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A 3-D VISUALIZATION OF THE COLON
The Washington University Medical Center Alumni Association created the Distinguished Alumni Scholarship Program (DASP) in 1989 to annually provide first-year medical students with four years of full-tuition funding. The scholarships are named after distinguished alumni who are Washington University faculty. A 1998 Distinguished Alumni Scholarship honors Gary Shackelford, MD, professor of radiology and of pediatrics. The Shackelford Scholarship was awarded to Hanna Wunsch, a 1997 Harvard University graduate who began her medical training at Washington University School of Medicine in the fall of 1998.

Shackelford has been a member of the MIR community since 1969 when he began three years of diagnostic radiology residency and served as the 1971-1972 chief resident. He joined the Institute faculty in 1972 as an instructor in radiology and was later appointed professor of radiology (1982) and professor of pediatrics (1983). An active participant in student and resident education, Shackelford served as director of Medical Student Education in Radiology (1977-1981) and director of Diagnostic Radiology Resident Training (1981-1988). He received the 1995 Distinguished Teaching Award, which is presented annually by the senior radiology residents. He is a fellow of the American College of Radiology and a member of the Radiological Society of North America and the Society for Pediatric Radiology (member of the Board of Directors, 1981 to 1983).

Other MIR faculty honored by DASP are (1995) Barbara Monsees, MD, chief of breast imaging; (1996) Ronald Evens, MD, director of the Institute; and (1997) Barry Siegel, MD, director of the Division of Nuclear Medicine.
NEW STUDIES YIELD RESULTS IN TREATING CERVICAL CANCER

Based on five landmark research studies, the National Cancer Institute reports that the survival rate for women with advanced cervical cancer is dramatically increased when chemotherapy is added to standard radiation treatment.

VIRTUAL COLONOSCOPY, A 3-D VISUALIZATION OF THE COLON

Researchers are evaluating a rapidly advancing technology called spiral computed tomography colonography to screen colorectal polyps, the precursors of colon cancer, by using two- and three-dimensional images of the colon.

UTERINE ARTERY EMBOLIZATION: AN ALTERNATIVE TO HYSTERECTOMY

The Washington University Comprehensive Fibroid Center offers a nonsurgical alternative to hysterectomy for women with uterine fibroids, the most common benign tumors in women in the United States.

THE ART OF IMAGING

Musculoskeletal radiologists are using the same rapid prototyping technology that replicates a patient’s anatomy to assist in the Saint Louis Art Museum’s restoration of an ancient Egyptian mask.

SPOT NEWS

ON THE COVER:
According to the National Cancer Institute, colon cancer is a highly treatable and often curable disease when detected early, yet it remains the second most common cause of cancer death in the United States. Dr. Elizabeth McFarland and a team of clinical and technical investigators are studying the reliability of virtual colonoscopy, a promising method for screening colon cancer.
SPOT NEWS

NCI establishes clinical trials network

Mallinckrodt Institute is one of 42 institutions participating in a new cooperative group committed to multicenter cancer-related clinical trials. Established in November 1998 and funded by the National Cancer Institute, the American College of Radiology Oncologic Imaging Network (ACRIN) is an integrated collaboration comprised of researchers from radiology, other medical specialties, and related basic and clinical sciences. ACRIN’s goal is to “improve the health of cancer patients through the advancement of diagnostic imaging and image-guided interventional procedures.”

Among its specific objectives, ACRIN intends to evaluate innovative diagnostic imaging and image-guided treatment methods for cancer patients; reduce healthcare costs while improving the effectiveness of patient care; define and disseminate standards of operation for the high quality use of imaging technology; and, through clinical trials, facilitate the early availability of new, potentially valuable technologies to a broader range of patients.

MIR faculty are active members of ACRIN.

■ Jeffrey Brown, MD, associate professor of radiology, director of clinical research, and codirector of magnetic resonance imaging, is the Institute’s representative to ACRIN and is a member of the Receptor Imaging and Delivery Systems Committee.

■ William Middleton, MD, professor of radiology and head of ultrasonography, is a member of the Ultrasound Committee.

■ David Piwnica-Worms, MD, PhD, professor of radiology and of molecular biology and pharmacology and director of the molecular pharmacology laboratory, chairs the Receptor Imaging and Delivery Systems Committee and is a member of the Research Strategy Committee. He also is a member of the Basic Sciences and Molecular Technologies Committee.

■ Barry Siegel, MD, professor of radiology and of medicine and director of the Division of Nuclear Medicine, chairs the Nuclear Medicine/SPECT/PET Committee and is a member of the Research Strategy Committee.

■ Marilyn Siegel, MD, professor of radiology and of pediatrics, chairs the Pediatrics Committee and is a member of the Research Strategy Committee.

■ Todd Wasserman, MD, professor of radiology, is chairman of the Radiation Oncology Committee of the Medical Specialties Advisory Committee.

■ Gilbert Jost, MD, director of the Division of Diagnostic Radiology, was elected to a three-year term as chairman of the Radiological Society of North America’s (RSNA) Electronic Communications Committee (ECC). Jost, who is a professor of radiology and of computer science, will guide the ECC as it oversees RSNA’s initiatives to improve the exchange of data among radiology information and imaging systems. The committee’s 15 members are responsible for evaluating computer software and hardware, magnetic and optical data, storage devices, and electronic data transmission.

“Today, we are moving away from the current information handling system of buying and selling text and image data. To provide the right care at the right time, the right information must be readily available,” Jost said.

MIR faculty among top cancer doctors

Good Housekeeping magazine annually publishes a listing of the “Top Cancer Doctors” in the United States. The magazine’s March 1999 issue narrowed the field to feature those doctors who “provide the most expert treatment and are the leading clinicians for lung, breast, and colon cancer in women.” The 318 physicians were those cited most often in the 1,200 doctors nominated on surveys sent to surgical, medical, and radiation oncology department heads and section chiefs at major U.S. medical centers. Nominators could not submit physicians from their own institution.

Three MIR faculty were among the experts:

■ Radiation oncology, colon cancer—Robert Myerson, MD, PhD, professor of radiology.

■ Radiation oncology, breast cancer and lung cancer—Carlos Perez, MD, professor of radiology and director of the Radiation Oncology Center.

■ Radiation oncology, breast cancer—Marie Taylor, MD, instructor in radiology and chief of Breast Cancer Service.
MIR textbooks included in select list

Since 1965, the "Selected List of Books and Journals for the Small Medical Library"—later called the "Brandon List" for its author and now the "Brandon/Hill List" to include its coauthor—has been the standard resource for hospital library collections. Endorsed by the Joint Commission on Accreditation of Healthcare Organizations, the list contains the most current and authoritative information for the practicing clinician and serves as a buying guide for health sciences librarians.

The list of journals and textbooks appears biennially in the Bulletin of the Medical Library Association and has traditionally been used as a planning tool for developing or updating a library print collection in a hospital or facility involved primarily in patient care. A recent Brandon/Hill List included two radiology textbooks authored or edited by Mallinckrodt Institute faculty.

"Pitfalls, Variants, and Artifacts in Body MR Imaging," authored by Scott Mirowitz, MD, associate professor of radiology, radiologist-in-chief at Barnes-Jewish Hospital north, and codirector of body magnetic resonance imaging, is a reference of the wide range of MRI artifacts and anatomic variants that can be mistaken for pathology. Published in 1996, the book provides clinically relevant methodology for making informed, accurate diagnoses.

