University of California, Irvine 6080 Interdisciplinary Science and Engineering Building Irvine, CA 92697-2700 **2** 949-824-3211  $\boxtimes$  grosberg@uci.edu 🖆 grosberglab.eng.uci.edu

# Anna "Anya" Grosberg

Curriculum Vitae

#### Current

July 2018-Present

#### Associate Professor of Biomedical Engineering, University of California, Irvine; UCI Edwards Lifesciences Foundation Cardiovascular Innovation and Research Center (CIRC). Irvine. CA.

- Functional characterization of iPS-derived cardiomyocytes
- Computational modeling of biological systems
- Micro-devices for biological assays •

- **Biomechanics**
- Cardiac mechanics
- **Tissue Architecture Metrics**

# Education

- Postdoctoral Fellow in Bioengineering, Harvard University, Cambridge, MA. 2008-2012
  - **Ph.D.** in Bioengineering, California Institute of Technology, Pasadena, CA. 2008
  - 2002 Bachelor of Chemical Engineering with a Minor in Chemistry, Bachelor of Biomedical Engineering, University of Minnesota, Minneapolis, MN.

#### Honors

- Chancellor's Award for Excellence in Undergraduate Research, Awarded for mentoring 2022 of undergraduate student research.
- 2018 Visiting faculty Program fellowship in the Department of Chemical and Biological Physics at the Weizmann Institute of Science.
- 2017-18 UCI Samueli School of Engineering, Early Career Excellence in Research.
  - American Heart Association "Volunteer of the Year for Go Red for Women 2017". 2017
  - Paper J-23J-23paper:award1 selected for JBME Editors' Choice papers for 2016. 2017
  - Society of Toxicology IVAM Specialty Section MB Research Award For Distinction in 2011 Practical In Vitro and Alternative Toxicology Methods.
  - 2011 Second Place: Postdoc in IVAM Annual Student/Postdoctoral competition.
  - 2011 Society of Toxicology RSESS Postdoctoral Award.
  - 2010 The Safety Pharmacology Society Jr. Investigator Travel Award.
  - Johns Hopkins University Institute for Computational Medicine NHLBI Short Course. 2010
  - 2008 The Hans G. Hornung Prize, Awarded to a student advised by Aeronautics faculty for the best oral PhD defense presentation.
  - The Ernest E. Sechler Memorial Award in Aeronautics, Awarded to a student who has 2008 made the most significant contribution to the teaching and research effort of GALCIT.
- Rosen Fellowship for a California Institute of Technology graduate student. 2002-2003

- 2001–2002 UROP Award for University of Minnesota undergraduate research.
  - 1997 Semi-Finalist in Westinghouse Competition.

## Experience

#### Research

- 2018- Associate Professor, University of California, Irvine; 1. Department of Biomedical Engineering; 2. Department of Chemical and Biological Engineering; 3. UCI Edwards Lifesciences Foundation Cardiovascular Innovation and Research Center (CIRC); 4. Center for Complex Biological Systems; 5. Stem Cell Research Center; 6. NSF-Simons Center for Multiscale Cell Fate Research, Irvine, CA.
- 2012-2018 Assistant Professor of Biomedical Engineering, University of California, Irvine; The Edwards Lifesciences Center for Advanced Cardiovascular Technology, Irvine, CA.
- 2008-2012 **Postdoctoral Fellow**, *Harvard University, School of Engineering and Applied Sciences*, Cambridge, MA.
  - In vitro and in silico Modeling of cardiac tissue formation
  - Studying engineered cardiac tissue dynamic behavior
  - Developing an assay for efficient characterization of cardiac tissue behavior
  - o Advisor: Prof. Kevin Kit Parker
- 2002-2008 **Ph.D. Thesis Research**, *California Institute of Technology, Option of Bioengineering*, Pasadena, CA.
  - Developing a novel computational model of cardiac mechanics
  - Computational modeling of cardiac pathology and development
  - Analytical modeling of heart twist mechanics
  - o Advisor: Prof. Morteza Gharib
- 2001–2002 **Student/Fellow Researcher**, University of Minnesota, Department of Pharmaceutics, Minneapolis, MN.
  - Mathematical modeling of assisted nerve regeneration
  - Modeling and developing a new drug delivery method (for diazepam)
  - o Advisor: Prof. Ronald A. Siegel
- Summer 2000 **Student Researcher**, *École normal Supériure, Laboratoire de Physique Statistique,* Paris, France.
  - Computational modeling of glass transition in polydisperse system of disks
  - Advisor: Prof. Werner Krauth

#### **Teaching**

Winter<br/>2019-2023Biotransport Phenomena (BME 150), University of California, Irvine.Spring 2022Quantitative Physiology: Organ Transport Systems (BME 121),<br/>University of California, Irvine.

