



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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ACADEMIC CONTACT INFORMATION

- **Administrative Assistant**

Cristina Cruz - Administrative Assistant

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Bio

BIO

Sanjiv Narayan is Professor of Medicine, Director of the Stanford NIH T32 CHIP (Computational medicine in the Heart: Integrated Program HL166155), and is Co-Founder of the Stanford Arrhythmia Center. He directs the Computational Arrhythmia Research Lab (CARL), that operates at the intersection of cardiovascular medicine, bioengineering, and data science. CARL pioneered computational mapping of 'chaotic' heart rhythm disturbances (arrhythmias), targeting mechanistic drivers for atrial and ventricular fibrillation (AF, VF), that included collaborating with multiple centers worldwide. Dr. Narayan is recipient of the Distinguished Scientist Award of the Heart Rhythm Society (2022), the "Top Doctor" award from Castle Connolly (2017-2024) and other awards. Our talented trainees have won an average of 2-3 prizes or grants every year since 2003.

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.

Funding Disclosures:

CARL is grateful to the Laurie C. McGrath Foundation for their Invaluable Support. CARL is grateful to the National Institutes of Health for continuous support since 2001, via grants HL70529 and HL162260 for ventricular arrhythmias, and HL103800, HL83359, HL122384, HL149134, and SBIR grants for atrial arrhythmias. 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. The lab co-invented intellectual property owned by University of California Regents and Stanford University, and licensed to start-up

companies including 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 in 2014.

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: 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

- Board Certification: Cardiovascular Disease, American Board of Internal Medicine (2000)
- T32 Training Fellow, Washington University, St Louis , Computational Cardiac Electrophysiology (1998)
- Fellowship: Washington University School Of Medicine Registrar (2001) MO
- Medical Education: University of Birmingham Medical School Registrar (1987) United Kingdom
- Fellowship: UCLA David Geffen School Of Medicine Registrar (1994) CA
- 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=42Um2o2oSJI&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/OBozymcv4hI>
- Get a Second Opinion: <https://stanfordhealthcare.org/second-opinion/overview.html>

Research & Scholarship

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

- Evaluation of Conventional Ablation With or Without Focal Impulse and Rotor Modulation to Eliminate Human AF, Recruiting
- Ablation of Ventricular Fibrillation by Accurate Targeting of Arrhythmogenic Regions (AVATAR), Not Recruiting
- The Dynamics of Human Atrial Fibrillation, Not Recruiting

Teaching

COURSES

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)

2021-22

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

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Sabyasachi Bandyopadhyay, Muhammad Fazal

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Cardiac Electrophysiology (Fellowship Program)

- Cardiovascular Medicine (Fellowship Program)

