



2014 GRANT RECIPIENT

RadSim: Simulation Based Training Program for CT Protocol, Iterative Reconstruction and Dual Energy Applications

"In radiology, simulation techniques have been assessed in interventional radiology and contrast media safety. We propose to develop, verify, and employ a novel educational simulation technology, RadSim, to document baseline understanding of CT scanning parameters, to undertake simulation based training exercise, and assess post-simulation knowledge assessment for radiology personnel in CT protocols, iterative reconstruction and dual energy CT applications. We strongly believe that RadSim will provide "real-life" scanning experience and training opportunity to its users to promote safe and efficient use of CT technology."

Anders Persson, M.D., Ph.D.
Linköping University, Sweden

DEREK HARWOOD-NASH EDUCATION SCHOLAR GRANT

► See more 2014 Grant Recipients Next Page

Foundation Names 2014 Recipients, Awards Record Amount in Grant Funding



AT THEIR MEETING THIS SPRING, the R&E Foundation Board of Trustees reaffirmed their commitment to Funding Radiology's Future[™] by approving \$3.6 million in funding for 94 research and education grant awards. This represents a 25 percent funding rate and the highest amount ever awarded by the Foundation.

"The R&E Foundation is pleased to support this year's recipients. By funding these educators and investigators, the Foundation continues to advance RSNA's mission to promote excellence in patient care and healthcare delivery through education, research and technologic innovation, and support and enhance the organized radiology community," said **James P. Borgstede, M.D.**, R&E Foundation Board of Trustees Chairman.

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LOOK INSIDE FOR

- Using Interventional Radiology to Treat Obesity
- Follow the Funding Journey of 2007 Grant Recipient
- Annual Roentgen Award Recognizes Outstanding Residents and Fellows

Introducing the 2014 Innovators



Identification of Novel Angiogenesis Biomarkers Correlating with Tumor Response after Hepatic Arterial Embolization for Hepatocellular Carcinoma

"We hypothesize that biomarkers showing sustained upregulation will represent the most clinically relevant therapeutic targets, and we will determine whether the magnitude of biomarker upregulation correlates with time to progression on follow up imaging."

James Spencer Clayton Ronald, M.D., Ph.D.
Duke University Medical Center

**COOK MEDICAL CESARE GIANTURCO / RSNA
RESEARCH RESIDENT GRANT**

Application of 4D Phase Contrast MRI as a Non-invasive Measure of Treatment Response in Patients with Pulmonary Hypertension

"The long-term goals of this project are to use novel, noninvasive cardiac MRI techniques for detailed characterization of the altered hemodynamics in patients with pulmonary hypertension, particularly for following response to medical intervention. Tailoring effective, early intervention may delay or prevent the development of right heart dysfunction, improving prognosis."

Kristin Kelly Porter, M.D., Ph.D.
Johns Hopkins University

**SIEMENS HEALTHCARE / RSNA
RESEARCH FELLOW GRANT**



MRI Surveillance of Induced Pluripotent Stem Cells for Stroke Using Gadolinium Nanoparticles

"Traditional histological methods for assessing transplanted stem cell migration and survival are not feasible in humans. This problem of surveillance has hindered clinical trials, but may serve as an opportunity for imagers. The proposed project addresses the need for treatment monitoring in stroke with an innovative imaging approach using gadolinium-nanoparticles (Gd-NPs). The proposed study aims to position radiologists in a key role, assessing treatment response in stroke while also advancing stem cell medicine."

**Jesse Jones, M.D. (left) and scientific advisor
S. Thomas Carmichael, M.D., Ph.D.**
University of California, Los Angeles

RSNA RESEARCH RESIDENT GRANT



Join the 2014 Fun Run to Benefit the Future of Radiology

Support the R&E Foundation and challenge yourself by joining the 2014 Fun Run. The annual 5K race follows the beautiful Lake Michigan shoreline. Whether you walk or run, it is a great way to start your morning! The Fun Run begins Tuesday, December 2, at 6:30 a.m. Your \$40 registration fee is fully tax-deductible and benefits the R&E Foundation. Participants will also receive a commemorative t-shirt while supplies last. Simply add the Fun Run to your online registration or sign up onsite at McCormick Place during the meeting.



