



DEPARTMENT OF PHYSICS & ASTRONOMY

Please join us for the Physics and Astronomy Colloquium:

Applied Physics in Medicine: Design, Fabrication and Evaluation of Dedicated Breast Computed Tomography Systems for Improved Cancer Detection

TIME AND DATE: 3:30 p.m. Friday January 25, 2019*

LOCATION: Room 125, Dane Smith Hall, UNM Main Campus

Refreshments will be available before the colloquium, at 3:15pm, in the lobby of Dane Smith Hall

Presenter:

John M. Boone, Ph.D.
Professor of Radiology • Chief of Medical Physics
Professor of Biomedical Engineering
University of California, Davis Medical Center
Sacramento, California



Abstract:

About 12.5% of women in the U.S. will be diagnosed with breast cancer during their lives. Currently, breast cancer screening is performed with mammography and tomosynthesis, but the breast imaging community is aware that better detection methods exist. A twenty-year program at UC Davis Medical Center has focused on the development of dedicated breast computed tomography (CT) systems to improve breast cancer detection and diagnosis. Four breast CT systems have been designed, fabricated in-house, and used in various clinical trials involving over 600 women. In this presentation, I will demonstrate the evolution of breast CT systems in the lab, with a technical discussion of fabrication and functionality, software integration and calibration, and image quality improvements. Breast CT images will be shown, illustrating the potential of these fully 3D images to improve breast cancer detection. A number of projects involving the analysis of these breast CT volume data sets will also be presented, showing surrogate metrics for breast imaging performance, comparisons of 2D imaging (mammography) with 3D breast CT using both computer and human observer studies, use of the CT image data for improved breast dosimetry, and use of these image data sets to further our understanding of breast glandular anatomy.

Biography:

John M. Boone, Ph.D. received his bachelor's degree in Biophysics at UC Berkeley and a Ph.D. in Medical Physics at UC Irvine. He is now Professor of Radiology and Biomedical Engineering at UC Davis. He is board-certified by the American Board of Radiology as a clinical diagnostic medical physicist. As an educator, Dr. Boone has taught both radiology residents and BME graduate students at UC Davis; he is the co-author of a textbook *The Essential Physics of Medical Imaging*, which is used world-wide for instruction in medical imaging. He has lectured extensively both in the U.S. and internationally as an educator and researcher scientist. As a researcher, Dr. Boone has published about 200 peer-reviewed papers and has led a large research lab in medical imaging for 25 years. Several of his papers have won editorial accolades, including two papers (2012 and 2015) which received the "best paper of the year award" in the journal *Medical Physics*. Dr. Boone has been elected as a fellow in 5 scientific societies and is a commissioner of the International Commission on Radiation Units (ICRU). He served as President (2015) and Chair of the Board (2016) for the principal society in his field, the American Association of Physicists in Medicine (AAPM). He has served as Deputy Editor of *Medical Physics* and is currently Associate Editor for the journals *Radiology* and *Academic Radiology*.

*To arrange to meet with the speaker prior to the colloquium on Friday please contact Paul Schwoebel (kas@unm.edu)