Pediatric Sonography, now in its second edition, was edited by Marilyn Siegel, MD, professor of radiology and of pediatrics. This comprehensive text on the pediatric applications of sonography includes up-to-date information on the grayscale and Doppler imaging approach to a variety of diseases and the use of sonography in biopsy and treatment. Book chapters were authored by Siegel and doctors Thomas Herman, associate professor of radiology; William McAlister, professor of radiology and of pediatrics and chief of pediatric radiology; Gary Shackelford, professor of radiology and of pediatrics; William Middleton, professor of radiology and head of ultrasoundography; and Marshall Hicks, a former MIR faculty member who is now head of interventional radiology at M.D. Anderson Cancer Center in Houston, Texas.

Evens leads FPP Board

In January, Ronald Evens, MD, director of Mallinckrodt Institute, was elected chairman of the 25-member Board of Directors of the Washington University School of Medicine Faculty Practice Plan (FPP). He succeeds Ralph Dacey, MD, head of neurological surgery and the Board's first chairman.

With more than 800 physicians and clinical revenues of more than $250 million, the full-time Washington University School of Medicine (WUSM) physicians comprises one of the largest consolidated multispecialty group practices in the United States. The FPP was initiated in 1997 to revamp clinical care at WUSM so that patients, referring physicians, and healthcare insurers would be better served. The Practice Plan Board is responsible for managing the medical school's clinical operations, with specific responsibility in the areas of clinical oversight, administration, fiscal management, and clinical planning.

"The establishment of the Washington University Faculty Practice Plan is a direct result of the rapidly changing healthcare market's effect on academic medicine nationwide and specifically in the St. Louis region," says Evens. "The FPP has already facilitated significant advances in strategic planning, medical management, and financial affairs, and we must continue to provide initiatives that will efficiently re-engineer the way we practice medicine."

Marilyn Siegel, professor of radiology and of pediatrics, was elected to a second term on the Board as a faculty-at-large representative. From the more than 1,000 medical school faculty, six representatives are elected by full-time faculty within the clinical departments.

Siegel's first two years on the board were exciting and productive. "The FPP played an important leadership role in designing the new ambulatory care center, streamlining some patient care activities, and planning satellite facilities," she says.
Women with advanced cervical cancer can now look to chemotherapy to help fight their disease. Researchers have found that adding chemotherapy to the standard radiation therapy dramatically increases a woman’s survival rate. Results from a series of five landmark studies, all sponsored by the National Cancer Institute during a seven-year period, are so significant that, for the first time in four decades, changes are being recommended in the treatment of cervical cancer.

New Studies Yield Results In Tre
Perry Grigsby, MD, MBA, FACR, professor of radiology at Mallinckrodt Institute, is a co-author of two reports documenting these study results; one of the reports was published in the April 15th issue of *The New England Journal of Medicine*. Because of the potential impact on public health, the *Journal* released the study results on its web site prior to the slated publication date, and the NCI mailed a rare clinical announcement to thousands of physicians, notifying them of the findings and urging them to consider the combination of chemotherapy and radiation therapy for the treatment of invasive cervical cancer.

The NCI recommends the combination treatment for women diagnosed with advanced cervical cancer that has spread to the pelvic lymph nodes or to the parametrium (the connective tissue surrounding the uterus) and for those who have cancer cells in the tissues outside of the removed tumor.

Radiation has been the treatment of choice for advanced cervical cancer since the 1950s. While approximately 20 studies have been done outside of the United States using various combinations of radiation and the chemotherapy drugs hydroxyurea, cisplatin, and 5-fluorouracil, none showed a benefit. The five studies in the United States, however, did show a benefit using cisplatin and 5-fluorouracil in tandem with radiation.

Grigsby attributes the difference in the study outcomes to the drugs selected and to the strict quality control guidelines of the U.S. research. The guidelines detailing the study are often 30 to 40 pages in length. “The research that we do is conducted in a rigid, scientific manner. It’s important research, and it’s all done with taxpayers’ dollars through the National Cancer Institute,” Grigsby said.

**STUDY RESULTS**

Grigsby and scientists from the University of Texas M.D. Anderson Cancer Center, along with other institutions and universities, looked at the effects of adding chemotherapy to radiotherapy. The study included 403 women of all ages who had advanced cervical cancer with tumors that were too large to remove surgically or with cancer that had spread to pelvic lymph nodes. Patients were randomly assigned treatment methods: Some received external and internal radiation, others received chemotherapy in addition to the internal and external radiation. For all patients, the radiation treatments were administered during an approximate six-week period. Externally, radiation was directed at the pelvic area. Internally, radioactive pellets were placed temporarily in the vagina and cervix. Those receiving chemotherapy had their first treatment within 16 hours of the first radiation treatment, with two more cycles of chemo given at three-week intervals. The side effects were similar for the women in the two groups; however, women in the combined therapy group had a higher rate of blood-related problems, which were reversible.

During treatment, patients were evaluated weekly. After treatment, evaluations were done every three months for the first two years. In the third year, evaluations were done every four months, then every six months during the fourth and fifth years.

After five years, the survival rate for women receiving the combination of chemo and radiation was 73 percent. Those women who received only radiation had a 58 percent survival rate. While these findings were encouraging, women in the combination therapy group could still have the disease. Taking the statistics a step further, 67 percent of the women who had received the combination treatment did not have cervical cancer after five years, while 40 percent of women in the radiotherapy group had beat the disease.

Following the study, researchers found that adding chemotherapy reduced the chances of surgically removing residual disease.
New Studies Yield Results

for recurrence of cervical cancer. This study also differed from others in that the median dose of radiation was higher and the median duration of treatment was shorter. A more aggressive regimen of chemotherapy was used with three cycles, administering a higher dose of cisplatin than the dose of fluorouracil used in other studies.

Because of the potential impact on public health, the Journal released the study results on its web site prior to the slated publication date...

According to Grigsby, while the findings are significant, some women in the study were hesitant to undergo the chemotherapy. “Some patients said that if there was a chance she would receive chemotherapy, then she wouldn’t participate in the study,” he says. “They knew a relative or a friend who had undergone chemo and hadn’t done well. Even though women knew that their survival rates might increase with the combined therapy, there was still some hesitancy.”

These volumetric images, produced from raw CT scans, reconstructed CT data, and digitally reconstructed radiographs, show axial, sagittal, and coronal views of the uterus, cervix, and tumor. Radiation oncology physicist Dr. Jeffrey Williamson received an NCI grant to study the treatment of locally advanced cervical cancer through an integration of imaging techniques.

In a second study, chemotherapy and radiation were given to women with invasive cervical cancer who had already undergone radical hysterectomies and lymphadenectomies. In those cases, the cancer had spread to pelvic lymph nodes, to the tissue surrounding the tumor, or to the parametrium. The survival rate for the 268 patients participating was 69 percent after four years.

“The findings from this study [which were presented in March to the Society of Gynecologic Oncologists in San Francisco] also showed a significant benefit to adding chemotherapy to the radiation therapy,” Grigsby says.

The three remaining studies were similar in that radiation was compared with the chemotherapy drugs cisplatin, 5-fluorouracil, and hydroxyurea, and all of the studies found the addition of chemo to be beneficial. The studies were performed by three of the NCI’s Clinical Trials Cooperative groups, comprised of institutions and physicians that conduct trials jointly.