Plan for your Financial Future during RSNA 2014

Have questions about planning your estate? The experts at TIAA-CREF will provide financial guidance and answers at “Estate Planning Today for a Better Tomorrow,” Monday, December 1, 3:00-5:30 p.m. during RSNA 2014. The presenters will review a variety of issues in the financial and tax planning arena, including:

- Income and estate tax updates
- Roth conversions
- Estate planning basics
- Sophisticated planning strategies
- Non-tax related planning
- Charitable planning



To enroll, visit RSNA.org/Register and search course SPEP21.

TIAA-CREF representatives will hold a limited number of private appointments on Tuesday, December 2. All inquiries will remain confidential. Contact Shelley Taylor at sltaylor@rsna.org or 630-590-7773 to reserve your time today.

Donate Today to be Recognized during RSNA 2014

The RSNA Research & Education Foundation will recognize donors during RSNA 2014 in the Donor Lounge. To be included on the Donor Wall, enjoy access to the Donor Lounge, and receive other recognition and benefits, make your gift before September 30, 2014, at RSNA.org/Donate, or add a donation to your RSNA 2014 registration. Your gift helps improve patient care and ensures the future of radiology.

ANNUAL GIFT	BENEFITS
\$300 or more	Name on the Donor Wall Access to the Donor Lounge
\$5,000, \$2,500, and \$1,500	Recognition as a Presidents Circle Donor Photo on the Donor Wall Access to the Donor Lounge Invitation to the Distinguished Donor Reception Express boarding pass for taxis and shuttles

RSNA's Centennial Celebration Means New Recognition Opportunities: Join the Corporate Partners Program

This year, RSNA is celebrating its 100th annual meeting. RSNA is proud of its legacy and the strong foundation our community has built to help drive radiology into the future. RSNA could not have done

this without the many companies who support RSNA and the Foundation—the lifeblood of radiologic innovation.

To show its appreciation, RSNA is launching a new program that recog-

nizes company support: RSNA Corporate Partners. The program will allow RSNA to publicly acknowledge the tremendous loyalty and support of companies that help RSNA achieve its mission. Through this

program, industry partners benefit from logo recognition, social invitations and acknowledgement in RSNA's prominent publications. All of the various ways in which companies support RSNA—

through donations to the R&E Foundation, sponsorships, advertising and subscriptions—apply toward recognition in this program.

RSNA is honored to have strong industry partners to continue bringing brilliant technological developments to the forefront of the medical imaging arena. To learn how you can be recognized through the Corporate Partners program, visit RSNA.org/Companies.



Using Interventional Radiology to Treat Obesity—Clinical Trial Emanating from Research Resident Grant Begins this Summer

According to the Centers for Disease Control and Prevention (CDC), approximately 190 million Americans are overweight, obese, or morbidly obese, and this number continues to rise. Obesity negatively affects general health and has been attributed to numerous chronic conditions and various cancers. Can interventional radiology play a role in the treatment of obesity?

AN IDEA IS BORN

In 2009, vascular/interventional radiology resident **Ben E. Paxton, M.D.**, and attending interventional radiologist **Charles Y. Kim, M.D.**, of Duke University Medical Center, were intrigued by a *Radiology* manuscript they reviewed during a department journal club meeting. The manuscript, “Catheter-directed Gastric Artery Chemical Embolization Suppresses Systemic Ghrelin Levels in Porcine Model”—co-authored by **Aravind Arepally, M.D.**, and **Dara L. Kraitchman, VMD, Ph.D.**, of Johns Hopkins University, described a minimally invasive bariatric procedure to manipulate ghrelin levels and alter weight gain via chemical embolization of the arterial supply to the fundus of the stomach in pigs.

