



IEEE INTERNATIONAL ULTRASONICS SYMPOSIUM
October 4 – October 8, 2026
Raleigh, North Carolina, USA



IUS LAB TOURS

INFORMATION PACKET

SUNDAY, OCTOBER 4, 2026



Sponsored by

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BIOMEDICAL
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LAMPE JOINT DEPARTMENT
OF BIOMEDICAL ENGINEERING

NC STATE UNIVERSITY

College of Engineering

Electrical and Computer Engineering
Mechanical and Aerospace Engineering

ABOUT THE LAB TOURS

Join us for an exclusive behind-the-scenes look at ultrasound research across the Triangle. Visit multiple laboratories at Duke University, the University of North Carolina at Chapel Hill, and NC State University to learn about cutting-edge research, meet faculty and students, and explore ultrasound technologies and applications.

WHAT'S INSIDE

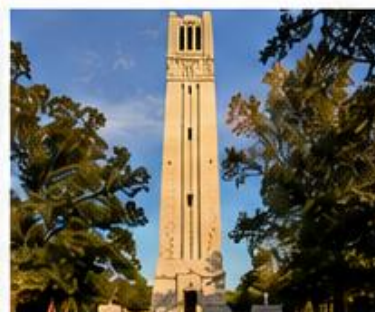
- Campus itineraries and schedules
- Laboratory descriptions
- Research highlights and focus areas
- Contact information



DUKE UNIVERSITY



UNC-CHAPEL HILL



NC STATE UNIVERSITY

Welcome to North Carolina's Research Triangle

The Research Triangle is home to one of the world's most active concentrations of ultrasound research and development. Within a remarkably compact region, investigators across leading universities, medical centers, and research laboratories are advancing ultrasound from fundamental acoustics and device development through computational imaging, diagnostics, therapeutics, and clinical translation. The 2026 IEEE International Ultrasonics Symposium brings the international ultrasound community to Raleigh. We invite you to use these tours not only to see our facilities and research, but also to discover the broader community that makes the Triangle an exceptional place to study, collaborate, and build a career in ultrasound.

ULTRASONC: a connected ultrasound community

Over 17 research groups represented | 6 universities | One regional community

ULTRASONC connects medical ultrasound investigators across UNC-Chapel Hill, Duke University, NC State University, North Carolina A&T State University, UNC Charlotte and High Point University. Together, these laboratories span diagnostic and therapeutic ultrasound, transducer and system design, contrast-enhanced and super-resolution imaging, elasticity imaging, quantitative tissue characterization, signal and image processing, computational modeling, photoacoustics, and AI-enabled methods. Graduate students can access specialized courses through an established inter-institutional course exchange, and graduate committees can draw on faculty expertise across the consortium. Trainees benefit from interdisciplinary mentorship, advanced ultrasound facilities, clinical collaborators, and pathways toward clinical and commercial translation.

Three major research campuses within an hour

UNC-Chapel Hill ↔ Duke University ~25 min;

Duke University ↔ NC State University ~35 min

UNC-Chapel Hill ↔ NC State University ~45 min

UNC and NC State are connected even more directly through the Lampe Joint Department of Biomedical Engineering, which spans both universities and their complementary engineering, medical, and research environments. Students can also take advantage of interinstitutional registration across UNC-Chapel Hill, NC State, and Duke, allowing approved courses taken on any of the three campuses to contribute to their degree programs.

An exceptional place to train in ultrasound

Ultrasound innovation has deep roots in the Triangle. Duke researchers contributed to the development of phased-array cardiac imaging in the 1970s and subsequently pioneered real-time three-dimensional ultrasound imaging. Today, researchers across the region continue that trajectory in ultrafast and super-resolution imaging, quantitative ultrasound, elasticity imaging, ultrasound tomography, AI and computational imaging, photoacoustics, therapeutic ultrasound, neuromodulation, microbubbles and drug delivery, and advanced transducers. The NIH-funded Unified Medical Ultrasound Technology Development (UNMUTED) Predoctoral Training Program, led by Caterina Gallippi, Ph.D., builds on the region's concentration of ultrasound expertise to train the next generation of medical ultrasound technology developers across ultrasound physics and engineering, clinical collaboration, and commercial translation.

Fundamental science → technology development → preclinical investigation → clinical translation → commercialization & real-world impact

Research Triangle Park: built for research and translation

Located between Raleigh, Durham, and Chapel Hill, Research Triangle Park (RTP) spans 7,000 acres and is home to more than 385 companies employing approximately 55,000 people across technology, biotechnology, advanced manufacturing, and professional services. NC State's Centennial Campus adds another direct connection between academic research and external partners, with more than 70 industry, government, and nonprofit partners located alongside university research.

Connected to the world

Raleigh-Durham International Airport (RDU) gives the Triangle direct international connectivity and convenient access to major U.S. hubs. The Raleigh Convention Center, home of IEEE IUS 2026, is approximately 20 minutes from RDU, with nonstop flights to London • Paris • Frankfurt • Dublin • Reykjavík • Toronto • Montréal • Vancouver • Mexico City • Panama City • Cancún • Punta Cana • San Juan, and more than 75 destinations across the United States.

Learn more: ULTRASONC (tarheels.live/ultrasonc) | IEEE IUS 2026 (ieee-ius.org/2026) | RTP (rtp.org) | RDU (rdu.com)

LAB TOUR LOGISTICS

Sunday, October 4, 2026

All tours depart from and return to the Raleigh Convention Center (RCC).

PLEASE ARRIVE IN TIME FOR BUS LOADING

8:30 AM for morning tours • 2:00 PM for afternoon tours

UNC-CHAPEL HILL	NC STATE UNIVERSITY	DUKE UNIVERSITY
AM TOUR Bus loads: 8:30 AM Departs RCC: 8:45 AM Arrive / Welcome: ~9:20–9:35 AM Lab tours: 9:35–11:15 AM Refreshments: 11:15–11:45 AM Return bus departs: 11:45 AM Approx. RCC return: ~12:20 PM	AM TOUR Bus loads: 8:45 AM Departs RCC: ~9:00 AM Arrive / Welcome: ~9:10–9:40 AM Lab tours: 9:40–11:20 AM Refreshments: 11:20 AM–12:00 PM Return bus departs: 12:00 PM Approx. RCC return: ~12:15 PM	AM TOUR Bus loads: 8:30 AM Departs RCC: 8:45–9:00 AM Arrive / Welcome: ~9:15–9:40 AM Lab tours: 9:40–11:15 AM Refreshments: 11:15–11:45 AM Return bus departs: 11:45 AM Approx. RCC return: ~12:15 PM
PM TOUR Bus loads: 2:00 PM Departs RCC: 2:15 PM Arrive / Welcome: ~2:50–3:05 PM Lab tours: 3:05–4:45 PM Refreshments: 4:45–5:15 PM Return bus departs: 5:15 PM Approx. RCC return: ~5:50 PM	PM TOUR Bus loads: 2:15 PM Departs RCC: ~2:30 PM Arrive / Welcome: ~2:40–3:10 PM Lab tours: 3:10–4:50 PM Refreshments: 4:50–5:30 PM Return bus departs: 5:30 PM Approx. RCC return: ~5:40 PM	PM TOUR Bus loads: 2:00 PM Departs RCC: 2:15–2:30 PM Arrive / Welcome: ~2:45–3:10 PM Lab tours: 3:10–4:45 PM Refreshments: 4:45–5:15 PM Return bus departs: 5:15 PM Approx. RCC return: ~5:45 PM

Please travel with your assigned campus tour.