In these studies, chemotherapy and radiation were given simultaneously—according to information from previous, smaller NCI studies, the treatments were found to have a greater effect when administered together than if given one after the other. Researchers believe that chemotherapy makes cells more receptive to radiation or vice versa. Chemotherapy also may prevent cancer cells from repairing the damage caused by radiation.
CAUSE AND EFFECT

Stopping the cancer cells becomes even more imperative when you look at the statistics: Cervical cancer is the most common type of cancer in women worldwide. In 1998 in the United States, an estimated 13,700 women were diagnosed with invasive cervical cancer. Of those, nearly 5,000 will die from the disease. According to the National Institutes of Health, half of the women with newly diagnosed invasive cervical cancer have never had a Pap test—the standard screening test for abnormalities. Another 10 percent have not had a Pap test in the past five years. Most at risk are minorities and low-income women who have insufficient access to and knowledge of the screening. The disease can be detected and treated early, with early detections tested and rated using a standardized scale. It is only after the disease has been undetected, often over the course of several years, that it becomes invasive.

Pap tests are recommended when women become sexually active or at age 18. Generally the tests are done once a year, but if any abnormalities are detected, Pap tests are recommended more frequently.

At the root of most cervical cancer—93 percent—lies the human papillomavirus, known as HPV. More than 70 types of HPV have been identified; twenty-three of them infect the cervix, according to information from the National Institutes of Health. Only some of them are associated with invasive cervical cancer. The virus is transmitted through sexual intercourse, and infection is most prevalent in women ages 22 to 25. Infection decreases with age, suggesting that most are resolved through host immune responses.

"HPV is sexually transmitted, and it's clearly a cause of cervical cancer. But we don't know if all cervical cancers are caused by HPV," Grigsby says.

In theory, cervical cancer can be prevented, and education is the key. Young women must learn how cervical cancer can be transmitted. Throughout their lifetime, women—and this includes postmenopausal women—must continue to have regular Pap tests. Worldwide research for an HPV vaccine has begun, and planning is underway at the NCI for a vaccine to be used as an auxiliary treatment after radiation or chemotherapy. Other vaccines focus on prevention. Early reports from an NCI study showed that a vaccine stimulated the body to produce antibodies to HPV. Further studies are being done, and if they are promising, the vaccine will be tested in larger numbers of women.

Chris Wayland is a St. Louis-based free-lance writer.
Colon cancer remains the second leading cause of cancer death in the United States, but a rapidly advancing technology may help to reduce that statistic through the early detection of colorectal polyps, the precursors of colon cancer. Spiral computed tomography (CT) colonography—or virtual colonoscopy—provides a noninvasive evaluation of the colon, using both two- and three-dimensional visualization displays.

Elizabeth McFarland, MD, assistant professor of radiology at Mallinckrodt Institute, has received a $500,000 contract from the National Cancer Institute (NCI) to study the diagnostic performance of this evolving technology. Along with the 3-D visualization of the entire colon, spiral CT colonography also views colorectal polyps from a variety of angles, using a spectrum of 2-D and 3-D image display techniques.

This diagnostic breakthrough enables doctors to virtually maneuver through the colon by using a 3-D software package called Vitrea, which was developed by Vital Images, Inc. of Minneapolis. With the patient’s obvious benefit from a noninvasive procedure and the physician’s diagnostic advantages, spiral CT colonography has shown promising results in the initial clinical studies.
**Virtual Colonoscopy**

Colorectal cancers are the third most frequently occurring cancers among men and women in the United States. There are approximately 160,000 new cases each year that result in 60,000 deaths and billions of dollars in costs. At all ages, men are more likely to develop colorectal cancer than women. African Americans have higher colorectal cancer incidence and mortality rates than men and women of other racial and ethnic groups. These staggering statistics reinforce the need for detection of early lesions and precancerous polyps in the colon.

“In the United States, there is a need for accurate, noninvasive, total colonic screening for colon cancer. Virtual colonoscopy may fill this need,” says Leonard Weinstock, MD, a coinvestigator of the research and an associate professor of clinical medicine in the Division of Gastroenterology.

**With virtual colonoscopy, the patient is positioned on the bed of a spiral CT scanner.** After the bowel is prepped, air is introduced into the colon through a small tube. Operating on a slip-ring technology, spiral CT allows the bed on which the patient is lying to move through the gantry at a steady pace while the X-ray beam traces a 360-degree spiral pathway around the patient. The patient is in the scanner for less than 30 minutes. Scans are taken—one while the patient is facedown; one, faceup—while the patient inhales, maintains a 40-second breathhold, and exhales. After the images are completed, the air in the distended colon is removed through another small tube. Patients may experience some minimal discomfort from cramping caused by the insufflation of air and distended colon.

The CT images are then electronically transferred to a dedicated 3-D workstation. Using the Vitrea software, these images are converted into a three-dimensional volume that is developed from approximately 200 CT slices, each about two millimeters thick. Multiple 3-D rendering algorithms are applied to automatically create a variety of interactive 2-D and 3-D visualizations. In general, a radiologist can use the two-dimensional multiplanar reformations simultaneously to cross-reference a focal finding in the axial, sagittal, and coronal planes. This provides not only a quick survey of the colon but the ability to interactively “fly” into the
3-D endoscopic view. The simultaneously displayed intraluminal and extraluminal images also allow the radiologist to maintain orientation along the course of the colon.

In early clinical trials, virtual colonoscopy has detected 67 to 83 percent of polyps that are one centimeter or larger in size. In a multiobserver study to assess the diagnostic performance of spiral CT and to evaluate the radiologists' interpretations, doctors Jay Heiken, professor of radiology and codirector of body computed tomography;annis Balfe, professor of radiology; and James Brink, vice-chairman of the Department of Radiology at Yale University, compared results from a spiral CT test set of colonic segments to those achieved with colonoscopy, the gold standard for detecting colorectal polyps. With both 2-D and 3-D display techniques, CT's overall sensitivity to detect polyps ranged from 83 to 92 percent. Heiken, Balfe, and Brink also reread the cases in a second session, and both intra- and inter-observer agreement were very good. MIR investigators also are collaborating with Ge Wang, PhD, of the University of Iowa, on a new display technique to “unravel” the colon.

Multiple issues of the rapid spiral CT acquisition are under investigation, including the occurrence of rippling artifacts that can degrade the image quality. Bruce Whiting, PhD, of the Institute’s Electronic Radiology Laboratory, developed specific quantitative metrics to evaluate the influences of CT acquisition parameters, such as pitch and angle, on the frequency and magnitude of the artifact. This approach is being used to analyze the performance of a new generation of multirow detector CT scan-

ners. “With this approach, a better understanding of the image formation process will result in improved diagnostic information,” says Whiting.

Spiral CT colonography, as is true of most new medical procedures, will go through varying stages of development. The study is now in the second stage of technology assessment: the evaluation of reader performance among expert readers compared to conventional colonoscopy performance. Following optimization and standardization of numerous parameters of both image acquisition and rendering, performance of this technique among expert radiologists first needs to be determined. The diagnostic performance of spiral CT in generalized settings will then be the next stage.

The Mallinckrodt Institute contract is part of a larger Washington University grant coordinated by Principal Investigator Gerald Andriole, MD, who is head of a preventive cancer research organization called PLCO (an acronym for prostate, lung, colon, and ovary).
Currently, McFarland’s study is recruiting 70 patients with colorectal polyps who also meet the criteria of Andriole’s PLCO study. At this point, the CT exam is in the validation stages and is not available as a routine test. If results continue to be promising, the next stage will be technology assessment of spiral CT in the general community.

Virtual colonoscopy is definitely a product of a constantly expanding computer age. The transition of two-dimensional CT slices into a three-dimensional image of the colon has entailed a multitude of expertise. As McFarland points out, “This technology will require a very strong multidisciplinary cooperative effort where radiology, gastroenterology, computer science, and electrical engineering work very closely together.”

