
AREAS OF SPECIALIZATION

Ultrasound imaging, photoacoustic imaging, coherence-based beamforming, clutter reduction, photoacoustic-guided surgery, image-guided robotics, light delivery systems for photoacoustic imaging, deep learning for ultrasound and photoacoustic image formation, medical technology development, clinical translation

EDUCATION / TRAINING

Johns Hopkins University, Baltimore, MD, USA
Postdoctoral Fellow, Computer Science, 2012-2016

Duke University, Durham, NC, USA
Ph.D., Biomedical Engineering, 2012

Institute of Cancer Research and Royal Marsden Hospital, Sutton, Surrey, UK
Visiting Scholar, Physics, 2009-2010

Massachusetts Institute of Technology, Cambridge, MA, USA
B.S., Mechanical Engineering, 2006

PROFESSIONAL APPOINTMENTS

John C. Malone Associate Professor, 2022-present

John C. Malone Assistant Professor, 3/15/2021-6/30/2022

Assistant Professor, 1/1/2017-3/14/2021

Johns Hopkins University, Baltimore, MD, USA

Departments of Electrical & Computer Engineering (2017-present), Biomedical Engineering (2017-present), Computer Science (2018-present), and Oncology (2023-present)

Founder & Director, Photoacoustic & Ultrasonic Systems Engineering (PULSE) Lab

Affiliate, Carnegie Center for Surgical Innovation

Affiliate, Laboratory for Computational Sensing and Robotics

Affiliate, Malone Center for Engineering in Healthcare

Fellow, Hopkins Extreme Materials Institute

Member, SKCC, Cancer Molecular and Functional Imaging Program

Core Faculty, Institute for Computational Medicine

Assistant Research Professor, 4/1/2016-12/31/2016

Johns Hopkins University, Baltimore, MD, USA

Engineering Research Center for Computer-Integrated Surgical Systems and Technology

HONORS AND AWARDS (bold indicates national and international awards/recognition)

2023 **Elected Fellow of SPIE**

for achievements in photoacoustic imaging techniques and applications for surgical guidance

2022 Johns Hopkins Catalyst Award

2022 **IEEE Ultrasonics Early Career Investigator Award**

for pioneering contributions to spatial coherence beamforming theory and deep learning methods for ultrasound and photoacoustic image formation

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| 2022 | Elected to AIMBE College of Fellows for pioneering contributions to development of ultrasonic and photoacoustic medical imaging systems, including coherence-based beamforming, photoacoustic-guided surgery, and deep learning applications |
| 2021 | SPIE Early Career Achievement Award for pioneering contributions to photoacoustic imaging for surgical guidance, including innovative technology designs, novel deep learning applications, informative spatial coherence beamforming theory, and visionary clinical possibilities |
| 2020 | IEEE UFFC Star Ambassador Lectureship Award |
| 2019 | ORAU Ralph E. Powe Junior Faculty Enhancement Award |
| 2019 | Maryland's Outstanding Young Engineer Award, Maryland Academy of Sciences & Maryland Science Center (includes Allan C. Davis medal and \$2,500 prize) |
| 2019 | Sigma Xi, The Scientific Research Honor Society (Full Membership) |
| 2019 | Whiting School of Engineering Lab Excellence Award Finalist |
| 2019 | Alfred P. Sloan Research Fellowship in Physics |
| 2018 | NSF CAREER Award |
| 2018 | NIH Trailblazer Award |
| 2018,2023 | Johns Hopkins Discovery Award |
| 2018 | National Academy of Engineering, U.S. Frontiers of Engineering Symposium, Invited Participant |
| 2018 | NSF ASSIST Travel Award, Academic and Research Leadership Symposium, co-located with the National Society of Black Engineers Annual Convention |
| 2016 | MIT Technology Review, Innovator Under 35 (TR35 Award) |
| 2015 | Best Paper Award Honorable Mention, IEEE International Conference on Advanced Robotics |
| 2015 | NIH K99/R00 Pathway to Independence Award |
| 2014 | Travel Award, FASEB MARC Postdoc Preparation Institute: Career Transitions |
| 2013-2015 | UNCF/Merck Postdoctoral Fellowship (\$92,000) |
| 2013-2014 | Ford Foundation Postdoctoral Fellowship (\$41,500) |
| 2012 | NextProf Faculty Development Workshop at University of Michigan |
| 2012 | Student Travel Award, IEEE International Symposium on Biomedical Imaging, Barcelona, Spain |
| 2011-2012 | UNCF/Merck Graduate Research Dissertation Fellowship (\$63,000) |
| 2009-2010 | Whitaker International Fellowship to conduct research in the UK (\$46,685) |
| 2008 | Student Travel Award, IEEE International Ultrasonics Symposium, Beijing, China |
| 2008-2011 | NIH Research Supplement to Promote Diversity (\$105,776) |
| 2008 | NSF Graduate Research Fellowship Honorable Mention |
| 2006-2008 | NIH Medical Imaging Training Program, Duke University |
| 2006-2011 | Duke Endowment Fellowship (\$16,000) |
| 2006 | GEM Fellowship (declined award) |
| 2006 | Hanson Place Black Achievers' Award |
| 2005 | Xerox Technical Minority Scholarship |
| 2005 | MIT Ilona Karmel Prize in Engineering Writing |
| 2004 | Pi Tau Sigma, Mechanical Engineering Honor Society |
| 2004 | Tau Beta Pi, Engineering Honor Society |

AWARDS WON BY STUDENTS

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| 2023 | Best Paper Award Runner Up, SPIE Physics of Medical Imaging Conference |
| 2022 | AIUM New Investigator Award |

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| 2022 | Siebel Scholarship |
| 2021 | Barry S. Goldwater Scholarship |
| 2021 | ARCS Foundation, Metropolitan Washington Chapter Undergraduate Scholarship |
| 2021 | ARCS Foundation, Metropolitan Washington Chapter Graduate Scholarship |
| 2021 | SPIE Photonics West Student Author Conference Support Award |
| 2020 | MICCAI Student Participation Award (x2) |
| 2020 | 2 nd Place Presentation Award, NSF-funded Research Experience for Undergraduates (REU) in Computational Sensing and Medical Robotics (CSMR) |
| 2019 | Travel Award, IEEE International Ultrasonics Symposium, Glasgow, Scotland |
| 2019 | Whiting School of Engineering Excellence in Research Trainee Award |
| 2019 | NSF Graduate Research Fellowship |
| 2019 | Best Paper Award, ACM Multimedia Conference, Nice, France |
| 2018 | Best Presentation Award, NSF CSMR REU |
| 2018 | Travel Award, IEEE International Ultrasonics Symposium, Kobe, Japan |
| 2018 | NSF Graduate Research Fellowship |
| 2018 | Fulbright Fellowship |
| 2017 | 2 nd place Undergrad Poster Competition Award, OSA-Sponsored Optics & Photonics Conference at JHU |
| 2017 | NSF Graduate Research Fellowship |
| 2017 | Best Presentation Award, NSF CSMR REU |
| 2016 | Best Presentation Award, NSF CSMR REU |
| 2015 | Best Presentation Award, NSF CSMR REU |

PROFESSIONAL MEMBERSHIPS

AIMBE

2022-now Elected to AIMBE College of Fellows

SPIE

2023-now SPIE, Fellow Member
2019-2022 SPIE, Senior Member
2017-now SPIE, Lifetime Member
2014-2016 SPIE, Early Career Member
2008-2010 SPIE, Student Member

Optica (formerly OSA)

2022-now Optica, Lifetime Member
2017-2022 Optical Society of America (OSA), Early Career Member

IEEE

2019-now IEEE Senior Member
2020-now IEEE Engineering in Medicine and Biology Society, Member
2017-now IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society, Member
2016-now IEEE Robotics and Automation Society, Member
2014-2019 IEEE Member
2012-2013 IEEE Engineering in Medicine and Biology Society, Student Member
2008-2012 IEEE Women in Engineering, Student Member
2008, 2012 IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society, Student Member
2008, 2012 Institute of Electrical and Electronics Engineers (IEEE), Student Member

BMES

2017-2020 Biomedical Engineering Society (BMES), Member
2013, 2015 BMES, Early Career Member

NSBE

2014-2018 National Society of Black Engineers (NSBE)

AAPM

2013 American Association of Physicists in Medicine (AAPM), Junior Member

PROFESSIONAL SERVICE

Scientific Advisory Board

Chan Zuckerberg Initiative (CZI), Imaging Program (2021-present)

Editorial Advisory Board

GEN Biotechnology (2021-present)

Associate Editor in Chief

IEEE Transactions on Ultrasonics Ferroelectrics and Frequency Control (2019-2021)

Associate Editor

Journal of Biomedical Optics (2022-present)

Medical Physics (2021)

IEEE Transactions on Medical Imaging (2020-present)

IEEE Transactions on Ultrasonics Ferroelectrics and Frequency Control (2018-2022)

Photoacoustics (2019-present)

Ultrasonic Imaging (2018-present)

Guest Editor

Translational Photoacoustic Imaging for Disease Diagnosis, Monitoring, and Surgical Guidance, Biomedical Optics Express (2020-2021)

Deep Learning in Medical Ultrasound – From Image Formation to Image Analysis, IEEE Transactions on Ultrasonics Ferroelectrics and Frequency Control (2019-2020)

Grant Panel Reviewer

National Institutes of Health (NIH)

Image Guided Interventions and Surgery (IGIS), 2019

Biomedical Imaging Technology (BMIT) A, 2018

NICHD, Special Emphasis Panel, 2017

Biomedical Imaging Technology (BMIT) B, 2017

National Science Foundation (NSF)

Smart and Connected Health (SCH), Robotics/Vision, 2018

ECCS Communication, Circuits, and Sensing-Systems, 2015

Conference Organization, Technical Program, and Society Committees

Biomedical Engineering Society (BMES)

Track Chair: Biomedical Imaging and Instrumentation, Pennsylvania, PA, 2019

Co-Organizer: Special Session on Novel Photoacoustic Imaging: Systems, Computation, and Agents, Atlanta, GA, 2018

IEEE International Ultrasonics Symposium (IUS)

Technical Program Committee: Medical Ultrasonics, 2022-present

Organizing Committee: Short Courses Co-Chair, Montreal, CA, 2023

Organizing Committee: Challenge Chair, Venice, 2022

Organizing Committee: Challenge Chair, Challenge on Ultrasound Beamforming with Deep Learning (CUBDL), Las Vegas, NV, 2020

Organizing Committee: Communications Chair, Kobe, Japan, 2018

Organizing Committee: Communications Co-Chair, Washington, DC, 2017

Neural Information Processing Systems (NeurIPS)

Co-Organizer: Workshop on Deep Learning and Inverse Problems, 2022 (proposed)

Optica, formerly Optical Society of America (OSA)

Program Committee: Biophotonics Congress: Optics in the Life Sciences, Bio-Optics: Design and Applications (BODA), Virtual, 2021

Program Committee: Biophotonics Congress: Biomedical Optics, Optical Tomography and Spectroscopy, Hollywood, FL, 2018

Organizing Committee: OSA-Sponsored Optics and Photonics Conference at Johns Hopkins, Baltimore, MD, 2017

SPIE Photonics West

Program Committee: Multiscale Imaging and Spectroscopy Conference, San Francisco, CA, 2021-present

Program Committee: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems, San Francisco, CA, 2019-present

Session Organizer: Deep Learning in Optics, Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XVII, San Francisco, CA, 2019

SPIE European Conferences on Biomedical Optics

Program Committee: Opto-Acoustic Methods and Applications in Biophotonics, 2022-present

American Association of Physicists in Medicine (AAPM)

Organizer: Special Session on Advances in Ultrasound Imaging Technology, San Antonio, TX, 2019

IEEE Conference on Information Sciences and Systems (CISS)

Session Organizer: Machine learning for ultrasound and photoacoustic image reconstruction, Baltimore, MD, 2019

IEEE International Symposium on Circuits and Systems (ISCAS)

Special Session Co-Organizer: Innovations in Acoustics, Baltimore, MD, 2017

Medical Imaging and Computer-Assisted Interventions (MICCAI)

Co-Organizer: Challenge on Liver Ultrasound Tracking, Munich, Germany, 2015

Co-Organizer: Challenge on Liver Ultrasound Tracking, Boston, MA, 2014

IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society (UFFC-S)

IUS Challenge Oversight Committee, 2020-present

Ultrasonics Representative, Women in Engineering Committee, 2017-2021

Chair, Women in Engineering / Diversity, Ultrasonics Standing Committee, 2018-2021

International Photoacoustic Standardisation Consortium (IPASC)

Voting Member, 2019-present

Session Chair

American Association of Physicists in Medicine (AAPM)
Advances in Ultrasound Imaging Technology, 2019
American Institute of Ultrasound in Medicine (AIUM)
Basic Science and Instrumentation: Tissue Characterization, Session Moderator, 2017
Biomedical Engineering Society
Photoacoustic Imaging, 2018
Special Session: Novel Photoacoustic Imaging: Systems, Computation, and Agents, 2018
IEEE International Ultrasonics Symposium (IUS)
Beamforming III, 2022
Photoacoustic Imaging #2, 2021
Advances in Photoacoustic Reconstruction / Beamforming, 2020
Coherence Imaging, Speckle tracking and Clutter Suppression, 2020
Cardiovascular Elastography, 2019
Technical Advances in Photoacoustic Imaging, 2018
Emerging Methods for Elasticity Imaging, 2017
IEEE International Conference on Biomedical Robotics and Biomechatronics (BioRob)
Surgical Robotics II, 2018
IEEE International Symposium on Circuits and Systems (ISCAS)
Special Session: Innovations in Acoustics, 2017
IEEE Conference on Information Sciences and Systems (CISS)
Machine Learning for Ultrasound and Photoacoustic Image Reconstruction, 2019
Machine Learning, 2017
OSA
Biophotonics Congress, Photoacoustic Tomography, Microscopy and Endoscopy, 2018
SPIE Photonics West
Novel Techniques, Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XXI, 2023
Emerging Sources of Multiscale Contrast II, Multiscale Imaging and Spectroscopy IV, 2023
Deep Learning, Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XVIII, 2020
Deep Learning in Optics, Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XVII, 2019
Ultrasonic Imaging and Tissue Characterization (UITC) Symposium
Photoacoustics, 2022
Imaging Session 1, 2021
Photoacoustics, 2019
Photoacoustics, 2018
Photoacoustics, 2017
Photoacoustics, 2015

Journal Article Reviewer

Biomedical Optics Express
Computerized Medical Imaging and Graphics
EURASIP Journal on Advances in Signal Processing

IEEE Transactions on Biomedical Engineering
 IEEE Transactions on Medical Imaging
 IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control
 International Journal of Medical Robotics and Computer Assisted Surgery
 International Journal of Computer Assisted Radiology
 Journal of Biomedical Optics
 Journal of Applied Remote Sensing
 Journal of Visualized Experiments
 Medical Physics
 Nature Biomedical Engineering
 Nature Machine Intelligence
 Optics Letters
 Photoacoustics
 Physics in Medicine and Biology
 Proceedings of IEEE
 Robotics and Automation Letters
 Science Translational Medicine
 Scientific Reports
 Ultrasonic Imaging
 Ultrasound in Medicine and Biology
 → Reviewer Profile: <https://www.webofscience.com/wos/author/record/1624715>

Conference Abstract Reviewer

BMES 2018
 BMES 2017

Conference Proceedings Reviewer

International Conference of IEEE Engineering in Medicine and Biology Society, 2021-2023
 International Conference on Robotics and Automation (ICRA), 2019-2020
 Biomedical Circuits and Systems Conference (BioCAS), 2018

Awards Committee Reviewer

AIMBE Fellow, 2022-2023

INVITED TALKS & KEYNOTE PRESENTATIONS

Keynote and Plenary Presentations

11. **Keynote:** Image Guided Therapeutics Symposium (IGTS), *Photoacoustic Image Formation and Surgical Guidance with Machine Learning*, Toronto, ON, June 12, 2023
– Invited by: Prof. Meaghan O'Reilly
12. **Distinguished Plenary:** Pan-African AI and Smart Systems (PA-AI&SS) Conference, *Ultrasound Image Formation in the Deep Learning Age*, Dakar, Senegal, November 2-4, 2022
– Invited by: Prof. Telex Ngatched
13. **Keynote:** MICCAI 2021, 2nd International Workshop on Advances in Simplifying Medical UltraSound (ASMUS), *Ultrasound Image Formation in the Deep Learning Age*, September 27, 2021 [delivered via Zoom to ~60 participants]
– Invited by: Profs. Su-Lin Lee & Yipeng Hu
14. **Distinguished Keynote:** 19th Annual Imaging Network Ontario (ImNO) Symposium,

- Toronto, ON, March 22-23, 2021 [delivered via Zoom to ~180 participants]
 – Invited by: Profs. Gabor Fichtinger, Miranda Kirby, and Pascal Fallavollita
15. **Plenary:** IEEE EMBS Grand Challenge on Data Science: Medical Imaging, *Ultrasound Image Formation in the Deep Learning Age*, February 10, 2021 [delivered via Zoom webinar to ~230 participants]
 – Invited by: Prof. Amir A. Amini
 16. **Keynote:** NeurIPS Black in AI Workshop, *Ultrasound Image Formation in the Deep Learning Age*, December 7, 2020 [virtual delivery via live stream with Zoom Q&A]
 – Invited by: Flora Tasse, PhD, Head of CV/AI Research at Stroom
 17. **Keynote:** King's College London (KCL) Biomedical Engineering and Imaging Sciences (BMEIS) Postgraduate Research (PGR) Symposium, *Photoacoustic Imaging for Surgical and Interventional Guidance*, July 20, 2020 [virtual delivery via MS Teams to approximately 175 participants]
 – Invited by: Symposium Organizing Committee
 18. **Plenary:** SPIE Photonics West, ***BiOS Hot Topics Plenary Event, Photoacoustic Imaging Assistants for Minimally Invasive Surgeries & Procedures***, San Francisco, CA, February 1, 2020 **[Inaugural Journal of Biomedical Optics (JBO) Speaker, selected for being the senior author of the most impactful paper published in JBO in 2019]**
 – Invited by: Profs. Jennifer Barton, Wolfgang Drexler, and Sergio Fantini
 19. **Keynote:** International Conference on Medical Imaging with Deep Learning, *Ultrasound Image Formation in the Deep Learning Age*, London, UK, July 8-10, 2019
 – Invited by: Prof. Ben Glocker
 110. **Keynote:** OSA-Sponsored Conference on Optics, Atoms and Laser Applications (KOALA), *Listening to the Sound of Light to Guide Surgeries*, Macquarie University, Sydney, Australia, December 4-8, 2018
 – Invited by: Conference Organizing Committee

