

# RSNA 2008 Lecture/Oration Preview

RSNA 2008 will feature honored lectures by these esteemed medical leaders: Michael J. Welch, Ph.D., of St. Louis, Elizabeth G. McFarland, M.D., of Chesterfield, Mo., and Minesh P. Mehta M.D., of Madison, Wis.



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## Eugene P. Pendergrass New Horizons Lecture

Nanoparticles hold great potential not only as diagnostic agents, but also as therapeutic agents, according to the RSNA 2008 New Horizons lecturer.

"The promise of nanoparticles results from their unique size and the ability to attach or encapsulate many different detection, targeting or therapeutic groups to the particles," said Michael J. Welch, Ph.D., who will deliver "Nanotechnology in the Future of Imaging: Prospects and Pitfalls," on Monday, Dec. 1.

For example, said Dr. Welch, radionuclides for PET and SPECT imaging can be attached to nanoparticles, as can probes for optical imaging and gadolinium or other metals used as MR contrast agents. The pharmacokinetics of the nanoparticle can even be altered to suit the requirements of the imaging technology being used, he said.

"If utilizing an imaging technology where longer imaging times can be used, the pharmacokinetics can be lengthened so that there is longer blood retention of the agent and greater uptake is likely to occur in the target site," Dr. Welch said.

Nanoparticles with varying chemical compositions have been studied and applied to imaging modalities including MR, nuclear optical and ultrasound. In addition to detailing the various studies, Dr. Welch will also address complicating issues such as non-specific uptake by the reticuloendothelial system and the enhanced permeability retention effect.

Dr. Welch is a professor of radiology, chemistry and molecular biology and pharmacology at the Mallinckrodt

Institute of Radiology at Washington University in St. Louis. He also teaches biomedical engineering at the university. Dr. Welch's investigation into the rapid synthesis of positron-labeled organic chemicals is recognized as essential to the development of PET in the early 1970s. His contributions earned him SNM's Benedict Cassen award in 2004.



Michael J. Welch, Ph.D.

He is the principal investigator of the PET component of Washington University's small animal imaging resource, one of the five original small animal imaging programs funded by the National Cancer Institute (NCI). He is also principal investigator of the NCI-supported radionuclide resource and co-principal investigator of integrated nanosystems for diagnosis and therapy, supported by the National Heart, Lung and Blood Institute.

Since 1979, Dr. Welch has been the primary investigator of the study titled "Cyclotron Produced Isotopes in Biology and Medicine," supported by NIH. It is the longest continuously renewed research grant at Washington University, now approaching 50 years of progress.

## Annual Oration in Diagnostic Radiology

In the decade and a half since CT colonography, or "virtual colonoscopy," was introduced, tremendous technological gains and validation trials of diagnostic performance pushed the field to new level of potential.

"Although CT colonography can provide a time efficient, noninvasive structural examination of the whole colon, the many achievements gained are countered by

significant challenges to overcome," said Elizabeth G. McFarland, M.D., who will deliver this year's Annual Oration in Diagnostic Radiology, "CT Colonography: Achievements and Challenges," on Tuesday, Dec. 2.

In the first decade of CT colonography development, Dr. McFarland was among the researchers who were able to attain National Cancer Institute or corporate funding to pursue optimization of the 3D endoscopic views and CT techniques and conduct validation trials of enriched cohorts of patients for detection of colorectal polyps. Novel work in 3D imagery, computed-aided diagnosis, prepless patient protocols and larger validation trials in screening cohorts followed, she said.

"Throughout these efforts, there was a strong culture of investigators both nationally and internationally who shared a common passion of the pursuit," said Dr. McFarland.

Among the challenges to CT colonography, she said, are the politics of potentially infringing on other specialties and the economics of reimbursement, not to mention implementation obstacles such as defining target lesion size for polyp detection and controlling radiation dose.



Elizabeth G. McFarland,  
M.D.

"Similar to the challenges of the low technology field of mammography, the advanced 3D imagery of CT colonography will only face the future challenges of early cancer detection through those who have the discipline to pursue it," said Dr. McFarland.

Dr. McFarland is a radiologist with Diagnostic Imaging Associates at St. Luke's Hospital in Chesterfield, Mo., and serves as medical director and director of CT

colonography at the Center for Diagnostic Imaging in Minneapolis. She is also an adjunct professor in 3D imaging and radiology in the Mallinckrodt Institute of Radiology at Washington University in St. Louis, where she previously spent 10 years as an associate professor.

Dr. McFarland is chair of the American College of Radiology colon cancer committee and has served on the board of directors for the association of university radiologists and on interdisciplinary panels for the American Gastroenterology Association, American Medical Association and ACR. Dr. McFarland also led recent efforts to establish colorectal screening guidelines for the American Cancer Society.

### Annual Oration in Radiation Oncology

The origins of radiotherapy are in diagnostic radiology and, while the two fields diverged over the last 30 years, advanced molecular imaging is now driving the need to re-integrate the two fields into a common strategy for improved patient outcome, said the presenter of the RSNA 2008 Annual Oration in Radiation Oncology.

"Advances in molecular medicine and diagnostic radiology will be central to moving the field of radiation oncology to the ultimate goal of personalized medicine or theragnostic radiation

oncology," said **Minesh P. Mehta, M.D.**, who will present "Alchemy, Early Detection, Precision Guidance and Radiotherapy," on Wednesday, Dec. 3.

Dr. Mehta noted that about half the 1.2 million people diagnosed with cancer annually in the U.S. receive radiotherapy, with half of those patients doing so with a curative intent. Encouraging multi-disciplinary interaction, his lecture will focus on early detection, avoidance of geographic/marginal misses, identification of biologically resistant subclones of tumor cells and appropriate therapeutic modifications to overcome this resistance, and improved treatment delivery.

"The need for integrating the fields of radiotherapy and diagnostic radiology into a common strategy for improved patient outcome in cancer is obvious," said Dr. Mehta. "It is an absolute necessity to reintegrate these fields as vital partners in the battle against cancer."

Earning international recognition for his investigation of innovative therapies for brain tumors, Dr. Mehta has explored techniques with radiosurgery, fractionated stereotactic radiotherapy, intensity modulated radiation therapy and image



Minesh P. Mehta, M.D.

guided radiation therapy. He has also studied promising methods such as using targeted agents in conjunction with radiotherapy to overcome therapeutic resistance.

Dr. Mehta is Eric Wolfe Professor of Human Oncology at the University of Wisconsin at Madison. He also teaches neurological surgery at the university. He serves at five of the university's specialized cancer clinics and maintains staff appointments at nearly a dozen hospitals in Wisconsin and Illinois.

Through clinical patient care programs at the University of Wisconsin, Dr. Mehta has chaired major international phase-three randomized studies. One examined the radiation effect modulator motexafin gadolinium in lung cancer patients with brain metastases and demonstrated the improvement in time to neurologic decline. Another study, supported by a program project grant from the National Institutes of Health, assembled a team of top investigators to carry out the first clinical implementation and utilization of tomotherapy.



The New Horizons Lecture is a popular event during RSNA annual meetings. Francis S. Collins, M.D., Ph.D., presented "A Roadmap for the Future of Biomedical Research" at RSNA 2003.