

Stanford



Sushma Reddy

Associate Professor of Pediatrics (Cardiology)

Pediatrics - Cardiology

CLINICAL OFFICES

- **Lucile Packard Children's Hospital**

725 Welch Rd

MC 5906

Palo Alto, CA 94304

Tel (650) 497-8000 **Fax** (650) 725-8343

- **Pediatric Cardiology**

750 Welch Rd Ste 325

MC 5731

Palo Alto, CA 94304

Tel (650) 723-7913 **Fax** (650) 725-8343

Bio

CLINICAL FOCUS

- Cardiac Critical Care
- Pediatric Cardiology

ACADEMIC APPOINTMENTS

- Associate Professor - University Medical Line, Pediatrics - Cardiology
- Member, Cardiovascular Institute
- Member, Maternal & Child Health Research Institute (MCHRI)

ADMINISTRATIVE APPOINTMENTS

- Anne T. and Robert M. Bass Faculty Scholar, Maternal Child Health Research Institute, Stanford University, (2021-2025)
- Clinical liaison to Basic Science and Engineering (BASE) program, Heart Center, Lucile Packard Children's Hospital, Stanford University, (2020- present)
- Research Director, Cardiovascular Intensive Care, Lucile Packard Children's Hospital, Stanford University, (2020- present)
- Director, Pediatric Heart Center Biobank, (2009- present)

HONORS AND AWARDS

- Clinical Science Research Award - Nomination, Department of Pediatrics, Stanford University (6/15/2022)
- 2022 Alwin C. Rambar-James B.D. Mark Award Excellence in Patient Care - Nomination, Stanford Medicine, Stanford University (2022)
- Pediatric Fellows Poster Award, Columbia University, NY (5/22/2006)

- Council on Clinical Cardiology, Women in Cardiology Travel Grant, American Heart Association Scientific Sessions (11/13/2005)
- Finalist, Young Investigator Award in Basic Research, Section on Cardiology and Cardiac Surgery, American Academy of Pediatrics (10/7/2005)
- Section on Cardiology and Cardiac Surgery's Educational Travel Grant, American Academy of Pediatrics (10/7/2005)
- Poster of Distinction, North American Society for Pediatric Gastroenterology, Hepatology & Nutrition (2002)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Review Editor, Editorial Board, Frontiers in Physiology (2022 - present)
- Research Mentor, Pediatric Cardiac Research Initiative in Imaging to support Mentoring (PRIISM) (2022 - present)
- Member, PCICS Research Committee (2016 - 2021)
- Member, AHA Grant Review Committee Member for pre and post-doctoral Fellowships in Population Science (2021 - present)
- Member, AHA CVDY SCILL committee (2017 - present)

PROFESSIONAL EDUCATION

- Board Certification: Pediatric Cardiology, American Board of Pediatrics (2018)
- Medical Education: Rajah Muthiah Medical College and Hospital Annamalai University (1998) India
- Residency: Children's Hospital of Michigan (2004) MI
- Fellowship: Morgan Stanley Children's Hospital (2008) NY
- Fellowship: Children's Hospital Boston (2009) MA
- Board Certification, Pediatric Cardiology , American Board of Pediatrics (2018)

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

My laboratory's overall goal is to (i) understand the mechanisms of right heart failure in children and adults with congenital heart disease and (ii) to develop biomarkers as a plasma signature of myocardial events to better understand the mechanisms of heart failure, improve monitoring of disease progression, early detection of heart failure and risk-stratification.

We have focused on tetralogy of Fallot population and single ventricle heart disease. As the survival continues to improve, so also has the incidence of heart failure. However, the underlying cellular mechanisms of heart failure are poorly understood as a result of which no targeted therapy is available. Since it is not possible to obtain heart muscle biopsies routinely on patients, we have taken a novel strategy of using Multi-Omics to better understand disease mechanisms and to follow patients over time comparing their Omics signature to themselves thereby personalizing their care. The goal is to create a targeted biomarker panel for clinical utility to be used in conjunction with imaging data to improve overall prediction of risk. Based on our work to date, we are also interested in understanding myocardial mitochondrial and vascular dysfunction as these have the potential to serve as novel therapeutic targets.