This schedule is intentionally high-level; detailed lab rotations will be coordinated on site.

TOUR-DAY CONTACTS

- IUS Lab Tour Chair: Virginie Papadopoulou, Ph.D.
- UNC-Chapel Hill: Phillip Durham, Ph.D. & Kathlyne Bautista, Ph.D.
- NC State University: Hieu Doan & Virginie Papadopoulou, Ph.D.
- Duke University: Kathryn Nightingale, Ph.D.

LABORATORY DIRECTORY

UNC-CHAPEL HILL

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Dayton Lab

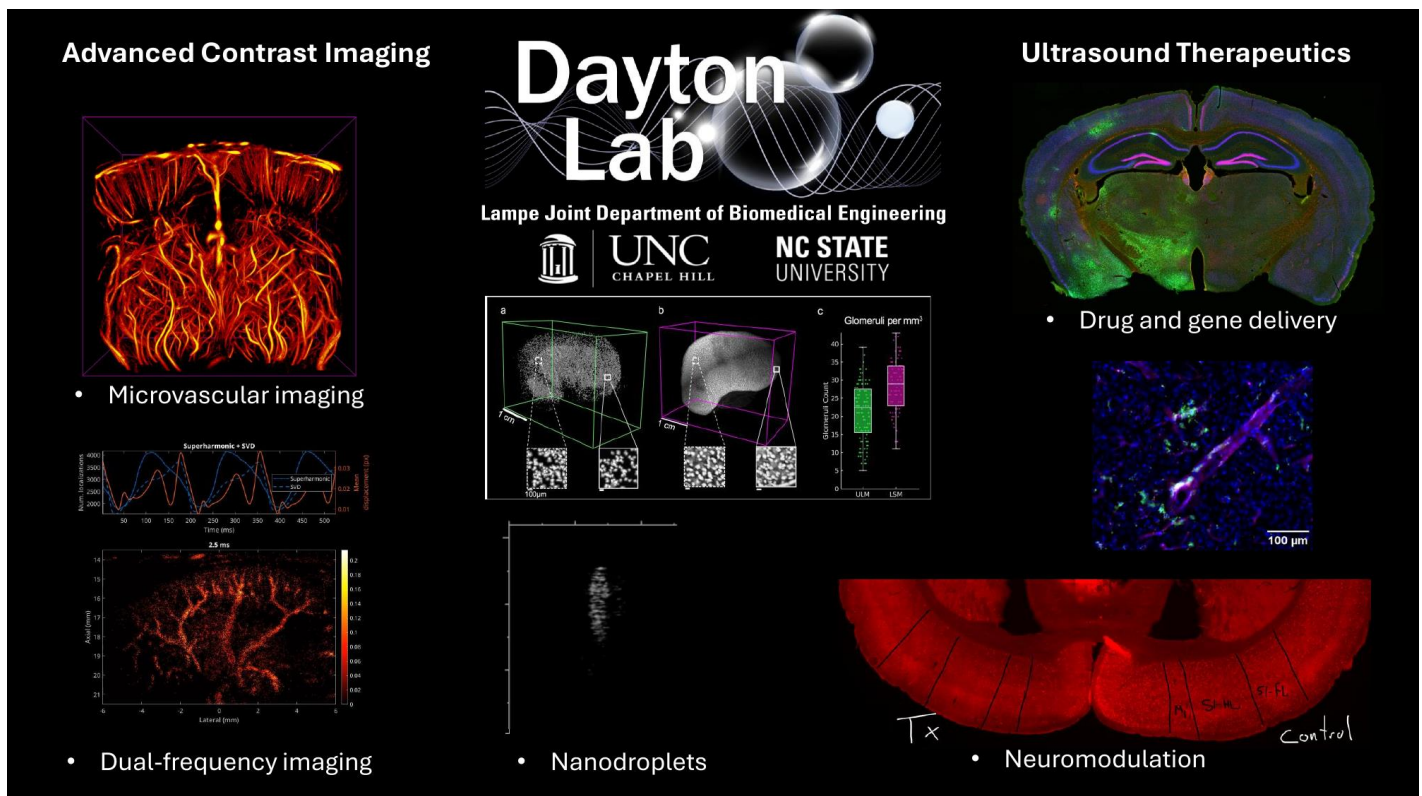
PI: Paul A. Dayton, Ph.D.

Additional faculty: Phillip G. Durham, Ph.D.

Dr. Paul A. Dayton's laboratory develops advanced biomedical ultrasound technologies and cavitation-enhancing contrast agents for high-resolution microvascular and molecular imaging and for image-guided therapies. Current research emphasizes microbubble- and nanodroplet-based approaches for super-resolution and transcranial imaging, cancer detection, and ultrasound-mediated therapeutic delivery, including blood-brain barrier opening and targeted drug or cell delivery.

Keywords: Microbubbles · Dual-frequency · Nanodroplets · Contrast imaging · Ultrasound therapeutics · Acoustic angiography

Website: <https://daytonlab.sites.unc.edu/>



ENHANCE: Human performance in austere environments

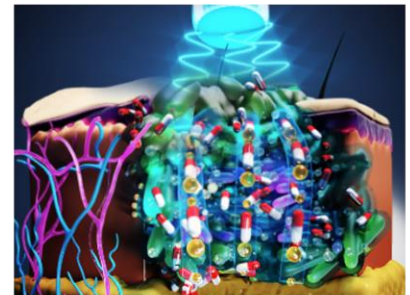
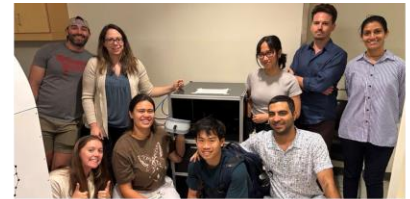
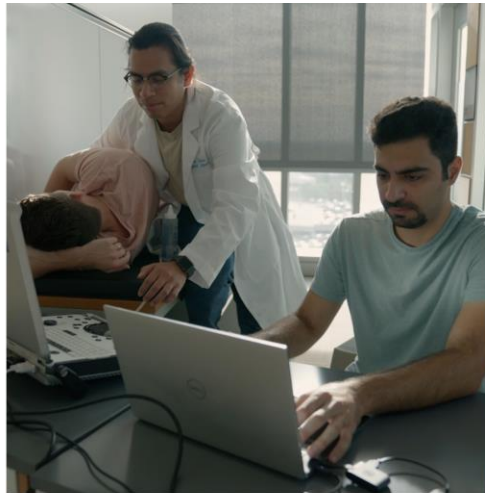
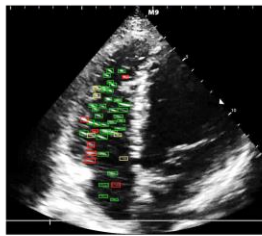
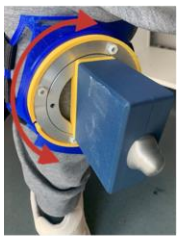
PI: Virginie Papadopoulou, Ph.D.

Additional faculty: Arian Azarang, Ph.D.

ENHANCE was established in 2024 as a new ultrasound lab between Radiology and Biomedical Engineering at UNC Chapel Hill. Led by Dr. Papadopoulou, our lab aims to advance biomedical ultrasound for human performance and interventional radiology translation. Our research interests are centered around ultrasound and microbubbles, their detection and gas physiology modulation in vivo, and their applications in addressing today's needs in biomedical disease and human performance applications. Our laboratory collaborates widely with others, integrates research with substantial outreach and education components, and prides itself on stakeholder engagement to increase our impact.

