

ARVINDH N. KANAGASUNDRAM, MD

Curriculum Vitae

OFFICE ADDRESS: Vanderbilt Heart & Vascular Institute
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Nashville, TN 37232

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EDUCATION

- 1997-2001 Bachelor of Arts, Physics (Cum Laude)
Dartmouth College
Hanover, NH
- 2001-2005 Doctor of Medicine
Vanderbilt University School of Medicine
Nashville, TN
- 2005-2008 Intern and Resident in Internal Medicine
Stanford University Medical Center, Stanford, CA
- 2008-2009 Chief Resident in Internal Medicine
Stanford University Medical Center, Stanford, CA
- 2009-2012 Fellow in Cardiovascular Medicine
New York Presbyterian Hospital
Weill-Cornell Medical Center, New York, NY
General Fellowship 2009-2011
Cardiac Electrophysiology 2011-2012
- 2012-2013 Fellow in Cardiac Electrophysiology
Vanderbilt University Medical Center, Nashville, TN

LICENSURE AND CERTIFICATION

License: TN 50184 Issued 2013
2013 Board Certification in Cardiac Electrophysiology
2012 Board Certification in General Cardiology
2008 Board Certification in Internal Medicine

ACADEMIC APPOINTMENTS

2008-2009 Clinical Instructor of Medicine
Stanford University Medical Center, Stanford, CA

2013- 2022 Assistant Professor- Cardiac Electrophysiology
Vanderbilt Heart & Vascular Institute
2014- 2018 Associate Program Director- Cardiac Electrophysiology Fellowship
2018 – Present Program Director- Cardiac Electrophysiology Fellowship
2022- Present Associate Professor- Cardiac Electrophysiology Vanderbilt Heart & Vascular
Institute

PROFESSIONAL ORGANIZATIONS

2007-present American College of Cardiology
2009-present American Heart Association
2008-present Heart Rhythm Society
2017-present Fellow of Heart Rhythm Society
2020-Present CCEP Program Directors Subcommittee (HRS)

PROFESSIONAL ACTIVITIES

Editorial Board

March 2020 -Present Journal of Cardiovascular Electrophysiology

Professional Leadership

April 2020- Present CCEP Program Directors Subcommittee- Heart Rhythm Society
January 2020- Present Circulation Arrhythmia and Electrophysiology Diversity Advisory Panel
January 2020- Present Circulation Arrhythmia and Electrophysiology VT Advisory Panel

Invited Reviewer

Journal of Cardiovascular Electrophysiology
Heart Rhythm Society
Journal of the American College of Cardiology: Electrophysiology
Circular Arrhythmia and Electrophysiology

International Experience

Incor-Vanderbilt Collaborative Arrhythmia collaborative conference
Medical Mission Clinics for Indigenous Kechuans in Cusco, Peru; 2004
Tucker Fellowship: Founded and Implemented a Volunteer Program at Dartmouth Medical
Center Emergency Department; 2000

Honors & Awards

1999 Citation for Highest Grade in Organic Chemistry
2000 Dartmouth Presidential Scholar
2015 Best Doctors, Inc
2016 Best Doctors, Inc
2017 Best Doctors, Inc
2018 Best Doctors, Inc
2019 Best Doctors, Inc
2020 Best Doctors, Inc

TEACHING ACTIVITIES

Graduate Medical Education:

Course Director: Developed curriculum and organize weekly CCEP fellow didactic, EGM and Device conferences

Quarterly Incor-Vanderbilt collaborative conference

Multi-disciplinary cardiac surgery-electrophysiology conference

Research Mentorship

Asad Aboud	July 2015- Present	Cardiac Electrophysiology Fellow
Breck Sandvall	July 2016-June 2018	Cardiology Fellow
Ricardo Lugo	July 2016-June 2019	Cardiac Electrophysiologist
Caleb Norton	July 2018- June 2020	Cardiology Fellow
Giovanni Davogusto	July 2018- Present	Clinical Instructor

RESEARCH PROGRAM

Understanding the substrate leading to ventricular tachycardia and outcomes after catheter ablation. This included starting and growing a busy ventricular arrhythmia ablation program and establishing clinical and biorepository databases to further understand the biomarker and genetic associations with ventricular arrhythmia. We have also fostered collaborations with cardiac and thoracic surgical specialties to perform hybrid surgical ablation and cardiac sympathetic denervation for refractory arrhythmias. This has led to several multi-center collaborations.

