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Department of Radiology-Annual Report-July 1, 1992 to June 30, 1993

David C. Levin

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DEPARTMENT OF RADIOLOGY

David C. Levin, M.D.
Professor and Chairman

Alfred B. Kurtz, M.D.
Professor and Vice-Chairman

1993/94

DEPARTMENT DIVISIONS AND DIRECTORS

General Diagnostic Radiology
Breast Imaging
Body CT
Neuroradiology/ENT Radiology
Cardiovascular/Interventional Radiology
Ultrasound
Magnetic Resonance Imaging
Pediatric Radiology
Physiological Research
Radiological Physics
Outcomes Research

Robert M. Steiner, M.D.
Stephen A. Feig, M.D.
Richard J. Wechsler, M.D.
Carlos F. Gonzalez, M.D.
Vijay M. Rao, M.D.
Geoffrey A. Gardiner, Jr., M.D.
Barry B. Goldberg, M.D.
Donald G. Mitchell, M.D.
George W. Gross, M.D.
P. Macke Consigny, Ph.D.
Simon Vinitski, Ph.D.
Flemming Forsberg, Ph.D.
Andrew A. Maidment, Ph.D.
Robert J. Harford, Ph.D.

DEPARTMENTAL COMMITTEES AND CHAIRMEN

Advisory Committee
Education Committee
Research Committee
Residency Selection Committee
Quality Assurance Committee
Computer Committee

Alfred B. Kurtz, M.D.
Vijay M. Rao, M.D.
Barry B. Goldberg, M.D.
George W. Gross, M.D.
Paul W. Spirn, M.D.
Gary S. Shaber, M.D.
DEPARTMENT FULL TIME FACULTY - 1993-94

Professors
David C. Levin, M.D.
Stephen A. Feig, M.D.
Barry B. Goldberg, M.D.
Carlos F. Gonzalez, M.D.
David Karasick, M.D.
Alfred B. Kurtz, M.D.
Donald G. Mitchell, M.D.
Vijay M. Rao, M.D.
Robert M. Steiner, M.D.
Richard J. Wechsler, M.D.
Simon Vinitski, Ph.D.

Emily F. Conant, M.D.
Diane M. Deely, M.D.
David E. Eschelman, M.D.
Rick I. Feld, M.D.
Flemming Forsberg, Ph.D.
David P. Friedman, M.D.
Ethan J. Halpern, M.D.
Eric K. Outwater, M.D.
Catherine W. Piccoli, M.D.
Bhaskara K. Rao, M.D.
Ana Salazar, M.D.
Mark E. Schweitzer, M.D.
Marcelle J. Shapiro, M.D.

Clinical Professors
Stephen Karasick, M.D.
Mark M. Mishkin, M.D.

Research Professor
Gary S. Shaber, M.D.

Clinical Assistant Professors
Levon Nazarian, M.D.
Jason E. Sagerman, M.D.
Sharon R. Segal, D.O.
Lisa M. Tartaglino, M.D.
Terri Tuckman, M.D.
Elaine Wolk, M.D.

Associate Professors
Adam E. Flanders, M.D.
Geoffrey A. Gardiner, Jr., M.D.
George W. Gross, M.D.
Anna S. Lev-Toaff, M.D.
Laurence Needleman, M.D.
Kevin L. Sullivan, M.D.

Research Assistant Professors
Saundra M. Ehrlich, M.S.
Ji-Bin Liu, M.D.

Instructors
Jane S. Hughes, M.D.
Cindy Isaacson, M.D.
Andrew A. Maidment, Ph.D.
Annina Wilkes, M.D.

Clinical Associate Professor
Paul W. Spirn, M.D.

Professors Emeriti
Jack Edeiken, M.D.
Benjamin M. Galkin, M.S.
Robert O. Gorson, M.S.
Philip J. Hodes, M.D.

Assistant Professors
Archibald A. Alexander, M.D.
Joseph Bonn, M.D.

Honorary Professor
A. Edward O'Hara, M.D.
FACULTY WITH SECONDARY APPOINTMENTS IN RADIOLOGY

Demetrius H. Bagley, M.D., Associate Professor of Urology [primary]
Associate Professor of Radiology [secondary]

Robert L. Brent, M.D., Ph.D., Professor of Pediatrics [primary]
Professor of Radiology (Radiation Biology) [secondary]

Ralph A. Carabasi, M.D., Professor of Surgery [primary]
Professor of Radiology [secondary]

Donald Myers, M.D., Assistant Professor of Neurosurgery [primary]
Instructor in Radiology [secondary]

Chan Hee Park, M.D., Professor of Radiation Oncology and Nuclear Medicine [primary]
Professor of Radiology [secondary]

Joel S. Raichlen, M.D., Clinical Associate Professor of Medicine [primary]
Clinical Associate Professor of Radiology [secondary]

Stanton N. Smullens, M.D., Professor of Surgery [primary]
Associate Professor of Radiology [secondary]

Nagalingam Suntharalingam, Ph.D., Professor of Radiation Oncology and Nuclear Medicine (Medical Physics) [primary]
Professor of Radiology (Medical Physics) [secondary]

Madhukar L. Thakur, M.D., Professor of Radiation Oncology and Nuclear Medicine [primary]
Professor of Radiology [secondary]

Jerome J. Vernick, M.D., Clinical Professor of Surgery [primary]
Clinical Associate Professor of Radiology [secondary]

Paul Walinsky, M.D., Professor of Medicine [primary]
Assistant Professor of Radiology [secondary]

Ronald J. Wapner, M.D., Professor of Obstetrics and Gynecology [primary]
Professor of Radiology [secondary]
DEPARTMENT OF RADIOLOGY
RESIDENTS/FELLOWS
1993-1994

RESIDENTS
Eric W. Emig, M.D., Chief Resident
Robert E. Epstein, M.D., Chief Resident

FIRST YEAR RESIDENTS
Joseph Bucich, M.D.
Kristen M. Gerndt, M.D.
Melissa J. Graule, M.D.
Asha M. Kovalovicb, M.D.
Rita S. Patel, M.D.
Dieu-Thu Vo, M.D.

SECOND YEAR RESIDENTS
Adam R. Fisher, M.D.
Charles E. Martin, M.D.
Timothy J. Murphy, M.D.
Daniel Radack, M.D.
Gautham P. Reddy, M.D.
Charul P. Saini, M.D.

THIRD YEAR RESIDENTS
Eric W. Emig, M.D.
Victoria Kong Endo, M.D.
Robert E. Epstein, M.D.
William B. Morrison, M.D.

FOURTH YEAR RESIDENTS
Jeannete G. Greer, M.D.
Bruce E. Hall, M.D.
Joseph F. Mammone, M.D.
James T. Tsatalis, M.D.
Corinne B. Winston, M.D.

FELLOWS
ULTRASOUND/CT/MRI
William G. Batte, M.D.
Neville Glajchen, M.D.
Daniel M. Golding, M.D.
Teresa J. Karcnik, M.D.
Sarah Kremer, M.D.
Denis R. Lincoln, M.D.
Eileen T. McGlynn, M.D.

NEURORADIOLOGY/ENT
Deborah M. Ancona-Schultz, M.D.
Stewart R. Berliner, M.D.
James P. Elder, Jr., M.D.
William Millar, M.D.
Robert J. Rapoport, M.D.

MUSCULOSKELETAL
Neil Roach, M.D.

CARDIOVASCULAR/INTERVENTIONAL
Rajesh Patel, M.D.
Charles Sutton, M.D.
Mark A. Westcott, M.D.

BREAST IMAGING/ULTRASOUND
Steven Sferlazza, M.D.
DEPARTMENT OF RADIOLOGY
DAVID C. LEVIN, M.D., CHAIRMAN
CLINICAL DIVISIONS 1993-94

GENERAL DIAGNOSTIC RADIOLOGY
(incorporating pulmonary, skeletal, gastrointestinal, and genitourinary radiology).

Directed by Dr. Robert Steiner.
Drs. Emily Conant, Diane Deely, Cindy Isaacson, David Karasick, Stephen Karasick, Anna Lev-Toaff, Ana Salazar, Mark Schweitzer, Gary Shaber, Paul Spirn, Richard Wechsler

BREAST IMAGING/AMBULATORY RADIOLOGY

Directed by Dr. Stephen Feig.
Drs. Emily Conant, Jane Hughes, Cindy Isaacson, Anna Lev-Toaff, Catherine Piccoli, Annina Wilkes, Elaine Wolk

PEDIATRIC RADIOLOGY

Directed by Dr. George Gross.
Drs. Archie Alexander, David Karasick, Stephen Karasick

CARDIOVASCULAR/INTERVENTIONAL RADIOLOGY

Directed by Dr. Geoffrey Gardiner.
Drs. Joseph Bonn, David Eschelman, Marcelle Shapiro, Kevin Sullivan

NEURORADIOLOGY/ENT RADIOLOGY

Directed by Drs. Carlos Gonzalez and Vijay Rao.
Drs. Adam Flanders, David Friedman, Mark Mishkin, Lisa Tartaglino

ULTRASOUND

Directed by Dr. Barry Goldberg.
Drs. Archie Alexander, Rick Feld, Ethan Halpern, Alfred Kurtz, Anna Lev-Toaff, Donald Mitchell, Levon Nazarian, Eric Outwater, Laurence Needleman, Catherine Piccoli, Bhaskara Rao, Jason Sagerman, Ana Salazar, Sharon Segal, Terri Tuckman, Annina Wilkes

BODY COMPUTED TOMOGRAPHY

Directed by Dr. Richard Wechsler.
Drs. Emily Conant, Rick Feld, Ethan Halpern, Alfred Kurtz, Anna Lev-Toaff, Levon Nazarian, Laurence Needleman, Bhaskara Rao, Jason Sagerman, Paul Spirn, Robert Steiner, Ana Salazar

MAGNETIC RESONANCE IMAGING

Directed by Dr. Donald Mitchell
Drs. Diane Deely, Eric Outwater, Catherine Piccoli, Mark Schweitzer
The 1992-93 academic year saw excellent progress in research and education in our department. However, our growth in clinical practice did not keep pace. For the first year since I've been at Jefferson, our procedure volume showed a decline compared with last year, albeit a small one. Our department is not unique in this experience; virtually every other academic department of radiology around the country has noted the same trend. The reasons are complex. One important contributing factor at Jefferson was a decline of approximately 900 in hospital admissions. Another was what appears to be a nationwide leveling off in demand for medical services of all types. Whatever the causes, we are taking steps to deal with this situation, as will be discussed below. In this report, I will review the following: (1) clinical activities of the past year, (2) planned new clinical programs for the coming year, (3) clinical weaknesses, (4) research accomplishments of the past year, (5) future research plans, (6) research weaknesses, (7) extramural funding, (8) interdepartmental activities, (9) faculty evaluation, (10) department goals, and (11) issues for the hospital and college. Our educational programs will be reviewed in a separate report by Vijay Rao, M.D., Associate Chairman for Education, which immediately follows this one.

CLINICAL ACTIVITIES

The key to a successful practice of radiology is the provision of rapid and excellent service to referring physicians and patients. To that end, several important logistical improvements were made this past year. One was the development of a computerized mechanism for continuous tracking of report turnaround times by all faculty radiologists. This system tracks, for every single examination, several time intervals commencing when the patient arrives in the department and ending when the report is signed by the radiologist. This allows us to identify areas where slowdowns occur and take steps to correct the situation. Another problem was that too many films were being lost at various points around the hospital before a final interpretation could be made by a radiologist. Although this is an almost inevitable problem in a teaching hospital where films are removed from the department for teaching rounds on the nursing floors, conferences, etc., it represents a serious shortcoming in good patient care. Under George McArdle's leadership, an "undictated film committee" was appointed, consisting of several radiologists and several administrative supervisors. Using a modified CQI approach, this committee met weekly for almost a year and was successful in reducing undictated cases to less than 1% of our total volume.

A number of new developments took place in some of our clinical divisions:

- **MRI** - The extraordinary expansion of MRI into clinical practice continued unabated this past year as radiologists at Jefferson discovered valuable new uses for this complex technology. Despite drops in procedure volume in some other divisions, healthy growth occurred in both body and neuro/ENT MRI. With four MRI units operating (including one in Langhorne), we have one of the largest clinical services in the country. To accommodate increased demand and reduce the backlogs that have developed in both the COB and Main 10, additional weekend shifts were added in both places. Drs. Don Mitchell, Mark Schweitzer, Eric Outwater, Catherine Piccoli, and Diane Deely worked closely with Simon Vinitski, Ph.D. in bringing some of Dr. Vinitski's pulse sequence research to the clinical sphere. Increased use of our pelvic phased array and rectal coils brought improved resolution of MR images of these areas. In his first year on our faculty, Dr. Eric Outwater introduced peripheral MR angiography, which in some cases can provide even better information about blood flow and vessel patency than catheter angiography.

- **Ultrasound** - Although a drop in overall ultrasound procedure volume occurred this year, Dr. Barry Goldberg and his colleagues continued to play a leadership role nationally in developing new uses for ultrasound. Endoluminal ultrasound, performed through catheters or endoscopes, is now providing valuable information about the walls of structures like the urethra, bladder, ureter, esophagus, and stomach. This technique is now also being used during laparoscopic surgery. Ultrasound is coming to play an ever increasing role in interventional radiology, and here again, our ultrasound group has helped lead the way. Dr. Rick Feld and others have built
up significant experience in the use of compression ultrasound to obliterate pseudoaneurysms, many of which now no longer require surgical repair. He and Drs. Archie Alexander and Levon Nazarian have also expanded the use of transrectal and transvaginal drainage of abscesses, working in conjunction with our cardiovascular/interventional radiologists.

- **Computed Tomography (CT)** - A very exciting new development was the addition of a new GE helical CT scanner in the COB and the upgrading of our CT scanner on Gibbon 3 to incorporate helical technology. Helical, or slip ring, CT allows better and faster images of tissue volumes to be routinely obtained. Imaging can be done during the peak opacification phase after an injection of intravenous contrast agent, thereby greatly improving visualization of blood vessels and some organs within the abdomen. This has also enabled us to begin doing some fascinating 3-D reconstruction of abdominal arteries, thanks to Dr. Ethan Halpern's computer expertise. Jefferson was the first major academic institution in the Delaware Valley to obtain helical CT technology. Another interesting new technique is CT-guided hookwire localization of peripheral pulmonary nodules prior to thoracoscopic resection. Drs. Paul Spirn, Richard Wechsler, Ana Salazar and Robert Steiner collaborated closely with the thoracic surgeons in developing this new technique. A fiberoptic-based network was established linking our laser imagers in the COB, Gibbon 3, and Main 10. This allows images to be electronically transferred from one area where a study is performed to another area where films can be printed instantaneously. Because our CT scanners are dispersed in 3 areas of the campus, this has helped us get the images to where our faculty physicians are located during the workday for rapid interpretation. Independent physician consoles have been installed on Main 10 and Gibbon 3 to facilitate CT and MR image processing.

