

# Ashish Manohar

University of California San Diego  
PhD Candidate  
Department of Mechanical and Aerospace Engineering  
Altman Clinical and Translational Research Institute

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## RESEARCH INTEREST

Medical imaging  
4DCT

Cardiac CT  
Modeling

Cardiac mechanics  
Motion correction

## EDUCATION

*Doctor of Philosophy*, Engineering Sciences 2017-2022 (expected)  
Mechanical Engineering, UC San Diego  
Thesis: Spatio-temporal resolution of regional cardiac function assessment with four-dimensional x-ray computed tomography  
Advisor: Dr. Elliot R. McVeigh  
GPA: 3.93/4.0

*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  
Advisor: Dr. Juan Carlos del Alamo  
GPA: 3.92/4.0

*Bachelor of Engineering*, Mechanical Engineering 2011-2015  
R.V. College of Engineering, Bangalore, India  
GPA: 8.62/10.0

## RESEARCH EXPERIENCE

*Cardiovascular Imaging Lab, UC San Diego* 2017-present  
Graduate Student Researcher

- 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

## AWARDS

- **American Heart Association Predoctoral Fellowship**, 2020
- **Siemens Young Scientist Award**, SPIE Medical Imaging, 2019

## REVIEW ACTIVITIES

- PLOS One
- Medical Physics

## LEADERSHIP & MENTORING EXPERIENCE

- **UCSD MAE Mentoring Program**, Mentor, 2021-present
- **Jacobs School of Engineering Undergraduate Mentoring Program**, Mentor, 2020-present
- **UCSD International Graduate Student Mentoring Program**, Mentor, 2019-present
- **UCSD Mechbio Symposium 2016**, Lead Student Organizer

## TEACHING EXPERIENCE

- Fall 2016: Teaching Assistant, Fluid mechanics (CENG 101A)  
*Received 80% 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 2017: Teaching Assistant, Fluid mechanics (MAE 101A)  
*Received 100% positive student evaluations*
- Fall 2017: Teaching Assistant, Aerodynamics (MAE 104)  
*Received 100% positive student evaluations*
- Winter 2018: Teaching Assistant, Fluid mechanics (MAE 101B)  
*Received 100% positive student evaluations*
- Spring 2018: Teaching Assistant, Advanced cardiac imaging (BENG 207)  
*Student evaluations not applicable*
- Fall 2018: Teaching Assistant, Biomedical imaging (BENG 280A)  
*Received 100% positive student evaluations*
- Spring 2019: Teaching Assistant, Imaging cardiovascular disease (BENG 280C)  
*Received 100% positive student evaluations*
- Spring 2020: Teaching Assistant, Imaging cardiovascular disease (BENG 280C)  
*Received 100% positive student evaluations*

## PUBLICATIONS

1. **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*, 2021 (accepted).
2. Jed D. 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*, 2021 (under revision).
3. 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.
4. **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.
5. **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.

## IN PREPARATION (\* denotes equal contribution)

1. **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 CRT response using a lead placement score derived from 4DCT”, *Circulation: Cardiovascular Imaging*.
2. **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 4DCT-derived 3D deformation fields: comparison with cardiac magnetic resonance feature tracking”, *Medical Physics*.
3. Zhenhong Chen, Gabrielle Colvert, **Ashish Manohar**, Andrew Kahn, Francisco Contijoch, and Elliot McVeigh, “Detection of wall motion abnormalities from volume rendering of 4DCT cardiac angiograms using deep learning”, *Radiology: Cardiothoracic Imaging*.

## CONFERENCE PROCEEDINGS & PRESENTATIONS

1. 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.
2. **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.
3. **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.
4. 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.
5. **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.
6. 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.
7. **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.

## REFERENCES

1. Dr. Elliot McVeigh  
Professor  
Department of Bioengineering, UC San Diego  
emcveigh@eng.ucsd.edu
2. Dr. Juan Carlos del Alamo  
Professor  
Department of Mechanical Engineering, University of Washington  
juancar@uw.edu
3. Dr. Francisco Contijoch  
Assistant Professor  
Department of Bioengineering, UC San Diego  
fcontijoch@eng.ucsd.edu
4. Dr. Jed Pack  
Senior Imaging Scientist  
GE Global Research  
jed.pack@ge.com