PM:15313941](#)
7. Wang TJ, Parise H, Levy D, D'Agostino RB, Sr., Wolf PA, Vasan RS,* **Benjamin EJ**.* Obesity and the risk of new-onset atrial fibrillation. *JAMA*. 2004;292:2471-2477. [PM:15562125](#)
8. **Benjamin EJ**, Chen PS, Bild DE, Mascette AM, Albert CM, Alonso A, Calkins H, Connolly SJ, Curtis AB, Darbar D, Ellinor PT, Go AS, Goldschlager NF, Heckbert SR, Jalife J, Kerr CR, Levy D, Lloyd-Jones DM, Massie BM, Nattel S, Olgin JE, Packer DL, Po SS, Tsang TS, Van Wagoner DR, Waldo AL, Wyse DG. Prevention of atrial fibrillation: report from a National Heart, Lung, and Blood Institute Workshop. *Circulation*. 2009;119:606-618. [PM:19188521](#)
9. Schnabel RB, Sullivan LM, Levy D, Pencina MJ, Massaro JM, D'Agostino RB, Sr., Newton-Cheh C, Yamamoto JF, Magnani JW, Tadros TM, Kannel WB, Wang TJ, Ellinor PT, Wolf PA, Vasan RS, **Benjamin**

- EJ.** Development of a risk score for atrial fibrillation (Framingham Heart Study): a community-based cohort *Lancet* 2009;373:739-745. [PM:19249635](#)
10. **Benjamin EJ**, Rice KM, Arking DE, Pfeufer A, van NC, Smith AV, Schnabel RB, Bis JC, Boerwinkle E, Sinner MF, Dehghan A, Lubitz SA, D'Agostino RB, Sr., Lumley T, Ehret GB, Heeringa J, Aspelund T, Newton-Cheh C, Larson MG, Marcianti KD, Soliman EZ, Rivadeneira F, Wang TJ, Eiriksdottir G, Levy D, Psaty BM, Li M, Chamberlain AM, Hofman A, Vasani RS, Harris TB, Rotter JI, Kao WH, Agarwal SK, Stricker BH, Wang K, Launer LJ, Smith NL, Chakravarti A, Uitterlinden AG, Wolf PA, Sotoodehnia N, Kottgen A, van Duijn CM, Meitinger T, Mueller M, Perz S, Steinbeck G, Wichmann HE, Lunetta KL, Heckbert SR, Gudnason V, Alonso A, Kaab S, Ellinor PT, Witteman JC. Variants in ZFX3 are associated with atrial fibrillation in individuals of European ancestry. *Nat Genet* 2009;41:879-81. [PM:19597492](#)
 11. Schnabel RB, Larson MG, Yamamoto JF, Kathiresan S, Rong J, Levy D, Keaney JF, Jr., Wang TJ, Vasani RS, **Benjamin EJ**. Relation of multiple inflammatory biomarkers to incident atrial fibrillation. *Am J Cardiol* 2009;104:92-6. [PM:19576326](#)
 12. Schnabel RB, Larson MG, Yamamoto JF, Sullivan LM, Pencina MJ, Meigs JB, Tofler GH, Selhub J, Jacques PF, Wolf PA, Magnani JW, Ellinor PT, Wang TJ, Levy D, Vasani RS, **Benjamin EJ**. Relations of Biomarkers of Distinct Pathophysiological Pathways and Atrial Fibrillation Incidence in the Community. *Circulation* 2010. [PM:20031590](#)
 13. Pfeufer A,* van NC,* Marcianti KD,* Arking DE,* Larson MG,* Smith AV,* Tarasov KV, Muller M, Sotoodehnia N, Sinner MF, Verwoert GC, Li M, Kao WH, Kottgen A, Coresh J, Bis JC, Psaty BM, Rice K, Rotter JI, Rivadeneira F, Hofman A, Kors JA, Stricker BH, Uitterlinden AG, van Duijn CM, Beckmann BM, Sauter W, Gieger C, Lubitz SA, Newton-Cheh C, Wang TJ, Magnani JW, Schnabel RB, Chung MK, Barnard J, Smith JD, Van Wagener DR, Vasani RS, Aspelund T, Eiriksdottir G, Harris TB, Launer LJ, Najjar SS, Lakatta E, Schlessinger D, Uda M, Abecasis GR, Muller-Myhsok B, Ehret GB, Boerwinkle E, Chakravarti A, Soliman EZ, Lunetta KL, Perz S, Wichmann HE, Meitinger T, Levy D, Gudnason V, Ellinor PT, Sanna S, Kaab S,* Witteman JC,* Alonso A,* **Benjamin EJ**,* Heckbert SR.* Genome-wide association study of PR interval. *Nat Genet* 2010;42:153-9. [PM:20062060](#)
 14. Ellinor PT, Lunetta KL, Glazer NL, Pfeufer A, Alonso A, Chung MK, Sinner MF, de Bakker PI, Mueller M, Lubitz SA, Fox E, Darbar D, Smith NL, Smith JD, Schnabel RB, Soliman EZ, Rice KM, Van Wagener DR, Beckmann BM, van NC, Wang K, Ehret GB, Rotter JI, Hazen SL, Steinbeck G, Smith AV, Launer LJ, Harris TB, Makino S, Nelis M, Milan DJ, Perz S, Esko T, Kottgen A, Moebus S, Newton-Cheh C, Li M, Mohlenkamp S, Wang TJ, Linda Kao WH, Vasani RS, Nothen MM, Macrae CA, Ch Stricker BH, Hofman A, Uitterlinden AG, Levy D, Boerwinkle E, Metspalu A, Topol EJ, Chakravarti A, Gudnason V, Psaty BM, Roden DM, Meitinger T, Wichmann HE, Witteman JC, Barnard J,* Arking DE,* **Benjamin EJ**,* Heckbert SR,* Kaab S.* Common variants in *KCNN3* are associated with lone atrial fibrillation. *Nat Genet* 2010;42:240-4. [PM:20173747](#)
 15. Hall JL, Barac A, **Benjamin EJ**. Genetic mutations as risk predictors of atrial fibrillation recurrence after catheter ablation? *J Am Coll Cardiol* 2010;55:754-7. [PM:20170813](#)

