




## Sanjiv Narayan

Professor of Medicine (Cardiovascular Medicine)

Medicine - Cardiovascular Medicine

 NIH Biosketch available Online

### CLINICAL OFFICE (PRIMARY)

- **Center for Academic Medicine - Cardiovascular Medicine**

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Palo Alto, CA 94303

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### ACADEMIC CONTACT INFORMATION

- **Administrative Assistant**

Martha Avamolifua - Administrative Assistant

**Email** [segaula@stanford.edu](mailto:segaula@stanford.edu)

**Tel** 650/724-1850

### Bio

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#### BIO

Sanjiv Narayan is Professor of Medicine, Director of the Stanford NIH T32 CHIP (Computational medicine in the Heart: Integrated Program HL166155), of Electrophysiology Research, of the AF Program and Co-Founder of the Stanford Arrhythmia Center. He is dedicated to developing techniques to improve the success rates from ablation for atrial fibrillation (AF) and ventricular arrhythmias. Dr. Narayan is a trained computer scientist and physician, and has worked at the intersection of medicine, bioengineering, and data science for 30 years. The Computational Arrhythmia Research Laboratory (CARL) that he directs pioneered mapping of AF to guide ablation, and tools he developed were extended by groups worldwide and are the foundation for several current commercial systems. Dr. Narayan received the Distinguished Scientist Award of the Heart Rhythm Society in 2022, as well as the "Top Doctor" award from Castle Connolly (2017-present) and other awards. Our talented trainees have won an average of 2-3 prizes or grants every year since 2003.

#### Funding Disclosures:

CARL is grateful to the Laurie C. McGrath Foundation for invaluable support. CARL is grateful to the NIH for continuous support since 2001, via grants K23 HL70529 and R01 HL162260 for ventricular arrhythmias, and K24 HL103800, R01 HL83359, R01 HL122384, R01 HL149134, and SBIR grants for atrial arrhythmias. We also thank the Laurie C McGrath Foundation and the the Doris Duke Charitable Foundation. Our amazing fellows have won funding by the Fulbright Foundation, NIH, American College of Cardiology, American Heart Association, Heart Rhythm Society, and British Heart Foundation. We have developed intellectual property owned by University of California Regents and Stanford University, and licensed to start-up companies including the Stanford spin-out PhysCade Inc. Focal Impulse and Rotor Mapping (FIRM) was licensed to a start-up founded by Dr. Narayan (Topera), which was acquired by Abbott Laboratories.

#### Personal

Dr. Narayan was born in Aylesbury, Buckinghamshire, England, then his parents Prakash and Kamalini moved to Birmingham UK. Dr Narayan trained in medicine (MB, ChB 1987) and software engineering focused on neural networks (MSc, 1990) in Birmingham UK, then moved to UCLA to train

in computational neuroscience in the Laboratory of Neuroimaging directed by Dr. Arthur Toga , where he developed an integrated optical mapping/ image processing workstation to study somatosensory cortex (Research MD, 1995). He pursued further training in Information and Data Science at UC Berkeley (2022-). Dr. Narayan gained membership (MRCP, 1990) and fellowship (FRCP, 1995) of the Royal College of Physicians of London, then trained in Internal medicine at Harvard/Mount Auburn Hospital under Dr. Charles Hatem (1994-6), and Cardiology/EP at Washington University/Barnes hospital (1996-2001) where his computational research led to his K23 award under Drs Michael Cain, Joseph Smith and Bruce Lindsay. Dr. Narayan is a devoted family man, and he and his wife Sujata (Family Practice, Stanford) have 3 children. Together, they enjoy music, working out at the gym, swimming, biking and skiing, discussing history and politics, and travel.

