



# The 2011 International Functional Pulmonary Imaging Workshop



**Philadelphia, PA**  
**Feb 28 - Mar 2, 2011**

## **Key Dates:**

<b>Deadline for Educational Travel Stipend Application for Trainees</b>	<b>January 14, 2011</b>
<b>Deadline for Abstracts</b>	<b>February 1, 2011</b>
<b>Deadline for Pre-registration</b>	<b>February 25, 2011</b>

**University of Pennsylvania**  
**421 Curie Boulevard**  
**Biomedical Research Building II**  
**Philadelphia, PA 19104**

## **Organizing Committee:**

Rahim R. Rizi  
Stephen Kadlecek  
Kiarash Emami  
Mitchell Schnall  
Masaru Ishii  
Milton D. Rossman  
Nicholas N. Kuzma

## **International Scientific Committee:**

John P. Mugler, III  
Per Åkeson  
Jack A. Elias  
David Lynch  
G. Wilson Miller  
Robert Brown  
James E. Baumgardner  
Eric A. Hoffman

## Registration Information

**Online:** [www.fmig-mri.org](http://www.fmig-mri.org)

**Fax/Mail:** Please use the registration form at the end of this brochure.

**Application for Financial Support:** Financial support is available on a limited basis to trainees (including graduate students and post-docs) who submit their abstracts and are selected for presentation at the workshop. The deadline for submission of abstracts and request for financial support is **January 14, 2011**, and it should be done through the workshop website. Please include a copy of CV along with the abstract to be considered for the financial support.

The length of the abstract is limited to one page (letter size or A4) with ½" margin including figures, tables and references. A minimum font size of 10 (Arial or Times New Roman) should be used. The abstract title, author's name, affiliation and address should be provided on top of the page. A sample template is available on the website.

## Hotel Accommodations

A block of rooms has been reserved at the Philadelphia Club Quarters Hotel, located at 1628 Chestnut Street in center city Philadelphia. Shuttle service will be made available to commute between the hotel and campus of University of Pennsylvania. The group rate is \$107/night (\$15 extra for double occupancy), plus the applicable taxes (currently at 15.2%). For more information about room amenities and pictures please visit the website of Philadelphia Club Quarters:

[www.clubquarters.com/loc\\_philadelphia.aspx](http://www.clubquarters.com/loc_philadelphia.aspx)

For reservations, call Club Quarters Member Services at 212-575-0006 before cut-off date of Jan 27, 2011 and identify yourself as a Penn affiliate attending the Pulmonary Workshop with the group reservation code UOP227.

**Office of Organizing Committee :**

Lori Ehrich

Manager, Continuing Education

UPHS, Department of Radiology

[Lori.Ehrich@uphs.upenn.edu](mailto:Lori.Ehrich@uphs.upenn.edu)

[cme@rad.upenn.edu](mailto:cme@rad.upenn.edu)

University of Pennsylvania

Department of Radiology

1 Silverstein, 3400 Spruce Street

Philadelphia, PA 19104

Tel: 215-662-6904

Fax: 215-349-5925

# Foreword

On behalf of the organizing committee, I would like to welcome you to *The 2011 International Pulmonary Imaging Workshop*. At this meeting -- much like previous workshops -- we have arranged for coverage of a diverse array of topics by inviting specialists who can speak authoritatively on pulmonary imaging (structure, function, and metabolic), lung physiology, lung mechanics, and the latest imaging and hyperpolarization techniques. If our program seems at all incomplete or lacking in a well-balanced consideration of some topics, this is only due to the unavoidable limitations of time.

The program is divided into fourteen sessions consisting of eight keynote lectures, nearly forty presentations from experts in the field of pulmonary imaging, and ten six-minute presentations by graduate students and post-doctoral fellows. In most cases, the presentations in each section are organized according to that session's underlying method or concept. While we believe that discussion is an important part of this meeting, we have only allotted a limited amount of time at the end of each session for dialogue. However, it is our hope that breaks given during each day's sessions will provide more time for informal conversation about the presentations.

The members of the organizing committee of *The 2011 International Pulmonary Imaging Workshop* extend their thanks to all speakers and participants in this meeting. We are looking forward to seeing you at the University of Pennsylvania on February 28, 2011.