Teaching

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Dipti Tripathi

Publications

PUBLICATIONS

- **miR Profile of Chronic Right Ventricular Pacing: a Pilot Study in Children with Congenital Complete Atrioventricular Block.** *Journal of cardiovascular translational research*
Navarre, B. M., Clouthier, K. L., Ji, X., Taylor, A., Weldy, C. S., Dubin, A. M., Reddy, S.
2022
- **Cardiac Fibrosis in the Pressure Overloaded Left and Right Ventricle as a Therapeutic Target.** *Frontiers in cardiovascular medicine*
Schimmel, K., Ichimura, K., Reddy, S., Haddad, F., Spiekerkoetter, E.
2022; 9: 886553
- **iPSC model of congenital heart disease predicts disease outcome.** *Cell stem cell*
Tripathi, D., Reddy, S.
2022; 29 (5): 659-660
- **Three-Dimensional Deep-Tissue Imaging of the Right Ventricle Reveals Adaptive Reconstruction of the Capillary Network in Right Heart Failure**
Ichimura, K., Zhang, F., Boehm, M., Andruska, A. M., Reddy, S., Kheyfets, M., Metzger, R., Spiekerkoetter, E. F.
AMER THORACIC SOC.2022
- **Altered Cardiac Energetics and Mitochondrial Dysfunction in Hypertrophic Cardiomyopathy.** *Circulation*
Ranjbarvaziri, S., Kooiker, K. B., Ellenberger, M., Fajardo, G., Zhao, M., Vander Roest, A. S., Woldeyes, R. A., Koyano, T. T., Fong, R., Ma, N., Tian, L., Traber, G. M., Chan, et al
2021
- **Intraoperative and Postoperative Hemodynamic Predictors of Acute Kidney Injury in Pediatric Heart Transplant Recipients** *JOURNAL OF PEDIATRIC INTENSIVE CARE*
Hollander, S. A., Chung, S., Reddy, S., Zook, N., Yang, J., Vella, T., Navaratnam, M., Price, E., Sutherland, S. M., Algaze, C. A.
2021
- **RIGHT VENTRICULAR OUTFLOW TRACT AND PULMONARY ARTERY GEOMETRY IN PATIENTS WITH REPAIRED TETRALOGY OF FALLOT PRIOR TO PULMONARY VALVE REPLACEMENT-CHARACTERIZATION AND LONGITUDINAL ASSOCIATION WITH BIOPROSTHETIC VALVE FUNCTION**
Arana, V., Chan, F., Schiavone, N., Reddy, S., Hanley, F., Marsden, A., McElhinney, D.
ELSEVIER SCIENCE INC.2021: 1410
- **Improving Right Ventricular Function by Increasing BMP Signaling with FK506.** *American journal of respiratory cell and molecular biology*
Boehm, M., Tian, X., Ali, M. K., Mao, Y., Ichimura, K., Zhao, M., Kuramoto, K., Dannewitz Prosseda, S., Fajardo, G., Dufva, M. J., Qin, X., Kheyfets, V. O., Bernstein, et al
2021
- **Transcriptomic and Functional Analyses of Mitochondrial Dysfunction in Pressure Overload-Induced Right Ventricular Failure.** *Journal of the American Heart Association*
Hwang, H. V., Sandeep, N., Nair, R. V., Hu, D., Zhao, M., Lan, I. S., Fajardo, G., Matkovich, S. J., Bernstein, D., Reddy, S.
2021: e017835
- **Noncanonical WNT Activation in Human Right Ventricular Heart Failure** *FRONTIERS IN CARDIOVASCULAR MEDICINE*
Edwards, J. J., Brandimarto, J., Hu, D., Jeong, S., Yucel, N., Li, L., Bedi, K. C., Wada, S., Murashige, D., Hwang, H. V., Zhao, M., Margulies, K. B., Bernstein, et al
2020; 7: 582407
- **Diagnosis and treatment of right ventricular dysfunction in congenital heart disease** *CARDIOVASCULAR DIAGNOSIS AND THERAPY*
Santens, B., Van de Bruaene, A., De Meester, P., D'Alto, M., Reddy, S., Bernstein, D., Koestenberger, M., Hansmann, G., Budts, W.
2020; 10 (5): 1625-45
- **4HNE Impairs Myocardial Bioenergetics in Congenital Heart Disease-Induced Right Ventricular Failure.** *Circulation*
Hwang, H. V., Sandeep, N., Paige, S. L., Ranjbarvaziri, S., Hu, D., Zhao, M., Lan, I. S., Coronado, M., Kooiker, K. B., Wu, S. M., Fajardo, G., Bernstein, D., Reddy, et al
2020