## **CLINICAL FOCUS**

- Clinical Cardiac Electrophysiology
- ATRIAL FIBRILLATION
- ABLATION
- ATRIAL FLUTTER
- COMPLEX ABLATION
- VENTRICULAR ECTOPIC BEATS AND TACHYCARDIA

## **ACADEMIC APPOINTMENTS**

- Professor - University Medical Line, Medicine - Cardiovascular Medicine
- Member, Bio-X
- Member, Cardiovascular Institute
- Member, Institute for Computational and Mathematical Engineering (ICME)

## **ADMINISTRATIVE APPOINTMENTS**

- Director, NIH T32 CHIP (Computational medicine in the Heart: Integrated Program), Stanford University, (2023-2028)
- Co-Director, Arrhythmia Center, Stanford Medicine, (2016- present)
- Director, Atrial Fibrillation Program, Stanford Medicine, (2014- present)
- Director, Electrophysiology Research, Stanford Medicine, (2014- present)
- Co-Director, Electrophysiology Program, University of California, San Diego, (2008-2014)
- Director, Clinical Cardiac Electrophysiology Fellowship Training Program, University of California, San Diego, (2008-2012)
- Director, Electrophysiology Program, Veterans Affairs San Diego Healthcare System, (2001-2014)

## **HONORS AND AWARDS**

- Mentor to Michael Lui, MD PhD, Recipient NIH F32 Fellowship Award, National Institutes of Health (2025-2027)
- Mentor to: Sabya Bandyopadhyay, PhD, Recipient AHA Fellowship Award, American Heart Association (2025-2027)
- Mentor to Michael Lui, MD PhD, Recipient AHA Fellowship Award, American Heart Association (2025-2026)
- Mentor to Samuel Ruiperez-Campillo, MS. Recipient of Paul Dudley White International Scholar Award, American Heart Association (2025)
- Mentor to: Albert J Rogers, MD MBA, Finalist for Samuel Levine Young Investigator Awards, American Heart Association (2025)
- Mentor to Heart Rhythm X (HRX) Top Abstract Prize Winner Neal Bhatia, MD, HRX, Heart Rhythm Society (2024)
- Mentor to: Brototo Deb, MD MS. Young Investigator Award Finalist, Cardiac Electrophysiology Society (2024)
- Mentor to Albert J Rogers, MD MBA. Recipient K23 HL166977, National Institutes of Health (2023-2028)
- Mentor to Brototo Deb, MD, Young Investigator Awards Finalist., Heart Rhythm Society (2023)
- Mentor to Prasanthan Ganesan, PhD, 1st Place Young Investigator Awards Competition, Western Atrial Fibrillation Symposium. (2023)

