

Deputy Director, MIT Skoltech Initiative	2014	2016
Associate Director, AIM Academy	2016	2017
Associate Director, MIT.nano	2017	
Faculty Lead for Industry Engagement, MechE	2018	

9. Consulting Record:

Engagements greater than 3 months.

<u>Firm</u>	<u>Beginning</u>	<u>Ending</u>
Los Alamos National Labs		2000
Textron		2000
Federal Trade Commission		2000
FAA		2004
Kodak		2004
Redlake		2005
Olympus		2006
TIS	2009	2012
Photron	2009	2011
Cooper Perkins	2010	2012
IDEO	2012	---
Alcon	2012	---
Ximedica	2013	2014
Herman Miller	2014	2014
Novartis	2015	2015
Lenze	2015	2016
Baxter	2019	2019
Apple	2017	

10. Professional Service

<u>Activity</u>	<u>Beginning</u>	<u>Ending</u>
MEngM Admissions Committee	2006	present
CDO Admissions Committee	2007	2008
Career Fair – SMA in Singapore, Org Chair	2007	2007
Career Fair – SMA/MIT in Singapore, Org Chair	2008	2008
Mfg. microFluidics Symp, Chair	2009	2010
SMART Proposal Lead on Med Devices	3/2010	9/2010
LMP Summit Co-Chair	2011	2011
MEDRC Workshop, Chair	2012	2012
Pilot IMI Proposal, MIT Lead	5/2012	6/2012
Additive mfg working group, Lead	6/2012	8/2012
Co-Chair Education Workstream, AMP 2.0	2013	2014
MIT's role in reducing the cost of health care	2014	2015
AIM Photonics Workforce Committee	2017	2017
Nextflex Collaboration Lead PI	2016	2017
Campus and Community Health Management	2020	2021
MIT-Skoltech Steering Committee	2017	2022
SPIE Conference Committee	2011	2022

MIT / Tufts CTSI TAP Committee	2020
MIT. nano Leadership Council	2017

11. Awards Received:

<u>Award</u>	<u>Date</u>
National Television Academy, Emmy for Innovative Technical Achievement. "Golf on CBS, SwingVision."	2005
BPLA Invented Here, Featured Honoree	2014

12. Current Organization Membership:

<u>Organization</u>	<u>Offices Held</u>
ASME	
IEEE	
SPIE	
AIUM (American Institute of Ultrasound in Medicine)	
Sigma Xi	
RSNA	

13. Patents and Patent Applications Pending:

1. US Patent 5606130 "Method for determining the octane rating of gasoline samples by observing corresponding acoustic resonances therein."
2. US Patent 6393384 "Apparatus and method for remote ultrasonic determination of thin material properties using signal correlation."
3. US Patent 6226081 "Optical height of fill detection system and associated methods."
4. US Patent 8,333,704, B. Anthony and M. Gilbertson, "Handheld Force-Controlled Ultrasound Probe," Dec 11, 2012
5. US Patent 8,328,725, B. Anthony and M. Gilbertson, "Ultrasound Probe," Dec 18, 2012
6. US Patent 8,382,671, B. Anthony and M. Gilbertson, "Handheld Ultrasound Probe," Feb 26, 2013
7. US Patent 9,121,705, B. Anthony and D. Ljubicic, "Sensor for Simultaneous Measurement of Thickness and Lateral Position of a transparent object," Sept 1, 2015
8. US Patent 9,456,800, Brian W. Anthony, Matthew W. Gilbertson, "Ultrasound scanning system", Oct 4, 2016
9. US Patent 10353191, Circular scanning technique for large area inspection, July 16, 2019.
10. MIT Case 14088, Force Controlled Ultrasound Probe, 16-Dec-09
11. MIT Case 14387, Deformation Estimation and Correction in Elastography with a Handheld Force Controlled Ultrasound Probe, 16-Jul-10
12. MIT Case 14422, High-Speed Profilometer for Manufacturing Inspection, 30-Jul-10
13. MIT Case 14966J, Force Measurement Ultrasound Probe for Sonographer Fatigue Monitoring, 10-Jun-11
14. MIT Case 15012, A 6-DOF Optical System for Freehand 3D Ultrasound, 05-Jul-11
15. MIT Case 15681J, Local Actuation and Control of Stamp Deformation in Microcontact Printing, 06-Jun-12
16. MIT Case 15782, Usability Improvements to a Handheld Force-Controlled Ultrasound Probe, 03-Aug-12

17. MIT Case 15884, Computer-Guided Restoration of Ultrasound Scan Poses by Optical Tracking, 01-Oct-12
18. MIT Case 16160, Quick-Release Mechanism for a Force-Measuring Ultrasound Probe, 22-Feb-13
19. MIT Case 16447, Force-correlated Quantitative Ultrasound Image Analysis, 02-Jul-13
20. MIT Case 17106J, Acoustic Characterization of Superficial Body Fluids, 07-May-14
21. MIT Case 17211J, Wireless Capsule Endoscopic Ultrasound, 24-Jun-14
22. MIT Case 17259K, A Concentric Circle Scanning Technique for Large Area Inspection, 09-Jul-14
23. MIT Case 17260K, Grid-Based Matching for Full-Field Large-Area Deformation Measurement, 09-Jul-14
24. MIT Case 17344, Recovery and Computer-Guided Restoration of Ultrasound Scan Poses Based on Human Skin Features, 21-Aug-14
25. MIT Case 17864J, Ultrasound-Based Individual Scatterer Detection Method Using Scatterer Motion Induced by Acoustic Radiation Force, 21-Apr-15
26. MIT Case 17865, Ultrasound-Based Absolute Scatterer Concentration Measurement Technique: Image Volume Estimation from Scatter Spread Function Extracted From the Image, 21-Apr-15
27. MIT Case 17990, Hydrogel Ultrasound Angle Wedge, 04-Jun-15
28. MIT Case 18074, Joint Camera-Ultrasound Data Acquisition for Limb Scanning, 13-Jul-15
29. MIT Case 18544, An Iterative RTM with a Priori Data to Estimate Bone Thickness Using a Cylindrically Scanning Ultrasound Tomography Scanner, 22-Feb-16
30. MIT Case 18545K, Block-Wise Inversion for the Soundspeed of Human Soft Tissue and Bone Using Ray Based Travel Time Tomographic Techniques, 22-Feb-16
31. MIT Case 18636, Concentric Ring-Based Point Pattern Matching of Skin Features, 05-Apr-16
32. MIT Case, Physical and Chemical Characterization of Aerosols with Photonic Waveguides, United States Patent Application 20190234850
33. MIT Case 19192QJ, Non-Invasive Assessment of Venous Pressure via Actuation of Reciprocal Surface Forces for Vessel Collapse Using Single-Crystal Ultrasound in Vertebrates
34. MIT Case 19409, Medical Ultrasound Device with Integrated Force Measurement and Methods for Data Synchronization
35. MIT Case 19460, Shear Wave Elastography Imaging with External Mechanical Vibration
36. MIT Case 19516, Source and Receiver Tracking for Non-Contact Ultrasound
37. MIT Case 19618, Real Time Imaging of Invisible Micron-Scale Monolayer Patterns on a Moving Web Using Condensation Figures
38. MIT Case 19626TE, Apparatus and Methods for Ultrasound Limb Scanning Under Load
39. MIT Case 19710, A Technique for Imaging Cortical Bone and Soft Tissue Using the Level-Set Method to Regularize Travel-Time and Full Waveform Tomography Techniques
40. MIT Case 19791, On chip Photonic Aerosol Spectrometer
41. MIT Case 19921, Equity Disbursement for Bionic Skins LLC (4914743)
42. MIT Case 20289, Miniaturization of External Mechanical Vibration for Ultrasound Shear Wave Elastography Imaging
43. MIT Case 20506L, Systems and Methods for Enabling Non-Contact Laser Ultrasound
44. MIT Case 21078, Microscale Photoacoustic Spectroscopy and Microscopy
45. MIT Case 21123, Tunable Filler Assembly in Multi-material Polymer Extrusions Using Direct Injection and Acoustic Radiation Forces

46. MIT Case 21145, 3D Organ and Tissue Property Mapping using Superficial Vasculature-Based RGBD-SLAM and Deep Vasculature Alignment
47. MIT Case 22420, Integrated Optofluidic Sensor for Thromboembolic and Coagulation Risk Monitoring in COVID-19 Patients at Point-of-Care
48. MIT Case 22432, High Sensitivity and Specificity, Rapid, Low Cost, On-Chip Covid-19 Virus (and Other Virus) Detection using Integrated Photonic Sensors
49. MIT Case 22652, Dynamic Control of a Fiber Manufacturing Process using Deep Reinforcement Learning
50. MIT Case 23256, Privacy-Preserving Health Diagnosis of Manufacturing Machines
51. Circular scanning technique for large area imaging (US Patent 10,735,674)
52. Method for detecting circulating cells in superficial body fluids (US Patent 10,639,012)
53. Physical and Chemical Characterization of Aerosols with Photonic Waveguides (US Patent 11,181,454)

14. Professional Registration:

N/A.