Invited Talks

111. **Invited:** IEEE IUS Satellite Symposium on AI in Ultrasonics, *Ultrasound Image Formation in the Deep Learning Age*, Montreal, Canada, September 8, 2023
 – Invited by: Prof. Jean Provost and Dr. An Tang
112. **Invited:** Fujifilm Visualsonics Symposium on Biomedical Applications of Photoacoustic Ultrasound, *Listening to the Sound of Light to Guide Surgeries*, Georgetown University, Washington, DC, June 28, 2023
 – Invited by: Diane Allen
113. **Invited:** Optica Biophotonics Congress: Optics in the Life Sciences, Bio-Optics: Design and Applications (BODA) Program, *Listening to the Sound of Light to Guide Surgeries*, Vancouver, BC, Canada, April 24-27, 2023
 – Invited by: Profs. Christine Hendon and Maciej Wojtkowski
114. **Invited:** George Mason University, Bioengineering Seminar Series, *Listening to the Sound of Light to Guide Surgeries*, Fairfax, VA, March 23, 2023
 – Invited by: Prof. Parag Chitnis
115. **Invited:** Carnegie Mellon University Biomedical Engineering Seminar Series, *Listening to the Sound of Light to Guide Surgeries*, Pittsburgh, PA, January 19, 2023
 – Invited by: Profs. Rosalyn Abbott & Keith Cook
116. **Invited:** Johns Hopkins University Sidney Kimmel Comprehensive Cancer Center, Women's Malignancies Seminar Series, *Ultrasound and Photoacoustic Imaging to Streamline Treatment of Women's Malignancies*, Baltimore, MD, January 10, 2023
 – Invited by: Prof. Tian-Li Wang

- I17. **Invited:** Johns Hopkins ASPIRE IRACDA Fellows Retreat, *Ultrasound and Photoacoustic Innovations*, Baltimore, MD, January 9, 2023
 – Invited by: Prof. Sri Sarma
- I18. **Invited:** Acoustical Society of America (ASA) Meeting, Nashville, TN, December 5-9, 2022 (scheduled)
 – Invited by: Profs. Herve Liebgott and Jian-yu Lu
- I19. **Invited:** Pitt-CMU seminar series on Machine Learning in Medicine, held jointly and virtually by the University of Pittsburgh (Pitt), Carnegie Mellon University (CMU), and the University of Pittsburgh Medical Center (UPMC), *Ultrasound Image Formation in the Deep Learning Age*, Pittsburgh, PA, November 30, 2022
 – Invited by: Prof. Kayhan Batmanghelich, on behalf of the Steering Committee for the MLxMed Seminar Series
- I20. **Invited:** Optica Frontiers in Optics + Laser Science, *Photoacoustic Image Formation and Surgical Guidance with Machine Learning*, Rochester, NY, October 16-20, 2022
 – Invited by: Profs. Aydogan Ozcan, Lei Tan, and Laura Waller
- I21. **Invited:** SPIE Optics + Photonics, Emerging Topics in Artificial Intelligence, *Ultrasound Image Formation in the Deep Learning Age*, San Diego, California, August 22-25, 2022
 – Invited by: Prof. Lei Tan and the Program Committee
- I22. **Invited:** Gordon Research Conference (GRC) on In Vivo Ultrasound Imaging, *Ultrasound Image Formation in the Deep Learning Age*, Ventura, California, August 14-19, 2022
 – Invited by: Profs. Michael Oelze and Kenneth Hoyt
- I23. **Invited:** Gordon Research Conference (GRC) on Optics and Photonics in Medicine and Biology, *Listening to the Sound of Light to Guide Surgeries*, Lewiston, Maine, July 10-15, 2022
 – Invited by: Prof. Kristen Maitland
- I24. **Invited:** 21st International Symposium on Therapeutic Ultrasound, *AI in Ultrasound: Image Formation in the Deep Learning Age*, Toronto, Canada, June 7-10, 2022 [delivered via Zoom]
 – Invited by: Prof. Meaghan O'Reilly and the Scientific Organizing Committee
- I25. **Invited:** Optica Biophotonics Congress: Biomedical Optics, *Laser Safety for Photoacoustic-Guided Surgery*, Fort Lauderdale, Florida, April 24-27, 2022 [delivered via Zoom]
 – Invited by: Profs. Nada Boustany, Eric Tkaczyk, and the Microscopy, Histopathology and Analytics (MHA) Program Committee
- I26. **Invited:** University of Nebraska-Lincoln, College of Engineering BME Seminar Series, *Listening to the Sound of Light to Guide Surgeries*, April 8, 2022 [delivered via Zoom]
 – Invited by: Prof. Angela Pannier
- I27. **Invited:** IEEE International Symposium on Biomedical Imaging, Special Session on Translational Clinical Applications of Photoacoustics, *Listening to the Sound of Light to Guide Surgeries*, Kolkata, India, March 28-31, 2022 [delivered via Zoom]
 – Invited by: Prof. Subhamoy Mandal
- I28. **Invited:** University of California Berkeley, *Ultrasound Image Formation in the Deep Learning Age*, Berkeley, CA, February 25, 2022 [delivered via Zoom]
 – Hosted by: Prof. Laura Waller
- I29. **Invited:** NeurIPS 2021 Deep Learning and Inverse Problems Workshop, *Ultrasound Image Formation in the Deep Learning Age*, December 13, 2021 [delivered virtually]
 – Invited by: Profs. Paul Hand, Becca Willett, Mahdi Soltanolkotabi, & Chris Metzler
- I30. **Invited:** Vanderbilt University, Biophotonics Seminar Series, *Listening to the Sound of*

- Light to Guide Surgeries*, Nashville, TN, December 7, 2021
 – Invited by: Prof. Audrey Bowden
131. **Invited:** University of California Berkeley, *Listening to the Sound of Light to Guide Surgeries*, Berkeley, CA, November 29, 2021 [delivered via Zoom]
 – Invited by: Prof. Laura Waller
 132. **Invited:** Pontificia Universidad Católica del Perú, Introduction to Medical Imaging (ING340) Guest Lecture, *Ultrasound Image Formation in the Deep Learning Age*, Lima, Peru, September 30, 2021 [delivered via Zoom]
 – Invited by: Prof. Roberto Lavarello
 133. **Invited:** Johns Hopkins University BME-X Seminar, *Ultrasound Image Formation in the Deep Learning Age*, Baltimore, MD, September 22, 2021 [delivered in hybrid format]
 – Invited by: Prof. Jeff Siewerdsen
 134. **Invited:** CZI Medical Imaging Workshop, *Integrating Image Formation and Deep Learning for Global Impact*, July 12-15, 2021 [delivered via Zoom]
 – Invited by: Stephani Otte, CZI Science Program Officer
 135. **Invited:** University of North Carolina at Chapel Hill, Computational Medicine Program Seminar Series, *Listening to the Sound of Light to Guide Surgeries*, Chapel Hill, NC, May 20, 2021 [delivered via Zoom]
 – Invited by: Prof. Natalie Stanley
 136. **Invited:** SPIE Women in Optics Spotlight Series, *Representation Matters: Role Models and Allies*, May 12, 2021 [virtual delivery]
 – Invited by: Dr. Jess Wade
 137. **Invited:** University of Virginia, Biomedical Engineering Seminar Series, *Listening to the Sound of Light to Guide Surgeries*, Charlottesville, VA, April 30, 2021 [virtual delivery via Zoom to ~50 attendees]
 – Invited by: Prof. John Hossack
 138. **Invited:** Marquette University and Medical College of Wisconsin, Joint Department of Biomedical Engineering Seminar Series, *Listening to the Sound of Light to Guide Surgeries*, Milwaukee, WI, April 23, 2021 [virtual delivery]
 – Invited by: Prof. Frank Pintar, Hosted by: Prof. Bng Yu
 139. **Invited:** OSA Therapeutic Laser Applications Technical Group Special Events at the OSA Biophotonics Congress: Optics in the Life Sciences, *Listening to the Sound of Light to Guide Surgeries*, April 14, 2021 [virtual delivery]
 – Invited by: Dr. Elina Vitol, OSA Therapeutic Laser Applications Technical Group Chair
 140. **Invited:** AIUM Machine Learning in Application to Ultrasound Beamforming Session, *Deep Learning Architectures and Applications for Ultrasound Image Formation*, New York, NY, April 10-14, 2021 [virtual delivery]
 – Invited by: Prof. Kenneth Bader
 141. **Invited:** University of Colorado at Boulder, Applied Mathematics Colloquium, *Ultrasound Image Formation in the Deep Learning Age*, April 2, 2021 [virtual delivery]
 – Invited by: Prof. Maziar Raissi
 142. **Invited:** Medtronic, Inc., *Photoacoustic Vision for Surgical Guidance*, San Francisco, CA, March 19, 2021 [virtual delivery]
 – Invited by: Dr. Patrick Helm
 143. **Invited:** MIT EECS Seminar Series, *Listening to the Sound of Light to Guide Surgeries*, Cambridge, MA, March 15, 2021 [virtual delivery]
 – Invited by: Prof. Joel Voldman, Hosted by: Prof. Polina Golland
 144. **Invited:** SPIE Photonics West, *Photoacoustic Vision for Surgical Guidance*, San Francisco, CA, March 6-11, 2021 [virtual delivery]

- Invited by: Prof. Martin Leahy
- 145. **Invited:** University of Toledo, *Listening to the Sound of Light to Guide Surgeries*, Bioengineering Seminar Series, Toledo, OH, March 5, 2021 [virtual delivery]
 - Invited by: Prof. Jian-yu Lu
- 146. **Invited:** University of Pennsylvania, *Photoacoustic Vision for Surgical Robotics*, GRASP On Robotics Seminar Series, Philadelphia, PA, February 26, 2021 [delivered via Zoom]
 - Invited by: GRASP Directors and Prof. Pratik Chaudhari
- 147. **Invited:** University of Washington, Bioengineering Seminar Series, *Listening to the Sound of Light to Guide Surgeries*, Seattle, WA, February 11, 2021 [delivered via Zoom]
 - Invited by: Prof. Patrick Boyle, Co-hosted by: Prof. Matthew O'Donnell
- 148. **Invited:** *Photonics Spectra* Conference, *Listening to the Sound of Light to Guide Surgeries*, January 19-22, 2021
 - Invited by: Douglas Farmer, Senior Editor, PHOTONICS MEDIA
- 149. **Invited:** American Institute of Ultrasound in Medicine (AIUM) Artificial Intelligence (AI) in Medical Ultrasound Imaging Summit, AI enabled US Signal Processing, January 13 & 20, 2021 [virtual delivery via Zoom to ~90 attendees]
 - Invited by: Dr. Anthony Samir & AIUM's Artificial Intelligence Summit Task Force
- 150. **Invited:** 179th Meeting of the Acoustical Society of America, Special Technical Session, “Death to Delay and Sum: Advanced Beamforming” *Deep Learning the Sound of Light to Guide Surgeries*, December 8-12, 2020 [virtual delivery via Zoom to ~45 attendees]
 - Invited by: Profs. Kenneth Bader & Kevin Haworth
- 151. **Invited:** University of California Irvine, Beckman Laser Institute & Medical Clinic Seminar Series, *Listening to the Sound of Light to Guide Surgeries*, Irvine, CA November 19, 2020 [delivered via Zoom to ~30 attendees]
 - Invited by: Profs. Liangzhong (Shawn) Xiang & Thomas Milner
- 152. **Invited:** University of Rochester, ECE Seminar Series, *Listening to the Sound of Light to Guide Surgeries*, Rochester, NY, November 11, 2020 [delivered via Zoom to ~30 attendees]
 - Invited by: Prof. Marvin Dooley
- 153. **Invited:** University of Texas Austin, Biomedical Engineering Seminar Series, *Listening to the Sound of Light to Guide Surgeries*, Austin, TX, October 29, 2020 [delivered via Zoom to ~35 attendees]
 - Invited by: Prof. Mia Markey
- 154. **Invited:** University of California Davis, Electrical and Computer Engineering Seminar Series, *Listening to the Sound of Light to Guide Surgeries*, Davis, CA, October 9, 2020 [delivered via Zoom to 170+ attendees]
 - Invited by: Prof. Jeremy Munday
- 155. **Invited:** OSA Frontiers 2020 (FiO), *Listening to the Sound of Light to Guide Surgeries*, Washington, D.C., September 13-14, 2020 [delivered via Zoom to 20+ attendees]
 - Invited by: Prof. Félix Fanjul-Vélez
- 156. **Invited:** IEEE International Ultrasonics Symposium, *Photoacoustic Vision for Surgical Guidance*, September 9, 2020 [delivered via Zoom to 80+ attendees]
 - Invited by: Prof. Paul Dayton
- 157. **Invited:** SPIE Journal of Biomedical Optics Hot Topics Webinar Series, *Photoacoustic Imaging for Surgical and Interventional Guidance*, one of three co-presenters in series entitled *Photoacoustic Imaging: The Next Generation*, August 17, 2020 [delivered via Demio to 200+ attendees, available online: <https://www.spiedigitallibrary.org/jbo-hot-topics-webinar-series>]
 - Invited by: Prof. Brian Pogue

158. **Invited:** Duke University Ultrasound Seminar Series, *Photoacoustic Spatial Coherence Theory*, June 26, 2020 [delivered via Zoom with 40+ attendees]
 – Invited by: Prof. Gregg Trahey
159. **Invited:** 179th Meeting of the Acoustical Society of America, Special Technical Session, “Death to Delay and Sum: Advanced Beamforming” *Deep Learning the Sound of Light to Guide Surgeries*, Chicago, IL, May 11-15, 2020 (postponed to December 8-12, 2020 due to COVID-19)
 – Invited by: Profs. Kenneth Bader & Kevin Haworth
160. **Invited:** University of Rochester, Distinguished Lecture Series, Rochester, NY, April 15, 2020 (postponed due to COVID-19)
 – Invited by: Prof. Marvin Doyley
161. **Invited:** Columbia University, ECE Seminar Series, New York, NY, March 24, 2020 (postponed due to COVID-19)
 – Invited by: Prof. Christine Hendon
162. **Invited:** AIUM Machine Learning in Application to Ultrasound Beamforming Session, *Deep Learning Architectures and Applications for Ultrasound Image Formation*, New York, NY, March 21-25, 2020 (canceled due to COVID-19)
 – Invited by: Prof. Kenneth Bader
163. **Invited:** Ryerson University Physics Colloquium, *Listening to the Sound of Light to Guide Surgeries*, Toronto, CA, March 2, 2020
 – Invited by: Prof. Jesse Tanguay, Co-hosted by: Prof. Mike Kolios
164. **Invited:** University of Maryland College Park, ECE Special Seminar, *Listening to the Sound of Light to Guide Surgeries*, College Park, MD, December 4, 2019
 – Invited by: Prof. Carol Epsy-Wilson
165. **Invited:** Johns Hopkins In vivo Cellular Molecular Imaging Center (ICMIC) Seminar Series, *Listening to the Sound of Light to Guide Surgeries*, Baltimore, MD, November 20, 2019
 – Invited by: Prof. Zaver Bhujwalla
166. **Invited:** MIT Computer Science and Artificial Intelligence Lab Seminar Series, *Listening to the Sound of Light to Guide Surgeries*, Cambridge, MA, September 12, 2019
 – Invited by: Prof. Polina Golland
167. **Invited:** AAPM Ultrasound Symposium, *Novel Ultrasound Imaging Methods to Distinguish Cancer and Improve Surgery*, San Antonio, TX, July 14-18, 2019
 – Invited by: Prof. Tian Liu
168. **Invited:** Tufts University, *Listening to the Sound of Light to Guide Surgeries*, Medford, MA, April 26, 2019
 – Invited by: Profs. Valencia Joyner-Koomson & Sameer Sonkusale
169. **Invited:** Duke University, Fitzpatrick Institute for Photonics Seminar Series, *Listening to the Sound of Light to Guide Surgeries*, Durham, NC, April 10, 2019
 – Invited by: Prof. Tuan Vo-Dinh, Co-hosted by: Prof. Yiyang Gong
170. **Invited:** JHU Faculty Forum, *Listening to the Sound of Light to Guide Surgeries*, Baltimore, MD, November 12, 2018
 – Invited by: Prof. Dennice Gayme
171. **Invited:** University of Twente, *Controlling Light and Learning from Sound to Guide Surgeries*, Enschede, The Netherlands, August 28, 2018
 – Invited by: Prof. Wiendelt Steenbergen
172. **Invited:** Duke University, *Controlling Light and Learning from Sound to Guide Surgeries*, Durham, NC, June 13, 2018
 – Invited by: Prof. Gregg Trahey