R&E FOUNDATION SUPPORT

Dr. Paxton and Dr. Kim formulated a research plan to build upon Dr. Arepally’s experimental design in a manner that could be more easily translatable to the clinic. Dr. Paxton reached out to Dr. Arepally to learn more about the current state of his research on bariatric embolization and future directions. “We asked Dr. Arepally to join our research team, given his experience on the topic, and thus began a collaborative project at Duke University that started with our **2010 Toshiba America Medical Systems/RSNA Research Resident Grant** project, ‘Catheter directed Gastric Artery Embolization for Long Term Modulation of Systemic Ghrelin Levels in a Porcine Model,’” said Dr. Paxton.

Dr. Kim served as the scientific advisor on that project. “I initially performed and subsequently trained Dr. Paxton on the techniques for performing the



PROJECT COLLABORATORS

Seated left to right: Aravind Arepally, M.D., Radiology Associates of Atlanta at Piedmont Healthcare; Ben E. Paxton, M.D., Yavapai Regional Medical Center; Charles Y. Kim, M.D., Duke University Medical Center; and Rahul S. Patel, M.D., Icahn School of Medicine at Mount Sinai, Standing left to right: Clifford R. Weiss, M.D., Johns Hopkins University; Aaron M. Fischman, M.D., Icahn School of Medicine at Mount Sinai; and Dara L. Kraitchman, V.M.D., Ph.D., Johns Hopkins University. Photo used with permission of the Society of Interventional Radiology © 2014

“This study will evaluate the feasibility, safety, and efficacy of Bariatric Embolization in morbidly obese patients with follow-up for one year post embolization.”

Aravind Arepally, M.D.

gastric artery embolization procedures in pigs, resulting in Dr. Paxton attaining embolization skills far beyond that of any resident-level trainee,” said Dr. Kim. “Dr. Arepally, as the initial pioneer that first investigated the role of interventional methods for modulating appetite, served as co-scientific advisor and provided invaluable insight and experience throughout the project – in fact, he

was the only expert in existence who had published on this specialized topic that was in its infancy.”

Six animals underwent bariatric embolization performed by the infusion of 40 μ calibrated microspheres selectively into the gastric arteries that supply the fundus, while six controls underwent a sham procedure with saline. The results were clear; bariatric embolization of the

“The three of us jointly analyzed the fascinating data that supported our hypothesis that embolization-induced focal ischemia to the gastric fundus diminishes the serum levels of the hunger hormone ghrelin by reducing the number of functional ghrelin-producing cells. However, the heart and soul of the project was RSNA Research Resident Grant recipient Dr. Paxton.”

Charles Y. Kim, M.D.

stomach fundus can significantly suppress the appetite hormone, ghrelin, and significantly impact weight loss (see *Figure 1*). Dr. Kim recalls, “The three of us jointly analyzed the fascinating data that supported our hypothesis that embolization-induced focal ischemia to the gastric fundus diminishes the serum levels of the hunger hormone ghrelin by reducing the number of functional ghrelin-producing cells. However, the heart and soul of the project was RSNA Research Resident Grant recipient Dr. Paxton.”

The results of Dr. Paxton’s Research Resident Grant project were published in both *Radiology* and the *Journal of Vascular Interventional Radiology*.

ADDITIONAL NIH FUNDING

Using Dr. Paxton’s initial research, the collaboration continued with **Dara L. Kraitchman, VMD, Ph.D.**, and **Clifford Weiss M.D.**, of Johns Hopkins University, obtaining funding for additional animal studies through an NIH-R01 grant mechanism. The project uses preliminary data from both Duke University and Johns Hopkins as grounds for their study. This phase of the study aims to improve bariatric arterial embolization by using advances in technology including specialized injection devices, X-ray visible embolic beads, and state-of-the-art X-ray imaging systems in order to produce a more complete fundal embolization with fewer adverse effects from non-target embolization and mucosal damage.