Grants

- American Heart Association 2019-2023
Sudden Cardiac Death and Arrhythmias Research Network
Project: Targeting Intracellular Calcium Leak for Ventricular Arrhythmia Prevention in Structural Heart Disease
Center Director: Bjorn Knollmann, MD, PhD
Role: Co-Investigator (Clinical Project; PI: William Stevenson, MD)
- VICTR (VR 54131) 06/2021
Project: Brain natriuretic peptide elevations in atrial fibrillation
Role: Principal Investigator
- VICTR (VR17167.1) 05/2017
Project: B-Type natriuretic peptide levels at time of radiofrequency ablation for ventricular tachycardia and correlation with procedural findings and outcomes
Role: Principal Investigator

Multi-center Trials

- CROSS- X4
Brief Summary: Trial to evaluate different ways to program around cardiac extrastimulation
Role: Vanderbilt Site PI

- **ATTAIN Stability Quad**
Brief summary: Evaluation of the safety and efficacy of the Attain Stability Quadripolar Lead
Role: Vanderbilt Site PI
- **SENSE**
Brief Summary: Investigator initiated trial evaluating the efficacy of an ICD lead with dedicated atrial sensing dipoles in detecting atrial high rate episodes
Role: Vanderbilt Site PI
- **TRAVERSE**
Brief Summary: Multicenter, randomized trial comparing effectiveness of transseptal versus retrograde approach in left ventricular ablation
Role: Vanderbilt Site PI
- **VANISH 2 Trial**
Brief Summary: Multi-center, randomized trial to assess efficacy of anti-arrhythmic therapies or catheter ablation in patients with sustained ventricular tachycardia (VT)
Role: Vanderbilt Site PI
- **PREEMPT-HF**
Brief Summary: Collect device and clinical event data to evaluate applications of the HeartLogic in patients with heart failure
Role: Vanderbilt Site PI
- **OPTION**
Brief Summary: Determine if left atrial appendage occlusion with Watchman FLX is a reasonable alternative to oral anti-coagulation
Role: Vanderbilt Site PI
- **ECG Belt for CRT Response**
Brief Summary: Utility of ECG Belt system to guide optimal left ventricular lead placement
Role: Vanderbilt Site PI
- **PREVENT-VT**
Brief Summary: Examine the effect of cardiac sympathetic denervation for the management of life threatening ventricular arrhythmias
Role: Vanderbilt Site PI. Played an important role in the grant submission

PUBLICATIONS AND PRESENTATIONS

Publications

Kanagasundram A, Richardson TD, Stevenson WG. Tissue Coverage Matters. *J Cardiovasc Electrophysiol.* 2021 Apr 29. PMID: 33928705

Negrotto SM, Lugo RM, Metawee M, **Kanagasundram A**, Chidsey G, Baker MT, Michaud GF, Piana RN, Benjamin Shoemaker M, Ellis CR. Left atrial appendage morphology predicts the formation of left atrial appendage thrombus. *J Cardiovasc Electrophysiol*. 2021 Apr;32(4):1044-1052. PMID: 33512055

Kanagasundram AN, Richardson TD, Stevenson WG. The Heart Rate of Ventricular Tachycardia. *Circulation*. 2021 Jan 19;143(3):227-229. PMID: 33464966

Nakajima I, Narui R, Aboud AA, Adeola O, McHugh J, Holmes B, Lugo R, Richardson TD, Montgomery J, Shen S, **Kanagasundram A**, Michaud GF, Stevenson WG. Periaortic Ventricular Tachycardias in Nonischemic Cardiomyopathy: Substrate and Electrocardiographic Correlations. *Circ Arrhythm Electrophysiol*. 2021 Feb;14(2). PMID: 33417473

