

Harvard Medical School Curriculum Vitae

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Place of Birth: London, Ontario, Canada

Education

1978	BS	Zoology	The George Washington University, Washington, DC
1987	Ph.D.	Anatomy and Neuroscience	Albany Medical College, Albany, NY
1992	M.D.	Medicine	Yale University School of Medicine, New Haven, CT

Postdoctoral Training

1/92 – 9/92	Intern	Internal Medicine	Yale New Haven Hospital
9/92 – 6/94	Resident	Internal Medicine	Yale New Haven Hospital
7/94 – 6/97	Fellow	Pulmonary and Critical Care Medicine	Yale University School of Medicine
7/87 – 6/88	Postdoctoral Associate	Neuroanatomy	Yale University School of Medicine
6/88 – 12/90	Postdoctoral Associate	Molecular Neurobiology	Howard Hughes Medical Institute and Yale University School of Medicine

Faculty Academic Appointments

1997 – 1998	Instructor	Medicine	Yale University School of Medicine
1998 – 2000	Assistant Professor	Medicine	Yale University School of Medicine
2000 – 2001	Assistant Professor	Medicine	Tufts University School of Medicine
2001 – 2011	Assistant Professor	Medicine	Harvard Medical School, Boston, MA
2011 -	Associate Professor	Medicine	Harvard Medical School, Boston, MA

Appointments at Hospitals/Affiliated Institutions

1993-1994	Attending Physician	Emergency Room	West Haven VA Hospital
1994-1995	Attending Physician	Emergency Medicine	Bristol Hospital, Bristol CT
1995-1997	Attending Physician	Emergency Medicine	Yale New Haven Hospital
1995-1999	Attending Physician	Emergency Medicine	Hospital of Saint Raphael
7/96-12/99	Attending Physician	Pulmonary Critical Care	West Haven VA Hospital
7/97-12/99	Attending Physician	Pulmonary Critical Care	Yale New Haven Hospital

1/00-12/01	Attending Physician	Pulmonary Critical Care	Winchester Hospital
1/00-12/01	Attending Physician	Pulmonary Critical Care	New England Medical Center, Boston
1/00-12/09	Attending Physician	Emergency Medicine	Faulkner Hospital, Boston, MA
1/02 – 11/09	Attending Physician	Pulmonary Critical Care	Massachusetts General Hospital
08/13– 07/16	Attending Physician	Cardiology	Boston Children’s Hospital
11/09 -	Consulting Staff	Medical Oncology	Dana-Farber Cancer Institute
11/09 -	Associate Physician	Pulmonary Critical Care	Brigham and Women’s Hospital

Major Administrative Leadership Positions

Local

1998-1999	Associate Medical Director, Medical Intensive Care Unit	Yale New Haven Hospital
1999-2001	Director of Bronchoscopy Services	Yale New Haven Hospital
2001	Medical Director of Respiratory Therapy	New England Medical Center
2005-2009	Director, Pulmonary Vascular Disease Program	Massachusetts General Hospital
2009 -	Director, Pulmonary Vascular Disease Program	Brigham and Women’s Hospital
2011-	Director, Dyspnea and Performance Evaluation Center	Brigham and Women’s Hospital
2012-2015	Associate Program Director, PCCM fellowship training program	Brigham and Women’s Hospital and Harvard Medical School
2013-	Executive Director, Center for Pulmonary Heart Diseases	Brigham and Women’s Hospital Heart and Vascular Center

Committee Service

Local

1983-1984	Curriculum Committee	Albany Medical College.
1983-1984		Member, Graduate Studies Program
1993-1994	Education Committee	Yale University School of Medicine, Department of Medicine
1993-1994		Member
1996-1999	Fellowship Curriculum Committee	Yale University School of Medicine, Section of Pulmonary and Critical Care
1996-1999		Chairperson
1996-1999	Fellowship Admissions Committee	Yale University School of Medicine, Section of Pulmonary and Critical Care
1996-1999		Member
1996-1999	Bronchoscopy Quality Assurance Committee	Yale New Haven Hospital
1996-1999		Chairperson
2002-2003	Fellowship Admissions Committee	Yale University School of Medicine
2004		Member
2004	Task Force on Sepsis Management and Early Goal Directed Therapy, Critical Care Committee	Massachusetts General Hospital
2004		Chairperson

2004	Task Force on the Use of Albumin in Resuscitation in Shock, Critical Care Committee 2004	Massachusetts General Hospital Chairperson
2004-2009	Optimum Care Committee 2004-2009	Massachusetts General Hospital Member
2007-2009	Clinical Research Council, 2007-2009	Massachusetts General Hospital Member
2014	Acute Pulmonary Embolism Program	Director of Steering Committee, Brigham and Women's Hospital

National and International

2003-2011	Partnership for Excellence in Critical Care	One of the founding members with a leadership role in a number of quality improvement initiatives
2008-2010	Biomarkers in Pulmonary Vascular Disease	Chair of Planning Committee for International Meeting
2012, 2013, 2014	International Right Heart Failure Summit Annual Meeting	Co-Chair of organizational committee developing an international expert forum focused on pathophysiologic and clinical issues focused on right heart failure from multiple pathways.
2013-2016	International Right Heart Failure Foundation	Founding member and Chair of the Scientific Steering Committee
2013	Pulmonary Vascular Research Institute - joint Symposium of the Excellence Cluster Cardiopulmonary System (ECCPS) and Pulmonary Vascular Research Institute (PVRI) in Bad Nauheim, Germany	Member of the scientific committee responsible for meeting organization and content.
2014	Pulmonary Vascular Research Institute – 8 th World Congress	Director of Scientific Affairs and head of committee responsible for meeting organization and content.
2017	Pulmonary Vascular Research Institute – Grants Advisory Committee	Formulation, administration, review, and distribution of research funds as part of the PVRI and Dinosaur Trust, UK

Professional Societies

1983-1992	American Association of Anatomists	
1996-	Society for Critical Care Medicine	
1996-	American College of Physicians	
2013		Fellow
1996-	American College of Chest Physicians	
1998-		Fellow

	2006-2007	Member, Chest Journal CME Task Force
1996-	American Thoracic Society ATS Pulmonary Circulation Assembly Program Committee for 2012.	Program committee to plan the Pulmonary Circulation Assembly's sessions for the 2013 International Conference, May 17-24 in Philadelphia, PA. Review abstracts submitted to the Assembly and help program acceptable abstracts into the appropriate format
2004-	Pulmonary Hypertension Association 2004- 2008-2010	Member, Clinicians and Researchers Scientific Leadership Council, Scientific Sessions Committee. Committee responsible for planning structure and content of sessions at 2010 PHA International Conference
	2011-2012	Scientific Leadership Council, Scientific Sessions Committee. Committee responsible for planning structure and content of sessions at 2012 PHA International Conference
2006-2008	Pulmonary Arterial Hypertension Education Initiative 2006-2008	Member, Educational Council
2008	European Respiratory Society	Member
2008-2014	Wilderness Medical Society	Member
2009	Pulmonary Vascular Research Institute	Fellow
2013	Pulmonary Vascular Research Institute	Chair, Right Heart Failure Task Force
2014-2015	Pulmonary Vascular Research Institute	Director, Scientific Affairs – Organize the annual international meeting, oversee all educational activities of the institute
2017	Pulmonary Vascular Research Institute	Organized the first PVRI Symposium on PAH for the Cuban Society of Cardiology and the Hospital Hermanos Ameijeiras

Editorial Activities

Ad Hoc Reviewer

Brain, Pediatric Research, Journal of Intensive Care Medicine, American Journal of Medicine, American Journal of Physiology: Lung Cellular and Molecular Physiology, Chest, American Journal of Respiratory Cell and Molecular Biology, Cytokine, Journal of Experimental Medicine, Respiratory Medicine, American Heart Journal, Circulation, Thrombosis and Hemostasis, Circulation Heart Failure, Journal of Heart and Lung Transplantation, Circulation Research, Pulmonary Circulation

Other Editorial Roles

2010	Editorial Board	Pulmonary Circulation
2012	Editorial Board	The Journal of Heart and Lung Transplantation

Honors and Prizes

1982-1987	Trustee Scholarship	Albany Medical College	Academic
1985, 1986	Dean's Award and Prize for Leadership	Albany Medical College	Leadership
1985, 1986	Dean's Award and Prize for Excellence in Teaching	Albany Medical College	Teaching
1987	Alumni Association Medal and Prize	Albany Medical College	Research and Teaching
1987	Sigma Xi	Sigma Xi Research Society	Excellence in scientific investigation
1997	Young Investigator's Awards	American College of Chest Physicians	Excellence in scientific investigation
1999	Merck Respiratory Young Investigator	Merck and Company, Inc	Excellence in scientific investigation
1999	Fellowship Teaching Award, Pulmonary Critical Care Fellowship	Yale University School of Medicine	Excellence in Teaching and Mentorship
2001	Oliver Smith Award	Tufts Medical Center	Recognition for outstanding patient care
2002	Pulmonary Critical Care Fellows Award for Teaching and Mentorship	Tufts Medical Center	Excellence in Teaching and Mentorship
2011	Susan & Katherine McArthur-Radovsky Award	Brigham and Women's Hospital	Research and Clinical
2014	Partners in Excellence Award	Brigham and Women's Hospital	Development of Right Heart Failure Team
2014	Excellence in Mentoring Award	Harvard Medical School	Nominee

