



Mayo Clinic College of Medicine

Rochester, MN, USA

Associate Professor to full Professor position in 2025

Interventional/Structural cardiologist at Mayo Clinic

Cofounder of Diagnostics

Co-director of R&D Affluent Medical - Mitral and Tricuspid Program

Co-founder of Heart Vortex - Novel ECMO device

Associate Professor of Medicine Mayo Clinic Rochester, MN, USA

Curriculum Vitae

Mohammad Sarraf, MD
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Education

- 1991 – 1998 Medical School - Shahid Beheshti University of Medical Sciences

US Experience

- March 2021 - present: Mayo Clinic, Rochester, MN, Division of Cardiovascular Disease
- December 2019 – February 2021: Tenet Health Corporation. Director of Structural Heart Program. Princeton Baptist Health Hospital
- July 2016 – October 2019: University of Alabama at Birmingham (UAB) – Director of Structural Heart Program; Assistant Professor of Medicine
- June 29, 2013 – June 27, 2014: Mayo Clinic – Rochester; Interventional cardiology (Coronary Intervention Training)
- August 25, 2014 – June 19, 2015: North Shore University, Evanston Hospital (Incomplete due to family sickness. There has been a total of nearly 60 days of intermittent interruption between March 2015 to June 2015).
- July 2015 – June 2016: Mayo Clinic. Structural Heart Interventional Cardiology Training
- September 2018 – June 2020: University of Zurich, Zurich, Switzerland. Master of Advanced Sciences. Mentor: Francesco Maisano, MD
- July 2010 – June 2013: University of Minnesota, Minneapolis, MN. Mentor: Demetrios Yannopoulos, MD
- July 2008 – June 2010: University of Colorado Health Sciences Center at Denver, CO; Cardiology Research Fellow
- July 2006 – June 2008: University of Colorado Health Sciences Center at Denver, CO; Residency in internal medicine. Mentor: Michael R Bristow, MD PhD, and Gregory S. Schwartz, MD PhD
- July 2005 – June 2006: Penn-State University, Milton S. Hershey Medical Center; Internship in Internal Medicine
- April 2004 – June 2005: Texas Heart Institute, TX; Laboratory assistant. Mentor: Ward S Casscells, MD

Ongoing Research

- Understanding the Flow Dynamics, Heart Vortices: Collaborators: Dr. Francesco Maisano (San Raffaele University, Milan, Italy), Dr. Arash Kheradvar (UC Irvine, CA)

- Bioenergetics of the heart before and after Mitral Valve Repair by Pressure-Volume Loop (Columbia University, NY) Collaborator: Dr. Daniel Burkhoff, Dr. Michael I. Brener
- Understanding the geometry of the heart and evolution of the atrio-ventricular valves, Mayo Clinic, Rochester, MN. Principal Investigator

Patents

1. Vero-Vortex Cannula for ECMO. IP is available. Inventor
2. Mechanical Transcatheter Heart Valve. Provisional patent has been submitted in December 2022. Inventor
3. A-Valve. Bileaflet Transcatheter Mitral Valve Replacement. Co-inventor

Clinical Research

1. ECLIPSE Trial May 2018- September 2019 (PI)
2. PARTNER 3 Trial since 2017 until 2019 (Co-investigator)
3. COAPT Trial 2015-1017 (Co-investigator)

Consulting

- Affluent Medical for a novel approach to TMVR by Epygon THV system and Kalios Mitral Valve Repair System.

Publications

1. **Sarraf M**, Schrier RW. Tuberos Sclerosis and End-Stage Renal Disease. Nat Clin Pract Nephrol. 2009 Mar;5(3):172-6
2. **Sarraf M**, Masoumi A, Schrier RW. Cardiorenal syndrome in acute decompensated heart failure. Clin J Am Soc Nephrol. 2009 Dec;4(12):2013-26
3. **Sarraf M**, Masoumi A, Schrier RW. Cardiorenal versus renocardiac syndrome. SpringerVerlag Italia. Book Chapter In: Cardiorenal Syndrome 2010: PP: 15-35
4. **Sarraf M**, Yannopoulos D. Therapeutic hypothermia in acute myocardial infarction. Nov. 1, 2011, <http://www.remecajournals.com/ijcr/>. (peer reviewed online publication)
5. Shroff GR, **Sarraf M**, Sprinkle MD, Karim RM. Air Embolism Involving the coronary and Pulmonary Circulation: An Unusual Cause of Sudden Cardiac Death. Circulation. 2011 Dec;124(25): 2949-2950.
6. **Sarraf M**, Hellrung D, Henry TD. Refractory angina. Springer; Book chapter, In: Coronary heart disease 2012: PP: 431-445