Spring Biotransport Phenomena (BME 150), University of California, Irvine. 2015-2018

Winter **Quantitative Physiology: Organ Transport Systems (BME 221)**, 2015-2021 *University of California, Irvine.* 

- Fall 2012-2014 **Tissue Engineering (BME 160)**, University of California, Irvine.
  - Spring 2012- Linking Modeling and Experiments in Bioengineering (BME 295),
  - 2014, 2018, University of California, Irvine.
  - 2023

#### Other

- 2022-2023 Organizing Committee Member the 2023 Cardiac Physiome Meeting, Irvine, CA.
- 2020-2021 Associate Editor Biophysics Review, AIP.
  - 2020- **CIRC Core lab Faculty Director** UCI Edwards Lifesciences Foundation Cardiovascular Innovation and Research Center.
  - 2020 **Track Chair: Stem Cell Engineering** *at the 2020 Biomedical Engineering Society Annual Meeting.*
  - 2020 Guest Editor Journal of Biomechanical Engineering.
- 2013-2019 American Heart Association, Go Red for Women Luncheon Planning Committee.
- 2016-2017 **Local Arrangements Chair for** the 2017 Summer Biomechanics, Bioengineering & Biotransport Conference.
- 2014-2019 **Reviewer for** Stem Cell Research & Therapy, Acta Biomaterialia, Journal of Cardiovascular System, Book proposal CRC Press, JoVE, Proceedings A, Lab on a Chip, Biomechanics and Modeling in Mechanobiology.
- 2012-2013 **Reviewer for** Integrative Biology, Lab on a Chip, PLOS Computational Biology, Acta Biomaterialia, Scientific Reports, Scientific Reports, IEEE Transactions on Biomedical Engineering(2).
- 2009-2010 **Reviewer for** Annals of Biomedical Engineering, Medical & Biological Engineering & Computing.

# Professional Societies Memberships

- 2010-Present Biomedical Engineering Society.
- 2012-Present American Heart Association.
- 2016-2017 Biophysical Society.
- 2017-Present American Mechanical Engineering Society.

# Publications

# **Book Chapters**

- BC-2. M.B. Knight, A. Grosberg, M.L. McCain, In Vitro Tools for Quantifying Structure-Function Relationships in Cardiac Myocyte Cells and Tissues. *Cardiac Cytoarchitecture*. (book chapter), 2015
- BC-1. N.K. Drew, A. Grosberg, Methods of Myofibrillogenesis Modeling. Cardiomyocytes: Methods and Protocols. 75-91, 2015

#### **Conference Proceedings - Peer-Reviewed**

CP-1. J. Naik, E. Lundqvist, C. King, and **A. Grosberg**, CardioStart: Development and Implementation of a Tissue Engineering Summer High School Program. *American Society of Engineering Education 127th Conference Proceedings*, 2020