173. **Invited:** JHU Computer Science Department Seminar Series, *Directing Light and Learning from Sound to Guide Surgeries*, Baltimore, MD, April 10, 2018
 – Invited by: Prof. Russ Taylor
174. **Invited:** ReWork Deep Learning in Healthcare Summit, *A Machine Learning Approach to Improve Photoacoustic-Guided Surgery*, Boston, MA, May 25-26, 2017
 – Invited by: Katie Pollitt, Summit Creator
175. **Invited:** University of Southern California, Biomedical Engineering Department Seminar Series, *Revolutionizing Image Formation to Improve Clinical Outcomes*, Los Angeles, CA, March 10, 2017
 – Invited by: Prof. Ellis Meng, Co-hosted by: Prof. Eun Ji Chung
176. **Invited:** JHU Biomedical Engineering Department Seminar Series, *Revolutionizing Image Formation to Improve Clinical Outcomes*, Baltimore, MD, March 6, 2017
 – Invited by: Prof. Warren Grayson
177. **Invited:** IBM PartnerWorld, Future Innovators Forum, *Creating clearer imaging to diagnose disease earlier and reduce patient risk*, Las Vegas, NV, February 14, 2017
 – Invited by: MIT Technology Review
178. **Invited:** EmTech MIT, Meet the Innovators Under 35, Cambridge, MA, October 18, 2016
 – Invited by: MIT Technology Review
179. **Invited:** JHU Center for Imaging Science Seminar Series, *Revolutionizing Image Formation to Improve Clinical Outcomes*, Baltimore, MD, October 11, 2016
 – Invited by: Prof. Michael Miller
180. **Invited:** Academic Research and Leadership Symposium at MIT, co-located with the NSBE National Convention, *Early Career Spotlight: Making Surgeries Safer with Photoacoustic-Guided Imaging*, Cambridge, MA, March 25, 2016
 – Invited by: ARLS Organizing Committee (Profs. Cullen Buie, C. Watson, M. Platt)
181. **Invited:** MIT Institute for Medical Engineering and Science (IMES) Special Seminar, co-hosted by the Mechanical Engineering Department, *Listening to the Sound of Light to Guide Surgeries*, Cambridge, MA, January 5, 2016
 – Invited by: Prof. John Leonard, Co-hosted by: Arup Chakraborty
182. **Invited:** Rensselaer Polytechnic Institute, Biomedical Engineering Department Seminar Series, *Listening to the Sound of Light to Guide Surgeries*, Troy, NY, December 14, 2015
 – Invited by: Prof. Xavier Intes
183. **Invited:** Johns Hopkins University, Biomedical Engineering Department Special Seminar, *Listening to the Sound of Light to Guide Surgeries*, Baltimore, MD, December 8, 2015
 – Invited by: Prof. Jeff Siewerdsen
184. **Invited:** National Institutes of Health, Earl Stadtman Investigator Symposia, *Listening to the Sound of Light to Guide Surgeries*, Bethesda, MD, December 7, 2015
 – Invited by: Center for Cancer Research (CCR), National Cancer Institute (NCI)
185. **Invited:** Stanford University, Mechanical Engineering Department Seminar Series, *Listening to the Sound of Light to Guide Surgeries*, Palo Alto, CA, December 3, 2015
 – Invited by: Prof. Ellen Khul
186. **Invited:** University of Michigan, Biomedical Engineering Department Seminar Series, *Listening to the Sound of Light to Guide Surgeries*, Ann Arbor, MI, November 12, 2015
 – Invited by: Prof. David Sept
187. **Invited:** JHU Electrical and Computer Engineering Department Seminar Series, *Listening to the Sound of Light to Guide Surgeries*, Baltimore, MD, October 29, 2015

- Invited by: ECE Faculty Search Committee
- 188. **Invited:** George Washington University, Biomedical Engineering Department Seminar Series, *Light, Sound, Action: Advancing Photoacoustic Systems Toward Clinical Ubiquity by Integrating Optics, Acoustics and Robotics*, Washington, D.C., April 29, 2015
 - Invited by: Prof. Jason Zara
- 189. **Invited:** University of California San Diego, Bioengineering Department Seminar Series, *Light, Sound, Action: Advancing Photoacoustic Systems Toward Clinical Ubiquity by Integrating Optics, Acoustics and Robotics*, San Diego, CA, March 17, 2015
 - Invited by: Prof. Pedro Cabrales
- 190. **Invited:** Washington University in St. Louis, Biomedical Engineering Department Seminar Series, *Toward Clinical Implementation of Photoacoustic Imaging Systems with Short-lag Spatial Coherence Beamforming*, St. Louis, MO, March 3, 2015
 - Invited by: Prof. Steven C. George
- 191. **Invited:** JHU LCSR Seminar Series, *Light, Sound, Action: Toward Clinical Ubiquity of Photoacoustic Systems by Integrating Optics, Acoustics and Robotics*, Baltimore, MD, February 18, 2015
 - Invited by: Prof. Peter Kazanzides
- 192. **Invited:** University of Maryland College Park, Bioengineering Department Seminar Series, *Short-Lag Spatial Coherence (SLSC) Beamforming of Ultrasound and Photoacoustic Images*, College Park, MD, February 26, 2014
 - Hosted by: Prof. Adam Hsieh
- 193. **Invited:** Arizona State University, School of Biological and Health Systems Engineering Seminar Series, *Short-Lag Spatial Coherence (SLSC) Beamforming of Ultrasound and Photoacoustic Images*, Tempe, AZ, USA, January 29, 2014
 - Invited by: Prof. Chris Buneo
- 194. **Invited:** Merck & Co., Inc., *Short-Lag Spatial Coherence (SLSC) Imaging: A Novel Method for Processing Ultrasound Data*, Rahway, NJ, USA, September 27, 2012
 - Invited by: Dr. Michael Klimas
- 195. **Invited:** Boston University, *Recent Advances in Ultrasound: Short-Lag Spatial Coherence (SLSC) Imaging and In Vivo Liver Tracking with a 2D Matrix Array*, Boston, MA, USA, June 25, 2012
 - Invited by: Prof. Thomas Szabo
- 196. **Invited:** Johns Hopkins University, *Advances in Ultrasound Imaging: Short-Lag Spatial Coherence (SLSC) Beamforming and In Vivo Liver Tracking with a 2D Matrix Array*, Baltimore, MD, USA, June 14, 2012
 - Invited by: Profs. John Wong & Emad Boctor
- 197. **Invited:** Spanish National Research Council, *Short-Lag Spatial Coherence (SLSC) Imaging: A Novel Beamforming Method for Ultrasound Images*, Madrid, Spain, May 14, 2012
 - Invited by: Prof. Carlos Fritsch

PUBLICATIONS

(h-index=37, source: Google Scholar, underline indicates students/postdocs advised)

Editorials & Commentaries

- E1. Xia J, **Bell MAL**, Laufer J, Yao J, Translational Photoacoustic Imaging for Disease Diagnosis, Monitoring, and Surgical Guidance: Introduction to Feature Issue, *Biomedical Optics Express*, 12(7): 4115–4118, 2021 **[Guest Editorial]**

- E2. Stevens KR, Masters KS, Imoukhuede PI, Haynes KA, Setton LA, Cosgriff-Hernandez E, **Bell MAL**, Rangamani P, Sakiyama-Elbert SE, Finley SD, Willits RK, Koppes AN, Chesler NC, Christman KL, Allen JB, Wong JY, El-Samad H, Desai TA, Eniola-Adefeso O, Fund Black scientists, *Cell*, 184(3):561-565, 2021 **[Commentary]**
- E3. Mischi M, **Bell MAL**, van Sloun RJG, Eldar YC, Deep Learning in Medical Ultrasound – From Image Formation to Image Segmentation, *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, 67(12): 2477-2480, 2020 **[Guest Editorial]**

Peer-Reviewed Journal Articles

- J1. Fernandes GSP, Uliana JH, Bachmann L, Carneiro AAO, **Bell MAL**, Pavan TZ, Mitigating skin tone bias in linear array *in vivo* photoacoustic imaging with short-lag spatial coherence beamforming, *Photoacoustics*, 33:100555, 2023
- J2. Graham M, Sharma A, Padovano W, Suresh V, Chiu A, Thon SM, Tuffaha S, **Bell MAL**, Optical absorption spectra and corresponding *in vivo* photoacoustic visualization of exposed peripheral nerves, *Journal of Biomedical Optics*, 28(9):097001, 2023
- J3. Zhang J, Wiacek A, Feng Z, Ding K, **Bell MAL**, Flexible array transducer for photoacoustic-guided interventions: phantom and ex vivo demonstrations. *Biomedical Optics Express*, 14(8):4349-4368, 2023
- J4. Huang X, Hooshangnejad H, China D, Feng Z, Lee J, **Bell MAL**, Ding K, Ultrasound Imaging with Flexible Array Transducer for Pancreatic Cancer Radiation Therapy, *Cancers*, 15(13):3294, 2023
- J5. Volpe, Wählby, Tian, ... **Bell MAL**... Bergman (75 authors), Roadmap on Deep Learning for Microscopy, *Jphys Photonics* **[Invited]**
- J6. González EA, **Bell MAL**, Photoacoustic Imaging and Characterization of Bone in Medicine: Overview, Applications, and Outlook, *Annual Review of Biomedical Engineering*, 25:207-232, 2023 **[Invited Review]**
- J7. Wiacek A, Oluyemi E, Myers K, Anbinder E, **Bell MAL**, Coherence Metrics for Reader-Independent Differentiation of Cystic from Solid Breast Masses in Ultrasound Images, *Ultrasound in Medicine and Biology* 49(1):256-268, 2023
- J8. Ji T, Feng Z, Sun E, Ng SK, Su L, Zhang Y, Han D, Han-Oh S, Iordachita I, Lee J, Kazanzides P, **Bell MAL**, Wong J, Ding K, A phantom-based analysis for tracking intra-fraction pancreatic tumor motion by ultrasound imaging during radiation therapy, *Frontiers in Oncology, section Radiation Oncology*, 12, 2022
- J9. González EA, **Bell MAL**, Dual-wavelength photoacoustic atlas method to estimate fractional methylene blue and hemoglobin contents, *Journal of Biomedical Optics*, 27(9):096002, 2022
- J10. Gubbi MR, González EA, **Bell MAL**, Theoretical Framework to Predict Generalized Contrast-to-Noise Ratios of Photoacoustic Images with Applications to Computer Vision, *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, 69(6):2098-2114, 2022
- J11. Zhao L, **Bell MAL**, A review of deep learning applications in lung ultrasound imaging of COVID-19 patients, *BME Frontiers*, 2022 **[Invited Review]**
- J12. Wiacek A, Wang KC, Wu H, **Bell MAL**, Photoacoustic-guided laparoscopic and open hysterectomy procedures demonstrated with human cadavers, *IEEE Transactions on Medical Imaging*, 40(12):3279-3292, 2021
- J13. Hyun D, Wiacek A, Goudarzi S, Rothlübbers S, Asif A, Eickel K, Eldar YC, Huang J, Mischi M, Rivaz H, Sinden D, van Sloun RJG, Strohm H, **Bell MAL**, Deep Learning for Ultrasound Image Formation: CUBDL Evaluation Framework & Open Datasets, *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, 68(12):3466-3483, 2021
- J14. Matrone G, **Bell MAL**, Ramalli A, Spatial Coherence Beamforming with Multi-Line Transmission to Enhance the Contrast of Coherent Structures in Ultrasound Images Degraded by Acoustic Clutter, *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, 68(12):3570-3582, 2021
- J15. González EA, Graham CA, **Bell MAL**, Acoustic frequency-based approach for identification of photoacoustic surgical biomarkers, *Frontiers in Photonics*, 2, 2021

- J16. Feng Z, Hooshangnejad H, Shin EJ, Narang A, **Bell MAL**, Ding K, The feasibility of Haar feature-based endoscopic ultrasound probe tracking for implanting hydrogel spacer in radiation therapy for pancreatic cancer, *Frontiers in Oncology*, 11:4466, 2021
- J17. Huang X, **Bell MAL**, Ding K, Deep Learning for Ultrasound Beamforming in Flexible Array Transducer, *IEEE Transactions on Medical Imaging*, 40(11): 3178-3189, 2021
- J18. González E, Jain A, **Bell MAL**, Combined ultrasound and photoacoustic image guidance of spinal pedicle cannulation demonstrated with intact ex vivo specimens, *IEEE Transactions on Biomedical Engineering*, 68(8):2479-2489, 2021
- J19. Graham MT, Dunne R, **Bell MAL**, Comparison of compressional and elastic wave simulations for patient-specific planning prior to transcranial photoacoustic-guided neurosurgery, *Journal of Biomedical Optics*, 26(7):076006, 2021 **[featured on journal cover]**
- J20. Tian L, Hunt B, **Bell MAL**, Yi J, Smith JT, Ochoa M, Intes X, Durr NJ, Deep learning in biomedical optics, *Lasers in Surgery and Medicine*, 53: 748-775, 2021
- J21. Wiacek A, **Bell MAL**, Photoacoustic-guided surgery from head to toe, *Biomedical Optics Express*, 12(4):2079-2117, 2021 **[Invited Review]**
- J22. Huang J, Wiacek A, Kempinski KM, Palmer T, Izzi J, Beck S, **Bell MAL**, Empirical Assessment of Laser Safety for Photoacoustic-Guided Liver Surgeries, *Biomedical Optics Express*, 12(3):1205-1216, 2021
- J23. Wiacek A, González E, **Bell MAL**, CohereNet: A Deep Learning Architecture for Ultrasound Spatial Correlation Estimation and Coherence-Based Beamforming, *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, 67(12):2574-2583, 2020 **[featured on journal cover]**
- J24. Nair AA, Washington K, Tran T, Reiter A, **Bell MAL**, Deep learning to obtain simultaneous ultrasound image and segmentation outputs from a single input of raw channel data, *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, 67(12):2493-2509, 2020
- J25. **Bell MAL**, Photoacoustic imaging for surgical guidance: Principles, applications, and outlook, *Journal of Applied Physics*, 128(6):060904, 2020 **[Invited Perspective*]**
*Perspective articles present an expert viewpoint on topics currently generating a lot of interest in the research community. While perspectives generally provide a brief overview of the topic, their main purpose is to provide a forward looking view on where progress in a particular research area is heading. Source: *Journal of Applied Physics* website
- J26. Graham MT, **Bell MAL**, Photoacoustic Spatial Coherence Theory and Applications to Coherence-Based Image Contrast and Resolution, *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, 67(10):2069-2084, 2020
- J27. Graham MT, Huang J, Creighton FX, **Bell MAL**, Simulations and human cadaver head studies to identify optimal acoustic receiver locations for minimally invasive photoacoustic-guided neurosurgery, *Photoacoustics*, 19:100183, 2020
- J28. González E, **Bell MAL**, GPU implementation of photoacoustic short-lag spatial coherence imaging for improved image-guided interventions, *Journal of Biomedical Optics*, 25(7):077002, 2020
- J29. Kempinski KM, Graham MT, Gubbi MR, Palmer T, **Bell MAL**, Application of the generalized contrast-to-noise ratio to assess photoacoustic image quality, *Biomedical Optics Express*, 11, 3684-3698, 2020
- J30. Wiacek A, Oluyemi E, Myers K, Mullen L, **Bell MAL**, Coherence-based beamforming increases the diagnostic certainty of distinguishing fluid from solid masses in breast ultrasound exams, *Ultrasound in Medicine and Biology*, 46(6):1380-1394, 2020
- J31. Graham M, Assis F, Allman D, Wiacek A, González E, Gubbi M, Dong J, Hou H, Beck S, Chrispin J, **Bell MAL**, In vivo demonstration of photoacoustic image guidance and robotic visual servoing for cardiac catheter-based interventions, *IEEE Transactions on Medical Imaging*, 39(4):1015-1029, 2020 **[featured in LaserFocus World, Science Daily, Health Imaging, etc.]**
- J32. Rodriguez-Molares A, Rindal OMH, D'hooge J, Måsøy, S, Austeng A, **Bell MAL**, Torp Hans, The generalized contrast-to-noise ratio: a formal definition for lesion detectability, *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, 67(4):745-759, 2020