15. Major New Products, Processes Designs, or Systems:

See next.

16. Major New Products, Processes Designs, or Systems:

The following is split between a) University Programs or Significant Initiatives, b) Products, and c) Companies.

A. Programs, Centers, or Significant Initiatives

MechE Alliance – Industry Immersion Project Program

The I2P Program provides MechE graduate students with an exclusive opportunity to gain real-world experience working on a 3-to-6 month industry project at a participating company while still enrolled at MIT. Project concepts are first proposed by the company, and then refined and improved by students and their faculty advisors to best suit their academic experience and career interests.

Living Lab in IMES

The Sekisui House at MIT established a multi-year and sustained collaboration around specific themes and needs, answer key questions—via targeted projects designed to collect clinically relevant evidence—and generate significant technology innovations. The program will be staffed and operated by clinicians, researchers, and technical instructors, while fostering educational and global exchange between disparate communities, all while highlighting efforts in medical and observational research. The broader MIT community will be engaged with annual workshops and calls for proposals, as well as nominations for faculty and students to join programs surrounding specific themes.

Immersion Lab – MIT.nano

The Immersion Lab is a two-story, state-of-the-art space for research in visualization, augmented and virtual reality (AR/VR), and the depiction and analysis of spatially related data. Housed in MIT.nano, the lab is an open-access research space. The Immersion Lab mission is to propel research and education at MIT by: Providing the community with an array of cutting-edge technologies to facilitate immersive experiences; Broadening interdisciplinary interest in immersive technologies at MIT and promoting collaborations in art, science, and technology; Supporting teaching in enhanced reality and mentoring MIT community members seeking to realize their projects using our facility; Bridging the domains of hardware and software—and encouraging cycles in which advances in one domain spark innovation in the other; Fueling experimentation and research in enhanced reality technologies through seed grants, shared equipment, symposia, and other resources.

MEngM

Former Director of the Master of Engineering in Manufacturing Program, and previously the director of the Singapore MIT Alliance - Manufacturing Systems and Technology Program since 2006. In these roles I have developed an education partnership program with small to multi-national corporations, defined and built the MEngM program and structure for the development and execution of company-based projects. I place student groups into companies, teach professional engineering practice in the contact of industry based group projects, and broadly define and execute the operations of the MEngM degree program.

MEDRC

Co-Founder, Co-Director of the Medical Electronic Device Realization Center (MEDRC). Along with Charlie Sodini, and Joel Voldman, I recruit large Medical Device manufacturing companies, lead research, and engage with the Med Tech community nationally and internationally.

The MEDRC establishes partnerships between the microelectronics industry, the medical devices industry, medical professionals, and MIT faculty, researchers, and students to collaboratively achieve improvements in the cost and performance of medical electronic devices. The successful realization of such a vision also demands innovations in the usability and productivity of medical devices, and new technologies and approaches to manufacture devices. The MEDRC is a focal point for large business, for venture-funded startups, and for the medical community.

MIT Skoltech Initiative

Deputy Director, and Lead Education, MIT Skoltech Initiative. I served as the education faculty lead in the development of high level curriculum concept for SkolTech Master's degree programs, spanning across domains (space, nuclear, biomedicine, IT, and energy). We develop the education-team collaboration, build consensus on vision, objectives, and plans, and to create education programs for each domain.

MIT.nano / SENSE.nano

Associated Director, MIT.nano. Founding director of first center of excellence at MIT.nano, SENSE.nano.

MIT Center for Clinical and Translation Research

Advisor for Clinical Technology Operation. The CCTR provides the facilities needed to conduct safe human research - in concert with colleagues in MIT Medical, the VPR Office of Research Compliance, and the Committee on the Use of Humans as Experimental Subjects (COUHES). The Center embodies a three-part mission: addressing critical needs in translational research within medicine, expanding central resources essential to MIT, and enabling external links to outside schools (Tufts University, Harvard University, Harvard Medical School), hospitals, and agencies (e.g. FDA).

Other Significant, formative, Initiatives

SMART Center - March through September 2010

I developed consensus around a theme, built the team of 10 investigators in Singapore and 10 investigators at MIT for a whitepaper and requested full center-proposal for SMART, entitled “*Realization (Design, Manufacturing, and Use) of Injectable Physiological Monitors – Enabling a Patient Centric Information Driven Healthcare Future.*”

Pilot Innovation Manufacturing Institute (IMI) Proposal – May, June 2012

A team (University of Massachusetts Amherst, University of Connecticut, Massachusetts Institute of Technology, the Connecticut Center for Advanced Technology, the Pennsylvania State University, UMass Lowell, United Technologies Corporation, and the National Center for Manufacturing Sciences) proposed to form an independent, non-profit technical center of excellence to accelerate technological progress and innovation in additive manufacturing (AM), in response to the May 8, 2012 Air Force Research Laboratory Broad Agency Announcement (BAA-122-17-PKM) for the NNMI pilot.

Flexible Hybrid Electronics Manufacturing Innovation Institute (NextFlex) – October 2015

MIT PI on winning proposal, including a team of Marc Baldo, Duane Boning, Vladimir Bulovic, Karen K Gleason, David E Hardt, Anastasios John Hart, Sang-Gook Kim. \$150M national center with a mission to catalyze the development of an ecosystem for manufacturing new forms of electronics that integrate bulk ICs and printed devices with functions such as power, communications, fluidics, and bio-sensing in flexible systems that can bend, fold, stretch, and conform.

B. Products

Fuselage Crack Inspection System for FAA

In support of the Federal Aviation Administration National Aging Aircraft Research Program (NAARP) the state-of-the-art Full-Scale Aircraft Structural Test Evaluation and Research (FASTER) Facility was established at the FAA William J. Hughes Technical Center - I designed, built, and delivered The Remote-Control Crack Monitoring System consisting of a pair of cameras with two different fields of view manipulative by with a large gantry robot. The cameras ‘fly’ over the fuselage surface to identify and track cracks using processed camera images to generate the feedback signal

Laser Wave for Textron

Textron Inc.’s LaserWave® products integrated advanced signal processing techniques, robust software algorithms, lasers, optics and ultrasonic technology. I developed propagation models describing the propagation of the collapsing circular, thermo-elastic, transient Lamb waves. I developed real-time inversion routines using a time-frequency wavelet decomposition to extract and identify group velocity mode shapes. The LaserWave products use models and algorithms that I developed to invert the measured temporal signals to estimate elastic constants and material thickness of thin layers.

Motion Tools for Photron Inc

I designed Photron Motion Tools to operate high-speed PCI cameras. Photron Motion Tools provides users with manual and automatic tracking capabilities. By simply selecting the point of interest within the recorded image sequence, Motion Tools automatically tracks the points-motion within the sequence.

i-Speed for Olympus

Capable of capturing images at speeds from 60 to 150,000 frames per second in 'normal' mode (down to 1 second/frame in 'timelapse' mode) i-SPEED cameras are an effective method of locating problems quickly and easily. I designed custom software to provide the operator with the ability to analyze and enhance high-speed videos. Velocity and distance measurement can also be calculated. The i-SPEED Software Suite was designed to mirror the ease-of-use and high specification power of the camera range.

Swing Vision for CBS

I designed and built the Swing Vision camera system, camera control system, camera mounts, the server architecture, and the analysis software. Two high-speed cameras record a golfer t-shot. A 2000 fps camera records the full view of the golfer. A 12500 frame per second camera is used to record the ball-club interaction. As the 2000 fps video is broadcast in slow motion, the 12500-fps video (gigabytes of raw video data) is **automatically** analyzed (in under 20 seconds). I won an Emmy for this system in 2005.

MiDAS and ProAnalyst - Xcitex

As Xcitex's CTO and first engineer, I developed the core of the flagship products - MiDAS and ProAnalyst. And as CTO and Vice-President of Xcitex, I developed and directed the development of products and solutions for the industrial and scientific video markets.

C. Companies

Xcitex – CoFounder, formerly CTO, formerly Vice-President, Board of Directors

Xcitex was self-funded and grew through solid product development and consistent execution of our business strategy. As Xcitex's first engineer, I developed the core of the flagship products - MiDAS and Pro Analyst. I also describe these products in a document that I include as supplemental material. As CTO and Vice-President of Xcitex, I built the technical team, architected and directed the development of products and solutions for the industrial and scientific video markets. Our products alone fueled our growth from startup to dominant market leader.

dRNOME – CoFounder, Investor, Board of Director

Provided tools for managing, manipulating, archiving, and searching your scientific video. Removed the necessity for its customers to make heavy investments in expensive hardware and software solutions, removes the overhead required to manage high-volume video needs, and we back this with a service level guarantee.

dRNOME Inc. (CueVue.com – Launched in February 2011, sold technology in 2014). Core technologies used to perform automated feature recognition of multiple streaming telemetry sources and to extract metadata and make this information available for ongoing operations, forensics, and security. Products enable multi-camera real-time feature recognition, extraction & tagging automation.