Report of Funded and Unfunded Projects

Funding Information

Past

1997-1999	IL-11 protection from hyperoxic lung injury Parker B. Francis Fellowship Award Role: Principle Investigator Goals: Characterize the protective effects of IL-11 pretreatment in the setting of hyperoxic injury. Characterize the mechanism(s) of IL-11-induced protection in the setting of hyperoxic injury.
1998-2004	Mechanisms of IL-11 protection from hyperoxic lung injury Mentored Clinical Scientist Research Award (KO8 HL03888-01) Role: Principle Investigator

- Goals: Compare the expression of apoptosis regulators in IL-11 transgene (+) and littermate control mice before and after exposure to 100% oxygen. Establish an *in vitro* system that can be used to define the mechanism of hyperoxia- (oxidant) induced apoptosis and the protective effects of IL-11.
- 1999-2001 Mechanisms of IL-11 protection from hyperoxic lung injury
American Lung Association Research Grant
Role: Principle Investigator
Goals: Define the kinetics and the specific cell populations that undergo apoptosis in hyperoxic lung injury. Define the alterations in apoptosis regulatory processes and, characterize the alterations in regulators of apoptosis induced by IL-11 and determine their role in mediating IL-11-induced protection in lung injury.
- 2004-2009 Interleukin-11 and Interleukin-6 protection from oxidant mediated lung injury
NIH RO1 Research Grant RO1 HL074859
Role: Principle Investigator
Goals: Characterize the signal transduction pathways that mediate IL-11 and IL-6 induced protection from oxidant stress *in vitro* and examine the relationship to upregulation of mediators of cell death. Evaluate the contribution(s) of Bcl 2 family proteins to protection of pulmonary epithelial and microvascular endothelial cells *in vitro*. Evaluate the contribution(s) of Bcl 2 family proteins to protection *in vivo*.
- 2006-2009 MGH Pulmonary Vascular Development Fund
Internal award for research on pathogenesis of pulmonary hypertension
Role: Principle Investigator
Evaluation of the role of inflammatory mediators in pulmonary vascular remodeling in a mouse model of pulmonary hypertension
- 2007-2009 A study to quantify the number of circulating endothelial cells in patients with severe sepsis.
Sponsor: Eli Lilly and Company - Investigator Initiated Grant
Role: Principle Investigator
Goals: Quantify and characterize abnormal circulating populations of endothelial cells in patients with severe sepsis and septic shock as a mechanism for multi organ failure syndrome
- 2007-2011 Open-label Study to Evaluate the Safety and Efficacy of PRX-08066 in Patients with Pulmonary Hypertension and Chronic Obstructive Pulmonary Disease.
Sponsor: EPIX Pharmaceuticals - Investigator Initiated Study
Role: Principle Investigator
- 2007-2011 A randomized, double blind, placebo-controlled study of oral UT-15C SR in Subjects with Pulmonary Arterial Hypertension
Sponsor: United Therapeutics, Protocol No. TDE-PH-201
Role: Principle Investigator
- 2008-2012 A Phase 2, Randomized, Double-blind, Placebo-controlled, Multicenter, Dose-ranging study of Cicletanine in Subjects with Pulmonary Arterial Hypertension
Sponsor Gilead Sciences (Chair of Steering Committee)
Role: Principle Investigator and Steering Committee Chairman
Goals: Assess the efficacy and safety of a novel eNOS coupler, Cicletanine, in patients with pulmonary arterial hypertension.
- 2011-2013 Brigham and Women's Hospital Clinical Innovations Grant, Development of a Multidisciplinary Dyspnea/Exercise Intolerance Center
Role: Principle Investigator and Director

- Goals: Establish of a comprehensive center to evaluate patients with resting or exertional dyspnea, bringing together a core group of clinical experts to collaboratively develop a streamlined efficient and effective approach to assessing and treating the patient with dyspnea.
- 2005-2012 REVEAL Registry
Sponsor: Actelion, Protocol No. RIV PH-408
Role: Site Principle Investigator
Goals: Development of a 5000 patient database of patients with PAH in order to better define the natural history of the disease.
- 2013-2016 Study to assess the fate, safety, and efficacy of allogeneic mesenchymal stromal cells in a large animal model of precapillary pulmonary hypertension and right ventricular dysfunction
United Therapeutics, Investigator Initiated Grant
Role: Principle Investigator
Goals: preclinical and clinical study to assess the safety and efficacy of allogeneic mesenchymal stromal cells infused into the right coronary artery in a large animal model of pulmonary hypertension and in patients with PAH and right ventricular dysfunction.
- 2012-2016 Heme Oxygenase – 1/Carbon Monoxide in Lung Vascular Injury
Role: Site Principle Investigator
NHLBI: R01HL06023412A1
Goals: My role is specific to Aim 3 and includes an assessment of the efficacy of carbon monoxide in ameliorating pulmonary vascular remodeling via inhibition of inflammasome
- 2014-2016 PCORI Clinical Data Research Network (CDRN) - Scalable Collaborative Infrastructure for Learning Healthcare System, PCORNet Rare Diseases Task Force, Harvard University Representative
Goals: 29 clinical research data networks that together will form an ambitious new resource known as PCORnet, the National Patient-Centered Clinical Research Network. PCORnet will be a large, highly representative, national network for conducting clinical outcomes research.
- 2008-2016 An open label uncontrolled study of the safety and efficacy of ambrisentan in patients with exercise induced pulmonary arterial hypertension.
Gilead Science, Investigator Initiated Grant
Role: Principle Investigator
Goals: 6-month study to evaluate the effects of Ambrisentan (selective ETRA) administered orally on exercise capacity utilizing invasive cardiopulmonary exercise testing in patients with either exercise induced pulmonary arterial hypertension or diastolic dysfunction.
- 2013-2016 Targeting metabolism to reverse RV dysfunction in PAH
The Cardiovascular Medical Research and Education Fund
Role: Co-Principle Investigator (Co-Principle Investigator with Dr. Yuchi Han at University of Pennsylvania)
Goals: Multicenter study with colleagues at the University of Pennsylvania and the University of Maryland. This proposal will identify: (A) Key molecular and metabolic regulatory pathways that may be targeted for recovery of RV function in patients with PAH; and (B) Specific imaging, plasma, and metabolic markers to better guide prognosis and therapy of the RV dysfunction in PAH.

Current

- 2014-2019 Integrated Endothelial Phenotyping to Redefine Pulmonary Hypertension.
NHLBI U01 HL125215-01
Role: Co-Principle Investigator (with Dr. Jane Leopold)
Goals: performing patient phenotyping, which will lead to novel sub classifications of patients with pulmonary vascular-right ventricular disease, based on molecular and radiographic as well as clinical characteristics, which can be associated with specific molecular mechanisms of pathogenesis.
- 2016-2019 Molecular imaging of angiogenic activity in pulmonary arterial hypertension
1R01HL131910-01 (Yu)
Role: Consultant
Goals: Molecular imaging of angiogenic activity in pulmonary arterial hypertension

Current Unfunded Projects

- 2007- Principle Investigator
Patient registry and biological database
Ongoing collection of patient samples obtained during right heart catheterization and invasive CPET from the pulmonary artery and radial artery at rest, peak exercise, and one hour post exercise

Report of Local Teaching and Training

Teaching of Students in Courses

Yale University School of Medicine

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| 1995-1997 | Yale Physician Associate Program, Introduction to Clinical Medicine for Pulmonary Section
1 st year students. | Lecturer, Course Coordinator
6 hours |
| 1996-1999 | Introduction to Clinical medicine for Pulmonary Medicine Section
2nd year medical students | Lecturer
4 1-hour lectures over a 2 mos period |
| 1997-1999 | Introduction to Clinical Medicine Course
2nd year medical students | Preclinical Tutor
4-hrs/wk for 16-wks |
| 1998-1999 | Introduction to Clinical Medicine Course, Cellular and Molecular Basis of Acute Lung Injury
2nd year medical students | Lecturer
1-hour lecture |

Harvard Medical School

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| 2003- | Introduction to Clinical Medicine Course, Human Systems, Respiratory/Cardiovascular Sections
2 nd year medical students | Preclinical Tutor
2-hrs/day 3-days/wk for 8 wks |
| 2004-2008 | Respiratory Infections, Human Systems, Respiratory/Cardiovascular Sections
2nd year medical students | Lecturer
1-hr per year |