With decreasing workstation costs and additional applications for the procedure, such as the trachea, the possibilities of this technology reaching the general community is increasing. It’s virtually there.

Editor’s note: Dr. McFarland’s spiral CT colonography research has also been generously funded by a two-year, General Electric-Association of University Radiologists career grant and by grants from the Barnes-Jewish Hospital and Washington University Cancer Center.

In early clinical trials, virtual colonoscopy has detected 67 to 83 percent of polyps that are one centimeter or larger in size.

RISK FACTORS FOR COLORECTAL CANCER

- **Age**—Older age is the single most important risk factor for the development of colorectal cancer.

- **Familial factors**—A personal history of colon cancer, intestinal adenomatous polyps, or inflammatory bowel disease also increase a person’s likelihood of developing colorectal cancer.

- **Diet**—A diet high in animal fats (i.e., red meats) is thought to increase the risk for developing colorectal cancer while a diet high in vegetables and fruits is considered protective.

- **Physical activity**—Participation in regular physical activity may reduce a person’s risk for developing colon cancer. Obesity has been shown to increase the risk for colon cancer in men.

- **Hormone replacement therapy**—Current use of hormone replacement therapy may decrease the risk for developing colorectal cancer in postmenopausal women.

- **Aspirin use**—Men and women who use nonsteroidal anti-inflammatory drugs may have a decreased risk for developing colon cancer and other cancers of the digestive tract.

This information was excerpted from the American Cancer Society’s 1999 Facts & Figures.
One solution for a woman with troublesome uterine fibroids is a hysterectomy, the surgical removal of the uterus. This operation usually entails a week in the hospital, followed by a four-to six-week recuperation. More important, it means the loss of child-bearing potential and, for some women, a piece of their gender identity. There is a second surgical option—myomectomy—which removes only the fibroids, but myomectomy can be a time-consuming, difficult procedure with an uncertain result.

By Candace O’Connor
Many women with uterine fibroids have discovered a third treatment option: a relatively new, nonsurgical procedure called uterine artery embolization. The concept was developed in France in the early 1990s and has been adopted worldwide for the treatment of more than 1,000 women with excellent clinical and therapeutic results. In the United States, it is performed routinely at an increasing number of medical facilities, including Washington University Medical Center.

"Fibroids are the most common benign tumors in women in the United States today. From twenty to forty percent of women have fibroids and, although only a quarter of the tumors are symptomatic, millions of women continue to live with them because the only alternative is surgery. Uterine artery embolization has the potential to transform how fibroids are treated," says Mallinckrodt Institute of Radiology's David Hovsepian, MD, assistant professor of radiology and of surgery.

Hovsepian and his team—doctors Suresh Vedantham, an interventional radiologist, and Valerie Ratts and Thomas Herzog, gynecologists—have founded the Washington University Comprehensive Fibroid Center to treat women with this common problem by providing excellent care and acquainting them with all of their treatment options.

Since June 1998, Hovsepian himself has treated seven women with uterine artery embolization and has more cases scheduled. Several women have found him via the Internet after reading about the procedure in magazines or newspapers. Hovsepian is impressed by his patients' motivation and education.

"These women are highly motivated and well-educated," he says. "They have usually been told that they need a hysterectomy, so they sit down and really do some extensive homework to find alternatives to surgery."

PROCEDURAL BACKGROUND

Uterine fibroids—or leiomyomata—are benign growths that arise from the muscular wall of the uterus. In some women, they can cause excessive menstrual bleeding, pain, and a feeling of heaviness in the abdomen. In fact, they may grow so large that a woman appears to be in an advanced state of pregnancy. Fibroids also may exert pressure on the bladder and lead to voiding problems and even incontinence.

Traditionally, a hysterectomy has been the recommended treatment, particularly for older women who are not concerned about preserving their fertility. In 1995, for example, some 600,000 women underwent a hysterectomy, making it the most commonly performed surgical procedure in women in the U.S. One-third of those procedures was for the treatment of uterine fibroids.

Myomectomy, which spares the uterus, is an alternative to hysterectomy, especially for younger women who may later wish to become pregnant. It is a more time-consuming procedure than a standard hysterectomy, even longer if the procedure is done laparoscopically, since the physicians painstakingly remove the
UTERINE ARTERY EMBOLIZATION: AN ALTERNATIVE TO HYSTERECTOMY

The cluster of two small circles and one square on each of the three images represents a dosimetry badge that monitors the amount of radiation.

1. Pre-embolization arteriogram shows prominent left and right uterine arteries (arrows) due to high blood flow. 2. Selective injection of left uterine artery shows a large fibroid (area within arrows). 3. Postembolization arteriogram shows no filling of uterine artery, but all other pelvic branches have normal blood flow. The dense area is the bladder (arrow), which has filled with contrast from the procedure.

individual fibroids. Not only does myomectomy carry the risks of any surgical procedure, there are other disadvantages as well. Small fibroids may be left behind only to enlarge later, or brand new fibroids may grow. Most frustrating of all is the chance that the key fibroid, which is causing most of the problems, may be left untreated.

In the early 1990s, a French physician, Jacques Ravina, conducted a study of women awaiting myomectomies. To reduce blood loss during surgery, Ravina and his colleagues embolized the patients' fibroids preoperatively. The results were surprising. The fibroids shrank, and the bleeding stopped. Many women were so pleased with the results that they canceled their planned surgery. To verify these findings, the investigators conducted a multicenter trial and had the same results.

Physicians at the University of California, Los Angeles (UCLA) learned of the French group's published reports and, in 1996, began their own study of uterine artery embolization. In the initial experience at UCLA, 11 women who had failed medical or surgical therapy underwent embolization. Out of nine women who completed the postoperative questionnaire, eight experienced symptomatic relief; only the ninth woman required a hysterectomy because of an infection. Thus, the technical success and the symptomatic improvement rate were very high.

When Hovsepian saw a presentation of the UCLA data, he was fascinated by this procedure, a fascination fed by his clinical interest in gynecologic interventional radiology—especially methods for treating fallopian tube occlusion and possible ways to achieve reversible tubal sterilization—and for treating pelvic venous congestion syndrome, a poorly understood and underrecognized condition in women who suffer from debilitating pelvic pain and pressure.

"In truth, uterine artery embolization is not a new technology. It is a new application of existing techniques," he says. "For years, many women have only been given the option of a hysterectomy for treatment of their fibroids, which has meant the loss of being able to bear children. Embolization for fibroids has the potential for helping a lot of women."

THE MIR TECHNIQUE

If a patient refers herself to Hovsepian and has not been seen recently by a gynecologist, Hovsepian first refers her to the gynecologists on his team for a physical exam and lab tests to rule out other reasons for her symptoms and to discuss the surgical options. Those patients who are still interested in having the embolization then meet with Hovsepian and clinical coordinator Pat Norton, RN, to discuss what the patient should expect before, during, and after the procedure.

On the day of the embolization, the patient checks in to the hospital early in the morning to undergo any remaining tests. She is instructed not to eat any food after midnight preceding the morning of the embolization. The procedure requires intravenous sedation only, not general anesthesia, so the recovery period is short and without side effects.
UTERINE ARTERY EMBOLIZATION: AN ALTERNATIVE TO HYSTERECTOMY

The secret to the success of embolization, says Hovsepian, is that fibroids are highly vascular and dependent on blood supplied by the left and right uterine arteries. In the arteriogram, taken at the beginning of each procedure, these arteries are very visible. Engorged with blood, they become enlarged and take an easily recognizable course to the uterus.