Enumage – CoFounder, Investor, Board of Director

Specializing in Laser Ultrasound.

Publications of Brian W. Anthony

1. Books:

Smart Manufacturing On-line course, deployed 2019 and 2020

2. Papers in Referred Journals:

- 2.1. B. Anthony, A. Abbate, D. Klimek, P. Kotidis., "Analysis of Ultrasonic Waves in Arbitrarily Oriented or Rotating Anisotropic Thin Materials", *Quantitative Nondestructive Evaluation*. Vol 18. pgs 215 - 222. (1999).
- 2.2. A. Abbate, B. Anthony, D. Klimek, P. Kotidis., "Analysis of Dispersive Ultrasonic Signals by the Ridges of the Analytic Wavelet Transform", *Quantitative Nondestructive Evaluation*. Vol 18. pgs 703 - 710. (1999).
- 2.3. Dan Klimek, Brian Anthony, Agostino Abbate, Petros Kotidis, "Laser Ultrasonic Instrumentation for Accurate Temperature Measurement of Silicon Wafers in Rapid Thermal Processing Systems", *Rapid Thermal and Integrated Processing VII*, Materials Research Society, Volume 525, pg 135. (1999)
- 2.4. Hardt, D.E., Anthony, B.W., Tor S.B., "A teaching factory for polymer microfabrication - μ Fac," *International Journal of Nanomanufacturing*, 2010, Vol. 6, No.1/2/3/4, pp. 137 - 151.
- 2.5. Shih-Yu Sun, Matthew Gilbertson, and Brian W. Anthony, "Probe Localization for Freehand 3D Ultrasound by Tracking Skin Features", *Book Section, Medical Image Computing and Computer-Assisted Intervention - MICCAI 2014*, Springer, 2014, Vol. 8674. *Lecture Notes in Computer Science*, Pages 365-372.
- 2.6. Xian Du, Brian W. Anthony, Nigel C. Kojimoto, "Grid-based matching for full-field large-area deformation measurement", *Optics and Lasers in Engineering*, Volume 66, March 2015, Pages 307-319.
- 2.7. Xian Du, Nigel C. Kojimoto, Brian W. Anthony, "Concentric circular trajectory sampling for super-resolution and image mosaicing", *Journal of the Optical Society of America A*, Volume 32, No. 2, February 2015, Pages 293-304.
- 2.8. M. Gilbertson, B. Anthony. "A Force and Position Control System for Freehand Ultrasound", *IEEE Transactions on Robotics*, Volume 31, Issue 4. 2015.
- 2.9. Andrey Kuzmin, Aaron Zakrzewski, Brian Anthony, Victor Lempitsky, "Multi-frame Elastography Using Handheld Force-Controlled Ultrasound Probe". *Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, Volume 62, Issue 8, Pages 1486 – 1500, 2015.
- 2.10. Xian Du and Brian Anthony, "Concentric circle scanning system for large-area and high-precision imaging," *Optics Express*, Vol 23, Issue 15, Pages 20014-20029, 2015.
- 2.11. Du, X., Anthony, B., "Controlled angular and radial scanning for super resolution concentric circular imaging," *Opt. Express* 24(20), 22581, United States (2016).
- 2.12. Jimenez, X., Shukla, S. K., Ortega, I., Illana, F. J., Castro-González, C., Marti-Fuster, B., Butterworth, I., Arroyo, M., Anthony, B., et al., "Quantification of Very Low Concentrations of Leukocyte Suspensions In Vitro by High-Frequency Ultrasound," *Ultrasound Med. Biol.* 42(7), 1568–1573, England (2016).
- 2.13. Koppaka, S., Shklyar, I., Rutkove, S. B., Darras, B. T., Anthony, B. W., Zaidman, C. M., Wu, J. S., "Quantitative Ultrasound Assessment of Duchenne Muscular Dystrophy Using Edge Detection Analysis," *J. Ultrasound Med.* 35(9), 1889–1897, United States (2016).
- 2.14. Lee, J., Boning, D., Anthony, B., "Measuring the Absolute Concentration of Microparticles in Suspension using High Frequency B-mode Ultrasound Imaging", *Ultrasound in Medicine and Biology*, 2018.
- 2.15. Correa-de-Araujo, R., Harris-Love, M., Miljkovic, I., Fragala, M.S., Anthony, B.W., Manini, T., Newman, A.B., "The Need for Standardized Assessment of Muscle Quality in Skeletal Muscle Function Deficit and Other Aging-Related Muscle Dysfunctions: A Symposium Report", *Frontiers in Physiology*, Section on Striated Muscle Physiology, 2017

Publications of Brian W. Anthony

- 2.16 Anthony, B, et al, "A Pilot Study to Precisely Quantify Forces Applied by Sonographers While Scanning: A Step Toward Reducing Ergonomic Injury", *WORK: A Journal of Prevention, Assessment, and Rehabilitation*, 2017
- 2.17 Zakrzewski, Aaron M., Anthony, Brian W., "Non-Invasive Blood Pressure Estimation Using Ultrasound and Simple Finite Element Models", *IEEE Transactions on Biomedical Engineering*, 2017
- 2.18 Anthony, B., Fitriana, "Computationally-Efficient Optimal Video-Comparison for Machine Monitoring and Process Control", *Journal of Manufacturing Science and Engineering*, 2017
- 2.19 Lee I, Du X, Anthony B. "Hair segmentation using adaptive threshold from edge and branch length measures," *Computers in Biology Medicine*, (2017).
- 2.20 Pigula-Tresansky AJ, Wu JS, Kapur K, Darras BT, Rutkove SB, Anthony BW. "Muscle compression improves reliability of ultrasound echo intensity," *Muscle Nerve*, 2017.
- 2.21 Xian Du, David Hardt, and Brian W. Anthony, "Real time imaging of invisible micron-scale monolayer patterns on a moving web using condensation figure," *IEEE Transactions on Industry Electronics*, (submitted, in review), 2017.
- 2.22 Brian W. Anthony, Xian Du, Ina Kundu, Judith Beaudoin, "Skin registration and point pattern matching of skin microrelief structure," (submitted, in revision), 2017.
- 2.23 Ozturk A, Grajo JR, Dhyani M, Anthony BW, Samir AE. *Principles of ultrasound elastography. Abdominal Radiology*. 2018.
- 2.24 Benjamin A, Zubajlo RE, Dhyani M, Samir AE, Thomenius KE, Grajo JR, Anthony, Brian W., "A Novel Approach to the Quantification of the Longitudinal Speed of Sound and its Potential for Tissue Characterization (Part I)", *Journal of Ultrasound in Medicine and Biology*, 2018
- 2.25 B. Anthony et al, "Experimental Validation of Longitudinal Speed of Sound Estimates in the Diagnosis of Hepatic Steatosis (Part II)", *Journal of Ultrasound in medicine and biology*, 2018
- 2.26 A. Ozturk et al., "Quantitative Hepatic Fat Quantification in NAFLD using Ultrasound-Based Techniques: A Review of Literature and their Diagnostic Performance," *Ultrasound in Medicine and Biology*, 2018
- 2.27 Zakrzewski, A. M., Huang, A. Y., Zubajlo, R. E., & Anthony, B. W. Real-Time Blood Pressure Estimation From Force-Measured Ultrasound. *IEEE Transactions on Biomedical Engineering*, 2018 (Nov 2018 cover article).
- 2.28 Singh, R., Su, P., Kimerling, L., Agarwal, A., & Anthony, B. W. "Towards On-chip Mid Infrared Photonic Aerosol Spectroscopy." *Applied Physics Letters*. (Accepted). 2018
- 2.29 Ranger, Bryan J., Feigin, M., Zhang, X., Moerman, Kevin M., Herr, H., Anthony, Brian W. "3D ultrasound imaging of residual limbs with camera-based motion compensation", *Transactions on Neural Systems & Rehabilitation*, (accepted) 2018.
- 2.30 Singh, R., Ma, D., Kimerling, L., Agarwal, A., & Anthony, B. W. "Chemical Characterization of Aerosol Particles Using On-chip Photonic Cavity Enhanced Spectroscopy". *ACS Sensors*. 2018
- 2.31 Feigin, M., Ranger, B., Anthony, B., "Probabilistic Framework for Maximal Consensus Image Registration with Application to Medical Ultrasound Imaging" *IEEE Transactions on Biomedical Engineering*, (submitted) 2019.
- 2.32 X. Du, D. Hardt, and B. Anthony, "Real Time Imaging of Invisible Micron-Scale Monolayer Patterns on a Moving Web Using Condensation Figures," *IEEE Trans. Ind. Electron.*, pp. 1–1, 2019.
- 2.33 B. J. Ranger, M. Feigin, X. Zhang, K. M. Moerman, H. Herr, and B. W. Anthony, "3D Ultrasound Imaging of Residual Limbs With Camera-Based Motion Compensation," *IEEE Trans. Neural Syst. Rehabil. Eng.*, vol. 27, no. 2, pp. 207–217, Feb. 2019.
- 2.34 M. Feigin-Almon, D. Freedman, and B. W. Anthony, "A Deep Learning Framework for Single-Sided Sound Speed Inversion in Medical Ultrasound," *IEEE Trans. Biomed. Eng.*, pp. 1–1, 2019.
- 2.35 R. Singh, D. Ma, L. Kimerling, A. M. Agarwal, and B. W. Anthony, "Chemical Characterization of Aerosol Particles Using On-Chip Photonic Cavity Enhanced Spectroscopy," *ACS Sensors*, vol. 4, no. 3, pp. 571–577, Mar. 2019.