7. **Sarraf M**, Francis GS. -blockers in stage B heart failure: a precursor of heart failure. *Heart Fail Clin.* 2012 Apr;8(2):237-45
8. **Sarraf M**, Francis GS. It is all about heart rate. Or is it? *J Am Coll Cardiol.* 2012 May 29;59(22):1946-7
9. **Sarraf M**, Lu L, Ye S, Reiter MJ, Greyson CR, Schwartz GG. Thiazolidinedione drugs promote onset, alter characteristics, and increase mortality of ischemic ventricular fibrillation in pigs. *Cardiovasc Drugs Ther.* 2012 Jun;26(3):195-204.
10. Segal N, Matsuura T, **Sarraf M**, Caldwell E, McKnite S, Zviman M, Aufderheide TP, Halperin HR, Lurie KG, Yannopoulos D. Ischemic postconditioning at the initiation of cardiopulmonary resuscitation facilitates functional cardiac and cerebral recovery after prolonged untreated ventricular fibrillation. *Resuscitation.* 2012 Nov;83(11):1397-403
11. Matsuura T, **Sarraf M**, Segal N, Thorsgard M, Caldwell E, Reese J, McKnite S, SantaCruz K, Aufderheide TP, Yannopoulos D. Ischemic post-conditioning and vasodilator therapy during standard cardiopulmonary resuscitation to reduce cardiac and brain injury after prolonged untreated ventricular fibrillation. *Resuscitation.* 2013 Aug;84(8):1143-9
12. Huang JV, Lu L, Ye S, Bergman BC, Sparagna GC, **Sarraf M**, Reusch JE, Greyson CR, Schwartz GG. Impaired contractile recovery after low-flow myocardial ischemia in a porcine model of metabolic syndrome. *Am J Physiol Heart Circ Physiol.* 2013 Mar 15;304(6):H861-73
13. **Sarraf M**, Steven R Goldsmith. Hyponatremia in Heart Failure. *Hyponatremia: Evaluation and Treatment.* 2013; pp:127-145
14. **Sarraf M**, Hirsch AT. Exercise in peripheral arterial disease. *Current Therapy in Vascular and Endovascular Surgery.* 2014;pp: 601-606
15. Low Wang CC, Lu L, Leitner JW, **Sarraf M**, Gianani R, Draznin B, Greyson CR, Reusch JE, Schwartz GG. Arterial insulin resistance in Yucatan micropigs with diet-induced obesity and metabolic syndrome. *J Diabetes Complications.* 2013 Jul-Aug;27(4):307-15
16. Vakil K, Roukoz H, **Sarraf M**, Krishnan B, Reisman M, Levy WC, Adabag S. Safety and Efficacy of MitraClip for Mitral Regurgitation: A Systematic Review. *Catheter Cardiovasc Interv.* 2014 Jul 1;84(1):129-36.
17. Riess ML, Matsuura TR, Bartos JA, Bienengraeber M, Aldakkak M, McKnite SH, Rees JN, Aufderheide TP, **Sarraf M**, Yannopoulos D. Anaesthetic postconditioning at the initiation of CPR improves myocardial and mitochondrial function in a pig model of prolonged untreated
18. ventricular fibrillation. *Resuscitation.* 2014 Oct 2. pii: S0300-9572(14)00761-8. doi:

10.1016/j.resuscitation.2014.09.019.

19. Riess ML, Matsuura TR, Bartos JA, Bienengraeber M, Aldakkak M, McKnite SH, Rees JN, Aufderheide TP, **Sarraf M**, Neumar RW, Yannopoulos D. Anaesthetic Postconditioning at the Initiation of CPR Improves Myocardial and Mitochondrial Function in a Pig Model of Prolonged Untreated Ventricular Fibrillation. *Resuscitation*. 2014;85(12):1745-51
20. Bartos JA, Matsuura TR, **Sarraf M**, Youngquist ST, McKnite SH, Rees JN, Sloper DT, Bates FS, Segal N, Debaty G, Lurie KG, Neumar RW, Metzger JM, Riess ML, Yannopoulos D. Bundled postconditioning therapies improve hemodynamics and neurologic recovery after 17 min of untreated cardiac arrest. *Resuscitation*. 2015;87:7-13.
21. **Sarraf M**, Feldman TE. Percutaneous intervention for mitral regurgitation. *Heart Fail Clin*. 2015;11(2):243-59
22. Feldman T, **Sarraf M**, Pedersen W. Balloon aortic valvuloplasty: Patient selection and technical considerations. *Journal of Structural Heart Disease*. 2015; 1, 1: 20-33
23. Alkhouli M, Zack CJ, **Sarraf M**, Bashir R, Nishimura RA, Eleid MF, Nkomo VT, Sandhu GS, Gulati R, Greason KL, Holmes DR, Rihal CS. Morbidity and Mortality Associated With Balloon Aortic Valvuloplasty: A National Perspective. *Circ Cardiovasc Interv*. 2017 May;10(5). pii:e004481
24. Al-Hijji MA, Alkhouli M, **Sarraf M**, Zack CJ, Malouf JF, Nkomo VT, Cabalka AK, Reeder GS, Rihal CS, Eleid MF. Characteristics and outcomes of re-do percutaneous paravalvular leak closure. *Catheter Cardiovasc Interv*. 2017 Feb 10. doi: 10.1002/ccd.26961
25. Alkhouli M, **Sarraf M**, Maor E, Sanon S, Cabalka A, Eleid MF, Hagler DJ, Pollak P, Reeder G, Rihal CS. Techniques and Outcomes of Percutaneous Aortic Paravalvular Leak Closure. *JACC Cardiovasc Interv*. 2016 Dec 12;9(23):2416-2426.
26. **Sarraf M**, Hillegass W. Routine invasive evaluation in non ST elevation myocardial infarction (NSTEMI-ACS): Optimizing best. *Catheter Cardiovasc Interv*. 2016 Nov;88(5):775-776
27. Alkhouli M, Zack CJ, **Sarraf M**, Eleid MF, Cabalka AK, Reeder GS, Hagler DJ, Maalouf JF, Nkomo VT, Rihal CS. Successful Percutaneous Mitral Paravalvular Leak Closure Is Associated With Improved Midterm Survival. *Circ Cardiovasc Interv*. 2017 Dec;10(12). pii: e005730.
28. Zareian R, Tseng JC, Fraser R, Meganck J, Kilduff M, **Sarraf M**, Dvir D, Kheradvar A. Effect of stent crimping on calcification of transcatheter aortic valves. *Interact Cardiovasc Thorac Surg*. 2019 Feb 21.