- **Proceedings From the 2019 Stanford Single Ventricle Scientific Summit: Advancing Science for Single Ventricle Patients: From Discovery to Clinical Applications.** *Journal of the American Heart Association*
Reddy, S., Handler, S. S., Wu, S., Rabinovitch, M., Wright, G.
2020; 9 (7): e015871
- **Characterizing the Molecular and Histological Events That Govern Right Ventricular Recovery in a Novel Mouse Model of PA De-Banding**
Boehm, M., Tian, X., Mao, Y., Ichimura, K., Dufva, M., Ali, M. K., Prosseda, S., Shi, Y., Kuramoto, K., Reddy, S., Kheyfets, V. O., Metzger, R. J., Spiekerkoetter, et al
AMER THORACIC SOC.2020
- **Circulating whole genome miRNA expression corresponds to progressive right ventricle enlargement and systolic dysfunction in adults with tetralogy of Fallot.** *PLoS one*
Weldy, C. S., Syed, S. A., Amsellem, M., Hu, D., Ji, X., Pun, R., Taylor, A., Navarre, B., Reddy, S.
2020; 15 (11): e0241476
- **FK506 Requires ALK1 to Attenuate Stimulus-Induced Collagen Production in Human Cardiac Fibroblasts**
Ali, M., Tian, X., Boehm, M., Andruska, A. M., Zhao, M., Kuramoto, K., Bernstein, D., Metzger, R., Reddy, S., Spiekerkoetter, E. F.
AMER THORACIC SOC.2020
- **Delineating the molecular and histological events that govern right ventricular recovery using a novel mouse model of PA de-banding.** *Cardiovascular research*
Boehm, M., Tian, X., Mao, Y., Ichimura, K., Dufva, M. J., Ali, K., Prosseda, S. D., Shi, Y., Kuramoto, K., Reddy, S., Kheyfets, V. O., Metzger, R. J., Spiekerkoetter, et al
2019
- **Bleeding and Thrombosis With Pediatric Extracorporeal Life Support: A Roadmap for Management, Research, and the Future From the Pediatric Cardiac Intensive Care Society (Part Two).** *Pediatric critical care medicine : a journal of the Society of Critical Care Medicine and the World Federation of Pediatric Intensive and Critical Care Societies*
Penk, J. S., Reddy, S., Polito, A., Cisco, M. J., Allan, C. K., Bembea, M., Giglia, T. M., Cheng, H. H., Thiagarajan, R. R., Dalton, H. J.
2019
- **Right ventricular failure in congenital heart disease.** *Current opinion in pediatrics*
Friedberg, M. K., Reddy, S.
2019
- **Bleeding and Thrombosis With Pediatric Extracorporeal Life Support: A Roadmap for Management, Research, and the Future From the Pediatric Cardiac Intensive Care Society (Part 1).** *Pediatric critical care medicine : a journal of the Society of Critical Care Medicine and the World Federation of Pediatric Intensive and Critical Care Societies*
Penk, J. S., Reddy, S., Polito, A., Cisco, M. J., Allan, C. K., Bembea, M. M., Giglia, T. M., Cheng, H. H., Thiagarajan, R. R., Dalton, H. J.
2019
- **Loss of Endothelium-Derived Wnt5a Is Associated With Reduced Pericyte Recruitment and Small Vessel Loss in Pulmonary Arterial Hypertension** *CIRCULATION*
Yuan, K., Shamskhov, E. A., Orcholski, M. E., Nathan, A., Reddy, S., Honda, H., Mani, V., Zeng, Y., Ozen, M. O., Wang, L., Demirci, U., Tian, W., Nicolls, et al
2019; 139 (14): 1710–24
- **Overexpression of Hypoxia Inducible Factors in Pulmonary Artery Smooth Muscle Cells Mitigates Hypoxia-Induced Pulmonary Hypertension**
Barnes, E. A., Che, X., Ito, R., Reddy, S., Cornfield, D. N.
AMER THORACIC SOC.2019
- **A process for academic societies to develop scientific statements and white papers: experience of the Pediatric Cardiac Intensive Care Society.** *Cardiology in the young*
Reddy, S., Polito, A., Staveski, S., Dalton, H.
2018: 1–4
- **Cardiovascular Disease in the Young Council's Science and Clinical Education Lifelong Learning Committee: Year in Review** *JOURNAL OF THE AMERICAN HEART ASSOCIATION*
Reddy, S., Marino, B. S., Baker-Smith, C. M., Beaton, A., Krawczeski, C. D., Miyake, C. Y., Cnota, J. F., Glatz, A. C., Feingold, B., Romano, J. C., Cabrera, A. G., John, A. S., Cohen, et al
2018; 7 (21): e010617

