Mozziyar Etemadi, M.D., Ph.D.

Curriculum Vitae

CONTACT INFORMATION

[redacted]

SUMMARY

- Research Assistant Professor in the Department of Bioengineering at the McCormick School of Engineering at Northwestern University, and, jointly, the Department of Anesthesiology at the Feinberg School of Medicine.

- Bachelors and Masters in Electrical Engineering from Stanford University, Graduate and Medical training from the University of California, San Francisco and Post-Doctoral Training from the University of California, Berkeley.

- As a medical and graduate student, established a collaborative research program creating novel wireless clinical sensing devices, which over five years has created over ten medical devices and trained over twenty medical and graduate trainees.

- Directly oversaw three Phase I patient trials of three novel devices; participated in development of three now FDA-cleared devices.

- Co-author of over fifty peer-reviewed publications (including four invited papers), over twenty peer-reviewed abstracts, and five patents.

- Research during medical and graduate school recognized by awards including Forbes Magazine "30 Under 30 Scientists," CIMIT Prize for Primary Care Innovation, Bill & Melinda Gates Foundation Grand Challenges Winner and Vodafone Americans Wireless Innovation Challenge.

- Principal Investigator or Co-Principal Investigator for over $15MM in career-total funding from government, foundation, and other sources.

- Directly mentored over twenty UCSF/UC Berkeley trainees and taught an undergraduate course in the Department of Chemistry at Stanford University.

EDUCATION

Residency in Anesthesiology **2016-2021**
Northwestern Medicine

Doctor of Medicine **2014-2016,**
University of California, San Francisco (UCSF) **2009-2011**

Postdoctoral Scholar **2013-2014**
University of California, Berkeley, Department Electrical Engineering and Computer Sciences and
University of California, San Francisco, Department of Bioengineering and Therapeutic Sciences
Co-advisors: Björn Hartmann, PhD and Shuvo Roy, PhD

Doctor of Philosophy, Bioengineering **GPA: 4.00** **2011-2013**
"Systems to Measure and Modify Fetal Lamb Pulmonary Physiology"
University of California, San Francisco and University of California, Berkeley
Joint Graduate Group in Bioengineering
Co-advisors: Shuvo Roy, PhD and Doug Miniati, MD

Master of Science, Electrical Engineering **GPA: 4.16**[1] **2008-2009**
Stanford University

Bachelor of Science, Electrical Engineering **GPA: 4.06**[1] **2004-2008**
Stanford University

[1] Stanford University GPAs are calculated out of 4.3, with 4.3 given for A+ grade.

PUBLICATIONS

Peer-Reviewed Journal Articles:

1. **M. Etemadi** and C. W. Hogue, "Preventing Intraoperative Hypotension: Artificial Intelligence versus Augmented Intelligence?" Anesthesiology, v. 133, no. 6, pp 1170-1172.

2. B. Semiz, A. M Carek, J. C. Johnson, S. Ahmad, J. A. Heller, F. Garcia-Vicente, S. Caron, C. W. Hogue, **M. Etemadi**, and O. T. Inan, "Non-Invasive Wearable Patch Utilizing Seismocardiography for Peri-Operative Use in Surgical Patients," IEEE Journal of Biomedical and Health Informatics, Accepted (October 22, 2020), e-pub ahead of print.

3. V. G. Ganti, A. M. Carek, B. N. Nevius, J. A. Heller, **M. Etemadi**, O. T. Inan., "Wearable cuff-less blood pressure estimation at home via pulse transit time," IEEE Journal of Biomedical and Health Informatics, Accepted (September 3, 2020), e-pub ahead of print.

4. M. M. H. Shandhi, W. H. Bartlett, J. A. Heller, **M. Etemadi**, A. Young, T. Ploetz, and O. T. Inan, "Estimation of Instantaneous Oxygen Uptake during Exercise and Daily Activities using a Wearable Cardio-Electromechanical and Environmental Sensor," IEEE Journal of Biomedical and Health Informatics, Accepted (July 7 2020), e-pub ahead of print.

5. M. M. H. Shandhi, S. Hersek, J. Fan, E. Sander, T. De Marco, J. A. Heller, **M. Etemadi**, L. Klein, O. T. Inan, "Wearable Patch Based Estimation of Oxygen Uptake and Assessment of Clinical Status during Cardiopulmonary Exercise Testing in Patients with Heart Failure," Journal of Cardiac Failure, vol 26, no 11, pp 948-958

6. C. N. Teague, J. A. Heller, B. N. Nevius, A. M. Carek, S. Mabrouk, F. Garcia-Vicente, O. T. Inan, and **M. Etemadi**, "A Wearable, Multimodal Sensing System to Monitor Knee Joint Health," IEEE Sensors, vol.. 20, no. 18, pp. 10323-10334.

7. E. M. I. Johnson, J. A. Heller, F. Garcia-Vicente, R. Sarnari, D. Gordon, P. M. McCarthy, A. J. Barker, **M. Etemadi**, M. Markl, "Detecting Aortic Valve-Induced Abnormal Flow with Seismocardiography and Cardiac MRI," Annals of Biomedical Engineering, vol. 48, no. 6, pp. 1779-1792.

8. S. M. McKinney, M. Sieniek, V. Godbole, J. Godwin, N. Antropova, H. Ashrafian, T. Back, M. Chesus, G. C Corrado, A. Darzi, **M. Etemadi**, F. Garcia-Vicente, F. J. Gilbert, M. Halling-Brown, D. Hassabis, S. Jansen, A. Karthikesalingam, C. J. Kelly, D. King, J. R. Ledsam, D. S. Melnick, H. Mostofi, L. Peng, J. J. Reicher, B. Romera-Paredes, R. Sidebottom, M. Suleyman, D. Tse, K. C. Young, J. De Fauw, S. Shetty, "International evaluation of an AI system for breast cancer screening," Nature, vol 577, no. 7788, pp 89-94.