29. **Sarraf M**, Burkhoff D, Brener MI. First-in-Man Four Chamber Pressure-Volume Analysis Before and After Transcatheter Aortic Valve Replacement for Bicuspid Aortic Valve Disease. JACC-CR. January 2021:77 – 81
30. **Sarraf M**, Alkhouli MA. Double-Envelope Mitral Continuous-Wave Doppler: Pressure, Velocity, or Else? J Cardiothorac Vasc Anesth. 2021 Nov;35(11):3445-3446.
31. **Sarraf M**, Nagaraja V. Pressure-Volume Loop Analysis in Tricuspid Valve Intervention: Are We There Yet?! JACC Case Rep. 2021 Dec 15;3(18):1888-1890.
32. Brenner MI, Burkhoff D, **Sarraf M**. Right Ventricle Pressure-Volume Analysis Before and After Transcatheter Leaflet Approximation for Severe Mitral Regurgitation. JAMA Cardiol. 2021;6(2):e207209
33. Brener MI, Olds A, Nemeth S, Kurlansky P, Nazif TM, Vahl TP, Khaliq OK, Hamid NB, Patel A, Ng VG, Chen S, Cahill TJ, Rahim HM, Hahn RT, Bapat V, **Sarraf M**, Ahmed MI, Leon MB, Kodali S, Eudailey KW, George I. Suprasternal Versus Transfemoral Access for Transcatheter Aortic Valve Replacement: Insights From a Propensity Score Matched Analysis. J Am Heart Assoc. 2021 Aug 17;10(16):e020491.
34. Brener MI, Masoumi A, Ng VG, Tello K, Bastos MB, Cornwell WK 3rd, Hsu S, Tedford RJ, Lurz P, Rommel KP, Kresoja KP, Nagueh SF, Kanwar MK, Kapur NK, Hiremath G, **Sarraf M**, Van Den Enden AJM, Van Mieghem NM, Heerdt PM, Hahn RT, Kodali SK, Sayer GT, Uriel N, Burkhoff D. Invasive Right Ventricular Pressure-Volume Analysis: Basic Principles, Clinical Applications, and Practical Recommendations. Circ Heart Fail. 2022 Jan;15(1):e009101.
35. Russo G, Pedicino D, Chiastra C, Vinci R, Lodi Rizzini M, Genuardi L, **Sarraf M**, d'Aiello A, Bologna M, Aurigemma C, Bonanni A, Bellantoni A, D'Ascenzo F, Ciampi P, Zambrano A, Mainardi L, Ponzo M, Severino A, Trani C, Massetti M, Gallo D, Migliavacca F, Maisano F, Lerman A, Morbiducci U, Burzotta F, Crea F, Liuzzo G. Coronary artery plaque rupture and erosion: Role of wall shear stress profiling and biological patterns in acute coronary syndromes. Int J Cardiol. 2023 Jan 1;370:356-365

Member of Organizations

- Alpha Omega Alpha since April 2012
- American Heart Association
- American College of Cardiology

Awards

1. First place award. ACC Minnesota Chapter, May 2011
2. AOA Award in April 2012 designated by the medical students of the University of Minnesota

3. First Award in ACC-MN chapter May 2011
4. First Award in ACC-MN chapter June 2013
5. Young Investigating Award Winner AHA 2014
6. Young Investigating Award Winner ACC 2014