#### **Journals**

- J-42. J. Naik, **A. Grosberg**, C. King, CardioStart Online: A Virtual High School Tissue Engineering Course. *Biomed Eng Education*, 2023. DOI: 10.1007/s43683-023-00106-6
- J-41. T.A. Morris, S. Eldeen, R.D.H. Tran, **A. Grosberg**, A Comprehensive Review of Computational and Image Analysis Techniques for Quantitative Evaluation of Striated Muscle Tissue Architecture. *Biophysics Reviews*, 2022. 3(4). DOI: 10.1063/5.0057434
- J-40. A. Basu, M.K. Paul, M. Alioscha-Perez, A. Grosberg, H. Sahli, S.M. Dubinett, and S. Weiss, Statistical Parametrization of Cell Cytoskeleton reveals lung cancer cytoskeletal phenotype with partial EMT signature. *Communications Biology*, 2022, 5 (407). https://doi.org/10.1038/s42003-022-03358-0
- J-39. R.D.H. Tran, T.A. Morris, D. Gonzalez, A. Hatem Salaheldin Hassan Ahmed Hetta, **A. Grosberg**, Quantitative Evaluation of Cardiac Cell Interactions and Responses to Cyclic Strain. *Cells*, 2021, Nov 17;10(11):3199. doi: 10.3390/cells10113199.
- J-38. M. Mehrabia, T.A. Morris, Z. Cang, C.H.H. Nguyen, Y. Sha, M.N. Asad, N. Khachikyan, T.L. Greene, D.M. Becker, Q. Nie, M.V. Zaragoza, A. Grosberg, A Study of Gene Expression, Structure, and Contractility of iPSC-Derived Cardiac Myocytes from a Family with Heart Disease due to LMNA Mutation. *Annals of Biomedical Engineering*, 2021, ;49(12):3524-3539. 10.1007/s10439-021-02850-8.
- J-37. W. F. Sherman, M. Asad,and A. Grosberg, An Energetic Approach to Modeling Cytoskeletal Architecture in Maturing Cardiomyocytes. ASME. J Biomech Eng., 2021, doi: doi.org/10.1115/1.4052112
- J-36. Q. Hu, T.A. Morris, **A. Grosberg**, A.J. Levine, E.L. Botvinick, Actively Driven Fluctuations in a Fibrin Network. *Frontiers in Physics*, 2021, 6: DOI=10.3389/fphy.2020.568736
- J-35. H.P. Widyastuti, T.M. Norden-Krichmar, **A. Grosberg**, M.V. Zaragoza, Gene expression profiling of fibroblasts in a family with LMNA-related cardiomyopathy reveals molecular pathways implicated in disease pathogenesis. *BMC Med Genet* . 2020. 21(152)
- J-34. W. Sherman, **A. Grosberg**, An adapted particle swarm optimization algorithm as a model for exploring premyofibril formation. *AIP Advances*, 2020. 10(4): p. 045126.
- J-33. J.A. White, D.P. Gaver, R.J. Butera, B. Choi, M.J. Dunlop, K.J. Grande-Allen, A. Grosberg, R.W. Hitchcock, A.Y. Huang-Saad, M. Kotche, A.M. Kyle, A.L. Lerner, J.H. Linehan, R.A. Linsenmeier, M.I. Miller, J.A. Papin, L. Setton, A. Sgro, M.L. Smith, M. Zaman, A.P. Lee, Core competencies for undergraduates in bioengineering and biomedical engineering: findings, consequences, and recommendations. *Annals of Biomedical Engineering*, 2020. 48, p. 905–912.
- J-32. T.A. Morris, J. Naik, K.S. Fibben, X. Kong, T. Kiyono, K. Yokomori, **A. Grosberg**, Striated myocyte structural integrity: Automated analysis of sarcomeric z-discs. *PLOS Computational Biology*. 2020; 16(3): e1007676