CLINICAL TRIAL TO START THIS SUMMER

Next, the collaborative group decided to pursue clinical application. After extensive discussions with the Food and Drug Administration (FDA), the

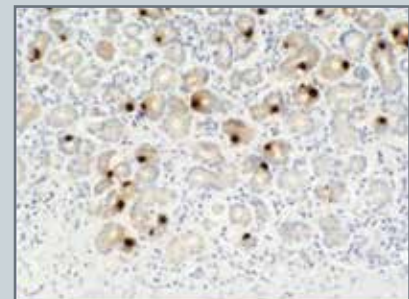
Bariatric Embolization of Arteries for Treatment (BEAT) Obesity clinical trial Investigational Device Exemption (IDE) application received clearance in February. The clinical trial, supported in part by a research grant from **Siemens Healthcare**, will begin in August. Most recently, the clinical team was also expanded to include **Rahul S. Patel, M.D.**, and **Aaron M. Fischman, M.D.**, of Mount Sinai Hospital.

Dr. Arepally, Dr. Weiss, Dr. Fischman, Dr. Kim, Dr. Kraitchman, Dr. Patel, and Dr. Paxton, are all co-investigators on the project.

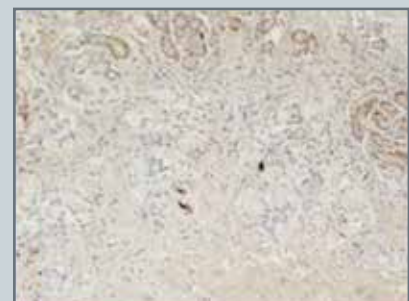
“This study will evaluate the feasibility, safety and efficacy of Bariatric Embolization in morbidly obese patients with follow-up for one year post embolization,” said Dr. Arepally. “The primary endpoints of this study are weight loss (absolute weight change from baseline and the percentage of excess weight loss [%EWL]) and 30 day adverse events. Our overall goal is to develop the first image-guided minimally invasive therapy targeting obesity. The successful development of such a technique would have enormous impact on healthcare costs and patients worldwide. The collaboration has been essential to all of our progress to date, and the group plans to continue this approach as they move to larger, phase II/III studies.”

The R&E Foundation is pleased to see the initial work of these talented and committed investigators evolve to the point of a potential care alternative for many patients’ ongoing battles against obesity.

GHRELIN – THE “HUNGER HORMONE” is a neuropeptide produced by ghrelin cells in the gastrointestinal tract, primarily in the stomach fundus. It is the most potent appetite stimulant and also has roles in regulating the distribution and rate of energy, and reward perception. Ghrelin levels rise before meals and with dieting and decrease after eating – for these reasons, ghrelin is a key target for weight control. It is believed that certain invasive surgical interventions for the morbidly obese, such as sleeve gastrectomy, work in part by decreasing ghrelin levels. Such surgical approaches involve extensive gastric/bowel reconstruction and can have significant complications. Thus, a critical need exists for minimally invasive bariatric procedures to reduce the perioperative complication rate and cost of bariatric therapy.



Non-treated Control



Post Bariatric Embolization

Figure 1. Decreased numbers of ghrelin-producing cells seen after bariatric embolization compared to normal levels in non-treated control.

R&E Foundation Donor Profile

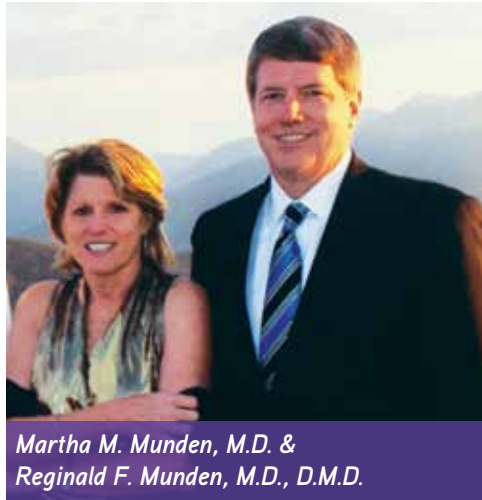
Reginald F. Munden, M.D., D.M.D., is Chair of the Department of Radiology at Houston Methodist Hospital, and he knows first-hand the value of supporting the RSNA Research & Education Foundation.