Publications of Brian W. Anthony

- 2.36 Xiang Zhang, Jonathan Fincke, Charles Wynn, Matthew Johnson, Robert Haupt, and Brian Anthony. Full Noncontact Laser Ultrasound: First Human Data. *Nature, Light: Science & Applications*. 2019 (Accepted)
 - 2.37 M. Feigin, M. Zwecker, D. Freedman, and B. W. Anthony, "Detecting muscle activation using ultrasound speed of sound inversion with deep learning," Submitted Oct. 2019.
 - 2.38 S. Kim, D. D. Kim, and B. Anthony, "Dynamic Control of a Fiber Manufacturing Process using Deep Reinforcement Learning," Submitted Nov. 2019.
 - 2.39 R. Singh, Y. Nie, A. M. Agarwal, and B. W. Anthony, "Inverse Design of Photonic Metasurface Gratings for Beam Collimation in Opto-fluidic Sensing," Submitted Oct. 2019.
 - 2.40 Benjamin A, Chen M, Li Q, Chen L, Dong Y, Carrascal CA, et al. Renal Volume Estimation Using Freehand Ultrasound Scans: An Ex Vivo Demonstration. *Ultrasound Med Biol*. 2020 Jul;46(7):1769–82.
 - 2.41 Chrzanowski S, Tresansky AP, Nagy J, Rutkove S, Anthony B. Muscle Imaging – MRI. *Neuromuscul Disord*. 2020 Oct;30:S95.
 - 2.42 Singh R, Agarwal A, W Anthony B. Mapping the design space of photonic topological states via deep learning. *Opt Express*. 2020 Sep 14;28(19):27893.
 - 2.43 Lee JH, Traverso G, Ibarra-Zarate D, Boning DS, Anthony BW. Ex Vivo and In Vivo Imaging Study of Ultrasound Capsule Endoscopy. *J Med Device*. 2020 Jun 1;14(2).
 - 2.44 Singh R, Agarwal A, Anthony BW. Design of optical meta-structures with applications to beam engineering using deep learning. *Sci Rep*. 2020 Dec 16;10(1):19923.
 - 2.45 Yang H, Carrascal CA, Xie H, Shamdasani V, Anthony BW. 2-D Ultrasound Shear Wave Elastography With Multi-Sphere-Source External Mechanical Vibration: Preliminary Phantom Results. *Ultrasound Med Biol*. 2020 Sep;46(9):2505–19.
 - 2.46 Benjamin, Alex; Ely, Gregory; Fincke, Jonathan; Anthony BW. Reflection Ultrasound Tomography Using Localized Freehand Scans. *IEEE Int Symp Biomed Imaging*. 2020.
 - 2.47 Ozturk A, Zubajlo RE, Dhyani M, Grajo JR, Mercaldo N, Anthony BW, et al. Variation of Shear Wave Elastography With Preload in the Thyroid: Quantitative Validation. *J Ultrasound Med*. 2021 Apr 20;40(4):779–86.
 - 2.48 Kang HED, Kim D, Kim S, Kim DD, Cheon JH, Anthony BW. Homomorphic Encryption as a secure PHM outsourcing solution for small and medium manufacturing enterprise. *J Manuf Syst*. 2021 Oct;61:856–65.
 - 2.49 Kim S, Kim DD, Anthony B. Dynamic Control of a Fiber Manufacturing Process using Deep Reinforcement Learning. *IEEE/ASME Trans Mechatronics [Internet]*. 2021;4435(c):1–1.
 - 2.50 Fincke J, Zhang X, Shin B, Ely G, Anthony BW. Quantitative Sound Speed Imaging of Cortical Bone and Soft Tissue: Results from Observational Data Sets. *IEEE Trans Med Imaging*. 2021;PP(X):1–1.
 - 2.51 Singh R, Nie Y, Gao M, Agarwal AM, Anthony BW. Inverse design of photonic meta-structure for beam collimation in on-chip sensing. *Sci Rep*. 2021 Dec 5;11(1):5343.
 - 2.52 Benjamin A, Ely G, Anthony BW. 2D speed of sound mapping using a multilook reflection ultrasound tomography framework. *Ultrasonics*. 2021 Jul;114:106393.
3. Proceedings of Refereed Conferences:
- 3.1. Dipen N. Sinha, Brian W. Anthony, David C. Lizon, "Swept Frequency Acoustic Interferometry Techniques for Chemical Weapons Verification and Monitoring", Third International Conference On-Site Analysis, (1995).
 - 3.2. David E. Hardt, Brian W. Anthony and Shu Beng Tor, "A Teaching Factory for Polymer Microfabrication – muFac", Proc. 5th International Symposium on Nano-Manufacturing (ISNM), Athens, November 12-15, 2008.
 - 3.3. Gilbertson, M., Anthony, B., and Sun, S.Y., "Handheld Force Controlled Ultrasound Probe", *J. Med. Devices* 4, 027540 (2010)

Publications of Brian W. Anthony

- 3.4. Ljubicic, D. M., Anthony, B., "Development of a high-speed profilometer for manufacturing inspection," Proceedings of SPIE Vol. 7767, 776705 (2010).
- 3.5. Sun, S., Anthony, B. W., Gilbertson, M. W., "Trajectory-based deformation correction in ultrasound images," Proceedings of SPIE Vol. 7629, 76290A (2010).
- 3.6. Anthony, B. W., Hardt, D. E., Hale, M., et al., "A research factory for polymer microdevices: muFac," Proceedings of SPIE Vol. 7593, 75930A (2010).
- 3.7. Gilbertson, M. W., Anthony, B. W., "Impedance-controlled ultrasound probe," Proceedings of SPIE Vol. 7968, 796816 (2011).
- 3.8. Ljubicic, D. M., Anthony, B. W., "3D high-speed profilometer for inspection of micro-manufactured transparent parts," Proceedings of SPIE Vol. 8082, 808211 (2011).
- 3.9. Anthony, B.W, Hardt, D.E., "Revitalizing US Manufacturing to Capitalize on Innovation – Through Education" 119th ASEE Annual Conference, San Antonio TX, June 10-13, (2012)
- 3.10. Anthony, B. W., Namvari, K., "Dimensional variation of polymer substrate electrode production," Proceedings of SPIE Vol. 8251, 82510G (2012).
- 3.11. Selvakumar, S., Linares, R., Oppenheimer, A., Anthony, B., "Variation analysis of flow rate delivered using a blister pump," Proceedings of SPIE Vol. 8251, 82510I (2012).
- 3.12. Donoghue, L., Anthony, B. W., "Design for manufacture of a micro-interdigitated electrode for impedance measurement in a biochemical assay," Proceedings of SPIE Vol. 8251, 82510Y (2012).
- 3.13. Holmes, J., Anthony, B. W., "Robustness and repeatability test of interdigitated electrodes on a polymer substrate in an aqueous environment," Proceedings of SPIE Vol. 8251, 825110 (2012).
- 3.14. Sun, S.-Y, Anthony, B. W. "Freehand 3D ultrasound volume imaging using a miniature-mobile 6-DOF camera tracking system". 2012 IEEE International Symposium on Biomedical Imaging (ISBI), 2-5 May, (2012).
- 3.15. Gilbertson, M.W., Anthony, B.A., 2012. "Ergonomic Controls Strategies for a Handheld Force-Controlled Ultrasound Probe," 2012 IEEE/RSJ Intelligent Robots and Systems (IROS) Conference. Vilamoura, Portugal. (2012)
- 3.16. Sun, S.-Y, Gilbertson, M., Anthony, B. W. "6-DoF Probe Tracking via Skin Mapping for Freehand 3D Ultrasound". 2013 IEEE International Symposium on Biomedical Imaging (ISBI), (2013).
- 3.17. Sun, S.-Y, Gilbertson, M., Anthony, B. W. "Computer-Guided Ultrasound Probe Realignment by Optical Tracking". 2013 IEEE International Symposium on Biomedical Imaging (ISBI), (2013).
- 3.18. Inamdar, T., Anthony, B. W., "Characterizing fluidic seals for on-board reagent delivery," Proceedings of SPIE (2013).
- 3.19. Zakrzewski, A., Anthony, B. W. "Quantitative Elastography and its Application to Blood Pressure Estimation: Theoretical and Experimental Results". 2013 IEEE Engineering in Medicine and Biology Society (EMBS), (2013).
- 3.20. Gilbertson, M. Anthony, B.W., "An Ergonomic, Instrumented Ultrasound Probe for 6-Axis Force/Torque Measurement". 2013 IEEE Engineering in Medicine and Biology Society (EMBS), (2013).
- 3.21. Dhyani, M, Gilbertson, M., Samir, A., Anthony, B.W., "Precise Quantification of Sonographic Forces: A First Step Toward Reducing Ergonomic Injury", 2014 AIUM Annual Convention, (2014).
- 3.22. Koppaka, S., Gilbertson, M., Wu, J., Rutkove, S., Anthony, B. W. "Assessing Duchenne Muscular Dystrophy With Force-controlled Ultrasound". 2014 IEEE International Symposium on Biomedical Imaging (ISBI), (2014).
- 3.23. Koppaka, S., Gilbertson, M., Rutkove, S., Anthony, B. W. "Evaluating the Clinical Relevance of Force-correlated Ultrasound". 2014 IEEE International Symposium on Biomedical Imaging (ISBI), (2014).
- 3.24. J. H. Lee, C. M. Schoellhammer, G. Traverso, D. Blankschtein, R. Langer, K. E. Thomenius, D. S. Boning, B. Anthony, "Towards Wireless Capsule Endoscopic Ultrasound (WCEU)," IEEE International Ultrasonics Symposium (IUS), Chicago, IL, 2014, pp. 734-7.