9. E. M. I. Johnson, **M. Etemadi**, S. C. Malaisrie, P. M. McCarthy, M. Markl, A. J. Barker, "Seismocardiography and 4D flow MRI reveal impact of aortic valve replacement on chest acceleration and aortic hemodynamics," Journal of Cardiac Surgery, vol. 35, no. 1, pp. 232-235.

10. V. B. Aydemir, S. Nagesh, M. M. H. Shandhi, J. Fan, L. Klein, **M. Etemadi**, J. A. Heller, O. T. Inan, and J. M. Rehg, "Classification of Decompensated Heart Failure from Clinical and Home Ballistocardiography," IEEE Transactions on Biomedical Engineering, vol 67, no. 5, pp. 1303-1313.

11. D. Ardila, A.P. Kiraly, S. Bharadwaj, B. Choi, J. J. Reicher, L. Peng, D. Tse, **M. Etemadi**, W Ye, G. Corrado, D.P. Naidich, and S. Shetty, "End-to-end lung cancer screening with three-dimensional deep learning on low-dose chest computed tomography," Nature Medicine, v. 25, pp. 954–961, 2019.

12. O. T. Inan, M. B. Pouyan, A. Q. Javaid, S. Dowling, **M. Etemadi**, A. Dorier, J. A. Heller, A. O. Bicen, S. Roy, T. De Marco, and L. Klein, "Novel Wearable Seismocardiography and Machine Learning Algorithms Can Assess Clinical Status of Heart Failure Patients, Circulation: Heart Failure, v. 11, no. 1, pp. 1-10, 2018. **Cover article.**

13. **M. Etemadi** and O. T. Inan, "Wearable Ballistocardiogram and Seismocardiogram Systems for Health and Performance," Journal of Applied Physiology, v. 124, no. 2, pp. 452-461, 2018.

14. A. Q. Javaid, H. Ashouri, A. Dorier, **M. Etemadi**, J. A. Heller, S. Roy, and O. T. Inan, "Quantifying and Reducing Motion Artifacts in Wearable Seismocardiogram Measurements during Walking to Assess Left Ventricular Health," IEEE Transactions on Biomedical Engineering, vol 64, no 6, pp 1277-1286, 2017.

15. S. Thatipelli, A. Arun, P. Chung, **M. Etemadi**, J. A. Heller, D. Kwiat, J. Imamura-Ching, M. R. Harrison, S. Roy, "Review of Existing Brace Adherence Monitoring Methods to Assess Adherence," Journal of Prosthetics and Orthotics, Journal of Prosthetics and Orthotics, vol 28, no 4, pp 126-135, 2016.

16. **M. Etemadi**, O. T. Inan, J. A. Heller, S. Hersek, L. Klein, and S. Roy, "A Wearable Patch to Enable Long-Term Monitoring of Environmental, Activity and Hemodynamics Variables," IEEE Transactions on Biomedical Circuits and Systems, IEEE Transactions on Biomedical Circuits and Systems, vol 10, no 2, pp. 280-88, 2016.

17. B. A. Harrison, L. Stern, P. Chung, **M. Etemadi**, D. Kwiat, S. Roy, M. R. Harrison, and M. M. Ferro, "MyPectus: First-in-human Pilot Study of Remote Compliance Monitoring of Teens Using Dynamic Compression Bracing to Correct Pectus Carinatum," Journal of Pediatric Surgery, vol 51, no 4, pp. 608-611, 2016.

18. A. Wiens, **M. Etemadi**, S. Roy, L. Klein, and O. T. Inan, "Towards Continuous, Non-Invasive Assessment of Ventricular Function and Hemodynamics: Wearable Ballistocardiography," IEEE Journal of Biomedical and Health Informatics, vol 19, no 4, pp. 1435-1442, 2015.

19. O. T. Inan, P. Migeotte, K. Park, **M. Etemadi**, K. Tavakolian, R. Casanella, J. Zanetti, J. Tank, I. Funtova, G. K. Prisk, and M. Di Rienzo, "Ballistocardiography and Seismocardiography: A Review of Recent Advances," IEEE Journal of Biomedical and Health Informatics, vol 19, no 4, pp. 1414-1427, 2015.

20. N. Shah, **M. Etemadi**, R. Kant, K. Goldman, and S. Roy, "Quality Factor Optimization of Inductive Antennas for Implantable Pressure Sensors," IEEE Sensors, vol 14, no 8, pp. 2452-2460, 2014. **Top 25 most downloaded papers in June 2014.**

21. P. Chung, J. A. Heller, **M. Etemadi**, P. E. Ottoson, J. A. Liu, L. Rand, and S. Roy, "Rapid and Low-cost Prototyping of Medical Devices Using 3D Printed Molds for Liquid Injection Molding," J. Vis. Exp., vol 88, e51745, 2014.

22. E. H. Shue, S. C. Schecter, W. Gong, **M. Etemadi**, M. Johengen, C. Iqbal, S. C. Derderian, P. Oishi, J. R. Fineman, D. Miniati, "Antenatal Maternally-Administered Phosphodiesterase Type 5 Inhibitors Normalize eNOS Expression in the Fetal Lamb Model of Congenital Diaphragmatic Hernia," Journal of Pediatric Surgery, vol 49, no 1, pp 39-45, 2014.

23. **M. Etemadi,** P. Chung, J. A. Heller, J. Liu, L. Rand, and S. Roy, "Towards BirthAlert - A Clinical Device Intended for Early Preterm Birth Detection," IEEE Transactions on Biomedical Engineering, vol 60, no 12, pp. 3484-3493, 2013.