- J33. Kempski K, Wiacek A, Graham M, González E, Goodson B, Allman D, Palmer J, Hou H, Beck S, He J, **Bell MAL**, In vivo photoacoustic imaging of major blood vessels in the pancreas and liver during surgery, *Journal of Biomedical Optics*, 24(12):121905, 2019
- J34. Huang P, Su L, Chen S, Cao K, Song Q, Kazanzides P, Iordachita I, **Bell MAL**, Wong J, Li D, Ding K, 2D Ultrasound Imaging Based Intra-fraction Respiratory Motion Tracking for Abdominal Radiation Therapy Using Machine Learning, *Physics in Medicine and Biology*, 64(18), 185006, 2019
- J35. Wiacek A, Rindal OMH, Falomo E, Myers K, Fabrega-Foster K, Harvey S, **Bell MAL**, Robust Short-Lag Spatial Coherence Imaging of Breast Ultrasound Data: Initial Clinical Results, *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, 66(3): 527-540, 2019
[featured in Duke BME Magazine]
- J36. **Bell MAL**, Shubert J, Photoacoustic-based visual servoing of a needle tip, *Scientific Reports*, 8:15519, 2018
- J37. Stephanian B, Graham MT, Hou H, **Bell MAL**, Additive noise models for photoacoustic spatial coherence theory, *Biomedical Optics Express*, 9(11):5566-5582, 2018
- J38. De Luca V, Banerjee J, Hallack A, Kondo S, Makhinya M, Nouri D, Royer L, Cifor A, Dardenne G, Goksel O, Gooding M, Klink C, Krupa A, Le Bras A, Marchal M, Moelker A, Niessen W, Papiez B, Rothberg A, Schnabel J, van Walsum T, Harris E, **Bell MAL**, Tanner C, Evaluation of 2D and 3D ultrasound tracking algorithms and impact on ultrasound-guided liver radiotherapy margins, *Medical Physics*, 45(11): 4986-5003, 2018
- J39. Shubert J, **Bell MAL**, Photoacoustic imaging of a human vertebra: Implications for guiding spinal fusion surgeries, *Physics in Medicine and Biology*, 63(14), 144001, 2018
- J40. Allman D, Reiter A, **Bell MAL**, Photoacoustic source detection and reflection artifact removal enabled by deep learning, *IEEE Transactions on Medical Imaging*, 37(6): 1464-1477, 2018
- J41. Nair AA, Tran T, **Bell MAL**, Robust Short-Lag Spatial Coherence Imaging, *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, 65(3):366-377, 2018
- J42. Allard M, Shubert J, **Bell MAL**, Feasibility of photoacoustic guided teleoperated hysterectomies, *Journal of Medical Imaging: Special Issue on Image-Guided Procedures, Robotic Interventions, and Modeling*, 5(2):021213, 2018 **[featured in Health Data Management News]**
- J43. Gandhi N, Allard M, Kim S, Kazanzides P, **Bell MAL**, Photoacoustic-based approach to surgical guidance performed with and without a da Vinci robot, *Journal of Biomedical Optics*, 22(12):121606, 2017 **[featured in BioOptics World]**
- J44. Eddins B and **Bell MAL**, Design of a multifiber light delivery system for photoacoustic-guided surgery, *Journal of Biomedical Optics*, 22(4):041011, 2017 **[featured in SPIE Newsroom]**
- J45. Su L, Iordachita I, Zhang, Y, Lee J, Ng SK, Jackson J, Hooker T, Wong J, Herman JM, Sen HT, Kazanzides P, **Bell MAL**, Yang C, Ding K, Feasibility study of ultrasound imaging for stereotactic body radiation therapy with active breathing coordinator in pancreatic cancer, *Journal of Applied Clinical Medical Physics*, 2017
- J46. Sen HT, **Bell MAL**, Zhang Y, Ding K, Wong J, Iordachita I, Kazanzides P, System integration and in-vivo testing of a robot for ultrasound guidance and monitoring during radiotherapy, *IEEE Transactions on Biomedical Engineering*, 64(7):1608-1618, 2017 **[featured on journal homepage]**
- J47. Zhang HK, **Bell MAL**, Guo X, Kang HJ, Boctor EM, Synthetic-aperture based photoacoustic re-beamforming (SPARE) approach using beamformed ultrasound data, *Biomedical Optics Express*, 7(8):3056-3068, 2016
- J48. Kang HJ, **Bell MAL**, Guo X, Boctor EM. Spatial angular compounding of photoacoustic images, *IEEE Transactions on Medical Imaging*, 35(8):1845-1855, 2016
- J49. **Bell MAL**, Kumar S, Kuo L, Sen HT, Iordachita I, Kazanzides P. Toward standardized acoustic radiation force (ARF)-based ultrasound elasticity measurements with robotic force control, *IEEE Transactions on Biomedical Engineering*, 63(7):1517-1524, 2016
- J50. **Bell MAL**, Dahl JJ, Trahey GE. Resolution and contrast characteristics of short-lag spatial coherence images, *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*,

- 62(7):1265, 2015 **[featured on journal cover]**
- J51. **Bell MAL**, Ostrowski AK, Li K, Kazanzides P, Bector EM. Localization of transcranial targets for photoacoustic-guided endonasal surgeries, *Photoacoustics*, 3(2):78-87, 2015
- J52. De Luca V, Benz T, Kondo S, Koenig L, Luebke D, Rothluebbers S, Somphone O, Allaire S, **Bell MAL**, Chung D, Cifor A, Grozea C, Guenther M, Jenne J, Kipshagen T, Kowarschik M, Navab N, Ruehaak J, Schwaab J, Tanner C. The 2014 liver ultrasound tracking benchmark, *Physics in Medicine and Biology*, 60(14):557, 2015
- J53. **Bell MAL**, Guo X, Song DY, Bector EM. Transurethral light delivery for prostate photoacoustic imaging, *Journal of Biomedical Optics*, 20(3):036002, 2015
- J54. **Bell MAL**, Kuo N, Song DY, Kang J, Bector EM. *In vivo* visualization of prostate brachytherapy seeds with photoacoustic imaging, *Journal of Biomedical Optics*, 19(12):126011, 2014.
- J55. **Bell MAL**, Sen HT, Iordachita I, Kazanzides P, Wong J. *In vivo* reproducibility of robotic probe placement for a novel ultrasound-guided radiation therapy system, *Journal of Medical Imaging*, 1(2):025001, 2014.
- J56. **Bell MAL**, Kuo N, Song DY, Bector EM. Short-lag spatial coherence beamforming of photoacoustic images for enhanced visualization of prostate brachytherapy seeds, *Biomedical Optics Express*, 4(10): 1964-1977, 2013.
- J57. **Bell MAL**, Goswami R, Kisslo JA, Dahl JJ, Trahey GE. Short-lag spatial coherence (SLSC) imaging of cardiac ultrasound data: Initial clinical results, *Ultrasound in Medicine and Biology*, 39(10):1861-74. 2013.
- J58. **Bell MAL**, Byram BC, Harris EJ, Evans PM, Bamber JC. *In vivo* liver tracking with a high volume rate 4D ultrasound scanner and a 2D matrix array probe, *Physics in Medicine and Biology*, 57(5):1359-74. 2012.
- J59. Dahl JJ, Hyun D, **Lediju MA**, Trahey GE. Lesion detectability in diagnostic ultrasound with short-lag spatial coherence imaging. *Ultrasonic Imaging* 33(2):119-133. 2011.
- J60. **Lediju MA**, Trahey GE, Byram BC, Dahl JJ. Spatial coherence of backscattered echoes: Imaging characteristics, *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, 58(7):1377-88. 2011.
- J61. **Lediju MA**, Pihl MJ, Hsu SJ, Dahl JJ, Gallippi CM, Trahey GE. A motion-based approach to abdominal clutter reduction. *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control* 56(11):2437-49. 2009. **[featured on journal cover]**
- J62. **Lediju MA**, Pihl MJ, Hsu SJ, Dahl JJ, Trahey GE. Quantitative assessment of the magnitude, impact, and spatial extent of ultrasonic clutter. *Ultrasonic Imaging* 30(3):151-168. 2008.

Conference Proceedings & Associated Presentations

- C1. Sharma A, Gonzalez E, Ambinder E, Myers K, Oluyemi E, **Bell MAL**, Real-time coherence imaging of suspicious breast masses recommended for aspiration or biopsy, Proceedings of the 2023 IEEE International Ultrasonics Symposium, Montreal, Canada, September 3-8, 2023
- C2. Timana J, Fernandes GSP, Pavan TZ, **Bell MAL**, Application of CohereNet to photoacoustic data for non-invasive, in vivo, subcutaneous imaging, Proceedings of the 2023 IEEE International Ultrasonics Symposium, Montreal, Canada, September 3-8, 2023
- C3. Fernandes GSP, Pavan TZ, **Bell MAL**, In silico demonstrations of the impact of wavelength and skin tone on photoacoustic breast imaging, Proceedings of the 2023 IEEE International Ultrasonics Symposium, Montreal, Canada, September 3-8, 2023
- C4. Kokumo K, Sharma A, Myers K, Ambinder E, Oluyemi E, **Bell MAL**, Theoretical basis and experimental validation of harmonic coherence-based ultrasound imaging for breast mass diagnosis, Proceedings of SPIE Medical Imaging, San Diego, CA, February 19-23, 2023
- C5. Kumar A, Kerensky M, Gonzalez E, **Bell MAL**, Theodore N, Thakor N, Manbachi A, Computational modeling approaches for placement of wearable and implantable ultrasound devices: visualization of beam propagation through patient-specific anatomy, Proceedings of SPIE Medical Imaging, San Diego, CA, February 19-23, 2023
- C6. China D, Feng Z, Hooshangnejad H, Sforza D, Vagdargi P, **Bell MAL**, Uneri A, Ding K, Real-time element position tracking of flexible array transducer for ultrasound beamforming,

- Proceedings of SPIE Medical Imaging, San Diego, CA, February 19-23, 2023
- C7. Zhang J, Wiacek A, Feng Z, Ding K, **Bell MAL**, Comparison of flexible array with laparoscopic transducer for photoacoustic-guided surgery, *Proceedings of SPIE Photonics West*, San Francisco, CA, January 28-February 2, 2023
 - C8. Graham MT, **Bell MAL**, PhocoSpace: An open-source simulation package to implement photoacoustic spatial coherence theory, *Proceedings of the 2022 IEEE International Ultrasonics Symposium*, Venice, Italy, October 10-13, 2022
 - C9. Gubbi MR, **Bell MAL**, Predicting Generalized Contrast-to-Noise Ratios in Frame-Averaged Photoacoustic Images, *Proceedings of the 2022 IEEE International Ultrasonics Symposium*, Venice, Italy, October 10-13, 2022
 - C10. Fernandes GSP, Uliana JH, Bachmann L, Carneiro AAO, **Bell MAL**, Pavan, TZ, Impact of skin pigmentation on photoacoustic imaging using linear array transducer: a pilot in vivo study, *Proceedings of the 2022 IEEE International Ultrasonics Symposium*, Venice, Italy, October 10-13, 2022
 - C11. Zhang J, Wiacek A, **Bell MAL**, Binary and Random Inputs to Rapidly Identify Overfitting of Deep Neural Networks Trained to Output Ultrasound Images, *Proceedings of the 2022 IEEE International Ultrasonics Symposium*, Venice, Italy, October 10-13, 2022
 - C12. Zhang J, Wiacek A, González E, Feng Z, Ding K, **Bell MAL**, A Flexible Array Transducer for Photoacoustic-Guided Surgery, *Proceedings of the 2022 IEEE International Ultrasonics Symposium*, Venice, Italy, October 10-13, 2022
 - C13. Zhao L, Fong TC, **Bell MAL**, COVID-19 feature detection with deep neural networks trained on simulated lung ultrasound B-mode images, *Proceedings of the 2022 IEEE International Ultrasonics Symposium*, Venice, Italy, October 10-13, 2022
 - C14. Sharma A, Wiacek A, Oluyemi E, Myers K, Ambinder E, **Bell MAL**, Distinguishing fluid and solid breast masses with fundamental and harmonic amplitude- and coherence-based ultrasound beamforming, *Proceedings of the 2022 IEEE International Ultrasonics Symposium*, Venice, Italy, October 10-13, 2022
 - C15. **Bell MAL**, Applications of Ultrasound Imaging in the Deep Learning Age, *Proceedings of SPIE Optics + Photonics*, San Diego, CA, August 21-25, 2022 **[Invited]**
 - C16. Frey B, Zhao L, Fong T, **Bell MAL**, Multi-stage investigation of deep neural networks for COVID-19 B-line feature detection in simulated and in vivo lung ultrasound images, *Proceedings of SPIE Medical Imaging*, San Diego, CA, February 20-24, 2022
 - C17. Graham M, von Guionneau N, Tuffaha S, **Bell MAL**, Design and optimization of simulated light delivery systems for photoacoustic assessment of peripheral nerve injury, *Proceedings of SPIE Photonics West*, San Francisco, CA, January 22-27, 2022
 - C18. González E, Graham CA, **Bell MAL**, Optimization of a dual wavelength atlas technique to differentiate methylene blue from hemoglobin in photoacoustic signals, *Proceedings of SPIE Photonics West*, San Francisco, CA, January 22-27, 2022
 - C19. González E, Assis F, Chrispin J, **Bell MAL**, A Beamformer-Independent Method to Predict Photoacoustic Visual Servoing System Failure from a Single Image Frame, *Proceedings of the 2021 IEEE International Ultrasonics Symposium*, Virtual, September 11-16, 2021
 - C20. Wiacek A, Oluyemi E, Myers K, Ambinder E, **Bell MAL**, Quantifying the Impact of Breast Density on the Lag-One Coherence of Hypoechoic Masses, *Proceedings of the 2021 IEEE International Ultrasonics Symposium*, Virtual, September 11-16, 2021
 - C21. Kempski KM, Gubbi MR, **Bell MAL**, A Method to Estimate the Spatial Coherence of Photoacoustic Channel Data Without Access to Channel Data, *Proceedings of the 2021 IEEE International Ultrasonics Symposium*, Virtual, September 11-16, 2021
 - C22. Wiacek A, Dehak N, Extending CohereNet to Retain Physical Features When Classifying Benign or Malignant Breast Masses, *Proceedings of the 2021 IEEE International Ultrasonics Symposium*, Virtual, September 11-16, 2021
 - C23. Gubbi MR, **Bell MAL**, Deep Learning-Based Photoacoustic Visual Servoing: Using Outputs from Raw Sensor Data as Inputs to a Robot Controller, *IEEE International Conference on Robotics and Automation (ICRA)*, Xi'an, China, May 30 - June 5, 2021

- C24. Nair AA, Tran TD, Reiter A, **Bell MAL**, Spectral Gap Extrapolation and Radio Frequency Interference Suppression Using 1-D UNets, IEEE Radar Conference, May 10-14, 2021
- C25. Graham M, Dunne R, **Bell MAL**, Investigating the effects of compressional and elastic photoacoustic waves to predict transcranial photoacoustic image quality for guidance of minimally invasive neurosurgeries, Proceedings of SPIE Photonics West, San Francisco, CA, March 6-11, 2021
- C26. Graham M, Creighton F, **Bell MAL**, Validation of eyelids as acoustic receiver locations for photoacoustic-guided neurosurgery, Proceedings of SPIE Photonics West, San Francisco, CA, March 6-11, 2021
- C27. Wiacek A, Wang KC, Wu H, **Bell MAL**, Parking sensor-inspired approach to photoacoustic-guided hysterectomy demonstrated with human cadavers, Proceedings of SPIE Photonics West, San Francisco, CA, March 6-11, 2021
- C28. González E, Jain A, **Bell MAL**, Photoacoustic differentiation of cortical from cancellous bone in the lumbar vertebrae of an intact human cadaver to prevent bone breaches during spinal fusion surgeries, Proceedings of SPIE Photonics West, San Francisco, CA, March 6-11, 2021
- C29. Kempski KM, Graham MT, Wiacek A, Gubbi MR, **Bell MAL**, Generalized contrast-to-noise ratio as a metric of photoacoustic image quality, Proceedings of SPIE Photonics West, San Francisco, CA, March 6-11, 2021
- C30. **Bell MAL**, Photoacoustic Vision for Surgical Guidance (Invited Paper), *Proceedings of the 2020 IEEE International Ultrasonics Symposium*, Virtual, September 6-11, 2020 **[Invited]**
- C31. **Bell MAL**, Listening to the Sound of Light to Guide Surgeries, in *Frontiers in Optics / Laser Science*, B. Lee, C. Mazzali, K. Corwin, and R. Jason Jones, eds., OSA Technical Digest, paper FW1E.1, 2020 **[Invited]**
- C32. Gubbi MR, **Bell MAL**, Theoretical predictions of generalized contrast-to-noise ratios for photoacoustic images, *Proceedings of the 2020 IEEE International Ultrasonics Symposium*, Virtual, September 6-11, 2020
- C33. Graham M, Creighton F, **Bell MAL**, Investigation of acoustic windows for photoacoustic imaging of intracranial blood vessels, *Proceedings of the 2020 IEEE International Ultrasonics Symposium*, Virtual, September 6-11, 2020
- C34. González E, **Bell MAL**, Acoustic frequency-based differentiation of photoacoustic signals from surgical biomarkers, *Proceedings of the 2020 IEEE International Ultrasonics Symposium*, Virtual, September 6-11, 2020
- C35. Wiacek A, Oluyemi E, Myers K, Mullen L, **Bell MAL**, Coherence-based beamforming improves the diagnostic certainty of breast ultrasound exams, *Proceedings of the 2020 IEEE International Ultrasonics Symposium*, Virtual, September 6-11, 2020
- C36. Bhatt M, Nair A, Kempski KM, **Bell MAL**, Multi-task learning for ultrasound image formation and segmentation directly from raw *in vivo* data, *Proceedings of the 2020 IEEE International Ultrasonics Symposium*, Virtual, USA, September 6-11, 2020
- C37. Matrone G, **Bell MAL**, Ramalli A, Enhancing the detectability of highly coherent targets in short-lag spatial coherence images with multi-line transmission, *Proceedings of the 2020 IEEE International Ultrasonics Symposium*, Virtual, USA, September 6-11, 2020
- C38. **Bell MAL**, Huang J, Hyun D, Eldar YC, van Sloun R, Mischi M, Challenge on ultrasound beamforming with deep learning (CUBDL), *Proceedings of the 2020 IEEE International Ultrasonics Symposium*, Virtual, USA, September 6-11, 2020
- C39. Wang Y, Kempski K, Kang JU, **Bell MAL**, A conditional adversarial network for single plane wave beamforming, *Proceedings of the 2020 IEEE International Ultrasonics Symposium*, 2020
- C40. Li Z, Wiacek A, **Bell MAL**, Beamforming with deep learning from single plane wave RF data, *Proceedings of the 2020 IEEE International Ultrasonics Symposium*, 2020
- C41. González E, **Bell MAL**, A GPU approach to real-time coherence-based photoacoustic imaging and its application to photoacoustic visual servoing, Proceedings of SPIE Photonics West, San Francisco, CA, February 1-6, 2020