Publications of Brian W. Anthony

- 3.25. Zhang, Xiang; Fincke, Jonathan; Kuzmin, Andrey; Lempitsky, Victor; Anthony, Brian, "A single element 3D ultrasound tomography system," in Engineering in Medicine and Biology Society (EMBC), 2015 37th Annual International Conference of the IEEE , vol., no., pp.5541-5544, 25-29 Aug. 2015.
- 3.26. Ranger, Bryan J.; Feigin, Micha; Pestrov, Nikita; Zhang, Xiang; Lempitsky, Victor; Herr, Hugh M.; Anthony, Brian W., "Motion compensation in a tomographic ultrasound imaging system: Toward volumetric scans of a limb for prosthetic socket design," in Engineering in Medicine and Biology Society (EMBC), 2015 37th Annual International Conference of the IEEE , vol., no., pp.7204-7207, 25-29 Aug. 2015.
- 3.27. Lee, John H.; Jimenez, Javier; Xiang Zhang; Boning, Duane S.; Anthony, Brian W., "Ultrasound image-based absolute concentration measurement technique for materials with low scatterer concentration", IEEE International Ultrasonics Symposium (IUS), 2015.
- 3.28. Lee, John H.; Jimenez, Javier; Butterworth, Ian R.; Castro-Gonzalez, Carlos; Shukla, Shiva K.; Marti-Fuster, Berta; Elvira, Luis; Boning, Duane S.; Anthony, Brian W., "Measurement of very low concentration of microparticles in fluid by single particle detection using acoustic radiation force induced particle motion", IEEE International, Ultrasonics Symposium (IUS), 2015.
- 3.29. Anthony, B. W., "Enhanced ultrasound for advanced diagnostics, ultrasound tomography for volume limb imaging and prosthetic fitting," Proc. SPIE 9790, N. Duric and B. Heyde, Eds., 97900Q (2016).
- 3.30. Fincke, J. R., Feigin, M., Prieto, G. A., Zhang, X., Anthony, B., "Towards ultrasound travel time tomography for quantifying human limb geometry and material properties," Proc. SPIE 9790, N. Duric and B. Heyde, Eds., 97901S (2016).
- 3.31. Kuzmin, A., Zhang, X., Fincke, J., Feigin, M., Anthony, B. W., Lempitsky, V., "Fast low-cost single element ultrasound reflectivity tomography using angular distribution analysis," 2016 IEEE 13th Int. Symp. Biomed. Imaging, 1021–1024, IEEE (2016).
- 3.32. Pigula, A. J., Wu, J. S., Gilbertson, M. W., Darras, B. T., Rutkove, S. B., Anthony, B. W., "Force-controlled ultrasound to measure passive mechanical properties of muscle in Duchenne muscular dystrophy," 2016 38th Annu. Int. Conf. IEEE Eng. Med. Biol. Soc., 2865–2868, IEEE (2016).
- 3.33. Ranger, B. J., Feigin, M., Zhang, X., Mireault, A., Raskar, R., Herr, H. M., Anthony, B. W., "3D optical imagery for motion compensation in a limb ultrasound system," Proc. SPIE 9790, N. Duric and B. Heyde, Eds., 97900R (2016).
- 3.34. Zhang, X., Fincke, J. R., Anthony, B. W., "Single element ultrasonic imaging of limb geometry: an in-vivo study with comparison to MRI," Proc. SPIE 9790, 97901R–97901R–7 (2016).
- 3.35. Nguyen, M.M, Graule, M.A., Huang, A.Y, Shamdasani, V., Anthony, B.W., Xie, H., "Ultrasound shearwave elastography with force sensing – integration design and preliminary ex-vivo results.," Proc. Int. Tissue Elast. Conf. 2016 (2016).
- 3.36. Feigin M., Ranger, B., Anthony, B., "Statistical Consensus Matching Framework for Image Registration," IEEE Int. Conf. Pattern Recognition, (2016).
- 3.37. Zakrzewski, A. M., Dhyani, M., Samir, A. E., Anthony, B. W., "Non-Invasive, Non-Occlusive Blood Pressure Estimation Using Ultrasound: Clinical Results (I)," 38th Annu. Int. Conf. IEEE Eng. Med. Biol. Soc. (2016).
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- 3.39. Anthony, et al, "Non-Invasive Diagnosis of Non-Alcoholic Fatty Liver Disease (NAFLD) using Ultrasound Image Echogenicity", 2017 39th Annu. Int. Conf. IEEE Eng. Med. Biol. Soc., accepted (2017).
- 3.40. Anthony, et al, "Camera-tracking vs. image-based motion compensation in a tomographic limb ultrasound system", 2017 39th Annu. Int. Conf. IEEE Eng. Med. Biol. Soc., (2017).

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- 3.41. Fincke JR. Imaging cortical bone using the level-set method to regularize travel-time and full waveform tomography techniques. *J Acoust Soc Am. Acoustical Society of America*; (2017)
- 3.42. Yang H, Nguyen MM, Huang S-W, Shamdasani V, Xie H, Anthony BW. "Simulation, design, and implementation of external mechanical vibration for ultrasound shear wave elastography.", *IEEE International Ultrasonics Symposium (IUS) IEEE*; 2017.
- 3.43. A. Benjamin et al., "Non-invasive diagnosis of non-alcoholic fatty liver disease (NAFLD) using ultrasound image echogenicity," 2017 39th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Seogwipo, 2017,
- 3.44. H. Yang, A. Benjamin, B. Anthony, "Simulation of multi-source external mechanical vibration for shear wave elastography," *The Journal of the Acoustical Society of America*, 142, 2017
- 3.45. Singh, R., Ma, D., Agarwal, A., & Anthony, B. W. (2018). On-chip photonic particle senso. Presented at the SPIE BiOS, San Francisco, CA.
- 3.46. Kundu, I., & Anthony, B. W. . "Imaging the superficial vascular structure for mapping and identification." *ISPIE Smart Structures and Materials + Nondestructive Evaluation and Health Monitoring*, Denver, Colorado. (2018)
- 3.47. Kundu, I., Du, X., & Anthony, B. W. (2018). "Imaging platforms for registering and analyzing the skin microrelief structure." Presented at the SPIE Smart Structures and Materials + Nondestructive Evaluation and Health Monitoring, Denver, Colorado. (2018)
- 3.48. Zakrzewski, A. M., & Anthony, B. W. (2018). Pre-and-Post Exercise Blood Pressure Estimation from Force-Measured Ultrasound: First Results. Presented at the 2018 40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Honolulu, HI.
- 3.49. Donk, F., Yang, H., & Anthony, B. W. (2018). Miniaturization of External Mechanical Vibration for Shear Wave Elastography Imaging. Presented at the 2018 40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Honolulu, HI.
- 3.50. Chen, M., Li, Q., Karimian, N., Yeh, H., Duan, Y., Fontan, F., ... Samir, A. E. (2018). Contrast-Enhanced Ultrasound to Quantify Perfusion in a Machine-Perfused Pig Liver. Presented at the 2018 40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Honolulu, HI.
- 3.51. Wang, Y. J., & Anthony, B. W. (2018). Characterization of wave fields using transient motion of microspheres under acoustic radiation force. Presented at the 21st International Symposium on Nonlinear Acoustics, Santa Fe, NM.
- 3.52. Yang, H., Carrascal, C., Xie, H., Shamdasani, V., Anthony, B.W., "Design and Experimental Validation of Miniature External Mechanical Vibrators towards Clinical Ultrasound Shear Wave Elastography", *IUS*, 2018.
- 3.53. Singh, Robin; Ma, Danhao; Kimerling, Lionel; Agarwal, Anuradha; Anthony, Brian, "Microscale photoacoustic spectroscopy using integrated photonics for lab-on-chip applications", *Spie BIOS*, (accepted), 2018.
- 3.54. J. B. Frontin and B. W. Anthony, "Quantifying Dermatology: Method and Device for User-Independent Ultrasound Measurement of Skin Thickness," in 2019 41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), 2019, pp. 5743–5748.
- 3.55. A. Benjamin et al., "Renal volume reconstruction using free-hand ultrasound scans," *J. Acoust. Soc. Am.*, vol. 145, no. 3, pp. 1922–1922, Mar. 2019.
- 3.56. A. Y. Huang and B. W. Anthony, "An Instrumented Ultrasound Probe for Shear Wave Elastography With Uneven Force Distribution," in 2019 41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), 2019, pp. 6208–6211.
- 3.57. Feigin M, Zwecker M, Freedman D, Anthony BW. Detecting muscle activation using ultrasound speed of sound inversion with deep learning. *Proc Annu Int Conf IEEE Eng Med Biol Soc EMBS*. 2020 Oct 20;2020-July:2092–5.