24. **M. Etemadi**, J. A. Heller, S. C. Schecter, E. H. Shue, D. Miniati and S. Roy, "Implantable Ultra-Low Pulmonary Pressure Monitoring System for Fetal Surgery," IEEE Transactions on Information Technology in Biomedicine, vol 16, no. 6, pp. 1208-1215, 2012.

25. J. Liu, **M. Etemadi**, J. A. Heller, D. Kwiat, R. Fechter, M. Harrison, and S. Roy, "ROBOImplant II: development of a non-invasive controller/actuator for wireless correction of orthopedic structural deformities," Journal of Medical Devices, vol. 6, no 3., 2012.

26. **M. Etemadi**, O. T. Inan, L. Giovangrandi, and G. T. A. Kovacs, "Rapid Assessment of Cardiac Contractility on a Home Bathroom Scale," IEEE Transactions on Information Technology in Biomedicine, vol. 15, no. 6, pp. 864-869, 2011. **Cover article.**

27. R. M. Wiard, O. T. Inan, B. Argyres, **M. Etemadi**, and G. T. A. Kovacs, "Automatic Detection of Motion Artifacts in the Ballistocardiogram Measured on a Modified Bathroom Scale," Medical & Biological Engineering & Computing, vol. 49, no. 2, pp. 213-220, 2011.

28. E. B. Jelin, **M. Etemadi**, J. Encinas, S. Schecter, C. Chapin, J. Wu, S. Guevara-Gallardo, A. Nijagal, K. D. Gonzales, W. T. Ferrier, S. Roy, and D. Miniati "Dynamic partial tracheal occlusion improves lung morphometrics and function in the fetal lamb model of congenital diaphragmatic hernia." Journal of Pediatric Surgery, vol. 46, Issue 6, pp. 1150-1157, 2010.

29. O. T. Inan, **M. Etemadi**, B. Widrow, and G. T. A. Kovacs, "Adaptive cancellation of floor vibrations in standing ballistocardiogram measurements using a seismic sensor as a noise reference," IEEE Transactions on Biomedical Engineering, vol. 57, no 3., pp. 722-727, 2010.

30. O. T. Inan, **M. Etemadi**, M. E. Sanchez, O. Marcu, S. Bhattacharya, and G. T. A. Kovacs, "A Miniaturized Video System for Tracking the Locomotor Activity of Walking Drosophila Melanogaster in Space and Terrestrial Settings," IEEE Transactions on Biomedical Engineering, vol.56, no.2, pp.522-524, 2009.

31. O. T. Inan, **M. Etemadi**, A. Paloma, G. T. A. Kovacs, L. Giovangrandi, "Non-invasive Cardiac Output Trending During Exercise Recovery on a Bathroom-Scale-Based Ballistocardiograph," Physiological Measurement, vol. 30, no. 3, pp. 261-274, 2009.

32. **O. T. Inan and M. Etemadi**, R. M. Wiard, L. Giovangrandi, and G. T. A. Kovacs, "Robust Ballistocardiogram Acquisition for Home Monitoring," Physiological Measurement, vol. 30, no. 2, pp. 169-185, 2009. **Co-first author.**

Peer-Reviewed Conference Proceedings:

33. M. M. H. Shandhi, M. Aras, S. Wynn, J. Fan, J. A. Heller, **M. Etemadi**, L. Klein, O. T. Inan, "Cardiac Function Monitoring for Patients Undergoing Cancer Treatments Using Wearable Seismocardiography: A Proof-of-Concept Study," 2020 42nd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), pp. 4075-4078, July 2020.

34. M. M. H. Shandhi, **M. Etemadi**, J. A. Heller, L. Klein, J. Fan, S. Hersek, and O. T. Inan, "Wearable Seismocardiography for Human Health and Performance," IEEE Biomedical and Health Informatics (BHI) Conference, Chicago, IL, 2019.

35. M. Shandi, L. Klein, J. Fan, **M. Etemadi**, and O. T. Inan, "Longitudinal Ballistocardiogram and Electrocardiogram Measurements from Patients with Heart Failure at Home: Results from the Ongoing Studies and Lessons Learned," IEEE International Conference on Biomedical and Health Informatics, Chicago, IL, 2018.

36. O. T. Inan, A. Q. Javaid, S. Dowling, H. Ashouri, **M. Etemadi**, J. A. Heller, S. Roy, and L. Klein, "Wearable Ballistocardiogram Measurements during Six Minute Walk Tests for Heart Failure Patients," 38th Annual IEEE Engineering in Medicine and Biology Conference, Orlando, FL, 2016.

37. **M. Etemadi**, M. A. Brooke, J. Alex Heller, S. Roy, O. T. Inan, and G. P. Victorino, "Wearable Hemodynamic Monitoring for Trauma Resuscitation," The IEEE International Conference on Biomedical and Health Informatics, Las Vegas, NV, 2016.

38. W. McGrath, **M. Etemadi**, S. Roy, and B. Hartmann, "fabryq: Using Phones as Gateways to Prototype Internet of Things Applications using Web Scripting," Proceedings of The 7th Association for Computing Machinery Special Interest Group on Computer–Human Interaction Symposium on Engineering Interactive Computing Systems (EICS), Duisberg, Germany, pp. 164-173, 2015. **Awarded best paper.**

39. O. T. Inan, **M. Etemadi**, R. M. Wiard, L. Giovangrandi, and G. T. A. Kovacs, "Unobtrusive Monitoring of Cardiovascular Health at Home using a Modified Weighing Scale," The 6th European Conference of the International Federation for Medical and Biological Engineering, Dubrovnik, Croatia, vol 45, pp. 918-921, 2014.