Formal Teaching of Residents, Clinical Fellows and Research Fellows (post-docs)

1997-1999	Acute Care Lecture Series, Internal Medicine Residency Program, Critical Care Summer Lecture Series	Lecturer - Yale New Haven Hospital 2 1-hour lectures
2000-2008	Critical Care Lecture Series Internal Medicine Residency Program	Lecturer – MGH 2 hours per month
2003-2008	Airway Workshop, airway management course; Pulmonary Critical Care Training Program Presented annually to incoming first year fellows in the Harvard Combined Program	Course Director and Lecturer - HMS 1-full day
2003-2008	Introduction to Bronchoscopy Course, Indication, Contraindication and Consent Presented annually to incoming first year fellows throughout New England	Lecturer - HMS 1-full day
2004-2009	Pulmonary Vascular Physiology Clinical Training Includes training and supervision of fellows	Preceptor - HMS 3-hours every week
2005-2009	Cardiopulmonary Physiology Lecture Series Pulmonary Critical Care fellowship trainees	Lecturer and Organizer – HMS training program 1-hour every week

Clinical Supervisory and Training Responsibilities

Yale University School of Medicine

1996-1997	Service Attending in the Medical Intensive Care Unit and Pulmonary Consultation Service, West Haven Veterans Hospital, Yale University Internal Medicine Training Program (1 Fellow, 1 Resident, 1 Student)	One month
1996-1997	Service Attending in the Medical Intensive Care Unit and Pulmonary Consultation Service, West Haven Veterans Hospital, Yale University Internal Medicine Training Program (1 Fellow, 1 Resident, 1 Student)	One month
1996-1999	Attending Physician, Pulmonary Consultation Service, West Haven Veterans' Administration Hospital	One month
1996-1999	Service Attending in the Medical Intensive Care Unit, Yale New Haven Hospital, Yale University Internal Medicine Training Program (1 Fellow, 3 Residents, 3 Interns, 2 Students)	Three months each year
1997-1999	Pulmonary Consultations Service Attending, Yale New Haven Hospital, Yale University Pulmonary Fellowship Training Program (1-2 Fellows, 1-2 Residents, 1-2 Students)	2 weeks each year
1997-1999	Attending Physician, Medical Intensive Care Unit, YNHH	3 months each year
1997-1999	Attending Physician, Pulmonary Consultation Service, YNHH	2 months each year

New England Medical Center

2000 – 2001	Pulmonary Service Attending, Tufts University Internal Medicine Training Program (1 Fellow, 1 Resident, 2 Interns, and 1-2 Students)	Four weeks each year for 2 years
2000-2001	Service Attending in the Medical Intensive Care Unit, New England Medical Center, Tufts University Internal Medicine Training Program (1 Fellow, 5 Residents, 3 interns, and 1-2 Students)	Three months each year for two years
2000-2001	Attending Physician, Medical Intensive Care Unit, NEMC	2 months

Winchester Hospital

2000-2001	Attending Physician Medical Intensive Care Unit, Winchester Hospital	2 months per year
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Harvard Medical School

2002-2009	Pulmonary Consult Attending, Massachusetts General Hospital, Harvard Medical School Pulmonary Critical Care Training Program (2 Fellows, 1-2 Residents, and 1-2 Students)	Two weeks each year
2002-2009	Critical Care Attending, Medical Intensive Care Unit, Massachusetts General Hospital, Harvard Medical School Internal Medicine and Pulmonary Critical Care Training Program (1 Fellow, 3 Residents, 3 interns, and 1-2 Students)	Three months each year
2003-2009	Pulmonary Clinic, Clinical Preceptor, Internal Medicine Residency Program (1 st , 2 nd and 3 rd year medical residents)	2 and a half days per week
2009-	Pulmonary Vascular Disease and Critical Care Attending, Brigham and Women's Hospital, Harvard Medical School Anesthesiology, Ob-Gyn, Surgery, Internal Medicine, and Pulmonary Critical Care Training Programs (1 Fellow, 4 Residents, 1 interns)	Two months each year

Laboratory and Other Research Supervisory and Training Responsibilities

Massachusetts General Hospital

2001- 2010	Principle Investigator Pulmonary Research Laboratory	15% effort
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Formally Supervised Trainees

1997-1998	Jonathan Corne, MBBS, Yale School of Medicine. Current position: Senior Consultant, Queens University Medical Center Nottingham, England, Funded by the Medical Research Council of the United Kingdom Research Advisor, 2 years. <i>IL-13 stimulates vascular endothelial cell growth factor and protects against hyperoxic lung injury.</i>	
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- 1996-1999 Nicholas Ward, M.D., Yale School of Medicine. Current position: Associate Professor, Brown University School of Medicine. Research Advisor, 2 years. *Evaluation of IL-6 induced protection in hyperoxic acute lung injury using an overexpression transgenic model*
- 2001-2002 Hubert Chen, M.D.,MPH, Current position: Medical Director at Genentech. Research Advisor, 1 year. *Potential Cost-Effectiveness of Epoprostenol as First-line Therapy for Pulmonary Arterial Hypertension.*
- 2003-2005 Po-Shun Lee, M.D., Current position in industry. Research Advisor, 2 years, *Plasma Gelsolin is a Critical Pro-Survival Factor in Sepsis; Evaluation of the role of cytoskeletal components and cellular debris in the initiation of the systemic inflammatory response.* Second Prize 2005 New England Respiratory Research Competition Award, Research Advisor, Current position Translational Medicine Expert at Novartis Institutes for BioMedical Research
- 2003-2007 George Barker, M.D., Ph.D. Current position, Clinical faculty Harvard Medical School, Mount Auburn Hospital, Primary Mentor, Research Advisor, 3 years. *DNA Damage in Hyperoxic Lung Injury.* Recipient of the GSK Mentored Pulmonary Research Fellowship 2004-2005, First Prize 2005 New England Respiratory Research Competition Award.
- 2005-2008 James Tolle, M.D., Current position, Assistant Professor, Vanderbilt University School of Medicine, Research Advisor, 3- years. *Abnormal Systemic Oxygen Extraction in Pulmonary Hypertension During Incremental Exercise.*
- 2006-2008 M. Kathryn E. Steiner, M.D., Current position, Staff Pulmonologist, New England Baptist Hospital, Primary Mentor, Research Advisor, 2-years. *Role of IL-6 in the Pathogenesis of Pulmonary Hypertension.*
- 2005- 2010 Narasiah Kolliputi, Ph.D., Current position, Associate Professor, University of South Florida, Primary Mentor, 5-years. *Role of IL-6 in protection from cell death.* Recipient of an AHA research award in lung injury, FASEB Young Investigator Award, and successfully RO1 funded
- 2013 Bart Boerrigter, M.D., Ph.D., Current Position, Clinical fellowship in pulmonary medicine, VU University Medical Center, Amsterdam. Research mentor as part of pre-doctoral research, *Pulmonary hemodynamics and exercise in chronic obstructive pulmonary disease.*
- 2012-2014 Mario Santos, M.D., Ph.D., Current position, Department of Physiology and Cardiothoracic Surgery, Cardiovascular R&D Unit, Faculty of Medicine, University of Porto, Portugal, Research mentor, Study of the physiologic limits to aerobic capacity in heart failure with preserved ejection fraction, and pulmonary hypertension.
- 2014-2015 Manyoo Agarwal, MBBS, Current position, Resident physician, Department of Internal Medicine, University of Tennessee, Memphis, Research Fellowship in pulmonary vascular disease and exercise physiology. Research Mentor as part of postdoctoral research fellowship, *Treatment of Group-3 PH with pulmonary vasodilator therapy.*
- 2014-2015 Rudolph Oliveira, M.D., Research Fellowship in pulmonary vascular disease and exercise physiology. Research Mentor as part of postdoctoral research fellowship, *Hemodynamic and physiologic characteristics of patients with connective tissue disease related lung disease*
- 2014-2015 Wei Huang, M.D., Ph.D, Research Fellowship and Clinical Observership funded by the State Hospital In Chongqing China. Research and Clinical mentor, *Outcomes of patients with EPAH and HFpEF*

2014-2016	Roza Badreslam, M.D., Erin-Schrodinger-Fellowship, Austrian Science Fund. Research Mentor, post-doctoral research fellowship, <i>Right ventricular remodeling and mitochondrial function</i>
2014-2017	Tamara Roldan Sevilla, Pre-Doctoral Student, Universidad Autónoma De Madrid Facultad De Medicina, Departamento De Medicina, Doctoral Thesis: <i>Safety Evaluation of Oral Anticoagulation in Pulmonary Arterial Hypertension: Observational Study of Patients Followed in Two Pulmonary Hypertension Referral Centers in Spain and United States.</i>
2015-present	Marianna Faria Urbina, M.D., Research Fellowship in pulmonary vascular disease and exercise physiology. Research Mentor, <i>Physiologic assessment of precapillary pulmonary hypertension in the setting of hypoxic lung disease.</i>
2016-present	Inderjit Singh, M.D., Pulmonary Vascular Disease Fellowship, 2 years, Primary Mentor, <i>Evaluation of RV-PA coupling during exercise in patients with Group-2 pulmonary hypertension.</i>
2017-present	Andrew Schissler, M.D., Primary Mentor, Research Mentor, 2 years, <i>Evaluation of outcomes in patients with submassive pulmonary embolism.</i>

