

American Thoracic Society Foundation

PULMONARY AND CRITICAL
CARE MEDICINE

DOMAS R. MD, M2

Research



Research
Program

“Science knows no country because knowledge belongs to humanity and is the torch which illuminates the world.”

—Louis Pasteur



Founded in 1905 as the American Sanatorium Association, the American Thoracic Society was formed by physicians working on the treatment of tuberculosis. Thanks to their collaborative spirit, TB became a treatable and preventable disease. Now, more than a hundred years later, the ATS continues to be at the forefront of international efforts to advance respiratory medicine and is committed to conquering lung disease, critical illness, and sleep disorders through research, education, and advocacy.

In 2004, the American Thoracic Society launched the ATS Foundation to fund science of the highest caliber and foster the development and training of future leaders in science and biomedical research. Through two-year grants and mentored fellowships, the Foundation encourages promising early career investigators to devote their talents to the study of respiratory disease, critical care, and sleep disorders. Since its founding, the Foundation has awarded nearly \$10 million to more than 100 talented emerging researchers from around the world.

Introduction

Respiratory disorders such as chronic obstructive pulmonary disease (COPD), lung cancer, sleep disorders, and acute lung injury represent an enormous health care burden worldwide. With stagnant funding, and in some cases decreased funding from both government and private philanthropy, competition for research support has become fierce—all the more so for scientists at the beginning of their careers. Without a strong global pipeline of early career scientists leading the way, progress in the treatment, diagnosis, and prevention of respiratory disease will falter.

In response to these challenges, the ATS Foundation partners with individuals, industry, patient advocacy groups, and private foundations to support the funding of high-impact research performed by early career investigators in respiratory, critical care, and sleep medicine. The results of our efforts have been astounding:

- Our investigators have attracted nearly \$90 million dollars in subsequent grant funding, published hundreds of articles relevant to their ATS Foundation awards, and have, in turn, become research mentors.
- Our investment in researchers in developing countries helps talented researchers in resource-poor countries contribute to the global battle against lung disease. Their work will improve understanding of the burden of lung disease in isolated and poor populations throughout the world.
- Together with our partners, we have provided \$4,185,000 towards advancing treatments for patients with rare diseases, for which federal support is extremely limited.

In spite of these successes, many promising investigators' proposals—and therefore many promising scientific leads—have gone unfunded, as the demand for support outstrips our ability to provide funds. Each year, only 10 percent of letter of intent applicants obtain grant funding. Furthermore, in our 2010 and 2011 grant review cycles, 34 percent of excellent proposals were unfunded because of the absence of financial resources.*

In response, the Foundation is stepping up its efforts to identify and invite the active involvement of leading philanthropists, charitable foundations, corporations, existing and new partners, and the ATS membership. Because the American Thoracic Society supports the Foundation's administrative expenses, all money contributed to the ATS Foundation Research Program funds research. Therefore, donors can be confident that every dollar is an investment towards discovery.

Sincerely,



James D. Donohue
James D. Donohue, MD
Chair
Foundation of the ATS



Jesse Roman
Jesse Roman, MD
Chair
ATS Scientific
Advisory Committee
2011-2012

The Global Burden of Lung Disease

Lung disease takes many forms. Most people are familiar with asthma, lung cancer, pneumonia, tuberculosis, and cystic fibrosis. But there are many other lung diseases that are not as well known—pulmonary fibrosis, pulmonary hypertension, bronchiolitis obliterans, acute respiratory distress syndrome, Hermansky-Pudlak Syndrome, among them—which are equally devastating.

Individually and collectively, diseases of the lung do not receive the attention or research dollars they deserve, given their prevalence and the burden they impose on patients and their families.

Today, the Foundation’s ultimate goal is to eliminate the many lung, critical care, and sleep-related illnesses that shorten or diminish lives. The pages that follow highlight how the ATS Foundation Research Program is uniquely situated to make enormous progress in reversing these disease trends. To succeed in our efforts, we must have a strong research enterprise—here in the United States and around the world—and your support.



The ATS Foundation has provided grant support to investigators throughout the world to combat the universal burden of lung disease. Markers reflect number of grants awarded by country between 2002–2011.

Global Burden of Lung Disease

- Respiratory disease kills more than 400,000 Americans each year, making it the third-leading cause of death in the United States.
- Lung cancer is the leading cause of cancer-related deaths in the United States and worldwide. Though in the US lung cancer kills more people than breast, colon, and prostate cancer combined, it receives less NIH funding than each of these diseases.
- Chronic obstructive pulmonary disease (COPD) is projected to become the third-leading cause of death worldwide by 2020. More than half of those with COPD are not diagnosed.
- The National Heart, Lung, and Blood Institute estimates that in 2009, the annual cost of providing healthcare related to all respiratory conditions—excluding lung cancer—was \$113 billion.

2004

Identified pathways by which an enzyme (MMP-8) protects mice from death due to severe acute insults to the lung.—**Caroline Owen, MD, PhD**

Observed that neutrophil and eosinophil granules contain DNA and RNA, an important finding for basic COPD and asthma research.

