focus on our future

2009 Annual Report of the AAPM Education & Research Fund

The American Association of Physicists in Medicine (AAPM) is the world's premier organization in medical physics, a broadly-based scientific and professional discipline encompassing physics principles and applications in biology and medicine. The AAPM supports its mission to advance the science, education and professional practice of medical physics by promoting high-quality educational programs at the graduate and postgraduate levels through sponsorship of the Commission on Academic Medical Physics Educational Programs (CAMPEP) and by awarding training grants and fellowships through its Education and Research Fund.

There is growing emphasis within the medical community on the professional training and qualifications of medical physicists. The AAPM Education & Research Fund supports Residencies in medical physics as the pathway to professional qualification by supporting CAMPEP and by awarding Grants and Fellowships. The Association co-sponsors the American Board of Radiology (ABR) and the American Board of Medical Physics (ABMP) and supports Board Certification of medical physicists as a pre-requisite for becoming a Qualified Medical Physicist.

The Development Committee would like to thank all who contributed in 2009, as well as in previous years to make these awards possible. An appendix appears at the end of the report containing the names of all who have so generously contributed to the Fund.

However, in 2009 the Fund received contributions totaling just over **$19,000** which, for a total membership of 7,100, is an average of less than $3 per member. The members of the AAPM Development Committee ask for your support in these valuable research efforts by considering a minimum donation of $100 annually. We have no other way of growing this important aspect of AAPM's efforts – growing the profession – without the support of ALL of our members. Please be generous in 2010 and consider making your $100 donation.

Go to **www.aapm.org** and click on the Education & Research Fund logo on the top right corner of the page. Let's all help continue this tradition of supporting the future generation of Medical Physicists.

Research Support:

Seed Funding Initiative: In 2009, $25,000, one-year grants were awarded to two students at Stanford University to provide funds to develop exciting investigator-initiated concepts, which will hopefully lead to successful longer term project funding from the NIH or equivalent funding sources. Funding began on July 1, 2009, research results will be submitted for presentation at the 2010 AAPM Annual Meeting.

The project entitled '*Developing a Hybrid IGRT System with Adaptive Measurements*,' submitted by Dr. Dan Ruan, received one of these grants. She reports that the aim of the project was to address two critical issues in radiation oncology – the explicit accounting of temporal changes in anatomy and the need to "image gently". The framework consists of (1) real-time target localization, motion analysis and prediction with kV, MV and optical imaging; (2) real-time control of the MLC for adaptive treatment; and (3) a formal investigation of IGRT scheme in which the timing of image acquisition varies to reduce the overall imaging dose without sacrifice

Dr. Ruan reports that "The support of the AAPM Research Seed Funding Initiative offered me the freedom of exploring novel areas in radiotherapy. The progress I made during the funded period sets a good foundation for further development. From a career development perspective, the award providevaluable assistance for me in the transition towards a more independent phase as a developer and researcher in medical physics."

The second Seed Funding award went to Kang-Hyun Ahn, Ph.D., a Postdoctoral Scholar at Stanford, for his project entitled '*Development of Multi-Parametric Molecular Imager by Integrating Overhauser-Enhanced MRI with Pre-polarized MRI*'. Dr. Ahn proposes that oxidative stress within tumor cells is a crucial determinant of the

malignant behavior of cancers and their response to radiation therapy. Therefore, a compelling need exists for a non-invasive means of determining tumor hypoxia and redox status. He proposes to develop a multi-parametric molecular imager to assess oxygenation status by integrating Overhauser-enhanced MRI (OMRI) with prepolarized MRI (PMRI), which is a low-cost MRI with image quality comparable to conventional MRI. The unique structure of PMRI systems facilitates the implementation of OMRI with a moderate hardware augmentation.

Residency Support: AAPM Imaging Residency

The Support for Clinical Residency in Imaging Medical Physics is a two-year grant made to institutions in partial support of a full-time clinical residency in imaging medical physics at the Ph.D. level. The 2007-2009 award went to Dr. Ken Nkongchu in the Department of Radiology, Diagnostic Physics, at the Henry Ford Health System, under the direction of Dr. Donald Peck.

The ASTRO/AAPM Radiation Oncology Physics Residency Training Grant is a two-year grant made to institutions in partial support of a full-time clinical residency in imaging medical physics at the Ph.D. level. The 2007-2009 award went to Dr. Ken Nkongchu in the Department of Radiology, Diagnostic Physics, at the Henry Ford Health System, under the direction of Dr. Donald Peck.