- Chair, Digital Health Committee, Heart Rhythm Society (2022-2023)
- Mentor to Brototo Deb, MD, Dean's List Scholar, Stanford University (2022)
- Mentor to Sunil Vasireddy, MD, Prystowsky Award for Highest Scoring Abstract, Heart Rhythm Society (2022)
- Mentor to Sunil Vasireddy, MD, Young Investigator Award Winner, Cardiac Electrophysiology Society (2022)
- Chair, Research Committee, Heart Rhythm Society (2021)
- Mentor to Miguel Rodrigo, PhD, Finalist, Young Investigator Award Competition, American College of Cardiology (2021)
- Mentor to Prasanthan Ganesan, PhD, Finalist Abstract Award, Atrial Signals 2021, Karlsruhe Institute of Technology (2021)
- Mentor to Prasanthan Ganesan, PhD, Finalist, Young Investigator Award Competition, Asia-Pacific Heart Rhythm Society (APHRS) (2021)
- Mentor to A.J. Rogers, MD, MBA. Finalist, Young Investigator Award Competition, Heart Rhythm Society (2020)
- Mentor to Tina Baykaner, MD, Recipient K23 HL145017, National Institutes of Health (2019-2024)
- Co-Chair, Data Sciences Study Section, American Heart Association, Institute for Precision Cardiovascular Medicine (2019-2021)
- Mentor to Mahmood Alhousseini, MS. Finalist, Young Investigator Award Competition, European Heart Rhythm Association (2019)
- Mentor to Miguel Rodrigo, PhD. Winner, Prystowski Abstract Award, Heart Rhythm Society (2019)
- Mentor to Neal Bhatia, MD. Top Scoring Abstract, European Heart Rhythm Association (2019)
- Mentor to AJ Rogers, MD MBA, Recipient F32 HL144101, National Institutes of Health (2018-2021)
- Chair and Vice-Chair, Research Committee, Heart Rhythm Society (2018-2020)
- Mentor to AJ Rogers, MD, Recipient, Josephson and Wellens Fellowship (Declined in Favor of NIH F32), Heart Rhythm Society (2018-2019)
- Mentor to G. Leef, MD, 1st Prize, Young Investigator Award, Asia Pacific Heart Rhythm Society (APHRS) (2018)
- Charter Member, ESTA Study Section, National Institutes of Health (2017 - 2020)
- Mentor to Junaid Zaman, MD, Best Poster Award, European Society of Cardiology Meeting, Barcelona (2017)
- Mentor to Rachita Navara, MD; 1st Prize 2017 Stanford General Internal Medicine Symposium, Stanford University (2017)
- Mentor to Mallika Tomboli, BS (MD class of 2019); Stanford MedScholars Program, Stanford University (2016 - 2017)
- Mentor to Rachita Navara, MD; 2016-7 Stanford Society of Physician Scholars research grant, Stanford University (2016 - 2017)
- Mentor to Christopher Kowalewski; Clinical Prize 2016 Stanford-Karolinska Institute Symposium, Stanford University (2016)
- Mentor to Tina Baykaner, MD, Recipient, Josephson and Wellens Fellowship, Heart Rhythm Society (2015-2016)
- Mentor to Junaid Zaman, MD, Fulbright Scholar, Fulbright Foundation (2015 - 2016)
- Mentor to Junaid Zaman, MD, Finalist Young Investigator Awards Competition, American Heart Association (2015)
- Mentor to Tina Baykaner, MD, Awardee Postdoctoral Fellowship (declined for HRS fellowship), American Heart Association (2015)
- Mentor to Junaid Zaman, MD, Recipient British Heart Foundation Grant 2014, British Heart Foundation (2014 - 2015)
- Mentor to Amir Schricker, MD, Recipient 1st Prize HRS 2013 Young Investigator Awards, Heart Rhythm Society (2013)
- Mentor to Amir Schricker, MD, Recipient, ACC-Merck Fellowship, American College of Cardiology Foundation (2012 - 2013)
- Mentor to Amir Schricker, MD, HRS Max Schaldach Fellow (declined in favor of ACC-Merck), Heart Rhythm Society (2012)
- Mentor to David Krummen, MD, Finalist, Samuel Levine Young Investigator Awards Competition, American Heart Association (2011)
- Mentor to David E. Krummen, MD. AHA Beginning-Grant-In-Aid, American Heart Association (2010 - 2012)
- Mentor to Antonio Moyeda, RCVT, 1st Prize, Allied Professionals, Heart Rhythm Society (2010)
- Mentor to Krishna Ravi, MD Class of 2010, Recipient Samuel B. Hamburger Memorial Prize, University of California, San Diego (2009)
- Ad Hoc Member, ESTA, CCIS, Other Study Section, National Institutes of Health (2008 - 2017)
- Mentor to David Krummen, MD, Finalist Young Investigator Awards Competition, American College of Cardiology Foundation (2008)
- Mentor to Dhruv Kazi MD, Recipient Schulman Prize, University of California, San Diego (2008)