Keywords: Ultrasound · Gas emboli · Contrast-enhanced ultrasound · Drug delivery · Human performance · Extreme environments

Website: <https://www.virginiepapadopoulou.com/>



ENHANCE LABORATORY

Biomedical Ultrasound for Human Performance & Translation

Virginie Papadopoulou, Ph.D. | Associate Professor | UNC Chapel Hill



Gallippi Lab

PI: Caterina M. Gallippi, Ph.D.

We develop new imaging technologies and create new signal-processing algorithms that non-invasively exploit tissue mechanical properties — stiffness, viscosity, and anisotropy — to extract clinically meaningful information from a variety of tissue.

Keywords: Elastography · Clinical imaging · Viscoelasticity · Anisotropy

Website: <https://gallippilab.web.unc.edu/>



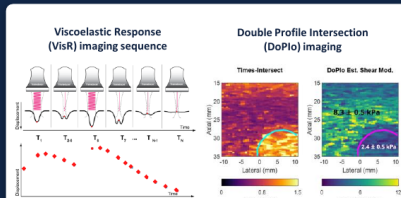
We develop new imaging technologies and create new signal-processing algorithms that non-invasively exploit tissue mechanical properties — stiffness, viscosity, and anisotropy — to extract clinically meaningful information from a variety of tissue.

<https://gallippilab.web.unc.edu/>

Ultrasound elastography · ARFI · Carotid, breast, renal, and muscle imaging · Viscoelasticity · Anisotropy · Machine learning

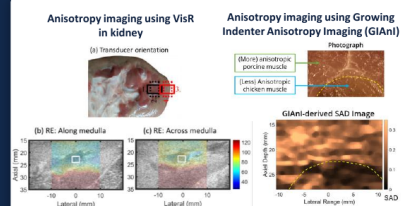
Lampe Joint Department
of Biomedical Engineering

UNC CHAPEL HILL
NC STATE UNIVERSITY



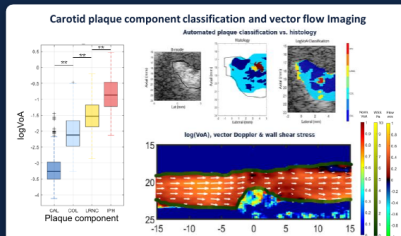
Quantitative Elasticity & Viscosity Imaging: QVirR & DoPlo

VisR measures relative elasticity and viscosity within tissue; QVirR quantifies viscous and elastic moduli with a multi-layer perceptron, and DoPlo recovers shear elasticity without spatial averaging artifacts.



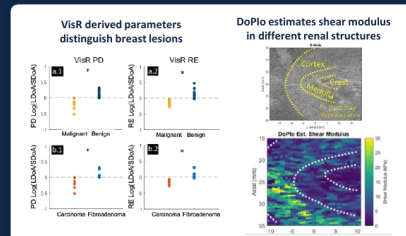
Mechanical Anisotropy Imaging: VisR & GIAnI

VisR measures 1D degree of anisotropy (DoA) by interrogating tissue at different rotation angles. GIAnI measures 2D anisotropy on-axis from paired narrow and wide ARFI pushes, without rotation.



Clinical Imaging: Carotid Plaque, WSS & Flow

ARFI and Variance of Acceleration (logVoA) features classify plaque components against matched histology, while multi-angle plane waves add concurrent vector flow and wall shear stress (WSS).



Clinical Imaging: Breast, Muscle & Renal

VisR, DoPlo, GIAnI, LogVoA, and other deep learning tools are used across various tissues — discriminating malignant breast lesions, tracking mechanical anisotropy in muscle, and distinguishing renal structures for allograft surveillance.



Johnson Lab

PI: Kennita Johnson, Ph.D.

Our research focuses on quantitative biomedical imaging to understand how organs respond to disease and physiologic stress, with the goal of identifying imaging biomarkers that reveal dysfunction earlier. We will package these insights with point-of-care ultrasound to make screening exams for kidney and liver damage in metabolic diseases more accessible.

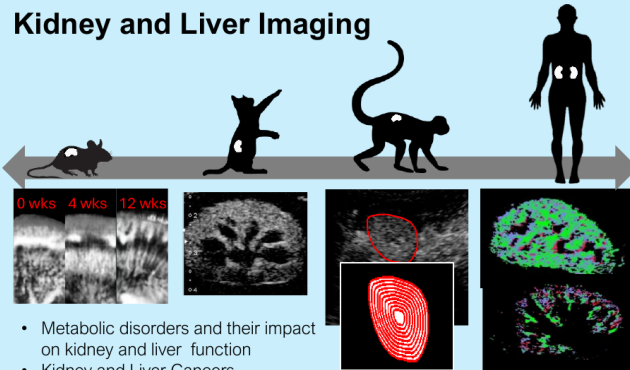
Keywords: Ultrasound · Kidney imaging · Liver imaging · Ultrasound contrast agents

Website: <https://bme.unc.edu/bme-person/kennita-johnson/>

JOHNSON LAB

Increasing accessibility to imaging

Kidney and Liver Imaging



- Metabolic disorders and their impact on kidney and liver function
- Kidney and Liver Cancers
- Different modes of ultrasound: B-mode, contrast-enhanced perfusion, quantitative, elastography
- Ultrasound systems: small animal, point of care and clinical

PI: Kennita Johnson, PhD
 Graduate Student: Peter Chukwuka, Amaris Thomas and Ahmeda Turay
 Undergraduates: Tobi Onasanya, Jasmine Ly and Emory Hamm
 Visiting Scientist: Taylor Key

Microscopy with ultraviolet surface excitation (MUSE) Imaging

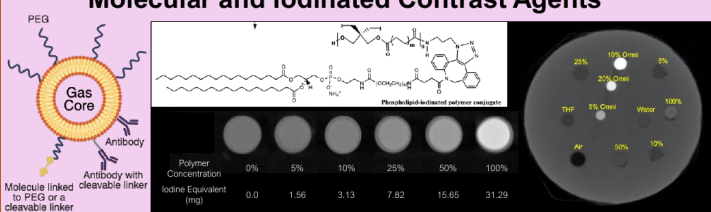


- Quick staining (2 min or less)
- Images of organ substructures

Women and Infant Health

- Maternal Health (placental imaging)
- Low Birth Weight Infants

Molecular and Iodinated Contrast Agents



Polymer Concentration	0%	5%	10%	25%	50%	100%
Iodine Equivalent (mg)	0.0	1.56	3.13	7.82	15.65	31.29





UNC School of Medicine

UNC Kidney Center






OmniWave

PI: Youzuo Lin, Ph.D.

Our lab develops next-generation computational imaging methods by integrating wave physics, AI, and large-scale computing. In ultrasound, we focus on AI-enabled ultrasound tomography and quantitative imaging, with the goal of making advanced medical imaging faster, more accurate, and more accessible.