- C42. Wiacek A, Wang KC, **Bell MAL**, Dual-wavelength photoacoustic imaging for guidance of hysterectomy procedures, *Proceedings of SPIE Photonics West*, San Francisco, CA, February 1-6, 2020
- C43. Graham M, Assis F, Allman D, Wiacek A, González E, Gubbi M, Hou H, Dong J, Beck S, Chrispin J, **Bell MAL**, Photoacoustic image guidance and robotic visual servoing to mitigate fluoroscopy during cardiac catheter interventions, *Proceedings of SPIE Photonics West*, San Francisco, CA, February 1-6, 2020
- C44. Wiacek A, González E, Dehak N, **Bell MAL**, CohereNet: A deep learning approach to coherence-based beamforming, *Proceedings of the 2019 IEEE International Ultrasonics Symposium*, Glasgow, Scotland, October 6-9, 2019
- C45. González E, Gubbi M, **Bell MAL**, GPU implementation of coherence-based photoacoustic beamforming for autonomous visual servoing of a needle tip, *Proceedings of the 2019 IEEE International Ultrasonics Symposium*, Glasgow, Scotland, October 6-9, 2019
- C46. Nair AA, Tran TD, Reiter A, **Bell MAL**, One-Step Deep Learning Approach to Ultrasound Image Formation and Image Segmentation with a Fully Convolutional Neural Network, *Proceedings of the 2019 IEEE International Ultrasonics Symposium*, Glasgow, Scotland, October 6-9, 2019
- C47. Nair AA, Tran TD, Reiter A, **Bell MAL**, A Generative Adversarial Neural Network for Beamforming Ultrasound Images, *53rd Annual Conference on Information Sciences and Systems*, Baltimore, MD, March 20-22, 2019 **[Invited Presentation]**
- C48. Allman D, Assis F, Chrispin J, **Bell MAL**, Deep Learning to Detect Catheter Tips in Vivo During Photoacoustic-Guided Catheter Interventions, *53rd Annual Conference on Information Sciences and Systems*, Baltimore, MD, March 20-22, 2019 **[Invited Presentation]**
- C49. **Bell MAL**, Deep learning the sound of light to guide surgeries, *Proceedings of SPIE Photonics West*, San Francisco, CA, February 2-7, 2019
- C50. Graham M, Guo J, **Bell MAL**, Simultaneous visualization of nerves and blood vessels with multispectral photoacoustic imaging for intraoperative guidance of neurosurgeries, *Proceedings of SPIE Photonics West*, San Francisco, CA, February 2-7, 2019
- C51. Wiacek A, Wang K, **Bell MAL**, Techniques to distinguish the ureter from the uterine artery in photoacoustic-guided hysterectomies, *Proceedings of SPIE Photonics West*, San Francisco, CA, February 2-7, 2019
- C52. González E, Wiacek A, **Bell MAL**, Visualization of custom drill bit tips in a human vertebra for photoacoustic-guided spinal fusion surgeries, *Proceedings of SPIE Photonics West*, San Francisco, CA, February 2-7, 2019
- C53. Kempski K, Wiacek A, Palmer J, Graham M, González E, Goodson B, Allman D, Hou H, Beck S, He J, **Bell MAL**, In vivo demonstration of photoacoustic-guided liver surgery, *Proceedings of SPIE Photonics West*, San Francisco, CA, February 2-7, 2019
- C54. Allman D, Assis F, Chrispin J, **Bell MAL**, A deep learning-based approach to identify in vivo catheter tips for photoacoustic-guided cardiac interventions, *Proceedings of SPIE Photonics West*, San Francisco, CA, February 2-7, 2019
- C55. Nair A, Liu L, Rangamani A, Chin A, **Bell MAL**, Tran T, Reconstruction-free deep convolutional neural networks for partially observed images, *6th IEEE Global Conference on Signal and Information Processing*, Anaheim, CA, November 26–29, 2018
- C56. Wiacek A, Myers K, Falomo E, Rindal OMH, Fabrega-Foster K, Harvey S, **Bell MAL**, Clinical feasibility of coherence-based beamforming to distinguish solid from fluid hypoechoic breast masses, *Proceedings of the 2018 IEEE International Ultrasonics Symposium*, Kobe, Japan, October 22-25, 2018
- C57. Nair AA, Gubbi M, Tran TD, Reiter A, **Bell MAL**, A fully convolutional neural network for beamforming ultrasound images, *Proceedings of the 2018 IEEE International Ultrasonics Symposium*, Kobe, Japan, October 22-25, 2018
- C58. Allman D, Assis F, Chrispin J, **Bell MAL**, Deep neural networks to remove photoacoustic reflection artifacts in *ex vivo* and *in vivo* tissue, *Proceedings of the 2018 IEEE International Ultrasonics Symposium*, Kobe, Japan, October 22-25, 2018

- C59. González E, **Bell MAL**, Segmenting bone structures in ultrasound images with Locally Weighted SLSC (LW-SLSC) beamforming, *Proceedings of the 2018 IEEE International Ultrasonics Symposium*, Kobe, Japan, October 22-25, 2018
- C60. Nair AA, Tran T, Reiter A, **Bell MAL**, A deep learning based alternative to beamforming ultrasound images, *IEEE International Conference on Acoustics, Speech and Signal Processing*, Calgary, Alberta, Canada, April 15-20, 2018
- C61. Allard M, Shubert J, **Bell MAL**, Technical Note: Feasibility of photoacoustic guided hysterectomies with the da Vinci robot, *Proceedings of SPIE Medical Imaging*, Houston, TX, February 10-15, 2018
- C62. Graham M, **Bell MAL**, Development and validation of a short-lag spatial coherence theory for photoacoustic imaging, *Proceedings of SPIE Photonics West*, San Francisco, CA, January 28-31, 2018
- C63. Shubert J, **Bell MAL**, A novel drill design for photoacoustic guided surgeries, *Proceedings of SPIE Photonics West*, San Francisco, CA, January 28-31, 2018
- C64. Allman D, Reiter A, **Bell MAL**, Exploring the effects of transducer models when training convolutional neural networks to eliminate reflection artifacts in experimental photoacoustic images, *Proceedings of SPIE Photonics West*, San Francisco, CA, January 28-31, 2018
- C65. Graham M, **Bell MAL**, Theoretical Application of Short-Lag Spatial Coherence to Photoacoustic Imaging, *Proceedings of the 2017 IEEE International Ultrasonics Symposium*, Washington, DC, September 6-9, 2017
- C66. Shubert J, **Bell MAL**, Photoacoustic Based Visual Servoing of Needle Tips to Improve Biopsy on Obese Patients, *Proceedings of the 2017 IEEE International Ultrasonics Symposium*, Washington, DC, September 6-9, 2017
- C67. Allman D, Reiter A, **Bell MAL**, A Machine Learning Method to Identify and Remove Reflection Artifacts in Photoacoustic Channel Data, *Proceedings of the 2017 IEEE International Ultrasonics Symposium*, Washington, DC, September 6-9, 2017
- C68. Dahl J, Hyun D, Li Y, Jakovljevic M, **Bell MAL**, Long W, Bottenus N, Kakkad V, Trahey G, Coherence Beamforming and its Applications to the Difficult-to-Image Patient, *Proceedings of the 2017 IEEE International Ultrasonics Symposium*, Washington, DC, September 6-9, 2017
- C69. Rodriguez-Molares A, Rindal OMH, Bernard O, Nair A, **Bell MAL**, Liebgott H, Austeng A, Lovstakken L, TheUltraSound Toolbox, *Proceedings of the 2017 IEEE International Ultrasonics Symposium*, Washington, DC, September 6-9, 2017
- C70. Kim S, **Bell MAL**, Kazanzides P, Feasibility of a photoacoustic image guided telerobotic system for skull base surgery, *Proceedings of the 14th International Conference on Ubiquitous Robots and Ambient Intelligence (URAI)*, Jeju, South Korea, June 28-July 1, 2017
- C71. Kim S, Gandhi N, **Bell MAL**, Kazanzides P, Improving the Safety of Telerobotic Drilling of the Skull Base Via Photoacoustic Sensing of the Carotid Arteries, *Proceedings of IEEE International Conference on Robotics and Automation*, Singapore, May 29-June 3, 2017.
- C72. Reiter A and **Bell MAL**, A machine learning approach to detect point sources in photoacoustic data, *Proceedings of SPIE Photonics West*, San Francisco, CA, January 28 - February 2, 2017.
- C73. Eddins B and **Bell MAL**, Optimizing light delivery for a photoacoustic surgical system, *Proceedings of SPIE Photonics West*, San Francisco, CA, January 28 - February 2, 2017.
- C74. Gandhi N, Kim S, Kazanzides P, **Bell MAL**, Accuracy of a novel photoacoustic-based approach to surgical guidance performed with and without a teleoperated da Vinci robot, *Proceedings of SPIE Photonics West*, San Francisco, CA, January 28 - February 2, 2017.
- C75. Kim S, Tan Y, Kazanzides P, **Bell MAL**. Feasibility of photoacoustic image guidance for telerobotic endonasal transsphenoidal surgery, *Proceedings of the 2016 IEEE International Conference on Biomedical Robotics and Biomechatronics*, University Town, Singapore, June 26-29, 2016.
- C76. **Bell MAL**, Dagle AB, Kazanzides P, Bactor EM. Experimental Assessment of Energy Requirements and Tool Tip Visibility for Photoacoustic-Guided Endonasal Surgery, *Proceedings of SPIE Photonics West*, San Francisco, CA, February 13-17, 2016.
- C77. Sen HT, **Bell MAL**, Zhang Y, Ding K, Wong J, Iordachita I, Kazanzides P, System integration

and preliminary in-vivo experiments of a robot for ultrasound guidance and monitoring during radiotherapy, *Proceedings of the 2015 IEEE 17th International Conference on Advanced Robotics*, Istanbul, Turkey, July 27-31, 2015. [this paper received 2nd place for Best Paper Award -- i.e., Honorable Mention]

- C78. Kim S, Kang HJ, Cheng A, **Bell MAL**, Bector EM, Kazanzides P. Photoacoustic image guidance for robot-assisted skull base surgery, *Proceedings of IEEE International Conference on Robotics and Automation*, Seattle, WA, May 26-30, 2015.
- C79. **Bell MAL**, Ostrowski AK, Li K, Kazanzides P, Bector EM. Quantifying bone thickness, light transmission, and contrast interrelationships in transcranial photoacoustic imaging, *Proceedings of SPIE Photonics West*, San Francisco, CA, February 7-12, 2015.
- C80. **Bell MAL**, Guo X, Kang HJ, Bector EM. Improved contrast in laser-diode-based photoacoustic images with short-lag spatial coherence beamforming, *Proceedings of the 2014 IEEE International Ultrasonics Symposium*, Chicago, IL, September 3-6, 2014.
- C81. **Bell MAL**, Sen HT, Iordachita I, Kazanzides P. Force-controlled ultrasound robot for consistent tissue pre-loading: Implications for acoustic radiation force elasticity imaging, *Proceedings of the 2014 IEEE International Conference on Biomedical Robotics and Biomechatronics*, São Paulo, Brazil, August 12-15, 2014.
- C82. **Bell MAL**, Sen HT, Iordachita I, Kazanzides P, Wong J. In vivo reproducibility of robotic probe placement for an integrated US-CT image-guided radiotherapy system, *Proceedings of SPIE Medical Imaging*, San Diego, CA, February 16-20, 2014.
- C83. **Bell MAL**, Ostrowski AK, Kazanzides P, Bector EM. Feasibility of transcranial photoacoustic imaging for interventional guidance of endonasal surgeries, *Proceedings of SPIE Photonics West*, San Francisco, CA, February 1-6, 2014.
- C84. **Bell MAL**, Song DY, Bector EM. Coherence-based photoacoustic imaging of brachytherapy seeds implanted in a canine prostate, *Proceedings of SPIE Medical Imaging*, San Diego, CA, February 16-20, 2014.
- C85. **Bell MAL**, Kuo N, Kang J, Song DY, Bector EM. In vivo photoacoustic imaging of prostate brachytherapy seeds, *Proceedings of SPIE Photonics West*, San Francisco, CA, February 1-6, 2014.
- C86. **Bell MAL**, Guo X, Song DY, Bector EM. Photoacoustic imaging of brachytherapy seeds in an ex vivo prostate with transurethral light delivery, *Proceedings of SPIE Photonics West*, San Francisco, CA, February 1-6, 2014.
- C87. Kang HJ, **Bell MAL**, Guo X, Taylor RH, Bector EM. Freehand spatial-angular compounding of photoacoustic images, *Proceedings of SPIE Medical Imaging*, San Diego, CA, February 16-20, 2014.
- C88. Sen HT, **Bell MAL**, Iordachita I, Wong J, Kazanzides P, A Cooperatively Controlled Robot for Ultrasound Monitoring of Radiation Therapy, *Proceedings of the 2013 IEEE/RSJ International Conference on Intelligent Robots and Systems*, Tokyo, Japan, November 3-8, 2013.
- C89. Dahl JJ, Bottenus N, **Bell MAL**, Cook M, Coherent Flow Imaging: A Power Doppler Imaging Technique Based on Backscatter Spatial Coherence, *Proceedings of the 2013 IEEE Joint UFFC, EFTF, PFM Symposium*, Prague, Czech Republic, July 21-25, 2013.
- C90. **Bell MAL**, Goswami R, Dahl JJ, Trahey GE. Improved Visualization of Endocardial Borders with Short-Lag Spatial Coherence (SLSC) Imaging of Fundamental and Harmonic Ultrasound Data, *Proceedings of the 2012 IEEE International Ultrasonics Symposium*, Dresden, Germany, October 7-10, 2012.
- C91. **Bell MAL**, Goswami R, Trahey GE. Clutter Reduction in Echocardiography with Short-Lag Spatial Coherence (SLSC) Imaging, *Proceedings of the 2012 IEEE International Symposium on Biomedical Imaging*, Barcelona, Spain, May 2-5, 2012.
- C92. **Bell MAL**, Dahl JJ, Trahey GE. Comparative Resolution and Tracking Performance in B-mode and Short-Lag Spatial Coherence (SLSC) Imaging, *Proceedings of the 2011 IEEE International Ultrasonics Symposium*, Orlando, FL, October 18-21, 2011.
- C93. Dahl JJ, Pinton GF, **Lediju MA**, Trahey GE. A Novel Imaging Technique Based on the Spatial Coherence of Backscattered Waves: Demonstration in the Presence of Acoustical Clutter,

Proceedings of SPIE Medical Imaging, Orlando, FL, February 12-17, 2011.

- C94. **Lediju MA**, Trahey GE, Jakovljevic M, Byram BC, Dahl JJ. Short-Lag Spatial Coherence Imaging, *Proceedings of the 2010 IEEE International Ultrasonics Symposium*, San Diego, CA, October 11-14, 2010.
- C95. **Lediju MA**, Byram BC, Harris EJ, Evans PM, Bamber JC. 3D Liver Tracking Using a Matrix Array: Implications for Ultrasonic Guidance of IMRT, *Proceedings of the 2010 IEEE International Ultrasonics Symposium*, San Diego, CA, October 11-14, 2010.
- C96. **Lediju MA**, Byram BC, Trahey GE. Sources and Characterization of Clutter in Cardiac B-mode Images, *Proceedings of the 2009 IEEE International Ultrasonics Symposium*, Rome, Italy, September 20-23, 2009.
- C97. Dahl JJ, Pinton GF, **Lediju MA**, Trahey GE. Simulation and Experimental Analysis of Ultrasonic Clutter in Fundamental and Harmonic Imaging, *Proceedings of SPIE Medical Imaging 2009*, Orlando, FL, February 7-12, 2009.
- C98. **Lediju MA**, Pihl MJ, Hsu SJ, Dahl JJ, Gallippi CM, Trahey GE. Magnitude, origins, and reduction of abdominal ultrasonic clutter, *Proceedings of the 2008 IEEE International Ultrasonics Symposium*, Beijing, China, November 2-5, 2008.

Refereed Conference Abstracts & Associated Presentations

- A1. Raghavan P, Ashikuzzaman M, Mondragon E, Huang J, Zhao L, Bonwit S, Etemadimanesh A, **Bell MAL**, Quantifying myofascial shear strain in chronic post-stroke shoulder pain with ultrasound shear strain measurements, Society for Neuroscience, Washington, DC, November 11-15, 2023
- A2. Zhao L, Frey B, Fong TC, **Bell MAL**, Multi-stage investigation of deep neural networks for COVID-19 B-line feature detection in simulated and in vivo ultrasound images, *46th International Symposium on Ultrasonic Imaging and Tissue Characterization*, Arlington, VA, June 8-10, 2022
- A3. Wiacek A, Oluyemi E, Myers K, Mullen L, **Bell MAL**, Clinical implications of spatial coherence features on breast ultrasound, *American Institute of Ultrasound in Medicine (AIUM) Annual Meeting*, San Diego, CA, March 12-16, 2022 [**won New Investigator Presentation Award**]
- A4. Graham M, Dunne R, **Bell MAL**, Comparison of Compressional and Elastic Photoacoustic Simulations for Planning, Imaging, and Guidance of Neurosurgeries, *IEEE International Ultrasonics Symposium*, Virtual, September 11-16, 2021
- A5. Gubbi M, **Bell MAL**, Deep-Learning Based Photoacoustic Visual Servoing, *45th International Symposium on Ultrasonic Imaging and Tissue Characterization*, Arlington, VA, June 2-4, 2021.
- A6. Wiacek A, Oluyemi E, Myers K, Mullen L, **Bell MAL**, Improving diagnostic certainty in breast ultrasound with coherence-based beamforming, *45th International Symposium on Ultrasonic Imaging and Tissue Characterization*, Arlington, VA, June 2-4, 2021.
- A7. Creighton FX, Huang J, Graham MT, Ding AS, **Bell MAL**, Photoacoustic imaging for intracranial and extracranial facial nerve detection, Association for Research in Otolaryngology, Mid-Winter Meeting, January 19, 2021
- A8. Wiacek A, Wang K, Wu H, **Bell MAL**, Dual-wavelength photoacoustic-guided hysterectomy demonstration with a human cadaver, *IEEE International Ultrasonics Symposium*, Virtual, September 6-11, 2020
- A9. Graham M, Huang J, **Bell MAL**, Simulation and experimental assessment of optimal receiver locations for photoacoustic image guidance during minimally invasive neurosurgeries, *IEEE International Ultrasonics Symposium*, Glasgow, Scotland, October 6-9, 2019
- A10. Washington K, Nair A, **Bell MAL**, Effect of Raw Ultrasound Data Downsampling on Small Cyst Segmentation with Deep Neural Networks, Biomedical Engineering Society (BMES) Annual Meeting, Philadelphia, PA, October 16-19, 2019.
- A11. Wiacek A, Oluyemi E, Myers K, Harvey S, **Bell MAL**, Coherence-Based Beamforming to Improve the Diagnostic Power of Breast Ultrasound Imaging, Biomedical Engineering Society (BMES) Annual Meeting, Philadelphia, PA, October 16-19, 2019.
- A12. Gonzalez E, Wiacek A, **Bell MAL**, Photoacoustic imaging of signals from a custom drill tip in side a human vertebra with coherence-based beamforming, *44th International Symposium on*