The objective of the procedure, which can take from one to three hours, is to block the blood flow through these arteries. It is necessary to embolize both arteries, Hovsepian stresses. Previous experience in which only one artery was blocked resulted in failure.

Through a small incision in the patient’s groin, physicians insert a tiny plastic tube, or catheter, which is guided into each uterine artery—one after the other—using the arteriogram as a map. Once the catheter is in place, 350 to 500 micron-size particles of polyvinyl alcohol (the size of grains of sand) are injected through the catheter. These granules immediately block the arteries, obstructing blood flow to the fibroids.

“In most of these cases, as soon as the fibroids have been embolized, the patient feels crampy abdominal pain, sometimes accompanied by nausea and vomiting—called ‘post-embolization syndrome’—that lessens over the next few days,” says Hovsepian. “It is usually necessary for the patient to stay overnight in the hospital so that she can be given strong medicines to provide optimum pain control.”

During the procedure, the patient receives intravenous medication for pain and relaxation; afterwards, she is placed on a morphine patient-controlled analgesia (PCA) pump, so that she can determine her own need for pain relief. Gradually, the patient is switched to oral medicines. Ibuprofen and Tylenol® are also added to treat the soreness and fever that usually develop during the first few days after embolization as the fibroids begin to break down. By the third or fourth day after the procedure, the patient can usually return to a modified routine, with most women returning to work within a week.

All of the fibroids are treated at the same time, and as they have been starved for oxygen or nutrients, they begin to shrink. Some fibroids “melt” away entirely, and occasionally some which have grown on a stalk inside the uterine cavity may even be expelled. A follow-up ultrasound at six months shows that, on average, the fibroids have diminished in size by 40 to 50 percent.

“If you combine all of the available reports,” says Hovsepian, “approximately ninety-two percent of patients have sufficient symptomatic relief from either pain or bleeding so that no further treatment is necessary.”

After undergoing uterine artery embolization, a few women in their forties stopped having periods. It is still unclear whether or not embolization effected the early onset of menopause for these women or whether they were already perimenopausal, a fact which became evident only after the abnormal bleeding had disappeared.

Therefore, until embolization’s possible effect on fertility is determined, younger women who want to have children are being counseled to consider myomectomy, unless it is not feasible, instead of embolization. No negative impact from embolization has been found. In fact, in a group of 25 women who had uterine artery embolization for postpartum hemorrhage, each of the six patients who tried to become pregnant afterwards succeeded.

“We explain all of this in detail to patients before the procedure so that they can understand the potential risks and benefits and can make their own informed decisions,” Hovsepian adds.

Hovsepian and his colleagues have constructed a database to track information on patients, their risk factors, fibroids, and ultrasound findings. A multicenter trial is in the planning stages to thoroughly evaluate the results of this procedure and to compare it with the current gold standard, myomectomy. There are a number of questions that remain unanswered, such as who will and who won’t benefit from this procedure, but for now, he says, “Uterine artery embolization has the potential for helping a large number of women.”

Editor’s note: For more information, visit the Comprehensive Fibroid Center’s web site at www.mir.wustledii/fibroid.
ONE WOMAN'S CRUSADE

Gail Hudson's uterine artery embolization was the most difficult—and longest—of any performed by interventional radiologist David Hovsepian. But Hudson, a St. Louis resident, is still an ardent fan. In fact, Hovsepian calls her a “one-woman crusade” for the procedure.

In a routine examination some 15 years ago, Hudson's physician found a fibroid mass the size of a grape. Over the years the mass grew much larger, finally to the size of a cantaloupe. But Hudson didn’t have many symptoms, except heavier than normal menstrual periods and an increasingly distended abdomen.

“Then I started to get indigestion and heartburn,” she says. “The bulk of the growth had begun to push up over my navel. That’s when I decided that I had been ‘pregnant’ with this long enough.”

After she read a short piece in a magazine about uterine artery embolization, Hudson, a software systems engineer, went to the Internet to learn everything she could about the procedure. Impressed by what she found, Hudson decided to undergo the embolization—but where? At first, she considered flying to Los Angeles where doctors were performing the procedure, but then she found Hovsepian’s name on the Internet and decided she could get the same treatment much closer to home.

In October 1998, Hudson had the procedure, which took longer than usual—a full three hours. After surgery, she seemed to have bypassed the typical crampy pain; two days later it hit, with pain, dizziness, and vomiting. Gradually, Hudson felt better and two weeks later went back to work. Now her uterine mass is down to the size of a tennis ball, and the abnormal bleeding has stopped.

Hudson was pleased with the “awesome” care she received from Hovsepian, who was compassionate and concerned throughout her treatment. She was so delighted with the results of the procedure that she wants to let other women know about it and has even invited Hovsepian to speak to a group of her coworkers about the procedure.

“It seems as though everyone you talk to knows someone with fibroids or is in the situation herself. Hopefully, we will get the word out to them that there is an alternative to surgery,” she says.
The Art of Imaging

by Vicki Runkler
There's a fine line between art and science, and that connection is especially apparent in a research project of radiologists Douglas Robertson and William Totty and senior research engineer Kirk Smith. Using their expertise in computed tomography (CT) and rapid prototyping technology, the Mallinckrodt Institute team is collaborating with The Saint Louis Art Museum in the restoration of an ancient Egyptian mummy mask.

The funerary mask, which may have belonged to a noblewoman who lived around 1250 BC, during the time of Ramses the Great, provides a rare opportunity to research materials and artists’ techniques used during the height of Egypt's artistic achievements. Due to the mask's fragility, the Art Museum conservators needed a means to objectively study the damaged areas of the mask and plan the repairs without causing additional harm to the artifact.

For the past three years, Robertson, an assistant professor of radiology and of orthopaedic surgery, has been studying a new rapid prototyping technology that uses patient data gathered from computed tomography or magnetic resonance imaging to create detailed copies of the patient's anatomy. Funded in part by a Whitaker Biomedical Foundation grant and working with Stratasys, Inc., the Minnesota-based company who developed the rapid prototyping software, Robertson is evaluating the technology for its use in producing three-dimensional models to aid in the preplanning of hip joint replacement surgery.

1. Conservator Suzanne Hargrove shows William Totty, MD, (left) and Douglas Robertson, MD, PhD, the progress on repair of the diadem and portions of the hair.

2. The model, made of layers of nontoxic wax or plastic, replicates the damaged areas of the original mask, which was formed by layers of thin linen, plaster, and wood.
Robertson is eager to test other applications for the rapid prototyping equipment, and the museum project provided a rare opportunity. Because the mask has no water content and is comparable in value to bone, Totty, who is a professor of radiology specializing in musculoskeletal imaging, used computed tomography (CT) to produce images comprised of 500 slices, each one millimeter thick. Working after hours so there would be no disruption in the scheduling of patients, the research team then converted the CT data to computer-aided design (CAD) descriptions that would be channeled to computer-controlled modeling equipment.

A large hole on the top portion of the mask’s head required extensive repair. In order to protect the mask from excessive handling, the actual repairs were to be made on a one-to-one ratio model. The repair would then be lifted from the model and placed directly onto the corresponding

3 & 4. Suzanne Hargrove (above with Dr. Totty and below with Kirk Smith) is attempting to match the damaged bitumen hair or wig portions of the mask. Bitumen is a hydrocarbon, such as asphalt or tar, that was used in ancient Asia Minor as a cement or mortar and as a waterproofing agent.