40. **M. Etemadi**, P. Chung, J. A. Heller, J. Liu, R. Grossman-Kahn, L. Rand, and S. Roy, "Novel Device to Trend Impedance and Fluorescence of the Cervix for Preterm Birth Detection," 35th Annual IEEE Engineering in Medicine and Biology Conference, Osaka, Japan, pp. 176-179, 2013.

41. P. Chung, A. Rowe, **M. Etemadi**, H. Lee, and S. Roy, "Fabric-based Pressure Sensor Array for Decubitus Ulcer Monitoring," 35th Annual IEEE Engineering in Medicine and Biology Conference, Osaka, Japan, pp. 6506-6509, 2013.

42. H. Jiang, D. Lan, S. Zhou, K. Goldman, N. Shah, **M. Etemadi**, H. Shahnasser, and S. Roy, "Modeling of Implantable Passive LC Sensors for Biomedical Applications," The 27th International Review of Progress in Applied Computational Electromagnetics, Williamsburg, VA, pp. 986-992, 2011.

43. H. Jiang, D. Lan, K. Goldman, **M. Etemadi**, H. Shahnasser, and S. Roy, "The Responsivity of a Miniaturized Passive Implantable Wireless Pressure Sensor," Proceedings of the IEEE Topical Conference on Biomedical Wireless Technologies, Networks, and Sensing Systems (BioWireless), Pheonix, AZ, pp. 11-14, 2011.

44. **M. Etemadi**, O. T. Inan, R. M. Wiard, L. Giovangrandi, and G. T. A. Kovacs, "Non-Invasive Assessment of Cardiac Contractility on a Weighing Scale," 31st Annual IEEE Engineering in Medicine and Biology Conference, Minneapolis, MN, pp. 6773-6776, 2009.

45. O. T. Inan, **M. Etemadi**, R. M. Wiard, L. Giovangrandi, and G. T. A. Kovacs, "Novel Methods for Estimating the Ballistocardiogram Signal Using a Simultaneously Acquired Electrocardiogram," 31st Annual IEEE Engineering in Medicine and Biology Conference, Minneapolis, MN, pp. 5334-5347, 2009.

46. O. T. Inan, **M. Etemadi**, R. M. Wiard, L. Giovangrandi, and G. T. A. Kovacs, "Non-invasive Measurement of Valsalva-Induced Hemodynamic Changes on a Bathroom Scale Ballistocardiograph," 30th Annual IEEE Engineering in Medicine and Biology Conference, Vancouver, B.C., pp. 674-677, 2008.

47. O. T. Inan, **M. Etemadi**, R. M. Wiard, L. Giovangrandi, and G. T. A. Kovacs, "Evaluating the Foot Electromyogram Signal as a Noise Reference for Bathroom-Scale Ballistocardiogram Recording," 21st Annual IEEE International Symposium on Computer Based Medical Systems, Jyväskylä, Finland, pp. 70-74, 2008.

Invited Peer-Reviewed Conference Proceedings:

48. **M. Etemadi**, S. Hersek, J. M. Tseng, N. Rabbani, J. Alex Heller, S. Roy, L. Klein, and O. T. Inan, "Tracking Clinical Status for Heart Failure Patients using Ballistocardiography and Electrocardiography Signal Features," Invited Paper to 36th Annual IEEE Engineering in Medicine and Biology Conference, Chicago, IL, pp. 5188-5191, 2014.

49. A. Wiens, **M. Etemadi**, L. Klein, S. Roy, and O. T. Inan, "Wearable Ballistocardiography: Preliminary Methods for Mapping Surface Vibration Measurements to Whole Body Forces," Invited Paper to 36th Annual IEEE Engineering in Medicine and Biology Conference, Chicago, IL, pp 5172-5175, 2014.

50. L. Giovangrandi, O. T. Inan, R. M. Wiard, **M. Etemadi**, and G. T. A. Kovacs, "Ballistocardiography– A Method Worth Revisiting," Invited Paper to IEEE EMBS Annual Conference, Boston, MA, pp. 4279-4282, 2011.

51. B. Widrow and **M. Etemadi**, "Cognitive Memory: Human and Machine," Invited Paper for International Joint Conference on Neural Networks, Atlanta, GA, pp. 3365-3372, 2009.

Peer-Reviewed Abstracts:

52. N Mazumder, A Kazen, A Carek, **M Etemadi**, J Levitsky, "The Answer Is At Our Fingertips: Determining Volume Status in Cirrhosis using Machine Learning and a Pulse Oximeter Waveform", Hepatology, Virtual Conference, 2020.

53. M. M. H. Shandhi, J. Fan, J. A. Heller, **M. Etemadi**, O. T. Inan, and L. Klein, "Non-Invasive Seismocardiography Can Accurately Track Changes In Pulmonary Artery Pressures During Vasodilator Challenge At The Time Of Right Heart Catheterization" Annual Meeting of the American College of Cardiology, Virtual Conference, 2020.

54. M. M. H. Shandhi, J. Fan, J. A. Heller, **M. Etemadi**, O. T. Inan, and L. Klein, "Seismocardiography Can Track Right Heart Catheterization Parameters in Patients with Heart Failure: A Pilot Study," European Society of Cardiology Heart Failure Congress, Athens, Greece, 2019.

55. M. M. H. Shandhi, J. Fan, J. A. Heller, **M. Etemadi**, O. T. Inan, and L. Klein, "Seismocardiography and Machine Learning Algorithms to Assess Clinical Status of Patients with Heart Failure in Cardiopulmonary Exercise Testing: A Pilot Study," Heart Failure Society of America (HFSA) Meeting, Philadelphia, PA, 2019.