Rahim R. Rizi, Ph.D.  
Associate Professor of Radiology  
University of Pennsylvania

# Program Schedule

## Monday February 28, 2011

7:20 – 8:00 AM **Continental Breakfast**

8:00 – 8:15 AM **Introductory Remarks**  
Rahim R. Rizi, Ph.D.  
University of Pennsylvania

8:15 – 8:30 AM **Welcome Remarks**  
R. Nick Bryan, M.D., Ph.D.  
University of Pennsylvania

### Session I: Keynote Lectures - Part I Moderator: Masaru Ishii, M.D., Ph.D.

8:30 - 8:45 AM **Opportunities in Lung Imaging: An NHLBI Perspective**  
Thomas L. Croxton, M.D., Ph.D.  
National Institutes of Health

8:45 - 9:25 AM **Pulmonary gas exchange in health and disease:  
Implications for assessment by imaging methods**  
Peter D. Wagner, M.D.  
University of California, San Diego

9:25 - 10:05 AM **CT Phenotypes of the Lung for New Insights into Patho-  
physiologic Processes and Genetic Correlates**  
Eric A. Hoffman, Ph.D.  
University of Iowa

10:05 – 10:20 AM **Discussion**

10:20 - 10:35 AM **Break**

### Session II: COPD Pathogenesis and Pulmonary Inflammation Moderator: Steven M. Albelda, M.D.

10:35 – 11:05 AM **Molecular Mechanisms of COPD Pathogenesis**  
Jeanine D'Armiento, M.D., Ph.D.  
Columbia University

11:05 - 11:35 AM **Functional Effects of Pulmonary Inflammation**  
Jose G. Venegas, Ph.D.  
Harvard University

11:35– 12:05 PM **Regional Inflammation in VILI**  
Joao Batista Borges, M.D., Ph.D.  
University Hospital of Uppsala, Sweden

12:05– 12:25 PM **Pulmonary Functional Imaging and Its Application to  
Thoracic Radiation Oncology**  
Ramesh Rengan, M.D., Ph.D.  
University of Pennsylvania

12:25 - 12:40 PM **Discussion**

12:40 - 1:40 PM **Lunch**

### Session III: Graduate Student and Postdoctoral Presentations - Part I Moderator: Kiarash Emami

1:40– 2:10 PM **DW imaging in rats using C2F6: ADC comparison between  
healthy and emphysematous lungs**  
Laura Carrero-Gonzalez  
Boehringer Ingelheim Pharma, Germany

**Imaging of Lung Micromechanics with Hyperpolarized Gas Diffusion MRI: Regional Compliance**

Yi Xin  
University of Pennsylvania

**Noninvasive in-vivo quantification of post-pneumonectomy compensatory lung growth in mice with hyperpolarized 3He diffusion MRI**

Wei Wang  
Washington University

**Experimental demonstration of the influence of field strength and magnetic susceptibility on the ADC of 3He gas in human lungs**

Juan Parra-Robles, Ph.D.  
University of Sheffield, UK

**Session IV: Asthma and Airways Disease**

**Moderator: Reynold A. Panettieri, Jr., M.D. and Lawrence De Garavilla, Ph.D.**

**2:10 - 2:40 PM**

**Asthma: The Newest Challenges**

Reynold A. Panettieri, Jr., M.D.  
University of Pennsylvania

**2:40 – 3:00 PM**

**Imaging of Lung Structure and Function in Asthma Exacerbation**

Sean B. Fain, Ph.D.  
University of Wisconsin

**3:00 – 3:20 PM**

**Allergen-Induced Airway Inflammation in Murine Models: Immune Pathologies**

Angela Haczku, M.D., Ph.D.  
University of Pennsylvania

**3:20 – 3:40 PM**

**Quantitative Imaging of Specific Lung Ventilation with Hyperpolarized Gas MRI**

Kiarash Emami  
University of Pennsylvania

**3:40 – 4:00 PM**

**Pulmonary Functional Imaging Using Hyperpolarized 3He**

Mitchell S. Albert, Ph.D.  
University of Massachusetts

**4:00– 4:15 PM**

**Discussion**

**4:15 - 4:35 PM**

**Break**

**Session V: Lung Function and Disease Models**

**Moderators: Jose G. Venegas, Ph.D. and James E. Baumgardner, M.D., Ph.D.**

**4:35 - 5:05 PM**

**Mechanical Ventilation Causes Abdominal Edema and Inflammation in Experimental Sepsis**

Göran Hedenstierna, M.D., Ph.D.  
University Hospital of Uppsala, Sweden

**5:05 - 5:25 PM**

**Dynamics of Cyclical Recruitment of Atelectasis: Insights from Gas Exchange**

James E. Baumgardner, M.D., Ph. D.  
Oscillogy, LLC

**5:25 - 5:45 PM**

**Dynamics of Cyclical Recruitment of Atelectasis: Insights from dCT and EIT**

Klaus Markstaller, M.D., Ph.D.  
Medical University of Vienna, Austria

5:45 - 6:05 PM

**Quantitative Imaging of Regional Lung Function Using Synchrotron Radiation Computed Tomography: Present Status, Future Orientations**