Keywords: Computational imaging · Ultrasound tomography · AI / machine learning · Wave physics · Quantitative imaging

Website: <https://smileunc.github.io/>

AI-Powered Computational Ultrasound Imaging

Advanced US Algorithms

Physics-guided ML

Integrate wave physics with machine learning for improved ultrasound imaging

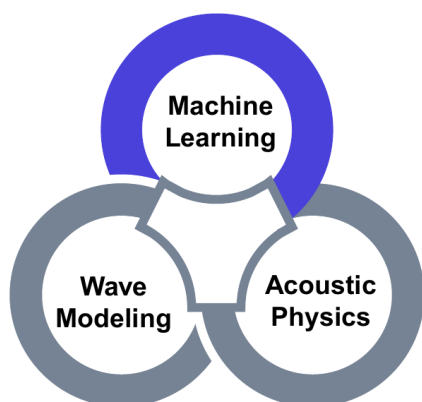
Multi-Parameter USCT

Multi-parameter ultrasound tomography (sound speed, reflectivity, attenuation)

Wave Propagation Modeling

High-order wave propagation modeling with reduced dispersion error

Physics+ML for Ultrasound Imaging



Clinical Applications

Prostate Imaging

Joint reflection–transmission ultrasound imaging of the prostate

Brain Tomography

Full-waveform inversion for transcranial ultrasound tomography

Quantitative Tissue Imaging

Quantitative reconstruction of acoustic tissue parameters

Wave physics + AI can transform ultrasound measurements into fast, quantitative tissue images.



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

1



Pinton Lab

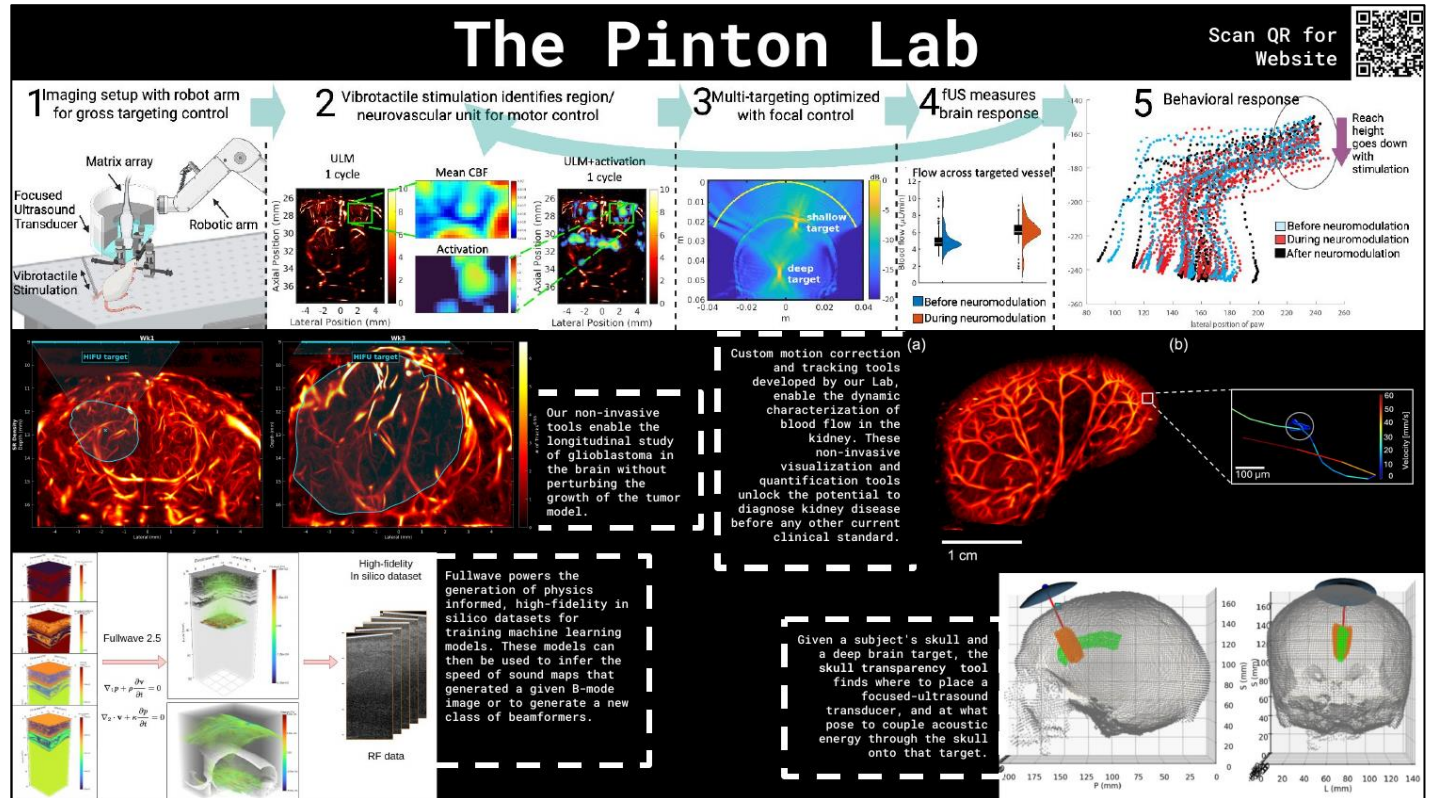
PI: Gianmarco Pinton, Ph.D.

Additional faculty: Francisco Santibanez, Ph.D.

The Pinton Lab specializes in the use of wave physics informed simulations to improve the quality of ultrasound imaging by developing custom imaging sequences and dedicated post-processing.

