

Dr. Yu Weng

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EXPERTISE

Ultrasonics

- Over 10 years of combined research and applied experience in ultrasonics.
- Quantification of ultrasonic shear wave scattering for nondestructive evaluation (NDE) applications.
- Ultrasonic Borehole imaging for radius and impedance characterization in the oilfield applications.
- Ultrasound B-mode imaging with advanced beamforming and apodization in biomedical applications.
- Contrast-enhanced ultrasound (CEUS) with nanobubbles for in vivo vascular imaging.

EDUCATION

Georgia Institute of Technology

Ph.D. & M.S. in Electrical and Computer Engineering
Ph.D. Advisor: Jennifer E. Michaels

Atlanta, Georgia, United States

Aug. 2014 – May 2018

Beijing University of Technology

M.S in Control Science and Engineering (Withdrawn)
B.E. in Automation (Highest Honor)

Beijing, China

Sep. 2012 – Jul. 2014

Sep. 2008 – Jul. 2012

WORK EXPERIENCE

The Kolios Lab, Toronto Metropolitan University

Postdoctoral Research Fellow

Advisor: Michael Kolios / Co-Advisor: Eno Hysi

Toronto, Ontario, Canada

Feb. 2024 – Present

- Lead research on contrast-enhanced ultrasound (CEUS) with nanobubbles using ultrafast ultrasound techniques, focusing on in vivo vascular imaging in mouse and rat models (kidney, liver, and brain).
- Publish research outcomes through peer-reviewed journal articles, patents, and conference presentations.
- Contribute to grant proposals and secure funding for ongoing projects.

R&D, eSonic Image

Senior Ultrasound System Engineer

- Developed and validated beamforming algorithms using experimental phantom data to improve B-mode image quality.
- Implemented key signal processing steps including TX/RX path calculation, apodization, phase rotation, and delay-and-sum beamforming.
- Designed and optimized beamforming for multiple probe types and imaging modes: linear/curved/phased arrays with focused beams, linear arrays with trapezoid expansion, compound imaging with steering angles, and ultrafast imaging using plane waves.

Beijing, China

Oct. 2022 – Feb. 2023

Sperry Drilling Services, Halliburton

Senior Acoustic Research Scientist

- Developed algorithms for borehole imaging in Logging While Drilling (LWD) applications.
- Contributed to the commercialization and worldwide deployment of ultrasonic imaging products.
- Published four patents related to downhole ultrasound imaging and measurement technologies.

Houston, Texas, United States

Jan. 2018 – Oct. 2021

QUEST Laboratory, Georgia Institute of Technology

Graduate Research Assistant

Advisor: Jennifer E. Michaels

Atlanta, Georgia, United States

Jan. 2015 – May 2018

- Developed algorithms for wavefield-based characterization of ultrasonic shear wave scattering from defects in aluminum plates.
- Contributed to two research projects sponsored by the Air Force Research Laboratory.
- Authored project reports, dissertation, and academic articles.

Introduction to Probability and Statistics for ECEs

- Assisted in teaching Introduction to Probability and Statistics for ECEs.
- Graded assignments and exams, held office hours, and delivered lectures in the absence of the professor.

PROGRAMMING LANGUAGE

MATLAB, C/C++.

PUBLICATIONS

1. **Y. Weng**, L. Coulter, M. S. Khan, E. Hysi, A. A. Exner and M. C. Kolios, "Cross Amplitude Modulation and Compound Amplitude Modulation for Nonlinear Contrast-Enhanced Ultrasound Imaging of Nanobubbles," in *IEEE Open Journal of Ultrasonics, Ferroelectrics, and Frequency Control*, vol. 5, pp. 146-160, 2025, doi: 10.1109/OJUFFC.2025.3603792.
2. **Y. Weng et al.**, "Improved Photoacoustic Beamforming Utilizing Apodization Windows," *2024 IEEE Ultrasonics, Ferroelectrics, and Frequency Control Joint Symposium (UFFC-JS)*, Taipei, Taiwan, 2024, pp. 1-5, doi: 10.1109/UFFC-JS60046.2024.10793943.
3. **Y. Weng**, *A Comprehensive Approach for Wavefield-Based Characterization of Ultrasonic Shear Wave Scattering in Plates*, Ph.D. Dissertation, Georgia Institute of Technology, 2018.
4. **Y. Weng** and J. E. Michaels, "Space-time windowing of angle-beam wavefield data to characterize scattering from defects," *AIP Conf. Proc.*, vol. 1949, p. 150001, 2018, doi: 10.1063/1.5031616.
5. C. T. Maki, **Y. Weng**, and J. E. Michaels, "A comparison of angle-beam shear wave scattering from hidden defects in single- and double-layer plates," *AIP Conf. Proc.*, vol. 1949, p. 200004, 2018, doi: 10.1063/1.5031640.
6. **Y. Weng** and J. E. Michaels, "Windowing of full wavefield data in multiple domains to characterize angle-beam shear wave scattering," *AIP Conf. Proc.*, vol. 1806, p. 140007, 2017, doi: 10.1063/1.4974722.
7. C. T. Maki, J. E. Michaels, **Y. Weng**, and T. E. Michaels, "Angle-beam shear wave scattering from buried crack-like defects in bonded specimens," *AIP Conf. Proc.*, vol. 1806, p. 020003, 2017, doi: 10.1063/1.4974544.