- J-31. W. Sherman, **A. Grosberg**, Exploring cardiac form and function: A length-scale computational biology approach. *WIREs Systems Biology and Medicine*. 2019; e1470.
- J-30. A.R. Ochs, M. Mehrabi, D. Becker, M.N. Asad, J. Zhao, M.V. Zaragoza, **A. Grosberg**, Databases to Efficiently Manage Medium Sized, Low Velocity, Multidimensional Data in Tissue Engineering. *JoVe*. 2019; (153), e60038, doi:10.3791/60038
- J-29. R.D. Tran, M. Siemens, C.H.H. Nguyen, A.R. Ochs, M.V. Zaragoza, A. Grosberg, The Effect of Cyclic Strain on Human Fibroblasts with Lamin A/C Mutations and Its Relation to Heart Disease. *Journal of Biomechanical Engineering*. 2019; BIO-19-1042, doi: 10.1115/1.4044091
- J-28. H. Atcha, C.T. Davis, N.R. Sullivan, T.D. Smith, S. Anis, W.Z. Dahbour, Z.R. Robinson, A. Grosberg, W.F. Liu, A low-cost mechanical stretching device for uniaxial strain of cells: a platform for pedagogy in mechanobiology. *Journal of Biomechanical Engineering*. 2018; 140(8):081005-081005-9. BIO-18-1022, doi: 10.1115/1.4039949
- J-27. J.Q. Core, M. Mehrabi, Z.R. Robinson, A.R. Ochs, L.A. McCarthy, M.V. Zaragoza, **A. Grosberg**, Age of heart disease presentation and dysmorphic nuclei in patients with LMNA mutations. *PLOS One*. 12(11): e0188256, 2017
- J-26. M. V. Zaragoza, C. H. H. Nguyen, H. P. Widyastuti, L. A. McCarthy, **A. Grosberg**, Dupuytren's and Ledderhose diseases in a Family with LMNA-related Cardiomyopathy. *Cells*. 6(4): 40, 2017
- J-25. S.P. Sheehy, A. Grosberg, P. Qin , D.J. Behm, J.P. Ferrier, M.A. Eagleson, A.P. Nesmith, D. Krull, J.G. Falls, P.H. Campbell, M.L. McCain, R.N. Willette, E. Hu, K.K. Parker, Toward improved myocardial maturity in an organ-on-chip platform with immature cardiac myocytes. *Exp Biol Med.* 2017 Jan 1:1535370217701006. doi: 10.1177/1535370217701006
- J-24. W. Tuet, S. Fok, V. Verma, M. Tagle Rodriguez, **A. Grosberg**, J. Champion, N.L. Ng, Dose-dependent intracellular reactive oxygen and nitrogen species production from particulate matter exposure: comparison to oxidative potential and chemical composition. *Atmospheric Environment*. 144: 335–344, 2016
- J-23. N.K. Drew, N.E. Johnsen, J.Q. Core, **A. Grosberg**, Multi-Scale Characterization of Cardiac Tissue Architecture. *Journal of Biomechanical Engineering*. 138(11): 111003, 2016.
- J-22. V.A. Webster, S.G. Nieto, **A. Grosberg**, O. Akkus, H.J. Chiel, and R.D. Quinn, Simulating muscular thin films using thermal contraction capabilities in finite element analysis tools. *Journal of the Mechanical Behavior of Biomedical Materials*. 63: 326-336, 2016
- J-21. M.V. Zaragoza, L. Fung, E. Jensen, F. Oh, K. Cung, L.A. McCarthy, C.K. Tran, V. Hoang, S.A. Hakim, A. Grosberg, Exome Sequencing Identifies a Novel LMNA Splice-site Mutation and Multigenic Heterozygosity of Potential Modifiers in a Family with Sick Sinus Syndrome, Dilated Cardiomyopathy, and Sudden Cardiac Death. PLOS ONE, 2016 11(5): e0155421
- J-20. M.B. Knight, N.K. Drew, L.A. McCarthy, and **A. Grosberg**, Emergent Global Contractile Force in Cardiac Tissues. *Biophysical Journal*. 110(7): 1615-1624, 2016
- J-19. N.K. Drew, M.A. Eagleson, D. Baldo Jr., K.K. Parker, and **A. Grosberg**, Metrics for Assessing Cytoskeletal Orientational Correlations and Consistency. *PLoS Computational Biology*. 11(8):e1004190, 2015
- J-18. S.P. Sheehy, F. Pasqualini, **A. Grosberg**, S. J. Park, Y. Aratyn-Schaus, and K.K. Parker, Quality metrics for stem cell-derived cardiac myocytes. *Stem cell reports*, 2(3): 282-94, 2014

- J-17. A. Chen, E. Lee, R. Tu, K. Santiago, **A. Grosberg**, C. Fowlkes, M. Khine, Integrated Platform for Functional Monitoring of Biomimetic Heart Sheets Derived From Human Pluripotent Stem Cells. *Biomaterials*. 35(2): 675-683, 2014
- J-16. M.L. McCain, S.P. Sheehy, **A. Grosberg**, J.A. Goss, and K.K. Parker, Recapitulating maladaptive, multiscale remodeling of failing myocardium on a chip. *PNAS*, 110: 9770-9775, 2013
- J-15. J.C. Nawroth, H. Lee, A.W. Feinberg, C.M. Ripplinger, M.L. McCain, **A. Grosberg**, J.O. Dabiri, and K.K. Parker, A Tissue-Engineered Jellyfish with Biomimetic Propulsion. *Nature Biotech*, 30(8):792-797, 2012
- J-14. S.P. Sheehy, **A. Grosberg**, and K.K. Parker, The contribution of cellular mechanotransduction to cardiomyocyte form and function. *Biomechanics and Modeling in Mechanobiology*, 11(8):1227-1239, 2012
- J-13. A.W. Feinberg, P.W. Alford, H. Jin, C.M. Ripplinger, A.A. Werdich, S.P. Sheehy, **A. Grosberg**, K.K. Parker. Controlling the contractile strength of engineered cardiac muscle by hierarchal tissue architecture. *Biomaterials*, 33(23):5732-41, 2012
- J-12. A. Grosberg, A.P. Nesmith, J.A. Goss, M.D. Brigham, M.L. McCain, K.K. Parker. Muscle on a Chip: *In Vitro* Contractility Assays for Smooth and Striated Muscle. *Journal of Pharmacological and Toxicological Methods*, 65(3):126-35, 2012
- J-11. J. Shim, A. Grosberg, J.C. Nawroth, K.K. Parker, and K. Bertoldi. Modeling of Cardiac Muscular Thin Films: Pre-stretch, Passive and Active Behavior. *Journal of Biomechanics*, 45(5):832-41, 2012
- J-10. K. Balachandran, P.W. Alford, J. Wylie-Sears, J.A. Goss, A. Grosberg, J. Bischoff, E. Aikawa, R.A. Levine, K.K. Parker. Cyclic strain induces dual-mode endothelial-mesenchymal transformation of the cardiac valve. *PNAS*, 108(50):19943-8, 2011
- J-9. **A. Grosberg**, P.W. Alford, M.L. McCain, K.K. Parker. Ensembles of Engineered Cardiac Tissues for Physiological and Pharmacological Study: Heart on a Chip. *Lab on a Chip*, 11(24): 4165 4173, 2011
- J-8. P.W. Alford, A.P. Nesmith, J.N. Seywerd, **A. Grosberg**, K.K. Parker. Vascular smooth muscle contractility depends on cell shape. *Integrative Biology*, 3(11): 1063-1070, 2011
- J-7. A. Grosberg\*, P.L. Kuo\*, C.L. Guo, N.A. Geisse, M.A. Bray, W.J. Adams, S.P. Sheehy, K.K. Parker. Self-Organization of Muscle Cell Structure and Function. *PLoS Computational Biology*, 7(2): e1001088, 2011
- J-6. **A. Grosberg**, M. Gharib, A. Kheradvar. Effect of Fiber Geometry on Pulsatile Pumping and Energy Expenditure. *Bulletin of Mathematical Biology*, 71(7): p. 1580-1598, 2009.
- J-5. **A. Grosberg** and M. Gharib. A dynamic double helical band as a model for cardiac pumping. *Bioinspiration & Biomimetics*, 4(2): p.026003 1-9, 2009.
- J-4. **A. Grosberg** and M. Gharib. Computational models of heart pumping efficiencies based on contraction waves in spiral elastic bands. *Journal of Theoretical Biology*, 257(3): 359-370, 2009.
- J-3. **A. Grosberg** and M. Gharib. Modeling the macro-structure of the heart: healthy and diseased. *Medical & Biological Engineering & Computing*, 47(3):301-311, 2009.