Keywords: Fullwave · Non-invasive imaging · Functional imaging

Website: <https://pinton-lab.github.io/>



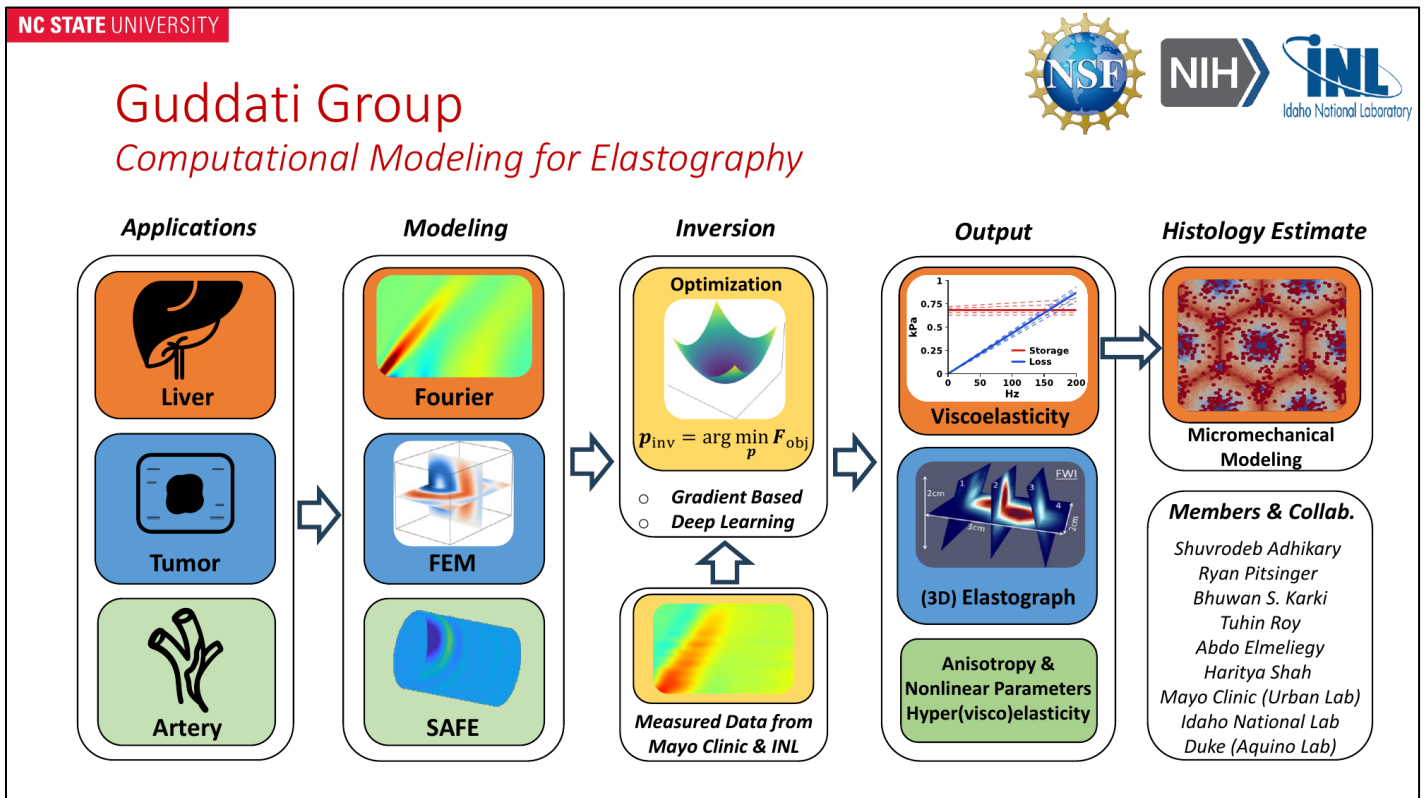
Guddati Lab

PI: Murthy Guddati, Ph.D.

The overarching theme of our lab is computational modeling and characterization of physical systems. In the realm of elastography, we develop methodologies ranging from Fourier analysis to full waveform inversion to characterize liver tissue, arteries, and tumors.

Keywords: Elastography · Viscoelasticity · Full waveform inversion · Fast computational methods

Website: <https://ccee.ncsu.edu/people/mnguddat/>



IMIST

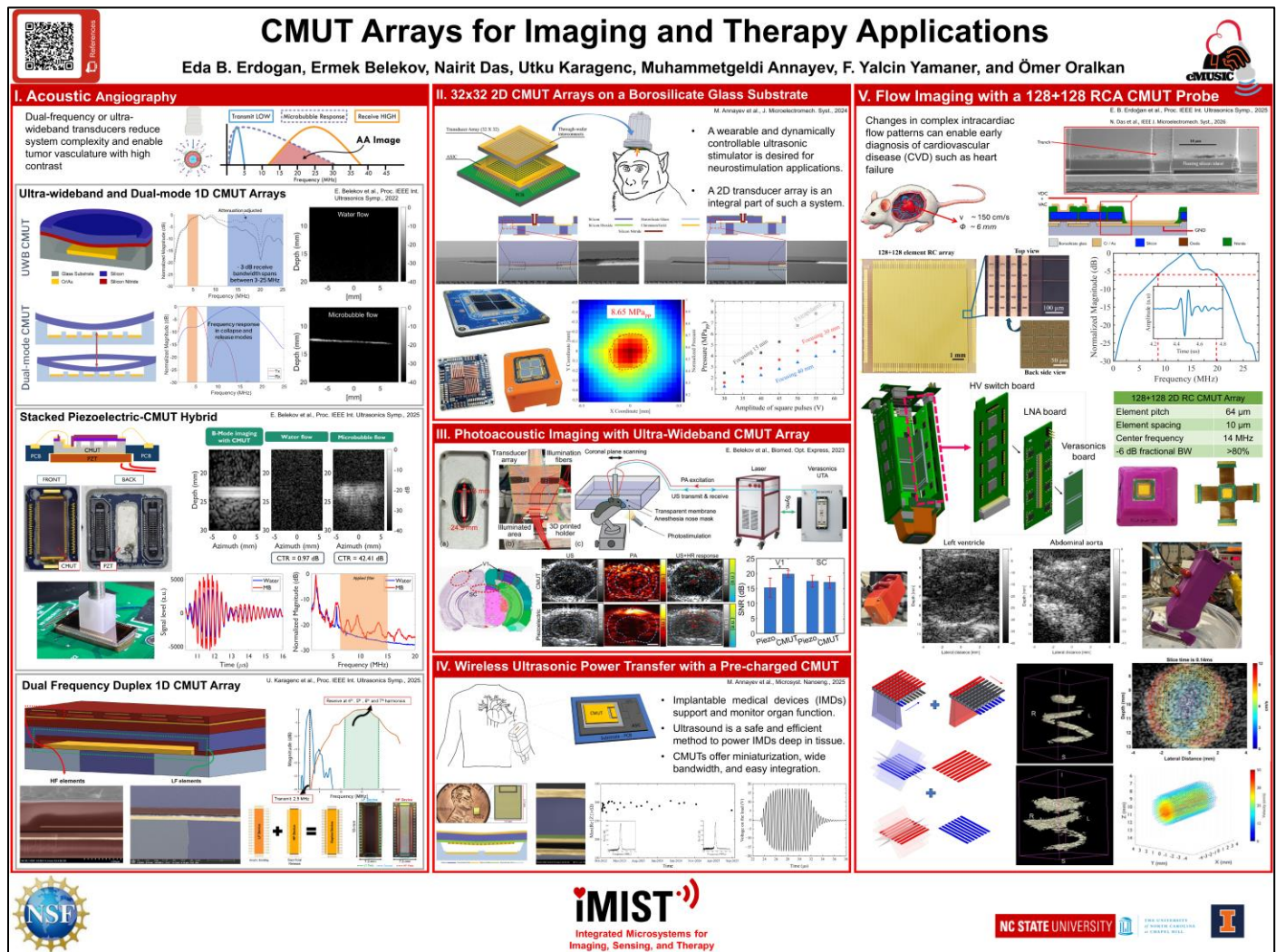
PI: Omer Oralkan, Ph.D.

Additional faculty: Yalcin Yamaner, Ph.D.

Develops CMUT devices and front-end electronics, spanning design, fabrication, packaging, and characterization for ultrasound systems.

Keywords: CMUT · Ultrasound · Microfabrication · Anodic bonding

Website: <https://research.ece.ncsu.edu/imist/>



Micro/Nano Engineering Lab (MNEL)

PI: Xiaoning Jiang, Ph.D.

Additional faculty: Huaiyu Wu, Ph.D.

The Micro/Nano-Engineering Lab (MNEL) is led by Professor Xiaoning Jiang to perform research on smart materials, smart structures, micro/nanofabrications, micro/nano-devices, and their applications in biomedical, mechanical, and aerospace engineering.

Keywords: Ultrasound in medicine & biology · Smart micro/nano-devices · Ultrasound NDE

Website: <https://research.mae.ncsu.edu/jiang/>

NC STATE UNIVERSITY

JIANG RESEARCH GROUP
Research Overview

Mechanical & Aerospace Engineering
NC State University

01
Ultrasound in Medicine & Biology

- High-frequency, broadband, and dual-frequency ultrasound transducers / arrays
- Biomedical imaging, contrast-enhanced imaging, and intravascular ultrasound
- Therapeutic ultrasound including high-intensity focused ultrasound (HIFU)

02
Smart Materials, Structures & Micro/Nano Devices

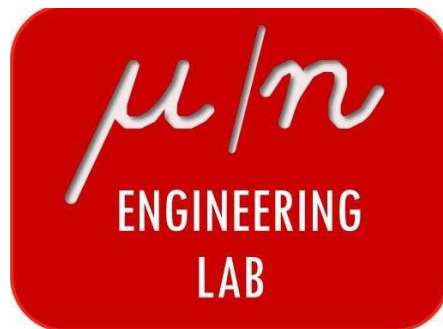
- Piezoelectric and flexoelectric materials, structures, and device concepts
- Micro / nanofabrication, characterization, actuators, transducers, and sensors
- Applications in tactile sensing, strain-gradient sensing, and high-temperature sensing

03
Ultrasound NDE & Structural Health Monitoring

- Novel ultrasound sensors and transducers for nondestructive evaluation (NDE)
- Flexible and stretchable PMN-PT arrays for conformal imaging of complex surfaces
- Structural health monitoring and acoustic-field-enabled inspection technologies

CORE CAPABILITIES
Materials & Structures > Modeling & Design > Micro/Nanofabrication > Transducer Fabrication > Characterization > Imaging / Therapy / NDE

Source: research.mae.ncsu.edu/jiang/research/
Dr. Xiaoning Jiang Research Group



Ultrasonic Material Characterization Laboratory

PI: Marie Muller, Ph.D.