(Round inset, interior view) The model identifies cracks and weakened portions of the actual mask.
area of the mask. The rapid prototyping equipment housed in Mallinckrodt Institute's Musculoskeletal Modeling and Visualization Laboratory is limited to a 10-inch cubic volume and could not replicate the mask's approximately 21-inch size. So the CAD data was transmitted to Stratasys' headquarters, where commercial modeling equipment has been used to produce models as large as car engines used in automobile industry research.

The resulting mask model was a resounding success. "We were pleased that the full-scale model picked up so much detail and were excited to be a part of this important project," says Robertson. "The link between human history and scientific technology is invaluable for all generations."

Back at the museum, objects conservator Suzanne Hargrove is using the model twin to meticulously reconstruct the original mask's damaged areas. The restored mask is scheduled to be part of a mask exhibit at The Art Museum this fall.

5. The face was originally fashioned from a gold foil, which has oxidized over the years to a deep red color. Gold on the face of a burial mask was reserved for high-ranking individuals. The eyes, eyebrow, and eyeliner are made of inlaid glass, which at the time was considered as valuable as gems.

6. The diadem encircling the top portion of the head is highlighted with gilding and is comprised of glass inlays.

(Round inset) The scene on the bottom chest portion of the mask depicts the deceased's entrance into the afterlife where she is met by Osiris, god of the underworld.
In this section, the names of personnel who are full-time faculty or staff or who have an appointment in the Department of Radiology are highlighted in boldface type.

The Director's Office Report

Off Staff

Joseph Borrello, MD, assistant professor of radiology, Division of Diagnostic Radiology, has accepted a position with Kalamazoo Radiology, P.C., in Kalamazoo, Michigan.

Andrew Fisher, MD, assistant professor of radiology, Division of Diagnostic Radiology, has accepted a position with Radiology Imaging Associates in Englewood, Colorado.

Rao Vallabhaneni, PhD, instructor in radiology, Division of Radiological Sciences.

Myeong Yoon, MD, instructor in radiology, completed four years of training in diagnostic radiology and a six-month fellowship in breast imaging. She has accepted a position with Radiology Associates of Pensacola in Pensacola, Florida.

Lorraine Portelance, MD, instructor in radiology, Radiation Oncology Center, completed a one-year fellowship in radiation oncology and has accepted a position with the Work Centre Hospitalier Regional de l'Outaouais in Gatineau, Quebec, Canada.

Theft Portelance, MD, instructor in radiology, Radiation Oncology Center, completed a one-year fellowship in radiation oncology and has accepted a position with the Work Centre Hospitalier Regional de l'Outaouais in Gatineau, Quebec, Canada.

Honor/Awards

Jay Heiken, MD, professor of radiology, chief of abdominal radiology, and codirector of body computed tomography, was selected as the 1999 Traveling Fellow of the Society of Gastrointestinal Radiologists.

Grants

Clifford Chao, MD, assistant professor of radiology, as principal investigator, received a one-year Barnes-Jewish Hospital Cancer Research Award to study “The impact of tumor hypoxia/reoxygenation kinetics on radiation curability in head and neck cancers.” Coinvestigators for the $30,000 grant are Walter Bosch, DSc, instructor in radiology; Duffy Cutler, PhD, assistant professor of radiology; Farrokh Dehdashti, MD, associate professor of radiology; Barry Siegel, MD, professor of radiology, and chief of cancer biology, as principal investigator, received a one-year renewal grant from the National Institutes of Health for research on “Nuclear-protein content and heat-induced cell killing.” Coinvestigator for the $223,585 grant, now in its thirteenth year, is Rajji Higashikubo, PhD, research assistant professor of radiology. Elizabeth McFarland, MD, assistant professor of radiology, as principal investigator, received a two-year March of Dimes Birth Defects Foundation grant for research on “MRI evaluation of soft palate motion during speech: comparison between cleft palate patients.” Peter Witt, MD, assistant professor of surgery (plastic and reconstructive), Washington University, is coinvestigator for the $87,000 grant.

Thomas Conturo, MD, PhD, assistant professor of radiology and adjunct assistant professor of physics, as principal investigator, received a National Institutes of Health/National Institute of Neurological Disorders and Stroke grant in the amount of $2,024,851 for research on “MR perfusion imaging for functional brain studies.” Coinvestigators for the five-year grant are Erbil Akbudak, PhD, research instructor in radiology; Joanne Marquard, MS, research associate, Institute of Biomedical Computing, and research assistant professor of medicine, Washington University; Abraham Snyder, PhD, MD, research scientist of radiology; and Mark Mintun, MD, associate professor of radiology.

Jeffrey McFarland, MD, president of the Society for Head and Neck Radiology, received a one-year Barnes-Jewish Hospital Cancer Research Award to study “The impact of tumor hypoxia/reoxygenation kinetics on radiation curability in head and neck cancers.” Coinvestigators for the $30,000 grant are Walter Bosch, DSc, instructor in radiology; Duffy Cutler, PhD, assistant professor of radiology; Farrokh Dehdashti, MD, associate professor of radiology; Barry Siegel, MD, professor of radiology, and chief of cancer biology, as principal investigator, received a one-year renewal grant from the National Institutes of Health for research on “Nuclear-protein content and heat-induced cell killing.” Coinvestigator for the $223,585 grant, now in its thirteenth year, is Rajji Higashikubo, PhD, research assistant professor of radiology.

Weili Lin, PhD, assistant professor of radiology, as principal investigator, received a $1.2 million grant from the National Institutes of Health/National Institute of Neurological Disorders and Stroke for the study of “Quantitative brain oximetry using MRL.” Coinvestigators for the four-year grant are Mark Haacke, PhD, professor of radiology and of electrical engineering and director of the magnetic resonance imaging research laboratory; William Powers, MD, associate professor of radiology; and Chung H. MD, professor of neurology.
Jeffrey Bradley, MD, instructor in radiology, was appointed associate director of clinical curriculum for the Radiation Oncology Center Residency Training Program at Mallinckrodt Institute.

Jay Heiken, MD, professor of radiology, chief of abdominal radiology, and codirector of body computed tomography, was appointed to the 1999 Radiological Society of North America Scientific Assembly and Annual Meeting Program Committee, Gastrointestinal Subcommittee.

Jeff Michalski, MD, assistant professor of radiology, was appointed to associate membership in the Intergroup Rhabdomyosarcoma Study Group, an affiliate of the Children's Cancer Group and Pediatric Oncology Group.

Scott Mirowitz, MD, associate professor of radiology, radiologist-in-chief at Barnes-Jewish Hospital North, and codirector of body magnetic resonance imaging, was named a Diplomate of the American College of Physician Executives. He was appointed to the American Roentgen Ray Society's (ARRS) Instructional Committee as coordinator of the Socioeconomic Track for ARRS' 2000 Annual Meeting.

Joseph Roti Roti, PhD, professor of radiology, associate director of the Radiation Oncology Center, and chief of cancer biology, was appointed to a one-year term as councilor of the North American Hyperthermia Society and was appointed to the International Organizing Committee of the Cell Stress Society.

Barry Siegel, MD, professor of radiology and of medicine and director of the Division of Nuclear Medicine, was appointed chairman of the Diagnostic Radiology Committee of the American College of Surgeons Oncology Group.

Pamela Woodard, MD, assistant professor of radiology, was appointed to the editorial board of Current Protocols in MRI, a quarterly reference guide. Mark Haacke, PhD, professor of radiology and of electrical engineering and director of the magnetic resonance imaging research laboratory, is editor, and Weili Lin, PhD, assistant professor of radiology, is associate editor.