—**Peter Pare, MD**

2005

Found supportive evidence in a mouse model that blocking the CX3CR1 protein-receptor interaction may halt the progression of disease in individuals with COPD who have stopped smoking.

—**Janet S. Lee, MD**

2006

Investigates new treatments for sepsis and acute lung injury, including administration of omega-3 fatty acids, antioxidants, and zinc.

—**Renee Stapleton, MD, MSc**

Defines molecular phenotype of genes involved in early *P. aeruginosa* infections of the cystic fibrotic lung and the contribution of host response to clinical outcome.—**Hara Levy, MD, MMSC**

Our Response— Supporting Science of the Highest Caliber

Through its fundraising efforts and corporate and non-profit partnerships, the ATS Foundation Research Program confronts the threat that science will lose brilliant young investigators because adequate funding is not available to support research. The program provides seed funds that allow scientists to generate the preliminary data necessary to be awarded larger grants for more extensive research.

In this endeavor, the ATS Foundation has been highly successful: Our investigators have gone on to secure nearly \$90 million in grants funding as principal investigators since completing their Foundation-sponsored research (*Figures 1-3, on page 6*). Furthermore, the ATS Foundation's program has helped maintain a pipeline of outstanding researchers. Each of our awardees continues to be involved in research, and 86 percent devote at least half of their professional time to their investigations.

Progress in science is incremental, with each discovery forming a platform for further research on lung disease. The talented scientists we fund are striving to advance respiratory, critical care, and sleep medicine. They are using multiple tools—the petri dish, mouse models, stem cells, CT scans, and clinical trials—to unlock the mysteries of lung disease. Some are working on investigating the mechanisms that control lung cancer, while others are measuring the burden of lung disease among petrol workers in Nigeria. Some are seeking new approaches for the design of a TB vaccine, while others are working to identify potential therapies to stop the progression of COPD, pulmonary fibrosis, and lung transplant rejection.

In 2011, the ATS Foundation introduced the MECOR Research Awards to its grants portfolio. These awards are offered to graduates of ATS MECOR, a program that offers intensive training in the methods of epidemiological, clinical, and operations research to physicians in developing nations. These grants entice brilliant researchers to remain in and improve the quality of science produced in their home countries. The MECOR Research Awards, therefore, help build a global workforce to confront the universal challenge of lung disease.



“The Research program is vitally important offering seed funding to junior investigators encouraging them to pursue careers in lung research. Without a steady pipeline of investigators leading the way, research will stall and patients will suffer.”

—**Marvin I. Schwarz, M.D.**
Professor of Medicine
Division Co-Head
University of Colorado Denver

2007

Explored the role that dysfunction of the alveolar epithelial cell population, the cells located in the area where gas exchange occurs, plays in idiopathic pulmonary fibrosis.

—**William Lawson, MD**

Discovered basic immune mechanisms in pulmonary sarcoidosis that may explain why some patients recover spontaneously while others are at risk for chronic disease or even respiratory failure. —**Jan Wahlstrom, MD, PhD**

Identified TGF- β as a mediator of hypoxia-induced changes in the newborn lung that inhibit lung development and trigger abnormal vascular remodeling.

—**Namasivayam Amblavanan, MBBS, MD**

Provided a novel perspective on creating a TB vaccine. —**Jinhee Lee, DVM, PhD**

Found evidence that stem cells are tumor-initiating cells for lung cancer. —**Brigette Gomperts, MD**

Total number of grant recipients surveyed	50 (out of 88) recipients surveyed
Total number of publications relevant to ATS grant	336
Total number of postdoctoral fellows mentored by awardees	182
Percent of awardees who continue to be involved in research	100%
Percent of awardees who received subsequent grants as a principal investigator (PI)	88%
Total number of subsequent grants received by awardees as PI	134
Total funding of subsequent grants received by awardees as PI	\$89,967,674

Fig. 1

Grant Type	No. of Grants	Total Funding
K01	1	\$649,215
K08	2	\$639,771
K22	0	\$0
K23	2	\$629,100
R01	27	\$40,301,878
R03	4	\$640,486
R21	3	\$687,500
Other NIH grants	70	\$41,113,220
Non-Government funding	25	\$5,306,504
Grant Total	134	\$89,967,674

Fig. 2

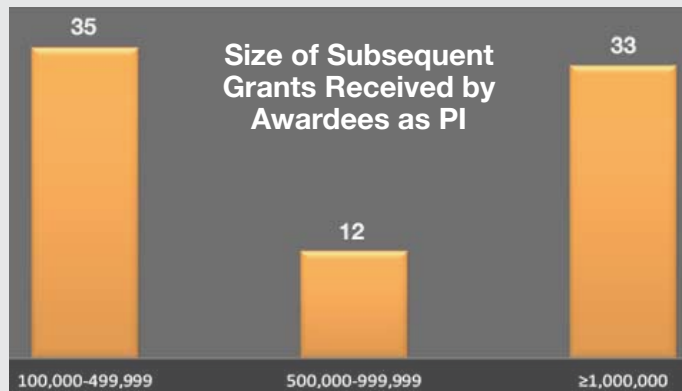


Fig. 3

2008

Discovered in a mouse model that prenatal exposure to nicotine results in long lasting alterations in airway branching and lung function.