Dr. Munden joined RSNA as a second-year resident. He remembers what an honor it was to present during the Scientific Assembly and Annual Meeting. He still values the RSNA's acceptance of posters and abstracts from residents, and even medical students, noting that anyone practicing good science has the opportunity to present.

"I feel a certain obligation to pay something back for what RSNA has done for the profession and especially me. RSNA gave me a forum to develop and grow my professional career, and now as a department chair, it is very important for my faculty to have the same opportunity," said Dr. Munden.

"Additionally, RSNA's current activities are critical for advancing and growing our profession, and I am happy to contribute for those causes," Dr. Munden added.

RSNA is the major society in the world for radiologists, he noted. The networking opportunities offered during the annual meeting are valuable to all practitioners. The meeting provides the opportunity to meet and interact with other radiologists, physicists, healthcare providers, equipment vendors and like-minded professionals outside your area



Martha M. Munden, M.D. & Reginald F. Munden, M.D., D.M.D.

of expertise, which greatly expands your overall knowledge of radiology.

"I contribute to the R&E Foundation to ensure the continuation of research and education to provide funds for young investigators to do their work. That has become of particular importance in recent years as funding from other sources has been cut back."

Dr. Munden said he has a lot of fun volunteering with the Corporate Giving Subcommittee. He enjoys speaking with friends and colleagues about the benefits of giving to the R&E Foundation. He also

learns from the committee interactions with the companies and businesses contributing to the Foundation by understanding their needs from radiology to develop and advance leading-edge imaging technology.

"It is a lot of work, but never a burden," said Dr. Munden of volunteering time both with RSNA and the R&E Foundation. In addition to serving as vice-chair of the Corporate Giving Subcommittee, Dr. Munden currently serves as Chair of the Chest Radiology Subcommittee of the Scientific Program Committee, reviewing abstracts and making selections for presentations during the annual meeting.

RSNA 2014 will be a family affair for the Mundens. Dr. Munden and his wife Martha M. Munden, M.D., will attend as usual, but this year they will be joined by their children, both mechanical engineers working in the Chicago area. Dr. Munden looks forward to touring the technical exhibits with them.

Drs. Reginald and Martha Munden are annual Presidents Circle donors and Bronze Visionary donors, recognizing a lifetime of giving to the Foundation.

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Reginald F. Munden, M.D., D.M.D.

\$1 = \$40

Each **\$1** awarded by the R&E Foundation generates more than **\$40** in subsequent funding to Principal Investigators and Co-Investigators from other sources including the NIH. The Foundation's \$44 million in grant awards translates to more than \$1.5 billion in research funding.

From Fellow to Scholar to NIH: Zhen Jane Wang, M.D.'s Research Journey

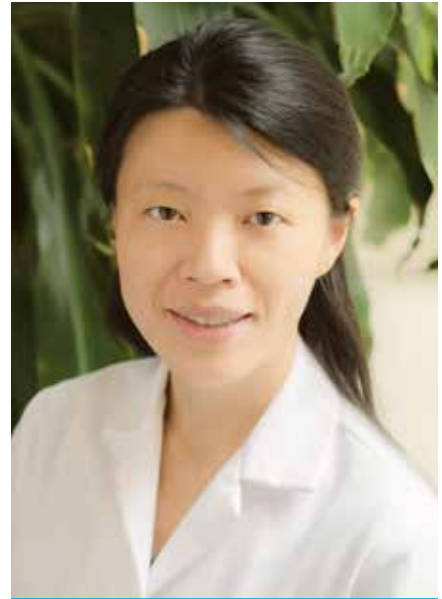
Zhen Jane Wang, M.D., received both a 2007 Philips Medical Systems/RSNA Research Fellow Grant and a 2010-12 GE Healthcare/RSNA Research Scholar Grant.

This initial support from the R&E Foundation allowed Dr. Wang to focus her research on the identification and development of novel diagnostic imaging tools, with a particular emphasis on renal imaging.