Sam Bayat, M.D., Ph.D.  
CHU Amiens, France

6:05 - 6:20 PM

**Break**

6:20 - 6:40 PM

**Quantitative Imaging of Alveolar Recruitment Dynamics with Hyperpolarized Gas MRI During Mechanical Ventilation**

Maurizio Cereda, M.D.  
University of Pennsylvania

6:40 - 7:00 PM

**Assessment of Lung Metabolism Activity by FDG-PET in Patients with Acute Lung Injury**

Giacomo Bellani, M.D., Ph.D.  
Università degli Studi di Milano-Bicocca, Italy

7:00 - 7:20 PM

**Differential Lung Uptake of  $^{99m}\text{Tc}$ -HMPAO and  $^{99m}\text{Tc}$ -Duramycin in Two Rat Lung Injury Models**

Anne V. Clough, Ph.D.  
Marquette University

**Tuesday March 1, 2011**

7:00 - 7:40 AM

**Continental Breakfast**

**Session VI: Keynote Lectures - Part II  
Moderator: Warren B. Gelfer, M.D.**

7:40 - 8:20 AM

**The National Lung Screening Trial (NLST)**

Mitchell Schnall, M.D., Ph.D.  
University of Pennsylvania

8:20 - 9:00 AM

**A Hard Day in the Soft Life of a Cell**

Jeffrey J. Fredberg, Ph.D.  
Harvard University

9:00 - 9:40 PM

**New Insights into the Pathogenesis of COPD obtained by Micro-CT Examination of Human Lungs**

James C. Hogg, M.D., Ph.D.  
iCAPTURE Centre, St. Paul's Hospital, Vancouver, Canada

9:40 - 9:55 AM

**Discussion**

9:55 - 10:10 AM

**Break**

**Session VII: COPD Biomarkers  
Moderator: Eric A. Hoffman, Ph.D.**

10:10 - 10:40 AM

**Imaging Airway Heterogeneity: Signal or Noise**

Robert H. Brown, M.D., M.P.H.  
Johns Hopkins University

10:40 - 11:00 AM

**Emerging Imaging Biomarkers in Emphysema**

Jonathan Goldin M.D., Ph.D.  
David Geffen School of Medicine

11:00 - 11:20 AM	<b>Quantitative CT in COPD: Current Status, Future Needs</b> David A. Lynch, M.D. National Jewish Hospital
11:20 - 11:40 AM	<b>Emphysema on CT Scan: Prevalence, Subtypes and Prognosis of a Distinct Disease</b> R. Graham Barr, M.D., DRPH Columbia University
11:40 - 12:00 AM	<b>Assessment of the Effect of Budesonide/Formoterol on Distal Airway Volume in COPD Patients Using HRCT and Lung Function Tests</b> Jan W. De Backer, Ph.D. FluidDA NV, Belgium
12:00 - 12:15 PM	<b>Discussion</b>
12:15 - 1:15 PM	<b>Lunch</b>

**Session VIII: Graduate Student and Postdoctoral Presentations - Part II**  
**Moderator: Kiarash Emami**

1:15 - 1:50 PM	<b>A Novel Model of Dissolved Hyperpolarized 129Xe Dynamic for Simultaneous Quantification of Lung Structure and Function</b> Yulin V. Chang, Ph.D. Washington University
	<b>Regional Ventilation Mapping of the Rat Lung using Hyperpolarized 129Xe Magnetic Resonance Imaging</b> Marcus J. Couch Robarts Research Institute, Canada
	<b>Lung ventilation- and perfusion-weighted MRI by Fourier decomposition: Validation with hyperpolarized 3He-MRI and dynamic contrast-enhanced MRI in an animal experiment</b> Bauman Grzegorz, Ph.D. German Cancer Research Center, Germany
	<b>An Improved Scheme for a Robust High Resolution Measurement of Alveolar Oxygen Tension in Human Lungs</b> Hooman Hamedani University of Pennsylvania
	<b>Imaging V/Q in Pulmonary Hypertension with 3He and 1H MRI</b> Helen Marshall, Ph.D. University of Sheffield, UK

**Session IX: Lung Function and Structure From Hyperpolarized Gas MRI - Part I**  
**Moderators: John P. Mugler, III, Ph.D. and Stephen Kadlecsek, Ph.D.**