- Mentor to Gautam Lalani, MD, Recipient of 2008 Leading Clinical Research Abstract Award, Heart Failure Society of America (2008)
- Mentor to David E Krummen MD, Recipient Schulman Prize, University of California, San Diego (2007)
- Mentor to Ashwani Sastry, MD. Recipient of Thomas Carew Cardiovascular Prize, University of California, San Diego (2006)
- Mentor to David E Krummen MD, Recipient Schulman Prize, University of California, San Diego (2006)
- Mentor to Han Bui, MD, Recipient of ACC-Merck Fellowship, American College of Cardiology Foundation (2005 - 2006)
- Mentor to David E. Krummen, MD, Featured Poster, Heart Rhythm Society (2005)
- Mentor to Bobbi L Hoppe, MD, Recipient Schulman Prize, University of California, San Diego (2004)
- Mentor to David Krummen, MD, Recipient, ACC-Merck Fellowship, American College of Cardiology Foundation (2003 - 2004)
- Finalist, Astra-Zeneca Cardiovascular Young Investigator Awards Competition, Astra-Zeneca-Competition (2001)
- Finalist, Samuel Levine Young Investigator Awards Competition, American Heart Association (1998)
- Finalist, Young Investigator Awards Competition, North American Society for Pacing and Electrophysiology (NASPE/HRS) (1998)

### **BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS**

- Chair, Digital Health Committee, Heart Rhythm Society (2022 - 2023)
- Chair, Research Committee, Heart Rhythm Society (2019 - 2021)
- Co-Chair, Data Sciences Study Section, AHA Institute for Precision Cardiovascular Medicine (2019 - 2020)
- Section Editor, Journal of the American College of Cardiology (2017 - present)
- Charter Member, ESTA Study Section, National Institutes of Health (2016 - 2020)
- Chair, Research Fellowship Committee, Heart Rhythm Society (2016 - 2018)
- Associate Editor, Journal of the American College Of Cardiology: Clinical Electrophysiology (2014 - 2020)
- Section Editor, Heart Rhythm Journal (2014 - 2014)
- Member, Editorial Board, Journal of Interventional Cardiac Electrophysiology (2013 - present)
- Co-Coordinator, Electrophysiology Program, American College of Cardiology Scientific Sessions (2013 - 2015)
- Member, Editorial Board, Journal of Cardiovascular Electrophysiology (2012 - present)
- Vice-Chair, Research Fellowship Committee, Heart Rhythm Society (2012 - 2016)
- Scientific Program Committee, Member, American Heart Association Scientific Sessions (2010 - 2012)
- Ad Hoc Reviewer, Various Study Sections, National Institutes of Health (2008 - present)
- Member, Editorial Board, Heart Rhythm Journal (2007 - present)
- Associate Editor, Journal of the American College of Cardiology (2006 - 2017)

### **PROFESSIONAL EDUCATION**

- Fellowship: UCLA David Geffen School Of Medicine (1994) CA
- Fellowship: Washington University School Of Medicine (2001) MO
- Board Certification: Cardiovascular Disease, American Board of Internal Medicine (2000)
- T32 Training Fellow, Washington University, St Louis , Computational Cardiac Electrophysiology (1998)
- Medical Education: University of Birmingham Medical School Registrar (1987) United Kingdom
- Board Certification: Clinical Cardiac Electrophysiology, American Board of Internal Medicine (2001)
- Residency: Barnes and Allied Hospitals/Washington University School of Med (2000) MO
- Internship: Mount Auburn / Harvard Medical School (1996) MA
- MD (Neuroscience Doctorate), University of Birmingham , UK (1994)

- Internship: University of Birmingham (1991) UK
- MSc (Computer Science), University of Birmingham , UK (1990)