- **Cardiovascular/Interventional Radiology (CVIR)** - Our CVIR division was another in which growth continued to occur this year. Procedures like transjugular intrahepatic portosystemic shunting (TIPS), intraarterial stent placement, and fallopian tube recanalization continued to grow in volume. A very dramatic expansion occurred this year in the use of percutaneous venous access procedures. These provide long term venous access for patients requiring extended IV therapy (antibiotics, total parenteral nutrition, etc.). CVIR has implanted these venous access lines in a number of patients referred by the Jefferson Home Infusion Service. These cases are performed immediately upon request, thereby allowing patients to be discharged earlier without having to wait for space to open up in the OR for surgical placement. Venous access procedures result in a markedly reduced incidence of phlebitis, compared with the use of standard IV lines.

- **Neuroradiology/ENT Radiology** - Our neuro/ENT division was another in which solid procedure growth occurred, primarily in MRI. In terms of technology, while helical CT offers few advantages in brain or spine imaging, it improves imaging of neck structures. In MRI, our neuro/ENT division has increased its use of fast spin echo (FSE) and other new pulse sequences in imaging the brain, spine, and head and neck structures. MR angiography of the carotid arteries has also dramatically increased. The latter technology is now so effective that many patients with carotid artery disease no longer require angiography before surgical treatment.

- **Breast Imaging Center (BIC)** - Another exciting new technology arrived at Jefferson with the installation of a stereotactic core breast biopsy device in the BIC. Although our experience with this technique is not yet large, initial results suggest that it is a highly accurate method of obtaining tissue from breast masses, and that it will ultimately prove to be a faster, easier and cheaper alternative than surgical biopsy for many of these lesions.

- **General Diagnostic Radiology** - A new radiology reading room was opened in the emergency department, greatly improving our support there. A new radiographic facility and reading room were also opened in the outpatient orthopedic offices in Walnut Towers. The “ballroom” on Gibbon 3 has been reorganized so that there are now dedicated alternators for patients in the intensive care units and the cardiology and cardiothoracic surgery services. The use of enteroclysis and defecography have expanded, under Dr. Stephen Karasick’s leadership. These procedures are very helpful in assessing patients with small bowel and rectal evacuation disorders. Drs. Mark Schweitzer and Diane Deely further expanded their use of percutaneous bone biopsy, and it now appears that Jefferson has one of the largest experiences in the country
with this very useful procedure. The general diagnostic division took over the reading of radiographic studies performed at Magee Rehabilitation Hospital, and we hope to improve our relationship with Magee in other areas of imaging as well.

**PLANNED NEW CLINICAL PROGRAMS**

In **ultrasound**, we will investigate the utility of ultrasonic evaluation of certain musculoskeletal abnormalities. In **CVIR**, the use of stents in the superficial femoral artery will begin as part of a national clinical trial. Until now, we have used these stents primarily for iliac artery obstructions. The use of interventional techniques in treating obstructed dialysis grafts will be expanded. In **neuroradiology**/**ENT radiology**, the use of helical CT will be evaluated to determine its role in imaging the carotid arteries. We will also expand our use of MRI in the study of cerebrospinal fluid dynamics. We will begin to use phase contrast techniques in MR evaluation of cerebral arteries to ascertain direction and velocity information. Up until now, MR angiography has used primarily time of flight techniques. In **CT**, a new GE workstation will be installed to facilitate 3-D reconstruction of abdominal and neck arteries and possibly also of the spine and facial bones. In **breast imaging**, we will develop a screening mammography facility in the ultrasound area of the COB. There is rapidly increasing demand for screening mammography and, as the premier breast imaging group in the Delaware Valley, our department will try to meet this by installing two new mammography machines dedicated purely to screening asymptomatic women. We will be able to do this within existing radiology department space, without requiring the addition of expensive new space. In the **general diagnostic division**, a new tableside fluoroscopy unit will be added, replacing one of our outdated remote control fluoroscopy units. This will help enhance our work in a variety of fluoroscopically based diagnostic and interventional procedures in the gastrointestinal and genitourinary tracts. In **MRI**, I am gratified that the hospital has supported the purchase of two new 5X hardware and software platforms, one of which will be installed in the COB and the other on Main 10. These platforms are necessary to accommodate the rapidly increasing clinical applications of MRI and to speed up patient throughput. We will also be obtaining another MR angiography package and another set of phased array coils.

**CLINICAL WEAKNESSES**

Because of the rapid growth in demand for MRI, we are at the point where at least one more MRI unit is needed. Patient backlogs for daytime outpatient MRI slots in the COB are approximately two weeks. Another weakness in this area is our lack of a cardiac MRI program. This is primarily due to the low volume of studies referred to us by cardiology. MRI of the heart is becoming increasingly valuable, as attested to by the large number of articles on this subject in both the radiology and cardiology literature. We hope to work with cardiology to build this service.

The CVIR division has outstripped its current facilities and is now seriously short of space. This is due to a rapid growth in procedure volume during the past few years - now more than double what it was a few years ago. Also, the length and complexity of these procedures have increased. Some cases now have to be performed in patient holding areas. The corridors are a cluttered mixture of storage boxes and carts, patients and their families, housekeeping personnel, sales representatives, house staff, attending physicians from other departments, visitors, and CVIR professional staff. Our high case volume often requires the performance of routine procedures late into the evening, which has strained morale among the nursing and technical personnel working in that area. It is important that both a third interventional procedure room and a vascular OR containing angiographic equipment be built, as part of Jefferson's commitment to a vascular disease center.

One last weakness is in pediatric radiology, which is now staffed by a single radiologist, Dr. George Gross. Dr. Gross is a superb clinician, but he is obviously only one person and is unavoidably away at times at meetings or on vacation. When he is away, we miss the necessary expertise he provides. Possible cross coverage by the A.I. DuPont radiologists will be explored.
RESEARCH ACCOMPLISHMENTS

1992-93 has been our best year ever in research. We have reached the ranks of the very top academic departments in the country. This was manifested by our performance at the 1992 RSNA meeting. At this largest medical meeting in the entire world, physicians and Ph.D.s from our department presented 43 scientific papers and 10 courses or symposia. This is by far the highest level of participation we have ever had and it will be a challenge to keep up this momentum in future years. We have had strong funding support from NIH, foundations and other medical organizations, and commercial industry. These grants are shown in Appendix A and are discussed in greater detail later.

In this report last year, I included as one of our goals the development of a better grant-writing infrastructure. I'm very pleased that with Dean Gonnella's assistance, we have developed a funding mechanism to support a full time grants coordinator. Ms. Judy Dubbs joined our department in this capacity during the past year and has become an invaluable asset in support of our grant-writing activities. With so many grants from so many sources, and more proposals being turned out weekly, better logistic support was a necessity. Ms. Dubbs and several other administrative personnel working under her can now provide department investigators with efficient assistance in the details of putting grants together.

In any department of radiology, unfunded research or that supported by department sources plays an important role in our overall research effort. A glance at this year's extensive list of papers and abstracts published by department investigators confirms this. In MRI, Drs. Mitchell and Outwater have worked with Dr. Vinitski to optimize FSE sequences in studying abdominal structures. Dr. Mark Schweitzer has continued his remarkable productivity in musculoskeletal MRI research. Dr. Piccoli is evaluating the potential role of MRI in women with breast disease. The entire division is actively involved in clinical trials of new MRI contrast agents. An interesting project has been carried out in conjunction with Pennsylvania Blue Shield to blindly assess the quality of MR images performed at 32 facilities around the Delaware Valley. This is part of the department's initiative in health services research.

In ultrasound, we are one of the first centers to evaluate the effectiveness of intravenously injected ultrasound contrast agents. This will allow better acquisition of color Doppler signals from blood vessels, detection of abnormal vascularity, and differentiation of blood vessels from surrounding tissues. Dr. Needleman assessed peripheral vascular enhancement using ultrasound contrast agents, and Dr. Goldberg used these agents in studying tumor vascularity. Dr. Feld has worked on improving the success of biopsy and drainage procedures by evaluating puncture needles containing transponders that allow their tips to be visualized ultrasonically. Drs. Liu, Steiner, and Goldberg used miniature transducers placed through bronchoscopes to study central and peripheral pulmonary masses. The Jefferson Ultrasound and Research and Education Institute was formed, directed by Dr. Barry Goldberg, to help promote research and education in this field.

Our CT division has studied the CT findings in orthotopic liver transplantation and has worked on detecting early signs of hepatic necrosis in liver transplant patients. They have studied talocalcaneal coalition and compared the CT findings with those on MRI. The CVIR division is the core facility for the SCVIR Transluminal Arterial Revascularization (STAR) registry. This is the largest registry ever compiled on peripheral vascular disease cases in the U.S. Several papers utilizing this registry's material were presented at last year's RSNA meeting. Other research pertaining to fallopian tube canalization and arterial abnormalities following liver transplantation are being prepared for publication.

I am pleased to note that the division of neuroradiology/ENT radiology has become progressively more active in research over the last several years. This past year was the first year of Dr. Adam Flanders' RSNA Scholar Award, during which he worked on the use of MRI in assessing severity and forecasting outcomes in spinal cord injury. Dr. Vijay Rao developed an interesting new classification of TMJ internal derangement based on MRI findings, and she also worked with new applications of FSE in TMJ MR imaging. Dr. Carlos Gonzalez is working on volumetric analysis of multiple sclerosis lesions and has recently submitted an NIH grant on the subject in conjunction with the
department of neurology. Dr. Lisa Tartaglino is studying FSE in spine MRI. Dr. David Friedman is working on the MRI quality project described earlier, and also on a study of utilization of cranial and spinal imaging in outpatient settings across the state.

At the Breast Imaging Center, Dr. Ana Lev-Toaff has studied the stability of malignant breast calcifications over time, and Dr. Emily Conant has studied growth rates of mucinous carcinoma of the breast. Dr. Catherine Piccoli is working on the use of contrast-enhanced MRI in assessing breast lesions and has a pending NIH grant on this subject. They are also investigating the use of imaging in complications of breast implants and the use of color flow Doppler in several types of breast lesions. Dr. Stephen Feig, in conjunction with the physics group at the University of Toronto, recently obtained an NIH grant for clinical evaluation of a digital mammography unit, although funding for the project has been severely reduced by the NIH and it is somewhat questionable whether we will actually be able to carry out this research.

In the general diagnostic radiology division, Drs. Mark Schweitzer, David Karasick, and Diane Deely have developed into an excellent research team and are working on a number of projects, primarily using MRI but also plain film radiography, in various aspects of musculoskeletal disease. Some interesting projects were carried out by the chest radiology section, emphasizing the radiographic findings in Jefferson’s large population of scleroderma patients. They also worked with Dr. Simon Vinitski on developing a new FSE pulse sequence for MRI imaging of the lungs. In pediatric radiology, Dr. George Gross has continued his work on neural networks and their application to pediatric radiology, as well as on the imaging aspects of ECMO.

Our basic science group was quite active. Dr. Simon Vinitski did some preliminary work on computer simulation of complex blood flow in MR angiography. He also worked on region-based 3-D tissue segmentation in MRI, minimizing echo time in conventional and FSE MRI, and the use of ferrum in MRI of lung parenchyma and pulmonary embolism. Dr. Flemming Forsberg investigated quantitative ultrasound attenuation imaging, the use of ultrasound contrast agents, and techniques for ultrasonic speckle reduction. He was recently awarded a 3-year grant from the Whitaker Foundation to support his research in nonstationary spectral analysis of Doppler ultrasound signals. Dr. P. Macke Consigny obtained 3 corporate grants and continued his work on release of smooth muscle cell mitogens and platelet-derived growth factors after angioplasty. We recruited Dr. Andrew Maidment to replace Dr. John Boone as head of radiological imaging physics. Dr. Maidment recently completed his physics training at the University of Toronto and has special interests in digital mammography and other aspects of x-ray physics. I anticipate that the four of them as a group will continue to keep Jefferson one of the leading centers for basic research in radiology.

Finally, our fledgling efforts in health services research as it pertains to radiology got off the ground with six papers presented at the 1992 RSNA meeting by Drs. Friedman, Spirn, Harford, and myself.

**FUTURE RESEARCH PLANS**

I am happy to report that the high level of research productivity achieved last year seems to be continuing. Dozens of abstracts from the department were sent in for this year’s RSNA meeting, and we should be finding out shortly which were accepted. Virtually every division is actively pursuing interesting research. Some of the projects now in progress or planned are as follows:

- **In health services research**, several of us are submitting manuscripts dealing with utilization of imaging studies in the state of Pennsylvania, as well as the Jefferson experience with cost containment measures in utilization of low osmolar contrast agents. A comparison of utilization trends in barium enemas and colonoscopy is also in progress.

- **In MRI**, comparison of the MR imaging findings with histology and clinical outcomes will be carried out on a large series of patients with liver disease. The division will also explore the role of MRI in pancreatic disease and in a host of musculoskeletal diseases - especially trauma, metastases, and osteomyelitis. Studies relating to the quality of MR imaging will continue and
we will be exploring the possibility of working with health services researchers in other states to develop practice standards and quality guidelines in MRI. Basic research in MRI will focus on techniques like chemical shift imaging, inversion recovery FSE imaging and tissue segmentation.

- **In ultrasound**, we recently received a prototype scanner which is configured to obtain 3-D images. The potential of 3-D ultrasound will be explored in imaging fetuses, pediatric brains and hips, and the kidneys and ovaries in adult patients. Working with industry, department researchers will attempt to develop an oral ultrasound contrast agent for better definition of the gastric wall, pancreas, and other organs in that area. Basic research in ultrasound will focus on studying the harmonics of intravenous ultrasound contrast agents and assessing breast implant integrity via ultrasound velocity. Grant proposals are being considered for work on contrast agents, as well as for the study of prostate disease, rectal cancer, and breast cancer.

- **In CT**, research will focus on the accuracy of CT arterial portography in predicting resectability of hepatic metastases. The group will also participate in Dr. Kurtz’ s NIH-funded project on ovarian cancer. Work will continue on trials of lymph node contrast agents.

- **In CVIR**, it appears that Jefferson will be the core laboratory for both the TRIPOD Registry (a multi-center trial of tPA and pulse spray techniques for treatment of peripheral arterial thromboembolic disease) and for the clinical trial of Palmaz stents in the superficial femoral artery. Further projects from the STAR Registry will also be forthcoming. Working with Macke Consigny, Ph.D., division researchers will evaluate the effect of new stent design and materials on the incidence of restenosis in animals. Some plans are also being made to design a clinical trial comparing interventional versus medical therapy in patients with leg claudication. Dr. Consigny will continue his experimental research on both placement of endothelial cells onto and drug delivery into arterial walls after angioplasty.

- **In neuroradiology**, research will continue on the hemodynamics of cerebral aneurysms using computer-based angiography simulation. Dr. Flanders will continue his RSNA Scholars project on MR imaging in spinal cord injury. Studies will also attempt to differentiate transverse myelitis from multiple sclerosis in the spinal cord, and to compare MR angiography, Doppler ultrasound and conventional angiography in the assessment of cervical carotid artery disease. In ENT radiology, joint research with the ultrasound division will be carried out to determine the utility of endoluminal ultrasound in guiding functional endoscopic sinus surgery. Other work will focus on magnetization transfer spin echo imaging in head and neck tumors.

