Hello and Welcome back! We have had a very eventful Spring! As the weather starts to heat up, let us look back on some of the accomplishments and events from March – May 2021. We will also look ahead to the upcoming events for Summer-Fall 2021!

Table of Contents:

New Faces .................................................................2

Spring Events.............................................................3

BU Press Releases.......................................................7

Awards and Accomplishments.................................12

Upcoming Events.......................................................16

Publications.............................................................17
New Faces

Riley Pihl, M.S.
PHD Student
Traber Lab

Lucien Garo III
PHD Student
Bosmann Lab

Shuang Xu
Research Technician
Bosmann Lab
Finally, the warm weather has arrived! And with it, a sense of ease is starting to spread over Boston. Our research labs are filled with faculty, researchers, and trainees as research and training continues. Vaccines are becoming easier to access and we are proud that our Pulmonary Center is returning to “closer to normal” working conditions starting June 14th!

We are also happy to announce that our Pulmonary Center has not only survived another Boston winter, but we have thrived through it and came out of it more focused and determined than ever. Our Trainees have astonished us with their accomplishments, receiving notice at Russek’s Day, ATS, and new and exciting Grants! Our Faculty continue with research, training, and have produced an astounding number of publications this past quarter. Lab and Administrative staff, still effectively communicate and support projects and keep the Center running as a well-oiled machine.

Together we were able to accomplish all of these wonderful successes, so thank you for helping to keep this Center running!

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**New Baby!**

Elliot Beccari Gereige

April 2, 2021
Gordon Snider Lecture
April 14, 2021
3:30pm

“From constellations to galaxies – how transcriptomics shapes our understanding of Pulmonary Fibrosis.”

Naftali Kaminski, MD
Yale School of Medicine
Professor of Medicine (Pulmonary); Section Chief, Pulmonary, Critical Care & Sleep Medicine

To learn more about the Annual Gordon Snider Lecture Series, Follow the QR Code:
“The BU Pulmonary Center Social Justice forum (SJF) is a biweekly, hour-long (5-6pm), trainee-initiated discussion platform for all members of the BU Pulmonary Center and the larger BU community to virtually gather, educate, discuss and share their knowledge and experiences regarding different forms of social injustices including (but not limited to) racism, gender inequality, sexual orientation, immigration status, and everything in between (any relevant suggestions are welcome).

The goal of this forum is to make everyone feel more aware and empowered to make positive changes; to educate ourselves on issues our colleagues in the workplace might have to face (or have already faced).

The SJF is a safe space, meaning that all opinions are welcomed with an open mind and is an opportunity for us to get to know each other, empathize with one another, and come out as better-informed global citizens in addition to being great scientists and clinicians.

Interested participants can reach out to Anukul Shenoy for login information.

The Social Justice Forum Webpage
We recently launched a new webpage on our Pulmonary Center site to host news and upcoming events regarding the Social Justice Forum:

[www.bumc.bu.edu/pulmonarycenter/sjf/](http://www.bumc.bu.edu/pulmonarycenter/sjf/)
Graduation

Emad Arafa PhD
March 30, 2021
Recovery from Pneumococcal Pneumonia Remodels the Pool of Alveolar Macrophages.
Mentor: Dr. Jay Mizgerd
Now at Senda Biosciences

Kimberly Barker, PhD
September 24, 2020
The Establishment and Function of Lung Resident Memory B Cells after Bacterial Respiratory Infection.
Mentor: Dr. Jay Mizgerd
Now at Bristol Myers Squibb

Beth Becker, PhD
June 20, 2020
Derivation of Airway Epithelium Transcriptomic Signatures of COPD Phenotypes
Now at Novartis

Kristy Abo, PhD
April 15, 2021
Maturation of Pluripotent Stem Cell-Derived Alveolar Type II cells at Air-Liquid Interface and Interaction with Environmental Stimuli
Mentor: Dr. Andrew Wilson
Now working on her MD!
Study Provides Novel Platform to Study how SARS-CoV-2 Affects the Gut

April 13, 2021

How could studying gastrointestinal cells help the fight against COVID-19, which is a respiratory disease? According to a team led by Gustavo Mostoslavsky, MD, PhD, at the BU/BMC Center for Regenerative Medicine (CReM) and Elke Mühlberger, PhD, from the National Emerging Infectious Diseases Laboratories (NEIDL), testing how SARS-CoV-2 affects the gut can potentially serve to test novel therapeutics for COVID-19.