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- 3.58. Li Y, Kim DD, Anthony B. HapticWall - An Encountered-type Two-Dimensional Vertical System for Virtual Reality. *Dyn Syst Control Conf.* 2020;1–9.
- 3.59. Feigin M, Zwecker M, Freedman D, Anthony BW. Detecting muscle activation using ultrasound speed of sound inversion with deep learning. In: 2020 42nd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC). IEEE; 2020. p. 2092–5.
- 3.60. Feigin M, Makovsky Y, Freedman D, Anthony BW. High-frequency full-waveform inversion with deep learning for seismic and medical ultrasound imaging. In: SEG Technical Program Expanded Abstracts 2020. Society of Exploration Geophysicists; 2020. p. 3492–6.
- 3.61. Singh R, Agarwal A, Anthony BW. Ultra-high sensitive all-optical photoacoustic transducers. In: Oraevsky AA, Wang L V., editors. *Photons Plus Ultrasound: Imaging and Sensing 2020*. SPIE; 2020. p. 35.
- 3.62. Singh R, Agarwal A, Anthony BW. Leveraging Integrated Photonics for Ultrasound Sensing Applications. In: *Imaging and Applied Optics Congress*. Washington, D.C.: OSA; 2020. p. JW5A.7.
- 3.63. Singh R, Su P, Agarwal A, Anthony BW. Integrated Mid-IR Photonics for Gas and Aerosol Sensors. In: *Imaging and Applied Optics Congress*. Washington, D.C.: OSA; 2020. p. JW5C.7.
- 3.64. Ely G, Fincke J, Zhang X, Anthony BW. Optimizing Transducer Acquisition Scheme for Rapid Ultrasound Tomography of Limbs. In: 2020 IEEE International Ultrasonics Symposium (IUS). IEEE; 2020. p. 1–4.
- 3.65. Cuiffi JD, Wang H, Heim J, Anthony BW, Kim S, Kim DD. Factory 4.0 Toolkit for Smart Manufacturing Training. In: 2021 ASEE Virtual Annual Conference Content Access. 2021.
- 3.66. Hahm KS, Chase AS, Dwyer B, Anthony BW. Indoor Human Localization and Gait Analysis using Machine Learning for In-home Health Monitoring. In: 2021 43rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC). IEEE; 2021. p. 6859–62

4 Articles in Preparation:

- 4.3 Comparison of Quantitative Ultrasound Methods to Classify Pathological Models of Skeletal Muscle, *Ultrasound in Medicine and Biology* (accepted, 2022)
- 4.4 Homomorphic Encryption Decision Trees for Machine Wear Prediction, *Journal of Manufacturing Systems*
- 4.5 Ljubicic, D., Anthony, B., "Sensor for Thickness and Lateral Position of a Transparent Web in a Roll-to-Roll Process", target: *IEEE Sensors*
- 4.6 Automated force-coupled ultrasound method for calibration-free carotid artery blood pressure estimation, *UMB*,
- 4.7 In-home Health Monitoring using Floor-based Gait Tracking, *Journal of Internet of Things*, (accepted, 2022)

5. Internal Memoranda and Progress Reports: List chronologically; number each item. N/A

6. Invited Lectures (as of 2015):

- June 2002, "High-speed software synchronizes images and data", *Technology Interview. Vision Systems Design*.
- June 2003, 2003 "Highspeed Video and Data", Brian W. Anthony, *MIT High-Speed Photography and Videography for Motion Analysis: Systems and Techniques*.
- June 2003, 2004, 2005, 2006, "Overview of Machine Vision", Brian W. Anthony, *MIT High-Speed Photography and Videography for Motion Analysis: Systems and Techniques*.
- June 2006, "Video Event Analysis and Video Event Detection - Video Based System Monitoring". Brian W. Anthony. *CSAIL Machine Vision Colloquim*.

Publications of Brian W. Anthony

- July 24, 2008, "Computational Imaging Systems," Samsung Electro Mechanical Research, Korea.
- May 5, 2009, "Video Instrumentation," LMP Seminar, MIT
- January 5-7, 2011, "Automation of a Work Cell for Polymer Microdevice Production: Precise Alignment and Visual Quality Inspection ", The Second Conference on Advances in Microfluidics and Nanofluidics and Asian-Pacific International Symposium on Lab on Chip (AMN-APLOC 2011). Singapore.
- February 11, 2011, "The MEDRC," MassMEDIC Board of Directors Meeting. Greenberg Traurig, International Place, Boston.
- March 23-25 2011, "New Perspectives – similar problems", S2I2 Workshop on Collection Digitization, Field Museum, Chicago
- June 20-22, 2011, "Design, Manufacturing, Information Technology, and Healthcare – enabling an information-driven healthcare future – industry, academia collaborations", Medical Device Manufacturing Summit, Red Rock Casino Resort & Spa, Las Vegas, NV.
- July 6, 2011, "Design, Manufacturing, Information Technology, and Healthcare - enabling an information-driven healthcare future – industry, academia collaborations" Korean Institute of Science and Technology.
- Nov 13-15, 2011, Invited Keynote Talk, "Medical Device Manufacturing - Helping to revitalize US manufacturing to capitalize on innovation," Medical Device Manufacturing Summit, Amelia Island, Florida
- November 18, 2011, Invited Keynote Talk, "Computational Videography in Manufacturing," MIT Center for Biomedical Innovation's Biomanufacturing Summit: Implementing Innovation in Biomanufacturing: The Hurdles and Opportunities, Bartos Theater, Building E15 MIT.
- January 27, 2012, "The MEngM and MEDRC Models and Experiences," MassMEDIC's Workshop on Catalyzing Innovation through Industry / Academic Collaborations.
- March 9, 2012, "Computational Enhanced Manufacturing Inspection Systems" Department of Manufacturing Engineering, Ann Arbor, Michigan
- March 13, 2012, "Computational Instrumentation - designing systems at the intersection of mechanical engineering, electrical engineering, and computer science," LMP Seminar, MIT
- March 15-16, 2012, "Industry, innovation, and entrepreneurship, in graduate education and research," SKTech Education Workshop, Moscow, Russia.
- March 27-28 2012, Invited Keynote Talk, "The Inner Beauty of Computational Enhanced Systems," Technology Review EmTech India Conference, Bengaluru, India.
- June 9, 2012, Invited Moderator, "American Transformations: the Next Industrial Revolution", MIT Graduate Alumni - Tech Reunions, MIT, Cambridge, MA.
- May 22 2013, Invited Speaker, MIT Vienna Conference
- June 16, 2013 , Invited Keynote Talk, "Lessons Learned from the MEDRC," EmTech China Conference, Shanghai, China.
- November 13 2013, Invited Speaker, "Microfluidic Devices Manufacturing - Sensing and Instrumentation Challenges and Opportunities", Lab-on-a-chip Asia, Singapore
- October 2013, Invited Speaker, "Have Russia's Innovation Prospects Stalled or Are You Just Not Looking Hard Enough?", US Russian Business Council (USRBC) Annual Meeting,
- January 2015, Keynote, "Limb Imaging" Wayne State University and Karmanos
- January 2015, Philips Research Alliance
- March 2015, Innovation Summit
- April 2015, World Medical Innovation forum
- May 2015, Emtech Columbia
- May 2015, FHE Industry Innovation Summit
- July 2015, ASU Wearables Summit
- August 2015, Medical Systems Design and Development Keynote, EMBC
- September 2015, Novartis Imaging Summit, Basel Switzerland