Our research takes advantage of the complexity of wave propagation in heterogeneous media, to retrieve information on the micro-architecture of heterogeneous solids such as bone, biological soft tissue or metallic foams.

Keywords: Quantitative ultrasound · Lung tissue characterization · Complex porous media · Microvasculature · Ultrasound stimulation of platelet-like particles

Website: <https://muller.wordpress.ncsu.edu/>

**NC STATE
UNIVERSITY**

ULTRASONIC MATERIAL CHARACTERIZATION LABORATORY
<https://muller.wordpress.ncsu.edu/>
 Contact: mmuller2@ncsu.edu

Principle investigator

Dr. Marie Muller



Dr. Sashank Gautam
Postdoc



Parniyan Norouzzadeh
PhD student



Caleb Moore
Masters' student



Dr. Kyla Bosh
Postdoc



Aniket Vilas Beldar
PhD student

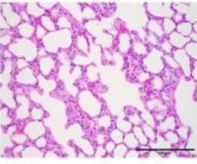
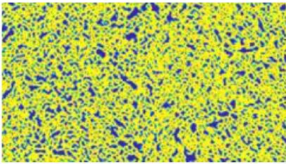


Hossein Ahmadian
PhD student



Quantitative Ultrasound

Lung Tissue Characterization

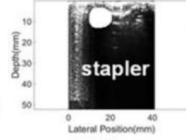
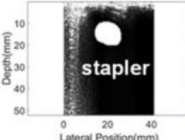
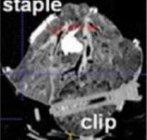



Pulmonary fibrosis in a rat model Digital map based on lung histology

Complex porous media

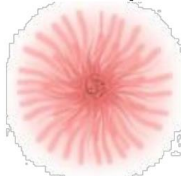


Margin visualization for lung cancer surgery

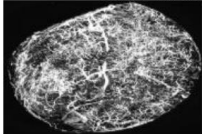




stapler stapler clip

Ultrasound stimulation of platelet-like particles



Microvasculature




Superharmonic volume of rat kidney

**Department of Mechanical and
Aerospace Engineering
North Carolina State University
Raleigh, NC, USA**

Our research takes advantage of the complexity of wave propagation in heterogeneous media, to retrieve information on the micro-architecture of heterogeneous solids such as bone, biological soft tissue

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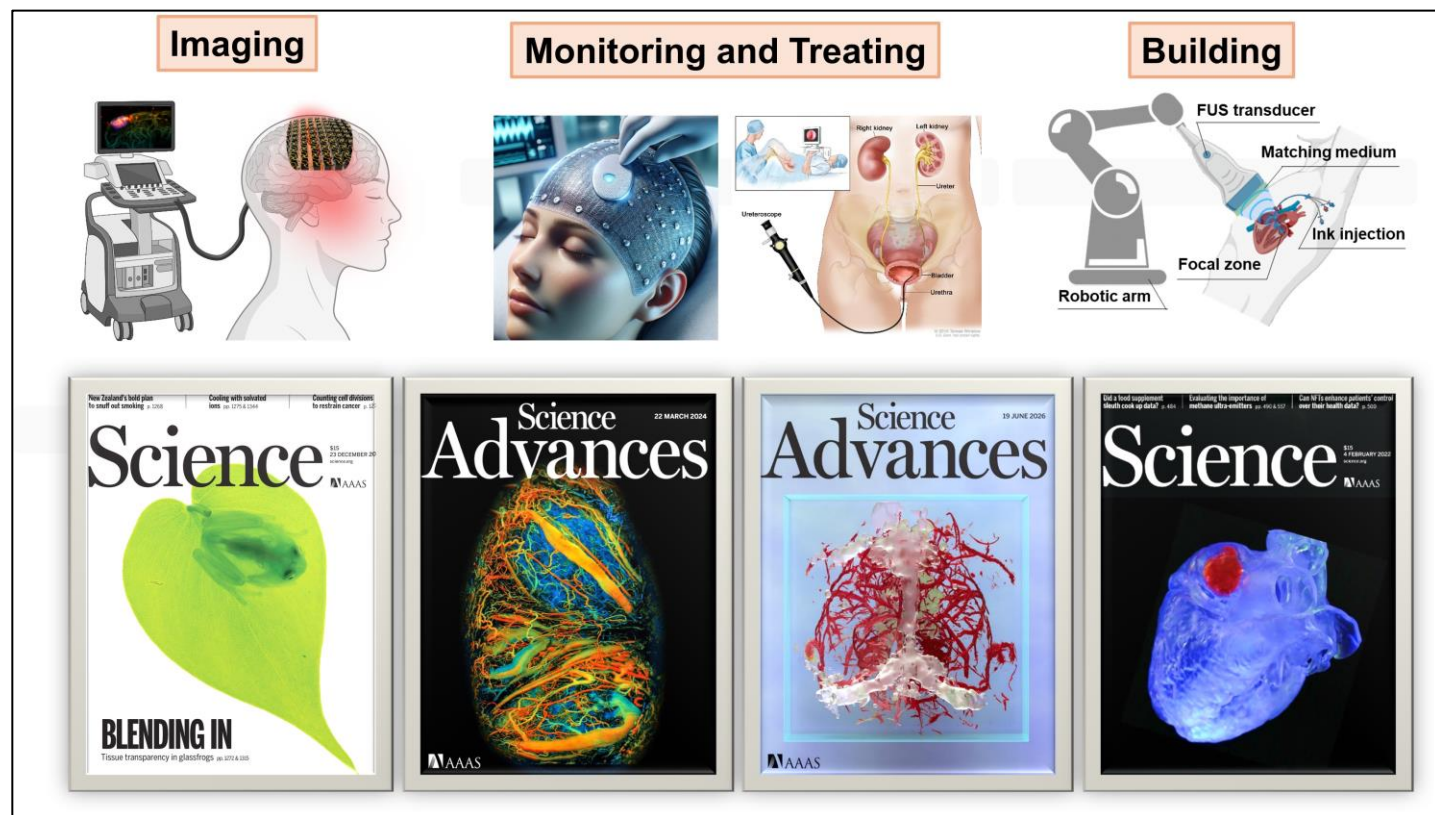
Photoacoustic Imaging Lab (PI-Lab)

PI: Junjie Yao, Ph.D.

Our laboratory develops next-generation imaging and therapeutic technologies built on a simple but powerful idea: light and sound can be converted into each other, and together they let us see, heal, and build inside the human body at depths far beyond the reach of light alone. We design photoacoustic and ultrasound systems that image the brain and body with molecular detail, wearable devices that both image and treat through the intact skull, and acoustic printing methods that manufacture therapeutic structures deep within living tissue. Led by Dr. Junjie Yao, our interdisciplinary team works across engineering, biology, and medicine — translating fundamental discoveries into real clinical impact, from functional brain imaging to image-guided therapy for stroke and beyond.