— **Cherry Wongtrakool, MD**

Defines how the complex, polymicrobial communities of microbes that occur in the lungs of children with chronic infections cause disease and respond to treatment. — **Lucas Hoffman, MD, PhD**

Improved understanding of the mechanisms of the most common chronic lung disease in infants, bronchopulmonary dysplasia.

— **Vineet Bhandari, MD, DM**

2009

Identifies new markers of lung injury that can be used to help recognize those infants with cystic fibrosis who may be at risk for having more rapidly progressive lung disease.

— **Theresa Laguna, MD, MSCS**

Found that an FDA-approved chemotherapeutic drug decreases expression of pulmonary fibrosis-associated genes.

— **Melissa Piper, PhD**

Selection of Research Proposals

To ensure that we are targeting the best science with the most potential, the Foundation's research investments are guided by the ATS Scientific Advisory Committee (SAC), leading scientists in respiratory, critical illness, and sleep disorder. The ATS SAC conducts an annual "NIH-style" review of research proposals, and the chairs of the committee evaluate ongoing initiatives and final progress reports to ensure that we fund only the highest quality research.

In addition, the ATS Foundation invites its non-profit partners to select patient advocates to represent the patient community in the review process. The patient advocate brings the concerns of the patient community to the project selection process. The collaboration among scientists and patient advocates helps to ensure that high quality research that best addresses patient needs is funded.

Our Collaborations

To achieve its mission, the Foundation partners with individuals, industry, non-profit organizations, and the pulmonary community around a common goal: the support of new discoveries in pulmonary, critical care, and sleep medicine. Specifically, the ATS Foundation and its partners pool resources in order to maximize the number of high impact projects that can be funded. The ATS covers the costs of administering the awards, enabling every dollar the Foundation raises and its partners contribute to go towards research.

Operating under the critical guiding principles of collaboration, the Foundation's grant portfolio reflects the breadth and multidisciplinary nature of our partners. Many of them are members of the ATS Public Advisory Roundtable (ATS PAR), non-profit organizations that represent persons affected by specific respiratory diseases, sleep-related conditions, or related critical illnesses. These organizations partner with the ATS to advance their shared educational, research, patient care, and advocacy goals. Our partners bring the patient's perspective to the Foundation, providing the Board of Trustees with the strategic guidance to keep patients and families as the central focus of all its activities.

Contract Expert Review Panel Available to Support Other Research Programs

In addition, non-profit and corporate organizations who wish to maintain sovereignty over their own grant making may consider participating in the ATS Foundation Grant-for-Hire program. The Foundation's Scientific Advisory Committee will review all grants that the outside organization receives for a fee. The money that we charge for this grant review will support new ATS Foundation partner and unrestricted grants.

2010

Examines the long term respiratory morbidities identified in extremely preterm infants and develops therapies that would improve their long term outcomes and quality of life as adults.

—**Lynette Rogers, PhD**

Examines the use of IL-22 as a novel therapy to limit lung inflammation and fibrosis in patients with ALI/ARDS, sarcoidosis, Hermansky-Pudlak Syndrome, IPF, and a variety of ILDs.

—**Philip Simonian, MD**

Identified racial differences and other factors that may influence how well patients respond to treatments for pulmonary hypertension, which may lead to more individualized treatment.

—**Scott Halpern, MD, PhD**

An Invitation to Make a Difference

The Foundation's grant making builds on a tradition of scientific authority and a commitment to patients and families. The Foundation Board of Trustees take great pride in the successes of the program: Our investigators have engaged in research of the highest level, published in prestigious journals, and transitioned to careers as senior investigators. They are not only achieving prominence in academia, but they are influencing the next generation of scientists as well.

However, further cooperation between patient advocacy groups, industry, and individual donors is necessary to support high-caliber research and to provide hope for patients with devastating diseases. We encourage you to support the Research Program. Together, we will help the world breathe better.

To support the ATS Foundation, please visit foundation.thoracic.org.

Further information about the Foundation Research Program is available at thoracic.org/research.



“The Pulmonary Hypertension Association believes that partnerships that leverage our donors’ funds encourage expanded support and create new opportunities for researchers. The ATS has been a valued and thoughtful partner since 2006, jointly creating possibilities for over a dozen research studies to date. We look forward to continuing this relationship.”

—**Rino Aldrighetti**
President and CEO
Pulmonary Hypertension
Association

2010

Identified potential biologic targets responsible for T-cell dysfunction in sarcoidosis patients.

—**Kyra Richter, PhD**

Performs a rigorous genetic analysis of DNA isolated from pulmonary hypertension patients to determine if spontaneous mutations occur in genes linked to common cancers.

—**Laura Fredenburgh, MD**

Revealed that the blood of patients with idiopathic pulmonary fibrosis contains increased Sema 7A expression, with the largest increase seen in those patients whose condition rapidly deteriorates. Sema7A may be an important therapeutic target for treating IPF. —**Erica Herzog, MD, PhD**



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*Doing business as "Breathing Better: Curing Respiratory Diseases through Research."