- Ultrasonic Imaging and Tissue Characterization*, Arlington, VA, June 5-7, 2019.
- A13. Stephanian B, Graham MT, Hou H, **Bell MAL**, Additive noise models for simulated photoacoustic coherence-based imaging, *44th International Symposium on Ultrasonic Imaging and Tissue Characterization*, Arlington, VA, June 5-7, 2019.
- A14. Wiacek A, Oluyemi E, Myers K, Harvey S, **Bell MAL**, Distinguishing solid from fluid breast masses with coherence-based ultrasound imaging, *44th International Symposium on Ultrasonic Imaging and Tissue Characterization*, Arlington, VA, June 5-7, 2019.
- A15. Kempski K, Wiacek A, Palmer J, Graham M, González E, Goodson B, Allman D, Hou H, Beck S, He J, **Bell MAL**, Initial Exploration of *In Vivo* Photoacoustic-Guided Liver Surgery, Biomedical Engineering Society (BMES) Annual Meeting, Atlanta, GA, October 17-20, 2018.
- A16. Allman DM, **Bell MAL**, Removing Problematic Reflection Artifacts from Photoacoustic Images Using Deep Neural Networks, Biomedical Engineering Society (BMES) Annual Meeting, Atlanta, GA, October 17-20, 2018.
- A17. Wiacek A, Rindal OMH, Fabrega-Foster K, Harvey S, **Bell MAL**, Application of robust short-lag spatial coherence beamforming to breast ultrasound data, *43rd International Symposium on Ultrasonic Imaging and Tissue Characterization*, Arlington, VA, May 30- June 1, 2018.
- A18. Graham MT, **Bell MAL**, Implications of theoretical photoacoustic spatial covariance for short-lag spatial coherence imaging, *43rd International Symposium on Ultrasonic Imaging and Tissue Characterization*, Arlington, VA, May 30- June 1, 2018.
- A19. Nair AA, Tran TD, Reiter A, **Bell MAL**, Deep learning alternative to beamforming ultrasound images, *43rd International Symposium on Ultrasonic Imaging and Tissue Characterization*, Arlington, VA, May 30- June 1, 2018.
- A20. Allman DM, Reiter A, **Bell MAL**, Deep learning for photoacoustic source detection and reflection artifact removal, *43rd International Symposium on Ultrasonic Imaging and Tissue Characterization*, Arlington, VA, May 30- June 1, 2018.
- A21. Gonzalez E, **Bell MAL**, Comparative study of CT-US registration performance with DAS and SLSC ultrasound beamforming techniques, *43rd International Symposium on Ultrasonic Imaging and Tissue Characterization*, Arlington, VA, May 30- June 1, 2018.
- A22. Nair AA, Tran TD, **Bell MAL**, Principal component short-lag spatial coherence imaging (PC-SLSC), *42nd International Symposium on Ultrasonic Imaging and Tissue Characterization*, Arlington, VA, June 5-7, 2017.
- A23. Shubert J, **Bell MAL**, Photoacoustic-based visual servoing of needle tips to improve surgery on obese patients, *42nd International Symposium on Ultrasonic Imaging and Tissue Characterization*, Arlington, VA, June 5-7, 2017.
- A24. Graham M, **Bell MAL**, Theoretical application of short-lag spatial coherence to photoacoustic imaging, *42nd International Symposium on Ultrasonic Imaging and Tissue Characterization*, Arlington, VA, June 5-7, 2017.
- A25. Allman D, Reiter A, **Bell MAL**, Evaluation of a convolutional neural network for identifying reflection artifacts in photoacoustic imaging, *42nd International Symposium on Ultrasonic Imaging and Tissue Characterization*, Arlington, VA, June 5-7, 2017.
- A26. Ding K, Su L, Lin H, Oshea T, lordachita I, Lee J, Ng SK, Zhang Y, Wang KK, Wong JW, Harris E, Herman JM, Sen HT, Kazanzides P, **Bell MAL** and Yang C, Improving targeting accuracy in abdominal proton therapy with real-time robotic ultrasound, *41st International Symposium on Ultrasonic Imaging and Tissue Characterization*, Arlington, VA, June 8-10, 2016.
- A27. HT Sen, Kazanzides P, **Bell MAL**, *Cooperatively controlled robot to standardize acoustic radiation force (ARF)-based tissue elasticity measurements*, *41st International Symposium on Ultrasonic Imaging and Tissue Characterization*, Arlington, VA, June 8-10, 2016.
- A28. Sen HT, Kazanzides P, **Bell MAL**, lordachita I, Wong J, Ding K, A Robotic System for Ultrasound-Guided Patient Setup and Real-Time Treatment Monitoring, 18th International Conference on the Use of Computers in Radiation Therapy, London, UK, June 27-30, 2016.
- A29. Sen HT, Ding K, Cheng A, **Bell MAL**, Wong J, lordachita I, and Kazanzides P, A Cooperatively-Controlled Robot for Ultrasound-Guided Radiation Therapy, NCIGT and NIH Image Guided Therapy Workshop, Bethesda, MD, March 15-16, 2016.

- A30. Zhang Y, Su L, Lee J, Hooker T, Ng SK, Iordachita I, Wong J, Herman J, Sen HT, Kazanzides P, **Bell MAL**, Ding K, Planning Feasibility Study of Ultrasound Guided Stereotactic Radiation Therapy (SBRT) on CyberKnife for Pancreatic Cancer, *American Society for Radiation Oncology (ASTRO) 57th Annual Meeting*, San Antonio, TX, October 18-21, 2015.
- A31. Su L, Zhang Y, Lee J, Ng SK, Iordachita I, Jackson J, Wong J, Herman J, Sen HT, Hooker T, Kazanzides P, **Bell MAL**, Ding K, Stereotactic Body Radiation Therapy Planning for Pancreas Cancer Under Real Time Ultrasound Monitoring, *American Society for Radiation Oncology (ASTRO) 57th Annual Meeting*, San Antonio, TX, October 18-21, 2015.
- A32. Ng SK, Armour E, Su L, Zhang Y, Iordachita I, Wong J, Sen HT, Kazanzides P, **Bell MAL**, Ding K. Evaluation of Fiducial Markers for Ultrasound and X-Ray Images Used for Motion Tracking in Pancreas SBRT, *AAPM 57th Annual Meeting and Exhibition*, Anaheim, CA, July 12-16, 2015.
- A33. Su L, O'Shea T, Ng SK, Zhang Y, Iordachita I, Wong J, Harris E, Bamber J, Sen HT, Kazanzides P, **Bell MAL**, Ding K. Real-Time Ultrasound Monitoring with Speckle Tracking in Abdominal Stereotactic Body Radiation Therapy, *AAPM 57th Annual Meeting and Exhibition*, Anaheim, CA, July 12-16, 2015.
- A34. **Bell MAL**, Guo X, Kuo NP, Song DY, Bector EM. Comparison of light delivery methods for photoacoustic imaging of prostate brachytherapy seeds, *40th International Symposium on Ultrasonic Imaging and Tissue Characterization*, Arlington, VA, June 22-24, 2015.
- A35. Ding K, Zhang Y, Sen H, **Bell MAL**, Goldstein S, Kazanzides P, Iordachita I, Wong J. Towards Integrated CT and Ultrasound Guided Radiation Therapy Using A Robotic Arm with Virtual Springs, *AAPM 56th Annual Meeting and Exhibition*, Austin, TX, July 20-24, 2014.
- A36. **Bell MAL**, Bector EM, Kuo N, Kang J, Song DY. Photoacoustic imaging for improved visualization of prostate brachytherapy seeds, *American Radium Society*, St. Thomas, U.S. Virgin Islands, April 26-29, 2014.
- A37. **Bell MAL**, Kang HJ, Guo X, Song DY, Bector EM. Real-time transurethral photoacoustic imaging of prostate brachytherapy seeds, *39th International Symposium on Ultrasonic Imaging and Tissue Characterization*, Arlington, VA, June 9-11, 2013.
- A38. Kang HJ, **Bell MAL**, Guo X, Cheng A, Tavakoli B, Bector EM. Flexible software framework for acquiring pre-beamformed photoacoustic RF data in real time, *39th International Symposium on Ultrasonic Imaging and Tissue Characterization*, Arlington, VA, June 9-11, 2013.
- A39. **Bell MAL**, Sen HT, Kazanzides P, Iordachita I, Forbang RT, Lachaine M, Wong J, Repeatability of Robotic Placement of Ultrasound Probes for An Integrated US-CT Approach to Image-Guided Radiotherapy, *AAPM 55th Annual Meeting and Exhibition*, Indianapolis, IN, August 4-8, 2013.
- A40. **Bell MAL**, Sen HT, Kazanzides P, Iordachita I, Bector EM, Wong J, *Feasibility of robotic placement of imaging and model ultrasound probes for combined US-CT image-guided radiotherapy*, Joint Workshop: Technology for Innovation in Radiation Oncology, Bethesda, MD, June 13-14, 2013.
- A41. **Bell MAL**, Sen HT, Kazanzides P, Iordachita I, Wong J, Bector EM, *Reproducibility of tissue deformations with robot-assisted placement of an ultrasound probe*, 38th International Symposium on Ultrasonic Imaging and Tissue Characterization, Arlington, VA, June 10-12, 2013.
- A42. Kang H, **Bell MAL**, Guo X, Taylor RH, Bector EM, *Freehand spatial-angular compounding of photoacoustic images*, 38th International Symposium on Ultrasonic Imaging and Tissue Characterization, Arlington, VA, June 10-12, 2013.
- A43. Kuo N, **Bell MAL**, Bector EM, *Prototype system and preliminary comparison of beamforming algorithms for photoacoustic imaging of prostate brachytherapy seeds*, 38th International Symposium on Ultrasonic Imaging and Tissue Characterization, Arlington, VA, June 10-12, 2013.
- A44. Guo X, Etienne-Cummings R, Kang H, **Bell MAL**, Bector EM, *Localizing surgical tools with an ultrasound-based active reflector-tracking system*, 38th International Symposium on Ultrasonic Imaging and Tissue Characterization, Arlington, VA, June 10-12, 2013.
- A45. Trahey GE, **Bell MAL**, Jakovljevic M, Hyun D, Dahl JJ, *Comparison of delay-and-sum and coherence beamforming methods*, 38th International Symposium on Ultrasonic Imaging and

- Tissue Characterization, Arlington, VA, June 10-12, 2013.
- A46. **Bell MAL**, Goswami R, Trahey GE. *Clutter reduction in in-vivo cardiac images with Short-Lag Spatial Coherence (SLSC) imaging*. 37th International Symposium on Ultrasonic Imaging and Tissue Characterization, Arlington, VA, June 11-13, 2012.
- A47. **Lediju MA**, Dahl JJ, Trahey GE. *Comparative resolution measurements in B-mode and Short-Lag Spatial Coherence images*. 36th International Symposium on Ultrasonic Imaging and Tissue Characterization, Arlington, VA, June 13-15, 2011.
- A48. **Lediju MA**, Byram BC, Trahey GE. *Preliminary investigation of clutter in cardiac images*. 34th International Symposium on Ultrasonic Imaging and Tissue Characterization, Arlington, VA, June 10-12, 2009.
- A49. **Lediju MA**, Pihl MJ, Hsu SJ, Dahl JJ, Gallippi CM, Trahey GE. *Ultrasonic clutter: Magnitude, impact on lesion detection, effect of harmonic imaging, and characterization of origins*. 33rd International Symposium on Ultrasonic Imaging and Tissue Characterization, Arlington, VA, May 14-16, 2008.
- A50. Dahl JJ, **Lediju MA**, Pihl MJ, Hsu SJ, Gallippi CM, Trahey GE. *Clutter reduction methods from compression of tissue*, Sixth International Conference on the Ultrasonic Measurement and Imaging of Tissue Elasticity, Santa Fe, New Mexico, November 2-5, 2007.
- A51. **Lediju MA**, Pihl MJ, Hsu SJ, Dahl JJ, Gallippi CM, Trahey GE. *Investigations into clutter reduction methods in abdominal ultrasonic imaging*. 32nd International Symposium on Ultrasonic Imaging and Tissue Characterization, Arlington, VA, May 16-18, 2007.

INTELLECTUAL PROPERTY

- P1. **Bell MAL**, Gubbi M, Method and Systems for Photoacoustic Visual Servoing, Provisional Patent Application Number 63/346,855, filed May 28, 2022, U.S. Patent filed May 26, 2023. Patent Pending.
- P2. **Bell MAL**, Graham MT, von Guionneau N, Tuffaha S, Photoacoustic imaging for intraoperative evaluation and treatment of peripheral nerve injury, Provisional Patent Application Number 63/379,005, filed October 11, 2022.
- P3. **Bell MAL**, Gonzalez E, Acoustic Frequency Atlas-Based Approach for Photoacoustic Identification of Surgical Biomarkers, PCT International Patent Application Number PCT/US2022/043903 filed September 16, 2022. Patent Pending.
- P4. **Bell MAL**, Gonzalez E, Acoustic Frequency-Based Spectral Unmixing to Determine Tissue Constituents, Provisional Patent Application Number 63/245,392, filed September 17, 2021.
- P5. **Bell MAL**, Wiacek A, Using machine learning techniques to obtain coherence functions for use in correlation estimation applications," PCT International Patent Application Number PCT/US2020/53070 filed September 28, 2020. Patent Pending
- P6. **Bell MAL**, Boctor EM, Kazanzides P, Method and System for Transcranial Photoacoustic Imaging for Guiding Skull Base Surgeries, U.S. Patent Number US10531828, filed February 2, 2015, issued January 14, 2020.
- P7. **Bell MAL**, Wiacek A, Distinguishing solid masses from fluid-filled masses using coherence-based ultrasound, Provisional Patent Application Number 62/907,356, filed September 27, 2019.
- P8. **Bell MAL**, Shubert J, Internal Laser Light Delivery For Photoacoustic-Guided Drilling, PCT Patent Application Number PCT/US19/41839 filed July 15, 2019. Patent Pending
- P9. **Bell MAL**, Shubert J, Internal Light Delivery For Photoacoustic-Guided Drilling, Provisional Patent Application Number 62/699,483, filed July 17, 2018.
- P10. **Bell MAL**, Reiter A, A Machine Learning Approach to Beamforming, U.S. Patent Application Number 15/852,106, filed December 22, 2017. Patent Pending.
- P11. Dahl JJ, **Bell MAL**, Trahey GE, Method and Apparatus for Van-Cittert Zernike Imaging, Duke University, U.S. Patent Number US9254116, filed March 30, 2011, issued February 9, 2016.

SPONSORED RESEARCH GRANTS & CONTRACTS

\$12,829,793 total (includes \$7,746,173 awarded as sole PI)

NIH R01 EB032358 \$1,521,728 8/1/23-5/31/27

Photoacoustic Image Guidance of Hysterectomies

The goal of this NIH R01 grant is to establish optimal parameters to advance photoacoustic technology toward differentiation of ureters, uterine arteries, and tool tips during hysterectomies.

Role: PI

Johns Hopkins Discovery Award \$100,000 7/1/23-6/30/24

Photoacoustic Assessment of Peripheral Nerve Injury

One of 35 proposals selected from ~200 proposals to support cross-divisional research at JHU

The goal of this proposal is to form a partnership between surgeons at the School of Medicine and engineers at the Homewood Campus to assess *in vivo* peripheral nerve injury with a custom-built photoacoustic device

Role: PI

Chan Zuckerberg Initiative & National Academies of Science, Engineering, Medicine
Science Diversity Leadership Award \$1,150,000 12/1/22-11/30/27

Handheld Photoacoustic Biopsy with Molecular Sensitivity to Breast Cancer

To develop a combined ultrasound and photoacoustic imaging biopsy-based approach that will provide joint anatomical and molecular sensitivity

Role: PI

NIH R61 AT012279 \$4,584,635 9/21/22-8/31/27

Quantifying and Treating Myofascial Dysfunction in Post Stroke Shoulder Pain

This project will develop quantitative imaging biomarkers of myofascial dysfunction in patients with post-stroke shoulder pain.

Role: Co-I with \$291,803 allocation (PI: Raghavan)

NIH R01 EB032960 \$1,393,351 8/15/22-4/30/26

Minimizing Uncertainty in Breast Ultrasound Imaging with Real-Time Coherence-Based Beamforming

The goal of this NIH R01 grant is to develop real-time ultrasound imaging technology that will simplify clinical workflows by distinguishing fluid-filled masses from solid masses and from complex cystic and solid masses, which all appear hypoechoic in traditional ultrasound B-mode images.

Role: PI

Johns Hopkins Catalyst Award \$75,000 7/1/22-6/30/23

Redefining Laser Safety for Photoacoustic-Guided Liver Surgery

The goal is to define laser safety for photoacoustic-guided surgery of the liver

Role: PI

POCTRN Center at CIMIT (subcontract to NIH U54EB015408)

BluePrint MedTech Pilot \$99,284 1/1/22-5/31/23

Viopsy: a Non-Invasive Imaging Device to Modernize Treatment of Peripheral Nerve Injuries

To develop a prototype with established sensitivity-specificity readings of peripheral nerve injury, a clearly defined regulatory approval pathway, and a completed freedom-to-operate analysis, complemented by a broad provisional patent portfolio.

Role: Co-PI with \$37,057 allocation (PI: Tuffaha)

NSF IIS 2014088

\$1,000,000

10/1/20-9/30/24

SCH: INT: Photoacoustic-Guided Cardiac Interventions

The objective of this award is to apply theoretical spatial coherence models and experimental optical analyses to understand the limits of a novel, integrated robotic-photoacoustic imaging system for guiding cardiac surgeries and interventions.