- J-2. **A. Grosberg** and M. Gharib. Physiology in Phylogeny: Modeling of mechanical driving forces in cardiac development. *Heart Failure Clinics*, 4(3):247-259, July 2008.
- J-1. B.I. Rosner, R.A. Siegel, A. Grosberg and R.T. Tranquillo. Rational Design of Contact Guiding, Neurotrophic Matrices for Peripheral Nerve Regeneration. Annals of Biomedical Engineering, 31(11):1383-1401, 2003.

## Presentations

- February 19, A. Grosberg. Sarcomere Model: Fluctuations Drive Energy Consumption in Striated Muscle
  2023 Under Constant Load. Biophysical Society Annual Meeting, San Diego, CA, Invited talk.
- March 15, 2021 **A. Grosberg**. Effect of Cyclic Strain on Cardiomyocytes and Fibroblasts and Its Relation to Heart Disease. APS Conference, Invited virtual talk.
  - February 15, **A. Grosberg**. Exploring the Heart: from Genetic Mutations to Tissue Function. Seminar at 2021 the Department of Biomedical Engineering at the University of Minnesota, Invited virtual talk.

October 12, **A. Grosberg**. Exploring the Heart: from Genetic Mutations to Tissue Function. Seminar 2020 at Cardiovascular Translational Research Center (CTRC) at the University of South Carolina, Invited virtual talk.

- January 14, **A. Grosberg** and M. Zaragoza. Mending a Broken Heart. Stem Cell Seminar Lecture Series, 2020 Sue & Bill Gross Stem Cell Research Center, University of California, Irvine, Invited Public Lecture.
- December 4, **A. Grosberg**. Exploring the Heart: from Genetic Mutations to Tissue Function. Biophysics 2018 Seminar in Bar-Ilan University, Tel Aviv, Israel, Invited talk.
- December 2, **A. Grosberg**. Exploring the Heart: from Genetic Mutations to Tissue Function. Clore Seminar 2018 on Biological Physics, Weizmann Institute, Rehovot, Israel, Invited talk.
- July 10, 2018 **A. Grosberg**. Exploring the Mechanical Factors in Pathologies Caused by Heart Disease Associated Lamin A/C Mutations. 8th World Congress of Biomechanics, Dublin, Ireland, Invited talk.
- December 13, **A. Grosberg**. Multi-Scale Sarcomere Organization and Genetic Mutation Effect on Emergent 2017 Cardiac Tissue. ISMB 2017, Singapore, Invited talk.
  - August 30, A. Grosberg. From Architectural Malformations to Genetic Mutations: The Emergent Heart
    2017 Function. GeorgiaTech ChBE Seminar Series, Invited Seminar.
- July 10, 2017 J.Q. Core, Z.R. Robinson, M. Mehrabi, L.A. McCarthy, M.V. Zaragoza, **A. Grosberg**. Heart Disease Associated Lamin A/C Mutations and Resultant Defects in Cell and Nuclei Structure. American Heart Association BCSV - Portland, Poster Presentation.
- February 16, A. Grosberg. From Architectural Malformations to Genetic Mutations: The Emergent Heart
  2017 Function. University of California, Los Angeles, Invited Seminar.
- February 3, **A. Grosberg**. The Emergent Heart Function: From Genetic Mutations to Architectural Mal-2017 formations. Computational Science Colloquium, San Diego State University, Invited Seminar.
- February 2017 J.Q. Core, Z.R. Robinson, M. Mehrabi, L.A. McCarthy, M.V. Zaragoza, A. Grosberg. Automated Detection of Structure Defects in Cell-Lines with LMNA Mutations. Q-Bio Winter Meeting, Podium Presentation.

