

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M.S in Control Science and Engineering (Withdrawn)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

- 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.

Atlanta, Georgia, United States

Jan. 2015 – May 2018

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**, L. Coulter, M. S. Khan, E. Hysi, A. A. Exner, and M. Kolios. “Nanobubble Flow Characterization in Nonlinear Contrast Imaging.” *Poster Presentation*, IEEE International Ultrasonics Symposium (IUS), 2025.
2. **Y. Weng**, L. Coulter, M. S. Khan, E. Hysi, A. A. Exner, and M. 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.
3. **Y. Weng**, N. R. Shirazi, S. Tran, E. Hysi, A. A. Exner, and M. Kolios. “Ultrafast Nonlinear Contrast Imaging in Mouse Kidneys Using Nanobubble-Mediated Dual-Amplitude Pulse Subtraction.” *Lecture Presentation*, IEEE International Ultrasonics Symposium (IUS), 2025.
4. **Y. Weng**, F. Boder, E. Berndt, E. Hysi, S. Singh, R. Veneziano, P. V. Chitnis, M. McVey, and M. Kolios. “Improved Photoacoustic Beamforming Utilizing Apodization Windows.” *Poster Presentation*, IEEE Ultrasonics, Ferroelectrics, and Frequency Control Joint Symposium (UFFC-JS), 2024.
5. **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.
6. **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.
7. **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. The Otto & Jenny Krauss Fellowship, ECE, Georgia Tech, 2014-2015
2. Outstanding Master Student, BJUT, 2013 (Top 5% department-wide).
3. Outstanding Graduate, Beijing Municipal Commission of Education, 2012 (Top 5% school-wide)