In order to study SARS-CoV-2, models are needed that can duplicate disease development in humans, identify potential targets and enable drug testing. BU researchers have created human induced pluripotent stem cells (iPSC)-derived intestinal organoids or 3-D models that can be infected and replicated with SARS-CoV-2.

iPSC are stem cells derived from the donated skin or blood cells that are reprogrammed back to an embryonic stem cell-like state and then can be developed into any cell type in the body.

“Human induced pluripotent stem cell derived intestinal organoids represent an inexhaustible cellular resource that could serve as a valuable tool to study SARS-CoV-2, as well as other intestinal viruses that infect the intestinal epithelium,” explained corresponding author Dr. Mostoslavsky, associate professor of microbiology and co-director of the CReM.

Using human iPSCs the researchers differentiated the iPSC cells into colonic and small intestine 3D organoids. The organoids were then passed along to the Mühlberger lab at the NEIDL where they were infected with SARS-CoV-2 to analyze the effect of infection on the cells by staining against markers, by electron microscopy and by RNA-sequencing.

“Our findings suggest that different epithelial tissues (such as the lung and the gut) react in similar manner to SARS-CoV-2 infection and therefore can help identify common mechanisms of disease that can be targeted by drugs,” added Dr. Mühlberger, director of Integrated Science Services at the NEIDL and professor of microbiology.
Study Provides Insight in Identifying, Treating Lung Cancer at Early Stages

April 27, 2021

Lung carcinomas are the leading cause of cancer-related deaths in the United States and worldwide. Lung squamous cell carcinomas (non-small cell lung cancers that arise in the bronchi of the lungs and make up approximately 30 percent of all lung cancers) are poorly understood, particularly with respect to the cell type and signals that contribute to disease onset.

According to the researchers, treatments for lung squamous cell carcinomas are limited and research into the etiology of the disease is required to create new ways to treat it.

“Our study offers insight into how damage to the airways of the lung develops into lesions that can transition to cancer. Identifying and treating pre-cancer lesions would offer an opportunity for intercepting lung cancer development,” said corresponding author Bob Varelas, PhD, associate professor of biochemistry.

The study shows that disruption of proteins that control the shape of the lung epithelium drives signals that promote precancerous cellular growth in the airways of the lung. Using a combination of new experimental models, human tissues and bio-computational approaches, the researchers were able to show that damage to the architecture (polarity) of the lung epithelium drives signals that promote the formation of lesions that resemble human pre-cancer lesions that are known to progress to lung squamous cell carcinoma. The polarity damage can be caused in part by factors known to contribute to lung cancer, such as cigarette smoke exposure.

The researchers further identified factors that control a gene expression program associated with pre-cancer development and progression in human patients. From these genes they identified one factor, the growth factor Neuregulin-1, that is associated with pre-cancer cell growth that can be therapeutically targeted for treatment of pre-cancer lesions in experimental models. “Targeting these signals may allow us to prevent and treat the formation of pre-cancer lesions,” explained Dr. Varelas.
Funding for this study was provided by the Boston University Flow Cytometry core and support by the National Center for Advancing Translational Sciences, NIH, through BU-CTSI Grant Number 1UL1TR001430. X.V. was funded by a grant from the NIH NHLBI (R01HL124392) and an American Cancer Society–Ellison New England Research Scholar Grant (RSG-17-138-01- CSM); N.M.K. was funded by NIH NHLBI Grant F31HL146163; J.H.B. was funded by NIH NHLBI Grant F31HL132506; J.G.K. was funded by NIH NCI Grant F31CA232683; J.B. was supported by a Janssen Pharmaceuticals Sponsored Research Agreement; and S.M. was supported by T32HL125232.

2021 Perkins Award Winners Announced

May 10, 2021

Aline Hillman

In a letter nominating Hillman, a colleague wrote that the Pulmonary Center has “countless moving parts, strong personalities, and a bottomless pit of demands. Simply put, the engine grinds to a halt without Aline.… Not only does she navigate her “normal” tasks, which include the management of virtually all personnel needs (ranging from summer interns to full professors), sponsored programs, and so much more, but Aline also serves as a crucial liaison who coordinates interactions with others in the unlikely event that she does not wave her magic wand and solve a problem on her own.”