- November 10, **A. Grosberg**. From Genetic Mutations to Architectural Malformations: The Emergent Heart 2016 Function. The Pennsylvania State University, Invited Seminar.
  - October 25, **A. Grosberg**. Cardiac contractility as a function of global tissue organization. QCBNet 2016 workshop: Cell Organization & Behavior at Multiple Scales, Invited Podium Presentation.
  - June 2016 M.B. Knight, N.K. Drew, L.A. McCarthy, **A. Grosberg**. Cardiac Contractility as a Function of Global Tissue Organization. SB3C, National Harbor, MD, Podium Presentation.
- November 2015 *M.B. Knight, A. Grosberg. Cardiac Contractility as a Function of Global Tissue Organization. IEEE-NanoMed, Hawaii*, Invited Podium Presentation.
  - February 4, A. Grosberg. Cardiac Contractility and Multi-Scale Organization. University of California, 2015 Riverside, Invited Seminar.
  - July 2014 M.B. Knight, **A. Grosberg**. Force Production in Locally Organized, Globally Disorganized Cardiac Tissues. 7th World Congress of Biomechanics, Boston, MA, Invited Podium Presentation.
  - January 17, **A. Grosberg**. Emergence of Structure and Function in the Heart. University of California, 2014 San Diego, Invited Seminar.
  - October 25, **A. Grosberg**. Quantifying Structure and Function in the Heart. University of California, 2013 Riverside, Invited Seminar.
  - October 2011 **A. Grosberg**, P.W. Alford, A.P. Nesmith, M.L. McCain, K.K. Parker. Heart on a Chip: Measuring Structure-Function Relationships of Cardiac Tissues. 2011 BMES Annual Fall Meeting, Hartford, CT, Oral.
  - March 2011 **A. Grosberg**, M.D. Brigham, J.A. Goss, P.W. Alford, K.K. Parker. Novel In Vitro Approach for Assessing Cardiac Contractile Liabilities Using Micropatterned Muscular Thin Films. Society of Toxicology, Washington, DC.
- November 2010 **A. Grosberg**, P.L. Kuo, M.L. McCain, K.K. Parker. Tissue formation modeling. Materials Research Society, Boston, MA, Oral.
- October 2010 **A. Grosberg**, M.L. McCain, K.K. Parker. Tissue formation modeling: myofibrillogenesis in a cell pair. 2010 BMES Annual Fall Meeting, Austin TX, Oral.
- October 2010 **A. Grosberg**, M.D. Brigham, K.K. Parker. A tissue scale, in vitro, combination contractility and electrophysiological assay. 2010 BMES Annual Fall Meeting, Austin TX.
  - September **A. Grosberg**, M.D. Brigham, K.K. Parker. Translation To Higher Throughput: An In Vitro, 2010 Combination Contractility And Electrophysiological Assay. ISACB, Boston, MA.
  - September **A. Grosberg**, M.D. Brigham, J.A. Goss, P.W. Alford, K.K. Parker. A tissue scale, in vitro, 2010 multiplex contractility assay. 10th Annual Safety Pharmacology Society Meeting, Boston, MA.
- November 2009 **A. Grosberg**, A.W. Feinberg, J.A. Goss, P.W. Alford, K.K. Parker. A Device for in vitro, High Throughput Cell Tissue Contractility Assay. Materials Research Society, Boston, MA.
  - 2008 **A. Grosberg** and M. Gharib. Helical contraction: an efficient mean for pulsatile ventricular assist devices. ASAIO, 54th Annual Conference San Francisco.
  - 2007 **A. Grosberg** and M. Gharib. The functional double helix in the heart. 2007 BMES Annual Fall Meeting.
  - 2006 **A. Grosberg** and M. Gharib. On the dynamics of the human heart myocardium. 5<sup>th</sup> World Congress of Biomechanics, Journal of Biomechanics, 39(Supplement 1):S278, Oral.