Formal Teaching of Peers (e.g., CME and other continuing education courses)

No presentations below were sponsored by outside entities

2002	Bioterrorism Preparedness and Response Harvard Medical School, Continuing Medical Education, Pulmonary Critical Care Postgraduate Course, MGH	Single presentation Cambridge, MA
2002	Bioterrorism Preparedness and Response. Harvard University Wide Health Policy Program Core Seminar Series, Public Health Section, Kennedy School of Government, Harvard University	Cambridge MA
2002	73-year-old woman with Pneumonia and Respiratory Failure. Clinical Pathologic Conference of the Massachusetts General Hospital and Harvard Medical School	Boston, MA
2003	Severe Sepsis and Septic Shock: New Options for Treatment. Anesthesia Critical Care Grand Rounds, Beth Israel Deaconess Medical Center and Harvard Medical School	Boston, MA
2003	Pulmonary Arterial Hypertension, Evaluation and Management. Medical Grand Rounds, Massachusetts General Hospital	Boston, MA
2003, 2004	Fluid Resuscitation in Septic Shock Harvard Medical School, Continuing Medical Education, Pulmonary Critical Care Postgraduate Course, MGH	Single presentation Cambridge, MA
2003, 2004	Severe Sepsis: New Options in the Treatment of Sepsis Harvard Medical School, Continuing Medical Education, Pulmonary Critical Care Postgraduate Course, MGH	Single presentation Cambridge, MA
2003, 2004	Pulmonary Arterial Hypertension Harvard Medical School, Continuing Medical Education, Internal Medicine Postgraduate Review Course, MGH	Single presentation Cambridge, MA
2004	Acute Respiratory Distress Syndrome	Single presentation

	Harvard Medical School Continuing Medical Education, Intensive Review of Internal Medicine, Postgraduate Review Course, Brigham and Women's Hospital	Boston, MA
2004, 2006, 2007,	Fluid Resuscitation in Vasodilatory Shock; Crystalloids versus Colloids	
	Harvard Medical School Continuing Medical Education, Pulmonary Critical Care Postgraduate Course, MGH	Cambridge, MA
2005, 2006, 2007, 2008	Pulmonary Arterial Hypertension: Evaluation and Management	
	Harvard Medical School Continuing Medical Education:	Cambridge, MA
	<ul style="list-style-type: none"> • Internal Medicine Postgraduate Review Course (2005) • Pulmonary Critical Care Postgraduate Course (2008), MGH 	
2006	Update on Therapy in Pulmonary Arterial Hypertension	Single presentation
	Harvard Medical School Continuing Medical Education, Advanced Heart and Lung Disease, MGH	Cambridge, MA
2007	Inflammation and Pulmonary Vascular Remodeling. Harvard Medical School Combined Pulmonary Critical Care Grand Rounds	Boston MA
2007	Evaluation and Management of Pulmonary Arterial Hypertension for the General Internist	Single presentation
	Harvard Medical School Continuing Medical Education, Internal Medicine Postgraduate Review Course, MGH	Cambridge, MA
2007	Simply Speaking - Post Conference Update: American Thoracic Society	
	Pulmonary Arterial Hypertension Educator's CME Lecture Series (Unrestricted Industry Grants)	Boston, MA
2007	Evolving Management of ARDS; Less is Definitely Better. Pediatric Pulmonary Conference, Massachusetts General Hospital	Boston, MA
2008, 2009	Fluid Resuscitation in Shock; Crystalloids and Colloids, is there any difference?	Single presentation
	Harvard Medical School Continuing Medical Education, Pulmonary Critical Care Postgraduate Course, MGH	Cambridge, MA
2009	Pulmonary Arterial Hypertension: Chronic and Acute and Management	Single presentation
	Harvard Medical School Continuing Medical Education, Pulmonary Critical Care Postgraduate Course, MGH	Cambridge, MA
2009	Pulmonary Arterial Hypertension; A Systemic Disease. Rheumatology Grand Rounds, Massachusetts General Hospital	Boston, MA
2009	Systemic Issues in PHT: The View from the Rest of the Body. Congenital Heart Disease-Associated Pulmonary Hypertension: A Two Day "Master Class", Children's Hospital	Boston, MA

- 2010 Pulmonary Arterial Hypertension – Management in the Acute Setting. Anesthesia Critical Care Grand Rounds, Brigham and Women’s Hospital Boston, MA
- 2010 Pulmonary Arterial Hypertension – A Systemic Inflammatory Disease. Cardiovascular Medicine Grand Rounds, Brigham and Women’s Hospital Boston, MA
- 2010 Making the Diagnosis of Pulmonary Arterial Hypertension, It Still Takes too Long, Brigham and Women’s Hospital Boston, MA
- 2011 New Therapies: Targeting The Right Ventricle in PAH. Pulmonary Grand Rounds, Brigham and Women’s Hospital, Boston, MA
- 2012 Pulmonary Hypertension; Controversy in Diagnosis and management. Medical Grand Rounds, Faulkner Hospital, Boston, MA
- 2013 CTEPH – Diagnostic Approaches and Therapeutic Options. Combined Cardiac Surgery and Thoracic Surgery Clinical Conference, Brigham and Women’s Hospital
- 2013 Idiopathic Pulmonary Arterial Hypertension; Clinical Presentation, Diagnosis, Therapy, and Prognosis. Harvard Medical School Continuing Medical Education, Biannual Cardiovascular Medicine Review Course
- 2015 Chronic Thromboembolic Pulmonary Hypertension, Biannual Thrombosis and Thromboembolism Course, Harvard Medical School Continuing Medical Education Brigham and Women’s Hospital, Boston, MA
- 2016 Clinical Case of the Month; 61 year old woman with dyspnea on exertion., Medical Grand Rounds, Brigham and Women’s Hospital, Boston, MA
- 2016 Recent advances in Pulmonary Arterial Hypertension; Translating preclinical studies into clinical practice., Medical Grand Rounds, Brigham and Women’s Hospital, Boston, MA
- 2016 Novel Therapeutic Approaches to the Treatment of Pulmonary Hypertension., Advances in the Practice of Pulmonary and Critical Care Medicine, Harvard Medical School and the Brigham and Women’s Hospital, Boston MA
- 2016 Updates in Pathophysiology, Genetics, and Medical Management of Idiopathic Pulmonary Hypertension, Brigham and Women’s Hospital / Mayo Clinic course: Cardiovascular Medicine Updates 2016: Updates for Practitioners, Harvard Medical School, Boston MA
- 2017 Pulmonary Arterial Hypertension; Clinical Presentation, Diagnosis, and Emerging Therapies., Harvard Medical School Continuing Medical Education, Biannual Cardiovascular Medicine Review Course, Boston, MA
- 2017 Novel Therapeutic Approaches to the Treatment of Pulmonary Hypertension., Second Annual Advances in the Practice of Pulmonary and Critical Care Medicine, Harvard Medical School and the Brigham and Women’s Hospital, Boston MA

Local Invited Presentations

No presentations below were sponsored by outside entities

- 1997 The Pulmonary Artery Catheter; A Technology Assessment.

