

PHT180 News: Fall 2025

Welcome to the Fall '25 edition of PHT180 News! In FY25, PHT180's faculty affiliates attained over \$8 million in sponsored research funding. Congratulations to everyone on this amazing accomplishment, and thank you for your hard work and participation in the center! We're looking forward to another great year!

--PHT180 Leadership Team

FY25 Summary




PHT180 Website Updates

In support of our initiative to foster and grow connections with local clinical institutions, we've added a new Clinical Collaborations section to our website! Check it out to find information on the collaboration cycle, as well as Q&As with affiliated faculty who have started and maintained successful collaborations with clinical partners:

<https://www.rit.edu/pht180/clinical-collaborations>

New Research Awards



National Institutes of Health

PI: **Vinay Abhyankar**, Associate Professor, Department of Biomedical Engineering; **Thomas Gaborski**, Department Head, Department of Biomedical Engineering

Sponsor: NIH/UR

Project: Translational Center for Barrier MPS (TRaCe-bMPS) - Qualifications Core

The goal of this project is to develop and qualify drug discovery tools in the areas of musculoskeletal disease and sepsis using the SiM tissue chip platform.

PI: **Rui Li**, Associate Professor, Department of Computing and Information Sciences PhD

Sponsor: NIH

Project: Large-scale Disease Pathway Discovery by Integrating Tissue-specific Molecular Networks via Hierarchical Bayesian Inference on Graph Neural Networks

This research program aims to design and develop novel bio-statistical graph strategies for structural characterization of large-scale disease pathways and systematic biomedical data analytics for a holistic view of molecular and functional relationships.

PI: **George Thurston**, Professor, School of Physics and Astronomy

Sponsor: NIH

Project: Phase boundaries and liquid structure of concentrated eye lens protein mixtures

This work will further establish molecular origins of the thermodynamic stability of highly concentrated eye lens protein mixtures important for understanding the origins of cataract disease, and elucidate principles governing high concentration macromolecular mixtures in living cells.

PI: **Hwan Shim**, Assistant Professor, Department of Electrical and Computer Engineering Technology

Sponsor: NIH

Project: Semantic-based auditory attention decoder using Large Language Model

This project will advance SiN processing by mimicking brain mechanisms, using machine learning for semantic clustering and large language models for attention decoding, with the goal of improving hearing devices for those with hearing impairments.

PI: **Qian Xue**, Associate Professor, Department of Mechanical Engineering

Sponsor: NIH/University of Utah

Project: Synchronization of Sound Source with Airway Resonances


The goal of this project is to develop machine learning models that are accurate but faster than 3D finite element models to predict glottal flow and vocal fold surface pressures given glottal width at any particular time as input.

PI: **Zhiqiang Tao**, Assistant Professor, School of Information

Sponsor: NIH

Project: Building Reliable Vision-Language Assistant for Dermatology AI through Modeling Uncertainties in Multimodal LLMs

The main goal of this research program is to develop a reliable large visual-language (VL) model for dermatology AI by studying various uncertainties in skin images and epistemic knowledge of LLMs.



NSF

PI: **Byron Erath**, Department Head, Department of Mechanical Engineering

Sponsor: NSF

Project: Collaborative Research: The mechanics of respiratory particle production in the larynx during phonation

This project will determine the mechanics of particle production within the larynx during voiced speech production to resolve questions like how particles are produced within the larynx during phonation, what fraction of emitted particles are produced at the larynx vs the lungs or oral cavity, and how variations in the rheology of the respiratory tract lining fluid impact particle production.

PI: **Moumita Das**, Professor, School of Physics and Astronomy

Sponsor: NSF

Project: Collaborative Research: Mechanical phase transitions organizing cartilage function


This project aims to elucidate cartilage function under compression and shear in health and disease to establish a new paradigm for understanding the macromolecular origins of physiologically relevant function in this critical soft tissue.

PI: **Zhiqiang Tao**, Assistant Professor, School of Information

Sponsor: NSF

Project: ERI: A New Uncertainty Modeling Framework for Snapshot Compressive Imaging

The goal of this research project is to understand and model uncertainties at various system levels in snapshot compressive imaging to enhance its reliability and robustness in practical use.



American Heart Association


PI: **Linwei Wang**, Bruce B Bates Professor, Department of Computing and Information Sciences PhD

Sponsor: AHA/UR

Project: Re-Designing STEMI/NSTEMI Classification: Secondary Screening for an Occluded Culprit Artery in NSTEMI

This project aims to develop a machine learning algorithm to detect an occluded artery among NSTEMI patients using an existing robust, investigator-created database, and assess the algorithm among various underrepresented populations which have historically suffered from poorer outcomes.


Welcome New Affiliates!