Publications

PUBLICATIONS

- **Safety of transvenous cardiac defibrillator and magnetic titanium beads system for gastroesophageal reflux disease: a case report.** *Journal of interventional cardiac electrophysiology : an international journal of arrhythmias and pacing*
Vasireddi, S. K., Greif, S., Fazal, M., Wei, C., Gomez, S., Shah, S., Rogers, A. J., Narayan, S. M., Wang, P. J., Kapoor, R., Baykaner, T.
2023
- **Comparative arrhythmia patterns among patients on tyrosine kinase inhibitors.** *Journal of interventional cardiac electrophysiology : an international journal of arrhythmias and pacing*
Wei, C., Fazal, M., Loh, A., Kapoor, R., Gomez, S. E., Shah, S., Rogers, A. J., Narayan, S. M., Wang, P. J., Witteles, R. M., Perino, A. C., Cheng, P., Rhee, et al
2023
- **Atrial Fibrillation Ablation Outcome Prediction with a Machine Learning Fusion Framework Incorporating Cardiac Computed Tomography.** *Journal of cardiovascular electrophysiology*
Razeghi, O., Kapoor, R., Alhusseini, M. I., Fazal, M., Tang, S., Roney, C. H., Rogers, A. J., Lee, A., Wang, P. J., Clopton, P., Rubin, D. L., Narayan, S. M., Niederer, et al
2023
- **Quantifying a spectrum of clinical response in atrial tachyarrhythmias using spatiotemporal synchronization of electrograms.** *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*
Ganesan, P., Deb, B., Feng, R., Rodrigo, M., Ruiperez-Campillo, S., Rogers, A. J., Clopton, P., Wang, P. J., Zeemering, S., Schotten, U., Rappel, W., Narayan, S. M.
2023
- **Can Machine Learning Disrupt the Prediction of Sudden Death?** *Journal of the American College of Cardiology*
Narayan, S. M., Rogers, A. J.
2023; 81 (10): 962-963
- **OBSTRUCTIVE SLEEP APNEA PORTENDS STROKE IN YOUNG INDIVIDUALS WITHOUT ATRIAL FIBRILLATION: A LARGE REGISTRY STUDY**
Deb, B., Vasireddi, S., Bhatia, N. K., Rogers, A. J., Clopton, P., Baykaner, T., Ganesan, P., Feng, R., Azizi, Z., Narayan, S. M.
ELSEVIER SCIENCE INC.2023: 130
- **Ambient Circulation Surrounding an Ablation Catheter Tip Affects Ablation Lesion Characteristics.** *Journal of cardiovascular electrophysiology*
Nussinovitch, U., Wang, P., Babakhanian, M., Narayan, S. M., Viswanathan, M., Badhwar, N., Zheng, L., Sauer, W. H., Nguyen, D. T.
2023
- **Machine learning of electrophysiological signals for the prediction of ventricular arrhythmias: systematic review and examination of heterogeneity between studies.** *EBioMedicine*
Kolk, M. Z., Deb, B., Ruiperez-Campillo, S., Bhatia, N. K., Clopton, P., Wilde, A. A., Narayan, S. M., Knops, R. E., Tjong, F. V.
2023; 89: 104462
- **Reduction in long-term mortality using remote device monitoring in a large real-world population of patients with implantable defibrillators.** *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*
Kolk, M. Z., Narayan, S. M., Clopton, P., Wilde, A. A., Knops, R. E., Tjong, F. V.
2023
- **Predicting acute termination and non-termination during ablation of human atrial fibrillation using quantitative indices.** *Frontiers in physiology*
Kappel, C., Reiss, M., Rodrigo, M., Ganesan, P., Narayan, S. M., Rappel, W. J.
2022; 13: 939350
- **Tyrosine kinase inhibitor-associated ventricular arrhythmias: a case series and review of literature.** *Journal of interventional cardiac electrophysiology : an international journal of arrhythmias and pacing*
Fazal, M., Wei, C., Chuy, K. L., Hussain, K., Gomez, S. E., Ba, S. S., Pietrasik, G., Yadav, N., Ghazizadeh, Z., Kapoor, R., Witteles, R. M., Blackmon, A., Wang, et al