Yoneda ZT, Shoemaker MB, Richardson T, Crawford D, **Kanagasundram A**, Shen S, Estrada JC, Holmes B, Lugo R, McHugh J, Saavedra P, Crossley G 3rd, Ellis CR, Montgomery JA, Michaud GF. Conduction Recovery After Cavotricuspid Isthmus Ablation When Performed With or Without Concomitant Atrial Fibrillation Ablation. 2020 Aug;6(8):989-996. PMID: 32819535

Stevenson WG, Richardson TD, **Kanagasundram A**. Ventricular Tachycardia in 3 Dimensions. *J Am Coll Cardiol*. 2020 Mar 3;75(8):898-900. PMID: 32130925

Stevenson WG, **Kanagasundram A**. VT Ablation: It Is Not Always About the Scar. *JACC Clin Electrophysiol*. 2020 Feb;6(2):241-243. PMID: 32081229

Kanagasundram AN, John RM, Stevenson WG. Sustained Monomorphic VT in Non-ischemic Heart Disease: Arrhythmia - Substrate Correlations That Inform the Approach to Ablation *Circ Arrhythm Electrophysiol*. 2019 Epub 2019 Oct 30. PMID:31661970

Thomas G, Choi DY, Doppalapudi H, Richards M, Iwai S, Daoud EG, Houmsse M, **Kanagasundram AN**, Mainigi SK, Lubitz SA, Cheung JW. Subclinical atrial fibrillation detection with a floating atrial sensing dipole in single lead implantable cardioverter-defibrillator systems: Results of the SENSE trial. *J Cardiovasc Electrophysiol*. 2019 Oct;30(10). PMID: 31328298

Montgomery JA, Sensing JY, Saunders SD, Clair WK, Abraham RL, **Kanagasundram AN**, Ellis CR, Crossley GH 3rd, Shoemaker MB, Saavedra P. Premature battery depletion due to compromised low-voltage capacitor in a family of defibrillators. *Pacing Clin Electrophysiol*. 2019 Jul;42(7):965-969. PMID: 31045260

Ellis CR, **Kanagasundram AN**. Atrial Fibrillation in Heart Failure: Left Atrial Appendage Management. *Cardiol Clin*. 2019 May;37(2):241-249. PMID: 30926025

Kanagasundram AN, John RM, Stevenson WG. Ventricular tachycardia induced by antitachycardia pacing for ventricular tachycardia: Not so pain-free? *Heart Rhythm*. 2019 Apr;16(4):551-552. PMID: 30465904

Nakamura T, Davogustto GE, Schaeffer B, Tanigawa S, Muthalaly RG, **Kanagasundram A**, John RM, Michaud GF, Tedrow UB, Stevenson WG. Complications and Anticoagulation Strategies for Percutaneous Epicardial Ablation Procedures. *Circ Arrhythm Electrophysiol*. 2018 Nov;11(11). PMID: 30376734

John RM, **Kanagasundram AN**, Stevenson WG. Substrate Mapping for Functionally Defined Ventricular Re-Entry. *JACC Clin Electrophysiol*. 2018 Aug;4(8):1049-1051. PMID: 30139486

Ellis CR, Saavedra P, **Kanagasundram A**, Estrada JC, Montgomery J, Farrell M, Shen S, Crossley GH, Michaud G, Shoemaker MB. Pulmonary Vein Sleeve Length and Association With Body Mass Index and Sex in Atrial Fibrillation. *JACC Clin Electrophysiol*. 2018 Mar;4(3):412-414. PMID: 30089570

Kanagasundram AN, John RM, Stevenson WG. Ventricular Tachycardia Ablation in Patients With Implantable Cardioverter Defibrillators Should No Longer Be a Therapy of Last Resort. *Circulation*. 2018 May 1; 137 (18). PMID 29712693

John RM, **Kanagasundram AN**, Stevenson WG. Inducibility Conundrum for Ablation of Ventricular Tachycardia: Are We Done Yet? *Circ Arrhythm Electrophysiol*. 2018 Mar; 11(3). PMID 29545364.