# Student and Collaboration Presentations (Selected)

- October 17-20, Mehrsa Mehrabi, Mira Asad, Danielle Beker, Halida Widyastuti, Cecilia Nguyen, Linda A. 2018 Mccarthy, Michael V. Zaragoza, Anna Grosberg, In Vitro Modeling of Variable Heart Diseases due to LMNA Mutation via Patient iPSC-derived Cardiomyocytes. Biomedical Engineering Society Annual Meeting, Atlanta.
  - August 23, Richard Tran, Alex Ochs, Linda McCarthy, Cecilia Nguyen, Mark Siemens, Michael Zaragoza,
    2018 Anna Grosberg, The effect of heart mechanics on the nuclear properties of cells with the Lamin A/C mutation and its relation to heart disease. NanoEngineering for Medicine and Biology (NEMB) ASME.
  - August 23, W. Sherman, A. Grosberg, Predicting Individual Cardiomyocytes' Fiber Placement and Nu 2018 clei Eccentricity in Spatially Constrained Cells. NanoEngineering for Medicine and Biology (NEMB) - ASME.
- July 31 Mehrsa Mehrabi, Mira Asad, Danielle Beker, Halida Widyastuti, Cecilia Nguyen, Linda A.
  August 2, 2018 Mccarthy, Michael V. Zaragoza, Anna Grosberg, In Vitro Modeling of Variable Heart Diseases due to LMNA Mutation via Patient iPSC-derived Cardiomyocytes. American Heart Association (AHA) 2018 Basic Cardiovascular Sciences Conference, San Antonio, Texas.
  - July 26-27, Morris TA, Naik J, Lundqvist EM, Grosberg A., Assessing continuous z-line length as a metric 2018 for cardiac function. Mechanobiology Conference: The Mechanome in Action 2018.
- July 8-12, 2018 Morris TA, Naik J, Lundqvist EM, Grosberg A., Assessing continuous z-line length as a metric for cardiac function. 2018 World Congress of Biomechanics.
  - June 21-23, Richard Tran, Alex Ochs, Linda McCarthy, Cecilia Nguyen, Mark Siemens, Michael Zaragoza,
    2018 Anna Grosberg, The effect of heart mechanics on cells with the Lamin A/C mutation and its relation to heart disease. 19th Annual UC Systemwide Bioengineering Symposium, UCR.
  - June 21-23, Mehrsa Mehrabi, Mira Asad, Danielle Beker, Halida Widyastuti, Cecilia Nguyen, Linda A. Mc 2018 carthy, Michael V. Zaragoza, Anna Grosberg, In Vitro Modeling of Variable Heart Diseases due
    to LMNA Mutation via Patient iPSC-derived Cardiomyocytes. 19th Annual UC Systemwide
    Bioengineering Symposium, UCR.
- October 11-14, Mehrsa Mehrabi , Jason Q. Core , Zachary R. Robinson , Linda A. Mccarthy, Michael Zaragoza,
  2017 Anna Grosberg, Heart Disease Associated Lamin A/C Mutations and Resultant Defects in Tissue Function and Nuclei Structure. Biomedical Engineering Society Annual Meeting, Phoenix.

#### Patents

- May 2017 A. Kheradvar, M. Gharib, A. Grosberg. Cardiac assist system using helical arrangement of contractile bands and helically-twisting cardiac assist device., Patent Number(s): US9656009-B2.
- June 2013 K.K. Parker, A.W. Feinberg, P.W. Alford, A. Grosberg, M.D. Brigham, J.A. Goss. Devices comprising muscle thin films and uses thereof in high throughput assays for determining contractile function, Patent Number(s): US9719982B2.
- May 2010 K.K. Parker, A.W. Feinberg, P.W. Alford, A. Grosberg, M.D. Brigham, J.A. Goss. Identifying a compound that modulates a contractile function comprises contacting the muscle thin films with a test compound, and determining the effect of the test compound on a contractile function, Patent Number(s): WO2010127280-A1 ; US2012142556-A1.