The recipients in 2009 included the following:

- Columbia University, NY, NY
- Karmanos Cancer Center, Detroit, MI
- Mary Bird Perkins Cancer Center, Baton Rouge, LA
- Medical College of Wisconsin, Milwaukee, WI
- The Cancer Institute of New Jersey, - Robert Wood Johnson Medical School, Newark, NJ
- The Johns Hopkins University School of Medicine, Baltimore, MD

Dr. Jay Burmeister reported that the Karmanos Cancer Center (KCC) Radiation Oncology Physics Residency Program, affiliated

with the Department of Radiation Oncology within the Wayne State University School of Medicine (WSUSOM), has a long history of medical physics graduate education. The KCC has provided clinical training for a large number of students, interns, residents, and visiting clinicians over the years.

He reports that "the complexity of radiotherapy technology and procedures has increased dramatically in recent years and this has led to increased demand for clinically proficient trainees. Given these clinical dynamics and the professional needs associated with 2012/2014 ABR initiative, we felt it necessary to review our training program to assure consistency with the most current AAPM guidelines and to seek CAMPEP accreditation. "

He adds: "The support provided by the ASTRO/AAPM Radiation Oncology Physics Residency Training Grant has been vital to our ability to review, modify, and administer enhancements to our program. We currently have two full time residents and will graduate our first resident from the newly enhanced residency curriculum in June. We have prepared and submitted our self-study to CAMPEP and are looking forward to achieving accreditation. In addition, we hope to expand the residency program in the future and are engaged in discussions with other hospital systems regarding the logistics of facilitating affiliate residency programs once our program is accredited. This will help to provide necessary residency positions for the impending 2012/2014 ABR initiative in a geographic region which has traditionally been very strong in clinical medical physics training as well as medical physics education and research.

"In light of the recent publicity surrounding quality in radiation therapy and the need for accountability and regulation in the provision of such care to patients, high quality education and clinical training is more important than ever. We are very grateful to the AAPM and ASTRO for their financial support of our education and training missions and for the benefits that such investment will have for the profession of medical physics and for the patients our trainees will treat."

Dr. X. Allen Li reports that the Medical Physics Residency program at the Medical College of Wisconsin is a three-year program that incorporates research along with the clinical training required for American Board of Radiology (ABR) certification. The residency program was created in 2008 with the support from an ASTRO/AAPM Radiation Oncology Physics Residency Training Grant, The program used part of the funds to develop and submit the application for CAMPEP accreditation. The program was reviewed by CAMPEP in October 2009 and a recommendation made to accredit the program immediately. Currently, the program has successfully enrolled three residents. Funds from the ASTRO/AAPM Radiation Oncology Physics Residency Training Grant were used to offset salary costs for the Program Directors and Program Coordinator in preparing the CAMPEP accreditation, as well as for training supplies for the residents.

Fellowships:
RSNA/AAPM Fellowship

The Fellowship for the training of a doctoral candidate in the field of Medical Physics is awarded for the first two years of graduate study leading to a doctoral degree in Medical Physics. It is sponsored by the Radiological Society of North America (RSNA) and the AAPM Education and Research Fund. Current recipients include:

2007 – 2009 Recipient:
University of Florida – Bart Lynch
David E. Hintenlang, Ph.D., Program Director

2009 – 2010 Recipient:
University of Texas HSC - San Antonio – Courtney Knaup
Geoffrey D. Clarke, Ph.D., Program Director

Mr. Courtney Knaup is the most recent recipient of this Fellowship. His projects in his first year were evaluating a new in vivo dose verification device, and investigating the relationship between prostate enlargement and dose degradation for LDR brachytherapy. His work will continue through 2011

Support for Undergraduate Training:

The American Association of Physicists in Medicine (AAPM) Summer Undergraduate Fellowship Program is designed to provide opportunities for undergraduate university students to gain experience in medical physics by performing research in a medical physics laboratory or assisting with clinical service at a clinical facility. In this program, the AAPM serves as a clearinghouse to match exceptional students with exceptional medical physicists, many who are faculty at leading research centers. Students participating in the program are placed into summer positions that are consistent with their interest. Students are selected for the program on a competitive basis to be an AAPM summer fellow. Each summer fellow receives a stipend from the AAPM. The fellowship will be for a period of 10 weeks during the summer academic period.

Several of last year's recipients were happy to provide a letter of gratitude for this support.

Mr. Long Ton was a 2009 recipient and his words define the importance of this program. He states: "... the most important thing I've learned from my fellowship experience is being able to answer the most important question to me at that time of my life, which is whether I would actually be interested in pursuing graduate study in this field specifically. Before applying for the fellowship

program, I was initially attracted to medical physics mainly due to my prior enjoyment of working in a clinical environment, but I was uncertain whether medical physics is what I would dedicate myself to. Thanks to the experience that was offered to me through this fellowship, I now know that the answer to my own question is a confident "yes." During my time at MGH, I was definitely able to see myself working as a medical physicist for the next few decades of my life while also being able to thoroughly enjoy the work as well."