Keywords: Photoacoustic tomography · Functional brain imaging · Molecular imaging · Theranostics

Website: <https://photoacoustics.pratt.duke.edu/>



Salahshoor Lab

PI: Hossein (Amir) Salahshoor, Ph.D.

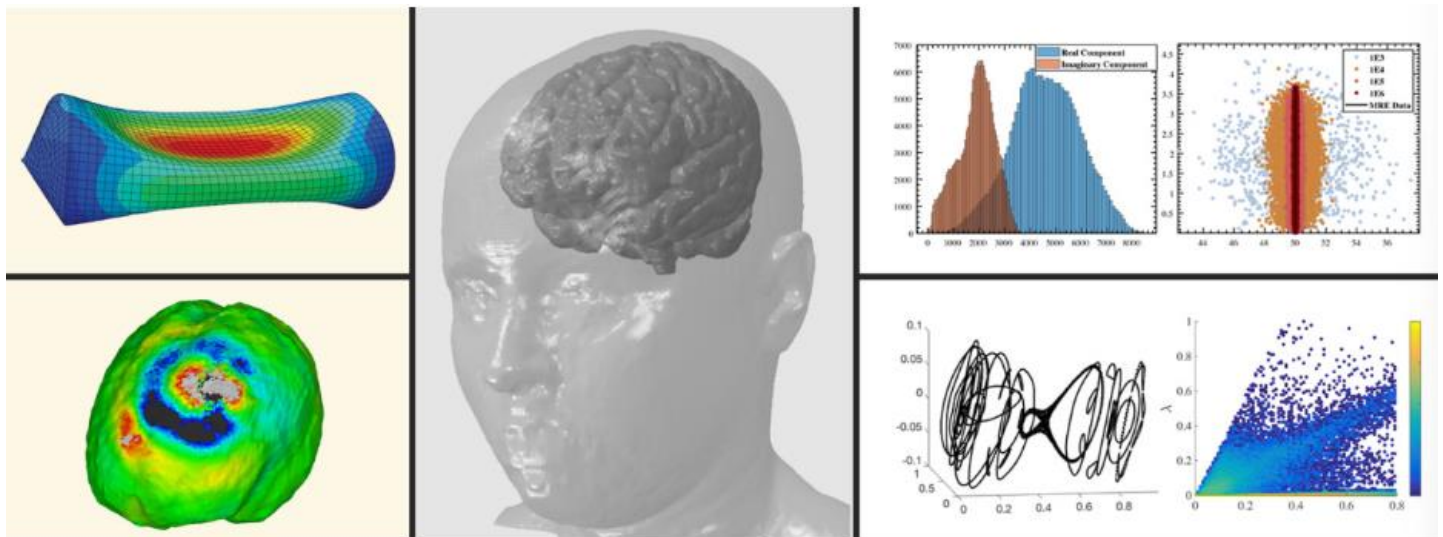
The Salahshoor Lab's mission is to expand current knowledge in physics of solids, and benefit society by addressing relevant engineering challenges, through research at the intersection of mechanics, data science, biology, and applied mathematics. We are committed to foster an inclusive, supportive, and collegial atmosphere.

Although our research thrusts encompass different materials and systems, each follows a similar goal and strategy: *Aim 1: Identify emerging/unresolved mechanical phenomena* in complex systems and the corresponding theoretical and computational challenges, solving which leads to impactful discoveries. *Aim 2: Address these challenges by developing tools* and making fundamental innovations in modeling approaches at the pertinent length scale, such as atomic, micro-, and macro-scale, appropriately informed by data. *Aim 3: Establish these data-centric predictive models* to work effectively in concert with experimental efforts to further expand understanding of physical phenomena and their control through the structure, applied fields, or other means.

An important focus area of our lab is to understand how ultrasound waves interact with biological tissues across scales, and what we can infer from mechanics of such systems through ultrasonic biomolecular agents.

Keywords: Brain mechanics · Computational mechanics · Data-driven methods · Ultrasonic neuromodulation

Website: <https://salahshoor.pratt.duke.edu/>



Mechanics & Materials » **Ultrasonic Medicine & Brain** « Scientific
Computing & Applied Math

Song Lab

PI: Pengfei Song, Ph.D.

Our lab focuses on developing and translating cutting-edge ultrasound imaging technologies to close the gap between clinical practice and unmet patient needs. We are currently concentrating on advancing various ultrafast ultrasound imaging technologies (see below) for a wide range of basic science and clinical applications including cancer, Alzheimer's disease, stroke, and cardiovascular diseases. We are firm believers in team science. Together we can improve the well-being of patients and make a difference in healthcare.

Keywords: Super-resolution ultrasound · Ultrafast 3D imaging · Functional neuroimaging

Website: <https://songlab.bme.duke.edu/>



The Nightingale Lab

PI: Kathy Nightingale, Ph.D.

Additional faculty: Mark Palmeri, M.D., Ph.D., <https://bme.duke.edu/people/mark-palmeri/>

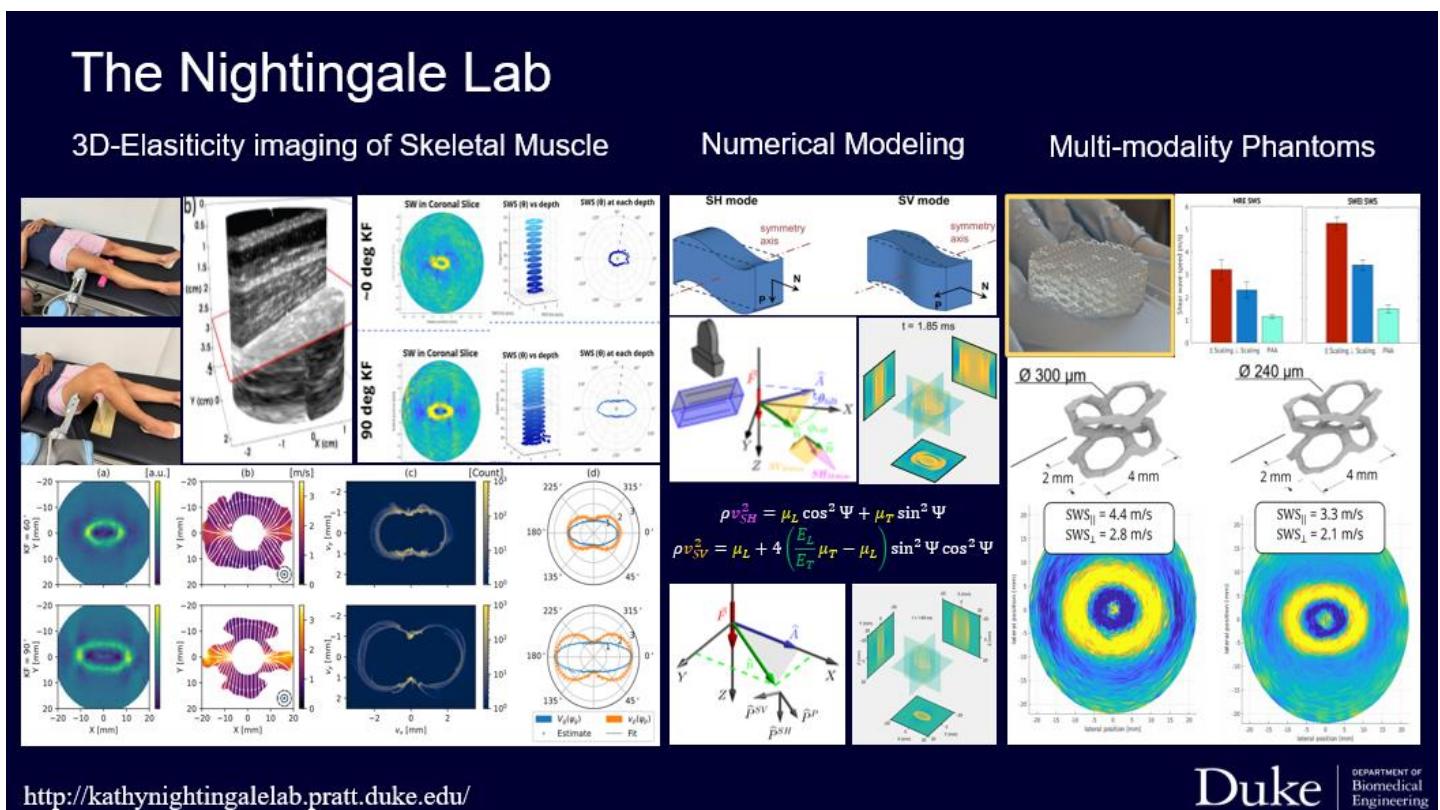
We seek to investigate and improve ultrasonic imaging methods for clinically-relevant problems. The main focus of our work is the development of novel, acoustic radiation force impulse (ARFI)-based elasticity imaging methods to generate images of the mechanical properties of tissue, involving interdisciplinary research in ultrasonics and tissue biomechanics.