Role: PI

NSF EEC 1852155

\$378,145

10/1/19-9/30/23

Research Experiences for Undergraduates (REU) Site for Computational Sensing and Medical Robotics (CS&MR)

This award enables us to continue JHU's Laboratory for Computational Sensing and Robotics 10+ year history of providing an engaging 10-week REU summer program to 10 undergrads nationwide who work on faculty-led research projects in engineering and computer science.

Role: Co-PI (PI: Etienne-Cummings)

ACCM StAAR Transformative Award

\$21,556

7/1/19-6/30/20

Continuous Ultrasound Imaging Platform for Monitoring and Surveillance

The goal of this pilot funding from the Department of Anesthesiology and Critical Care Medicine (ACCM), Stimulating and Advancing ACCM Research (StAAR) Transformative Award is to develop a proof-of-concept CUSI platform, which can be used for continuous monitoring of vessel size and blood flow and subsequently refine this application using human volunteer.

Role: Collaborator (PI: Pustavoitau)

ORAU Junior Faculty Enhancement Award

\$10,000

6/1/19-5/31/20

Robust Short-Lag Spatial Coherence Imaging of Hypoechoic Breast Masses

The goal of this ORAU Ralph E. Powe Junior Faculty Enhancement Award is to provide pilot funds to investigate robust short-lag spatial coherence imaging methods that distinguish complicated fluid-filled cysts from benign and malignant solid masses in breast ultrasound data

Role: PI

Alfred P. Sloan Research Fellowship

\$70,000

9/15/19-8/31/23

A Medical Physics Approach to Defining Safety Limits for Photoacoustic-Guided Surgery

The goal of this proposal is to employ basic medical physics principles to determine the safety limits of laser delivery directly to the surgical site of specific tissues (liver, heart, and pancreas)

Role: PI

NIH R21 EB025621

\$859,297

8/1/18-12/06/21

A Machine Learning Alternative to Beamforming to Improve Ultrasound Image Quality for Interventional Access to the Kidney

The goal of this NIH Trailblazer Award is to develop a new, deep learning framework alternative to the ultrasound beamforming process that removes needle tip reverberations and acoustic clutter caused by multipath scattering in near-field tissues (includes COVID-19 supplement)

Role: PI

| | | |
|---|-------------------|-------------------|
| Johns Hopkins Discovery Award | \$97,822 | 7/1/18-6/30/19 |
| Photoacoustic Image Guidance of Gynecological Surgeries | | |
| <i>One of 30 proposals selected from ~200 proposals to support cross-divisional research at JHU</i> | | |
| The goal of this proposal is to form a partnership between surgeons at the School of Medicine and engineers at the Homewood Campus to investigate the feasibility of differentiating blood vessels from the ureter using photoacoustic imaging. | | |
| Role: PI | | |
| | | |
| NSF ECCS-1751522 | \$540,000 | 2/15/18-1/31/24 |
| CAREER: Technical & Theoretical Foundations for Photoacoustic-Guided Surgery | | |
| The objective of this CAREER proposal is to apply optical analyses, spatial coherence theory, and independent resolution models to describe fundamental performance limits of photoacoustic-guided surgery. | | |
| Role: PI | | |
| | | |
| NVIDIA GPU Grant | unrestricted gift | 9/8/17-present |
| Clinical Implementation of Novel Ultrasound Beamformers | | |
| Titan Xp GPU was donated by NVIDIA Corporation to support the clinical implementation of our novel ultrasound and photoacoustic imaging algorithms | | |
| Role: PI | | |
| | | |
| Cutting Edge Surgical, Inc. | \$26,798 | 7/1/17 – 12/31/17 |
| Spinal Fusion Photoacoustic Imaging Project | | |
| Explore feasibility of photoacoustic-guided spinal fusion surgery | | |
| Role: PI | | |
| | | |
| NIH R00 EB018994 | \$725,965 | 4/1/17 – 1/31/20 |
| Coherence-Based Photoacoustic Image Guidance of Transsphenoidal Surgeries | | |
| Build, test, and validate a prototype system for avoiding the deadly risk of carotid artery injury during surgeries to remove pituitary tumors using coherence-based photoacoustics (independent phase) | | |
| Role: PI | | |
| | | |
| NIH K99 EB018994 | \$176,212 | 4/1/15 – 3/31/17 |
| Coherence-Based Photoacoustic Image Guidance of Transsphenoidal Surgeries | | |
| Build, test, and validate a prototype system for avoiding the deadly risk of carotid artery injury during surgeries to remove pituitary tumors using coherence-based photoacoustics (mentored phase) | | |
| Role: PI | | |

RESEARCH EXPERIENCE

2012-2016

Postdoctoral Fellow, Johns Hopkins University, Baltimore, MD

Engineering Research Center for Computer-Integrated Surgical Systems and Technology, Whiting School of Engineering, and Johns Hopkins Medical Institutions

Designed, fabricated, and tested novel photoacoustic imaging light delivery methods (e.g. interstitial, transperineal, transurethral) to improve prostate cancer detection and treatment, culminating with validation studies in phantom, *ex vivo* and *in vivo* canine prostates - Spearheaded *in vivo* human and animal studies to evaluate photoacoustic detection of brachytherapy seeds for treating prostate

cancer and robotic placement of ultrasound probes for monitoring radiation therapy and measuring tissue elasticity - Managed a team of graduate students to investigate photoacoustic imaging with smaller, safer, less expensive pulsed laser diodes and coherence-based beamforming for improved image quality - Performed 3D Monte Carlo simulations of light propagation to predict optical profiles in biological tissues for transcranial and prostate photoacoustic imaging - Co-developed robot-based navigational systems for photoacoustic-guided surgery (Mentors and Clinical Collaborators: Emad Boctor, Peter Kazanzides, Danny Song, John Wong)

2006-2012

Graduate Research Assistant, Duke University, Durham, NC

Department of Biomedical Engineering

Laid theoretical foundations, developed the mathematical framework, implemented the first short-lag spatial coherence (SLSC) beamformer to improve ultrasound image quality, and tested it in phantom, simulations, and clinical cardiac data - Programmed and conducted clinical studies with a research-based Verasonics® ultrasound imaging system to improve endocardial border visualization in cardiology patients at the Duke University Medical Center - Analyzed sources of acoustic clutter noise in ultrasonic imaging, resulting in the development of novel clutter reduction and signal processing methods (Advisor: Gregg E. Trahey)

2009-2010

Academic Visitor & Whitaker International Fellow, Institute of Cancer Research and Royal Marsden Hospital, Sutton, Surrey, UK

Joint Department of Physics

Implemented 3D speckle tracking with data from a state-of-the-art 4D ultrasound system to identify minimum volume acquisition rates for ultrasound guidance of intensity-modulated radiation therapy - Initiated and won funding to support this international collaboration (Advisor: Jeffrey C. Bamber)

2002-2006

Undergraduate Research Assistant, Massachusetts Institute of Technology, Cambridge, MA

Departments of Mechanical Engineering and Materials Science and Engineering

Calculated analytical expressions derived from thermodynamic principles to describe skin heating and blood perfusion of a finger in contact with a temperature-based probe for testing endothelial dysfunction - Utilized the Surface Evolver simulation package to study the motion of an optical fiber due to solder wetting on a range of solder pad geometries (Advisors: Adam C. Powell, IV, H. Frederick Bowman)

STUDENTS & FELLOWS ADVISED

Postdoctoral Fellows

Md Ashikuzzaman, Electrical and Computer Engineering, 2022-present

Arunima Sharma, Electrical and Computer Engineering, 2021-2022

Lingyi Zhao, Electrical and Computer Engineering, 2021-2022

Manish Bhatt, Electrical and Computer Engineering, 2020

Assistant Professor at BITS-Pilani University, Goa, India

Doctoral Students

Mahban Gholijafari, Electrical and Computer Engineering, 2023-present

Manik Kakkar, Electrical and Computer Engineering, 2023-present

Gareth Keene, Electrical and Computer Engineering, 2023-present

Nethra Venkatayogi, Computer Science, 2023-present

Junhao Zhang, Electrical and Computer Engineering, 2023-present

Junior Arroyo, Biomedical Engineering, 2021-present

Jiaxin Zhang, Electrical and Computer Engineering, 2021-present

Won Travel Award to IEEE International Ultrasonics Symposium, Venice, Italy, 2022

Ziwei Feng, Electrical and Computer Engineering, 2019-present

(co-advised with Kai Ding, my contribution: 50%)

Mardava Gubbi, Electrical and Computer Engineering, 2018-present

Eduardo Gonzalez, Biomedical Engineering, 2017-2022

Won Fulbright Fellowship, 2018

Won Travel Award to IEEE International Ultrasonics Symposium, Scotland, 2019

Thesis: Ultrasound and Photoacoustic Techniques for Surgical Guidance Inside and Around the Spine

Alycen Wiacek, Electrical and Computer Engineering, 2017-2022

Won Travel Award to IEEE International Ultrasonics Symposium, Kobe, Japan, 2018

Won IEEE IUS Women Engineering Elevator Pitch Competition, 2018

Won Inaugural Whiting School of Engineering Excellence in Research Award, 2019

Won MICCAI Student Participation Award, 2020

Won SPIE Photonics West Student Author Conference Support Award, 2021

Won ARCS Foundation, Metropolitan Washington Chapter Scholarship, 2021-2022

Won Siebel Scholarship, 2022

Won AIUM New Investigator Award, 2022

Assistant Professor at Oakland University, Rochester Hills, MI, USA

Thesis: Coherence-based ultrasound and photoacoustic imaging with applications in breast mass diagnosis and hysterectomy guidance

Michelle Graham, Electrical and Computer Engineering, 2016-2022

Won NSF Graduate Research Fellowship, 2018

Thesis: Theoretical, simulated, and experimental photoacoustic approaches to detect the internal carotid artery during minimally invasive neurosurgery

Arun Nair, Electrical and Computer Engineering, 2017-2021

Won Best Paper Award, ACM Multimedia Conference, Nice, France, 2019

Thesis: Machine Learning for Beamforming in Audio, Ultrasound, and Radar

(co-advised with Prof. Trac Tran, my contribution: 68% total, comprised of 46% primary, 15% secondary, and 7% equal contributions, based on thesis page count)

Masters Students

Suryansh Shukla, Biomedical Engineering, 2022

Prabha Mandaleeka, Biomedical Engineering, 2021-2022

STP Satwik, Biomedical Engineering, 2021-2022

Kelley Kempinski, Biomedical Engineering, 2019-2021

Won NSF Graduate Research Fellowship, 2019

Won MICCAI Student Participation Award, 2020

Joshua Krachman, Biomedical Engineering, 2020

Zehua Li, Electrical and Computer Engineering, 2020

Jiaqi (Justina) Huang, Biomedical Engineering, 2019-2020

Derek Allman, Electrical and Computer Engineering, 2016-2019

Huayu Hou, Electrical and Computer Engineering, 2018-2019

Jinxin Dong, Electrical and Computer Engineering, 2017-2019

Joshua Shubert, Electrical and Computer Engineering, 2016-2018

Won NSF Graduate Research Fellowship, 2018

Rotation Students

Teja Maruvada, Electrical and Computer Engineering, 2022

Basudha Pal, Electrical and Computer Engineering, 2022

Serene Kamal, Electrical and Computer Engineering, 2020
Theron Palmer, Biomedical Engineering, 2018-2019

Visiting PhD Students

Guilherme Fernandes, University of São Paulo, Brazil, 2022-2023
Ole Marius Hoel Rindal, University of Oslo, 2016-2017

Undergraduate Students

Nidhi Batra, JHU Electrical and Computer Engineering, 2023-present
Neil Mahto, JHU Computational Neuroscience and English (double major), 2023-present
Ahmed El-Desoky, Xavier University of Louisiana, Summer 2023-present
NSF Computational Sensing and Medical Robotics REU Student
Sara Ibrahim, University of Texas at Austin, Summer 2023
NSF Computational Sensing and Medical Robotics REU Student
Adah Harding, University of Maryland Baltimore County, Summer 2023
NSF Computational Sensing and Medical Robotics REU Student
Jose Timana, Pontifical Catholic University of Peru, 2022-2023
Khadijat Kokumo, Northwestern University, Summer 2022
NSF Computational Sensing and Medical Robotics REU Student
Won Best Paper Award Runner Up, SPIE Physics of Medical Imaging Conference, San Diego, CA, 2023
Camryn Graham, University of Michigan, Summer 2021
NSF Computational Sensing and Medical Robotics REU Student [advised remotely]
Benjamin Frey, University of St. Thomas, St. Paul, MN, Summer 2021
NSF Computational Sensing and Medical Robotics REU Student [advised remotely]
Won 2nd Best Presentation Award, NSF CSMR REU Program, 2021
Reese Dunne, Mississippi State University, Summer 2020
NSF Computational Sensing and Medical Robotics REU Student [advised remotely]
Won Barry S. Goldwater Scholarship, 2021
Won Astronaut Scholarship, 2021
Won Best Oral Presentation (STEM), Mississippi Honors Undergrad Conference, 2021
Won 2nd Place Presentation Award, MSU Fall Undergrad Research Symposium, 2020
Won 2nd Best Presentation Award, NSF CSMR REU Program, 2020
Jessica Su, JHU Biomedical Engineering, Summer 2019-2022
Won ARCS Foundation, Metropolitan Washington Chapter Scholarship, 2021-2022
Kendra Washington, Georgia Institute of Technology, Summer 2019
Leadership Alliance Scholar
Brooke Stephanian, JHU Biomedical Engineering, 2017-2019
Won 2nd place Poster Award, OSA-Sponsored Optics & Photonics Conference, 2017
Jasmin Palmer, Massachusetts Institute of Technology, Summer 2018
Leadership Alliance Scholar
Kelley Kempinski, University of Delaware, Summer 2018
NSF Computational Sensing and Medical Robotics REU Student
Won Best Presentation Award, NSF CSMR REU Program, 2018
Bria Goodson, Delta State University, Summer 2018
McNair Scholar
Joanna Guo, JHU Biomedical Engineering, 2018
Rene Lopez, JHU Biomedical Engineering, 2018
Margaret Allard, Smith College, Summer 2017

NSF Computational Sensing and Medical Robotics REU Student
Won Best Presentation Award, NSF CSMR REU Program, 2017

Elizabeth Shi, JHU Electrical and Computer Engineering, 2017

Blackberrie Eddins, JHU Biomedical Engineering, Summer 2016

NSF Computational Sensing and Medical Robotics REU Student
Won Best Presentation Award, NSF CSMR REU Program, 2016

Neeraj Gandhi, University of Virginia, Summer 2016

NSF Computational Sensing and Medical Robotics REU Student

Alicia B. Dagle, Clark University, Summer 2015

NSF Computational Sensing and Medical Robotics REU Student
Won Best Presentation Award, NSF CSMR REU Program, 2015

Anastasia K. Ostrowski, University of Michigan, Summer 2013 & Summer 2014

NSF Computational Sensing and Medical Robotics REU Student

Doctoral Dissertation Committees

Junyu Chen, JHU Electrical and Computer Engineering, 2022

Eduardo Gonzalez, JHU Biomedical Engineering, 2022

Michelle Graham, JHU Electrical and Computer Engineering, 2022

Alycen Wiacek, JHU Electrical and Computer Engineering, 2022

Guo Shoujing, JHU Electrical and Computer Engineering, 2022

Ebuka Arinze, JHU Electrical and Computer Engineering, 2018

Gyeong Woo Cheon, JHU Electrical and Computer Engineering, 2016

Preliminary Research Proposal Committees

Mardava Gubbi, JHU Electrical and Computer Engineering, 2022

Michelle Graham, JHU Electrical and Computer Engineering, 2021

Eduardo González, JHU Biomedical Engineering, 2021

Alycen Wiacek, JHU Electrical and Computer Engineering, 2021

Blake Dewey, JHU Electrical and Computer Engineering, 2021

Soohyun Lee, JHU Electrical and Computer Engineering, 2020

Arun Nair, JHU Electrical and Computer Engineering, 2020

Ye (Gary) Li, JHU Electrical and Computer Engineering, 2019

Phillip Wilcox, JHU Electrical and Computer Engineering, 2019

Ebuka Arinze, JHU Electrical and Computer Engineering, 2017

Graduate/Doctoral Board Oral Exams

Junior Arroyo, JHU Biomedical Engineering, 2023

Mardava Gubbi, JHU Electrical and Computer Engineering, 2022

Michelle Graham, JHU Electrical and Computer Engineering, 2020

Alycen Wiacek, JHU Electrical and Computer Engineering, 2020

Eduardo González, JHU Biomedical Engineering, 2019

Arun Nair, JHU Electrical and Computer Engineering, 2018

Phillip Wilcox, JHU Electrical and Computer Engineering, 2018

TEACHING EXPERIENCE

Sample evaluations and enrollments, 2013-2020

| | JHU Course Number | Course Name | Course median & mean \pm std | Instructor median & mean \pm std | # of students enrolled |
|-------------------------------|---------------------------------|---|---|------------------------------------|------------------------|
| Online Summer 2015-now | N/A | Introduction to Medical Imaging (★Bestseller) | 4.71 average rating* 3,004 students from 108 countries* offered in 25 languages* *these stats were reported on 10/5/2023 https://www.udemy.com/intro-to-medical-imaging/ shows most recent public stats | | |
| Spring 2020 | 520.631 | Ultrasound and Photoacoustic Beamforming | 5.00 4.89 \pm 0.33 | 5.00 4.89 \pm 0.33 | 10 |
| Fall 2019 | 520.432/ 520.632 | Medical Imaging Systems | 4.00 4.05 \pm 0.78 | 4.00 4.11 \pm 0.94 | 22 |
| Spring 2019 | 520.631 | Ultrasound and Photoacoustic Beamforming | 5.00 4.43 \pm 0.79 | 4.00 4.29 \pm 0.76 | 8 |
| Fall 2018 | 520.432/ 520.632 | Medical Imaging Systems | 4.00 4.00 \pm 0.98 | 4.00 3.77 \pm 1.21 | 27 |
| Spring 2018 | 520.631 | Ultrasound and Photoacoustic Beamforming | 4.50 4.50 \pm 0.58 | 4.50 4.50 \pm 0.58 | 4 |
| Fall 2017 | 520.432/ 580.472/ 520.632 | Medical Imaging Systems | 4.00 3.88 \pm 1.01 | 4.00 3.44 \pm 1.26 | 26 |
| Fall 2016 | 520.631 | Ultrasound and Photoacoustic Beamforming | 5.00 4.71 \pm 0.49 | 5.00 4.86 \pm 0.38 | 8 |
| Intersession 2016 | 600.146 | Introduction to Medical Imaging | 4.00 4.35 \pm 0.79 | 4.00 4.12 \pm 0.86 | 22 |
| Spring 2014 | 580.684 | Ultrasound Imaging: Theory and Applications | 5.00 4.40 \pm 0.89 | 5.00 4.60 \pm 0.55 | 7 |
| Intersession 2013 | 600.146 | Introduction to Medical Imaging | 4.00 3.92 \pm 0.51 | 4.00 3.67 \pm 0.78 | 15 |