Catherine Frame reported that her experiences confirmed her desire to pursue a clinical medical physics career. She writes that the Summer Fellowship has given her an appreciation for how gratifying the work can be. She says: "I found the Undergraduate Fellowship Program to be an invaluable learning opportunity and a step forward towards my medical physics career." She will be entering Vanderbilt University's Doctorate of Medical Physics Program in August of 2010.

Dan Smith at Notre Dame spent his summer in the Radiation Oncology Department at Johns Hopkins Hospital. He worked on two major projects, one in which he assisted medical physicists who are trying to bridge the technological gap—between simple treatment methods used for small animals and advanced treatment methods used for human patients—with the Small Animal Radiation Research Platform (SARRP). Through Monte Carlo simulations, he helped develop what will become a high-precision dose engine for the SARRP. He also worked on estimating the dose enhancement at the lateral wall of the lateral ventricles in the mouse brain when an iodinated contrast agent is injected into the cerebrospinal fluid. He irradiated a polycarbonate phantom which contained an iodine solution and water layer separated by a radio chromic film, and then measured the deposited dose on the film when the iodine concentration was varied. He is currently awaiting responses and making final decisions with respect to several graduate programs and hopes to use his experience at Johns Hopkins as a springboard for a career in biomedical research, with a likely focus on either radiation therapy or diagnostic imaging.

Benjamin Kandel worked in the lab of Dr. Assen Kirov at Memorial Sloan-Kettering Cancer Center developing image filtering algorithms for processing PET scan images. The main focus of his research was comparing the effectiveness of several different algorithms designed to minimize the inaccuracies in PET images caused by limited PET resolution, an effect known as the partial volume effect (PVE).

Mr. Kandel feels that while working in Dr. Kirov's lab, he learned a tremendous amount about image processing in particular and biotechnological research in general. In addition to technical training in the computational and mathematical tools used in image processing, he reported that he gained a broader introduction to the ideas that drive medical physics and engineering. As an undergraduate physics student, he learned about using mathematical models and theorems to describe and predict physical phenomena. His research as an AAPM Fellow showed him how quantitative techniques can be harnessed to improve instruments that make a real impact on the lives of patients. He states: "My experience this summer has encouraged me to pursue a Ph.D. in biomedical engineering with a focus on medical imaging. I enjoyed my experience as an AAPM Fellow, and the research I performed has intensified my interest to continue pursuing medically relevant research."

Another Summer Undergraduate Fellow, Christopher Peeler, provided the following report on his summer experience.

"As a participant in the American Association of Physicists in Medicine (AAPM) Summer Undergraduate Fellowship Program (SUFP), I spent ten weeks during the summer of 2009 in Bloomington, Indiana. This time was devoted to working on a research project with Dr. Dmitri Nichiporov at the Indiana University Cyclotron Facility and Midwest Proton Radiotherapy Institute (MPRI). Before participating in the SUFP, I had little knowledge of proton radiotherapy, save for knowing that it was a new cancer treatment modality. Prior to actually beginning work on my project, I spent time reading in order to learn how proton radiotherapy works and

why it is such a novel cancer treatment method. After gaining the necessary knowledge, I was able to confidently begin work on the project that Dr. Nichiporov had planned for me.

"My project, '*Development of a Temperature Control System for Testing a Patient Dose Monitor Ion Chamber*,' was focused on creating a system which could be used for testing a prototype patient dose monitor (PDM) over a specific range of temperatures. The PDM is a device located in the proton beam gantry nozzle at MPRI which serves to measure important information relating to the proton field used for treatment, such as the uniformity of the field over its cross-section and the dose that it will deliver to the patient. In-house testing had shown that the materials composing the PDM were susceptible to environmental conditions such as humidity, and changes in these conditions could affect the measurements taken by the device. The goal of the project was to create a system that could be used to control the temperature in a controlled environment chamber so that the effects of temperature on the PDM materials could be studied. The limits of the designed and constructed temperature control system were tested over a predetermined range of temperatures. Based on the data collected from these tests, it was determined that the system was capable of producing the desired conditions in the controlled environment chamber. By the end of the summer, the temperature control system was complete and ready to be used for testing the prototype PDM in the proton beam.