## PATENTS

- Carey R. Briggs, Sanjiv M. Narayan. "United States Patent 9,392,948 B2 System and Method for Identifying Sources for Biological Rhythms", University of California, Regents., Jul 19, 2016
- Sanjiv Narayan, Ruchir Sehra. "United States Patent 8,868,169 B2 Method and System for Detection of Biological Rhythm Disorders", Regents of the University of California; Topera Inc; US Government represented by Dept of Veterans Affairs, Oct 21, 2014
- Sanjiv M. Narayan, Wouter-Jan Rappel. "United States Patent 8,838,222 B2 Method for Treating Complex Rhythm Disorders", University of California Regents, Sep 16, 2014
- Sanjiv M. Narayan, Wouter-Jan Rappel. "United States Patent 8,838,223 B2 Method for Analyzing Complex Rhythm Disorders.", University of California Regents, Sep 16, 2014
- Sanjiv M. Narayan, Ruchir Sehra. "United States Patent 8,700,140 Methods, system and apparatus for the detection, diagnosis and treatment of biological rhythm disorders", Regents of the University of California; Topera Inc., US Department of Veterans Affairs, Apr 15, 2014
- Sanjiv Narayan. "United States Patent 8,676,303 Machine and Process for Treating Heart Instability", University of California Regents, Mar 18, 2014
- Carey R. Briggs, Sanjiv M. Narayan. "United States Patent 8,594,777 System And Method For Reconstructing Cardiac Activation Information", University of California Regents, Nov 26, 2013
- Sanjiv M. Narayan, Wouter-Jan Rappel. "United States Patent 8,521,266 Methods for the Detection And/Or Diagnosis Of Biological Rhythm Disorders", University of California Regents, Aug 27, 2013
- Carey R. Briggs, Sanjiv M. Narayan. "United States Patent 8,165,666 System And Method For Reconstructing Cardiac Activation Information", University of California Regents, Apr 24, 2012
- Sanjiv Narayan, Valmik Bhargava. "United States Patent 7,123,954 Method and Apparatus for Classifying and Localizing Heart Arrhythmias", University of California Regents, Oct 17, 2006

## LINKS

- My Lab Site: <http://web.stanford.edu/group/narayanlab/cgi-bin/wordpress/contact/>
- Why I Went Into Medicine: <https://www.youtube.com/watch?v=42Um2o2oSJl&feature=youtu.be>
- Video Story: <https://stanfordhealthcare.org/stanford-health-care-now/why-i-got-into-medicine/why-medicine-sanjiv-narayan-md.html>
- FIRM Physician Centered Video: <https://youtu.be/OBozymcv4hl>
- Get a Second Opinion: <https://stanfordhealthcare.org/second-opinion/overview.html>

## Research & Scholarship

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### CURRENT RESEARCH AND SCHOLARLY INTERESTS

Dr. Narayan directs the Computational Arrhythmia Research Laboratory, whose goal is to define the mechanisms underlying complex human heart rhythm disorders, to develop bioengineering-focused solutions to improve therapy that will be tested in clinical trials. The laboratory has been funded continuously since 2001 by the National Institutes of Health, AHA and ACC, and interlinks a disease-focused group of clinicians, computational physicists, bioengineers and trialists.

### CLINICAL TRIALS

- Machine Learning in Atrial Fibrillation, Recruiting
- The Dynamics of Human Atrial Fibrillation, Recruiting
- Ablation of Ventricular Fibrillation by Accurate Targeting of Arrhythmogenic Regions (AVATAR), Not Recruiting
- Evaluation of Conventional Ablation With or Without Focal Impulse and Rotor Modulation to Eliminate Human AF, Not Recruiting
- Stanford Cardiac Invasive Electrophysiology Novel Computer Experience, Not Recruiting
- The Dynamics of Human Atrial Fibrillation, Not Recruiting

## Teaching

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### COURSES

#### 2025-26

- Introduction to Bioengineering Research: BIOE 390, MED 289 (Aut)

#### 2024-25

- Introduction to Bioengineering Research: BIOE 390, MED 289 (Aut)

#### 2023-24

- Introduction to Bioengineering Research: BIOE 390, MED 289 (Aut)

#### 2022-23

- Introduction to Bioengineering Research: BIOE 390, MED 289 (Aut)

### STANFORD ADVISEES

#### Postdoctoral Faculty Sponsor

Sabyasachi Bandyopadhyay, Michael Liu, Charles Sillett

### GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Cardiac Electrophysiology (Fellowship Program)
- Cardiovascular Medicine (Fellowship Program)