- Yale University School of Medicine, Connecticut State Chest Conference, New Haven, CT
- 1997 The Pulmonary Artery Catheter Under Fire; Do The Data Support It's Continued Use In The ICU Medical Grand Rounds, Greenwich Hospital, Greenwich, CT
- 1997 Critical Care Update on Mechanical Ventilation. Yale University School of Medicine, Connecticut State Chest Conference, New Haven, CT
- 1999 Protection from oxidant induced lung injury: Modulation of cell death pathways
The John B. Pierce Laboratory, Center for Research in Health and the Environment and Yale University School of Medicine, New Haven, CT
- 1999 Patient with acute onset of dyspnea. Medical Grand Rounds, Yale New Haven Hospital and Yale School of Medicine, New Haven, CT
- 1999 Management of Shock with an emphasis on septic shock. Yale University School of Medicine, Connecticut State Chest Conference, New Haven, CT
- 2001 A patient with rapidly progressive dyspnea and hemodynamic collapse –Medical Grand Rounds, New England Medical Center, Boston, MA
- 2001 27-Week Pregnant Patient with Massive Pulmonary Embolism – Critical Care Management. Yale University School of Medicine, Pulmonary Critical Care Fellowship Clinical Conference, New Haven, CT
- 2004 Chronic Obstructive Pulmonary Disease, Update on Evaluation and Management
Harvard Vanguard Medical Associates, Continuing Medical Education Series, Boston, MA
- 2004 Pulmonary Arterial Hypertension, Evaluation and Management in the 21st Century. Massachusetts Society for Respiratory Care (MSRC) Twenty-Seventh Annual Meeting, Springfield, MA
- 2004 Diagnosis and Management of Pulmonary Arterial Hypertension: ACCP Evidence-Based Clinical Practice Guidelines. What are they? Should we use them? 2nd Annual Update in Pulmonary Hypertension, Boston, MA
- 2007 Inflammatory Mediators and the Pathogenesis of Pulmonary Arterial Hypertension, a New Paradigm. 5th Annual Update in Pulmonary Hypertension, Boston, MA
- 2008 Pulmonary Arterial Hypertension. Massachusetts General Hospital, The Norman Knight Nursing Center for Clinical and Professional Development, Pulmonary Hypertension Education Day, Boston, MA
- 2008 Pathway Directed Therapy, A Look Towards The Future – 6th Annual Update in Pulmonary Hypertension, Boston MA
- 2009 Pulmonary Arterial Hypertension, A Systemic – Inflammatory Disease. The Warren Alpert Medical School of Brown University, Division of Pulmonary, Sleep and Critical Care Medicine, Rhode Island Hospital, Providence, RI
- 2010 Cancer Chemotherapies: Role in PAH? 7th Annual Update in Pulmonary Hypertension
Boston, MA
- 2011 Non-Group-1 Pulmonary Hypertension, Evaluation and Management. Combined Pulmonary and Cardiology Conference, Mount Auburn Hospital, Cambridge, MA

- 2011 Unexplained shortness of breath; A systematic approach to evaluation in women vs. men. Women's Health CME Course, Brigham and Women's / Massachusetts General Hospital and Harvard Medical School, Foxborough, MA
- 2011 PAH, Clinical Presentation, Diagnosis, and Therapy. Combined Cardiology and Pulmonary Grand Rounds, South Shore Hospital, Weymouth MA
- 2011 Pulmonary Hypertension, Definition, Presentation, Diagnosis, and Therapy. Combined Cardiology and Pulmonary Grand Rounds, Leonard Morse – Metro West Medical Center, Natick MA
- 2012 Cellular Respiration: Advances in Therapeutic Targeting in PH. Pulmonary Research Seminar, Tufts University School of Medicine, Tufts Medical Center, Pulmonary Critical Care Division, Boston, MA
- 2013 Unexplained Dyspnea; A Systematic Approach to Evaluation. Medical Grand Rounds, Melrose Wakefield Hospital, Melrose, MA
- 2014 Pulmonary Arterial Hypertension: Diagnostic Approach and Treatment. Spaulding Rehabilitation Hospital, Cambridge MA
- 2014 Improving Outcomes in Pulmonary Heart Disease: Diagnostic Approach and Treatment. Medical Grand Rounds, Beth Israel Deaconess Medical Center - Needham, Needham, MA
- 2014 Practical Management of PAH: A Case-Based Approach. Prima Care Medical, Pulmonary Medicine, Fall River, MA
- 2014 Improving Outcomes in Pulmonary Heart Disease; Diagnostic Approach and Treatment. Medical Grand Rounds, Good Samaritan Hospital, Brockton, MA
- 2014 Non-Group-1 Pulmonary Hypertension, Ignored but not Forgotten. Medical Grand Rounds, Saint Elizabeth's Medical Center, Boston, MA
- 2014 Improving Outcomes in Pulmonary Vascular Disease; Sometimes it is a Zebra. Medical Grand Rounds, Lowell General Hospital, Lowell, MA
- 2014 Prostaglandin Pathway – New Drugs and Approaches. 12th Annual Update in Pulmonary Hypertension, Boston, MA
- 2016 Unexplained Dyspnea; Diagnosis based on physiology., Harvard University Health Services, Grand Rounds, Cambridge, MA
- 2017 Explaining unexplained exertional dyspnea., Medical Grand Rounds, Metrowest Medical Center, Natick, MA

Report of Regional, National and International Invited Teaching and Presentations

Invited Presentations and Courses

Regional

No presentations below were sponsored by outside entities

- 1997 Interleukin-11 Protection from Hyperoxic Lung Injury - Connecticut Thoracic Society, 1997 Connecticut Lung Research Conference, Meriden, CT
- 2001 Update on Therapy for Pulmonary Hypertension - Yale University School of Medicine, Connecticut State Chest Conference, New Haven, CT

- 2002 Therapy for Pulmonary Artery Hypertension in the 21st Century –Medical Grand Rounds
The North Shore Medical Center, Salem Hospital, Salem, MA
- 2002 National Asthma Education and Prevention Program, Update on Asthma Therapy –
Medical Grand Rounds, Caritas Norwood Hospital, Norwood, MA
- 2003 Spirometry and Asthma – Lung Update Series, American Lung Association of Greater
Norfolk County Norwood, MA
- 2003 Community Acquired Pneumonia: Epidemiology, Diagnosis, and Management – Medical
Grand Rounds, Caritas Saint Anne’s Hospital, Fall River, MA
- 2003 Community Acquired Pneumonia: Diagnosis and Management – Medical Grand Rounds
New England Sinai Hospital and Rehabilitation Center, Stoughton, MA
- 2004 Chronic Obstructive Pulmonary Disease, Evaluation, Management, and Treatment –
Medical Grand Rounds, Veterans Administration Hospital, Togus, ME
- 2006 Management of ARDS: Less May Be Better – Medical Grand Rounds, Newton-Wellesley
Hospital, Newton, MA
- 2008 Pulmonary Hypertension, Controversies in Management – Medical Grand Rounds,
Newton-Wellesley Hospital, Newton, MA
- 2008 Treatment of Pulmonary Hypertension: Approach to the Patient Who Worsens on Therapy
– 3rd Annual Update on Pulmonary Hypertension, Brown University School of Medicine,
Rhode Island Hospital, Providence, RI
- 2009 Pulmonary Arterial Hypertension; A Systemic Disease – 12th Annual Yale Pulmonary
Critical Care Alumni Lecture, New Haven CT
- 2009 Pulmonary Arterial Hypertension, Update on Evaluation and Management – Medical
Grand Rounds, Hospital of Saint Raphael’s, Yale School of Medicine, New Haven, CT
- 2010 Pulmonary Arterial Hypertension: Management Of PAH In The Acute Setting – What Do
You Do When The Patient Is Decompensating – Pulmonary Critical Care Fellows
Conference, Division of Pulmonary Critical Care Medicine, Yale University School of
Medicine
- 2010 Pulmonary Arterial Hypertension, A Systemic - Inflammatory Disease – Connecticut State
Chest Conference Yale University School of Medicine
- 2012 Improving Outcomes in Pulmonary Hypertension; Diagnostic Approaches and
Therapeutic Options. Medical Grand Rounds, Memorial Hospital, Pawtucket, RI
- 2013 Innovation in Targeting Pulmonary Heart Disease. Connecticut State Chest Conference,
Yale University School of Medicine, New Haven, CT – Visiting Professor Spring 2013
- 2013 Inflammation – Playing a Central Role in Pulmonary Heart Disease. Pulmonary Critical
Care Research Conference, Yale University School of Medicine, New Haven, CT –
Visiting Professor Spring 2013
- 2013 Improving Outcomes in Pulmonary Hypertension; Diagnosis and Treatment. Medical
Grand Rounds, Berkshire Medical Center, Pittsfield, MA
- 2014 Improving Outcomes in Pulmonary Heart Disease: Diagnostic Approach and Treatment.
St. Vincent’s Hospital, Worcester, MA
- 2014 Making Therapy Decisions in Individual PAH Patients: Balancing Efficacy, Safety and
Tolerability. Cardiology Seminar, Hartford Cardiology Associates, New Haven, CT

- 2014 Improving Outcomes in Pulmonary Heart Disease: A Pathophysiologic Approach. Medical Grand Rounds, University of Massachusetts, Worcester, MA
- 2014 Long-term Management of Patients with PAH. Adult Medicine Noon Conference, Community Health Services, Hartford, CT
- 2016 Exercise Induced Pulmonary Hypertension; Is it a real disease? Cardiology Grand Rounds, Yale University School of Medicine, New Haven, CT
- 2016 Chronic Thromboembolic Disease and Chronic Thromboembolic Pulmonary Hypertension., Medical Grand Rounds, Department of Internal Medicine, Hartford Hospital, Hartford CT
- 2016 Chronic Thromboembolic Pulmonary Hypertension – Evaluation and Management., Heart and Vascular Center Grand Rounds, Dartmouth Medical Center, Hitchcock NH
- 2017 Pulmonary Arterial Hypertension; Clinical Presentation, Diagnosis, and Emerging Therapies., Medical Grand Rounds, Gaylord Hospital, Wallingford CT
- 2018 Explaining unexplained exertional dyspnea: Application of the full Fick Principle., 29th Annual Samuel Frumkin Lecture, Medical Grand Rounds, Norwalk Hospital, Norwalk CT