56. L. Liang et al, "Smart Diaphragm Study: Multi-omics profiling and cervical device measurements during pregnancy," Society for Maternal Fetal Medicine, 39th Annual Meeting, Las Vegas, NV, 2019.

57. M. Shandi, J. Fan, J. A. Heller, **M. Etemadi**, O. T. Inan, and L. Klein "Seismocardiography Can Assess Cardiopulmonary Exercise Test Parameters in Patients with Heart Failure," Heart Failure Society of America, 2018.

58. P. Nesper, **M. Etemadi**, J. A. Heller, and A. Fawzi, "Hyperspectral fundus imaging and automated dimensionality reduction in eyes with age-related macular degeneration," Association for Research in Vision and Ophthalmology, Honolulu, HI, 2018.

59. O. T. Inan, A. Dorier, S. Dowling, A. Q. Javaid, **M. Etemadi**, S. Roy, T. De Marco, and L. Klein, "Activity-Contextualized Wearable Ballistocardiogram Measurements can Classify Decompensated versus Compensated Heart Failure Patients," American Heart Association Scientific Sessions, New Orleans, LA, 2016.

60. O. T. Inan, A. Q. Javaid, S. Dowling, H. Ashouri, **M. Etemadi**, J. A. Heller, S. Roy, and L. Klein, "Using Ballistocardiography to Monitor Left Ventricular Function in Heart Failure Patients," Heart Failure Society of America Scientific Meeting, Orlando, FL, 2016.

61. A. Q. Javaid, S. Dowling, **M. Etemadi**, J. A. Heller, S. Roy, L. Klein, and O. T. Inan, "Quantification of Posture-Induced Changes in Wearable Ballistocardiogram Signals for Heart Failure Patients," Computers in Cardiology, Vancouver, BC, 2016.

62. O. Quesada, M. El Banani, J. A. Heller, S. Beach, **M. Etemadi**, S. Roy, O. T. Inan, J. Gonzalez, and L. Klein, "A Pilot Study of a Modified Bathroom Scale to Monitor Cardiovascular Hemodynamics in Pregnancy," Annual Meeting of the American College of Cardiology, Chicago, IL, April 2016.

63. B. Harrison, L. Stern, P. Chung, **M. Etemadi**, D. Kwiat, M. R. Harrison, M. M. Ferro, "MyPectus: a novel mobile health system for remote assessment of treatment," Annual Meeting of the American Pediatric Surgical Association, Phoenix, AZ, June, 2014.

64. E. H. Shue, S. C. Schecter, W. Gong, M. Johengen, W.T. Ferrier, J. Wu, **M. Etemadi**, P. Oishi, J. Fineman, D. Miniati, "The role of prenatal tadalafil in altered relaxation of pulmonary arteries from lambs with surgical diaphragmatic hernia," American College Of Surgeons 98th Annual Clinical Congress, Chicago, IL, September, 2012.

65. **M. Etemadi**, S. C. Schecter, E. H. Shue, J. A. Heller, S. Roy, and D. Miniati, "Development of a Novel, Closed-system, Implantable Sensor to Assess the Mechanobiology of Fetal Lung Maturation," 43rd Annual Meeting of the American Pediatric Surgical Association, San Antonio, TX, May, 2012.

66. J. A. Liu, **M. Etemadi**, J. A. Heller, M. M. Ferro, A. Lopez, D. A. Kwiat, S. Roy, and M. R. Harrison, "Wireless Monitor for Data-Driven Treatment of Pectus Carinatum," 43rd Annual Meeting of the American Pediatric Surgical Association, San Antonio, TX, May, 2012.

67. J. A. Liu, J. A. Heller, **M. Etemadi**, D. A. Kwiat, R. Fechter, S. Roy, M. R. Harrison, "Roboimplant II: Development, Design, and Testing of a Controller for Noninvasive Actuation of an Implanted Telescopic Rod Used To Correct Structural Deformities," 43rd Annual Meeting of the American Pediatric Surgical Association, San Antonio, TX, 2012.

68. S. C. Schecter, **M. Etemadi**, J.A. Heller, E.H. Shue, W.T. Ferrier, S. Roy, D. Miniati. "Characterization Of In Vivo Fetal Intra-Airway Pressures In The Lamb Model Of Congenital Diaphragmatic Hernia." American Thoracic Society International Conference. San Francisco, California, May, 2012.

69. S. C. Schecter, **M. Etemadi**, J. A. Heller, E. B. Jelin, and D. Miniati, "An in vitro model of in utero fluid-filled pulmonary mechanics," Thirtieth Annual Meeting of International Fetal Medicine and Surgery Society, Arizona, 2011.

70. S. C. Schecter, **M. Etemadi**, J. A. Heller, and D. Miniati, "System For In-Vitro Evaluation Of Fluid Filled Pulmonary Dynamics In The Fetus," Sixth Annual Academic Surgical Congress, Huntington Beach, CA, 2011.

71. E. B. Jelin, **M. Etemadi**, J. Encinas, J. Wu, S. Guevara-Gallardo, A. Nijagal, K. D. Gonzales, W. T. Ferrier, and D. Miniati, "Dynamic Tracheal Occlusion Improves Lung Morphometrics and Function in the Ovine Model of Congenital Diaphragmatic Hernia," American Academy of Pediatrics National Conference and Exhibition, San Francisco, CA, 2010.

72. **M. Etemadi**, O. T. Inan, R. M. Wiard, L. Giovangrandi, and G. T. A. Kovacs, "Non-invasive Cardiac Contractility Assessment during Valsalva," Athlete's Heart, Sudden Death & Hypertrophic Cardiomyopathy Conference, Stanford, CA, 2009.