## Publications

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### PUBLICATIONS

- **Identification of cardiac wall motion abnormalities in diverse populations by deep learning of the electrocardiogram.** *NPJ digital medicine*  
Rogers, A. J., Bhatia, N. K., Bandyopadhyay, S., Tooley, J., Ansari, R., Thakkar, V., Xu, J., Soto, J. T., Tung, J. S., Alhusseini, M. I., Clopton, P., Sameni, R., Clifford, et al  
2025; 8 (1): 21
- **Engineering of Generative Artificial Intelligence and Natural Language Processing Models to Accurately Identify Arrhythmia Recurrence.** *Circulation. Arrhythmia and electrophysiology*  
Feng, R., Brennan, K. A., Azizi, Z., Goyal, J., Deb, B., Chang, H. J., Ganesan, P., Clopton, P., Pedron, M., Ruiperez-Campillo, S., Desai, Y., De Larocheillère, H., Baykaner, et al  
2024: e013023
- **Atrial Fibrillation Nomenclature, Definitions and Mechanisms: Position Paper from the International Working Group of the Signal Summit.** *Heart rhythm*  
de Groot, N. M., Kleber, A., Narayan, S. M., Ciaccio, E. J., Doessel, O., Bernus, O., Berenfeld, O., Callans, D., Fedorov, V., Hummel, J., Haissaguerre, M., Natale, A., Trayanova, et al  
2024
- **Successful cardiac resynchronization therapy reduces negative septal work in patient-specific models of dyssynchronous heart failure.** *PLoS computational biology*  
Craine, A., Krishnamurthy, A., Villongco, C. T., Vincent, K., Krummen, D. E., Narayan, S. M., Kerckhoffs, R. C., Omens, J. H., Contijoch, F., McCulloch, A. D.  
2024; 20 (10): e1012150
- **Prediction of sudden cardiac death using artificial intelligence: Current status and future directions.** *Heart rhythm*  
Kolk, M. Z., Ruiperez-Campillo, S., Wilde, A. A., Knops, R. E., Narayan, S. M., Tjong, F. V.  
2024
- **Learning AI for busy clinicians: Staying ahead.** *Heart rhythm*