- **Renin-Angiotensin-Aldosterone System Inhibitors for Right Ventricular Dysfunction in Tetralogy of Fallot Quo Vadis?** *CIRCULATION*
Reddy, S., Bernstein, D., Newburger, J. W.
2018; 137 (14): 1472–74
- **Physiological Mitochondrial Fragmentation Is a Normal Cardiac Adaptation to Increased Energy Demand.** *Circulation research*
Coronado, M. n., Fajardo, G. n., Nguyen, K. n., Zhao, M. n., Kooiker, K. n., Jung, G. n., Hu, D. Q., Reddy, S. n., Sandoval, E. n., Stotland, A. n., Gottlieb, R. A., Bernstein, D. n.
2018; 122 (2): 282–95
- **Loss of Endothelial Derived WNT5A is Associated with Reduced Pericyte Recruitment and Small Vessel Loss in Pulmonary Arterial Hypertension.** *Circulation*
Yuan, K. n., Shamskhou, E. A., Orcholski, M. E., Nathan, A. n., Reddy, S. n., Honda, H. n., Mani, V. n., Zeng, Y. n., Ozen, M. O., Wang, L. n., Demirci, U. n., Tian, W. n., Nicolls, et al
2018
- **miR-21 is associated with fibrosis and right ventricular failure.** *JCI insight*
Reddy, S., Hu, D., Zhao, M., Blay, E., Sandeep, N., Ong, S., Jung, G., Kooiker, K. B., Coronado, M., Fajardo, G., Bernstein, D.
2017; 2 (9)
- **Institution of Veno-arterial Extracorporeal Membrane Oxygenation Does Not Lead to Increased Wall Stress in Patients with Impaired Myocardial Function** *PEDIATRIC CARDIOLOGY*
Koth, A. M., Axelrod, D. M., Reddy, S., Roth, S. J., Tacy, T. A., Punn, R.
2017; 38 (3): 539-546
- **Compassionate deactivation of ventricular assist devices in pediatric patients** *JOURNAL OF HEART AND LUNG TRANSPLANTATION*
Hollander, S. A., Axelrod, D. M., Bernstein, D., Cohen, H. J., Sourkes, B., Reddy, S., Magnus, D., Rosenthal, D. N., Kaufman, B. D.
2016; 35 (5): 564-567
- **De Novo and Rare Variants at Multiple Loci Support the Oligogenic Origins of Atrioventricular Septal Heart Defects.** *PLoS genetics*
Priest, J. R., Osoegawa, K., Mohammed, N., Nanda, V., Kundu, R., Schultz, K., Lammer, E. J., Girirajan, S., Scheetz, T., Waggott, D., Haddad, F., Reddy, S., Bernstein, et al
2016; 12 (4)
- **Time-dependent evolution of functional vs. remodeling signaling in induced pluripotent stem cell-derived cardiomyocytes and induced maturation with biomechanical stimulation.** *FASEB journal : official publication of the Federation of American Societies for Experimental Biology*
Jung, G., Fajardo, G., Ribeiro, A. J., Kooiker, K. B., Coronado, M., Zhao, M., Hu, D. Q., Reddy, S., Kodo, K., Sriram, K., Insel, P. A., Wu, J. C., Pruitt, et al
2015
- **Molecular Mechanisms of Right Ventricular Failure.** *Circulation*
Reddy, S., Bernstein, D.
2015; 132 (18): 1734-1742
- **The vulnerable right ventricle.** *Current opinion in pediatrics*
Reddy, S., Bernstein, D.
2015; 27 (5): 563-568
- **BMP2 Preserves Mitochondrial Function and DNA during Reoxygenation to Promote Endothelial Cell Survival and Reverse Pulmonary Hypertension** *CELL METABOLISM*
Diebold, I., Hennigs, J. K., Miyagawa, K., Li, C. G., Nickel, N. P., Kaschwich, M., Cao, A., Wang, L., Reddy, S., Chen, P., Nakahira, K., Alcazar, M. A., Hopper, et al
2015; 21 (4): 596-608
- **Adrenergic receptor genotype influences heart failure severity and β -blocker response in children with dilated cardiomyopathy.** *Pediatric research*
Reddy, S., Fung, A., Manlihot, C., Selamet Tierney, E. S., Chung, W. K., Blume, E., Kaufman, B. D., Goldmuntz, E., Colan, S., Mital, S.
2015; 77 (2): 363-369
- **Variability of characteristics and outcomes following cardiopulmonary resuscitation events in diverse ICU settings in a single, tertiary care children's hospital*.** *Pediatric critical care medicine*
Gupta, P., Yan, K., Chow, V., Dao, D. T., Gossett, J. M., Leong, K., Franzon, D., Halamek, L. P., Reddy, S., Berg, R. A., Roth, S. J., Nadkarni, V. M.
2014; 15 (3): e128-41