"I believe that the apparatus created as part of my project has the potential to allow improvement of the data collected from the proton beam at MPRI as it will allow for the creation of an improved PDM. More directly, it will allow for the study of environmental effects on proton beam monitoring devices, which could prove useful to the field in general. In addition to providing valuable experience working in and around a cancer treatment center which serves as excellent preparation for graduate study in medical physics, my research project also provided a great deal of knowledge about proton radiotherapy. The area of proton radiotherapy is now of such great interest to me that I am considering pursuing graduate research relating to the field, and I wouldn't be prepared for such opportunities had I not participated in the AAPM Summer Undergraduate Fellowship Program."

Michael Derr used his fellowship to work under Dr. Tiezhi Zhang at William Beaumont Hospital in Royal Oak, Michigan. He helped construct a PCB circuit board and designed collimators that are being used in Dr. Zhang's Tetrahedron Beam Cone Tomography experiment. A paper regarding this research will be presented at the 2010 AAPM annual meeting in Philadelphia with Mr. Derr listed as a co-author.

Jennifer Dixon spent her summer at Baylor University Medical Center at Dallas doing clinical diagnostic medical physics. Her first few weeks were spent observing various clinical procedures throughout the hospital, which helped put the work of medical physicists into perspective for her. Throughout the remainder of her fellowship, she assisted in the testing of nearly every imaging modality, observed several nuclear medicine audits, attended physics lectures for radiology residents, and collected patient radiographic exposure data. She feels this experience has confirmed her interest in a medical physics career.

Lena Bradley was placed in Dr. Andrew D.A. Maidment's laboratory at the University of Pennsylvania in Philadelphia, whose group deals primarily with topics in x-ray imaging, specifically those related to mammography and digital breast tomosynthesis (DBT). This technology uses multiple, angled projection images through the breast to reconstruct three dimensional slices of the breast, rather than creating a simple two-dimensional projection image. This helps reveal the breast's inner structure for better screening and diagnostic uses. She spent her time in Dr. Maidment's lab measuring the angular dependence of mammographic dosimeters in DBT geometries. Her work was published and presented as part of the 2010 SPIE Medical Imaging conference held in San Diego, CA.

Jeremy Bancroft Brown participated in computer-aided diagnosis (CADx) research in Dr. Maryellen Giger's lab at the University of Chicago and pursued multiple distinct, but related, research projects for CADx on breast dynamic contrast-enhanced MRI. These projects included: (1) comparing the diagnostic efficacy of kinetic features extracted from raw kinetic curve data with those extracted from empirically fitted kinetic curves, (2) comparing the diagnostic efficacy of kinetic and non-kinetic (i.e., textural and morphological) features, (3) optimizing the parameters of a fuzzy C-means algorithm in order to select the most diagnostically useful "characteristic kinetic curve" of a lesion, (4) investigating the relationship of lesion enhancement heterogeneity to disease status, (5) developing a novel lesion visualization scheme for our intelligent breast MRI CADx workstation, and (6) exploring the potential of generalized fractal dimension lesion descriptors to improve the performance of the CADx system.

He recently presented a talk entitled "*Optimization of a fuzzy C means approach to determining probability of lesion malignancy and quantifying lesion enhancement heterogeneity in breast DCE-MRI*" at SPIE Medical Imaging 2010. He has submitted an abstract to the AAPM Annual Meeting 2010 entitled "*Fractal dimension analysis of kinetic feature maps in contrast-enhanced breast MRI*." He is taking classes at the University of Chicago and preparing manuscripts for publication. He continues to work part-time in Dr. Giger's lab with plans to continue as a full time member of the lab in summer 2010.

He said "It was a pleasure to work with the wonderful investigators in Dr. Giger's lab and learn about research in computer-aided diagnosis. In addition to funding my research and helping me to learn a great deal, the AAPM Summer Undergraduate Fellowship stimulated my interest in medical physics and solidified my plans for a career in the field. I hope that my ongoing research in medical physics will ultimately translate into meaningful benefits for patients in the clinic.

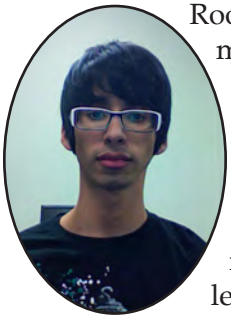
The American Association of Physicists in Medicine (AAPM) Minority Undergraduate Summer Experience Program (MUSE) is designed to expose minority undergraduate university students to the field of medical physics by performing research or assisting with clinical service at a U.S. institutions (university, clinical facility, laboratory, tc). The charge of MUSE is specifically to encourage minority students from Historically Black Colleges and Universities (HBCU), Minority Serving Institutions (MSI) or non-Minority Serving Institutions (nMSI) to gain such experience and apply to graduate programs in medical physics.