Narayan, S. M., Svennberg, E.  
2024

- **Factors of Engagement in Research After Graduation from EP Fellowship: an HRS Survey.** *Heart rhythm*  
Ferns, S. J., Vaseghi, M., Singleton, M. J., Nguyen, D. T., Narayan, S. M., Bilchick, K. C.  
2024
- **Mechanistic Insights From Trials of Atrial Fibrillation Ablation: Charting a Course for the Future.** *Circulation. Arrhythmia and electrophysiology*  
Goldberger, J. J., Mitrani, R. D., Zaatari, G., Narayan, S. M.  
2024: e012939
- **Arrhythmia Research at a Tipping Point: The Need for Disruptive Science and Technology.** *Circulation. Arrhythmia and electrophysiology*  
Wang, P. J., Fishman, G. I., Eckhardt, L., Wu, J. C., Delmar, M., Chung, M. K., Patton, K. K., Russo, A. M., Albert, C. M., Narayan, S. M.  
2024: e012720
- **Novel Domain Knowledge-Encoding Algorithm Enables Label-Efficient Deep Learning for Cardiac CT Segmentation to Guide Atrial Fibrillation Treatment in a Pilot Dataset.** *Diagnostics (Basel, Switzerland)*  
Ganesan, P., Feng, R., Deb, B., Tjong, F. V., Rogers, A. J., Ruipérez-Campillo, S., Somani, S., Clopton, P., Baykaner, T., Rodrigo, M., Zou, J., Haddad, F., Zaharia, et al  
2024; 14 (14)
- **Concerns on digital health from a cardiac implantable electrical device remote monitoring clinic perspective: results from an international survey** *HEART RHYTHM O2*  
Vandenberk, B., Ferrick, N., Wan, E. Y., Narayan, S. M., Ferrick, A. M., Raj, S. R.  
2024; 5 (7): 479-482
- **Concerns on digital health from a cardiac implantable electrical device remote monitoring clinic perspective: results from an international survey.** *Heart rhythm O2*  
Vandenberk, B., Ferrick, N., Wan, E. Y., Narayan, S. M., Ferrick, A. M., Raj, S. R.  
2024; 5 (7): 479-482
- **Navigating the Ebb and Flow of AtrialFibrillation.** *JACC. Clinical electrophysiology*  
Ma, C., Narayan, S. M., Baykaner, T.  
2024
- **Multimodal explainable artificial intelligence identifies patients with non-ischaemic cardiomyopathy at risk of lethal ventricular arrhythmias.** *Scientific reports*  
Kolk, M. Z., Ruipérez-Campillo, S., Allaart, C. P., Wilde, A. A., Knops, R. E., Narayan, S. M., Tjong, F. V.  
2024; 14 (1): 14889
- **Determinants of global cardiac implantable electrical device remote monitoring utilization - Results from an international survey** *CARDIOVASCULAR DIGITAL HEALTH JOURNAL*  
Vandenberk, B., Ferrick, N., Wan, E. Y., Narayan, S. M., Ferrick, A. M., Raj, S. R.  
2024; 5 (3): 141-148
- **Determinants of global cardiac implantable electrical device remote monitoring utilization - Results from an international survey.** *Cardiovascular digital health journal*  
Vandenberk, B., Ferrick, N., Wan, E. Y., Narayan, S. M., Ferrick, A. M., Raj, S. R.  
2024; 5 (3): 141-148
- **Successful Cardiac Resynchronization Therapy Reduces Negative Septal Work in Patient-Specific Models of Dyssynchronous Heart Failure.** *bioRxiv : the preprint server for biology*  
Craine, A., Krishnamurthy, A., Villongco, C. T., Vincent, K., Krummen, D. E., Narayan, S. M., Kerckhoffs, R. C., Omens, J. H., Contijoch, F., McCulloch, A. D.  
2024
- **Competing Risks for Monomorphic versus Non-Monomorphic Ventricular Arrhythmias in Primary Prevention Implantable Cardioverter Defibrillator Recipients: Global Electrical Heterogeneity and Clinical Outcomes (GEHCO) Study.** *Europace : European pacing, arrhythmias, and cardiac electrophysiology : journal of the working groups on cardiac pacing, arrhythmias, and cardiac cellular electrophysiology of the European Society of Cardiology*