- **Atherosclerosis causing recurrent catastrophic aortopulmonary shunt dehiscence in a patient with Alagille syndrome.** *Pediatric cardiology*
May, L., Hanley, F. L., Connolly, A. J., Reddy, S.
2013; 34 (8): 1945-1948
- **Deletion of the beta 2-adrenergic receptor prevents the development of cardiomyopathy in mice** *JOURNAL OF MOLECULAR AND CELLULAR CARDIOLOGY*
Fajardo, G., Zhao, M., Urashima, T., Farahani, S., Hu, D., Reddy, S., Bernstein, D.
2013; 63: 155-164
- **FK506 activates BMPR2, rescues endothelial dysfunction, and reverses pulmonary hypertension.** *journal of clinical investigation*
Spiekerkoetter, E., Tian, X., Cai, J., Hopper, R. K., Sudheendra, D., Li, C. G., El-Bizri, N., Sawada, H., Haghghat, R., Chan, R., Haghghat, L., de Jesus Perez, V., Wang, et al
2013; 123 (8): 3600-3613
- **Altered ubiquitin-proteasome signaling in right ventricular hypertrophy and failure.** *American journal of physiology. Heart and circulatory physiology*
Rajagopalan, V., Zhao, M., Reddy, S., Fajardo, G., Wang, X., Dewey, S., Gomes, A. V., Bernstein, D.
2013; 305 (4): H551-62
- **Physiologic and molecular characterization of a murine model of right ventricular volume overload.** *American journal of physiology. Heart and circulatory physiology*
Reddy, S., Zhao, M., Hu, D., Fajardo, G., Katznelson, E., Punn, R., Spin, J. M., Chan, F. P., Bernstein, D.
2013; 304 (10): H1314-27
- **Hypoxia-inducible factor-1a in pulmonary artery smooth muscle cells lowers vascular tone by decreasing Myosin light chain phosphorylation.** *Circulation research*
Kim, Y., Barnes, E. A., Alvira, C. M., Ying, L., Reddy, S., Cornfield, D. N.
2013; 112 (9): 1230-1233
- **Dynamic microRNA expression during the transition from right ventricular hypertrophy to failure** *PHYSIOLOGICAL GENOMICS*
Reddy, S., Zhao, M., Hu, D., Fajardo, G., Hu, S., Ghosh, Z., Rajagopalan, V., Wu, J. C., Bernstein, D.
2012; 44 (10): 562-575