The fellowship is for a period of 10 weeks during the summer academic period. Recipients in 2009 included Nivedh Manohar at Georgia Tech under the direction of Dr. Sang Hyun Cho. His project, entitled '*Monte Carlo Modeling of an X-ray Fluorescence Detection System for In Vivo Quantification of Tumor Gold Concentration*,' studied gold nanoparticle-aided radiation therapy (GNRT) as an emerging treatment modality. This technology is being actively developed by Dr. Sang Hyun Cho's research group. Of the several unique features of gold nanoparticles, two important ones are utilized in GNRT: high tumor specificity due to passive extravasation and significant dose enhancement during X-ray irradiation as a result of increased photoelectric absorption due to the high atomic number of gold. Over the course of the fellowship period, the detection system was accurately modeled. Several simulations were run and compared to the experiment in order to validate the model. The model has proven extremely useful and convenient. As a continuing work in progress, there are still several aspects of the detection system that need to be optimized in order to increase the efficiency of fluorescence production and detection and the model will be improved.

Mr. Manohar reports that "Ultimately, the goal of the project is to provide an efficient and reliable X-ray fluorescence detection system for an in vivo animal study to demonstrate the proof of concept for gold concentration quantification to be used for GNRT. The AAPM MUSE fellowship provided the opportunity and motivation to undertake this project, one that shows great promise as an emerging treatment modality with the potential to revolutionize the medical physics industry."

Tahisha Hamwright was another 2009 recipient of a MUSE award. She chose to embark into the physics of medical imaging research at The Pennsylvania State University, under the mentorship of Susan K. Lemieux, Ph.D. Penn State's Chandlee Laboratory, also known as the Social, Life and Engineering Sciences Imaging Center (SLEIC), houses three MR scanners, a 3 tesla whole body human Siemens Trio, a 7 tesla horizontal bore animal scanner and 14 tesla Varian vertical bore scanner. Ms. Hamwright feels she learned many things regarding the MR scanners and was introduced to the various types of imaging and spectroscopy sequences, including spin echo, gradient echo, echo planar imaging (EPI), and many more, resolution, sources of signal and noise, magnetic susceptibility, motion, ghosting and eddy currents.

Another MUSE recipient, Mario Bencomo, spent the past summer in a research program in New York City interning at St. Luke's Roosevelt Hospital getting an overview of nuclear medicine and conducting a research project under the supervision of the Associate Director of the Nuclear Medicine Department, Dr. Friedman. Mr. Bencomo reports that he had the opportunity to shadow the technicians, as well as the doctors in order to obtain a clinical view of nuclear medicine. He also participated in the physics lectures given to residents entailing the physics behind the apparatuses, important physics topics, and other seminars. Some of the covered topics covered were: radiation, crystal scintillators, gamma cameras, and overviews of MRI, PET, and SPECT. His research project consisted of an analysis of dose calibrator linearity assessment, and at the end of the ten weeks he gave an hour-long presentation summarizing the project and its results to the rest of the department.



Yanisley Valenciaga applied to the MUSE program while in her junior year of an electrical engineering program. She did her research at UCLA working in medical Imaging, specifically in

several projects related with CT under the supervision of Ph.D. Michael McNitt-Gray. As a result of her summer experience she has applied to the Ph.D. program at UCLA. While there last summer, she was involved in two major projects; Volcano 2009, and Coffee Break 2009. The "Volcano 2009" project consisted in the calculation of variation of tumor volume with time using CT images in lung cancer patients. The purpose of this project was to do a statistical analysis in order to know how much the dimensions of tumors from the sample population changed with time. The "Coffee Break 2009" project involved measuring the variability of tumor dimensions using CT scans with 15 minutes lap. In both projects, she acted as a reader measuring the diameters of the nodules in patients with lung cancer using software. She also reported that she participated in some experiments, where her team measured doses from CT scanners at the Ronald Regan UCLA Medical Center.

She feels this award has benefited both her and the medical physics profession. Even more importantly in her mind, it developed a passion for medical physics inspired her to apply to a Ph.D. program in the field. She wrote: "Last by no least, I had the possibility to have a wonderful time in a new place (Los Angeles), and meet a lot of people, many of them with the same professional interests that I have. MUSE program has definitely changed my life."

The preceding testimonials provide just a snapshot of the successes achieved through the AAPM Education & Research Fund, yet we continue to struggle in obtaining the necessary contributions to continue to fund these efforts.