- Tereshchenko, L. G., Waks, J. W., Tompkins, C., Rogers, A. J., Ehdaie, A., Henrikson, C. A., Dalouk, K., Raitt, M., Kewalramani, S., Kattan, M. W., Santangeli, P., Wilkoff, B. W., Kapadia, et al  
2024
- **Catheter Ablation as First-Line Therapy in Persistent Atrial Fibrillation: Patient Characteristics and Clinical Outcomes.** *JACC. Clinical electrophysiology*  
Barkagan, M., Milman, A., Zahavi, G., Younis, A., Dhakal, B., Dixit, S., Wong, C. X., Gerstenfeld, E. P., Narayan, S. M., Bunch, J. T., Cerbin, L., Tzou, W. S., Metzl, et al  
2024
  - **Use of Artificial Intelligence in Improving Outcomes in Heart Disease: A Scientific Statement From the American Heart Association** *CIRCULATION*  
Armoundas, A. A., Narayan, S. M., Arnett, D. K., Spector-Bagdady, K., Bennett, D. A., Celi, L., Friedman, P. A., Gollob, M. H., Hall, J. L., Kwitek, A. E., Lett, E., Menon, B. K., Sheehan, et al  
2024; 149 (14): e1028-e1050
  - **IMPACT OF CARDIAC FIBER ORIENTATION ON ELECTRICAL DYSSYNCHRONY IN VENTRICULAR ECTOPY**  
Perkins, S. J., Salvador, M., Hu, Z., Tikenogullari, O., Kong, F., Narayan, S. M., Marsden, A.  
ELSEVIER SCIENCE INC.2024: 88
  - **NOVEL INTERACTIONS BETWEEN STROKE RISK FACTORS IN THE YOUNG REVEALED BY INTERNET SEARCH ALGORITHMS APPLIED TO ELECTRONIC HEALTH RECORDS**  
Deb, B., Vasireddi, S., Perino, A., Clopton, P., Bhatia, N. K., Narayan, S. M.  
ELSEVIER SCIENCE INC.2024: 2345
  - **AUTOMATED, ACCURATE IDENTIFICATION OF VENTRICULAR TACHYCARDIA FROM ELECTRONIC HEALTH RECORDS USING NATURAL LANGUAGE PROCESSING**  
Brennan, K., Azizi, Z., Feng, R., Goyal, J., Liu, X., Ganesan, P., Ruiperez-Campillo, S., Baykaner, T., Badhwar, N., John, R. M., Viswanathan, M., Perino, A., Wang, et al  
ELSEVIER SCIENCE INC.2024: 2644
  - **IMPACT OF CARDIAC FIBER ORIENTATION ON ELECTRICAL DYSSYNCHRONY IN VENTRICULAR ECTOPY**  
Perkins, S. J., Salvador, M., Hu, Z., Tikenogullari, O., Kong, F., Narayan, S. M., Marsden, A.  
ELSEVIER SCIENCE INC.2024: 88
  - **Visions for digital integrated cardiovascular care: HRS Digital Health Committee perspectives.** *Cardiovascular digital health journal*  
Narayan, S. M., Wan, E. Y., Andrade, J. G., Avari Silva, J. N., Bhatia, N. K., Deneke, T., Deshmukh, A. J., Chon, K. H., Erickson, L., Ghanbari, H., Noseworthy, P. A., Pathak, R. K., Roelle, et al  
2024; 5 (2): 37-49
  - **What Cannot be Missed: Important Publications on Electrophysiology in 2023.** *Arrhythmia & electrophysiology review*  
Grace, A., Lip, G. Y., Lambiase, P. D., Narayan, S. M., Calkins, H., Guo, Y., Ellenbogen, K., Katritsis, D. G.  
2024; 13: e04
  - **Advanced Electroanatomic Mapping: Current and Emerging Approaches** *CURRENT TREATMENT OPTIONS IN CARDIOVASCULAR MEDICINE*  
Narayan, S. M., John, R. M.  
2024
  - **Latent drivers for atrial fibrillation and specific patterns of localized fibrosis.** *Cardiovascular research*  
Rogers, A. J., Narayan, S. M.  
2024
  - **Spatially Conserved Spiral Wave Activity During Human Atrial Fibrillation.** *Circulation. Arrhythmia and electrophysiology*  
Rappel, W. J., Baykaner, T., Zaman, J., Ganesan, P., Rogers, A. J., Narayan, S. M.  
2024: e012041
  - **Arrhythmias including Atrial Fibrillation and Congenital Heart Disease in Kleeftstra Syndrome: a possible epigenetic link.** *Europace : European pacing, arrhythmias, and cardiac electrophysiology : journal of the working groups on cardiac pacing, arrhythmias, and cardiac cellular electrophysiology of the European Society of Cardiology*  
Vasireddi, S. K., Draksler, T. Z., Bouman, A., Kummeling, J., Wheeler, M., Reuter, C., Srivastava, S., Harris, J., Fisher, P. G., Narayan, S. M., Wang, P. J., Badhwar, N., Kleeftstra, et al

2024

- **Race, Sex, and Age Disparities in the Performance of ECG Deep Learning Models Predicting Heart Failure.** *Circulation. Heart failure*  
Kaur, D., Hughes, J. W., Rogers, A. J., Kang, G., Narayan, S. M., Ashley, E. A., Perez, M. V.  
2023: e010879
- **Dynamic prediction of malignant ventricular arrhythmias using neural networks in patients with an implantable cardioverter-defibrillator.** *EBioMedicine*  
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