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## ACHIEVEMENT IN BASIC SCIENCE RESEARCH AWARD

### **J. Brian Fowlkes, Ph.D.**

*Associate Professor of Radiology*

*Associate Professor of Biomedical Engineering*

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J. Brian Fowlkes' efforts in ultrasound imaging are so exceptional that the American Institute of Ultrasound in Medicine twice awarded him the Presidential Recognition Award for outstanding contributions and service to the expanding future of ultrasound in medicine.

The use of contrast media for ultrasound imaging and therapy has been limited in clinical applications – perhaps until now. Fowlkes and his colleagues in the ultrasound laboratory have developed a method of acoustic droplet vaporization to produce gas bubbles within an artery, creating a selectively localized ultrasound contrast media that can be used in a variety of applications such as volume flow estimations, tissue perfusion and shape control of acoustic fields within the body. These microbubbles also can be generated in such sufficient numbers as to affect blood flow for occlusion therapy. Dr. Fowlkes and his colleagues are expanding their methods to enclose therapeutic agents into gas bubbles and provide vectors to direct them to the appropriate organ. To overcome imaging limitations, he is creating 3-D ultrasound images of contrast media.

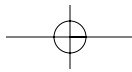
Dr. Fowlkes' success in these and other efforts is documented by the quality and number of his peer review publications. In addition, he has consulted with companies such as Dupont, Johnson & Johnson, Merck, CIRS, Creare and ImaRx. The national and international health care communities recognize him as an articulate advocate and leader in ultrasound imaging research.

Dr. Fowlkes' other areas of research include drug enhancement and delivery of ultrasonic therapy, tissue elasticity imaging, imaging and quantification of vascular flow and perfusion, safety of medical ultrasound, image processing, instrumentation, 3-D imaging and quantitative tissue characterization, and quantitative testing of new applications. One colleague says, "Dr. Fowlkes' latest advance in volume flow quantification by new imaging methods is likely to lead to a patent and a widespread new clinical imaging technique."

In addition, Dr. Fowlkes' work with Dr. Thomas Wakefield of Vascular Surgery at the University of Michigan has resulted in progress in developing non-invasive ultrasound techniques for monitoring the evolution of deep venous thrombosis. They demonstrated that echogenicity changes follow clot formation and dissolution in an animal model. Their work toward use in humans allowed assessment of thrombus age, progress and response to therapy in a noninvasive manner using relatively inexpensive means.

Dr. Fowlkes generously contributes his time and effort to supporting the research projects of others. In addition, he serves as a valuable mentor for junior faculty within the ultrasound division and as a collaborator with faculty in other departments and schools.

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He also has made extensive contributions to the scientific, professional and educational activities of national societies. In the 13,000-member American Institute of Ultrasound in Medicine, he is known as one of the most productive members in his generation of basic scientists in medical ultrasound. He has been chair of the AIUM's Bioeffects Committee, which is viewed as one of the world's leading watchdogs of medical ultrasound safety due to publications such as a special issue of the *Journal of Ultrasound Medicine*, entitled "Mechanical Bioeffects from Diagnostic Ultrasound," and co-edited by Dr. Fowlkes.

He is respected throughout the biomedical engineering community, as well as the medical imaging sciences and acoustical physics communities. One colleague says, "His joint appointment in the Department of Biomedical Engineering is a reflection of the value of his contributions."

In 1999, Johnson & Johnson awarded Dr. Fowlkes with a Focused Giving Program Award in recognition of outstanding research toward the advancement of science and technology in health care.

Dr. Fowlkes joined the University of Michigan faculty as a research investigator in 1991. He is a fellow of the American Institute of Medical and Biological Engineering.

*Dr. Fowlkes says, "In my free time, I enjoy fishing and skiing with my family, bicycling and a little golf. I enjoy being a counselor with our church youth program, and I find some time for pleasure reading, mostly science fiction."*

*"I would like to thank Paul Carson for his constant support and mentorship. Thanks to my colleagues in Radiology, particularly Jon Rubin and Oliver Kripfgans, all of whom make it a pleasure and honor to be here. Thanks to my colleagues in Biomedical Engineering, particularly Charles Cain, and other departments for opportunities to work together. And I humbly thank the students who have worked so hard and are the real success stories. Finally, I thank my parents who encouraged my science interests, my wife, Donna, whom I have loved through it all, and our children, Nicole and Sarah, who taught us how meaningful it is to be parents."*