- **At the Breast Imaging Center**, we hope to begin work on the NIH-funded digital mammography project. A study is also commencing of long-term survival rates in women with nonpalpable breast tumors. An NIH grant application was recently submitted as part of a consortium for studying the efficacy of stereotactic core breast biopsy. In conjunction with a commercial manufacturer, measurement of the bioelectric potentials of breast lesions will be carried out. This is an interesting example of the application of a completely new technology to human disease, and it is presently too early to tell whether it will prove fruitful. Work will also continue by several researchers on the use of MRI and ultrasound to study silicone leakage and other problems in women with breast implants.

- **In the general diagnostic division**, studies will assess acromio-clavicular joint fluid, tarsal coalition, and Achilles tendon injuries. In thoracic radiology, studies will relate the CT changes in patients with scleroderma and SLE to the clinical and pathologic findings. Efforts will be made to develop a bronchoscope incorporating endoluminal ultrasound equipment to allow the study of central and peripheral lung masses. A new lead foil grid has been developed here in the department and initial clinical testing suggests that it may provide better scatter reduction and improve the quality of portable films. Further tests of the grid will be conducted during the coming year.
RESEARCH WEAKNESSES

We are very pleased that two of the research weaknesses identified in last year's report have now been corrected. One was the absence of an individual to coordinate the writing and organization of grant proposals. The addition of Judy Dubbs has made an important difference and she will continue to provide assistance to departmental investigators in writing and organizing their proposals to NIH and other outside funding sources. A second problem last year was that we lacked a Ph.D. scientist in radiological imaging physics following the departure of Dr. Boone. This past March, Dr. Andrew Maidment filled this position. His recruitment was the culmination of a very long and careful search process.

Although our research productivity reached a high last year, I am still anxious to see more grant-writing activity from our Ph.D. scientists. Hopefully this will increase, with the assistance of Ms. Dubbs. With heavy clinical demands upon the time of faculty radiologists, the burden of grant-writing necessarily falls on the shoulders of our Ph.D.s.

Several years ago, Dr. Gonnella encouraged me to develop a program of outcomes and health services research in radiology. So far, this has resulted in one peer-reviewed publication, two other manuscripts that are just about completed, several others that are in preparation, and the aforementioned six abstracts presented at last year's RSNA meeting. Despite this, I am not satisfied with the progress of the program. Dr. Harford and I have discussed this, and I expect that things will improve during the coming year. One of the problems has been in obtaining access to outside databases, and this is a problem which is not easily surmounted.

EXTRAMURAL FUNDING

During the course of the 1992-93 academic year, radiology department investigators had grants in force totaling $1,289,000 from NIH or foundation sources. The details of these grants are shown in Appendix A. The principal investigators were Drs. Goldberg, Kurtz, Mishkin, Mitchell, Needleman, Flanders, Tasciyan, Gardiner and Boone. In addition, we had $702,000 of grant funding in force from industry. There were 14 separate projects included in this industrial group. The principal investigators were Drs. Consigny, Feld, Goldberg, Mitchell, Needleman, Piccoli, B. Rao, Wechsler and myself.

In recent months, 10 other members of our faculty have submitted grant proposals to federal agencies, foundations or commercial industry. Several of these have already been awarded and will start during the 1993-94 academic year; the remainder are pending. We plan to submit several grant proposals to the recently-announced Department of the Army breast cancer research program.

At the moment, the best prospects for securing outside funding from federal agencies for diagnostic imaging research appear to be in breast disease. Other possibilities include brain and spine disease, new applications of ultrasound and MRI, and outcomes/health services research as it applies to radiology. Judging by our recent experience with industrial funding, it would appear that the best possibilities here lie with ultrasound and MRI contrast agents, and the development of better and safer interventional procedures.

INTERDEPARTMENTAL ACTIVITIES

Working closely with referring clinical services is an inherent part of radiology. Over the years, we have made strenuous efforts to develop close relationships in both clinical programs and research with virtually all our referring departments at Jefferson. I feel we have been largely successful. A look at the list of our departmental publications reveals that on a large proportion, there are collaborating authors from other Jefferson clinical departments. We are proud of these good working relationships and will continue our efforts to foster them in the future.
This past year saw the opening of radiographic facilities in the new urology endoscopy suite on Thompson 5. We are pleased to support this unit and are confident that the suite will greatly help our urological colleagues expand their practice. We also opened up a new radiology reading room in the emergency department. There is unanimous agreement that this has greatly helped the emergency physicians, and we appreciate their help in developing a space in their department for the reading room. Radiology residents are now reading emergency films there at night, and this fall our residents will begin covering that service during weekday daytime hours as well.

A close working relationship has been established between several of our divisions and the Jefferson Cancer Institute, headed by Dr. Carlo Croce. This marriage of the basic and clinical sciences is the “wave of the future” in clinical research. Dr. Croce has been a tremendous addition to Jefferson and he deserves great credit for his awareness of the importance of working with clinical departments like ours. We are delighted at the opportunity to work closely with him and his colleagues and look forward to future collaboration with them.

**FACULTY EVALUATIONS**

The Dean has requested that these reports include a brief discussion on evaluation of faculty members. I feel that we have a good mechanism for doing this in the department of radiology. At the end of each academic year, all faculty members submit to me a written report of their clinical, educational and research activities of the past year, as well as their plans for the coming year in these three areas. Also included is a list of their peer-reviewed publications and abstracts, invited presentations at national meetings or other academic institutions, and outside editorial activities and service to national medical organizations. After reviewing these reports, I meet with each faculty member individually to discuss his/her report and performance in general. I also obtain valuable feedback from them regarding any of their own concerns, problems or suggestions for improving departmental operations.

**DEPARTMENT GOALS**

We hope to correct the clinical and research weaknesses identified in earlier sections of this report. Our single overriding goal, however, is to restore the healthy trend in procedure volume growth that characterized previous years but that was interrupted this past year (I use the term “interrupted” advisedly; I hope it only proves to be a temporary interruption). As discussed earlier, there are many causes for this slowdown, and most of them are beyond the control of the department of radiology itself. Nevertheless, we must react aggressively and take measures to restore clinical growth. These are some of the things that are in progress as part of our plan to build our practice:

- There continues to be a patient backlog for both body and neuro/ENT MRI studies. To satisfy this demand, we are working with TME, Inc. to develop a new MRI site in Bala Cynwyd, near the Ford Road Campus of TJUH. We are also continuing to pursue the possibility of an MRI unit at the Wills Eye Hospital.

- We are currently recruiting a marketing manager who will work full time marketing our radiology practice. I first became interested in this possibility during the past year after hearing that several other large radiology departments in the area had their own marketers. I appreciate the agreement by the hospital administration to help support this position. When that individual comes on board in the near future, his/her primary responsibility will be to build up our practice in ultrasound and general diagnostic radiology. These are two of our largest divisions and both saw a decline in procedure volume this past year. We can offer superb clinical skills, state of the art equipment, and a high level of operating efficiency to potential referring physicians. We have to be certain that we get the word out about this.

- Managed care is here to stay and it is vital that we develop contracts with these organizations. The hospital and practice plan are conducting negotiations with the two largest managed care groups in the Philadelphia area, and we have active input. During the coming year, we hope to see the initiation of contracts with both groups - contracts which are supportive of the hospital’s
needs while at the same time providing appropriate professional reimbursement to our department.

- Marketing surveys conducted in recent years by the American College of Radiology have clearly shown that rapid reporting is one of the primary factors in successfully building a radiology practice. With our development this past year of ongoing radiology report turnaround time tracking, we now have the capability to monitor our efficiency in this area. One of our major goals will be to reduce the time it takes to turn around our reports to an absolute minimum. I will work with all our division directors to achieve this goal as promptly as possible.

Closely related to practice-building is the development of a more formal mechanism for consulting by radiologists. This is sometimes referred to as a “gatekeeper” role. Although informal consultation goes on in virtually every division of our department every day, it is likely that a more formal mechanism will have to be developed. This will become particularly important if capitation contracts with managed care companies are instituted. We have already had a number of discussions within the department, involving both faculty and residents, on this issue. I have also discussed it with Dean Gonnella and officials at Pennsylvania Blue Shield. The exact nature and scope of this mechanism has not yet been defined. It is a difficult issue, because with approximately 700 examinations per day performed in our department, speed and efficiency are of the essence. Also, we place ourselves in somewhat of a precarious position if we contemplate trying to both increase referrals and turn them off at the same time. This will undoubtedly prove to be an interesting challenge for us.

Another goal is the integration of the department of radiology at the Ford Road Campus of TJUH into our own department. The hospital is anxious for this to happen, and Mr. McArdle and I have had discussions with Drs. Joseph Rosen and Norman Ristin and the administration to see how this might be accomplished. At the moment, we appear to be close to a resolution of the issue. The amalgamation could potentially have benefits for everyone. As an extension of our department, the Ford Road Campus could provide us with an excellent outpatient imaging site, particularly if we are successful in obtaining an MRI unit in the Bala area close to it.

As stated earlier, we currently lack an active program in cardiac MRI. This is an up and coming new area for MRI, and another of our goals is to work collaboratively with the division of cardiology to develop this.

Finally, as mentioned earlier, there is a need for closer interaction with the department of radiology at the A.I. DuPont Institute. They have an excellent group of radiologists there, all of whom have faculty appointments here at Jefferson. It is important that a closer working relationship be developed between our two departments.

ISSUES FOR THE COLLEGE AND HOSPITAL

The single most crucial issue facing Jefferson is the development of contracts with managed care organizations. Virtually every academic institution in the Delaware Valley is developing such plans, and it is to be hoped that we can succeed better than any of the others. No one has all the expertise or all the answers as to how to go about developing these contracts because this is such a new phenomenon. It will be a challenge which will engage the leadership of the institution for years to come.

CONCLUSION

I'd like to close by quoting a statement made by a well-known radiologist: “As for the future, I see rough times ahead ....... The difficulties will stem from a confrontation between the costs of a rapidly expanding technology and concerted drives by insurance carriers and government to cut hospital costs......” Does this scenario sound familiar? It does indeed. Interestingly enough, these words were written by Philip J. Hodes, M.D. upon the occasion of his retirement as chairman of the department.
of radiology here at Jefferson in 1971 - exactly 22 years ago! While the subsequent two decades did indeed see some significant problems, they were truly a golden age for radiology with the development of ultrasound, CT, MRI, and interventional radiology, virtually none of which existed in 1971. Now in 1993 with dark clouds again looming on the horizon, we can be inspired by Dr. Hodes' perceptions back then and the experience of the subsequent years. Radiology survived nicely then and will do so again now. Our field has become one of the pivotal points of modern medicine, and here at Jefferson, we have one of the best academic departments in the country. Because of these two facts, we can not only survive but prosper - if we take the bit between our teeth and move ahead forcefully to face and solve our problems.
INTRODUCTION

The education of medical students, residents and fellows remained a high priority for our faculty in spite of the mounting pressures to increase clinical workload and research productivity. One of the major strengths of our department lies in the well-designed and viable teaching programs at all levels of graduate education. Our residency is recognized nationally as one of the best training programs. We are currently competing successfully with other top programs in the country for the best residency applicants as well as fellowship applicants. It gives me great satisfaction to report that our residents and fellows find themselves highly competitive for desirable positions in both academic radiology and community or private practice radiology.

A. RESIDENCY PROGRAM

The primary goal of our residency program is to produce radiologists who are well trained in all aspects of diagnostic imaging so that they will feel comfortable in either an academic setting or a private practice environment. Each of our five graduating residents passed the written and oral portions of the American Board of Radiology examination. Our residency program has set a record that is hard to beat. Our program performance average in the written part of the examination was ranked in the 93rd percentile for Diagnostic Radiology and 94th percentile for Physics nationwide. Four of our graduating residents have chosen to remain with us in order to pursue fellowship training in Cross-Sectional Imaging, Body MRI, Neuroradiology and Cardiovascular/Interventional Radiology.

Resident selection is a time consuming process and can be quite burdensome. George Gross, M.D. chairman of the residency selection committee has done an outstanding job each year. We received 286 applications for 6 positions and interviewed 58 applicants. We filled our five positions from the top 28 choices in the National Interns and Residents Match Program (NIRMP). Six candidates who just began residency in July 1993 include two from Jefferson Medical College, one from the University of Wisconsin, one from the Robert Wood Johnson Medical School, one from Albany Medical College, and one from Cornell Medical College.

The resident rotations were restructured this year in an attempt to increase working contact between the senior and junior residents and provide additional manpower in general radiology. Other changes that were instituted to optimize the resident training and improve radiology services include “on-line” dictation by the residents on call and reading of films in the emergency room. A radiologist is now available for consultation in the Emergency Room in the evenings and weekends and the films are easily accessible to the ER physicians. A full-time day rotation in the Emergency Room will begin effective October 1, 1993.

As an academic facility, research is strongly encouraged. The residents are expected to complete at least one project by the end of their third year. Several of our residents presented scientific papers at national radiology meetings such as the AUR and RSNA this year.

B. TRAINING PROGRAMS FOR FELLOWS

Our fellowship programs continued to enjoy another year of excellence. There is an ever-increasing number of extremely well qualified applicants for fellowships in all the areas offered by our department, including cardiovascular/interventional radiology, neuroradiology/ENT radiology,
US/CT/MRI, body MRI, musculoskeletal radiology and breast imaging. Our neuroradiology/ENT radiology fellowship is accredited by the ACGME and we are in the process of obtaining accreditation for the CVIR fellowship. Our visiting fellowships remain very popular in the various subspecialty areas, which allow practicing radiologists to learn new techniques and sharpen their old skills. Because of our international reputation, several physicians from overseas have chosen to pursue their research theses in our department in the divisions of Neuroradiology/ENT, Ultrasound, etc.

Under the aegis of the Jefferson Ultrasound Research and Education Institute, a joint grant from the U.S. Agency for International Development and the Soros Foundation will provide approximately $240,000 for one year (starting 9/1/93) for training international physicians in ultrasound. Under the terms of the grant, the program will be open to physicians from Central and Eastern Europe. Three groups of eight of these physicians will come to Jefferson to receive three months of training in ultrasound techniques.

Commercial contributions have been obtained for bringing an international research fellow to spend one year in the ultrasound division under the supervision of Barry Goldberg, M.D. This individual will be a fully-trained radiologist who will have a purely research role here.

C. TEACHING PROGRAMS FOR MEDICAL STUDENTS

**Junior and Senior Students:** The objectives of our department are to teach the basic elements involved in diagnostic radiology. Principles of x-rays, fluoroscopy, computed tomography, ultrasound, nuclear medicine and magnetic resonance imaging are taught, enabling the students to better understand the factors affecting patient preparation, patient cooperation, and the sequence in which diagnostic tests should be performed. Another goal is to teach the effective use of the Radiology department and appropriate use of new technology, with emphasis on cost containment. These are achieved through five separate electives in general radiology, pediatric radiology, neuroradiology, cross-sectional imaging, and cardiovascular/interventional radiology.