Kanagasundram AN, Lugo RM, Michaud GF. Ventricular Tachycardia Ablation: Are We in a New Age? *Circ Arrhythm Electrophysiol*. 2017 Dec; (10)12. PMID 29254948

Richardson T, Lugo R, Saavedra P, Crossley G, Clair W, Shen S, Estrada JC, Montgomery J, Shoemaker MB, Ellis C, Michaud GF, Lambright E, **Kanagasundram AN**. Cardiac sympathectomy for the management of ventricular arrhythmias refractory to catheter ablation. *Heart Rhythm* 2018 Jan; 15(1):56-62. PMID 28917558

Farrell M, Yoneda Z, Montgomery J, Crawford D, Wray LL, Xu M, Kolek MJ, Richardson T, Lugo R, Metawee M, Michaud G, Estrada JC, Saavedra P, Shen S, **Kanagasundram A**, Ellis CR, Crossley G, Roden D, Shoemaker MB. Non-pulmonary vein mediated atrial fibrillation: A novel sub-phenotype. *PLoS One*. 2017 Sep 7;12(9):e0184354. PMID 28880943

Bersell K, Montgomery JA, **Kanagasundram AN**, Campbell CM, Chung WK, Macaya D, Konecki D, Venter E, Shoemaker MB, Roden DM. Partial Duplication and Poly(A) Insertion in KCNQ1 Not Detected by Next-Generation Sequencing in Jervell and Lange-Nielsen Syndrome. *Circ Arrhythm Electrophysiol*. 2016 Jun; 9(6). PMID 27286732

Montgomery JA, Abdallah W, Yoneda ZT, Brittain E, Aznaurov SG, Parvez B, Adkins K, Whalen SP, Estrada JC, Shen S, Crossley GH, **Kanagasundram A**, Saavedra P, Ellis CR, Lawson M, Darbar D, Shoemaker MB. Measurement of diffuse ventricular fibrosis with myocardial TI in patients with atrial fibrillation. *J Arrhythm*. 2016 Feb;32(1):51-6. PMID 26949431

Montgomery, JA, **Kanagasundram AN**, Clair WK, Rottman JN, Crossley GH. Sudden Cardiac Death Despite a Functional Cardioverter- Defibrillator: The Case for Early and aggressive Therapy for Ventricular Tachycardia in Selected Patients. *J Cardiovasc Electrophysiol*. 2016 Jan; 27(1): 120-4. PMID 26511459

Kolek MJ, Patel NJ, Clair WK, Whalen SP, Rottman JN, **Kanagasundram A**, Shen ST, Saavedra PJ, Estrada JC, Abraham RL, Ellis CR. Efficacy of a Bio-Absorbable Anti-bacterial Envelope to Prevent Cardiac Implantable Electronic Device Infections in High-Risk Subjects. *J Cardiovasc Electrophysiol*. 2015 Oct; 26(10):1111-6. PMID 26222980

Kornej J, Hindricks G, Shoemaker MB, Husser D, Arya A, Sommer P, Rolf S, Saavedra P, **Kanagasundram A**, Patrick Whalen S, Montgomery J, Ellis CR, Darbar D, Bollmann A. The APPLE score: a novel and simple score for the prediction of rhythm outcomes after catheter ablation of atrial fibrillation. *Clin Res Cardiol* 2015 Apr 17. PMID 25876528

Shoemaker MB, Bollmann A, Lubitz SA, Ueberham L, Saini H, Montgomery J, Edwards T, Yoneda Z, Sinner MF, Arya A, Sommer P, Delaney J, Goyal SK, Saavedra P, **Kanagasundram A**, Whalen SP, Roden DM, Hindricks G, Ellis CR, Ellinor PT, Darbar D, Husser D. Common genetic variants and response to atrial fibrillation ablation. *Circ Arrhythmia Electrophysiol*. 2015 Apr; 8 (2). PMID: 25684755