Publications of Brian W. Anthony

- September 2015, Digital Health, MA Medical Innovation Summit
- October 2015, “Medical Device Innovation”, Novartis Innovation Summit
- November 2015, AIM / FHE / WFD in Chicago
- February 2016, Keynote Talk, Ultrasonic Imaging and Tomography at SPIE Medical Imaging
- April 2016, PMI Aerosol Summit, Switzerland
- April 2016, Body Coupled Communication and interested in wearable ultrasound
- April, 2016 Keynote NIH Muscle Quality, ICSFR Philadelphia
- May 2016, Monterrey Tec-MIT Summit
- June 2016, Polytechnic University of Madrid, Medical Device Keynote
- August, 2016, NIBIB US/India Workshop on Developing Passive, Cuffless, and Noninvasive Blood Pressure Measurement Technologies, Orlando, FL
- August 2016, FNIH Liver Imaging standards workshop, Keynote
- December 2016, Lowell UMass Wearable Sensor Keynote
- March 2017, AUB Conference, Keynote, Beirut
- July 2017, Embc Keynote
- September 2017, National Academies of Sciences, Engineering, and Medicine, DC. Graduate Education in Manufacturing
- September 2017, Health Sensing Conference Keynote
- December 2017, Innovation in Liver Health, Broad
- February 2018, DARPA Innovation in Sensors for Agriculture, Keynote
- May 2018, Siemens Smart Manufacturing Keynote
- Jul 2018, EMBC Imaging Panel
- October 2018, Bloomberg Live Event in Atlanta – Devices and Manufacturing Keynote
- February 2019, 123sonography Live, Ultrasound Innovation, Keynote
- May 2019, Siemens Smart Manufacturing Keynote
- July 2019, Hacking NanoMedicine
- September 2019, Madrid
- October 2019, Lam Research Symposium – Keynote
- January 2020, Consumer Electronics Show (CES) Ambient Sensing, Special Keynote
- February 2020, Wisconsin Workforce Development, Keynote in Smart Manufacturing
- March 2020, Siemens – Keynote on MiA
- May 2020, IMA Innovation in Digital Manufacturing Keynote
- August 2020, High Value Manufacturing Summit (virtual), Keynote
- May 2021, NCSOFT mini-workshop Chair
- April 2021, EmTech NEXT's Inside Track: Ambient Sensing
- May 2021, Tufts CTSI Translational Research Day, Keynote
- February 2021, NSF IMSI Keynote - Private AI

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Summary:

	<u>Total</u>	<u>Completed</u>	<u>In Progress</u>
Bachelor's	5	5	0
Master's	42	35	7
MEng	29	17	12
Engineer's			
<u>Doctoral</u>			
As Supervisor	26	15	11
As Reader	4	3	1

Last	First	Title	Department	Year
Bachelor's Theses				
Syverud	Brian	<i>Robotic ultrasound manipulator: calibration of position and orientation measurement system</i>	MechE	2009
Johnson	Michael	<i>Design of a precise X-Y-Theta nanopositioning optical sensor</i>	MechE	2009
Chai	Lauren	<i>Design of mechanical arterial simulator</i>	MechE	2012
Ramos	Javier	<i>Design of Force Measurement Probe</i>	MechE	2012
Mireault	Alfred Norman	<i>Mechanical design of an ultrasonic tomographic imaging system</i>	MechE	2016

Master's Theses				
Fitriani		<i>Multiscale Dynamic Time and Space Warping</i>	CDO	2008
Zarrouati	Nadège	<i>A precision manipulation system for polymer microdevice production</i>	MechE	2010
Gilbertson	Matthew Wright	<i>Handheld force-controlled ultrasound probe</i>	MechE	2010
Sun	Shih-Yu	<i>Deformation correction in ultrasound imaging in an elastography framework</i>	EECS	2010
Zakrzewski	Aaron	<i>Multi-scale quantitative elastography and its application to blood pressure estimation</i>	MechE	2013
Koppaka	Sisir	<i>Imaging Biomarkers for Duchenne Muscular Dystrophy</i>	CDO	2015
Zhang	Xiang (Shawn)	<i>Design of a single element 3D ultrasound scanner</i>	MechE	2015
Primack	Willow	<i>Analysis and Productivity Improvement of an Automated Material Handling System through Simulation</i>	LGO	2015
Churchill	Hugh E.	<i>Cycle-time Analysis and Improvement Using Lean Methods within a Retail Distribution Center</i>	LGO	2015

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Sazdanoff	Nicholas	<i>Evaluation of postponement in the Drug Product supply chain</i>	LGO	2015	
Kojimoto	Nigel Costello	<i>Ultrasonic inspection methods for defect detection and process control in roll-to-roll flexible electronics manufacturing</i>	MechE	2015	
Kundu	Ina Annesha	<i>Imaging platforms for detecting and analyzing skin features and Its stability : with applications in skin health and in using the skin as a body-relative position-encoding system</i>	MechE	2015	
Conover	Susan	<i>Imaging platforms for detecting and analyzing skin features and Its stability : with applications in skin health and in using the skin as a body-relative position-encoding system</i>	SDM	2015	
Hess	Tylor	<i>Algorithm deployment platform</i>	MechE	2016	
Lee	Kang Qi lan	<i>Computational tools for enabling longitudinal skin image analysis</i>	CDO	2016	
Huang	Athena Yeh	<i>May the force be with you : a medical ultrasound system with integrated force measurement</i>	MechE	2017	
Benjamin	Alex	<i>The (travel) times they are a changing : a computational framework for the diagnosis of non-alcoholic fatty liver disease (NAFLD)</i>	CDO	2017	
Yang	Heng	<i>Ultrasound shear wave elastography imaging with external mechanical vibration</i>	MechE	2017	
Zubajlo	Rebecca	<i>Quantitative biomarkers for tissue characterization</i>	MechE	2017	
Benjamin	Rishon Robert	<i>Silence of the lamb waves</i>	CDO	2017	
Haidar	Samer	<i>Supply chain network strategy for consumer medical device introduction</i>	LGO	2016	
Al-Meer	Mariam	<i>Reducing heart failure admissions through improved care systems and processes</i>	LGO	2017	
Sandford	Michael	<i>Application of 3D printing in medical devices New Product Development</i>	LGO	2017	
Graule	Moritz Alexander	<i>Towards force-correlated ultrasound volume elastography</i>	MechE	2017	
Sun	Mingxiu	<i>Education and practice factory : from factory design to first product delivery</i>	MechE	2018	
Singh	Robin	<i>Whispering photons : on-chip biophotonic integrated circuits for point-of-care diagnostics</i>	MechE	2018	
Beaudoin	Judy	<i>Quantifying dermatology : method and device for user-</i>	MechE	2018	

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		<i>independent ultrasound measurement of skin thickness</i>			
DiAndreth	Chris	<i>Optimization of Downstream Supply Chain Product Flow based on an Integrated Cost-to-Deliver Perspective</i>	LGO	2019	
Puppo	Manuel Martinez	<i>Replenishment in an integrated stock world</i>	LGO	2019	
Lu	Shirley Suet-Ning	<i>Design of dynamically controlled desktop fiber accumulator with tension feedback as part of smart manufacturing educational kit</i>	MechE	2020	
Kim	Sangwoon	<i>Model-free tracking control of an optical fiber drawing process using deep reinforcement learning</i>	MechE	2020	
Chen	Hongling (Holly)	<i>Vascular Imaging System for Longitudinal Registration and Mapping of Superficial Vessels with Quantitative Analysis</i>	IDM	2020	
Chavez	Yasmin	<i>System identification and control of a miniature external mechanical vibration device towards clinical ultrasound shear wave elastography</i>	MechE	2020	
Koeppen	Ryan	<i>Design of Electromechanical Attachments for Improved Ultrasound Imaging Repeatability</i>	MechE	2021	
Goryachev	Ivan	<i>Kiosks for Non-Contact Vital Sign Detection</i>	MechE	2021	
Adiwijaya	Zenia	<i>Tenative: ML for Process control</i>	SDM	2023	expected
Chen	George	<i>Tenative: ML for Process control</i>	MechE	2022	expected
Deshpande	Aniruddha	<i>Tenative: Food manufacturing - ML models</i>	EECS	2023	expected
Dhar	Shreya	<i>Tenative: Education Kit</i>	MechE	2023	expected
Espinoza	Victor Reyes	<i>Tenative: ML for Process control</i>	EECS	2022	expected
Justiniano	Eugenio Caraballo	<i>Tenative: Sound and Light on Cells</i>	MechE	2023	expected
Magana-Salgado	Uriel	<i>Tenative: Muscle Health monitoring</i>	MechE	2023	expected