1:50 - 2:20 PM	<b>Breath-hold Imaging of Ventilation and Gas Uptake with Hyperpolarized Xenon-129</b> John P. Mugler, III, Ph.D. University of Virginia
2:20 - 2:40 PM	<b>Progress in Hyperpolarized 129Xe MRI: From Mouse to Human Subjects</b> Bastiaan Driehuys, Ph.D. Duke University
2:40 - 3:00 PM	<b>Pulmonary Physiology with Hyperpolarized 129Xe</b> Samuel Patz, Ph.D. Harvard Medical School

3:00 - 3:20 PM	<b>Regional Measurement of O<sub>2</sub> Tension in Both Small Animals and Human Subjects</b> Masaru Ishii, M.D., Ph.D. Johns Hopkins University
3:20 - 3:40 PM	<b>Short Breath Hold PAO<sub>2</sub> Mapping</b> Wilson Miller, Ph.D. University of Virginia
3:40 - 4:00 PM	<b>Detection of Acinar Microstructural Changes in Early Emphysema by In Vivo <sup>3</sup>He Lung Morphometry</b> James D. Quirk, Ph.D. Washington University, St. Louis
4:00 - 4:15 PM	<b>Discussion</b>
4:15 - 4:35 PM	<b>Break</b>

**Session X: Polarization Methods**  
**Moderators: William Hersman, Ph.D. and Bastiaan Driehuys, Ph.D.**

4:35 - 4:55 PM	<b>Hyperpolarized Xenon Production: From Laboratory Innovation to Clinical Trials</b> F. William Hersman, Ph.D. University of New Hampshire
4:55 - 5:15 PM	<b>Production and Use of Hyperpolarized Xenon For Lung Imaging: State of the Art and Future Directions</b> Nicholas N. Kuzma, Ph.D. University of Pennsylvania
5:15 - 5:35 PM	<b>Production of Hyperpolarized Liquids Under Continuous Flow Conditions</b> Kerstin Münnemann, Ph.D. Max Planck Institute
5:35 - 5:50 PM	<b>Discussion</b>
5:50 - 6:30 PM	<b>Poster Session</b>

**Wednesday March 2, 2011**

7:00 - 7:40 AM	<b>Continental Breakfast</b>
----------------	------------------------------

**Session XI: Keynote Lectures - Part III**  
**Moderator: John Hansen-Flaschen, M.D.**

7:40 - 8:20 AM	<b>Murine Modeling of COPD</b> Jack A. Elias, M.D. Yale University
8:20 - 9:00 AM	<b>Imaging of the Lung for Clinical Phenotyping of COPD</b> Robert A. Wise, M.D. Johns Hopkins University

9:00 - 9:40 AM

**COPDGene: Quantitative Imaging and Genetics for Therapeutic Development**

James Crapo, M.D.  
National Jewish Hospital

9:40 - 9:55 PM

**Discussion**

9:55 - 10:10 AM

**Break**

**Session XII: Assessing the Lung with Proton MRI**  
**Moderators: Per Åkeson, M.D., Ph.D., and Wilson Miller, Ph.D.**

10:10 - 10:30 AM

**Quantifying Regional Ventilation with Proton MRI**

Kim Prisk, Ph.D.  
University of California, San Diego

10:30 - 10:50 AM

**Dynamic MR Angiography of the Pulmonary Circulation**

Parmede Vakil, Ph.D.  
Northwestern University

10:50 - 11:10 AM

**Physiological Insights into the Pulmonary Circulation Using Proton MRI**

Susan R. Hopkins, M.D., Ph.D.  
University of California, San Diego

11:10 - 11:30 AM

**Lung Proton MRI in Small Animals: Where Are We? Where Are We Going?**

Yannick Cremilieux, Ph.D.  
University of Bordeaux, France

11:30 - 11:50 AM

**Calculatin of Parenchymal Tissue Mechanical Properties in Low Signal-to-Noise MRI Elastography**

Kieran McGee, Ph.D.  
Mayo Clinic

11:50 - 12:05 PM

**Discussion**

12:05 - 1:05 PM

**Lunch**

**Session XIII: Graduate Student and Postdoctoral Presentations - Part III**  
**Moderator: Kiarash Emami**

1:05 - 1:35 PM

**Non-invasive Assessment of Lung Status by Ventilation/Perfusion SPECT Imaging in a Murine Model of Long-term Cigarette Smoke Exposure**