Contributors to the Education & Research Fund

Platinum Contributors
$10,000 and above

Individuals

Libby Brateman
Bruce Curran
Robert Dixon
Kunio Doi
Joel Gray
Moses Greenfield
Leroy Humphries
James Kereiakes
Faiz Khan
Charles Lescrenier
Richard Morin
Ravinder Nath
Alfred Smith
Edward Sternick
Don Tolbert
Edward Webster
Ann Wright

Organizations

AAPM Florida Chapter
AAPM NY Regional Chapter - RAMPS
AAPM Southeast Chapter
Computerized Imaging Ref Systems, Inc.
Radiological Society of North America

Gold Contributors
$5,000 - $9,999

Individuals

Peter Almond
Joseph Blinick
Paul Carson
Jimmy Fenn
Theodore Fields
William Hendee
Walter Huda
Kenneth Kase
Carolyn Kimme-Smith
John Laughlin
Sam Lott
Edwin McCullough
Mary Meurk
Colin Orton
Jacques Ovadia
James Purdy
Robert Sanford
Nagalingam Suntharalingam
Stephen Thomas
Kenneth Wright

Organizations

Medical Physics Foundation

Silver Contributors
$2,500 - $4,999

Individuals

Jerry Allison
Farideh Bagne
Gary Barnes
Richard Geise
Maryellen Giger
Hy Glasser
Steven Goetsch
David Lee Goff
John Hale
Geoffrey Ibbott
James Chi-Wing Liu
Thomas Mackie
Harold Marcus
Melissa Carol Martin
Shantilata Mishra
Robert Morton
Don Ragan
Lawrence Rothenberg
Raymond Tanner
Kenneth Ulin
Kenneth Vanek
Shirley Vickers
Robert John Wilson
Raymond Wu
Ellen Yorke

Organizations

AAPM Southern California Chapter

Copper Contributors
$1,000 - $2,499

Individuals

Suresh Agarwal
Hassaan Alkhatib
Daniel Bassano
Arthur Boyer
Priscilla Butler
Edward Chaney
Charles Coffey
Edmund Cytacki
Jerome Dare
James Deye
David Findley
G. Donald Frey
Gary Fullerton
Philip Heintz
Maynard High
Jerald Hilbert
Kenneth Hogstrom
F. Eugene (Gene) Holly
Donald Holmes
Alan Huddleston
C. Karzmark
James Kortright
Jack Krohmer
Danny Landry
Louis Levy
C. Clifton Ling
Eric Loevinger
Larry Luckett
Chang Ming Charlie Ma
Christopher Marshall
James McDonough
Michael Mills
Walter Nikesch
J. Thomas (Tom) Payne
Jacob Philip
Douglas Shearer
Melvin Siedband
Guy Simmons
James Smathers
Perry Sprawls
Jean St. Germain
Richard Stark
George Starkschall
Donna Stevens
David Switzer
Jon Trueblood
Martin Weinhous
Marilyn Wexler
John Winston
Michael Yester
James Zagzebski

Organizations

AAPM Education & Research Fund
AAPM Great Lakes Chapter
AAPM Missouri River Valley Chapter
AAPM New England Chapter
Northwest Medical Physics Center
The American Board of Radiology

Education and Research Fund Donors (up to $1000)

Individuals

Gail Adams
E. Theodore Agard
Muthana S.A. Al-Ghazi
Waleed Al-Najjar
Katherine Albano
Howard Ira Amols
Lowell Anderson
David Applebaum
Gary Arbique
Benjamin Archer
Elwood Armour
Frank Ascoli
Alfred Asprinio
William Aubin
Chantal Audet
Luther Aull
Glaister Ayr
Edward Bacza
Michael Bailey
Colin Bailey
John Balog
Morris Bank
Jonathan Bareng
Robert Barish
J. Ed Barnes
Maxine Barnes
Mario Basic
Jerry Battista
Wolfgang Baus
Joseph Beach
Frederick Becchetti
Richard Behrman
Areg Bejanian
Mark Belanich
Clyon Wayne Bell
Jose BenComo
J. Douglas Bennett
Ishtiaq Bercha
Carl Bergsagel
Laszlo Berkovits
Kenneth Bernstein
Jagdish Prasad Bhatnagar
Margaret Eddy Blackwood
Olivier Blasi
Joseph Blechinger
Douglas Boccuzzi
Frank Bolin
Patrick Booton
Giovanni Borasi
Robert Boyd
Suresh Brahmavar
A. Bertrand Brill
Gordon Brownell
Vera Burtman
Sheila Bushe
Harry Bushe
Stewart Bushong
Terry Button
Carlos Caballero
M. Paul Capp
James Carey
Dev Chakraborty
David Chamberlain
Bun Chan
Sandra Chan
Sha Chang
Paule Charland
Jean Jacques Chavaudra
Chinwei Helen Chow
R. Todd Clark
Laurence Clarke
Mark Colgan
Robert Comiskey
Christodoulos Constantinou
Kevin Corrigan
George Coutrakon

Education and Research Fund Donors (up to $1000)

