James Long, Ph.D.

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Assistant Teaching Professor in Biomedical Engineering at University of Colorado Boulder

Education

2017–2022 **Duke University, Durham, NC**
Ph.D., Biomedical Engineering (2017–2022)
M.S., Biomedical Engineering (2017–2021)
Certificate in College Teaching (2020–2022)

2013–2017 **Rice University, Houston, TX**
B.S., Bioengineering

Teaching Experience

2025–present **University of Colorado Boulder, Biomedical Engineering**
BMEN 4010: Biomedical Engineering Capstone Design I (2025–present)
BMEN 4020: Biomedical Engineering Capstone Design II (2026–present)
BMEN 2000: Introduction to Biomedical Engineering (2026–present)

2022–2025 **Rice University, Bioengineering**
BIOE 448: Microcontrollers for Medical Device Design* (2024–2025)
BIOE 385: Bioinstrumentation laboratory (2022–2024)
BIOE 420: Transport phenomena in bioengineering (2023–2024)
BIOE 320: Systems physiology laboratory (2023–2025)

2019–2022 **Duke University, Department of Biomedical Engineering**
BME 244L: Quantitative physiology with biostatistical applications (2021–2022)
BME 260L: Modeling cellular and molecular systems† (2019–2021)

* Course creator
† Teaching assistant

Research Experience

2017–2022 **Graduate research assistant**
Duke University, Biomedical Engineering,
Advisor: Gregg Trahey, Ph.D.

2016–2017 **Undergraduate research assistant**
M.D. Anderson Cancer Center, Imaging Physics
Supervisor: Richard Bouchard, Ph.D.

2014–2016 **Undergraduate research assistant**
Rice University, Biosciences
Supervisor: Daniel Wagner, Ph.D.

2012 **Research volunteer**
Johns Hopkins University, Biomedical Engineering
Supervisor: David Yue, Ph.D.

Awards & Honors

2024 Excellence in Teaching in Bioengineering
Rice University

2020 Teaching Assistant of the Year in Biomedical Engineering
Duke University

2019 NSF Graduate Research Fellowship

2018 Stephen Smith Fellowship in Biomedical Engineering
Duke University

2018 IEEE Student Travel Award
IEEE International Ultrasonics Symposium

Funding

2025 Critical Cell/Tissue Culture Equipment in Biomedical Engineering (Co-PI)
University of Colorado Boulder Engineering Excellence Fund

Professional Societies

2023–present American Society of Engineering Education, Biomedical Engineering Division

2016–present Biomedical Engineering Society

2018–2024 IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society

2018–2022 American Institute of Ultrasound in Medicine

Service

2025–present **University of Colorado Boulder, Biomedical Engineering**
Task force on BME minor, lead
Undergraduate curriculum committee, member

2025–present **Journal of Ultrasonic Imaging**

Reviewer

2025–present **Biomedical Engineering Education Community**
Faculty development lead

2024–present **Journal of Biomedical Engineering Education**
Guest editor, Special Issue on Computing (2024–2025)
Reviewer (2024–present)

2023–present **ASEE, Biomedical Engineering Division**
Co-lead for special session on *Working Through Education Challenges* (2025)
Mentorship program co-lead (2023–2025)
Reviewer (2024–present)

2023–2025 **Camp Kesem Rice**
Faculty advisor to Rice University's student chapter

2022–2025 **Rice University, Bioengineering**
Faculty advisor to undergraduate student chapter of BMES (2024–2025)
Dept. representative to the School Course Review Committee (2024–2025)
Undergraduate awards committee, co-chair (2022–2025)
Undergraduate affairs committee, member (2022–2025)
Undergraduate advising committee, member (2022–2025)
Major advisor (2022–2025)

2022, 2024–2025 **Rice University, Academic Advising**
Engineering divisional advisor to Baker residential college (2024–2025)
Interim engineering divisional advisor to Brown residential college (2022)

Patents

1. **James Long**, Nick Bottenus, Will Long, Gregg Trahey (2024). *Adaptive selection of ultrasound frequency* (U.S. Patent No. 11,896,428). U.S. Patent and Trademark Office.

Peer-reviewed Publications

1. Sabia Abidi, Katie Reuther, **James Long** (2026, *prospective*). *Educational challenges in biomedical engineering classrooms, curricula and research: Insights from the American Society for Engineering Education 2025 Annual Conference.* Manuscript accepted at the Journal of Biomedical Engineering Education.

2. Katelyn Flint, Matthew Huber, **James Long**, Gregg Trahey, Timothy Hall (2025). *Clutter-generating phantom material, part I: development of a tunable, acoustic clutter-generating layer for use with ultrasound tissue-mimicking phantoms.* Ultrasound in Medicine & Biology, 51(5), 768-776.