Paul Spirn, M.D. has devoted considerable effort in upgrading the RAD 401 course and has done a fine job. The evaluations by the students for this course have been very positive. During RAD 401, the students receive a dedicated lecture daily specifically targeted towards them. In addition, they attend two teaching conferences held for residents each day. The sub-groups are smaller, which has effectively increased one-on-one contact of students with faculty. The radiology residents are more actively participating in student conferences for the general radiology elective.

**Freshmen Students.** The radiology lectures on cross-sectional anatomy with CT and MRI correlation for the freshman class during their gross anatomy course were again well received as in the past.

**Sophomore Students.** Since radiology has advanced so rapidly in the past two decades, it is imperative that the radiologists become an integral part of the patient management team and teach students the most efficient and cost effective diagnostic imaging work-up of patients at an early stage of their education. We have, therefore, proposed that the Curriculum Committee of the medical school to incorporate radiology into the Introduction to Clinical Medicine course for the sophomore class in the future.

D. CONTINUING MEDICAL EDUCATION PROGRAMS

Once again, numerous CME courses were offered by our department this past year, although such activities tend to be somewhat a drain on faculty time.

The Thirteenth Annual Leading Edge in Diagnostic Ultrasound Conference held in Atlantic City was a great success. In addition, the department offered close to 40 CME courses lasting from 2-5 days.
in diagnostic ultrasound applications for the abdomen, obstetrics and gynecology, noninvasive vascular diagnosis, urologic and prostate ultrasound, neonatal brain, ultrasound in surgery, physics and instrumentation, cross-sectional anatomy and echocardiography.

An international post graduate course was given by Barry Goldberg, M.D., Laurence Needleman, M.D. and Rick Feld, M.D. in cooperation with Semmelweis Medical University on "Ultrasound Update: Current Practices and Future Applications" in Budapest, Hungary. This was supported in part by the Soros Foundation.

The Sixth Annual Hodes lecture in honor of Philip J. Hodes, M.D. was very successful. The guest speaker was Bruce Hillman, M.D., Professor and Chairman of Radiology, University of Virginia, who gave an outstanding presentation on "Physician Conflict of Interest and Public Trust: Reflections on Self Referral".

Radiology Grand Rounds, given biweekly, were very well received and covered 15 topics of interest in all the radiology subspecialties.

The teaching programs at all levels of graduate training remain a great source of pride. This year, the highlights include upgrading of student elective course RAD 401, restructuring of residency rotations, on-line dictation by residents on call, presence of a radiologist in the emergency room and establishing a radiology film reading room in the ER. Our international reputation is evident by overseas expansion of our CME courses and by the increasing number of international physicians visiting here to learn new skills or to pursue research interests. The commitment of our faculty to maintaining the excellence of our teaching programs is gratifying.
PUBLICATIONS

Journal Articles:


Books and Books Chapters:


Abstracts


FORMAL SCIENTIFIC PRESENTATIONS

ARCHIBALD A. ALEXANDER, M.D.

September 11, 1992
Ninth Annual Conference, The Society of Diagnostic Medical Sonographers, Philadelphia, PA
- "Prostate ultrasound update, 1992"
- "Penile Doppler for erectile dysfunction and ultrasound of the rectal wall"

September 15, 1992
Visiting Professor, Frankford Hospital, Frankford, PA
- "Transrectal ultrasound of prostate cancer"

October 22-25, 1992
Visiting Professor, "Sopron Ultrasound Days" Sopron, Hungary
- "Ultrasound of the anorectal complex"
- "Transvaginal interventional ultrasound"
- "Penile and scrotal ultrasound"

February 11-23, 1993
Visiting Professor, OTE Radiología Clinika, Budapest, Hungary
- "Penile Doppler"
- "Renal artery stenosis"
- "Staging of rectal carcinoma"

March 10-12, 1993
Visiting Lecturer, Brooke Army Hospital, San Antonio, TX
- "TRUS biopsy techniques"
- "TRUS of prostate cancer"

April 14-17, 1993
Visiting Lecturer, Asociacion Mexicana de Ultrasonido en Medicine, Acapulco, Mexico
- "TRUS findings in prostate cancer"
- "Color Doppler of the normal and abnormal prostate"
- "Penile Doppler for erectile dysfunction"
- "Cross-sectional imaging for staging of rectal cancer"

April 29, 1993
Lehigh Valley Medical Society, Bethlehem, PA
- "Color Doppler imaging of the penis and scrotum"

May 7-8, 1993
Lecturer, SONIX, Fort Lauderdale, FL
- "Introduction to color vascular ultrasound"
- "Cerebrovascular ultrasound"
- "Pathophysiology of cerebrovascular disease"
- "Venous ultrasound"
- "Cerebrovascular case analysis"

May 13-15, 1993
The Leading Edge in Diagnostic Ultrasound, sponsored by Thomas Jefferson University Hospital, Atlantic City, NJ
- "Prostatic ultrasound techniques"
- "Color Doppler evaluation of the prostate and rectal wall"
- "Prostate biopsy and other interventions"

JOSEPH RONN, M.D.

October 9-10, 1992
Tutorial on the Management of Peripheral Vascular Disease Using Thrombolysis, Hospital of the University of Pennsylvania, Philadelphia, PA
- "Upper extremity arterial thrombolysis"
February 28-
March 4, 1993
18th Annual Scientific Meeting of the Society of Cardiovascular and Interventional Radiology, New Orleans, LA
- "Vascular stents: Workshop session"
- "Symposium on percutaneous IVC filters"
- "Vascular stents: Refresher course"

March 17, 1993
Chesapeake Interventional Radiology Society, Alexandria, VA
- "Vascular stents"

EMILY F. CONANT, M. D.

March 4, 1993
Blue Ribbon Lecture, Philadelphia Roentgen Ray Society, Philadelphia, PA
- "The reconstructed breasts: Strategies in imaging and interpretation"

March 26, 1993
West Virginia Diagnostic Ultrasound Annual Conference, Morgantown, WV
- "Ultrasonographic evaluation of the silicone breast prosthesis"

April 25-30, 1993
American Roentgen Ray Society, San Francisco, CA
- "Colloid carcinoma of the breast: Mammographic, ultrasonographic, and pathologic correlation"
- "Prospective ultrasonographic evaluation of the silicone breast prosthesis"

P. MACKE CONSIGNY, Ph.D.

October 9-10, 1992
Tutorial on the Management of Peripheral Vascular Disease Using Thrombolysis, University of Pennsylvania, Philadelphia, PA
- "Atherogenesis: The response-to-injury hypothesis"
- "Pathophysiology of peripheral vascular disease"

November 29-
December 4, 1992
The 78th Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, IL
- "Placement of endothelial cells on denuded arterial surfaces"

January 25, 1993
Fifth Annual International Symposium on Vascular Diagnosis and Intervention, Miami, FL
- "Pathogenesis of atherosclerosis"
- "Re-endothelialization after angioplasty"

February 28-
March 4, 1993
18th Annual Scientific Meeting of the Society of Cardiovascular and Interventional Radiology, New Orleans, LA
- "In vivo placement of endothelial cells on balloon-dilated arterial surfaces"

April 21, 1993
International Congress and Comprehensive Course, Zermatt, Switzerland
- "Intimal hyperplasia. Some hard facts from experimental studies"
- "In vivo placement of endothelial cells on balloon dilated arterial surfaces"

May 19, 1993
Association of University Radiologists, Cincinnati, OH.
- "Drug delivery into the arterial wall after angioplasty" (poster)
DIANE M. DEELY, M.D.

November 29-December 4, 1992
The 78th Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, IL
• "Hyperextension vectors in hyperflexion cervical spine injuries: Analysis with MR imaging"

March 14, 1993
1993 Annual Scientific Meeting of the Pennsylvania Radiological Society, Hershey, PA
• Imaging evaluation of musculoskeletal trauma"

STEPHEN A. FEIG, M.D.

July 12-14, 1992
Sixth Annual Symposium on Breast Disease: Diagnostic Imaging and Current Management, sponsored by the University of Michigan Medical School, Grand Traverse, MI
• "Controversies in breast cancer screening"
• "The mammographic report"
• "Analysis of breast calcifications"
• "Preoperative localization of nonpalpable lesions"

September 10-13, 1992
12th Annual Pittsburgh Breast Imaging Seminar, sponsored by Pittsburgh Radiology Associates, PC, Radiologic Consultants Ltd, University of Pittsburgh/Magee-Women's Hospital and Western Pennsylvania Hospital, Pittsburgh, PA
• "Needle localization techniques"
• "Case studies-interpretation and patient management"
• "The screening guidelines: New questions and the answers"
• "The mammographic report"

October 12-15, 1992
Fifteenth Annual Postgraduate Course, Practical Radiology, University of Virginia School of Medicine, Continuing Medical Education Program, Charlottesville, VA
• "Analysis of breast calcifications"
• "Imaging evaluation of breast masses"
• "The mammographic report including medicolegal aspects"
• "Localization techniques for nonpalpable lesions"

October 16-18, 1992
Workshops in Mammography, sponsored by Workshops in Mammography, Inc, Atlanta, GA
• "Mammographic technique, equipment, and quality control"
• "Mammographic interpretation of breast masses, problems and pitfalls"
• "Teaching pearls in mammographic interpretation of breast calcifications"
• "Results of screening trials: Why the controversy?"

October 23-25, 1992
13th Annual American College of Radiology Symposium on Mammography, Chicago, IL
• "Calcifications"
• "Screening"
• "Unknown case discussion"

October 28, 1992
Diagnosis and Treatment of Non-Invasive Breast Cancer. Women and Infants Hospital, Brown University School of Medicine, Providence, RI
• "Screening for non-invasive and early invasive breast cancer"
November 9-13, 1992  
A Practical Approach to Breast Imaging, sponsored by the Department of Radiology, University of California School of Medicine at San Francisco, Rancho Mirage, CA  
- "Mammographic features of breast calcifications"  
- "Problem-solving mammography, interpretation and management"  
- "Mammography screening: Current assessment of benefits, risks, and guidelines"

November 19, 1992  
Department of Radiology, University of Medicine and Dentistry of New Jersey, Robert Wood Johnson Medical School, New Brunswick, NJ  
- "Mammographic features of breast calcifications"  
- "Mammographic features of breast masses"

November 29-December 4, 1992  
The 78th Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, IL  
- "Preoperative localization and needle biopsy of nonpalpable breast lesions"  
- "Preoperative localization techniques for nonpalpable breast lesions"  
- "Risk, benefit and screening controversies"  
- "Controversy: Mammography under age 50-to screen or not to screen"

January 26, 1993  
Radiology Grand Rounds, Department of Radiology, Albert Einstein College of Medicine, Bronx Municipal Hospital Center, New York, NY  
- "Breast calcifications, diagnostic criteria and management"

February 27, 1993  
- "How to reduce unnecessary breast biopsy of nonpalpable lesions without missing early cancers"

March 10-13, 1993  
Third Annual Breast Imaging Conference, Orlando Regional Healthcare System, Orlando, FL  
- "Analysis of microcalcifications"  
- "Preoperative needle localization techniques"  
- "Advanced interpretation"

March 18-19, 1993  
President's Cancer Panel, Special Commission on Breast Cancer, National Cancer Program, National Cancer Institute, Screening and Early Detection, Development of New Technologies for Detection and Diagnosis, Miami, FL  
- "Radiation exposure: Mammography safety"

March 19-21, 1993  
14th ACR Symposium on Mammography, sponsored by the American College of Radiology, Lake Buena Vista, FL  
- "Equipment"  
- "Calcifications, Part 1"  
- "Calcifications, Part 2"  
- "Screening"

March 30, 1993  
Radiology Grand Rounds, Hospital of the University of Pennsylvania, Philadelphia, PA  
- "Breast calcifications: The good, the bad and the ugly"
April 4-6, 1993

1993 Symposium on Breast Imaging, Indiana University School of Medicine, Division of Continuing Education and Department of Radiology, Indianapolis, IN

- "Analysis of masses"
- "Screening controversies"
- "The mammography report"
- "Cost effectiveness of screening"

April 14-18, 1993

First Meeting and Postgraduate Course, co-sponsored by the Society of Breast Imaging and the American College of Radiology, Amelia Island, FL

- "Screening controversies: Who and how often?"
- "Maintaining image quality"

RICK I. FELD, M.D.

November 6-7, 1992

Thomas Jefferson University International Conference in Cooperation with Semmelweis Medical University, Budapest, Hungary

- "Doppler and interventional ultrasound"

November 29-December 4, 1992

The 78th Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, IL

- "Carotid Doppler sonography"

May 13-15, 1993

The Leading Edge in Diagnostic Ultrasound, sponsored by Thomas Jefferson University Hospital, Atlantic City, NJ

- "New aspects of guidance for interventional ultrasound"
- "Topics in vascular ultrasound"

May 22, 1993

Hewlett-Packard, Baltimore, MD

- "Vascular ultrasound update: Iatrogenic femoral artery injuries"

FLEMMING FORSBERG, Ph.D.

February 18, 1993

Drexel University, Philadelphia, PA

- "Towards quantitative attenuation imaging"
May 2-4, 1993
CVI/CVI-Q Investigator Meeting, Winston-Salem, NC
- "Evaluation of CVI-Q in an animal model"

May 13-15, 1993
The Leading Edge in Diagnostic Ultrasound, sponsored by Thomas Jefferson University Hospital, Atlantic City, NJ
- "Physics of endorectal probes"

June 7-9, 1993
18th International Symposium on Ultrasonic Imaging and Tissue Characterization, Washington DC
- "Different instantaneous frequency estimators for ultrasonic speckle reduction"
- "Pitfalls in intravenous ultrasound contrast agent studies"

DAVID P. FRIEDMAN, M.D.

November 29-December 4, 1992
The 78th Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, IL
- "Performance of office/imaging center craniospinal CT, MR and plain radiographic studies by radiologists and nonradiologists in Pennsylvania in 1991: Comparison of utilization and physician reimbursement"

May 16-20, 1993
The 31st Annual Meeting of the American Society of Neuroradiology, Vancouver, British Columbia
- "Imaging of the abnormal conus medullaris" (exhibit)

GEOFFREY A. GARDINER JR., M.D.

October 13, 1992
First International Symposium on Cardiovascular and Interventional Radiology, Harvard Medical School, Brigham and Women's Hospital, Boston, MA
- "Balloon angioplasty and vascular stents in the iliac arteries"
- "Thrombolysis of occluded bypass grafts: Long-term results"

November 29-December 4, 1992
The 78th Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, IL
- "Interobserver variability in evaluation of angioplasty results"
- "Peripheral vascular disease: Natural history and indications for treatment"

February 16, 1993
Grand Rounds, Albany Medical Center and Roentgen Ray Society, Albany, NY
- "Balloon angioplasty and vascular stents in the iliac arteries: Current status"

BARRY B. GOLDBERG, M.D.