73. O. T. Inan, **M. Etemadi**, R. M. Wiard, L. Giovangrandi, and G. T. A. Kovacs, "Non-invasive Cardiac Output Trending During Exercise Recovery on a Home Bathroom Scale," Athlete's Heart, Sudden Death & Hypertrophic Cardiomyopathy Conference, Stanford, CA, 2009.

Regional Meetings:

74. **M. Etemadi** et al, "Dynamic control of fetal breathing *in utero* for the treatment of Congenital Diaphragmatic Hernia," UCSF/UC Berkeley Joint Graduate Group in Bioengineering Annual Retreat, Tahoe City, CA, October 2011. **First place prize for "Best Poster."**

75. S. C. Schecter, **M. Etemadi**, J. A. Heller, D. Miniati, "An in vitro model of in utero fluid-filled pulmonary dynamics." UCSF Department of Surgery 24th Annual Resident Research Symposium. San Francisco, CA, April 2011.

76. S. C. Schecter, E. B. Jelin, **M. Etemadi**, A. Nijagal, K. D Gonzales, W. T. Ferrier, and D. Miniati, "Optimized Pressure Rescues Fetal Lung Growth and Function in Congenital Diaphragmatic Hernia." Bay Area Society of Thoracic Surgeons, February 16th, 2011. San Francisco, California.

RESEARCH EXPERIENCE

Etemadi Research Group **2016-present**
Biomedical Engineering / McCormick School of Engineering
Anesthesiology / Feinberg School of Medicine
Northwestern University, Chicago, IL

UCSF Biodesign Laboratory (PI: Shuvo Roy) **2009-2016**
University of California, San Francisco, San Francisco, CA
Leading a collaborative, multidisciplinary division of the Biodesign Laboratory that designs, develops, and tests novel clinical sensing solutions, including:

- Fully-implantable, ultra-low fetal pulmonary pressure recording and dynamic tracheal occlusion system. *In collaboration with Dr. Doug Miniati.*
- An inexpensive, wireless device that trends cervical collagen metrics in pregnant women to look for very early signs of preterm labor. *In collaboration with UCSF OB/GYN and Reproductive Sciences.*
- Wearable devices to monitor and trend cardiovascular parameters. *In collaboration with Prof. Omer T. Inan at the Georgia Institute of Technology and Dr. Liviu Klein and Dr. Teresa DeMarco of UCSF Cardiology.*
- A "smart bandage" that monitors skin/wound pressure to provide an early warning of pressure ulcer formation. *In collaboration with Dr. Hanmin Lee and UCSF Surgical Innovations.*
- Wireless pressure data-logging sensor and iOS application for treatment monitoring of Pectus Carinatum bracing. *In collaboration with Dr. Michael Harrison and the UCSF Pediatric Device Consortium.*
- Controller for wireless orthopedic implant actuation system to facilitate leg lengthening and scoliosis correction. *In collaboration with Dr. Michael Harrison and the UCSF Pediatric Device Consortium.*
- A "smart retainer" and associated iOS application to monitor orthodontic retainer adherence. *In collaboration with Dr. Sneha Oberoi in the UCSF School of Dentistry.*
- Novel, wearable knee vibration monitor for early detection and classification of degenerative joint disease. *In collaboration with Dr. Richard Souza of UCSF Physical Therapy.*

Post-doctoral Scholar **2013-2014**
Co-advised by Professor Björn Hartmann and Professor Shuvo Roy
Department of Electrical Engineering & Computer Sciences
University of California, Berkeley, Berkeley, CA and
Department of Bioengineering & Therapeutic Sciences
University of California, San Francisco, San Francisco, CA

Created fabryq, a software platform enabling seamless communication of sensor data to the cloud over Bluetooth Low Energy.

Research Assistant, Stanford Transducers Lab (PI: Gregory T.A. Kovacs) 2005-2009
Stanford University, Stanford CA

Member of a collaborative effort involving the Stanford Transducers Lab and groups in the Stanford Medical Center and Palo Alto Veterans Affairs (VA) Hospital to design, develop, and verify an electronic weighing scale-based device for non-invasive cardiovascular monitoring.

- Organizing human subject trials in collaboration with the Palo Alto VA and Stanford Echocardiography Lab to evaluate the performance of the ballistocardiogram (BCG) acquisition device.
- Designed and built electronics and hardware for BCG acquisition device.
- Performed extensive validation of the robustness and repeatability of the BCG measurements, with a clinical trial at the Transducers lab.
- Executed clinical trials in collaboration with the Stanford Echocardiography Lab to verify the hemodynamic accuracy of parameters measured by the device for exercising subjects.
- Introduced new methods for estimating the noise of the BCG signal using multiple sensors.
- Developed new algorithms for improving the signal-to-noise-ratio of the BCG.
- Designed MATLAB data acquisition environment for multiple signal acquisition

EMPLOYMENT HISTORY

Information Technology Consultant **2004-2005**

Stanford University, Stanford, CA

Supported and managed end-user workstations running Windows, Linux, or MacOS. Created and managed a Linux-based network monitoring server. Helped clients in person, on the phone, and via e-mail.

Lead Software Developer **2005**

Cascade Technologies, Mountain View, CA

Created PHP/MySQL web portal for legacy text-based engineering software—allows for text-based engineering programs to be easily accessed, executed, and analyzed from a web browser.