Maintaining strong collaborations with the Duke University Medical Center, we aim to translate these technologies to clinical practice. ARFI imaging technologies serve as a basis for commercial imaging technique in clinics worldwide. We also work closely with the ultrasound manufacturing industry, in which many of our graduate students gain internship experience.

Currently, the Nightingale lab is focused on the characterization of anisotropic materials like skeletal muscle, using 3D Rotational Shear Wave Elasticity Imaging (3D-RSWEI) techniques.

Keywords: ARFI · Shear-wave elastography · Quantitative ultrasound · Image quality · Clinical translation

Website: <https://kathynightingalelab.pratt.duke.edu/>



Prof. Emeritus Gregg Trahey

Robert Plonsey Distinguished Professor Emeritus of Biomedical Engineering: Gregg Trahey, Ph.D.

Research Interests: Medical ultrasound, image guided surgery, adaptive imaging, imaging of tissue's mechanical properties, and radiation force imaging.

Website: <https://bme.duke.edu/people/gregg-trahey/>

QUEST: Quantitative Ultrasound: Enhancing Soft Tissue Imaging

PI: Farah Deeba, Ph.D.

The QUEST Lab develops advanced ultrasound imaging and quantitative ultrasound methods to characterize tissue structure and function. Our primary applications are in pregnancy and placental imaging, with the goal of improving assessment of placental health and pregnancy outcomes.

Keywords: Quantitative ultrasound · Placenta · Multimodal imaging

Website: <https://coefs.charlotte.edu/fdeeba/>



QUS parameters from the placenta are correlated with tissue microstructure and can serve as biomarkers for placenta-mediated diseases.

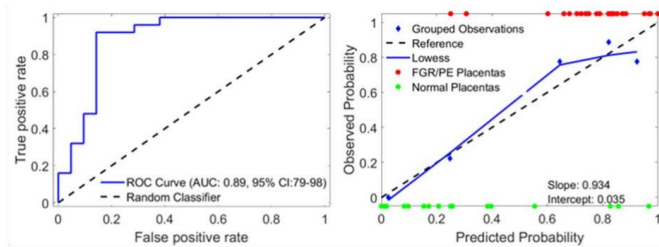
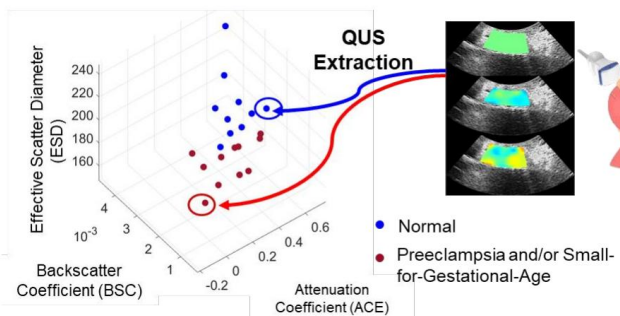
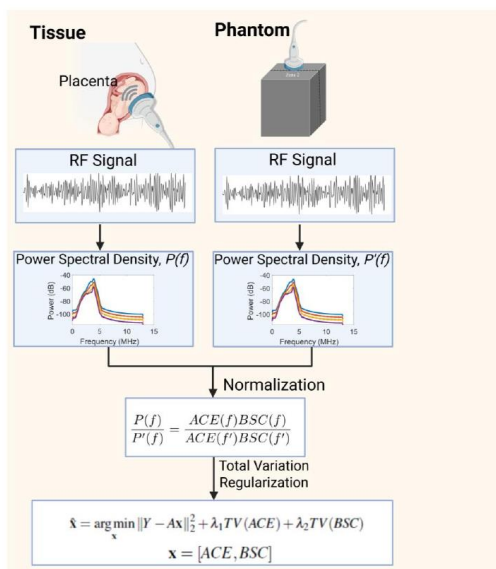


Figure: Discrimination and calibration of placenta-QUS model for PE and/or SGA detection in human placenta ex vivo [Deeba et al., 2024].



Rokni Lab

PI: Eric Rokni, Ph.D.

The Rokni Acoustics Lab at High Point University is an undergraduate research group using focused ultrasound to generate histotripsy and studying how the resulting cavitation activity influences fluid flow dynamics within vessels.

Keywords: Focused ultrasound · Cavitation · Flow · Undergraduate research

Website: <https://www.highpoint.edu/physics/faculty-research-interests/>

ROKNI ACOUSTICS LAB

High Point University | Undergraduate Research Group



Focused Ultrasound & Histotripsy

We use focused ultrasound to generate histotripsy, a non-thermal cavitation process, and study how the resulting bubble cloud dynamics alter fluid flow. Undergraduate researchers design and run acoustic cavitation experiments, capture high-speed imaging of bubble cloud behavior, and analyze the relationship between cavitation activity and induced flow fields.

- Histotripsy-Induced Cavitation**
Generating and characterizing bubble clouds from pulsed focused ultrasound
- Flow Field Effects**
Quantifying how cavitation activity drives and disrupts local fluid flow
- Undergraduate-Led Experiments**
Hands-on acoustics, imaging, and signal analysis training



Rokni Acoustics Lab • Department of Physics, High Point University

Ultrasonic Brain Drug Delivery / Aryal Laboratory

PI: Muna Aryal, Ph.D.

Our lab develops innovative ultrasound-based technologies to understand and treat neurological diseases. By integrating ultrasound, microfluidics, in vivo experimentation, mathematical modeling, and artificial intelligence, we investigate glymphatic brain fluid dynamics and therapeutic delivery mechanisms to advance translational solutions that improve brain health through targeted drug delivery and enhanced glymphatic function, the brain's natural waste-clearance system.

Keywords: Therapeutic Ultrasound · Glymphatic System · Microfluidics · Neuroengineering · Translational Biomedical Research

Website: <https://maryal1.wixsite.com/aryal-lab>