This colleague, who has been juggling work with elementary school–age children learning from home during the pandemic, wrote that Hillman “routinely checks in on me, perhaps more than any other individual at BU, and it has meant the world to me—far more than I am sure she realizes.”
Hillman, a 30-year BU employee, says she’s mined the fulfillment she gets from such service to fortify her during the last, tough year of COVID: “What is most rewarding to me is supporting our amazing and dedicated faculty, trainees, and research staff so that they can concentrate on science and clinical care, instead of being concerned about administrative and financial management tasks.

“While I am very fortunate that my position does not involve risky work itself, the work of our faculty and trainees very much does, and has been greatly impacted by the pandemic. I’ve tried to even better support them so they have one less thing to worry about and can focus on patient care and pulmonary research.”

Researchers Identify Genes Responsible for Loss of Lung Function

May 11, 2021

Chronic Obstructive Pulmonary Disease (COPD) is a disease caused by cigarette smoking that reduces lung function and causes difficulty breathing. It is the third leading cause of death worldwide. Current treatments for COPD only affect symptoms, not progression. Identifying who is going to get COPD before they get it is key to figuring out how to intercept the disease at an early stage.

BUSM researchers have identified a panel of genes that are active in smokers and ex-smokers who experience faster loss of lung function over time. They believe these genes could be useful to predict which people are most at risk for smoking-related decline in lung function.

“Our discovery that airway genes change before a rapid decline in lung function should give patients with COPD a lot of hope. A test like this could help doctors identify people at risk for COPD before they get it, and help scientists find new treatments to stop the disease before it gets worse,” explained corresponding author Katrina Steiling, MD, MSc, assistant professor of medicine.

Smoking, and diseases related to smoking, create changes throughout the airways and lungs. These changes can be detected using a procedure called a bronchoscopy, where a small flexible camera inserted through the nose or mouth is used to collect cells with brushes from the sides of the airways. The researchers tested airway brushings from 134 people who were current or former smokers. They found changes in the activity of specific genes in the people that went on to have more rapid worsening of their lung function several years after
that initial airway brushing. Some of the genes were more active in the people who rapidly lost lung function while other genes were less active in these people.

According to the researchers, further study of these genes may provide clues as to what causes rapid lung function decline which could be used to develop new treatments for preventing the development of COPD. “Being able to identify people most at risk for worsening lung function might also make clinical trials of COPD fighting medications easier, by enriching the trials testing new medications for people most likely to benefit from them,” added co-author Beth Becker, PhD, a recent graduate from BU’s bioinformatics program.

This study further shows another use for the ‘airway field of injury’ hypothesis. “Cigarette smoking causes changes to the cells in the lungs and airways. Because the changes in the airways are similar to those that occur deep inside the lung, testing the cells in the airways can be used to detect diseases deep within the lungs,” added Marc Lenburg, PhD, professor of medicine and pathology and laboratory medicine.

These findings appear online in the journal Thorax.

Funding for this study was provided by the National Institutes of Health/National Heart, Lung, and Blood Institute (ROI HL095388 and ROI HL 118542-01) and Dutch Longfonds Foundation (4.2.16.132JO).
Awards and Accomplishments

Justin Lui, M.D.
Pulmonary Fellow, Mentor: Klings/Wiener
2021 ATS Ziskind Clinical Research Scholar Award

"The Ziskind Clinical Research Scholar Award is an ATS Scholarship Award that honors pulmonary and critical care fellows engaged in clinical research. The award was named after Morton Ziskind, MD, a highly respected clinician-researcher from Tulane University who died in 1979 and was renowned for bringing his fellows to the ATS International Conferences and exposing them to memorable learning experiences. In an effort to honor his inspiring mentoring practices, the ATS created this award program to recognize the best and the brightest individuals in clinical research."

Joseph P. Mizgerd ScD
Professor, Pulmonary, Allergy, Sleep & Critical Care Medicine
Director, Pulmonary Center
Assembly on All Scientific Achievement Award

This award is given to an AII member to recognize an established, internationally recognized investigator with a record of sustained exemplary achievement in the scientific areas of the Assembly.

“Spanning nearly 3 decades, Dr. Jay Mizgerd has been committed to unraveling the molecular mechanisms controlling pneumonia outcome and susceptibility. He has made seminal contributions to the field, including but not limited to the discovery of cell-specific immune signaling hubs and the biology underlying immune remodeling in the experienced lung. His substantial efforts advocating for the importance of pneumonia as a public health concern and critical research area have made him the steward of this field in the ATS and beyond.”