National

No presentations below were sponsored by outside entities

- 1998 Modulation of acute lung injury in transgenic mice.
New York Academy of Sciences and The Inflammation Research Association, Joint Meeting on Cytokines and Chemokines in Pulmonary Disease, New York, NY
- 1998 Targeted lung expression of interleukin-11 enhances murine tolerance of 100% oxygen and diminishes hyperoxia-induced DNA fragmentation.
Thomas L. Petty Aspen Lung Conference, 41st Annual Meeting, Aspen CO
- 2001 IL-6 type cytokines protect from hyperoxic acute lung injury.
University of Rochester School of Medicine Lung Biology Research Program, Rochester, NY
- 2001 Workup and Management of Pulmonary Hypertension – City Wide Pulmonary Grand Rounds, University of Rochester School of Medicine, Rochester, NY - City Wide Pulmonary Grand Rounds
- 2005 Cytokines and Organ Injury; Rethinking Old Concepts – Pulmonary Critical Care Training Program, Critical Care Grand Rounds, Denver Health Medical Center, University of Colorado, Denver, CO
- 2006 Assessing the Evidence: Clinical Applications of Therapeutic Interventions in the Treatment of PAH - American College of Chest Physicians, Chest 2006, October 23, 2006 Satellite Symposium on Pulmonary Arterial Hypertension in 2006: Treating to Goal
- 2007 Pulmonary Arterial Hypertension: Current Controversies in Management – Combined Pulmonary, Cardiology, and Rheumatology Grand Rounds, Dekalb Hospital, Atlanta GA
- 2007 Pulmonary Arterial Hypertension: Current Controversies in Management – Medical Grand Rounds, Northside Hospital, Atlanta GA
- 2007 Inflammation and Pulmonary Vascular Remodeling - Cleveland Clinic Pulmonary Hypertension Summit 2007, Translating Discoveries into Patient Care, Cleveland, OH

- 2008 Treatment Decisions in the Complex Patient with PAH – Cardiology Grand Rounds, Carolinas Medical Center, Carolinas Heart Institute, Charlotte, NC
- 2008 Pulmonary Arterial Hypertension: Management in the Acute Setting – Critical Care Medicine for the Hospitalist, Society of Hospital Medicine One Day University Baltimore, MD
- 2010 Diagnosis to Treatment: Facing the Challenges of Pulmonary Arterial Hypertension. Clinical Case Challenge. <http://cmecorner.articulate-online.com/p/6103578089/DocumentViewRouter.ashx?Cust=61035&DocumentID=8f33d44d-07d5-4e9b-ae3c-6d53133c9688&Popped=True&InitialPage=quiz.html>
- 2011 PAH: Clinical Presentation, Evaluation, and Treatment, an Update for 2011. Internal Medicine Grand Rounds, Northside Hospital, Atlanta GA
- 2011 Exercise Induced Pulmonary Arterial Hypertension; Does it exist and what does it mean? Baltimore Right Heart Failure Summit, University of Maryland School of Medicine, Baltimore, MD
- 2011 The Right Ventricle as Victim of Heart Failure Preserved Ejection Fraction. Heart Failure Society of America, Boston, MA
- 2012 Cellular Respiration: Targeting Metabolism in PH. Pulmonary Critical Care Grand Rounds, University of Pittsburgh Medical Center, Pittsburgh PA.
- 2013 Pulmonary Hypertension; Diagnosis and Treatment. Combined Pulmonary and Cardiology Rounds. Northside Hospital Pulmonary Hypertension Conference, Atlanta GA
- 2013 Improving Outcomes in Pulmonary Hypertension; Diagnostic Approach's & Treatment. Medical Grand Rounds, Lankenau Medical Center, Jefferson Medical College, Philadelphia PA
- 2013 Form Follows Function: Understanding the Structural Basis on Pulmonary Arterial Hypertension. Heart Failure Society of America Annual Meeting, Orlando FL
- 2013 Regenerative Medicine: Are Opportunities Growing? Pulmonary Hypertension Association Pulmonary Hypertension Professional Network Symposium, Arlington VA
- 2014 Unexplained shortness of breath; A systematic approach to evaluation, Pulmonary Grand Rounds, Stanford University School of Medicine, Palo Alto, CA
- 2015 Explaining unexplained dyspnea. Pulmonary Critical Care Grand Rounds, Division of Pulmonary Critical Care Medicine, University of North Carolina School of Medicine, Chapel Hill, NC
- 2015 Exercise Induced Pulmonary arterial hypertension; What is it? And what do we do about it? 7th North Carolina Research Triangle Pulmonary Hypertension Symposium, Joint Symposium sponsored by Duke University and University of North Carolina Schools of Medicine, Durham, NC
- 2016 Exercise in the Diagnosis of Patients without/maybe with/with Pulmonary Hypertension. The Alfred P. Fishman Symposium: Exercise in the Diagnosis, Assessment and Treatment of Pulmonary Hypertension. University of Pennsylvania School of Medicine, Philadelphia PA.

- 2016 How should we standardize proteomic approach for phenotyping? Proteomic & Genomic Deep Phenotyping in Pulmonary Arterial Hypertension, Stanford University, Palo Alto, CA
- 2016 Invasive-CPET: Dynamic Assessment of Cardiovascular, Respiratory, and Metabolic Function During Exercise, Cardiopulmonary Exercise Testing Course September 2016, American College of Chest Physicians Global Headquarters, Glenview, IL
- 2016 CTEPH: predicting who is at risk and how to follow patients after a PE., Venous Thromboembolism Symposium, The Difficult Questions Re-Visited 2016 A Global Perspective., Lankenau Medical Center, Philadelphia PA
- 2017 Invasive Exercise Testing; The full Fick equation., Cardiopulmonary Exercise Testing Course September 2017, American College of Chest Physicians Global Headquarters, Glenview, IL
- 2018 Invasive cardiopulmonary exercise testing to predict outcomes in heart failure preserved ejection fraction. University of Utah Cardiac Recovery Symposium, University of Utah School of Medicine, Salt Lake City, UT
- 2018 Treprostinil Administered Using a Fully Implantable Programmable Intravascular Delivery System. Intermountain Medical Center, Murray UT
- 2018 Unexplained exertional intolerance: Dynamic assessment of cardiopulmonary and metabolic function during invasive exercise testing., Lung Force Expo, Loma Linda University School of Medicine, and The American Lung Association, Loma Linda, CA
- 2018 Totally Implantable Subcutaneous Devices for Continuous Prostanoid Delivery., University of California, San Francisco's 11th International Conference, Neonatal & Childhood Pulmonary Vascular Disease, San Francisco, CA

International

Those presentations below sponsored by outside entities are so noted and the sponsor is identified.

- 1998 Etiology and Treatment of Acute Lung Injury: From Bench to Bedside – IL-6 type cytokine protection from lung injury. NATO Advanced Study Institute, Corfu, Greece
- 1999 IL-6 type cytokine protection in hyperoxic lung injury – Symposium on Basic and Clinical Aspects of Apoptosis in the Lung, American Thoracic Society, International Conference, San Diego, CA
- 2000 Current Management of Pulmonary Hypertension American Thoracic Society, International Conference, Toronto, Ont
- 2003 Transgenic Investigations of Apoptosis in Acute Lung Injury – Symposium on Mechanisms of Apoptosis During Acute Lung Injury, American Thoracic Society, International Conference, Seattle, WA
- 2008 Diagnosis and Evaluation of Pulmonary Arterial Hypertension: What Do We Really Need to Know? – Chairperson and Organizer, American Thoracic Society Toronto, Ontario Evening Postgraduate Seminar. Seminar focuses on diagnostic tools used to evaluate pulmonary arterial hypertension (PAH) in clinical practice and in clinical trials.
- 2009 Inflammation in Pulmonary Hypertension and Pulmonary Vascular Remodeling – Session Chair, American Thoracic Society International Conference, San Diego, California