August 30-September 3, 1992
The Third Congress of Asian Federation of Societies for Ultrasound in Medicine and Biology (AFSUMB '92), Seoul, Korea
- "Color Doppler ultrasound"
- "Doppler ultrasound enhancement using a new intravenous ultrasound contrast agent"

September 5, 1992
Honorable Guest Lecturer, The Society of Ultrasound in Medicine of the Republic of China, Taiwan, China
- "Advances in color ultrasound imaging"
September 6, 1992  Honorable Guest Lecturer, The Society of Emergency and Critical Care Medicine, Taiwan, China
  • "Use of ultrasound in emergency and critical care situations"
  • "Transnasal 20 MHz endoluminal ultrasound: A new method of imaging the detailed structures of the esophagus in health and disease"

September 7, 1992  Taichung Veterans General Hospital, Taiwan, China
  • "Advances in color US imaging"

September 11, 1992  Society of Diagnostic Medical Sonographers, Philadelphia, PA
  • "New horizons in ultrasound"
  • "Uses of color Doppler in the abdomen"

September 17-19, 1992  The 14th Annual Seminar on Diagnostic Ultrasound, Ann Arbor, MI
  • "Color Doppler of the abdomen and pelvis"
  • "Endoluminal ultrasound using miniature transducers"
  • "Ultrasound contrast agents"

October 23-25, 1992  The First Annual Postgraduate Education Course of the Society of Radiologists in Ultrasound, Chicago, IL
  • "New developments in ultrasound"

October 31, 1992  Recent Advances in Ultrasound, A Nationwide Satellite Conference, Bothell, WA
  • "Recent advances in contrast media"

November 6-7, 1992  Thomas Jefferson University International Conference in Cooperation with Semmelweis Medical University, Budapest, Hungary
  • "Ultrasound update: Current practices and future applications"
  • "Prostate ultrasound"
  • "Uses of color Doppler in the abdomen and pelvis"
  • "New horizons in ultrasound"

November 29-December 3, 1992  Roma Chirurgia '92, Rome, Italy
  • "Advances in endoluminal ultrasound"

January 20-21, 1993  Visiting Professor, North Shore University Hospital, Manhasset, NY
  • "Color Doppler in the abdomen and pelvis"
  • "New horizons: Endoluminal, 3D and contrast ultrasound"

January 24-31, 1993  Great Medical Getaways Cruise Seminar, Caribbean
  • "Diagnostic ultrasound: An overview and a look into the future"

February 11, 1993  Philadelphia Obstetrical Society Meeting, OB/GYN Resident Basic Science Series, Philadelphia, PA
  • "Pelvic ultrasonography"

March 12-15, 1993  AIUM 37th Annual Convention, Honolulu, HI
  • "Ureters, bladder and female urethra"
  • "Ultrasonic contrast agents"
  • "New ultrasound techniques in gynecology (endoluminal, contrast agents, 3D, color Doppler)"
  • "Endoluminal bronchoscopic ultrasound"
  • "Endoluminal ultrasound"

March 19, 1993  New England Roentgen Ray Society, Cambridge, MA
• "New horizons in ultrasound: Contrast agents, endoluminal ultrasound and 3D ultrasound"

May 13-15, 1993
The Leading Edge in Diagnostic Ultrasound, sponsored by Thomas Jefferson University Hospital, Atlantic City, NJ
• "The future of ultrasound diagnosis"

CARLOS F. GONZALEZ, M.D.

March 15, 1993
Visiting Professor, Mercy Catholic Medical Center, Darby, PA
• "Orbital imaging"

June 12, 1993
Visiting Professor, Spanish Society of Neuroradiology, Madrid, Spain
• "Pathophysiology of the ongoing growth and rupture of intracranial aneurysms"

June 14, 1993
Visiting Professor, Villa Nobel, San Remo, Italy
• Tissue characterization by MRI: data segmentation using 3D feature MAP

June 25-26, 1993
Visiting Professor, Colombia Society of Neurological Sciences, Bogota, Colombia
• "Neuroimaging in dementia and degenerative diseases of the CNS"
• "Blood flow changes in cerebral aneurysms using numerical analysis"
• "Blood flow changes in atheromatosis of the carotid arteries using numerical analysis"
• "Acute cervical spine trauma: Correlation of MR imaging findings with degree of neurologic deficit"
• "The role of MRI in the diagnosis of ocular and orbital pathology"
• "Intraaxial and extraaxial spinal cord tumors: An MRI analysis"

GEORGE W. GROSS, M.D.

February 28-May 4, 1993
Ninth Annual CNMC ECMO Symposium, Keystone, CO
• "Grade I subependymal hemorrhage prior to and during ECMO in neonates: Frequency and patterns of evolution"
• "Intracranial complications associated with ECMO in neonates - pattern and frequency"
• "Chest radiographic appearances in neonates on ECMO - common findings and variations"
• "Radiographic and sonographic appearances of thoracic complications of ECMO"
• "Abdominal complications associated with ECMO in neonates"

March 11-17, 1993
Annual Meeting of the Society of Thoracic Radiology, Hilton Head Island, SC
• "Diaphragmatic hernia treated with ECMO: Radiographic appearances"

May 12-15, 1993
Annual Meeting of the Society for Pediatric Radiology, Seattle, WA
• "Assessment using computer-aided diagnosis"

May 20, 1993
Visiting Professor, Christiana Hospital, Wilmington, DE
• "Common sense approach to the newborn chest radiograph"
ETHAN J. HALPERN, M.D.

March 9, 1993 Delaware Valley Vascular Ultrasound Society, Philadelphia, PA  
• "Renal artery stenosis and renal Doppler"

June 7, 1993 Intercity Kidney Rounds, National Kidney Foundation of the Delaware Valley, Philadelphia, PA  
• "CT and ultrasound in the diagnosis of renal artery stenosis"

ROBERT J. HARFORD, Ph.D.

November 29- December 4, 1992 The 78th Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, IL  
• "Comparative reimbursements to radiologists and nonradiologists for office-imaging center x-ray studies: Statewide Pennsylvania data for 1991"

DAVID KARASICK, M.D.

August 27, 1992 International Skeletal Society, Open Meeting, Stockholm, Sweden  
• "Cervical spine fusion: Struts and plugs"

October 1, 1992 Blue Ribbon Lecture, Philadelphia Roentgen Ray Society, Philadelphia, PA  
• "Imaging of the traumatized elbow"

October 14, 1992 Lecturer, Mercy Catholic Hospital, Department of Radiology, Darby, PA  
• "Metabolic bone disease update"

April 25-30, 1993 93rd Annual Meeting of the American Roentgen Ray Society, San Francisco, CA  
• "Characteristic radiologic changes of the asymmetric flat foot following posterior tibial tendon dysfunction and tear"  
• "Imaging options in the assessment of anterior cervical spine fusions following discectomy for degenerated or protruded discs: A study of 295 patients"

STEPHEN KARASICK, M.D.

November 29- December 4, 1992 The 78th Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, IL  
• "Transurethral balloon dilatation of the external urinary sphincter: Effectiveness in spinal cord injured men with detrusor sphincter dyssynergia"  
• "Intraurethral wire mesh prosthesis placement in the external urinary sphincter: A new treatment for detrusor sphincter dyssynergia"

January 9, 1993 Uroradiology '93 - Society of Uroradiology, Naples, FL  
• "Assessment of alternative therapies to external sphincterotomy; Sphincter prosthesis placement and balloon dilation."

March 17, 1993 Visiting Lecturer, Mercy Catholic Hospital, Department of Radiology, Darby, PA  
• "Clinical urography"
ALFRED B. KURTZ, M.D.

October 2-4, 1992  Guest Lecturer, Brigham and Women's Hospital, Boston, MA
    • Symposium: "Screening for ovarian carcinoma"
    • "Reevaluation of the biophysical profile"
    • "Fetal skeletal anomalies"

October 23-25, 1992  The First Annual Postgraduate Education Course of the Society of Radiologists in Ultrasound, Chicago, IL
    • "Deep vein thrombosis"

February 25, 1993  Visiting Professor Conference, UMDNJ Robert Wood Johnson Medical School, New Brunswick, NJ
    • Case presentations to residents
    • "Diagnosis of ovarian cancer"

March 15-18, 1993  The 37th Annual Convention of the American Institute of Ultrasound in Medicine, Honolulu, HI
    • "The ultrasound assessment of growth retardation"

March 31, 1993  Visiting Professor, State University of New York Health Science Center at Brooklyn, Brooklyn, NY
    • "Prostatic ultrasound"
    • Case presentations to residents

April 8, 1993  Conference Lecture, Presbyterian Medical Center of Philadelphia, Philadelphia, PA
    • "Ovarian cancer"

April 15, 1993  Guest Lecturer, Clayton H. Hale Memorial Lecture in Radiology, The Central New York Radiological Society, Syracuse, NY
    • "Ovarian cancer analysis"
    • "Color Doppler in the extremities"

April 16, 1993  Visiting Professor, State University of New York, Health Science Center, cosponsored by the Central New York Radiological Society, Syracuse, NY
    • "First trimester ultrasound: Transvaginal and transabdominal"
    • Case presentations to residents

May 6, 1993  Guest Lecturer, New York Roentgen Society Spring Conference, New York, NY
    • "Pulse and color Doppler in the abdomen and pelvis"
    • "Peripheral venous and arterial Doppler imaging"

May 13-15, 1993  Co-Director, The Leading Edge in Diagnostic Ultrasound, sponsored by Thomas Jefferson University Hospital, Atlantic City, NJ
    • "First trimester pregnancy: Intrauterine and extraterine, transabdominal and transvaginal"
    • "Transvaginal ultrasound in the 2nd and 3rd trimesters"

ANNA S. LEV-TOAFF, M.D.

April 25-30, 1993  93rd Annual Meeting of the American Roentgen Ray Society, San Francisco, CA
    • "The pre- and post-myomectomy hysterosalpingogram"
    • "Diagnostic imaging in refractory puerperal febrile morbidity"
May 13-15, 1993
The Annual Meeting of the Pennsylvania Radiologic Society, Hershey, PA
  • "Diagnostic imaging in refractory puerperal febrile morbidity"

May 13-15, 1993
The Leading Edge in Diagnostic Ultrasound, sponsored by Thomas Jefferson University Hospital, Atlantic City, NJ
  • "Ultrasound in female infertility"

DAVID C. LEVIN, M.D.
July 10, 1992
Geisinger Medical Center, Danville, PA
  • "How to interpret coronary arteriograms"

September 12, 1992
Society of Chairmen of Academic Radiology Departments, Phoenix, AZ
  • "Subspecialty certification: Impact on radiology training programs"

November 18, 1992
Fifth Annual Charles Dotter Memorial Lecture of the American Heart Association, New Orleans, LA
  • "Angiographic assessment of stenosis morphology. Is this a new way to look at coronary arteriograms?"

November 29-December 4, 1992
The 78th Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, IL
  • "Diagnostic and interventional coronary angiography" (Refresher Course)
  • "Self-referral vs referral to radiologists in obstetric ultrasound: 1991 analysis of utilization patterns and reimbursements in Pennsylvania"
  • "Performance of office/imaging center body CT, MR imaging and ultrasound studies by radiologists and nonradiologists in Pennsylvania in 1991: Comparison of utilization and physician reimbursement"
  • "Effect of guidelines, monitoring, and feedback mechanisms on controlling utilization of intravenous low-osmolar contrast agents"

February 4, 1993
American College of Cardiology course. The Cardiac Cath Lab of the '90s: Preparing for the Future, Bethesda, MD
  • "Technical considerations in laboratory design"

February 18-19, 1993
University of Texas Medical Branch, Galveston, TX
  • "The practice of radiology by nonradiologists: Cost, utilization and quality issues"
  • "The use of intravascular stenting"

March 9, 1993
Radiology Grand Rounds, Brigham and Women's Hospital/Harvard Medical School, Boston, MA
  • "Angiographic coronary stenosis morphology"

March 9, 1993
32nd Annual Merrill C. Sosman Lecture, Brigham & Women's Hospital/Harvard Medical School, Boston, MA
  • "The practice of radiology by non-radiologists: Cost, quality, and utilization issues"

April 7, 1993
Albany Medical College, Albany, NY
  • "Updates in cardiac interventions"
May 13-15, 1993
The Leading Edge in Diagnostic Ultrasound, sponsored by Thomas Jefferson University Hospital, Atlantic City, NJ
• "The economics of ultrasound"

JI-BIN LIU, M.D.
November 29-
December 4, 1992
The 78th Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, IL
• "Transnasal esophageal ultrasound: New method of imaging esophageal varices"
• "Transnasal ultrasound evaluation of esophageal involvement in scleroderma correlated to histology and manometry"

March 15-18, 1993
The 37th Annual Convention of the American Institute of Ultrasound in Medicine, Honolulu, HI
• "High frequency endoluminal ultrasound evaluation of gastric and esophageal varices"
• "High resolution endoluminal ultrasound evaluation of esophageal involvement in scleroderma"

May 13-15, 1993
The Leading Edge in Diagnostic Ultrasound, sponsored by Thomas Jefferson University Hospital, Atlantic City, NJ
• "Endoluminal ultrasound of genitourinary tract"

MARK M. MISHKIN, M.D.
October 29,
November 1 1992
Economics for Diagnostic Imaging 1992: National Symposium, Washington, DC
• "Non-ionic contrast: Issues and societal initiative"

November 19, 1992
Visiting Professor, Grand View Hospital, Sellersville, PA
• "Issues surrounding the use of ionic and non-ionic contrast media"

DONALD G. MITCHELL, M.D.
October 13, 1992
New York University Advanced MRI Course, New York, NY
• "Diffuse liver disease"
• "Pancreatic MRI"
• "Prostate MRI"

November 3, 1992
Grand Rounds, Medical College of Pennsylvania, Philadelphia, PA
• "MRI of the liver"

November 29-
December 4, 1992
The 78th Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, IL
• "MR imaging of the abdomen"

January 14, 1993
Grand Rounds, University of Medicine and Dentistry of New Jersey, Robert Wood Johnson Medical School, New Brunswick, NJ
• "MRI of the liver"

February 11, 1993
The Obstetrical Society of Philadelphia, Philadelphia, PA
• "MRI of the female pelvis"
February 11, 1993 Delaware Valley MRI Society, Philadelphia, PA
• "MRI of the liver"

March 30-31, 1993 The 11th Annual Meeting of the Society for Magnetic Resonance Imaging, San Francisco, CA
• "Tissue contrast in MR imaging: Basic principles and abdominal applications"

May 1, 1993 1993 MRI Expert's Meeting, sponsored by Berlex Laboratories, Inc, Dallas, TX
• "MRI of the liver"

May 24, 1993 Grand Rounds, Medical College of Pennsylvania, Philadelphia, PA
• "MRI of the pancreas"

LEVON NAZARIAN, M.D.

May 5, 1993 Visiting Professor, The New York Hospital, Cornell Medical Center, New York, NY
• "Ultrasound board review"

May 13-15, 1993 The Leading Edge in Diagnostic Ultrasound, sponsored by Thomas Jefferson University Hospital, Atlantic City, NJ
• "Case presentation and self-examination"

LAURENCE NEEDLEMAN, M.D.