D. Research Support – Selected

Identification of Common Genetic Variants for Atrial Fibrillation and PR interval

TYPE: **1R01HL092577-01A1**

Agency: NIH/NHLBI

Multi-PIs Benjamin EJ & Patrick T. Ellinor, MD, PhD

Period: 4/15/09 – 3/31/2013

Specific Aims: To use GWAS to conduct a meta-analysis of atrial fibrillation and PR interval, a quantitative intermediate phenotype for AF, in the CHS, FHS, Rotterdam, MONICA/KORA and PREVENT-IT studies, to replicate GWAS findings for AF and PR intervals, to study the mechanisms of replicated SNPs in cellular and zebrafish model systems and to examine gene-environment and gene-gene interactions.

Risk prediction of atrial fibrillation: clinical, biological and genetic markers

Type: **1 RC1 HL101056-01**

Agency: NIH/NHLBI

Multi-PIs Benjamin EJ & Alvaro Alonso, MD, PhD

Period: 09/30/2009 – 07/31/2011

Specific Aims: 1. To validate, recalibrate & potentially modify the FHS AF clinical risk prediction model in diverse communities. 2) To test whether biomarkers, (NPs or CRP) enhance risk prediction of AF when added to clinical factors; 3) To examine whether a genotype score from CHARGE AF improves risk prediction; 4) To

develop methods for reclassification in the context of survival data and cross-cohort meta-analysis.

Role: Joint-PI

Patterns of Health Care Use, Treatment & Outcomes in Atrial Fibrillation: PATH-AF

Type: **1R01HL102214**

Agency: NIH/NHLBI

Multi-PI: Lesley H Curtis, PhD, Benjamin EJ, Susan R Heckbert, MD, PhD Period: 05/01/2010 – 04/30/2013

Specific Aims: To assess the use of guidelines-based care, standard care, and emerging technologies to treat AF, and to study the relations between health care use, outcomes and costs in patients with AF.

Aging and Inflammation: Longitudinal Markers and Genetics in the Framingham Study

Type: **1 R01 AG028321**

Agency: NIA: RFA AG-05-011

PI: Emelia J. Benjamin, MD, ScM

Period: 09/01/06-06/30/11

Specific Aims: To examine the relation of serial inflammatory markers & SNPs to aging phenotypes.

The Framingham Heart Study Physical Examination, Testing and Surveillance

PI: Philip A. Wolf, MD

Agency: NIH/NHLBI

Type: **N01-HC 25195**

Period: 10/01/01-03/31/15

Specific Aims: Provide resources for examination of Original, Offspring, and Third Generation cohorts.

Precursors of Stroke Incidence and Prognosis

PI: Philip A. Wolf, MD

Agency: NIH/NINDS

Type: **6R01-NS 17950**

Period: 04/01/09-03/31/14

Specific Aims: Relate echo findings, atrial fibrillation, and genetic variability to the stroke and brain MRI.

Ventricular Vascular Coupling: Correlates and Prognosis

PI: Vasani S. Ramachandran, MD

Agency: NIH/NHLBI

Type: **R01 HL080124**

05/01/2005 – 04/30/2010

Specific Aims: To perform echo & arterial tonometry in 3500 Offspring & Omni cohort participants