Development Manager **2002-2004**

AirLogic Internet Services, Lincolnshire, IL

Was involved from start to successful sale of this internet service provider (ISP) during high school:

- Developed PHP/MySQL/C++ based customer database system.
- Designed, deployed, and tested large wireless network containing 802.11b and 5.2/5.8GHz Trango™ wireless radios.
- Created C++/PHP based video surveillance network for nearby shopping mall.
- Created C++/PHP billing system for in-room Hilton hotel internet access.
- Designed large IP networks using Cisco routing and switching equipment.
- Created high-availability web/e-mail server cluster for customer and internal use.
- Supported customers over the phone and on site at their home or office.
- Served as lead consulting liaison to our largest client, a $300 million corporate real estate firm.

TEACHING AND MENTORING

Student Research Mentorship **2009-Present**

During medical and graduate school, and now as a faculty member, directly supervised the research of many dozens of trainees ranging from high school students up to medical and PhD students.

Lecturer **2009**

Department of Chemistry, Stanford University, Stanford, CA

Taught a biochemistry laboratory course where students learn a variety of biochemistry techniques, such as protein purification, enzyme characterization, and single molecule fluorescence. Course usually taught by PhD faculty.

Teaching Assistant **2009**

Department of Electrical Engineering, Stanford University, Stanford, CA

Helped develop curriculum for a brand new course on biomedical applications of electrical engineering and served as the inaugural teaching assistant.

Residential Computing Consultant / Resident Assistant **2006-2008**

Stanford University, Stanford, CA

Provided computer consulting to an apartment complex of over four hundred people. Planned numerous activities for residents ranging from arts performances to large dinners and other social events. Helped resident assistants in providing support to residents with academic and personal problems.

Tutoring Director, Tau Beta Pi **2007-2008**

Stanford University, Stanford, CA

Served one elected term as this officer position in Tau Beta Pi, the engineering honors society. Tutored numerous engineering undergraduate students in the engineering fundamental classes at Stanford. Managed 15-20 tutors doing the same.

INTELLECTUAL PROPERTY

1. "Scale-based systems and methods for monitoring heart function," United States Patent 9,814,397, Nov 14, 2017.
2. "Systems and Methods for Monitoring Heart Function," United States Patent 8,870,780, Dec 22, 2015.
3. "Weighing Scale and Sensor Systems and Methods for Monitoring Heart Function," United States Patent 9,055,871, Jun 16, 2015.
4. "Systems and Methods for Monitoring Heart Function," United States Patent 8,870,780, Oct 28, 2014.
5. "Systems and Methods for Monitoring Heart Function," United States Patent 8,858,449, Oct. 14, 2014.

GRANTS & RESEARCH SUPPORT

Co-Principal Investigator, United States Centers for Disease Control ($926k) **2020-2021**
"Presymptomatic Early Warning System for COVID-19 Infection"

Principal Investigator, Sponsored Research ($145k) **2020-2021**
"Next-generation Wearable Fetal Monitoring during Labor and Delivery"

Principal Investigator, Sponsored Research ($290k) **2020-2021**
"Better Identification of Incidental Radiographic Findings"

Investigator, Bill and Melinda Gates Foundation ($100k) **2020-2021**
"Fetal Age and Machine Learning Initiative"

Principal Investigator, Sponsored Research ($450k) **2020-2021**
"Next-generation AI training and inferencing pipelines"

Principal Investigator, Sponsored Research ($450k) **2020-2021**
"Artificial intelligence applications in multi-modal imaging"

Co-Principal Investigator, Gift ($300k) **2020**
"Artificial intelligence applications in Gastroenterology"

Co-Principal Investigator, Moore Foundation Award ($499k) **2019-2020**
"Reducing Cancer Due to Colonoscopy Diagnostic Errors using Machine Learning"

Co-Principal Investigator, DARPA ($421K) **2019-2021**
"Wearable Systems for Joint Health"

Google Faculty Research Award ($69K) **2019**
"Ultrasound For All: Augmenting Low-Cost Ultrasound"

Principal Investigator, Sponsored Research ($290K) **2019-2020**
"Longitudinal advanced technology projects in a large health system"

Principal Investigator, Sponsored Research ($312K) **2018-2019**
"Further engineering considerations for deep integration of AI"

Principal Investigator, Sponsored Research ($250K) **2018-2019**
"Artificial intelligence applications in novel imaging"

Principal Investigator, Sponsored Research ($495K) **2018-2019**
"Artificial intelligence applications in intensive care"

Principal Investigator, Sponsored Research ($475K) **2018-2019**
"Engineering considerations for machine learning in medical applications"

Principal Investigator, Sponsored Research ($194K) **2017-2018**
"Artificial intelligence models for radiographic images"

Principal Investigator, ERG Fund [redacted] **2016-2021**
"Intra-hospital, collaborative creation of medical technologies"

Co-Investigator / Site PI, NIH R01 (1R01HL130619-01A1) ($2.8M) **2016-2021**
"Noninvasive biosensors to detect cardiovascular changes in heart failure patients"

Research Support, NIH R56 (1R56AG048458-01A1) ($616K) **2015-2016**
"Wearable Cardiomechanics Monitor to Decrease Heart Failure Readmissions"

Research Support, UCSF-CTSI / NIH UL1 (TR000004) ($30K) **2015**
"fabryq: an integrated platform to enable rapid creation of wireless biomedical sensors"

Principal Investigator, UCSF Strategic Opportunities Support ($30K) **2014**
"In-Home Pilot Study of Heart Failure Exacerbation Prediction Device"

Co-Principal Investigator, Gates Foundation Grand Challenges Phase II ($2.7M) **2013**
"A "Smart Diaphragm" for the Early Detection of Preterm Labor"

Principal Investigator, CIMIT Prize for Primary Care Innovation ($110K) **2012**
"A New Cloud-Enabled Technology for Monitoring Heart Failure At Home"