- **Recipient Genotype Is a Predictor of Allograft Cytokine Expression and Outcomes After Pediatric Cardiac Transplantation** *80th Annual Scientific Session of the American-Heart-Association (AHA)*
Auerbach, S. R., Manlhiot, C., Reddy, S., Kinnear, C., Richmond, M. E., Gruber, D., McCrindle, B. W., Deng, L., Chen, J. M., Addonizio, L. J., Chung, W. K., Mital, S.
ELSEVIER SCIENCE INC.2009: 1909-17
- **Genomic Profiling of Left and Right Ventricular Hypertrophy in Congenital Heart Disease** *53rd Annual Scientific Session of the American-College-of-Cardiology*
Kaufman, B. D., Desai, M., Reddy, S., Osorio, J. C., Chen, J. M., Mosca, R. S., Ferrante, A. W., Mital, S.
CHURCHILL LIVINGSTONE INC MEDICAL PUBLISHERS.2008: 760-67
- **Pyloric Stenosis** *AAP Textbook on Pediatric Care*
Sushma Reddy, Deepak M Kamat
2008; Chapter315
- **RAAS gene polymorphisms influence progression of pediatric hypertrophic cardiomyopathy** *77th Scientific Meeting of the American-Heart-Association*
Kaufman, B. D., Auerbach, S., Reddy, S., Manlhiot, C., Deng, L., Prakash, A., Printz, B. F., Gruber, D., Papavassiliou, D. P., Hsu, D. T., Sehnert, A. J., Chung, W. K., Mital, et al
SPRINGER.2007: 515-23
- **Failure of right ventricular adaptation in children with tetralogy of Fallot** *78th Annual Scientific Session of the American-Heart-Association*
Reddy, S., Osorio, J. C., Duque, A. M., Kaufman, B. D., Phillips, A. B., Chen, J. M., Quaegebeur, J., Mosca, R. S., Mital, S.
LIPPINCOTT WILLIAMS & WILKINS.2006: I37-I42
- **Inlet patch: Heterotopic gastric mucosa - Another contributor to supraesophageal symptoms?** *JOURNAL OF PEDIATRICS*
Macha, S., Reddy, S., Rabah, R., Thomas, R., Tolia, V.
2005; 147 (3): 379-382
- **Restrictive interatrial communication in hypoplastic left heart syndrome after modified Fontan repair** *ANNALS OF THORACIC SURGERY*

Nemeh, H. W., Reddy, S., Walters, H. L., Hakimi, M., Ross, R. D.
2003; 76 (6): 2089-2091