With her Research Scholar Grant, Dr. Wang investigated the use of hyperpolarized ^{13}C MR spectroscopic imaging techniques to assess renal tumor aggressiveness and treatment response. The experience and training gained as a result of the Scholar Grant has led to her NIH National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) R01 project grant titled "Hyperpolarized ^{13}C Markers of Nephropathy and Treatment Response."

Dr. Wang's current NIH-funded Project is for \$1,186,000 over 5 years and aims to non-invasively interrogate diabetes induced alteration in renal tissue biochemistry using new hyperpolarized probes, with the goal of developing biomarkers that can monitor the onset and progression of diabetic nephropathy and response to targeted treatment.

"I am very grateful for the support from RSNA," said Dr. Wang. "The Scholar Grant has provided me invaluable protected time, resources and credibility to develop my research and to obtain further extramural grant support for hyperpolarized ^{13}C renal imaging work."



Zhen Jane Wang, M.D.

R&E Grant Recipient Named Department Chair

Earlier this year, **Vincent P. Mathews, M.D.**, became the James E. Youker Professor and Chairman of Radiology at the Medical College of Wisconsin. Dr. Mathews assumed this role after serving as professor of radiology at the Indiana University School of Medicine and President and CEO of Northwest Radiology Network of Indiana.

Dr. Mathews is a 1990 Mallinckrodt, Inc./RSNA R&E Foundation Research Fellow Grant recipient for his project titled "Magnetic Resonance Imaging and Spectroscopy of Acute Stroke." Subsequent to his Fellow Grant, Dr. Mathews continued his research on functional magnetic resonance imaging of the brain and brain functioning in adolescents. He is the recipient of additional funding from the National Institutes of Health, numerous international pharmaceutical companies and the Center for Successful Parenting. Dr. Mathews is a sought

after lecturer and has published many peer-reviewed journal articles and book chapters.

Dr. Mathews has served organized radiology throughout his professional career, including as a Trustee of the American Board of Radiology (ABR) and recipient of the ABR Lifetime Service Award. Dr. Mathews is an active contributor to the RSNA, serving on the Public Information Advisors Network, as a *RadioGraphics* reviewer, member of the RSNA Annual Meeting and Scientific Assembly faculty and as a member of the



Vincent P. Mathews, M.D.

Education Exhibits Committee. His R&E Foundation service and support includes membership on the Visionaries in Practice Subcommittee and as a Bronze Visionary Donor.

Congratulations, Dr. Mathews, on your new role, and thank you for your commitment to radiology.

Outstanding Residents and Fellows Recognized

This year, the Foundation is pleased to announce that 159 residents and fellows from 143 institutions have been awarded the RSNA Roentgen Resident/Fellow Research Award.

This annual award recognizes outstanding residents and fellows actively involved in radiologic research. Recipients are selected by their program directors or department chairs, based on a number of criteria including publication of scientific papers in peer-reviewed journals, receipt of grant funding, presentation of scientific papers at regional or national meetings, and overall contributions to the their respective department's research initiatives.

Nominations are limited to one resident or fellow per ACGME-approved program in radiology, radiation oncology or nuclear medicine per year.

The full list of 2014 recipients can be viewed at RSNA.org/Roentgen-Research-Award.

"In our department, this award has grown in internal prestige over the past several years, and is now an honor that holds significant cachet for the individual, residency and department. We strongly encourage our residents to explore their research interests and pursue the projects that truly excite them, and this award offers an excellent opportunity to recognize those who have done so with the greatest vigor and success."

Michael L. Loftus M.D., M.B.A.

Assistant Professor of Radiology, Program Director, Radiology Residency, Quality and Patient Safety Chair,
Department of Radiology Weill Cornell Medical College, New York-Presbyterian Hospital



Michael L. Loftus, M.D., M.B.A., Residency Program Director, Sumit N. Niogi, M.D., Ph.D., Roentgen Award Recipient, and Robert J. Min, M.D., M.B.A., Chairman of Radiology

Three Easy Ways to Give:

