

Ashish Manohar

Stanford University
Postdoctoral Scholar
Cardiovascular Medicine

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RESEARCH INTERESTS

Medical imaging	4D computed tomography	Cardiac mechanics
Image analysis	Cardiovascular imaging	Risk prediction modeling

EDUCATION

Doctor of Philosophy, Engineering Sciences 2017-2022
Mechanical Engineering, UC San Diego
Dissertation: Spatio-temporal resolution of regional cardiac function assessment with four-dimensional computed tomography
Advisor: Dr. Elliot R. McVeigh

Master of Science, Engineering Sciences 2015-2017
Mechanical Engineering, UC San Diego
Thesis: Estimation of regional left ventricular function based on texture analysis of computed tomography images

Bachelor of Engineering, Mechanical Engineering 2011-2015
R.V. College of Engineering, Bangalore, India

RESEARCH EXPERIENCE

Center for Academic Medicine, Stanford University 2022-present
Postdoctoral Scholar

- Integrative structural and functional image analysis for enhanced risk stratification of cardiomyopathies

Cardiovascular Imaging Lab, UC San Diego 2017-2022
PhD Candidate

- Spatio-temporal resolution of 4DCT for regional cardiac function assessment
- Modeling cardiac mechanics
- 4DCT for guiding cardiac resynchronization therapy

del Alamo Research Group, UC San Diego 2015-2017
Graduate Student Researcher

- Texture analysis of cardiac muscle walls
- Regional values of fractal dimension as surrogate markers of left ventricular function

Micro Air Vehicle Unit, National Aerospace Laboratories 2014-2015
Research Intern

- Design and fabrication of flapping wing micro air vehicles
- Asymmetric flapping for differential thrust generation

FELLOWSHIPS & AWARDS

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|---------------------------------------------------------------|------|
| • Postdoctoral Fellowship , American Heart Association | 2024 |
| • Predoctoral Fellowship , American Heart Association | 2020 |
| • Siemens Young Scientist Award , SPIE Medical Imaging | 2019 |

REVIEWER ACTIVITIES

- Medical Physics
- J of Cardiovascular Computed Tomography
- PLOS One
- J of Clinical Medicine
- Intl. J of Imaging Systems and Technology
- European Radiology
- Eur Heart J Cardiovascular Imaging
- J of Medical Imaging
- J of Personalized Medicine
- Stanford CVI Summer Research Program Application Review Committee

MENTORING, OUTREACH & LEADERSHIP

- **Stanford Cardiovascular Institute Early Career Committee,** 2023-present
Member of committee dedicated to promoting excellence in cardiovascular research through collaboration, mentorship, and outreach
- **Stanford Science Small Groups,** 2024-present
Mentor to a group of 5 students from local community colleges providing socio-emotional and instructional mentorship.
- **Stanford Institutes of Medicine Summer Research Program,** 2023-present
Mentor to two high school students promoting interest in and understanding of scientific research
- **Stanford Cardiovascular Institute Early Career Symposium,** 2023
Planning and organization committee member
- **UCSD Mechanical & Aerospace Engineering Mentoring Program,** 2021-2022
Mentor to two mechanical and aerospace engineering undergraduate students
- **Jacobs School of Engineering Undergraduate Mentoring Program,** 2020-2021
Mentor to engineering students providing socio-emotional support as they navigate their undergraduate journey
- **UCSD International Graduate Student Mentoring Program,** 2019-2020
Mentor for incoming international graduate students, providing support and resources to aid in their transition
- **UCSD Mechbio Symposium,** 2016
Lead Student Organizer

TEACHING EXPERIENCE

- Spring 2020: Teaching Assistant, Imaging cardiovascular disease (BENG 280C)
Received 100% positive student evaluations
- Spring 2019: Teaching Assistant, Imaging cardiovascular disease (BENG 280C)
Received 100% positive student evaluations
- Fall 2018: Teaching Assistant, Biomedical imaging (BENG 280A)
Received 100% positive student evaluations
- Spring 2018: Teaching Assistant, Advanced cardiac imaging (BENG 207)
Student evaluations not recorded
- Winter 2018: Teaching Assistant, Fluid mechanics (MAE 101B)
Received 100% positive student evaluations
- Fall 2017: Teaching Assistant, Aerodynamics (MAE 104)
Received 100% positive student evaluations
- Winter 2017: Teaching Assistant, Fluid mechanics (MAE 101A)
Received 100% positive student evaluations
- Summer 2016: Instructor, Introduction to fluid mechanics (UCSD Academic Connections)
Designed course curriculum and taught a class of 15 students between the 9-12 grades
- Winter 2016: Teaching Assistant, Fluid mechanics (CENG 101A)
Received 80% positive student evaluations

PUBLICATIONS (* denotes equal contribution)

1. Zhye Yin*, Pengwei Wu*, **Ashish Manohar**, Elliot McVeigh, and Jed Pack, “Protocol optimization for functional cardiac CT imaging using noise emulation in the raw data domain”, *Medical Physics*, 2024.
2. **Ashish Manohar**, James Yang, Jed Pack, Gordon Ho, and Elliot McVeigh, “Motion correction of wide-detector 4DCT images for cardiac resynchronization therapy planning”, *Journal of Cardiovascular Computed Tomography*, 2024.
3. **Ashish Manohar**, Davis Vigneault, Deborah Kwon, Kadir Caliskan, Ricardo Budde, Alexander Hirsch, Seung-Pyo Lee, Whal Lee, Anjali Owens, Harold Litt, Francois Haddad, Gabriel Mistelbauer, Matthew Wheeler, Daniel Rubin, Wilson Tang, and Koen Nieman, “Quantitative metrics of the LV trabeculated layer by cardiac CT and cardiac MRI in patients with suspected noncompaction cardiomyopathy”, *European Radiology*, 2023.
4. Zhenhong Chen, Francisco Contijoch, Andrew Kahn, Seth Kligerman, Hari Narayan, **Ashish Manohar**, and Elliot McVeigh, “Myocardial regional shortening from 4D cardiac CT angiography for the detection of left ventricular segmental wall motion abnormality”, *Radiology: Cardiothoracic Imaging*, 2023.
5. **Ashish Manohar**, Gabrielle Colvert, James Yang, Zhenhong Chen, Maria Ledesma-Carbayo, Mads Brix Kronborg, Anders Sommer, Bjarne Linde Nørgaard, Jens Cosedis Nielsen, and Elliot McVeigh, “Prediction of cardiac resynchronization therapy response using a lead placement score derived from 4-dimensional computed tomography”, *Circulation: Cardiovascular Imaging*, 2022.
6. Zhenhong Chen, Francisco Contijoch, Gabrielle Colvert, **Ashish Manohar**, Andrew Kahn, Hari Narayan, and Elliot McVeigh, “Detection of Left Ventricular Wall Motion Abnormalities from Volume Rendering of 4DCT Cardiac Angiograms Using Deep Learning”, *Frontiers in Cardiovascular Medicine*, 2022.
7. **Ashish Manohar***, Gabrielle Colvert*, Juan Ortuño, Zhenhong Chen, James Yang, Brendan Colvert, Patricia Bandettini, Marcus Chen, Maria Ledesma-Carbayo, and Elliot McVeigh, “Regional left ventricular endocardial strains estimated from low-dose 4DCT: comparison with cardiac magnetic resonance feature tracking”, *Medical Physics*, 2022.
8. **Ashish Manohar**, Jed Pack, Andrew Schluchter, and Elliot McVeigh, “Four-dimensional computed tomography of the left ventricle, part II: estimation of mechanical activation times”, *Medical Physics*, 2022.
9. Jed Pack, **Ashish Manohar**, Sathish Ramani, Bernhard Claus, Zhye Yin, Francisco Contijoch, Andrew Schluchter, and Elliot McVeigh, “Four-dimensional computed tomography of the left ventricle, part I: motion artifact reduction”, *Medical Physics*, 2022.
10. Gabrielle Colvert, **Ashish Manohar**, Francisco Contijoch, James Yang, Jeremy Glynn, Philipp Blanke, Jonathan Leipsic, and Elliot McVeigh, “Novel 4DCT method to measure regional left ventricular endocardial shortening before and after transcatheter mitral valve implantation”, *Structural Heart*, 2021.
11. **Ashish Manohar**, Gabrielle Colvert, Andrew Schluchter, Francisco Contijoch, and Elliot McVeigh, “Anthropomorphic left ventricular mesh phantom: a framework to investigate the accuracy of SQUEEZ using Coherent Point Drift for the detection of regional wall motion abnormalities”, *Journal of Medical Imaging*, 2019.
12. **Ashish Manohar**, Lorenzo Rossini, Gabrielle Colvert, Davis Vigneault, Francisco Contijoch, Marcus Chen, Juan Carlos del Alamo, and Elliot McVeigh, “Regional dynamics of fractal dimension of the left ventricular endocardium from cine computed tomography images”, *Journal of Medical Imaging*, 2019.