PATENTS

1. **Y. Weng**, P. Li, C. Chang, R. Coates, R. A. Marlow, X. Wu, Y. Ge, and J. Jin, "Downhole Ultrasound Image Correction in Oil Based Mud," Patent. No. US11,927,712 B2, Granted March 12, 2024.
2. P. Li, **Y. Weng**, C. Chang, R. Marlow, and B. Wiecek, "Downhole tool dynamic and motion measurement with multiple ultrasound transducer," Patent. No. US11,519,255 B2, Granted December 6, 2022.
3. **Y. Weng**, P. Li, C. Chang, R. Coates, R. A. Marlow, X. Wu, Y. Ge, and J. Jin, "Downhole Ultrasound Image Correction in Oil Based Mud," Patent. No. US11,415,720 B2, Granted August 16, 2022.
4. C. Chang, **Y. Weng**, P. Li, Z. Li, and R. Marlow, "Echo velocity measurements without using recessed ultrasonic transceiver," Patent. No. US 10,947,838 B2, Granted March 16, 2021.

RESEARCH PROJECTS

1. M. Kolios, E. Hysi, A. Needles, **Y. Weng**, and N. R. Shirazi, "Development of Multi-Frequency Ultrasound Localization Microscopy (ULM) Techniques on the Vevo F2 System and VADA Platform", NSERC Alliance-Mitacs Accelerate grants, Canada, 2025.
2. M. Kolios, E. Hysi, and **Y. Weng**, "Photoacoustics as a Novel Kidney Fibrosis Imaging Tool", CIHR grant, Canada, 2024.
3. J. E. Michaels, T. E. Michaels, A. J. Dawson, J. W. Kummer, **Y. Weng**, and C. T. Maki, "Wavefield Imaging for Far Surface Defect Characterization", Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio, US, 2017.

4. J. E. Michaels, T. E. Michaels, **Y. Weng**, and C. T. Maki, “Sensitivity Study for Wavefield Imaging of Far Surface Defects”, Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio, US, 2017.

CONFERENCE PRESENTATIONS

1. **Y. Weng**, N. R. Shirazi, S. Tran, L. Coulter, E. Hysi, A. A. Exner, and M. C. Kolios. “Advancing Nanobubble-Enhanced Ultrasound Imaging: From Phantoms to In Vivo Studies.” *Poster Presentation*, International Symposium on Biomolecular Ultrasound & Sonogenetics (ISBUS), 2025.
2. **Y. Weng**. “Nanobubbles: Tiny Agents Driving Huge Impacts in Contrast-Enhanced Vascular Ultrasound Imaging.” *Invited Presentation*, IEEE, 2025.
3. **Y. Weng**, L. Coulter, M. S. Khan, E. Hysi, A. A. Exner, and M. C. Kolios. “Nanobubble Flow Characterization in Nonlinear Contrast Imaging.” *Poster Presentation*, IEEE International Ultrasonics Symposium (IUS), 2025.
4. **Y. Weng**, L. Coulter, M. S. Khan, E. Hysi, A. A. Exner, and M. C. Kolios. “Cross Amplitude Modulation vs. Compound Amplitude Modulation: A Phantom-Flow Study for Nanobubble-Enhanced Nonlinear Ultrasound Imaging.” *Lecture Presentation*, IEEE International Ultrasonics Symposium (IUS), 2025.
5. **Y. Weng**, N. R. Shirazi, S. Tran, E. Hysi, A. A. Exner, and M. C. Kolios. “Ultrafast Nonlinear Contrast Imaging in Mouse Kidneys Using Nanobubble-Mediated Dual-Amplitude Pulse Subtraction.” *Lecture Presentation*, IEEE International Ultrasonics Symposium (IUS), 2025.
6. **Y. Weng**, F. Boderia, E. Berndt, E. Hysi, S. Singh, R. Veneziano, P. V. Chitnis, M. McVey, and M. C. Kolios. “Improved Photoacoustic Beamforming Utilizing Apodization Windows.” *Poster Presentation*, IEEE Ultrasonics, Ferroelectrics, and Frequency Control Joint Symposium (UFFC-JS), 2024.
7. **Y. Weng** and J. E. Michaels. “Space-time windowing of angle-beam wavefield data to characterize scattering from defects.” *Lecture Presentation*, AIP Conference, 44th Annual Review of Progress in Quantitative Nondestructive Evaluation, 2017.
8. **Y. Weng** and J. E. Michaels. “On the generation and interpretation of scattering patterns from angle-beam wavefield data.” *Lecture Presentation*, AIP Conference, 43rd Annual Review of Progress in Quantitative Nondestructive Evaluation, 2016.
9. **Y. Weng** and J. E. Michaels. “Windowing of full wavefield data in multiple domains to characterize angle-beam shear wave scattering.” *Poster Presentation*, AIP Conference, 43rd Annual Review of Progress in Quantitative Nondestructive Evaluation, 2016.

SELECTED AWARDS AND HONORS

1. FOS Dean’s Research Fund, Travel Award for Postdoctoral Fellows, Toronto Metropolitan University, 2025.
2. People’s Choice Award, *BioHubNet 2025 Annual Symposium*, Toronto, Canada, 2025.
3. The Otto & Jenny Krauss Fellowship, ECE, Georgia Tech, 2014-2015.
4. Outstanding Master Student, BJUT, 2013 (Top 5% department-wide).
5. Outstanding Graduate, Beijing Municipal Commission of Education, 2012 (Top 5% school-wide).