Tim Craig
Richard Crilly
Maximian Felix D'Souza
Mojtaba Dahbashi
Andrew Daniel
Cupido Daniels
Indra Das
Lawrence Dauer
Alan Daus
Todd Davisson
Fermin De La Fuente-Calvo
Domenico Delli Carpini
Paul DeLuca
John DeMarco
Katharin Deschesne
John Dicello
Arden Dockter
Gregory Dominiak
Lei Dong
Anonymous Donor
Karen Doppke
Godwin Dorbu
Dick Drost
Robert Duerkes
James Durgin
James Durlacher
Anton Eagle
Matthew Earl
Michael Epps
Jon Erickson
Ravimeher Errabolu
Carlos Esquivel
Thomas Michael Evans
Lynne Fairobent
Karl Farrey
Kenneth Fetterly
Charles Finney
Jennifer Hann Fisher
Doracy Fontenla
Doracy Fontenla
Eric Ford
Martin Fraser
D. Jay Freedman
Stanley Fricke
Stephanie Frost
Vincent Frouhar
Cynthia Anne Gaffney
James Galvin
Steven Anthony Gasiecki
barbara geiser
William Geisler
James David George
Bruce Gerbi
Joseph Giardina
John Gibbons
Gregory Gibbs
Michael Gillin
Patrick Glennon
David Lloyd Goff
Richard Goodman
Matthew Goodman
Michael Goodwill
Paul Goodwin
Joseph Greco
Bennett Greenspan
Suzanne Gronemeyer
Suveena Guglani
Madhup Gupta
David Gur
Per Halvorsen
Homayoun Hamidian
Russell Hamilton
Jorgen Lindberg Hansen
Peter Hardy
Mary Hare
Gayle Harnisch
Joanna Harper
James Harrington

Education and Research Fund Donors (up to $1000)

Hubert Harrison
Bruce Hasegawa
Herman Haymond
John Hazle
Chris Hearn
Robert Heaton
Joseph Hellman
Sheri Dawn Henderson
Margaret Henzler
Martin Herman
Donald Hess
James Hevezi
Michael Hoffman
Kenneth Hoffmann
Timothy Holmes
Randall William Holt
Giang Hong
Roger Howell
Lincoln Hubbard
Margie Hunt
Cecilia Hunter
Abrar Hussain
Gulkan Isin
Edward Jackson
Christopher James
Joshua James
Jian-Yue Jin
Zheng Jin
Ernest Jones
Chandra Prakash Joshi
Philip Judy
Stergios Kaidas
Thomas Kampp
Alexander Kapulsky
Alireza Kassaee
Iwan Kawrakow
Paul Keall
Angela Keyser
Bernadette Kirk
Steven Kirkpatrick
Rebecca Kitchen
Susan Klein
Jayne Knoche
Sandra Konerth
Latha Kota
Matthew Kowalski
Bradford Krutoff
William Kubricht
Shrikant Kubsad
Salvatore La Rosa
Roger Ladle
M. Terry LaFrance
Lena Lamel
Richard Lane
Thomas Lang
Itembu Lannes
Lawrence Lanzl
Renee Larouche
Joseph Lauritano
Joel Lazewatsky
Jesse Lee
Richard Lee
Norman Lehto
Edwin Leidholdt
Lisa Lemen
JinSheng Li
Qijuan Li
David Lightfoot
Liyong Lin
Edna Lipson
Dale Litzenberg
Hui Helen Liu
Jeffrey Long
John Lontz
Joel Thomas Love
F. Anne Lucas-Quesada
Steven Luckstead
Gary Luxton

Education and Research Fund Donors (up to $1000)

William MacIntyre
Mark Madsen
Gig Mageras
Eugene Mah
Mahadevappa Mahesh
Stephen Mahood
Ann Maitz
William Malloy
Lesley Ann Malone
Sivasubramanian Manoharan
Nematallah Mansour
James Marbach
David Marsden
Mary Martel
Rafael Martin
Kali Kathleen Mather
Howell Kerry Maughon
William McCarthy
Sean McGreevey
Sharon McMillan
Kevin McNamara
Michael McNitt-Gray
Robert Meiler
Matthew Meineke
Albert Mesa
Jeffrey Messinger
David Metcalf
Brian Methe
Ira Miller
Mohamedo Minhaj
Fernando Mireles-Garcia
Matthew Mischke
George Mitev
Raj Mitra
Radhe Mohan
Mary Moore
Jose Morales Monzon
James Murray
Lee Myers
Uwe Myler
Leon Myrianthopoulos
Venkataramanan Natarajan
David Nelson
Joseph Nelson
Azam Niroomand-Rad
Robert Nishikawa
Amos Norman
Josef Novotny
Marilyn Noz
James Nunnally
James O'Rear
Patricia ogburn
Olabode Thomas Ogunleye
Arthur Olch
Mark Oldham
Elaine Osterman
Sandra Paige
David Palmer
Joon Park
Brent Parker
Norris Parks
Kishor Patel
Daniel Pavord
Todd Pawlicki
Alberto Pedalino
Shashi Perera
Angelica Perez-Andujar
Thomas Petrone
Douglas Pfeiffer
John Pfund
Stanley Phillips
Bhaskaran Pillai
Arthur Pinkerton
Robert Pizzutiello
Donald Plewes
Mark Pohlman
Jerimy Polf
Bill Post