Master Eng. Theses

Su	Xiangyong	<i>Optimization of labor allocation at a syringe production facility : design proposals</i>	MechE	2008	
Liaw	Sze Sen	<i>Optimization of labor allocation at a syringe production facility using computer simulation</i>	MechE	2008	
Ng	Gar Yan	<i>Optimization of labor allocation at a syringe production facility : work study</i>	MechE	2008	

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Linares	Rodrigo	<i>Manufacturability of lab on a chip devices: tolerance analysis and requirements establishment</i>	MechE	2010	
Selvakumar	Sivesh	<i>Manufacturing of Lab-On-a-Chip devices : variation analysis of liquid delivery using blister packs</i>	MechE	2010	
Namvari	Kasra	<i>Manufacturability of lab-on-chip devices : dimensional variation analysis of electrode foils using visual technology</i>	MechE	2011	
Donoghue	Linda	<i>Design of a micro-interdigitated electrode for impedance measurement performance in a biochemical assay</i>	MechE	2011	
Holmes	Jacklyn	<i>Robustness and repeatability of interdigitated electrodes on a substrate tested in an aqueous environment</i>	MechE	2011	
Judge	Benjamin	<i>Thermoplastic bonding of microfluidic substrates</i>	MechE	2012	
Jain	Nikhil	<i>A comprehensive study and validation of high-throughput microscale electrode production using thermal transfer printing techniques</i>	MechE	2012	
Inamdar	Tejas Satish	<i>Manufacturing of lab-on-a-chip devices : characterizing seals for on-board reagent delivery</i>	MechE	2013	
Saber	Aabed Saud	<i>Manufacturability of lab on chip devices : reagent-filled reservoirs bonding process and its effect on reagents flow pattern</i>	MechE	2013	
Nguyen	Khanh Huy	<i>Hot embossing as a method for rapid prototyping microfluidic devices</i>	MechE	2013	
Ragosta	Nicholas Hiroshi	<i>Design and measurement analysis of hot embossing system for high aspect ratio microfluidics</i>	MechE	2013	
Kalsekar	Viren Sunil	<i>Design and process optimization of a hot embossing machine for microfluidics with high aspect ratios</i>	MechE	2013	
Xue	Elise	<i>Sensorless ultrasound probe 6DoF pose estimation through the use of CNNs on image data</i>	EECS	2018	
DiAndreth	Christopher	<i>Optimization of downstream supply chain product flow based on an integrated cost-to-deliver perspective</i>	LGO	2019	
Cherna	Samuel	<i>External virbarion on Butterfly Probes</i>	EECS	2022	expected
Sawant	Nilay Sanjay	<i>Tenative: ML for Process Control</i>	MechE	2022	expected
Othman	Mohamed Ayman Mohamed	<i>Tenative: ML for Process Control</i>	MechE	2022	expected

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Sardet	Maelle Jade	<i>Tenative: ML for Process Control</i>	MechE	2022	expected
Li	Rui	<i>Tenative: Design and Manufacture of Education Kit</i>	MechE	2022	expected
Rojrungsasithorn	Tanach	<i>Tenative: Design and Manufacture of Education Kit</i>	MechE	2022	expected
Levi	Aviva Jesse	<i>Tenative: Design and Manufacture of Education Kit</i>	MechE	2022	expected
Bradley	Russel	<i>Tenative: Design and Manufacture of Education Kit</i>	MechE	2022	expected
Smith	Carly Madeleine	<i>Tenative: Clinical Trial Monitoring Kit Design</i>	MechE	2022	expected
Aitmbiriq	Imane	<i>Tenative: Clinical Trial Monitoring Kit Design</i>	MechE	2022	expected
Noh	Joyce	<i>Tenative: Clinical Trial Monitoring Kit Design</i>	MechE	2022	expected
Lin	Ryan Shao-Wei	<i>Tenative: Clinical Trial Monitoring Kit Design</i>	MechE	2022	expected

Doctoral Theses, Supervisor					
Ljubicic	Dean	<i>High Speed Instrumentation for Inspection of transparent parts</i>	MechE	2013	
Gilbertson	Matthew Wright	<i>Electromechanical systems to enhance the usability and diagnostic capabilities of ultrasound imaging</i>	MechE	2014	
Sun	Shih-Yu	<i>Ultrasound probe localization by tracking skin features</i>	EECS	2014	
Zakrzewski	Aaron	<i>Arterial blood pressure estimation using ultrasound</i>	MechE	2017	
Roberts	Megan	<i>Design and fabrication of a flexible membrane ultrasound transducer</i>	MechE	2018	
Lee	John Haeseon	<i>Measuring the absolute concentration of particles in suspension using high frequency B-mode ultrasound imaging</i>	EECS	2015	
Fincke	Jonathan Randall	<i>Non-contact quantitative imaging of limbs, bone and tissue, using ultrasound tomographic techniques</i>	MechE	2018	
Ranger	Bryan	<i>Ultrasonic imaging methods for quantitative musculoskeletal tissue assessment and improved prosthetic interface design</i>	HST	2018	
Kundu	Ina Annesha Kundu	<i>Imaging skin structures for health, body mapping, and identification (under the Tucson Skin)</i>	MechE	2018	
Kim	David Donghyun Kim	<i>Design and development of desktop fiber and fabric manufacturing system for advanced materials</i>	MechE	2020	
Wang	Jenny Wang	<i>Formation Process of Acoustophoretic Patterns</i>	MechE	2022	

Theses Supervised by Brian W. Anthony

Pigula	Anne Pigula	<i>Statistical analysis of ultrasound signals for tissue characterization : the Homodyned K Distribution</i>	HST	2020	
Zhang	Xiang Zhang	<i>Non-contact ultrasound</i>	MechE	2019	
Benjamin	Alex Benjamin	<i>3D organ property mapping using freehand ultrasound scans</i>	MechE	2020	
Singh	Robin Singh	<i>Integrated bio-photonic devices : sensors, imagers, and beyond</i>	MechE	2021	
Chen	Melinda Chen	<i>Tentative: Liver Vascular Health Imaging</i>	HST	2022	expected
Chai	Lauren	<i>Tentative: Radiation Force Manufacturing</i>	MechE	2022	expected
Zubajlo	Rebecca Zubajlo	<i>Tentative: Physical Measurement of Cells</i>	MechE	2022	expected
Jaffe	Alex	<i>Tentative: Venous and Blood Pressure in the extremities</i>	EECS	2022	expected
Lange	April	<i>Tentative: Volume US - Squishy slam</i>	MechE	2023	expected
Zhang	Zhuorui	<i>Tentative: Large Aperture Wearable</i>	MechE	2024	expected
Gao	Mingye	<i>Tentative: Integrated Photonics for Biosensing</i>	EECS	2024	expected
Hahm	Katie	<i>Tentative: Ambient Gait Analysis</i>	MechE	2023	expected
Lin	QiAn	<i>Tentative: US Path Planning</i>	MechE	2024	expected
Kang	David Ha Eun	<i>Tentative: Homomorphic Encryption and ML</i>	MechE	2023	expected
Tripathy	Soumya	<i>Tentative: Integrated Photonics for US</i>	Media	2024	expected

Doctoral Theses, Reader

Shi	Chuan	<i>Efficient buffer design algorithms for production line profit maximization</i>	MechE	2011	
Petrzelka	Joe	<i>Contact region fidelity, sensitivity, and control in roll-based soft lithography</i>	MechE	2012	
Smyth	Katherine	<i>Piezoelectric micro-machined ultrasonic transducers for medical imaging</i>	EECS	2016	
Athanassiadis	Athanasios G.	<i>Optical breakdown acoustics : transduction and sensing underwater</i>	MechE	2019	

Postdoctoral Associates and Fellows Supervised by Brian W. Anthony

Current Postdocs

<i>Name</i>	<i>Dates of Appointment</i>	<i>PhD Granting Institution</i>
Shawn Zhang	2019 -	MIT
Praneeth Namburi	2020 -	MIT

Previous Postdocs

<i>Name</i>	<i>Current Title</i>	<i>Current Employer</i>
Vannah, Bill	Scientist	Mary Free Bed Rehabilitation Hospital
Victor Lempitsky	Head of AI	Samsung
Javier J. Gonzalez	May 2013 – 2015	University of Madrid
Matthew Gilbertson	Senior Electro-Optical Engineer	Lockheed Martin
Xian, Du	Professor	UMass (2018)
David Ibarra	Professor	Monterery Tec
Micha Feigin	Research Scientist	MIT
Ian Butterworth	Biomedical Research Engineer	MIT
Carlos Castro-Gonzalez		
	Co-Founder and CEO	Leuko
Berta Martí Fuster	Head of Communications	Oncoheroes Biosciences
Bonghun (Bruce) Shin	Senior Scientist	University Waterloo
Megan Roberts	Director of Product Development	Med Tech Co.
Greg Ely	Senior Algorithm Engineer	Imaging Co.
David Kim	Scientist	Sandia Labs