2022

- **Opportunities and challenges in heart rhythm research: Rationale and development of an electrophysiology collaboratory** *HEART RHYTHM*
Nguyen, D. T., Bilchick, K. C., Narayan, S. M., Chung, M. K., Thomas, K. L., Laurita, K. R., Vaseghi, M., Sandhu, R., Chelu, M. G., Kannankeril, P. J., Packer, D. L., McManus, D. D., Verma, et al
2022; 19 (11): 1927-1945
- **Needle-Tipped Catheter Ablation of Papillary Muscle Results in Deeper and Larger Ablation Lesions.** *Journal of cardiovascular translational research*
Nussinovitch, U., Wang, P., Babakhanian, M., Narayan, S. M., Viswanathan, M., Badhwar, N., Zheng, L., Sauer, W. H., Nguyen, D. T.
2022
- **Racial, ethnic, and sex disparities in atrial fibrillation management: rate and rhythm control.** *Journal of interventional cardiac electrophysiology : an international journal of arrhythmias and pacing*
Gomez, S. E., Fazal, M., Nunes, J. C., Shah, S., Perino, A. C., Narayan, S. M., Tamirisa, K. P., Han, J. K., Rodriguez, F., Baykaner, T.
2022
- **Machine Learning of Adipose Tissue in Atrial Fibrillation.** *Heart rhythm*
Baykaner, T., Narayan, S.
2022
- **Machine Learning-Enabled Multimodal Fusion of Intra-Atrial and Body Surface Signals in Prediction of Atrial Fibrillation Ablation Outcomes.** *Circulation. Arrhythmia and electrophysiology*
Tang, S., Razeghi, O., Kapoor, R., Alhousseini, M. I., Fazal, M., Rogers, A. J., Rodrigo Bort, M., Clopton, P., Wang, P., Rubin, D., Narayan, S. M., Baykaner, T.
2022: 101161CIRCEP122010850
- **Mapping Atrial Fibrillation After Surgical Therapy to Guide Endocardial Ablation.** *Circulation. Arrhythmia and electrophysiology*
Bhatia, N. K., Shah, R. L., Deb, B., Pong, T., Kapoor, R., Rogers, A., Badhwar, N., Brodt, C., Wang, P. J., Narayan, S. M., Lee, A. M.
2022: 101161CIRCEP121010502
- **Future Directions for Mapping Atrial Fibrillation** *ARRHYTHMIA & ELECTROPHYSIOLOGY REVIEW*
Zaman, J. B., Grace, A. A., Narayan, S. M.
2022; 11
- **What Cannot Be Missed: Important Publications on Electrophysiology in 2021 Foreword** *ARRHYTHMIA & ELECTROPHYSIOLOGY REVIEW*
Narayan, S. M., Calkins, H., Grace, A., Ellenbogen, K., Lip, G. H., Lambiase, P. D., Katritsis, D. G.
2022; 11 (1)
- **Future Directions for Mapping Atrial Fibrillation.** *Arrhythmia & electrophysiology review*
Zaman, J. A., Grace, A. A., Narayan, S. M.
2022; 11: e08
- **What Cannot Be Missed: Important Publications on Electrophysiology in 2021.** *Arrhythmia & electrophysiology review*
Narayan, S. M., Calkins, H., Grace, A., Lip, G. Y., Ellenbogen, K., Lambiase, P. D., Katritsis, D. G.
2022; 11: e01
- **Atrial fibrillation signatures on intracardiac electrograms identified by deep learning.** *Computers in biology and medicine*
Rodrigo, M., Alhousseini, M. I., Rogers, A. J., Krittanawong, C., Thakur, S., Feng, R., Ganesan, P., Narayan, S. M.
2022; 145: 105451
- **TARGETING SYNCHRONIZED ELECTROGRAM ISLANDS WITHIN ATRIAL FIBRILLATION FOR ABLATION**
Ganesan, P., Deb, B., Feng, R., Rodrigo, M., RUIPEREZ-CAMPILLO, S., Bhatia, N. K., Rogers, A. J., Clopton, P., Rappel, W., Narayan, S. M.
ELSEVIER SCIENCE INC.2022: 3
- **A MORPHOLOGICAL OPERATION-BASED APPROACH TO AUTOMATICALLY SEPARATE AND LABEL LEFT ATRIUM BODY AND PULMONARY VEINS**
Feng, R., Ganesan, P., Deb, B., Rogers, A. J., RUIPEREZ-CAMPILLO, S., Rodrigo, M., Zaharia, M., Clopton, P., Rappel, W., Narayan, S. M.
ELSEVIER SCIENCE INC.2022: 1244
- **UNSUPERVISED MACHINE LEARNING IDENTIFIES PHENOTYPES FOR ATRIAL FIBRILLATION THAT PREDICT ACUTE ABLATION SUCCESS**
Deb, B., Ganesan, P., Feng, R., Bhatia, N. K., Rogers, A. J., RUIPEREZ-CAMPILLO, S., Clopton, P., Narayan, S. M.