September 13, 1992 Ninth Annual Conference of the Society of Diagnostic Medical Sonographers, Philadelphia, PA
• "Obstetrical measurements"

September 19, 1992 Advanced Technology Laboratories Color Update, Rochester, NY
• "Abdominal color Doppler"
• "Doppler evaluation of peripheral veins"

September 25, 1992 Pennsylvania Hospital, Department of Radiology, Philadelphia, PA
• "Carotid Doppler study"

September 25, 1992 Delaware Valley Vascular Society, Philadelphia, PA
• "Ultrasound evaluation and intervention of catheter related arterial injuries"

October 8, 1992 New Jersey Institute for Ultrasound in Medicine, Edison, NJ
• "Venous ultrasound"

October 22, 1992 Fellows Meeting of the Society of Radiologists in Ultrasound, Chicago, IL
• "Upper extremity venous disease"

October 23-25, 1992 The First Annual Postgraduate Education Course of the Society of Radiologists in Ultrasound, Chicago, IL
• "Peripheral vascular ultrasound"

November 6-7, 1992 Thomas Jefferson University International Conference in Cooperation with Semmelweis Medical University, Budapest, Hungary
• "Carotid ultrasound"
• "Peripheral vascular ultrasound"
• "Peripheral venous ultrasound"

November 17, 1992
Greater Delaware Valley Ultrasound Society, Philadelphia, PA
• "Intrauterine growth retardation"

November 29-December 4, 1992
The 78th Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, IL
• "Initial experience with a US contrast agent in upper-extremity venous thrombosis"
• "Venous ultrasound hands-on"
• "Carotid duplex ultrasound hands-on"

January 4, 1993
Visiting Professor, Grand Rounds, Rhode Island Hospital, Department of Diagnostic Imaging, Providence, RI
• "Cerebrovascular ultrasound"
• "Obstetrical ultrasound evaluation for abnormal AFP levels"

January 6, 1993
Department of Radiology, Albany Medical College, Albany, NY
• "Ultrasound of elevated AFP"

January 6, 1993
Grand Rounds, Department of Radiology, Albany Medical College and Northeastern New York Radiological Society Meeting, Albany, NY
• "Vascular ultrasound: New techniques and applications"

February 26-27, 1993
Chiba International Symposium on Abdominal Color Doppler Ultrasound, Chiba, Japan
• "Principles of abdominal color Doppler"
• "Contrast agents"

March 28-31, 1993
Ultrasound: 1993, Department of Radiology, Brigham and Women's Hospital, Harvard Medical School, Boston, MA
• "Film panel of unknown cases"
• "Doppler: Kidneys, transplants, scrotum"
• "Doppler: Carotid arteries"
• "Doppler: Upper extremity venous"

March 29, 1993
New England Society of Ultrasound in Medicine, Boston, MA
• "Venous ultrasound"

April 2, 1993
Maine Sonographers Association, Spring Conference, Portland, ME
• "Diffuse liver disease/portal hypertension"
• "Potpourri of ultrasound imaging"
• "Fetal echocardiography"
• "Doppler in OB/GYN"

April 25-30, 1993
93rd Annual Meeting of the American Roentgen Ray Society, San Francisco, CA
• "Abnormal fetal growth"

May 1, 1993
The National Kidney Foundation of the Delaware Valley, Nephrology Teaching Day, Philadelphia, PA
• "Diagnosis of renal artery stenosis by Doppler ultrasound and CT"
• "Diagnosis and management of renovascular disease" (panel discussion)

May 13-15, 1993
The Leading Edge in Diagnostic Ultrasound, sponsored by Thomas Jefferson University Hospital, Atlantic City, NJ
• "TUGR imaging and Doppler"
• "Congenital heart disease in the fetus and neonate"

ERIC K. OUTWATER, M.D.

August 12, 1992
The Tenth Annual Meeting of the Society of Magnetic Resonance in Medicine, San Francisco, CA
• "Magnetization transfer of hepatic lesions: Evaluation of a novel contrast technique in the abdomen"

October 27, 1992
Visiting Professor, Department of Radiologic Sciences, Medical College of Pennsylvania, Philadelphia, PA
• "MRI of the female pelvis"

March 30-31, 1993
The 11th Annual Meeting of the Society for Magnetic Resonance Imaging, San Francisco, CA
• "MR cholangiography with a fast spin echo sequence" [poster]
• "MRI characterization of hemorrhagic adnexal masses: A blinded reader study"
• "Evaluation of a fast spin echo sequence for the liver" [poster]

CATHARINE W. PICCOLI, M.D.

March 30, 1993
Invited Faculty, MR Mammography Advisory Panel, Miami, FL
• "The role of breast sonography"

May 13-15, 1993
The Leading Edge in Diagnostic Ultrasound, sponsored by Thomas Jefferson University Hospital, Atlantic City, NJ
• "Case presentations and self-evaluation"

BHASKARA K. RAO, M.D.

November 12, 1992
Invited Speaker, Dayton-Troy Gastroenterology Society Symposium, "Gastroenterology Update 1993", Dayton, OH
• "Sonography of the gastrointestinal tract: An update"
• "Future directions in gastrointestinal tract imaging"

April 15-18, 1993
XII National Congress of Mexican Association of Ultrasound in Medicine, Acapulco, Mexico.
• "Color Doppler flow imaging in the diagnosis of ovarian carcinoma"
• "Color Doppler flow imaging of deep venous system of lower extremities"
• "Color Doppler flow imaging of carotid arterial system and carotid body tumors"
• "Color Doppler flow imaging: Applications in abdomen"

May 13-15, 1993
The Leading Edge in Diagnostic Ultrasound, sponsored by Thomas Jefferson University Hospital, Atlantic City, NJ
• "Sonography of thyroid and parathyroid glands"

May 18, 1993
Greater Delaware Valley Ultrasound Society, Color Doppler Imaging Symposium, Philadelphia, PA
• "Color Doppler imaging applications in abdomen"

May 26, 1993
Catholic University Medical Center, Seoul, Korea
May 28-30, 1993

Third International Workshop on Fetal Genetic Pathology, Perugia Bosco, Italy

- "Fetal craniocerebral malformations with pathologic correlations"

VIJAY M. RAO, M.D.

October 21, 1992

Visiting Professor, Mercy Catholic Medical Center, Fitzgerald Mercy Division, Darby, PA

- "Head and neck imaging"

October 29, 1992

Visiting Professor, Presbyterian Medical Center of Philadelphia, Philadelphia, PA

- "Imaging of infrahyoid neck"

November 12, 1992

Guest Lecturer, Delaware Valley MRI Society, Philadelphia, PA

- "MRI of TMJ"

November 29 - December 4, 1992

The 78th Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, IL

- "The elusive "stuck" disk in TMJ dysfunction: Diagnosis by MRI"

May 14, 1993

The 26th Annual Meeting of the American Society of Head and Neck Radiology, Vancouver, British Columbia

- "Mid skull base anatomy and pathology"

June 10, 1993

Visiting Professor, Deborah Heart and Lung Institute, Browns Mills, NJ

- "Sinonasal imaging by CT and MRI"

JASON E. SAGERMAN, M.D.

November 29 - December 4, 1992

The 78th Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, IL

- "Ultrasound guided biopsy of focal liver lesions: Core biopsy versus fine needle aspiration with immediate cytotecnological analysis"

May 13-15, 1993

The Leading Edge in Diagnostic Ultrasound, sponsored by Thomas Jefferson University Hospital, Atlantic City, NJ

- "Ultrasound and CT in abdominal trauma"

ANA SALAZAR, M.D.

October 12, 1992

Visiting Professor, Yale-New Haven Hospital, New Haven, CT

- "CT-guided wire localization of small pulmonary nodules prior to thoracoscopic resection"

MARK E. SCHWEITZER, M.D.

November 29 - December 4, 1992

The 78th Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, IL

- "MR imaging of the posterior tibialis tendon: Secondary findings"
• "MR imaging of the patellar tendon: Buckling and other normal variants"

December 8, 1992
Grand Rounds, Medical College of Pennsylvania, Philadelphia, PA
• "Axial MRI of the knee"

December 17, 1992
Blue Ribbon Speaker, Philadelphia Roentgen Ray Society, Philadelphia, PA
• "Axial MRI of the knee"

March 18, 1993
Visiting Professor, University of California, San Diego, CA
• "MR of bone and soft tissue tumors"
• "MR of the wrist"
• "MR of the foot and ankle"
• "MR: Normal variants"

March 30, 1993
Eleventh Annual Meeting of the Society of Magnetic Resonance Imaging, San Francisco, CA
• "MR of the shoulder"
• "Bull's eyes and halos: Useful MR imaging discriminators of osseous metastases"

May 13, 1993
Delaware Valley MRI Society, Philadelphia, PA
• "MR: Musculoskeletal variants"

SHARON R. SEGAL, D.O.

November 3-4, 1992
Annual Meeting of the American Osteopathic College of Radiology, San Diego, California
• "Endovaginal ultrasound in obstetrics"
• "Venous ultrasound in the extremities"

May 13-15, 1993
The Leading Edge in Diagnostic Ultrasound, sponsored by Thomas Jefferson University Hospital, Atlantic City, NJ
• "Stump the stars"

June 26, 1993
16th Annual Conference of the Society of Vascular Technology, Washington, D.C.
• "Color flow and duplex Doppler imaging, magnetic resonance angiography and contrast angiography in Moya-Moya Disease: A case study" [Poster]

MARCELLE J. SHAPIRO, M.D.

December 2, 1992
Guest Lecturer, New York Academy of Gastroenterology, New York University School of Medicine, New York, NY
• "T.I.P.S.S.: The shunt of the 90's?"

February 8, 1993
Guest Lecturer, GI Grand Rounds, Atlantic City Medical Center, Atlantic City, NJ
• "T.I.P.S.S.: The shunt of the 90's?"

February 28-
March 4, 1993
18th Annual Scientific Meeting of the Society of Cardiovascular and Interventional Radiology, New Orleans, LA
• "Vascular stents"
• "Non-vascular endoluminal ultrasound"
March 17, 1993

Guest Lecturer, Grand Rounds, Medical Center of Delaware, Christiana, DE

- "New radiologic intervention in portal hypertension: Transjugular intrahepatic portosystemic stent shunts (T.I.P.S.S.)"

PAUL W. SPIRN, M.D.

September 19, 1992

Guest Lecture Series in Critical Care and Pulmonary Medicine, West Penn Hospital, Pittsburgh, PA

- "Imaging the chest in the critically ill patient"

ROBERT M. STEINER, M.D.

July 10, 1992

Radiology Grand Rounds, Cornell Medical Center, New York Hospital, New York, NY

- "Adult congenital heart disease"

August 8, 1992

Radiology Grand Rounds, Stanford University School of Medicine, Stanford, CA

- "MRI of bone marrow update"

October 1, 1992

7th World Congress of Bronchology, Rochester, MN

- "Endoluminal ultrasonography of the tracheobronchial tree"

October 2, 1992

Radiology Grand Rounds, The Mayo Clinic, Rochester, MN

- "Congenital heart disease in the adult"

November 7, 1992

Invited Seminar Speaker, Maricopa Radiological Society, Phoenix, AZ

- "Radiology of collagen disease"

November 29-December 4, 1992

The 78th Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, IL

- "MR of bone marrow" [Refresher Course]
- "Pulmonary embolism discovered fortuitously" [Exhibit]

January 13-14, 1993

Invited Speaker, Department of Radiology, Semmelweiss Medical University, Budapest, Hungary

- "Critical care radiology"
- "CT of the lung parenchyma"

January 18-19, 1993

Invited Speaker, Department of Radiology, Szeged University of Hungary, Szeged, Hungary

- "Radiology of collagen vascular disease"

March 11-17, 1993

Annual Meeting of the Society of Thoracic Radiology, Hilton Head Island, SC

- "Ultrasound-assisted bronchoscopy of the tracheo-bronchial tree"

April 8, 1993

Visiting Professor, Mercy Catholic Medical Center, Darby, PA

- "Case presentation conference"
April 25-30, 1993 93rd Annual Meeting of the American Roentgen Ray Society, San Francisco, CA
- "Short E-space spin-echo imaging of the lung"

May 6, 1993 Guest Speaker, Spring Seminar, New York Roentgen Ray Society, New York, NY
- "New imaging tools for the diagnosis of lung cancer"

May 7, 1993 Visiting Professor, Presbyterian Medical Center of Philadelphia, Philadelphia, PA
- "Right outlet obstructive cardiac lesions"

KEVIN L. SULLIVAN, M.D.

November 29-December 4, 1992 The 78th Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, IL
- "The influence of early angioplasty on dialysis access thrombosis and hospitalization rates"

February 28-March 4, 1993 18th Annual Scientific Meeting of the Society of Cardiovascular and Interventional Radiology, New Orleans, LA
- "The influence of renal vein inflow on the lysis rate of clot trapped in Greenfield caval filters"
- Peripheral thrombolysis review course
- Thrombolysis workshop

LISA M. TARTAGLINO, M.D.

November 29-December 4, 1992 The 78th Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, IL
- "Reduction of post-operative metallic artifacts in the spine using fast spin-echo imaging"

May 13-21, 1993 The 31st Annual Meeting of the American Society of Neuroradiology, Vancouver, British Columbia
- "Differentiation of idiopathic acute transverse myelitis from multiple sclerosis"

TALIN A. TASCIVAN, Ph.D.

November 29-December 4, 1992 The 78th Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, IL
- "Understanding pulsatile flow artifacts in magnetization prepared sequences"

June 20-24, 1993 The ASME Fluids Engineering Conference, Washington, DC
- "A comparison of 2D pulsatile hemodynamic analyses within a stenosed carotid arterial bifurcation and its normal counterpart"

SIMON VINITSKI, Ph.D.

October 29-November 1, 1992 The 14th Annual International Conference of the IEEE Engineering in Medicine and Biology, Paris, France
- "Computer simulation of blood flow using short TE magnetic resonance angiography"
March 27-31, 1993
The 11th Annual Meeting of the Society for Magnetic Resonance Imaging, San Francisco, CA
• "Inversion recovery fast spin-echo imaging" [poster]
• "Investigation of time-of-flight magnetic resonance angiography in the presence of pulsatile turbulent flow" [poster]

April 1, 1993
Visiting Professor, Department of Environmental and Radiological Sciences, Rutgers University, New Brunswick, NJ
• "Quality assurance in MRI"

RICHARD J. WECHSLER, M.D.

April 14, 1993
Visiting Professor, Reading Hospital and Medical Center, Reading, PA
• "Cross-sectional imaging of the gluteus"

April 28, 1993
Visiting Professor, Presbyterian Medical Center of Philadelphia, Philadelphia, PA
• "Computed tomography of abdominal trauma"

May 13-15, 1993
The Leading Edge in Diagnostic Ultrasound, sponsored by Thomas Jefferson University Hospital, Atlantic City, NJ
• "Ultrasound and CT in abdominal trauma"
HONORS, EDITORIAL ACTIVITIES, SERVICE TO REGIONAL OR NATIONAL ORGANIZATIONS

ARCHIBALD A. ALEXANDER, M.D.