3. **James Long**, Evan Dragich, Ann Saterbak (2022). *Problem-based learning impacts students reported learning and confidence in an undergraduate biomedical engineering course.* Biomedical Engineering Education, 2, 209-232.

4. **James Long**, Gregg Trahey, Nick Bottenus (2022). *Spatial coherence in medical ultrasound - a review.* Ultrasound in Medicine & Biology, 48(6), 975-996.

5. Will Long, David Bradway, Rifat Ahmed, **James Long**, Gregg Trahey (2022). *Spatial coherence adaptive clutter filtering in color flow imaging, part I: simulation studies.* IEEE Open Journal of Ultrasonics, Ferroelectrics, and Frequency Control, 1(2), 106-118.

6. Will Long, David Bradway, Rifat Ahmed, **James Long**, Gregg Trahey (2022). *Spatial coherence adaptive clutter filtering in color flow imaging, part II: phantom and in vivo experiments.* IEEE Open Journal of Ultrasonics, Ferroelectrics, and Frequency Control, 1(2), 119-130.

7. Rifat Ahmed, Nick Bottenus, **James Long**, Gregg Trahey (2021). *Reverberation clutter suppression using 2D spatial coherence analysis.* IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, 69(1), 84-97.

8. **James Long**, Nick Bottenus, Gregg Trahey (2021). *Frequency-dependent spatial coherence in conventional and chirp transmissions.* IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, 68(5), 1707-1720.

9. Samantha Paulsen, Trevor Mitcham, Charlene Pan, **James Long**, Bagrat Grigoryan, Daniel Sazer, Collin Harlan, Kevin Janson, Mark Pagel, Jordan Miller, Richard Bouchard (2021). *Projection-based stereolithography for direct 3D printing of heterogeneous ultrasound phantoms.* PloS one, 16(12), e0260737.

10. **James Long**, Will Long, Nick Bottenus, Gregg Trahey (2020). *Coherence-based quantification of acoustic clutter sources in medical ultrasound.* Journal of the Acoustical Society of America, 148(2), 1051-1062.

11. Ye Chen, Joanne Ho, David Shis, Chinmaya Gupta, **James Long**, Daniel Wagner, William Ott, Kreimir Josi, Matthew Bennett (2018). *Tuning the dynamic range of bacterial promoters regulated by ligand-inducible transcription factors.* Nature Communications, 9(1), 64.

12. Trevor Mitcham, Houra Taghavi, **James Long**, Cayla Wood, David Fuentes, Wolfgang Stefan, John Ward, Richard Bouchard (2017). *Photoacoustic-based SO_2 estimation through excised bovine prostate tissue with interstitial light delivery.* Photoacoustics, 7, 47-56.

Presentations

1. **James Long** (2026, *prospective*). *SHARE: Fermi problems to improve early-project teaming.* Abstract accepted to the ASEE Annual Conference & Exposition.

2. Sabia Abidi, Katie Reuther, **James Long** (2025). *Working through education challenges: Navigating strategies for the classroom, curriculum, and research.* Share and Learn presentation through the Biomedical Engineering Education Community.

3. **James Long** (2025). *Work in progress: Multiple submissions for technical writing assignments improve students self-efficacy and reduce anxiety.* Poster presentation at the ASEE Annual Conference & Exposition.

4. **James Long**, Sarah Ellestad, Patrica McNally, Melissa Lefevre, Eduardo Sandoval Murillo, Gregg Trahey (2022). *Clinical utility of adaptive frequency selection for optimizing target detectability.* Podium presentation at the IEEE International Ultrasonics Symposium.

5. **James Long**, Sarah Ellestad, Patrica McNally, Melissa Lefevre, Eduardo Sandoval Murillo, Gregg Trahey (2022). *Clinical utility of adaptive frequency selection for optimizing target detectability.* Podium presentation at the International Symposium on Ultrasonic Imaging and Tissue Characterization.

6. **James Long**, Rifat Ahmed, Gregg Trahey (2021). *Frequency-selective coherent compounding in spatial coherence-based beamforming.* Podium presentation at the IEEE International Ultrasonics Symposium.

7. Rifat Ahmed, Nick Bottenus, **James Long**, Gregg Trahey (2021). *Detection and suppression of partially correlated reverberation clutter using matrix arrays.* Poster presentation at the IEEE International Ultrasonics Symposium.

8. **James Long**, Rifat Ahmed, Katelyn Flint, Sarah Ellestad, Gregg Trahey (2021). *Frequency compounding in spatial coherence-based beamforming.* Podium presentation at the International Symposium on Ultrasonic Imaging and Tissue Characterization.