Mekides Assefa Abebe

Visiting Assistant Professor
Color Science Program


Research Areas: Color and high dynamic range imaging, color and material perception and measurement, AI in color imaging and perception, imaging and display color and contrast quality measurement and enhancements, color and multi-sensory perception



Nirvana Ahmic

Assistant Professor
Physician Assistant Program


Research Areas: Urology, hematuria management, catheterization standardization; teaching assistants in curriculum; increase diversity within the PA profession, AAPA and their Pathways program



Benjamin Chin

Assistant Professor
Center for Imaging Science

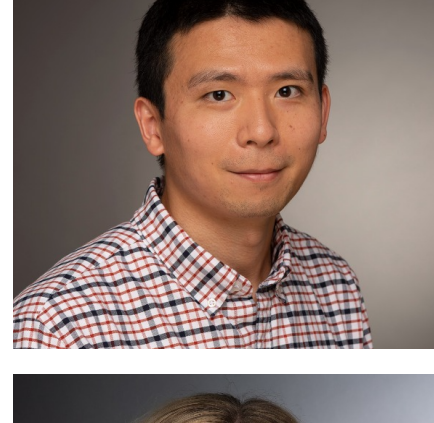
Research Areas: Imaging science, vision science, optometry, perceptual psychology, computational neuroscience, augmented reality, visual clarity, myopia control, contact lenses, natural image statistics, visual psychophysics



Basca Jadamba

Professor
School of Mathematics and Statistics


Research Areas: Numerical methods for partial differential equations, mathematical modeling and scientific computing, inverse problems and optimization, biomedical mathematics



Dongfang Liu

Assistant Professor
Department of Computer Engineering

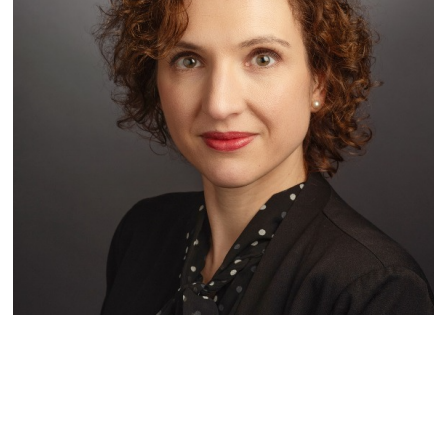
Research Areas: Artificial intelligence, vision-language intelligence



Marcia Shea

OTD Program Academic Fieldwork Coordinator
Occupational Therapy

Research Areas: Fall prevention/safety with older adults, aging in place, OT in hospice/palliative care, OT in the ER

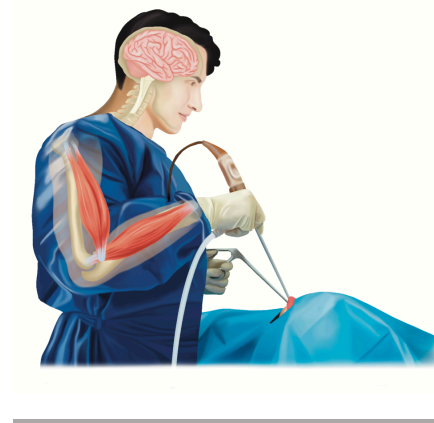


Agnes Villwock

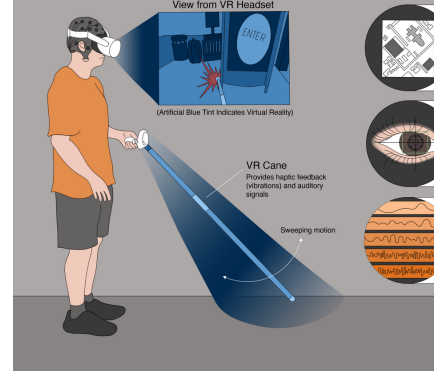
Assistant Professor
Integrated Sciences Academy

Research Areas: Neuroplasticity, deafness, sign languages, cochlear implants, bilingualism, multisensory processing, critical periods in brain development

Illustrations



Aastha Soni created an illustration for **Yangming Lee** for his publication in *Sensors* titled "Deformable and Fragile Object Manipulation: A Review and Prospects."
<https://www.mdpi.com/1424-6220/25/17/5430>



Aastha Soni created an illustration for **Pamela Beach** for her NIH proposal. A version of the illustration will also be included in an upcoming journal submission.

Affiliate Highlights

- Other Awards and Honors**
- ♦ **Jessica Hardin** (Associate Professor, Department of Sociology and Anthropology) was selected for a writing residency at the Brocher Foundation in Switzerland.
 - ♦ **Quang "Neo" Bui** (Associate Professor, Department of MIS, Marketing, and Analytics) was awarded a Fulbright Scholar Award.
<https://www.rit.edu/news/quang-neo-bui-earns-fulbright-faculty-award>
 - ♦ **Blessing Emerenini** (Assistant Professor, School of Mathematics and Statistics) received the Award of Excellence for her presentation entitled "The Power of Data Modelling in Mapping Microbial Worlds" at the University of Lagos.