ELSEVIER SCIENCE INC.2022: 51

- **Perpendicular Catheter Orientation During Papillary Muscle Ablation Results in Larger, Deeper Lesions.** *Journal of cardiovascular electrophysiology*
Nussinovitch, U., Wang, P., Narayan, S., Viswanathan, M., Badhwar, N., Zheng, L., Sauer, W. H., Nguyen, D. T.
2022
- **Predicting Atrial Fibrillation Recurrence by Combining Population Data and Virtual Cohorts of Patient-Specific Left Atrial Models.** *Circulation. Arrhythmia and electrophysiology*
Roney, C. H., Sim, I., Yu, J., Beach, M., Mehta, A., Alonso Solis-Lemus, J., Kotadia, I., Whitaker, J., Corrado, C., Razeghi, O., Vigmond, E., Narayan, S. M., O'Neill, et al
1800: CIRCEP121010253
- **Stochastic termination of spiral wave dynamics in cardiac tissue.** *Frontiers in network physiology*
Rappel, W., Krummen, D. E., Baykaner, T., Zaman, J., Donsky, A., Swarup, V., Miller, J. M., Narayan, S. M.
2022; 2
- **Identifying Atrial Fibrillation Mechanisms for Personalized Medicine.** *Journal of clinical medicine*
Deb, B., Ganesan, P., Feng, R., Narayan, S. M.
2021; 10 (23)
- **Rapid Exclusion of COVID Infection With the Artificial Intelligence Electrocardiogram.** *Mayo Clinic proceedings*
Attia, Z. I., Kapa, S., Dugan, J., Pereira, N., Noseworthy, P. A., Jimenez, F. L., Cruz, J., Carter, R. E., DeSimone, D. C., Signorino, J., Halamka, J., Chennaiah Gari, N. R., Madathala, et al
2021; 96 (8): 2081-2094
- **Editorial: Electrical and Structural Remodelling in Atrial Fibrillation: Phenotyping for Personalized Therapy** *FRONTIERS IN PHYSIOLOGY*
Chauhan, V. S., Verma, A., Narayan, S. M.
2021; 12: 697536
- **Immediate and Delayed Response of Simulated Human Atrial Myocytes to Clinically-Relevant Hypokalemia** *FRONTIERS IN PHYSIOLOGY*
Clerx, M., Mirams, G. R., Rogers, A. J., Narayan, S. M., Giles, W. R.
2021; 12: 651162
- **CONSISTENT SPATIOTEMPORAL VECTORS IN ATRIAL FIBRILLATION PREDICT RESPONSE TO ABLATION**
Ganesan, P., Bhatia, N., Beck, T. C., Ravi, N., Rogers, A., Krummen, D., Wang, P., Rappel, W., Narayan, S.
ELSEVIER SCIENCE INC.2021: 334
- **NON-INVASIVE TRACKING OF ATRIAL FIBRILLATION PREDICTS ACUTE TERMINATION BY ABLATION**
Rodrigo, M., Baykaner, T., Rappel, W., Narayan, S.
ELSEVIER SCIENCE INC.2021: 280
- **CLASSIFICATION OF INDIVIDUAL ATRIAL INTRACARDIAC ELECTROGRAMS BY DEEP LEARNING**
Rodrigo, M., Rogers, A., Ganesan, P., Krittanawong, C., Alhusseini, M., Narayan, S.
ELSEVIER SCIENCE INC.2021: 3217
- **PROBING MACHINE LEARNING TO SEPARATE ATRIAL FIBRILLATION FROM OTHER ARRHYTHMIAS**
Rodrigo, M., Rogers, A., Ganesan, P., Alhusseini, M., Krittanawong, C., Narayan, S.
ELSEVIER SCIENCE INC.2021: 3410
- **MACHINE LEARNING CLASSIFIES INTRACARDIAC ELECTROGRAMS OF ATRIAL FIBRILLATION FROM OTHER ARRHYTHMIAS**
Rodrigo, M., Rogers, A., Ganesan, P., Krittanawong, C., Alhusseini, M., Narayan, S.
ELSEVIER SCIENCE INC.2021: 279
- **VALIDATING NON-INVASIVE INDICES OF AF COMPLEXITY AGAINST INTRACARDIAC MEASUREMENTS**
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