Senturia Lecture

Thomas Spackman, MD, chairman of Xicon Technologies and former president and CEO of Elscint, Inc., presented the Fifth Annual Hyman R. Senturia Lecture on February 8 in MIR's Scarpleino Auditorium. Dr. Spackman, who also is a clinical professor of radiology at the University of Connecticut, spoke on "Watching radiology by an occasional radiologist."
LECTURES/ PRESENTATIONS

DeWitte Cross, MD, assistant professor of radiology, as invited lecturer, presented a seminar on “Management of posterior circulation aneurysms” and “Clinical response to intra-arterial papaverine for cerebral vasospasm” at the American Association of Neurological Surgeons and Congress of Neurological Surgeons Joint Section on Cerebrovascular Disease and American Society of Interventional and Therapeutic Neuroradiology Meeting, Nashville, Tennessee, January 31 - February 3.

Duffy Cutler, PhD, assistant professor of radiology, as invited lecturer, spoke on “Whole body PET: 2D or 3D?” at the Society of Nuclear Medicine Mid-Winter Symposium, Fort Lauderdale, Florida, February 8 and 9.

Colin Derdeyn, MD, assistant professor of radiology, presented “A cost-effective analysis of therapy for symptomatic carotid occlusion: PET screening followed by selective EC/IC bypass versus medical treatment” and “Benign course of asymptomatic carotid occlusion” at the 24th International Joint Conference on Stroke and Cerebral Circulation, Nashville, Tennessee, February 4. He spoke on “Carotid disease and stroke” and “Acute stroke intervention” at the Current Concepts in Peripheral Vascular Disease Symposium, NorthEast Medical Center, Concord, North Carolina, February 16.

David Diamond, MD, assistant in radiology and cochief resident, Radiation Oncology Center, presented “Vascular radiotherapy for restenosis” at the Society of Cardiovascular and Interventional Radiology, Orlando, Florida, March 14.

Keith Fischer, MD, associate professor of radiology, spoke on “Labeled antibodies: emphasis on prostate cancer imaging” and “Tumor imaging with Ir-111 labeled somatoctatin analogs” at the Mississippi Society of Nuclear Medicine’s “Nuclear Medicine Update,” Jackson, Mississippi, March 19 and 14.


Lawler receives BJH award

Leo Lawler, MD, a third-year diagnostic radiology resident, received the Barnes-Jewish Hospital Foundation’s Caring Spirit Award, which honors individuals for their care, compassion, and service above and beyond expectation. Lawler was nominated for the award for his “beyond the typical” care and concern for his patients as well as for his professionalism. The mother of one patient cited that Lawler visited her son morning and evening without fail and that after her son’s release from the hospital, “Doctor Lawler called two to three times per week to just check in and see how things were going.”

Robert Gropler, MD, associate professor of radiology and director of the cardiovascular imaging laboratory, presented “Impairment of myocardial blood flow alters the myocardial stress-strain relations in ischemic cardiomyopathy” at the American College of Cardiology 48th Annual Scientific Meeting, New Orleans, Louisiana, March 7 - 10.

Jay Heiken, MD, professor of radiology, chief of abdominal radiology, and codirector of body computed tomography, presented “Hepatic contrast enhancement: a pharmacokinetic approach” and “Contrast enhancement for helical CT of the liver and pancreas: lessons and solutions from computer modeling” at the International Symposium: Abdominal Imaging 1999, Kumamoto, Japan, January 22 and 23. He presented the Special Lecture, “CT evaluation of nontraumatic emergencies of the gastrointestinal tract,” at the Annual Meeting of the Kyushu Society of Interventional Radiology, Kumamoto, Japan, January 23. As visiting professor, Heiken spoke on “A pharmacokinetic approach to hepatic and pancreatic enhancement for helical CT: lessons from computer modeling” at

Eric Klein, MS, assistant professor of radiology, as invited lecturer, spoke on "Multi-segmented electron IMRT fields" at the Intensity Modulated Electron Radiotherapy Symposium, Palo Alto, California, March 22.

William McAlister, MD, professor of radiology and of pediatrics and chief of pediatric radiology, as invited lecturer, presented "Allimentary tract emergencies in children" at the Armand Brodeur Lecture, sponsored by the City-Wide Radiology Conferences, Saint Louis University, St. Louis, Missouri, January 12. As invited lecturer, he presented "Imaging of sinusitis in pediatrics" at the Larry Davis Memorial Lecture, Rossir Children's Hospital, Louisville, Kentucky, February 12.

Elizabeth McFarland, MD, assistant professor of radiology, presented "3D spiral CT endoscopic applications" to the St. Louis Society of Radiologists, St. Louis, Missouri, January 19. She presented "Spiral CT colonography: technical considerations of image acquisition and image display" at the General Electric-Association of University Radiologists Research Symposium, San Diego, California, March 12.

Robert McKinstry, MD, PhD, instructor in radiology, as invited lecturer, spoke on "Diffusion tensor imaging" at the University of Illinois, Chicago Medical Center, Department of Radiology, January 20.

Jeff Michalski, MD, assistant professor of radiology, presented "Radiation in brain tumors" at the Brain Tumor Support Network meeting, sponsored by Missouri Baptist Medical Center, St. Louis, Missouri, February 9. He spoke on "3D CRT in prostate carcinoma," "Quality assurance for 3D CRT clinical trials," and "3D conformal radiation therapy for CNS and other pediatric tumors: minimizing toxicity and achieving a cure." University of Montreal/McGill, Montreal, Canada, March 3 and 4.

Biello Lecture

Jamshid Maddahi, MD, director of the Clinical PET Center at the University of California, Los Angeles, was invited lecturer for the Thirteenth Annual Daniel R. Biello Memorial Lecture on March 8. Dr. Maddahi spoke on "State-of-the-art clinical applications of cardiovascular nuclear medicine: diagnosis, prognosis, and myocardial viability." At left is Barry Siegel, MD, director of the Division of Nuclear Medicine and coordinator of the Biello Lecture.
Lectures/Presentations

Continued from page 25

Tom Miller, MD, PhD, professor of radiology and electrical engineering, presented "Iterative reconstruction: its role in clinical practice today and tomorrow" at the Society of Nuclear Medicine Mid-Winter Symposium, Fort Lauderdale, Florida, February 8 and 9.

Scott Mirowitz, MD, associate professor of radiology, radiologist-in-charge at Barnes-Jewish Hospital north, and codirector of body magnetic resonance imaging, as guest speaker, spoke on "Diagnostic pitfalls in abdominal MRI," "MRI artifacts: challenges and solutions," "MRI of the rotator cuff," and "Pitfalls in knee MRI" at the Johns Hopkins School of Medicine MRI Course, Marco Island, Florida, March 13 and 14.


Carlos Perez, MD, professor of radiology and director of the Radiation Oncology Center, spoke on "Three-dimensional conformal radiation therapy and hormone therapy in localized carcinoma of the prostate" at the First Annual Palm Beach Cancer Symposium, Palm Beach, Florida, February 4 - 7. He presented "Radiation therapy in the management of carcinoma of the uterine cervix" at the Cleveland Clinic, Cleveland, Ohio, February 26.

James Purdy, PhD, professor of radiology, associate director of the Radiation Oncology Center, and chief of radiation oncology physics, presented "Diagnostic pitfalls" at the University of Wisconsin, Madison, March 22.

Marcus Raichle, MD, professor of radiology and of neurology and neurobiology, presented "The neural correlates of consciousness" at the Salk Institute, San Diego, California, February 1. He spoke on "Recent advances in neuroimaging" at Hypoxia 99, Jasper, Alberta, Canada, March 1.