Co-Principal Investigator, Vodafone Wireless Innovation Challenge ($200K) **2011-2013**
"A "Smart Diaphragm" for the Early Detection of Preterm Labor"

Co-Principal Investigator, Gates Foundation Grand Challenges Round 6 ($100K) **2011-2012**
"A "Smart Diaphragm" for the Early Detection of Preterm Labor"

Winner, mHealth Alliance Prize, United Nations Foundation ($50K) **2011**
"A "Smart Diaphragm" for the Early Detection of Preterm Labor"

Winner, Berkeley Venture Labs Competition ($6K) **2011**
"A "Smart Diaphragm" for the Early Detection of Preterm Labor"

Research Support, NIH STTR (1R41HL110466-01) ($247K) **2010-2012**
"Miniature Device to Promote Lung Development"

Research Support, FDA P50 (2P50FD003793-03) **2010-2012**
"UC San Francisco Pediatric Device Consortium"

Principal Investigator, Biodesign Fund **2010-2013**
"Low-cost, Clinically Actionable Medical Devices"

AWARDS

Winner, EICS Best Paper	**2015**
Winner, Bill & Melinda Gates Grand Challenges Phase 2	**2014**
Finalist, yCombinator	**2013**
Second Prize, CIMIT Prize for Primary Care Innovation	**2012**
Grand Prize Winner, Dow Sustainability Student Innovation Challenge	**2012**
Forbes Magazine "30 Under 30: Science"	**2011**
Second Prize, Vodafone Americas Wireless Innovation Challenge	**2011**
Winner, mHealth Alliance Prize	**2011**
Winner, Bill & Melinda Gates Grand Challenges Phase 1	**2011**
Finalist, RockHealth Business Accelerator	**2011**
Medical Scientist Training Program Fellowship	**2009-2016**
Electrical Engineering Fellowship	**2008-2009**
Bachelor's Degree conferred "With Distinction"	**2008**
Frederick E. Terman Award for Scholastic Achievement in Engineering	**2008**
Elected to Tau Beta Pi Engineering Honors Society	**2007**
Four-time recipient of the Fred C. and Mary R. Koch Foundation Scholarship	**2004-2008**
Recipient of the President's Award for Excellence in the Freshman Year	**2005**
Two-time Nominee for the Boothe Prize for Excellence in Writing	**2004, 2005**
Recipient of the Microsoft College Scholarship	**2004**

PRESS

"Artificial intelligence is improving the detection of lung cancer," Nature Outlook, November 2020. https://www.nature.com/articles/d41586-020-03157-9

"Researchers developing AI to detect breast cancer in mammograms," WGN TV, January 2020. https://wgntv.com/news/medical-watch/researchers-developing-ai-to-detect-breast-cancer-in-mammograms/

"A.I. Is Learning to Read Mammograms," The New York Times, January 2020. https://www.nytimes.com/2020/01/01/health/breast-cancer-mammogram-artificial-intelligence.html

"A.I. Took a Test to Detect Lung Cancer. It Got an A," The New York Times, May 2019. https://www.nytimes.com/2019/05/20/health/cancer-artificial-intelligence-ct-scans.html

"Behind the scenes of Google's effort to test AI for lung-cancer screening," STAT News, May 2019. https://www.statnews.com/2019/05/22/behind-scenes-of-google-ai-lung-cancer-screening/

"Artificial intelligence 'better than doctors' at diagnosing lung cancer," BBC World Service, May 2019. https://www.bbc.co.uk/programmes/p07b2680

"UCSF team develops early-warning system for preterm labor," San Francisco Chronicle, March, 2014. http://www.sfgate.com/health/article/UCSF-team-develops-early-warning-system-for-5329118.php

"Designing Bespoke Interactive Devices," IEEE Computer Magazine, August, 2013.

"UC Berkeley students recognized for sustainability research projects," San Jose Mercury News, October 25, 2012. http://www.mercurynews.com/breaking-news/ci_21857366/uc-berkeley-students-recognized-sustainability-research-projects

"Home monitoring of heart failure via web-enabled bathroom scales wins award," UCSF News Service, August 2, 2012. http://pharmacy.ucsf.edu/news/2012/08/07/1/

"30 Under 30: Science," Forbes Magazine, December 2011. http://www.forbes.com/pictures/mkg45giif/mozziyar-etemadi-graduate-student-department-of-bioengineering-therapeutic-sciences-university-of-california-san-francisco-25/

"UCSF Team Takes Second Place for 'Smart' Diaphragm Device in National Innovation Competition," UCSF News Service, April 22, 2011. http://www.ucsf.edu/news/2011/04/9748/ucsf-team-takes-second-place-national-innovation-competition

"SMART Diaphragm: Changing the Way Doctors Detect High-Risk Pregnancies," MobileActive.Org, April 22, 2011. http://www.mobileactive.org/case-studies/smart-diaphragm-changing-way-doctors-look-high-risk-pregnancies

"A Miniaturized Video System for Monitoring Drosophila Behavior," NASA Tech Briefs Magazine, April 1, 2011. http://www.techbriefs.com/component/content/article/9604

"Teens Weaving A Golden Web On Internet," Chicago Tribune, June 20, 1996. http://articles.chicagotribune.com/1996-06-20/news/9606280342_1_web-page-computer-jobs/2

PROFESSIONAL AFFILIATIONS

Resident Member, American Society of Anesthesiologists (ASA)	**2014-present**
Student Member, American College of Surgeons (ACS)	**2012-2016**
Member, Institute for Electrical and Electronic Engineers (IEEE)	**2008-present**
Member, IEEE Engineering in Medicine and Biology Society (EMBS)	**2008-present**
Member, Tau Beta Pi Engineering Honors Society	**2007-present**