- July 2009 Anna Grosberg, Arash Kheradvar, and Morteza Gharib. Cardiac assist system for assisting cardiac pumping function of patient's heart, includes at least one contractile elastic band helically arranged around periphery of patient's heart, Patent Number: WO2009009131-A2; US2009131740-A1; WO2009009131-A3.
- August 2007 James C. Cloyd, Ronald A. Siegel, Anna Grosberg, and Hao Hou. Composition for inducing sedation and for treating epilepsy, comprises super-saturated solution of benzodiazepine, water and glycofurol, Patent Number(s): WO2006122217-A2 ; US2007021411-A1 ; US2007208011-A1 ; WO2006122217-A3.

#### Funding

#### Current

NSF **10/01/2020** – **09/30/2023** COVID-19 and the Role of the Immune System in Cardiac CMMI-2035264 Function and Pathology, PI).

NIH **09/22/2021** – **08/31/2023** *Functional and mechanistic analysis of FSHD myocytes*, Yoko-1R21AR079654 mori, Grosberg (MPI).

NIH R03 **07/01/2021** – **06/30/2023** *Quantifying Multi-Scale Architecture of Cardiac Tissues*, PI). EB028605

#### Completed

NIH R01 **09/01/2015-4/30/2020** Cardiac Functional and Structural Implications of Lamin A/C Mu-HL129008-01 tation, Multi-PI(Grosberg, Zaragoza).

UCI Seed **09/01/2017-08/31/2019** *Cardiovascular Center: Program in Heart Muscle Systems*, co-Pi Funding (Botvinick, Grosberg).

- NSF EAGER **08/01/2013-07/31/2015** *Tissue Organization Contribution to Cardiac Force Output*, #1338609 PI(Grosberg).
- UCI Computing **01/08/2014** One time computer support for laboratory workstation, PI(Grosberg)). Initiative

	Trainees		
	Postdoctoral Scholars		Master Degree Students
2022-	C. Hunter Wallace, Ph.D.	June 2015	Meghan Knight M.S.
	Doctorate Students	June 2015	Nicholas Johnsen M.S.
Sep. 2016	Nancy Drew Ph.D.	June 2017	Jeoung Kawk M.S.
Sep. 2020	Mehrsa Mehrabi Ph.D.	June 2018	Alex R. Ochs M.S.
Sep. 2020	William Sherman Ph.D.	Sep. 2018	Nicole Le M.S.
June 2021	Tessa Morris Ph.D	June 2019	Kirby S. Fibben M.S.
Sep. 2021	Jasmine Naik Ph.D	June 2019	Jing Zhao M.S.
Sep. 2021	Richard Tran Ph.D	June 2020	Mohamed Ajam M.S.
		June 2020	Evan Bender M.S.
	Current Graduate Students	June 2021	Mira Asad M.S
2020 -	Andrew Schmidt Ph.D. Student.	June 2021	Jinal Patel M.S
2022 -	Nida Tariq Qayyum Ph.D. Student.	June 2021	Huiyi Yang M.S
2023 -	Mary Tran Ph.D. Student.	June 2022	Marco A. Medrano Ramirez M.S.
2022 -	<b>Taylor Greene</b> Master Degree Student.		

## $11~{\rm of}~12$

# Undergraduate Students Researchers

2022 -	Takudzwa Gavaza.	2019 - 2019	Anjali Nilesh Bhagat.
2022 -	Jonovan Osorio.	2019 - 2019	Abdullah Jaber.
2022 -	Tobey Wong.	2016 - 2019	Danielle Becker.
2021 -	Tim Hu.	2016 - 2019	Mira Asad.
2022 -	Ashley Varatip.	2016 - 2019	Emil Lundqvist.
2022 -	Alex Chu.	2016 - 2019	Adriana Rodriguez.
2021 -	Ronit Lal Shrestha.	2016 - 2018	Nasam Chokr.
2020 -	Ali Hatem Salaheldin Hassan A Hetta	<b>a</b> 2014 - 2016	Tuyetnhi (Nicole) Ngoc Le.
2021 - 2022	Omar Ahmed Said.	2014 - 2017	Jason Core.
2020 - 2022	Lisa Melody Elzik.	2014 - 2017	Marlen Soledad Tagle Rodriguez.
2020 - 2022	Gia Ferrante.	2014 - 2017	Zachery Ryen Robinson.
2019 - 2022	Taylor Greene.	2012 - 2013	Meghan Knight.
2020 - 2021	Francisco Javier Brenes.	2012 - 2015	Danny Baldo Jr.
2019 - 2021	Daniela Gonzalez.	2012 - 2015	Nick Sullivan.
2018 - 2021	Nyree Khachikyan.	2014 - 2015	Kelsey Fung.
2019 - 2020	Kevin Vinayak Kathrotia.	2016 - 2017	Eric Lawver.

2017 - 2019 Mark Siemens.