Kristine Abo, Ph.D.
M.D./Ph.D. Student, Mentor: Wilson
1st place at Russek Day
Tyler Matte  
Graduate Student, Hawkins Lab  
1st place Russek Day

Elim Na  
Ph.D. Student, Mentor: Quinton  
• Received 3rd place at Russek Day for the Department of Molecular and Translational Medicine  
• 2021 ATS Abstract Scholarship

Eduardo Núñez, MD  
Pulmonary Fellow, Mentor: Wiener  
ATS Assembly on Behavioral Science and Health Services Research Abstract Scholarship Award

Rhiannon Werder, Ph.D.  
Postdoctoral Fellow, Mentor: Wilson  
CTSI Poster Award

**New Activities:**

John Berk, M.D.  
Professor of Medicine  
Recently promoted from Associate to Professor of Medicine

Alexis Gallardo Foreman, MSN  
Instructor of Medicine  
Selected to participate in the Early Career Faculty Development Program for 2021-2022.
Davidson H. Hamer, MD
Professor of Medicine
- February 2021 – asked to serve as a member of the Flight Safety Foundation’s Medical Advisory Board

Nathan Mesfin, M.D.
Pulmonary Fellow
Selected to join the ATS Behavioral Sciences & Health Services Research Assembly website committee.

New Grants:

Markus Bosmann, M.D.
Associate Professor, Pulmonary, Allergy, Sleep & Critical Care Medicine
Assistant Professor, Pathology & Laboratory Medicine
- ARCA Biopharma, Inc. project titled “Therapeutic effects of NAPc2 in SARS-CoV-2 infection of K18-hACE2 transgenic mice”
- CTSI Pilot award titled “Generation of GNB2-flox mice to investigate Legionellosis”

Claire Burgess
Ph.D. Student, Mentor: Kotton
Former Pulmonary T32 predoc trainee
New F31 grant

Senegal Carty
Ph.D. Student, Mentor: Jones
American Heart Association predoc fellowship titled “Pulmonary Lymphatic Endothelial Cell Remodeling in Response to Influenza Infection”
Neelou Etesami, M.D./Ph.D. Student, Mentor: Mizgerd
NIH F30 titled “Protective lung memory B cell functions and dynamics during respiratory infection”

Kari Gillmeyer, M.D.
Assistant Professor, Pulmonary, Allergy, Sleep & Critical Care Medicine
Parker B. Francis Fellowship titled “Characterizing Care Coordination in Pulmonary Hypertension: A Mixed Methods Study”

Yang Jin MD., Ph.D.
Professor, Pulmonary, Allergy, Sleep & Critical Care Medicine
NIH R01 administrative supplement

Justin Lui, M.D.
Pulmonary Fellow, Mentor: Klings/Wiener
F32 research grant (F32HL156614) by the NIH/NHLBI
“Left Ventricular Strain in Systemic Sclerosis-related Pulmonary Hypertension”

Christine Odom
Ph.D. Student, Mentor: Quinton
NIH F31-HL154615
“Liver-dependent lung remodeling and pneumonia susceptibility during endotoxemia”

Robert Smyth, M.D.
Pulmonary Fellow, Mentor: Spira
International Lung Cancer Foundation John Fishers Legacy Fellowship award.
“Development of a nasal gene expression classifier in patients with indeterminate pulmonary nodules”
Upcoming Events

Mary Williams Lecture
July 7, 2021

Nicholas Heaton, PhD
Duke University School of Medicine
Assistant Professor of Molecular Genetics and Microbiology
Member of the Duke Cancer Institute

Sue Kim Hanson Lecture
September 10, 2021

Kate A. Fitzgerald PhD, MRIA
Professor and Vice Chair, Department of Medicine
University of Massachusetts Medical School

Jerry Brody Lecture
November 3, 2021

Wellington Cardoso, M.D., PhD
Columbia University School of Medicine
Professor of Medicine and of Genetics and Development;
Director of the Columbia Center for Human Development
Congratulations to the Pulmonary Center members for the following publications this quarter:


Jessie Huang, Darrell N. Kotton. Induced pluripotent stem cells for generating lung alveolar epithelial cells and modelling respiratory disease. Eur Respir Monogr 2021; 91: 205-221