Joseph Roti Roti, PhD, professor of radiology, associate director of the Radiation Oncology Center, and chief of cancer biology, presented "Nuclear matrix-DNA interactions and the sensitivity of mammalian cells to ionizing radiation" and "Subcellular localization of DNA damage and repair: How close can we look?" at the Cellular Localization of Repair and Effects of Bound Proteins Session, The Gordon Conference, Ventura, California, February 7 - 12.


Vo receives academic fellowship

Katie Vo, MD, a fellow in neuroradiology, is one of four radiology investigators nationwide to receive a 1999 GE-AUR Radiology Research Academic Fellowship. The award was presented for her research on "Interventions to improve physician performance in interpreting cranial computed tomography scans of acute ischemic stroke patients."

The two-year fellowship provides a $50,000 annual stipend and is sponsored by the Association of University Radiologists and General Electric Medical Systems, a leading supplier of medical diagnostic imaging technology. GE-AUR fellowships encourage young investigators to pursue careers in radiology research by allowing them to devote a substantial amount of time to scientific projects in health outcomes, technology assessment, and related areas.
Barry Siegel, MD, professor of radiology and of medicine and director of the Division of Nuclear Medicine, spoke on “New technologies—PET scanning in the staging of thoracic malignancies” and “PET to assess the biology of thoracic malignancies” at the 12th Annual Meeting of General Thoracic Surgical Club, Marco Island, Florida, March 11 - 14.

Marilyn Siegel, MD, professor of radiology and of pediatrics, presented “Neonatal cranial sonography” at the Pacific Northwest Ultrasound Society Meeting, Seattle, Washington, January 21. As visiting guest lecturer, she presented “Ultrasonography of pediatric abdominal masses” at the University of Washington, Seattle, January 21. Siegel spoke on “Ultrasonography of the acute abdomen in children” at the Arkansas Sonographer’s Society, Fayetteville, January 30. As the invited Hooshang Taybi Honorary Lecturer, she presented “Practical applications of MR imaging in the pediatric patient” at Children’s Oakland Hospital, Oakland, California, February 9. Siegel spoke on “Neonatal pulmonary disease” and “Genitourinary anomalies and infections” at the University of California, San Francisco Resident Review Course, February 10. She presented “Ultrasonography of the pediatric chest” at the American Institute of Medicine Annual Meeting, San Antonio, Texas, March 14 and 15. As invited lecturer, Siegel spoke on “Ultrasonography of the acute pediatric abdomen” at the University of Texas Health Science Center, San Antonio, March 15.

Douglas Spitz, PhD, assistant professor of radiology, spoke on “Glucose deprivation-induced oxidative stress in human tumor cells” at the Graduate Center for Toxicology Research Seminar, University of Kentucky, Lexington, January 25 and 26; at the Department of Radiation Oncology Research Seminar, University of Pennsylvania, Philadelphia, February 10 and 11; and at the Society of Toxicology 38th Annual Meeting, New Orleans, Louisiana, March 15 - 18.

Match Day results announced

In June, 15 physicians will begin their first year of training in the Institute’s Diagnostic Radiology Residency Program. The results were announced on the annual Match Day when senior medical students in the United States learn which residency programs they will enter in the upcoming academic year. Of the new MIR trainees, three received medical degrees from Duke University, two from Washington University, two from the University of Wisconsin, and one each from Georgetown, Emory, Johns Hopkins, Yale, Dartmouth, New York University, Boston University, and the University of Missouri-Columbia.

Todd Wasserman, MD, professor of radiology, presented “Protection of normal tissue from toxicity” (an educational program sponsored by The Institute for Continuing Healthcare Education and supported by MediCom of Princeton, Inc. and Alza Pharmaceuticals), St. Louis, Missouri, February 24. He presented “Combined chemotherapy and radiotherapy for Hodgkin’s disease” and “Combined chemotherapy and radiotherapy for non-Hodgkin’s lymphoma” to the Texas Radiology Society, Dallas, April 9.
SYMPOSIA

In this section of FYI, only those faculty and staff who have MIR appointments are listed.

MEDICAL IMAGING 1999

Sponsored by The International Society for Optical Engineering (SPIE)
San Diego, California
February 20 - 26, 1999

James Blaine, DSc, technical conference cochair, "PACS design and evaluation: engineering and clinical issues."

Gilbert Jost, MD, panel member, PACS Keynote Session, "PACS: now or never."

WORKSHOP

Gilbert Jost, MD, instructor, "IHE: the path to demonstrating integration."

SCIENTIFIC SESSIONS

Elizabeth McFarland, MD; Jay Heiken, MD; Dennis Balfe, MD; Daniel Hirselj, BS; Thomas Pilibram, PhD, "Spiral CT colography (virtual colonoscopy): multiobserver study of different image display techniques compared to colonoscopy."

Bruce Whiting, PhD; Elizabeth McFarland, MD; Casey Dellabarea, BS; Barry Brunsden, "Study of CT artifacts in virtual colonoscopy."

Bruce Whiting, PhD; Edward Muka, MSE, "Colon unraveling based on electrical field—recent progress and further work."

Bruce Whiting, PhD; Edward Muka, MSE, "Dynamic viewing protocols for diagnostic image evaluation."

Edward Muka, MSE; Bruce Whiting, PhD, "Deploying CRT soft-copy displays in medical imaging systems: a discussion of basic issues."

POSTER SESSIONS

Edward Muka, MSE; Bruce Whiting, PhD, "The veiling glare point-spread function of medical imaging monitors."

NATIONAL AMERICAN CHEMICAL SOCIETY

217th Annual Meeting
Anaheim, California
March 21 - 25, 1999

Carolyn Anderson, PhD, co-organizer, Bioconjugate Chemistry in Nuclear Medicine Symposium.

SCIENTIFIC SESSIONS

Carolyn Anderson, PhD; Laura Bass, PhD; Margaret Lanahan, MS, "Metabolism of radiometal-labeled octreotide analogs."

David Reichert, PhD; Michael Welch, PhD, "Conformational analysis of octreotide and indium bifunctional chelate conjugates."

Michael Lewis, PhD; Carolyn Anderson, PhD, "Evaluation of copper-64-labeled anti-colorectal carcinoma monoclonal antibody conjugate TETA-1A3."
David Gius, MD, PhD, instructor in radiology, was selected as the 1998 Radiation Oncology Teacher of the Year. The Teacher of the Year presentation is made annually in December to honor the Institute faculty member who makes a significant contribution to resident education during the academic year. Radiation oncology residents select the award recipient through a nomination and voting process.

Gius joined the faculty in 1997 after completing three years of training in radiation oncology at the Institute, including one year as an American Society for Therapeutic Radiology and Oncology Fellow. His medical and research background is extensive and impressive: medical degree from the Stritch School of Medicine at Loyola University of Chicago, doctoral degree from the University of Chicago, postdoctoral fellowships in molecular genetics and cell biology and in radiation and cellular oncology, a transitional internship at the the University of Chicago, and one year of residency at the University of Michigan Medical Center. Gius currently has a lab in the Radiation Oncology Center's cancer biology section where he is investigating the events that activate and repress cell division and growth.

Since the award's inception in 1989, the following faculty have been selected as teacher of the year: (1989) Susan Shapiro, MD; (1990) Carlos Perez, MD; (1991 and 1995) Perry Grigsby, MD; (1992) Jeff Michalski, MD; (1993) Russell Gerber, MS; (1994) Mary Graham, MD; (1996) James Purdy, PhD; and (1997) Marie Taylor, MD.