Pandey AK, **Kanagasundram A**, Raj SR. Deglutition Syncope: does fluid temperature matter?. *J Am Coll Cardiol*. 2014 May; 63 (20). PMID 24703921

Kanagasundram AN, Baduashvili A, Liu CF, Cheung JW, Thomas G, Ip JE, Young SD, Lerman BB, Markowitz SM. A Novel Criterion for Conduction Block after Catheter Ablation of Right Atrial Tachycardia after Mitral Valve Surgery. *Circ Arrhythm Electrophysiol*. 2013 Feb; 6 (1) :39-47. PMID: 23243191

Book Chapters

Kanagasundram AN, Stevenson WG. “Ischemic Ventricular Tachycardia: Limitations of the Electrocardiogram; Epicardial Intervention: A Guide for Cardiac Electrophysiologists” Cardiotext publishing; May 2020.

Kanagasundram, A. “Trans-Septal Catheterization and Pericardial Access: American College of Cardiology Electrophysiology Self-Assessment Program” First edition published 2019.

Christopher R Ellis, **Arvinth N Kanagasundram**. “Wolff- Parkinson-White Syndrome and Atrioventricular Reciprocating Tachycardia: Color Atlas of Cardiovascular Disease” Jaypee Brothers Medical Publishers; First Edition 2015.

Kanagasundram, A; Ardehali, R; Wang, P; Froelicher, V. Book Chapter “Non-invasive Stress Testing: A Practical Approach to Cardiovascular Medicine” Wiley & Sons; First edition published 2011.

Faculty Presentations at Scientific Meetings

Invited Faculty; Ventricular Tachycardia Ablation utilizing hybrid surgical approach with concomitant electroanatomical mapping. Heart Rhythm Society’s 42nd Annual Scientific Sessions, 2021.

Invited Faculty; Functional Assessment of Ventricular Tachycardia Substrate. Annual VT Symposium 2020.

Invited Faculty; Live VT case from Vanderbilt University. Heart Rhythm Society's 40th Annual Scientific Sessions, 2019.

Presentations

Arvindh N. Kanagasundram, Ricardo Miguel. Lugo, Rachel Schreier, Robert Piana and Christopher R. Ellis. “Serum BNP Levels At Time Of Left Atrial Appendage (LAA) Occlusion And Association With LAA Morphology”. Heart Rhythm Society's 40th Annual Scientific Sessions, 2019.

Ryohsuke Narui, Tomofumi Nakamura, Ikutaro Nakajima, **Arvindh N. Kanagasundram**, Roy M. John, and William G. Stevenson. “Mechanisms And Ablation Challenges For Ventricular Tachycardia In Patients With Left Ventricular Assist Devices: The Importance Of Peri-cannula Origins”. Heart Rhythm Society's 40th Annual Scientific Sessions, 2019.

Ricardo Lugo, Breck Sandvall, Sushan Yang, Asad Al Aboud, Travis Richardson, Marcia Blair, Kelsey Tomasek, Yan Ru Su, Benjamin Shoemaker, Quinn Wells, William Stevenson, **Arvindh Kanagasundram**. “Serum BNP expression differs in endocardial versus epicardial scar area”. American Heart Association’s Scientific Sessions 2018.

Ricardo Lugo, Ryohsuke Narui, William Stevenson, **Arvindh Kanagasundram**. “Characteristics associated with steam pops during radiofrequency ablation with reduced ionic concentration irrigation”. American Heart Association’s Scientific Sessions 2018.

Hannah Fish-Trotter, MD, Ricardo Lugo, MD, Sushan Yang, MD, Rebecca R. Hung, MD, PhD and **Arvindh N. Kanagasundram, MD**. “Electroanatomic Mapping In a Patient with Danon Disease”. Heart Rhythm Society's 39th Annual Scientific Sessions, 2018.