- 2009 Practical Solutions to Modern Clinical Dilemmas: PAH Case Studies. The Case of a Patient With Poor Functional Class and Prognosis. Symposium on Prostacyclins in Treatment of PAH. European Respiratory Society, International Conference, Vienna Austria (United Therapeutics)
- 2010 Inflammation And Bone Marrow Derived Cells In Pulmonary Arterial Hypertension Session Chair, American Thoracic Society International Conference, New Orleans, LA
- 2010 IL-6 and Pulmonary Arterial Hypertension. The 11th International Workshop on Scleroderma Research, Boston, Massachusetts
- 2011 IL-6 in PAH; Downstream targets for therapy. Pulmonary Vascular Research Institute Workshop and Debates, Panama City, Panama
- 2011 New Therapies: Advances in Targeting, The Right Ventricle as a Therapeutic Target in PAH. Symposium on Pulmonary Hypertension: new targets, new goals, and new therapies. European Respiratory Society, International Conference, Amsterdam, Netherlands (Bayer Healthcare)
- 2012 Survival data and results of most relevant clinical trials. Teach in Seminar: Basics of Pulmonary Hypertension: Classification, Definitions, and Management, Pulmonary Vascular Research Institute International Conference, Cape Town South Africa
- 2012 Be it resolved. The most important target of therapy in advanced WHO category 1 Pulmonary Hypertension is the right ventricle. Right ventricular pathobiology in pulmonary vascular disease. Pulmonary Vascular Research Institute International Conference, Cape Town South Africa
- 2012 Targeting Mitochondria and Metabolism in Pulmonary Hypertension and Right Heart Failure. Chinese Heart Congress 2012, Beijing, China
- 2012 Any news from the right ventricle? Innovative therapy for the RV. 5th Annual Central European Pulmonary Hypertension Conference, Salzburg, Austria
- 2013 The Role of Inflammation in PAH – Possible Inflammatory Pathways Causing PAH. Pulmonary Vascular Research Institute International Conference, Istanbul, Turkey
- 2013 Exercise training and rehabilitation in patients with PH, safe and effective. Pulmonary Vascular Research Institute International Conference, Istanbul, Turkey
- 2013 Inflammation – Playing a Central Role In Pulmonary Arterial Hypertension. Invited speaker for the Annual Meeting of the International Society of Heart Lung Transplantation, Montreal Quebec, Canada
- 2013 The Roll of Inflammation in Pulmonary Arterial Hypertension. Pulmonary Hypertension from Bench to Bedside, Post Graduate Course, American Thoracic Society International Conference, Philadelphia, PA
- 2013 Right Ventricular Metabolic Shift And Ischemia In Pulmonary Arterial Hypertension. Session Chair, American Thoracic Society International Conference, Philadelphia, PA
- 2013 Initiating the right prostanoid, in the right patient at the right time. Symposium on Changing the parenteral paradigm – Keeping prostanoids front and centre in PAH management thinking. European Respiratory Society, International Conference, Barcelona, Spain (United Therapeutics)
- 2014 Chronic Altitude Sickness. Pulmonary Vascular Research Institute International Conference, Bad Nauheim, Germany
- 2014 Prostacyclin Therapy for PAH; Choosing the right prostanoid at the right time in the right person. Chinese Medical Doctors Association, Cardiovascular Section, Guangzhou, China (Lee's Pharmaceuticals)

- 2014 Prostacyclin Therapy for PAH; Choosing the right prostanoid at the right time in the right person. Chinese Medical Doctors Association and the Fuwai Cardiovascular Hospital, Beijing, China (Lee's Pharmaceuticals)
- 2014 Combination Treatment for PAH: What is the evidence telling us so far? Right Heart Failure Summit and American Heart Association joint meeting, Chicago IL
- 2016 Assessing heart function in patients with early to advanced pulmonary vascular disease. PH Global Science Forum 2016, Berlin Germany (Bayer Pharmaceutical)
- 2016 Abnormal Transpulmonary Metabolite Flux In Exercise Induced Pulmonary Arterial Vasculopathy., American Thoracic Society International Conference, San Francisco, CA
- 2016 Pulmonary Arterial Hypertension; Clinical Presentation, Diagnosis, and Approach to Therapy., Department of Cardiology, Chongqing Medical University, Chongqing China
- 2016 Recent advances in Pulmonary Arterial Hypertension; Translating preclinical studies into clinical practice., Long March Cardiovascular Conference, Fuwai Hospital, Beijing China
- 2016 Clinical Trials for Exercise Pulmonary Hypertension Are Warranted, 3rd International Drug Discovery & Development Symposium, PVRI/FDA/NIH Bethesda MD
- 2016 Unexplained Exertional Intolerance; A systematic approach to diagnosis., Respiratory Medicine Conference, The Royal Brompton Hospital, London England
- 2017 Twenty Years of Therapy for PAH; Where are we now, and where are we headed., PAH Symposium La Sociedad Cubana De Cardiologia and Hospital Hermanos Ameijeiras, Havana Cuba
- 2017 Imaging the Right Ventricle During Exercise, Pulmonary Vascular Research Institute International Conference, Miami FL
- 2017 Is there a therapeutic opportunity for prostacyclins in patients with PH secondary to primary pulmonary disease? 12th John Vane Memorial Symposium on Prostacyclin Science and Pulmonary Vascular Disease, 17th and 18th March 2017 at the Royal Society London, United Kingdom
- 2017 Practical use of different methods of exercise testing in PH, including 6-minute walk test, cardiopulmonary exercise test, and treadmill exercise., Berlin Pulmonary Hypertension Symposium, Berlin Germany (Bayer and Merck Sharp and Dohme)

Report of Clinical Activities and Innovations

Current Licensure and Certification

- 1993 Massachusetts State License (77804)
- 1993 National Board of Examiners, Diplomat
- 1994 Connecticut state License (inactive as of 2/2002)
- 1995 American Board of Internal Medicine, Diplomat (Recertified 2015)
- 1997 American Board of Internal Medicine, Diplomat in Pulmonary Disease (Recertified 2007)
- 1998 American Board of Internal Medicine, Diplomat in Critical Care (Recertified 2008)
- 2009 Utah State License

Practice Activities

- 2009 - Ambulatory Care Watkins Clinic, Brigham and Women's Hospital 2 sessions/week

Clinical Innovations

1. **Bronchoscopy Credentialing Guidelines for YNHH (1998)**– developed clinical guidelines for credentialing for the practice of Bronchoscopy at Yale New Haven Hospital. Prior to this there were no prepared standards for the hospital. As part of this guideline I instituted maintenance of privileges standards and a record keeping system.
2. **Community Acquired Pneumonia Clinical Practice Guideline, YNHH (1999)** – As part of a hospital-working group, I helped develop guidelines for Yale New Haven Hospital for diagnosis and treatment of community acquired pneumonia.
3. **Pulmonary Vasodilator Clinical Practice Guideline YNHH (1999)** – Developed clinical practice guideline for acute pulmonary vasodilator testing. This was first developed at Yale New Haven Hospital. This was revised and implemented at MGH (2001) and continued now at the BWH (2010).
4. **Ventilator Weaning Protocol, T-NEMC (2001)** – Developed guidelines and instituted a protocol based approach to liberating patients from mechanical ventilation at Tufts-New England Medical Center MICU.
5. **Right heart catheterization and invasive cardiopulmonary exercise testing Clinical Practice Guideline, MGH (2004)** – Developed procedure guideline for all aspects of right heart catheterization and acute pulmonary vasodilator testing. Also developed guidelines regarding placement of right heart catheters and radial arterial lines for invasive cardiopulmonary exercise testing. These guidelines have formed the basis for a new clinical exercise-testing program at the BWH (2010).
6. **Intravenous Prostacyclin Clinical Practice Guideline, MGH (2006)** – Developed clinical protocol for continuous delivery of intravenous prostacyclins for patients with pulmonary hypertension. This was initially developed for patients at the MGH. In November 2011 this was updated for use at the BWH and for new pump technologies.
7. **Exercise Training Clinical Practice Guideline, MGH (2006)** – Developed a guideline for starting exercise rehabilitation programs in patients with PAH. This was initially designed for our clinical practice. Through involvement in national committee's on practice guidelines for patients with PAH, we have contributed components of this guideline to the formulation of a national guideline. These guidelines have been updated recently based on data that we have generated in our exercise laboratory.
8. **Cicletanine for treatment of PAH (2006)** - Evaluated the use of a novel eNOS coupler for treatment of PAH as part of a compassionate use program. Compound was acquired by Gilead Sciences and has now entered Phase II clinical trial. Steering Cmt. Chairman, Study Sponsor: Gilead Sciences. The initial work on this project has been published, see research publication #20.
9. **Sepsis Management Clinical Practice Guideline, MGH (2007)** – Led a working group that developed practice guideline for management of severe sepsis and septic shock in the ICU at MGH. As part of this program I oversaw the development of a computer ordering admission template for template for patients admitted to the ICU with severe sepsis and septic shock.
10. **Mechanical Ventilation Clinical Practice Guideline (2008)** – Developed a best practice approach to liberating patients from mechanical ventilation. This was presented to a national working group and portions of our guidelines were adapted into a national multicenter guideline for determining readiness for liberation from mechanical ventilation. Work related to this effort was published, see research publication #19.