Education and Research Fund Donors (up to $1000)

Robert Praeder
Mitchell Randall
Surendar Rao
Prema Rassiah-Szegedi
Ailsa Ratcliffe
Janet Reddin
Curtis Reece
Stanley Reed
Chester Reft
Robert Rice
Peter Riley
Michael Randall Ringor
Miguel Rios
E. Russell Ritenour
William Rivkin
Dante Roa
Gene Robertson
Antinogenes Romaguera Fernandez
Peter Rosemark
Isaac Rosen
Ivan Rosenberg
Alan Rowberg
Vijayalakshmi Rudraraju
James Sample
Scott Sample
Ernest Scalzetti
Edward Scarbrough
Petra Schmalbrock
L. John Schreiner
Reinhard Schulte
Cheryl Culver Schultz
Jan Seuntjens
Shakil Bin Shafique
Robert Shalek
Edwin Sham
Charles Shang
S. Jeff Shepard
Jungwook Shin
Thomas Shope
Deborah Shumaker
Michael Silver
Douglas Simpkin
Larry Simpson
Warren Sinclair
Ramon Alfredo Siochi
Lester Skaggs
John Skrobola
Stanley Skubic
Eric Daniel Slessinger
Rene Smith
Jerry Soen
Emilie Soisson
Milo Solomito
David Spelic
David Spencer
R. Jason Stafford
Robert Stanton
Leonard Stanton
Stuart Starr
K. David Steidley
Keith Stenroos
Palmer Steward
Thomas Stinchcomb
Stephen Strother
Dennis Stroud
Kenneth Strubler
Predrag Sukovic
Deborah Summa
Steven Sutlief
Kazumichi Suzuki
Michelle Svatos
David Swanberg
John Swanson
Lawrence Sweeney
John Sweet
Ibrahim Syed
Joseph Takahashi

Education and Research Fund Donors (up to $1000)

Russell Tarver
Michael Tassotto
David Taylor
Charles Tenney
James Terry
Bruce Thomadsen
Mark Towsley
Earl Trestrail
Floyd Tuley
Payments Unknown
Gnanaprakasam Vadivelu
Johannes van de Geijn
William Van de Riet
James VanDamme
William VanderWall
Rafaela Varela Rohena
Stephen Vastagh
Sathiyanarayanan Vatyam
Vaidehi Venkatakrishnan
Ramasamy Virudachalam
Teodor Vulcan
Steven Wallace
Matthew Walters
Barbara Walters
Steven Wang
John Washington
Karen Wheeler
Pamela White
Gerald White
Thomas White
Virgil Willcut
Michael Williams
John Willins
Robin Winsor
Peter Wisner
Charles Wissuchek
John Wochos
Margaret Wolf
Ronald Keith Wolff
Myron Wollin
John Wong
Roland Wong
Wesley Wooten
Don Wrede
Andrew Wu
Genevieve Wu
Nai-Chuen Yang
Shigeru Yokoyama
Cedric Yu
Ning Yue
Loren Zaremba
Pengpeng Zhang
Qinghui Zhang
Jay Zheng
Timothy Zhu
Eric Zickgraf
Frank Zink
Jeananne Zink
Terry David Zipper

Organizations

AAPM
AAPM Connecticut Regional Chapter
AAPM Mid Atlantic Chapter
AAPM North Central Chapter
Colorado Assn in Medical Phys (CAMP)
Landauer, Inc.
LAP of America LC
Modus Medical Devices, Inc.
Standard Imaging, Inc.
The Phantom Laboratory, Inc.

We are asking all AAPM members to make a contribution to the Education & Research Fund.

Go to
www.aapm.org
and click on the Education & Research Fund button on the top right corner

of the page.
Let's all help continue this tradition of supporting the future generation of Medical Physicists.

Thank You!

American Association of
Physicists in Medicine
One Physics Ellipse
College Park, MD 20740-3846
(301) 209-3350
2010.aapm@aapm.org

www.aapm.org