9. Rifat Ahmed, Nick Bottenus, **James Long**, David Bradway, Gregg Trahey (2021). *In vivo lag-one coherence measurements using matrix arrays.* Podium presentation at the International Symposium on Ultrasonic Imaging and Tissue Characterization.

10. **James Long**, Will Long, Nick Bottenus, Gregg Trahey (2020). *Coherence-based quantification of acoustic clutter sources in medical ultrasound.* Podium presentation at the Acoustical Society of America Biannual Meeting.

11. Katelyn Offerdahl, Matthew Huber, **James Long**, Nick Bottenus, Gregg Trahey (2020). *Occult regions of suppressed coherence in ultrasonic liver images.* Podium presentation at the Acoustical Society of America Biannual Meeting.

12. Matthew Huber, Katelyn Flint, **James Long**, Will Long, Nick Bottenus, Gregg Trahey (2020). *Real-time, patient-adaptive ultrasonic intensity adjustment: hepatic imaging observations.* Podium presentation at the Acoustical Society of America Biannual Meeting.

13. **James Long**, Nick Bottenus, Gregg Trahey (2020). *Congruence of frequency-dependent spatial coherence between linear frequency-modulated pulses and conventional pulses.* Poster presentation at the IEEE International Ultrasonics Symposium.

14. Ouwen Huang, **James Long**, Will Long, Gianmarco Pinton, Gregg Trahey, Mark Palmeri (2020). *UltraNet: deep learning dataset for modeling acoustic wall clutter.* Poster presentation at the IEEE International Ultrasonics Symposium.

15. Matthew Huber, **James Long**, Katelyn Flint, Will Long, Nick Bottenus, Gregg Trahey (2020). *Implementation of adaptive transmit parameter adjustment in ultrasound imaging.* Poster presentation at the IEEE International Ultrasonics Symposium.

16. **James Long**, Will Long, Gregg Trahey (2019). *Quantification of reverberation and aberration using lag-one coherence.* Podium presentation at the IEEE International Ultrasonics Symposium.

17. Katelyn Flint, **James Long**, Matthew Huber, Gregg Trahey, Timothy Hall (2019). *Development of an acoustic clutter generating phantom.* Podium presentation at the IEEE International Ultrasonics Symposium.

18. **James Long**, Veronica Gough, Madeleine Sitton, Ann Saterbak (2019). *Realization of higher levels of Blooms Taxonomy through problem-based learning modules.* Podium presentation at the Biomedical Engineering Society Annual Meeting.

19. **James Long**, Anna Knight, Kathryn Nightingale, Gregg Trahey (2019). *Assessing lag-one coherence as a tool for ARFI bias estimation.* Podium presentation at the International Symposium on Ultrasonic Imaging and Tissue Characterization.

20. **James Long**, Will Long, Nick Bottenus, Gregg Trahey (2019). *Applications of lag one coherence to real-time adaptive frequency selection.* Podium presentation at the AIUM Convention.

21. **James Long**, Will Long, Nick Bottenus, Gianmarco Pinton, Gregg Trahey (2018). *Implications of lag one coherence on real-time adaptive frequency selection.* Podium presentation at the IEEE International Ultrasonics Symposium.

22. Nick Bottenus, Will Long, **James Long**, Gregg Trahey (2018). *A real-time lag one coherence tool for adaptive imaging.* Poster presentation at the IEEE International Ultrasonics Symposium.

23. Katelyn Flint, Will Long, **James Long**, David Bradway, Sarah Ellestad, Patricia McNally, Gregg Trahey (2018). *Pilot study of adaptive fetal imaging based on lag-one coherence.* Podium presentation at the International Symposium on Ultrasonic Imaging and Tissue Characterization.

24. Samantha Paulsen, **James Long**, Bagrat Grigoryan, Wolfgang Stefan, Jordan Miller, Richard Bouchard (2017). *Quantitative 3D assessment of flow in printed hydrogel vascular phantom.* Poster presentation at the IEEE International Ultrasonics Symposium.

25. Samantha Paulsen, **James Long**, Bagrat Grigoryan, Wolfgang Stefan, Jordan Miller, Richard Bouchard (2017). *Quantitative 3D assessment of flow in printed hydrogel vascular phantom.* Podium presentation at the International Symposium on Ultrasonic Imaging and Tissue Characterization.

26. Trevor Mitcham, Houra Taghavi, **James Long**, David Fuentes, Wolfgang Stefan, John Ward, Brian Hobbs, Richard Bouchard (2016). *Photoacoustic SO_2 estimation with fluence correction in an interstitially irradiated excised prostate.* Podium presentation at the IEEE International Ultrasonics Symposium.