CONFERENCE PROCEEDINGS & PRESENTATIONS

1. **Ashish Manohar**, Dominic Profit, Bethzaida Sandoval Valle, Domenico Mastrodicasa, Gabriel Mistelbauer, Koen Nieman, and Dominik Fleischmann, “Zero-shot learning for automated segmentation of true and false lumen in type-B aortic dissection from CT angiography images”, *European Congress of Radiology*, February 2024, Vienna, Austria.

2. **Ashish Manohar**, Davis Vigneault, Matthew Wheeler, Ricardo Budde, Alexander Hirsch, Kadir Caliskan, Seung-Pyo Lee, Harold Litt, Anjali Owens, Deborah Kwon, Wilson Tang, and Koen Nieman, “Quantitative evaluation of excessive LV trabeculation - a comparison between cardiac CT and MRI”, *18th Annual Scientific Meeting of the Society of Cardiovascular Computed Tomography*, July 2023, Boston, USA.
3. Gabrielle Colvert, **Ashish Manohar**, Jeremy Glynn, and Elliot McVeigh, “Characterization of changes in 4DCT-derived regional left ventricular function before and 1-month after transcatheter mitral valve implantation”, *70th Annual Scientific Session of the American College of Cardiology*, May 2021, Atlanta, USA.
4. **Ashish Manohar**, Andrew Schluchter, Francisco Contijoch, and Elliot McVeigh, “Anthropomorphic dyssynchronous LV phantom: a framework to investigate the assessment of LV dyssynchrony using 4DCT-SQUEEZ”, *15th Annual Scientific Meeting of the Society of Cardiovascular Computed Tomography*, July 2020, Seattle, USA.
5. **Ashish Manohar**, Gabrielle Colvert, Francisco Contijoch, and Elliot McVeigh, “Quantitative assessment of localized regional wall motion abnormalities from 4DCT: recursive estimation of SQUEEZ (reSQUEEZ)”, *14th Annual Scientific Meeting of the Society of Cardiovascular Computed Tomography*, July 2019, Baltimore, USA.
6. Gabrielle Colvert, **Ashish Manohar**, Brendan Colvert, Francisco Contijoch, and Elliot McVeigh, “Analysis of longitudinal and circumferential strain on the endocardial surface using 4DCT”, *14th Annual Scientific Meeting of the Society of Cardiovascular Computed Tomography*, July 2019, Baltimore, USA.
7. **Ashish Manohar**, Gabrielle Colvert, Andrew Schluchter, Francisco Contijoch, and Elliot McVeigh, “LV systolic point-cloud model to quantify accuracy of CT derived regional strain”, *Medical Imaging 2019: Image-Guided Procedures, Robotic Interventions, and Modeling*, February 2019, San Diego, USA.
8. Gabrielle Colvert, **Ashish Manohar**, Brendan Colvert, Andrew Schluchter, Francisco Contijoch, and Elliot McVeigh, “Novel measurement of LV twist using 4DCT: quantifying accuracy as a function of image noise”, *Medical Imaging 2019: Biomedical Applications in Molecular, Structural, and Functional Imaging*, February 2019, San Diego, USA.
9. **Ashish Manohar**, Lorenzo Rossini, Gabrielle Colvert, Davis Vigneault, Francisco Contijoch, Marcus Chen, Juan Carlos del Alamo, and Elliot McVeigh, “Changes in fractal dimension of the LV endocardium are reduced in myocardial dysfunction”, *91st Annual Scientific Session of the American Heart Association*, November 2018, Chicago, USA.

INVITED TALKS

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| 1. Biomechanics Seminar Series
Stanford University | 2024 |
| 2. Early Innovators Spotlight
American Heart Association Scientific Sessions | 2024 |

REFERENCES

1. Dr. Koen Nieman
Professor
Departments of Medicine and Radiology, Stanford University
knieman@stanford.edu
2. Dr. Elliot McVeigh
Professor
Department of Bioengineering, UC San Diego
emcveigh@ucsd.edu
3. Dr. Dominik Fleischmann
Professor
Department of Radiology, Stanford University
d.fleischmann@stanford.edu
4. Dr. Francisco Contijoch
Associate Professor
Department of Bioengineering, UC San Diego
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