Tomofumi Nakamura, Giovanni Davogustto, Benjamin Schaeffer, Shinichi Tanigawa, Rahul Muthalaly, Usha Tedrow, **Arvindh Kanagasundram**, Roy John, Gregory Michaud, and William Stevenson. “Relation Of Anticoagulation To Complications During Percutaneous Epicardial Access For Catheter Ablation.” Heart Rhythm Society's 39th Annual Scientific Sessions, 2018.

Christopher Ellis, Sara Negrotto, Ricardo Miguel. Lugo, Mohamed I. Metawee, Geoffrey Chidsey, Michael Baker, **Arvindh Kanagasundram** and Robert Piana. “ Left Atrial Appendage Morphology Predicts the Formation of Left Atrial Appendage Thrombus” Heart Rhythm Society's 39th Annual Scientific Sessions, 2018.

Asad Aboud, Sushan Yang, Jay Montgomery, Ricardo M Lugo, Pablo Saavedra, Juan Carlos Estrada, Sharon Shen, Walter Clair, Robert Abraham, George Crossley, Christopher Ellis, Quinn Wells, Yan Ru Su, Benjamin Shoemaker, **Arvindh Kanagasundram**.” Longer Time to VT Ablation Correlates With More Complex Ventricular Substrate”. American Heart Association’s Scientific Sessions 2017.

Breck C Sandvall, Ricardo Lugo, Jay Montgomery, Asad A Aboud, Pablo Saavedra, Juan C Estrada, Sharon Shen, Walter Clair, Robert Abraham, George Crossley, Christopher R Ellis, M. Benjamin Shoemaker, **Arvindh N Kanagasundram**. “Long Term Follow-up in Patients With Prior Electrical Storm Undergoing Ventricular Tachycardia Ablation”. American Heart Association’s Scientific Sessions 2017.

Lugo R, Yang S, Aboud A, Blair M, Tomacek K, Su Y, Gupta D, Shoemaker B, Wells Q, **Kanagasundram A**. Poster Presentation. “Serum B-type Natriuretic Peptide at the Time of Ventricular Tachycardia Ablation Correlates with Myocardial Substrate”. American Heart Association’s Scientific Sessions 2016.

Aboud A, Shoemaker, M, Saavedra, P, Estrada JC, Shen S, Clair W, Rottman J, Abraham R, Crossley G, Ellis C, **Kanagasundram A**. Poster Presentation. “Ablation of regions of very slow conduction within myocardial scar and recurrence of ventricular tachycardia after ablation”. American Heart Association’s Scientific Sessions 2015.

Kanagasundram, A; Ellis, C; Whalen, P. Oral Presentation “Successful epicardial cryoablation of crux ventricular tachycardia not amenable to radiofrequency ablation.” Heart Rhythm Society's 35th Annual Scientific Sessions, 2014

Kanagasundram, A; Whalen, P; Ellis, C. Poster Presentation. “Epicardial hybrid ablation for ventricular tachycardia storm using a novel ablation catheter.” Heart Rhythm Society's 35th Annual Scientific Sessions, 2014

Kanagasundram, A; Markowitz, S. Poster Presentation “Complex Patterns of Right Atrial Activation and Block in Patients with Atrial Tachycardias after Mitral Valve Surgery” Heart Rhythm Society's 33rd Annual Scientific Sessions, 2012

Kanagasundram, A; Feldman, D. Poster Presentation “Long-Term Survival following Saphenous Vein Graft versus Native Vessel Percutaneous Coronary Interventions in the Contemporary Drug-Eluting Era” American College of Cardiology 60th Annual Scientific Sessions, 2011

Kanagasundram, A; Wang, P. Poster Presentation “Initiation Patterns of Ventricular Arrhythmias Determined from Analysis of Intracardiac Electrograms in the MADIT II Database” American College of Cardiology 56th Annual Scientific Sessions, 2007

Kanagasundram, A. Poster Presentation “Calciphylaxis: Hard to diagnose, harder to treat” American College of Physicians Western Conference 2005