11. **Implantable Drug Delivery System of Treprostinil in PAH (2009)** - Proposed use of Medtronic Synchronmed pump as part of a fully implantable IV drug delivery system. Steering committee member designing device trial supported by Medtronic's and United Therapeutics, see research publication #s 53 and 60
12. **CTEPH Clinical Program, BWH (2011)**– Developing a systematic approach to the patient with chronic thromboembolic pulmonary hypertension in consideration for surgical or medical therapy. This program is being developed as a multispecialty approach to the evaluation and treatment of patient with both surgical and medical thromboembolic disease.
13. **Dyspnea and Performance Evaluation Center (2011)** - successful clinical innovation grant to develop a clinical program for the efficient evaluation and diagnosis of patients with unexplained dyspnea. This was a collaborative program with participants from Pulmonary and Cardiovascular Medicine, Radiology, and Neurology. This included the establishment of a structured multilevel cardiopulmonary exercise evaluation program. Work related to this effort was published, see research publication #s 38, 46, 48, 49, 52, 56, 57, 60, 61, 64, and 69
14. **First in human percutaneous Potts Shunt as salvage therapy for PAH and right heart failure (2013)** – Working as a member of the RV Salvage group, a collaborative team of physicians from the Brigham and Women's Hospital and Boston Children's Hospital developed a percutaneous descending aorta-left main pulmonary artery conduit to unload the failing right ventricle. Work related to this effort has been published, see research publication #34
15. **Acute Pulmonary Embolism Program at BWH (2014)**. Program designed to improve triage and optimize timely management of patients presenting to the ED with Acute Pulmonary Embolism. This is a multidisciplinary program and members of the Cardiovascular Division (Vascular Medicine, CCU, Interventional Cardiology), Pulmonary Vascular Medicine, Cardiac Surgery, and Cardiovascular Imaging are also involved.
16. **Center for Pulmonary Heart Disease (2014)**. Executive Director and organizer of the first center of its kind in the country, the Center brings together BWH experts in both lung and cardiac disease to tackle pulmonary heart diseases from all possible angles. The center's clinical programs are closely tied to its translational research platform, bringing findings made in the laboratory to the clinic, and then back to the laboratory for further improvement.
17. **Advanced Fellowship in Pulmonary Heart Disease (2014)**. The program focuses on the evaluation and management of patients with diseases of the right heart system including pulmonary vascular disease, congenital heart disease, and end stage lung disease. The program provides trainees with several unique clinical opportunities that are not available in most centers across the country and provide more in depth and focused training than what is provided in general Pulmonary and Critical Care Medicine and Cardiovascular training programs.
18. **PHA-Accredited Pulmonary Hypertension Care Center (2015)**. BWH pulmonary vascular disease program, under my direction, was formally accredited by the Pulmonary Hypertension Association after undergoing a thorough evaluation based on quality and depth of resources available for the expert care of patients with pulmonary vascular disease.

Report of Education of Patients and Service to the Community

Activities

2006	Pulmonary Hypertension Association 6 th International Conference
	Chaired patient education forum on prostacyclin's - Prostacyclin treatment options
2006	Developed educational pamphlet for patients who are undergoing right heart catheterization at the MGH. This is being adapted now for distribution at the BWH
2008	Pulmonary Hypertension Association 7 th International Conference

- Discussant - Patient education forum on clinical lab testing as part of the care of patients with PAH - The ABC's of BNP (and Other PH Test Results)
- 2009 PHA 30-City Tour Medical Education Program
Information on PAH diagnosis and management to physicians and other health professionals located in areas without nationally recognized PAH centers
- 2009 Pulmonary Hypertension Patient PHorum
Patient education forums held around the United States and sponsored by the Pulmonary Hypertension Association
- 2009 - Volunteer Physician for Snowbird Ski Patrol / Wasatch Mountain Rescue
Physician first responder on Ski patrol and backcountry rescue for Snowbird Utah and Wasatch Mountain Rescue – 10 shifts per season
- 2009 - Continuing education lecturer, Snowbird Ski Patrol and Wasatch Mountain Rescue
Physician speaker for continuing education program, 4 lectures per year
- 2010 Pulmonary Hypertension Association 8th International Conference
Discussant – Managing emergency situations for care givers and patients with PAH
- 2012 Pulmonary Hypertension Patient Support Group – Taking control of your pulmonary hypertension treatment – A question and answer session for patients and caregivers. Seabrook NH
- 2015 Established and organized a community outreach program for the Roxbury Tenants of Harvard Community with focus on improving health in heart and lung disease, and diabetes. This is an ongoing program that includes health screening and education.
- 2016 Pulmonary Hypertension Association 10th International Conference
Panel Discussant – Living with a chronic disease
- 2017 Appointed to the Governors Pulmonary Hypertension Task Force, Massachusetts General Laws Chapter 6A, Section 16Z
- 2017 Exercise and exercise testing. Teen Talent ID Camp, USA Cycling's National Development Program, Amherst MA

Educational Material for Patients and the Lay Community

Books, monographs, articles and presentations in other media

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| 2005 | Patient Care Manual | Massachusetts General Hospital | Patient care manual detailing guidelines on initiating treatment, side effect management, Hickman catheter care, and management of line infections |
| 2008 | Pulmonary Arterial Hypertension, Diagnostic Challenges and Selecting Optimal Therapy | MedScape CME | http://cme.medscape.com/viewprogram/17133 |
| 2012 | Shortness of breath, lung disease and pulmonary hypertension | Massachusetts Senior Action Council | Invited by the MSAC to present to the council and provide a question and answer period for members because of high prevalence of lung and vascular disease among seniors |

2016	Chapter 7-More on PH Drugs	Patients Survival Guide – 5 th Edition	Book developed for patients and care givers by the Pulmonary Hypertension Association, covers all aspects of living with the disease
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Recognition

2005-2018	Best Doctors in America	Castle Connelly Medical, Ltd.
2007-2009	Best Doctors in Boston	Boston Magazine
2016-2018	Best Doctors in Boston	Boston Magazine

Report of Scholarship

Peer reviewed publications in print or other media

Research Investigations:

1. Klemm WR, Sherry CJ, Sis RF, Schake LM and **Waxman AB**. (1984) Evidence of a role for the vomeronasal organ in social hierarchy in feedlot cattle. Applied Animal Behavior Science 1980; 12:53-62
2. Higgins D, **Waxman AB**, and Banker GA. The distribution of microtubule-associated protein 2 changes when dendritic growth is induced in rat sympathetic neurons in vitro. Neuroscience 1988; 241:583-92 PMID: 3362354
3. **Waxman AB**, Goldie SJ, Brett-Smith H, Matthay RA. Cytomegalovirus as a Primary Pulmonary Pathogen in AIDS. Chest 1997; 111:128-34 PMID: 8996006
4. **Waxman AB**, White K, Trawick DR. Electromechanical dissociation following verapamil and propranolol ingestion: a physiologic profile. Cardiology 1997; 8:478-82 PMID: 9286512
5. Goldie SJ, **Waxman AB**. Cytomegalovirus as a Pulmonary Pathogen. Chest 1997; 112:1151
6. **Waxman AB**, Einarsson O, Seres T, Knickelbein RG, Homer R, Warshaw JB, Johnston R, Elias, JA. Targeted lung expression of interleukin-11 enhances murine tolerance of 100% oxygen and diminishes hyperoxia-induced DNA fragmentation. Journal of Clinical Investigation 1998; 101:1970-82 PMID: 9576762
7. **Waxman AB***, Ward N*, Homer R, Du Y, Mantel L, Elias JA. IL-6 induced protection in hyperoxic acute lung injury, American Journal of Respiratory Cell and Molecular Biology 2000; 22:535-542 PMID: 10783124 *Co-First authorship
8. Corne, J, Chupp G, Lee GG, Homer RJ, Zhu Z, Chen Q, Ma B, Du Y, Mc Ardle J, **Waxman AB**, Elias JA. IL-13 stimulates vascular endothelial cell growth factor and protects against hyperoxic acute lung injury. Journal of Clinical Investigation 2000; 106:783-91 PMID: 10995789
9. **Waxman AB**, Zhu Z, Lee CG, Elias JA. Transgenic Modeling of Mechanisms of Protection in Acute Lung Injury, Matalon S, Sznajder JI, editors. NATO ASI Series, Etiology and Treatment of Acute Lung Injury: From Bench to Bedside. BV Amsterdam, Netherlands: IOS Press, NATO Science Series, Series 1 January 2000; 336:140-51
10. **Waxman AB**, Mahboubi K, Knickelbein RG, Mantel L, Manzo ND, Pober JS, Elias JA, Interleukin-11 and interleukin-6 protect cultured human endothelial cells from H2O2-induced cell death. American Journal of Respiratory Cell and Molecular Biology 2003; 29:5513-522 PMID: 12730073

11. He CH, **Waxman AB**, Lee CG, Link H, Rabach ME, Ma B, Chen Q, Zhu Z, Homer R, and Elias JA. Bcl-2-related protein A1 is an endogenous and cytokine-stimulated mediator of cytoprotection in hyperoxic acute lung injury. *Journal of Clinical Investigation* 2005; 115:1039-48 PMID: 15841185
12. Chetty A, Manzo N, **Waxman AB**, Nielsen HC. Modulation of IGF-binding protein-2 and -3 in hyperoxic injury in developing rat lung. *Pediatric Research*, 2005; 58(2): 222-28 PMID: 16055936
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