• Reviewer, Abdomen Scientific Review Committee, American Institute of Ultrasound in Medicine (for Annual Convention)

JOSEPH BONN, M.D.

• Chairman, Annual Meeting Workshop Committee, Society of Cardiovascular and Interventional Radiology
• Chairman, Ad Hoc Committee on Manpower, Society of Cardiovascular and Interventional Radiology
• Member, Annual Meeting Scientific Program Committee, Society of Cardiovascular and Interventional Radiology
• Member, Annual Meeting Scientific Program Committee, Young Investigator Award Subcommittee, Society of Cardiovascular and Interventional Radiology
• Associate Editor, Interventional-Cardiovascular Section, Radiology,
• Deputy Editor, Radiology
• Reviewer, Radiology
• Abstract Reviewer, Journal of Vascular and Interventional Radiology
• Reviewer, Journal of Vascular and Interventional Radiology

EMILY F. CONANT, M.D.

• Member, Mammography Accreditation Program, American College of Radiology
• Reviewer, American Journal of Roentgenology

P. MACKE CONSIGNY, Ph.D.

• Elected Fellow, Arteriosclerosis Council, American Heart Association.
• Director-at- large, Cardiovascular and Interventional Radiology Research and Education Foundation (CIRREF)
• Member, Research Committee, Society of Cardiovascular and Interventional Radiology
• Participant, SCVIR Training Course (radio/television communications)
• Abstract reviewer, Annual meeting, Society of Cardiovascular and Interventional Radiology
• Reviewer, Investigative Radiology
• Reviewer, Journal of Vascular and Interventional Radiology
• Reviewer, Brain Research

SAUNDRA M. EHRLICH, M.Sc.

• Invited Member, American Statistical Association

STEPHEN A. FEIG, M.D.

• Guest Examiner, American Board of Radiology
• Category Chairman, Breast Radiology, American Board of Radiology
• Member, Written Examination Committee, American Board of Radiology
• Member, Committee on Breast Imaging, American College of Radiology
• Member, Breast Task Force, American College of Radiology

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• Member, Section on Breast Disease Syllabus II, Committee on Professional Self Evaluation and Continuing Education, American College of Radiology
• Member, Mammography Practice Accreditation Committee, American College of Radiology
• Member, Clinical Image Reviewer Training Committee, Mammography Accreditation Program, American College of Radiology
• Member, Clinical Image Reviewer Subcommittee, Mammography Accreditation Program, American College of Radiology
• Member, Committee on Mammography Reporting and Data Base System, American College of Radiology
• Member, Program Committee, 27th National Conference on Breast Cancer, American College of Radiology
• Center for Disease Control - American College of Radiology Cooperative Agreement for Quality Assurance in Mammography
  - Co-Chairman, Committee on Correlation of Phantom and Clinical Image Quality
  - Member, Oversight Committee
  - Member, Committee on Radiologists Education
  - Member, Data Analysis and Research Committee
  - Member, Imaging Systems Focus Group
  - Member, Quality Assurance Manual Development Committee
• Treasurer, Society of Breast Imaging
• Member, Executive Committee, Society of Breast Imaging
• Member, Scientific Committee 72: Radiation Protection in Mammography, National Council on Radiation Protection and Measurements
• Member, Program Committee, First Biannual Course on Breast Imaging, Society for Breast Imaging
• Member, Mammography Advisory Committee, American Registry of Radiologic Technologists
• Member, Breast Cancer Awareness Committee, American Cancer Society, Philadelphia Division
• Co-Editor, An International Journal, Breast Diseases
• Section Editor, [Breast], Current Opinion in Radiology
• Editor, Breast Diseases, A Year Book Quarterly
• Reviewer, Radiology
• Reviewer, American Journal of Roentgenology
• Reviewer, Journal of the American Medical Association
• Reviewer, RadioGraphics (manuscripts)
• Reviewer, RadioGraphics (scientific exhibits)
• Reviewer, Cancer
• Reviewer, Breast Cancer Research and Treatment
• Reviewer, Journal of the National Cancer Institute
• Editors Recognition Award with Distinction, Radiology

RICK I. FELD, M.D.

• Reviewer, Clinical Imaging

ADAM E. FLANDERS, M.D.

• Consultant, Squibb Diagnostics, Contrast Division
• Appointed Member, Squibb Diagnostics Contrast Speakers Bureau
• Invited Panel Participant, Introduction to Research Program: Beginning an Academic Career, Radiological Society of North America
• Invited Member, Scientific Exhibit Committee, Pennsylvania Radiologic Society Meeting
FLEMMING FORSBERG, Ph.D.

- Appointed Adjunct Assistant Professor, Biomedical Engineering and Science Institute, Drexel University
- Reviewer, Ultrasound in Medicine and Biology
- Reviewer, RSNA 1993; Physics
- Reviewer, IEEE Transactions on Ultrasonics, Ferro Electrics and Frequency Control

DAVID P. FRIEDMAN, M.D.

- Reviewer, American Journal of Roentgenology

GEOFFREY A. GARDINER JR., M.D.

- Member, Technology Assessment Committee, Cardiovascular and Interventional Radiology Research and Education Foundation
- Member, Editorial Board, Radiology
- Member, Editorial Board, Cardiovascular and Interventional Radiology
- Member, Editorial Board, Journal of Vascular and Interventional Radiology
- Reviewer, Circulation

BARRY B. GOLDBERG, M.D.

- President-Elect, World Federation for Ultrasound in Medicine and Biology
- Medical Advisor in Ultrasound, World Health Organization
- Chairman, Archives Committee, World Federation for Ultrasound in Medicine and Biology
- Chairman, Nominating Committee, World Federation for Ultrasound in Medicine and Biology
- Chairman, Archives Committee, American Institute of Ultrasound in Medicine
- Member, Administrative Council, World Federation for Ultrasound in Medicine and Biology
- Member, Committee on Accreditation, American College of Radiology
- Member, Channel 10 Medical Advisory Board
- Member, Awards Committee, American Institute of Ultrasound in Medicine
- Member, International Organizing Committee for the International Congress on the Ultrasonic Examination of the Breast
- Member, Museum Exhibits Committee, 1995 Centennial Celebration, American College of Radiology
- Member, Public Information Advisory Board, Radiological Society of North America
- Member, Task Force on Standards, American College of Radiology
- Member, Ad Hoc Committee on the Procurement of Training and Research Grants in Ultrasound, American Institute of Ultrasound in Medicine
- Member, Fellowship Committee, American College of Radiology
- Member, Editorial Board, Archives of Clinical Imaging
- Member, Editorial Advisory Board, Clinics in Diagnostic Ultrasound
- Member, Editorial Advisory Board, Ultrasound in Medicine and Biology
- Reviewer, United States-Israel Binational Science Foundation
- Reviewer, Radiology
- Reviewer, American Journal of Roentgenology
- Reviewer, Journal of Ultrasound in Medicine

CARLOS F. GONZALEZ, M.D.

- Fellow, American College of Radiology
ETHAN J. HALPERN, M.D.
• Reviewer, Investigative Radiology

ROBERT J. HARFORD, Ph.D.
• Referee, Loebner Prize for Artificial Intelligence, Sponsored by the Cambridge Institute for Behavioral Studies
• Member, American College of Radiology Research and Technology Assessment Committee

DAVID KARASICK, M.D.
• Board Examiner in Musculoskeletal Radiology, American Board of Radiology
• Consulting Editor, Skeletal Radiology
• Book Reviewer, American Journal of Roentgenology
• Reviewer, Radiology
• Reviewer, American Journal of Roentgenology
• Reviewer, RadioGraphics
• Reviewer, Skeletal Radiology

STEPHEN KARASICK, M.D.
• Written Board Examiner (American Board of Radiology)
• Oral Board Examiner (American Board of Radiology)
• Reviewer, RadioGraphics
• Reviewer, Urologic Radiology

ALFRED B. KURTZ, M.D.
• President, Society of Radiologists in Ultrasound
• Member, Board of Governors, American Institute of Ultrasound in Medicine
• Secretary, American Institute of Ultrasound in Medicine
• Member, Ultrasound Manuscript Reviewer, Radiology
• Reviewer, RadioGraphics
• Reviewer, American Journal of Obstetrics and Gynecology
• Reviewer, Obstetrics and Gynecology
• Editor's Recognition Award with Distinction, Radiology
• Editor's Certificate of Recognition, RadioGraphics

DAVID C. LEVIN, M.D.
• Fifth Annual Charles Dotter Memorial Lecture of the American Heart Association, November 1992, New Orleans
• 32nd Annual Merrill C. Sosman Lecture of the Brigham & Women's Hospital/Harvard Medical School, March 1993, Boston
• Chairman, Cardiovascular Radiology Program Subcommittee, Radiological Society of North America
• Executive Board, Philadelphia Roentgen Ray Society
• Oral Board Examiner, American Board of Radiology
• Executive Committee, Association of University Radiologists
• Finance Committee, Association of University Radiologists
• Executive Committee, Council on Cardiovascular Radiology, American Heart Association
• Budget and Long Range Planning Committees of the Council on Cardiovascular Radiology, American Heart Association
• Ad hoc Committees on Publications, Annual Meeting Support and Standards for Responsible Conduct of Research, Association of University Radiologists
• Ad hoc Committee on Society Administrative Reorganization, Society of Cardiovascular and Interventional Radiology
• Scientific Program Committee, Association of University Radiologists
• Training Committee, Society of Cardiovascular and Interventional Radiology
• Council Advisory Committee, Society of Cardiovascular and Interventional Radiology
• Scientific Advisor, RSNA Research and Education Fund, Radiological Society of North America
• Public Information Advisory Board, Radiological Society of North America
• Committee of Research and Technology Assessment of the Interventional Radiology Commission, American College of Radiology
• Panel Leader, ACR Summit Meeting, American College of Radiology
• Committee on Transcatheter Therapy of Peripheral Vascular Disease, Council on Cardiovascular Radiology, American Heart Association
• Subcommittee on Peripheral Vascular Interventions, Society for Cardiac Angiography and Interventions
• Cardiac Catheterization Committee, American College of Cardiology
• Economics Committee, Philadelphia Roentgen Ray Society
• Public Relations and Marketing Committee, Pennsylvania Radiological Society
• Committee on Diagnostic Radiology, Pennsylvania Radiological Society
• Ad hoc Committee on Angiography/Interventions, Pennsylvania Radiological Society
• Committee on Blue Cross, Blue Shield, and State Health Care Programs, Pennsylvania Radiological Society
• Program Committee, Pennsylvania Radiological Society
• Publications Committee, Pennsylvania Radiological Society
• Secretary-Treasurer, Society of Chairmen of Academic Radiology Departments
• Executive Committee, Society of Chairmen of Academic Radiology Departments
• Conjoint Committee on Diagnostic Radiology, SCARD/AUR/ACR
• Associate Editor, Radiology
• Editorial Board, American Journal of Cardiac Imaging
• Editorial Board, Clinical Imaging
• Editorial Board, Current Diagnosis
• Editorial Executive Committee, Investigative Radiology
• Editorial Board, Journal of Vascular and Interventional Radiology
• Reviewer, American Journal of Roentgenology
• Reviewer, Catheterization and Cardiovascular Diagnosis
• Reviewer, New England Journal of Medicine

ANDREW A. MAIDMENT, Ph.D.
• Reviewer, Medical Physics
• Reviewer, RSNA Annual Meeting, Physics Abstracts

MARK M. MISHKIN, M.D.
• Appointed Adjunct Professor of Radiology, School of Medicine, University of Pennsylvania
• President, Eastern Radiological Society
• Nominee for President, American College of Radiology
• Medical Director, American College of Radiology Institute
• Consultant, Committee on Drugs and Contrast Media, American College of Radiology
• Liaison Member, Commission on Education, American College of Radiology
• Reviewer, Cancer
• Reviewer, Archives of Neurology
• Reviewer, Journal of the American Medical Association

DONALD G. MITCHELL, M.D.

• President, Greater Delaware Valley MRI Society
• Chairman, Technical Exhibits Committee, Society for Magnetic Resonance Imaging
• Chairman, Residency Training Committee, Society for Magnetic Resonance Imaging
• Member, Body Imaging Committee, Society for Magnetic Resonance Imaging
• Member, Medical Science Council, Society for Magnetic Resonance Imaging
• MRI Editorial Board, Radiology
• Editor, Body Section, Current Review of Magnetic Resonance Imaging
• Editorial Board, Journal of Magnetic Resonance Imaging
• Editorial Board, Topics in Magnetic Resonance Imaging
• Co-Editor, Clinical Desktop Section, MResource Guide
• Reviewer, Journal of Computer Assisted Tomography
• Reviewer, Investigative Radiology
• Reviewer, American Journal of Roentgenology
• Reviewer, CRC Critical Reviews in Diagnostic Imaging
• Editor's Certificate of Recognition, RadioGraphics

LAURENCE NEEDLEMAN, M.D.

• Chairman, Scientific Sessions, 1994 American Institute of Ultrasound in Medicine Annual Convention
• Member, Conference Planning Committee, American Institute of Ultrasound in Medicine
• Member, Economics Committee, Ultrasound Commission of the American College of Radiology
• Secretary and Member, Board of Directors, Joint Review Committee on Education in Cardiovascular Technology (representative of the American College of Radiology)
• Abstract Reviewer, American Heart Association Annual Meeting
• Reviewer, Radiology
• Reviewer, Annals of Internal Medicine
• Reviewer, Hepatology
• Reviewer, Journal of Clinical Ultrasound

ERIC K. OUTWATER, M.D.

• Magna Cum Laude award for poster presentation “MR Cholangiography with a Fast Spin Echo Sequence” presented at the 11th Annual Meeting of the Society for Magnetic Resonance Imaging
• Reviewer, Radiology
• Reviewer, Magnetic Resonance in Medicine
• Editor's Certificate of Recognition for review of scientific exhibits at the Annual Meeting and Scientific Assembly of the Radiological Society of North America and RadioGraphics,

BHASKARA K. RAO, M.D.

• Chairman, Continuing Medical Education Committee, American Institute of Ultrasound in Medicine
• Liaison, Accreditation Council for Continuing Medical Education, American Institute of Ultrasound in Medicine
• Reviewer, Abstracts for Gynecology Section, American Institute of Ultrasound in Medicine
• Reviewer, Journal of Clinical Ultrasound.
VIJAY M. RAO, M.D.

- Member, Ad Hoc Education Committee, American Society of Head and Neck Radiology
- Member, Awards Committee, American Society of Head and Neck Radiology
- Member, Rules Committee, Association of Program Directors in Radiology
- Ad Hoc Member, Research Manpower Committee, NHLBI, National Institutes of Health
- Reviewer, Veterans Administration Grants
- Reviewer, *American Journal of Neuroradiology*
- Reviewer, *Radiology*
- Reviewer, *Neuroradiology*
- Reviewer, *Journal of Cancer Research*

ANA SALAZAR, M.D.

- Reviewer, *Radiology.*

MARK E. SCHWEITZER, M.D.