Brian Jobse  
McMaster University, Canada

**Imaging of Airway Remodeling in a Murine Model of Bronchial Hyper-responsiveness**

Jennia Rajaei  
University of Pennsylvania

**Pulmonary  $^3\text{He}$  MRI of Pediatric Subjects with Risk Factors for Asthma**

Robert Cadman, Ph.D.  
University of Wisconsin-Madison

**Assessment of lung morphology with steady state free precession (SSFP) MRI compared to computed tomography**

Smitha Rajaram, Ph.D.  
University of Sheffield, UK

**Session XIV: Lung Function and Structure from Hyperpolarized Gas MRI - Part II**  
**Moderator: Dmitriy Yablonskiy, Ph.D.**

- 1:35 - 1:55 PM**      **Hyperpolarized Helium MRI in a Rat Model of Interstitial Lung Disease**  
Milton Rossman, M.D.  
University of Pennsylvania
- 1:55 - 2:15 PM**      **Simultaneous Multinuclear MRI of the Lungs**  
Jim M. Wild, Ph.D.  
University of Sheffield, UK
- 2:15 - 2:35 PM**      **Rodent Lung Imaging using Novel MRI and CT Approaches**  
Giles Santyr, Ph.D.  
Robarts Research Institute, Canada
- 2:35 - 2:55 PM**      **Imaging Lung Microstructure in Normal Mice with Hyperpolarized <sup>3</sup>He Diffusion MRI**  
Jason Woods, Ph.D.  
Washington University
- 2:55 - 3:15 PM**      **Quantification of Lung Function in Humans Using Non-Equilibrium Xenon Uptake Spectroscopy (NEXUS)**  
Kai Ruppert, Ph.D.  
University of Virginia
- 3:15 - 3:35 PM**      **Functional MRI of Obstructive Lung Disease Therapy: Research Hype or Clinically Relevant?**  
Grace Parraga, Ph.D.  
Robarts Research Institute, Canada
- 3:35 - 3:50 PM**      **Discussion**
- 3:50 - 4:10 PM**      **Break**

**Session XV: Upcoming Techniques and Therapies**  
**Moderator: Stephen Kadlecck, Ph.D.**

- 4:10 - 4:30 PM**      **Nanodevices for Targeting Imaging Probes to the Pulmonary Vasculature**  
Vladimir Muzykantov, M.D., Ph.D.  
University of Pennsylvania
- 4:30 - 4:50 PM**      **Reflectance Microscopy Techniques for 3-D Imaging of the Alveolar Structure**  
Caroline Unglert, M.S.  
Harvard University
- 4:50 - 5:05 PM**      **Discussion**
- 5:05 - 5:20 PM**      **Final Remarks**  
Rahim R. Rizi, Ph.D.  
University of Pennsylvania
- Adjournment**

*Office of Organizing Committee :*  
Lori Ehrich  
Manager, Continuing Education  
UPHS, Department of Radiology  
Lori.Ehrich@uphs.upenn.edu  
cme@rad.upenn.edu

University of Pennsylvania  
Department of Radiology  
1 Silverstein, 3400 Spruce Street  
Philadelphia, PA 19104  
Tel: 215-662-6904  
Fax: 215-349-5925



# Registration Form

## *"The 4233 International Workshop on Functional Pulmonary Imaging*

Name: \_\_\_\_\_ Title: MD \_\_\_ PhD \_\_\_ Other \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip/Postal Code: \_\_\_\_\_

Country: \_\_\_\_\_ Daytime Telephone: \_\_\_\_\_ Fax: \_\_\_\_\_

Email Address: \_\_\_\_\_

### Specialty (Please circle)

Radiologist	Pulmonary Medicine	Graduate Student	Resident/Fellow
Physiology	Medicine (other)	Anesthesia	Medical Student
Bioengineering & Engineering	Physics	Industry	Specific Area(s) of Interest _____ _____

### Registration Fee

~~AAA~~ \$500.00    **Physicians and Healthcare Professionals**  
 \$200.00    **Fellows, students, and Post-docs**     \$350.00    **Research Faculty**

### Payment Method

**Check** (US dollars only drawn on a US bank)    **Payable to: UPHS Department of Radiology**  
 **Credit Card** (check one)    \_\_\_ Visa    \_\_\_ Mastercard    \_\_\_ American Express

Account Number \_\_\_\_\_ Expiration Date: \_\_\_\_/\_\_\_\_

CSC: \_\_\_\_\_ Signature \_\_\_\_\_

Name of Account Holder: \_\_\_\_\_

Street Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

City: \_\_\_\_\_ State/Province: \_\_\_\_\_ ZIP/Postal Code: \_\_\_\_\_