Course Instructor, Johns Hopkins University, Baltimore, MD

520.432/580.472/520.632, *Medical Imaging Systems*

Department of Electrical and Computer Engineering / Cross-listed in BME Department

- Annual course for upper-level undergraduate students and graduate students to learn about medical imaging from a signals and systems viewpoint
- Introduced new hands-on image formation modules
- *Taught 6 Semesters: Fall 2022, Fall 2021, Fall 2020, Fall 2019, Fall 2018, Fall 2017*

Course Instructor, Johns Hopkins University, Baltimore, MD

520.631, *Ultrasound and Photoacoustic Beamforming*

Department of Electrical and Computer Engineering

- Founded and developed new project-based, graduate-level course that provides extensive hands-on experience in ultrasound and photoacoustic imaging
- *Taught 6 Semesters: Spring 2022, Spring 2021, Spring 2020, Spring 2019, Spring 2018, Fall 2016*

Course Instructor, Johns Hopkins University, Baltimore, MD

600.146, *Introduction to Medical Imaging*

Department of Computer Science

- Designed the syllabus, prepared lecture material, and graded assignments and exams for

this accelerated course offered during the intersession period

- *Taught 2 Semesters: Intersession 2016, Intersession 2014*

Course Instructor, Udemy, Inc., San Francisco, CA

Introduction to Medical Imaging

Massive Open Online Course

- Developed videos, interactive lectures, and quizzes and published course materials online

Course Instructor, Johns Hopkins University, Baltimore, MD

580.684, Ultrasound Imaging: Theory and Applications

Department of Biomedical Engineering

- Co-founded and co-developed this elective course for the imaging core curriculum in the BME Department - Responsible for designing and delivering lecture materials, managing student projects, creating homework and test problems, and recruiting teaching assistants - Evaluation scores exceeded JHU BME department mean and median

2012

Guest Lecturer, Duke University, Durham, NC

Department of Biomedical Engineering

- Taught lecture entitled "Introduction to Short-lag Spatial Coherence (SLSC) Imaging: A Novel Ultrasound Beamforming Approach" to students enrolled in the Advanced Methods in Ultrasound Imaging graduate-level course

2010

Guest Lecturer, Institute of Cancer Research and Royal Marsden Hospital, Sutton, Surrey, UK

Joint Department of Physics

- Taught hands-on lecture and demonstration entitled "Elastography Basics" to students from King's College London enrolled in Physics of Medical Imaging course

2008-2009

Mentor and Science Coach, Duke University, Durham, NC

Building Opportunities and Overtures in Science and Technology (BOOST) Program

- Mentored two minority sixth-grade girls for 4-6 hours a week for one year to improve the scientific performance of these underrepresented, female, and economically disadvantaged students and increase their preparedness for science education - Designed stimulating hands-on activities, led scientific experiments, fed their intuition and curiosity, and guided and encouraged them as they explored self-selected topics of interest, culminating with a year-end science exposition to family and friends

2007-2008

Laboratory Instructor and Teaching Assistant, Duke University, Durham, NC

Department of Biomedical Engineering

- Led hands-on experiments for the laboratory component of the "Introduction to Biomechanics" undergraduate-level course for two semesters - Responsible for reviewing lecture material, introducing parallel laboratory assignments, holding regular office hours, and grading laboratory reports

2006

Resident Tutor, Massachusetts Institute of Technology, Cambridge, MA

Women's Technology Program (WTP) in Mechanical Engineering

- Founding member - Taught a lecture entitled "Introduction to Mechanical Design" to twenty talented rising high-school seniors in the inaugural mechanical engineering branch of WTP - Assisted with coursework development, class instruction, and nightly homework

Reading Tutor, Cambridge Community Center, Cambridge, MA
ReachOut Reading Program

- Tutored local third-grade student in reading, writing, and language arts once a week for 1 yr.

INDUSTRY & CONSULTING EXPERIENCE

Technical Consultant, Sonavex, Inc., Baltimore, MD 2019-2020

Intern, Medtronic, Inc., Minneapolis, MN Summer 2005
Neurological Division

Investigated the top manufacturing defect in neurological stimulation leads and presented possible solutions to the engineering design team, resulting in potential savings of approximately \$1M

Intern, Medtronic, Inc., Minneapolis, MN Summer 2004
Cardiac Rhythm Management Division

Assisted with four projects in the areas of concept product design and testing, finite element analyses of the stresses on cardiac leads inserted *in vivo*, and mechanical solutions to histological slicing

Intern, United Technologies, Pratt & Whitney, Hartford, CT Summer 2003
Mechanical Design Intern

Performed mechanical engineering design and drafting tasks to reduce the weight of the F135 engine on the F-35 joint strike fighter plane

UNIVERSITY SERVICE AND OUTREACH

1. Faculty, Johns Hopkins University

1.1 Service to ECE, BME, and CS Departments and Affiliated Centers

Faculty Advisor, Graduate Association of Women in Computer Science & Electrical and Computer Engineering (GRACE), 2016-present

Graduate Admissions Committee, Electrical and Computer Engineering, 2022-present

Director Search Committee, Malone Center for Engineering in Healthcare, 2020-2021

Faculty Search Committee, LCSR Faculty in Medical Robotics, 2018-2019

Faculty Search Committee, Department of Biomedical Engineering, 2017-2019

Faculty Search Committee, LCSR Lecturer, 2017-2018

Department Chair Election Committee, Electrical and Computer Engineering, 2020

Diversity Committee, Department of Electrical and Computer Engineering, 2018-2021

Distinguished Lecturer Committee, Electrical and Computer Engineering, 2017-2021

Joint Appointments Committee, Electrical and Computer Engineering, 2018-2021

Department Research Visioning Committee, Electrical and Computer Engineering, 2021

1.2 Service to Whiting School of Engineering & University-Wide Initiatives

Search Committee, Bloomberg Distinguished Professor, AI-X Initiative, 2022-present

Commencement Marshal, Johns Hopkins University-Wide Commencement, 2019

Award Reviewer, Catalyst Awards, 2019

Early career faculty award from Provost to support promising research and creative endeavors

Award Selection Committee, Vredenburg Travel Scholarship, 2018

Travel scholarship offered to engineering undergrads to support experiential summer abroad opportunities

Faculty Judge, HW-PDA Elevator Pitch Competition, 2017

Annual event during postdoc appreciation week (initiated during my tenure as HW-PDA president)

1.3 Seminars Hosted at Johns Hopkins University

ECE Distinguished Lecturer, Anita Mahadevan-Jansen, 2023

WSE Trailblazer Seminar, Charles Johnson-Bey, 2020

Kouwenhoven Memorial Lecturer, Lihong Wang, 2019

ECE Distinguished Lecturer, Yonina Eldar, 2018

LCSR Seminar Speaker, Michael Miga, 2018

BME Seminar Speaker, Christine Hendon, 2018

BME Seminar Speaker, Stacey Finley, 2017

ECE Distinguished Lecturer, Michael Insana, 2017

Joint ECE-BME Seminar Speaker, Mostafa Fatemi, 2017

ECE Distinguished Lecturer, Stanislav Emelianov, 2016

1.4 Outreach Activities to Women and Underrepresented Minorities

Invited Panelist, MIT Rising Stars in EECS, 2021

Annual workshop catered to the world's brightest researchers in electrical engineering, computer science, artificial intelligence, and decision-making for two days of scientific interactions and discussions about navigating the early stages of an academic career (October 15, 2021)

Co-Organizer, IEEE IUS Women in Engineering SheLeads@IUS Event, 2021

This event convened 60 women engineers, advocating that we are all leaders within our spheres of influence, and we must share, empower, and remain connected throughout turbulent times. Five women leaders from academia and industry shared their pandemic experience and lessons learned with breakout sessions for dedicated discussions. Awareness of shared challenges among participants rose from 30% to 96% as a result of this event. (September 13, 2021)

Invited Presenter, SPIE Women in Optics Spotlight Series, 2021

Monthly interview with women in optics to learn about their research and hear their advice. Hosted by 2020 Diversity Outreach Award recipient, Jess Wade, this series is part of efforts to encourage and inspire women to bring their ideas to light. Topics discussed: photoacoustic-guided surgery, representation matters, role models, allies (May 12, 2021)

Featured Guest, Fun with the Maryland STEM Festival, Podcast Series, 2021

Podcast series consisting of short interviews with people who contribute to success of the Maryland STEM Festival, organized to interest students in STEM (February 10-11, 2021)

Faculty Participant, Rising Stars in Biomedical at MIT, IMPACT Program, 2019

This career development workshop aims to bring together top female and under-represented minority postdocs and senior graduate students whose research focuses on biomedical applications. One goal is to provide mentoring and support for top junior researchers as they transition to the next phase of their career (September 11-12, 2019)

Featured Guest, Success Journey Show, Podcast Series, 2019

Podcast series designed to expose the general public to the lives of individuals on their road to success, showcasing how dreams, drive, discipline, and diligence work together to transform goals into reality (January 29, 2019)

Organizer, IEEE IUS Women in Engineering Elevator Pitch Event, 2018

This event was the first of its kind, designed to increase the networking skills, elevator pitches, and confidence of women at our annual IEEE International Ultrasonics Symposium. Over 80 women attended. On a scale of 1 to 5 (where 5 is "very confident"), the mean confidence level

rose from 2.6 before the event to 3.7 after the event. Feedback was extremely positive with one participant exclaiming, “Do this one again! It highlights the amazing women in this network at all levels.” (October 24, 2018)

Panel Member, Rising Stars in Biomedical at JHU, Junior Career Panel, 2018

This career development workshop aims to bring together top female and under-represented minority postdocs and senior graduate students whose research focuses on biomedical applications. One goal is to provide mentoring and support for top junior researchers as they transition to the next phase of their career (November 15, 2018)

Presenter, Penn State Millennium / UMBC Meyerhoff Summer Program, 2018, 2020

Recruitment event designed to help the brightest minority undergraduates in the sciences at Penn State and UMBC to learn about the opportunities available in graduate study at Johns Hopkins University (July 17, 2018, July 7, 2020)

Featured in SPIE Women in Optics Planner, 2018

Approximately 5,000 copies printed and distributed in over 25 countries worldwide. This planner includes photos and interesting facts about women who are making a difference through their work and other contributions to the fields of science, optics, and engineering.

Panel Member, BME Women Engineers, 2017

This panel took place at the annual BME retreat to provide our students with some insights into life as a female faculty member (September 30, 2017)

Presenter, UMBC Meyerhoff Summer Program, 2017

Recruitment event designed to help the brightest minority undergraduates in the sciences at UMBC to learn about the opportunities available in graduate study at Johns Hopkins University (July 13, 2017)

Panel Member, Explore Hopkins (EHOP), Pathways to the Professoriate, 2016-2021

Recruitment event to provide prospective underrepresented minority graduate students with a customized opportunity to learn more about our doctoral programs and network with our faculty. The purpose of this panel was to provide students with a better understanding of why obtaining a PhD is worthwhile and share insights on career trajectories and opportunities for STEM PhDs in academia (November 4, 2016; October 13, 2017; October 5, 2018; Oct 4, 2019, Nov 5, 2021)

Panel Member, GRACE Mentoring Dinner, 2016

Featured Guest, STEM Dialogue Podcast Series, 2016

Podcast series designed to expose high school students to the world of science, technology, engineering, and math

PULSE Lab Tours, 2017-present

LCSR Industry Day, Miracle City Summer Enrichment Camp, Royal Robotics Club, etc.

2. Postdoctoral Fellow, Johns Hopkins University

President, Homewood Postdoc Association (HW-PDA), 2015-2016

Mentor, NSF Computational Sensing and Medical Robotics (CSMR) Summer Research Experience for Undergraduates (REU) Program (mentored Alicia B. Dagle), 2015

Social Co-Chair, HW-PDA Executive Board, 2014-2015

Mentor, NSF CSMR REU program (mentored Anastasia K Ostrowski), 2013, 2014

Invited Speaker, Project Scientist Academy, Charlotte, NC, USA, 2014

Delivered a research and motivational talk, entitled “*Engineering and Innovation in Medicine with Ultrasound and Photoacoustic Technology*” to empower girls ages 4-12 who possess aptitude, talent and passion for STEM (August 1, 2014 & August 8, 2014)

3. Graduate Student, Duke University

Recruiter, National Society of Black Engineers (NSBE) National Convention, 2012

Selected to recruit graduate students to Duke University at the 38th NSBE National Convention,

Pittsburgh, PA, which attracted a total of 53 underrepresented students who signed up to be contacted by the Duke graduate admissions office

Member, Duke University Bouchet Society, 2006-2012

The Bouchet Society is an organization that supports the academic, professional, and social development of underrepresented minority graduate students in the STEM fields

Invited Speaker, Wallington SDA Group, Wallington, Surrey, UK, 2010

Delivered an invited research and motivational talk to church group entitled, *"The Story of One Biomedical Engineer"* (May 22, 2010)

Mentor and Science Coach, Building Opportunities and Overtures in Science and Technology (BOOST) Program, 2007-2008

Mentored two minority sixth-grade girls for 4-6 hours a week for one year

Public Relations Chairperson, Duke University Bouchet Society, 2007-2008

Organized and promoted events such as the Celebration of Black History Month Poster Session and Seminar Series

Invited Speaker, Lee High School, Raleigh, NC, USA, 2008

Delivered an invited research and motivational talk to high school students entitled, *"On the Road to Success"* (March 8, 2008)

4. Undergraduate Student, Massachusetts Institute of Technology

Founding Member & Resident Tutor, Women's Technology Program in Mechanical Engineering (WTP-ME), 2006

Mentored and delivered the lecture "Introduction to Mechanical Design" to 20 talented rising high-school seniors in the inaugural mechanical engineering branch of WTP

Member, Biomedical Engineering Society (BMES), MIT Student Chapter, 2002-2006

Vice President of Publicity, BMES MIT Student Chapter, 2003-2004

Editor, The BioTECH, Newsletter of BMES MIT Student Chapter, 2004-2006

Member, MIT Black Students' Union (BSU), 2002-2006

Treasurer, MIT BSU, 2004-2005

Member, National Society of Black Engineers, MIT Student Chapter, 2002-2006

SELECTED MEDIA HIGHLIGHTS

Johns Hopkins University & Medicine (12/3/21): Emerging Devices Enhance Imaging, Dexterity, in Surgeries -- <https://giving.jhu.edu/story/story-human-machine-partnership/>

Optics.org (4/22/2020): Photoacoustic imaging guides cardiac interventions -- <https://optics.org/news/11/4/32>

LaserFocus World (4/17/2020): Photoacoustic imaging could make catheter-based heart procedures safer -- <https://www.laserfocusworld.com/fiber-optics/article/14174351/photoacoustic-imaging-could-make-catheterbased-heart-procedures-safer>

Maryland Science Center (6/12/2019): 2019 Outstanding Young Engineer Recipient: Muyinatu Bell -- <https://www.youtube.com/watch?v=tYIZ4yhUtGo&t=4s>

Duke Biomedical Engineering (BME) Magazine (Spring 2019): Making the Next Wave of Imaging Tools for Cancer Diagnosis -- <https://pratt.duke.edu/about/news/making-next-wave-imaging-tools-cancer-diagnosis>

JHU Engineering Magazine (Winter 2019): Upstarts: Removing the 'Noise' in Ultrasound -- <https://engineering.jhu.edu/magazine/2018/11/removing-the-noise-in-ultrasound/#.XFQkY89Kgyn>

Health Data Management News (5/9/18): Enhanced imaging could cut errors in robot-aided surgeries -- <https://www.healthdatamanagement.com/news/enhanced-imaging-could-cut-errors-in-robot-aided-surgeries>

BioOptics World (1/18/18): Image-guided surgery: Photoacoustics provides critical tissue differentiation at depth -- <https://www.bioopticsworld.com/articles/print/volume-11/issue-1/image-guided-surgery-photoacoustics-provides-critical-tissue-differentiation-at-depth.html>

Robohub (10/10/17): 25 Women in Robotics You Need to Know About -- <https://robohub.org/25-women-in-robotics-you-need-to-know-about-2017/>

SPIE Newsroom (1/16/17): Photoacoustic Imaging for Improved Surgical Tools -- <http://spie.org/newsroom/bell-video>

Society of Women Engineers (SWE) Magazine (Winter 2017): AI's Forthcoming Transformation of Medicine -- https://viewer.aemmobile.adobe.com/index.html#project/630f08d4-cacf-4cf0-bfb7-c77938722044/view/swe-winter_2017/article/swe_2017.1_ft_ai

JHU Engineering Magazine (Winter 2017): Clearer Vision for Surgeons -- <https://engineering.jhu.edu/magazine/2017/01/clearer-vision-surgeons/#.XFQnKc9Kgym>

MIT Technology Review (8/23/16): Creating clearer imaging to spot cancer earlier and more accurately -- <https://www.technologyreview.com/lists/innovators-under-35/2016/inventor/muyinatu-bell>