- A. Edward O’Hara M.D. Award for Excellence in Teaching, Department of Radiology, Thomas Jefferson University Hospital -- June, 1993
- President-elect, Delaware Valley Magnetic Resonance Imaging Society
- Member, Educational Committee, Philadelphia Roentgen Ray Society
- Expert Panel Member, Orthopedic Radiology, Pathology Society (ORP)
- Reviewer, *Radiographics*
- Reviewer, *AJR*
- Reviewer, *Radiology*
- Editor’s Recognition Award, *Radiology*

SHARON R. SEGAL, D.O.

- Member, Editorial Committee, American Osteopathic College of Radiology

MARCELLE J. SHAPIRO, M.D.

- Vice President, Philadelphia Angiography and Interventional Radiology Society
- Chairperson, Women in Medicine Dinner and Committee, University of Pennsylvania School of Medicine
- Member, Public Relations and Marketing Committee, Society of Cardiovascular and Interventional Radiology
- Member, Executive Committee, Medical Alumni Society, University of Pennsylvania School of Medicine
- Reviewer, *Radiology*
- Reviewer, *American Journal of Roentgenology*
- Reviewer, *Investigative Radiology*
- Reviewer, *Journal of Interventional Radiology*
- Reviewer, *Journal of Vascular & Interventional Radiology*
- Editor’s Recognition Award with Special Distinction for Reviewing, *Radiology*
- Distinguished Reviewer Award, *Journal of Vascular Interventional Radiology*

PAUL W. SPIRN, M.D.

- Reviewer, *Radiology*
ROBERT M. STEINER, M.D.

- Inducted as Fellow, American College of Chest Physicians
- Chairman, Training and Standards Committee, Society of Thoracic Radiology
- Chairman CME Committee, Society of Thoracic Radiology
- President, Philadelphia Roentgen Ray Society
- Member-elect, Executive Committee, Philadelphia Roentgen Ray Society
- Member, Program Committee, Philadelphia Roentgen Ray Society
- Member, Inter Society Commission, American College of Radiology
- Member, Board of Directors, North American Society for Cardiac Radiology
- Member, Nominating Committee, Pennsylvania Radiologic Society
- Reviewer, *Radiology*
- Editorial Board, *American Journal of Cardiac Imaging*
- Editorial Board, *Heart and Vessel*
- Abstract Reviewer for Annual Meeting, American Heart Association
- Manuscript and Book Reviewer, *RadioGraphics*
- Reviewer, *Cancer*

KEVIN L. SULLIVAN, M.D.

- Chairman, Thrombolysis Workshops, The 18th Annual Scientific Meeting of the Society of Cardiovascular and Interventional Radiology
- Editor, *Journal of Vascular and Interventional Radiology*
- Reviewer, *Radiology*

TERRI TUCKMAN, M.D.

- Member, Ad Hoc Committee on Maternity and Medicine, American Medical Women's Association
- Member, Ad Hoc Committee on Dependent Care, American Medical Women's Association
- Member, Ad Hoc Program Committee, Women Physicians' Forum
- Member, University of Pennsylvania Medical Alumni Society Speaker Committee

SIMON VINITSKI, Ph.D.

- Reviewer, *Journal of Magnetic Resonance Imaging*
- Reviewer, *Medical Physics*

RICHARD J. WECHSLER, M.D.

- Chairman, Program Committee, Philadelphia Roentgen Ray Society
- Member, Committee on Continuing Education, Philadelphia Radiological Society
- Director of Chapter, Pennsylvania Radiological Society
- Reviewer, *Radiology*

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Appendix A
(FUNDED RESEARCH)

Table 1: Active Grants
Table 2: Pending Grants
Table 3: Grant Income and Expenses
Active Grants
07/01/92 - 06/30/93
(Report reflects entire award period and first year of award)

### NIH Grants - ACTIVE

<table>
<thead>
<tr>
<th>Principal Investigator</th>
<th>Project Name</th>
<th>Sponsor and Grant Number</th>
<th>Proposed Date</th>
<th>Direct Cost Total</th>
<th>Indirect Cost Total</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boone, J.</td>
<td>Equalized Dual Energy Dual Phosphor Chest Radiography</td>
<td>NIH 080-02347</td>
<td>08/01/91 - 07/31/92</td>
<td>$102,232</td>
<td>$44,809</td>
<td>$147,041</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$102,232</td>
<td>$44,809</td>
<td>$147,041</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$102,232 (-01 year)</td>
<td>$44,809 (-01 year)</td>
<td>$147,041 (01 year)</td>
</tr>
<tr>
<td>Goldberg, B.</td>
<td>Development of Ultrasonic Tissue Characterization Methods CORE A</td>
<td>NIH (Drexel 1PO1 CA52823 080-05271</td>
<td>09/01/90 - 08/31/93</td>
<td>$75,040</td>
<td>$48,772</td>
<td>$123,812</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$31,442 (-03 year)</td>
<td>$20,751 (-03 year)</td>
<td>$52,193 (-03 year)</td>
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<tr>
<td>Goldberg, B.</td>
<td>Effects of Prenatal US on Postnatal Development</td>
<td>NIH 2RO1HD21678 080-03219</td>
<td>04/01/86 - 07/31/93</td>
<td>$952,374</td>
<td>$358,099</td>
<td>$1,310,473</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$152,912 (-06 year)</td>
<td>$51,200 (-06 year)</td>
<td>$204,112 (-06 year)</td>
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<tr>
<td>Goldberg, B. (Graziani, L.)</td>
<td>Ultrasound and Ventilator Studies in Preterm Infants</td>
<td>NIH 080-02548</td>
<td>05/01/91 - 04/30/96</td>
<td>$90,624</td>
<td>$59,216</td>
<td>$149,840</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$22,144 (-03 year)</td>
<td>$14,061 (-03 year)</td>
<td>$36,205 (-03 year)</td>
</tr>
<tr>
<td>Name</td>
<td>Description</td>
<td>NIH</td>
<td>Start Date - End Date</td>
<td>Total Funded</td>
<td>Total NIH Grant Funding</td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
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<td></td>
</tr>
<tr>
<td>Kurtz, A.</td>
<td>The Detection and Staging of Ovarian Cancer (RDOG IV)</td>
<td>NIH 1RO1 CA59648</td>
<td>09/30/92 - 09/29/95</td>
<td>$262,682</td>
<td>$368,292 (-01 year)</td>
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<tr>
<td></td>
<td></td>
<td>080-03217</td>
<td></td>
<td>$84,150 (-01 year)</td>
<td>$136,955 (-01 year)</td>
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<tr>
<td>Mishkin, M.</td>
<td>Study of Non-ionic Reactions: Can Steroids Modify?</td>
<td>NIH (UCSD) 5RO1CA46675</td>
<td>02/01/88 - 01/31/93</td>
<td>$74,760</td>
<td>$123,002 (-05 year)</td>
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<td></td>
<td>080-05456</td>
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<td>$33,905 (-05 year)</td>
<td>$56,000 (-05 year)</td>
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<tr>
<td>Mitchell, D.</td>
<td>National Collaborative Diagnostic Imaging Trial</td>
<td>NIH (NCI) 3 UO1 CA45254</td>
<td>09/04/87 - 07/31/92</td>
<td>$153,182</td>
<td>$216,844 (-05 year)</td>
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<tr>
<td></td>
<td></td>
<td>080-03374</td>
<td></td>
<td>$46,625 (-05 year)</td>
<td>$76,543 (-05 year)</td>
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</tr>
<tr>
<td>Needleman, L.</td>
<td>Doppler Screening for Pregnancy-Induced Hypertension</td>
<td>NIH 5RO1HD22560</td>
<td>07/01/88 - 05/31/94</td>
<td>$621,609</td>
<td>$996,973 (-05 year)</td>
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<tr>
<td></td>
<td></td>
<td>080-03356</td>
<td></td>
<td>$141,947 (-05 year)</td>
<td>$230,842 (-05 year)</td>
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<tr>
<td><strong>TOTAL NIH GRANT FUNDING</strong></td>
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<td>$2,332,503</td>
<td>$3,436,277 (-05 year)</td>
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<td>$615,357 (current grant year)</td>
<td>$939,891 (current grant year)</td>
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</tbody>
</table>
## Foundation/Non-Profit Organization Grants - Active

<table>
<thead>
<tr>
<th>Principal Investigator</th>
<th>Project Name</th>
<th>Sponsor and Grant Number</th>
<th>Proposed Date</th>
<th>Direct Cost Total</th>
<th>Indirect Cost Total</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flanders, A.</td>
<td>Uses of MRI on Assessing Severity and Forecasting Outcomes of Spinal Cord Injury</td>
<td>RSNA 080-01365</td>
<td>07/01/92 - 06/30/94</td>
<td>$90,000</td>
<td>$0</td>
<td>$90,000</td>
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<td></td>
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<td></td>
<td></td>
<td>$45,000 (-01 year)</td>
<td>$0 (-01 year)</td>
<td>$45,000 (-01 year)</td>
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<tr>
<td>Gardiner, G.</td>
<td>SCVIR Transluminal Angioplasty &amp; Revascularization Registry (STAR)</td>
<td>CIRREF (Cardiovascular/Interventional Radiology Research &amp; Education Foundation 080-08309</td>
<td>01/01/92 - 12/31/94</td>
<td>$448,955</td>
<td>$40,045</td>
<td>$489,000</td>
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<tr>
<td></td>
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<td>$223,182 (-02 year)</td>
<td>$21,318 (-02 year)</td>
<td>$244,500 (-02 year)</td>
</tr>
<tr>
<td>Tasciyan, T.</td>
<td>Contrast in MR Angiography: Optimization with Respect to Rapid Pulse Sequences</td>
<td>Whitaker Foundation 080-08291</td>
<td>12/01/90 - 11/30/93</td>
<td>$149,438</td>
<td>$28,535</td>
<td>$177,973</td>
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<tr>
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<td></td>
<td>$49,677 (-02 year)</td>
<td>$9,935 (-02 year)</td>
<td>$59,612 (-02 year)</td>
</tr>
</tbody>
</table>

### TOTAL FOUNDATION/ NON-PROFIT FUNDING
- $688,393 (current grant year)
- $68,580 (current grant year)
- $756,973 (current grant year)
## Active Grants

07/01/92 - 06/30/93

(Report reflects entire award period and first year of award)

### Industrial Grants - Active

<table>
<thead>
<tr>
<th>Principal Investigator</th>
<th>Project Name</th>
<th>Sponsor and Grant Number</th>
<th>Proposed Date</th>
<th>Direct Cost Total</th>
<th>Indirect Cost Total</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Consigny, M.</td>
<td>Delivery of PKH26 into the Arterial Wall</td>
<td>Zynaxis 080-08104</td>
<td>09/01/92 - 08/31/93</td>
<td>$5,295</td>
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<td></td>
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<td>$5,295 (-01 year)</td>
<td>$0</td>
<td>$5,295</td>
</tr>
<tr>
<td>Consigny, M.</td>
<td>Feasibility of Using Hydrogel-coated Angio-plasty Balloons as a System to Deliver Drugs to the Arterial Wall During Angioplasty</td>
<td>Boston Science 080-01001</td>
<td>09/01/92 - 08/31/93</td>
<td>$9,218</td>
<td>$2,305</td>
<td>$11,523</td>
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<tr>
<td></td>
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<td>$9,218 (-01 year)</td>
<td>$2,305</td>
<td>$11,523</td>
</tr>
<tr>
<td>Consigny, M.</td>
<td>Effect of Tyrosine Kinase Inhibition on Angioplasty-Induced Smooth Muscle Cell Proliferation in Rabbits</td>
<td>Rhone-Poulenc Rorer 080-01070</td>
<td>04/19/93 - 04/18/94</td>
<td>$15,532</td>
<td>$3,883</td>
<td>$19,415</td>
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<td></td>
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<td>$15,532 (-01 year)</td>
<td>$3,883</td>
<td>$19,415</td>
</tr>
<tr>
<td>Feld, R.</td>
<td>Color Doppler US Needle and Catheter Enhancement for Percutaneous Biopsies</td>
<td>EchoCath 080-01015</td>
<td>12/01/92 - 11/30/93</td>
<td>$5,000</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>$5,000 (-01 year)</td>
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<td>Squibb</td>
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Pending Grants
07/01/92 - 06/30/93
(Report reflects entire award period and first year of award)

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<td>Sphincter Conservation Surgery for Rectal Cancer (Project #5) &quot;Transrectal US, CT and Magnetic Resonance Imaging&quot;</td>
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### Pending Grants
07/01/92 - 06/30/93
(Report reflects entire award period and first year of award)

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<td>Goldberg, B. (Graziani, L)</td>
<td>Exploratory Neonatal Brain Disorder Research Grant (CORE C) Cranial Ultrasound and Other Imaging Facility for Obstetrical and Neonatal Infant Studies</td>
<td>NIH</td>
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<td>NIH</td>
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## Pending Grants
07/01/92 - 06/30/93
(Report reflects entire award period and first year of award)

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## Foundation/Non-Profit Organization Grants - PENDING

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<td>Consigny, P.M.</td>
<td>Re-endothelialization of Arteries after Angioplasty</td>
<td>American Heart Association</td>
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<td>Whitaker Foundation</td>
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<td>$146,758</td>
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(Report reflects entire award period and first year of award)
### Pending Grants
07/01/92 - 06/30/93
(Report reflects entire award period and first year of award)

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**TOTAL PENDING FOUNDATION/ NON-PROFIT ORGANIZATION GRANTS**

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Pending Grants
07/01/92 - 06/30/93
(Report reflects entire award period and first year of award)

## Industrial Grants - PENDING

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<td>Sonus Pharmaceuticals</td>
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<td>$16,880</td>
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<td>Outwater, E.</td>
<td>A Phase II/III Safety &amp; Efficacy Investigation of LumenHance™ in Patients Undergoing MRI of the Abdomen and Pelvis</td>
<td>Squibb Diagnostics</td>
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<td>Squibb Diagnostics</td>
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Pending Grants  
07/01/92 - 06/30/93  
(Report reflects entire award period and first year of award)

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<td>Boone, J. 080-02347 08/01/91-07/31/92</td>
<td>Equalized Dual Energy Dual Phosphor Chest Radiography</td>
<td>NIH</td>
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<td>Consigny, P.M. 080-08104 09/01/92-08/31/93</td>
<td>Delivery of PKH26 into the Arterial Wall</td>
<td>Zynaxis</td>
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<td>Consigny, P.M. 080-01001 09/01/92-08/31/93</td>
<td>Feasibility of Using Hydrogel-Coated Angioplasty Balloons as a System to Deliver Drugs to the Arterial Wall During Angioplasty</td>
<td>Boston Scientific</td>
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<td>Effect of Tyrosine Kinase Inhibition on Angioplasty-Induced Smooth Muscle Cell Proliferation in Rabbits</td>
<td>Rhone-Poulenc Rorer</td>
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<td>Uses of MRI on Assessing Severity and Forecasting Outcomes of Spinal Cord Injury</td>
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<td>Goldberg, B. 080-01377</td>
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