

Winter 2022

Division of Pulmonary, Critical Care, Allergy & Sleep Medicine Annual Newsletter



**T**he Division of Pulmonary, Critical Care, Allergy, and Sleep Medicine at the Medical University of South Carolina (MUSC) continues to be a nationally recognized leader in the treatment of respiratory diseases. Our subspecialty programs in critical care, cystic fibrosis, lung transplantation, non-tuberculosis mycobacterium, pulmonary fibrosis, pulmonary hypertension, sarcoidosis, sleep medicine, rare lung diseases, thoracic oncology and Tele-ICU care are regional and national leaders in patient care and research.

Division faculty have provided critical leadership and support to MUSC through our organizational response to the COVID-19 pandemic in regards to surge planning and clinical best practices implementation, as well as state-wide support through education and patient referrals, especially as it relates to extracorporeal membrane oxygenation (ECMO) evaluation. The division consistently achieves *U.S. News & World Report's* "high-performing" designation, meaning we are among the top 10% of pulmonary programs in the country.

As the only lung transplant center in South Carolina, MUSC Health excels at lung transplant surgery for people living with

advanced lung disease. Our nationally recognized critical care program provides specialized services, including life support for people with life-threatening illness or injuries. As a Designated Platinum Level Center of Excellence in Life Support, we deliver sophisticated therapies such as ECMO, which takes over the work of the lungs in people who cannot breathe on their own.

The division continues to recruit outstanding fellows into our three fellowship programs: pulmonary and critical care medicine, critical care medicine, and sleep medicine. We also offer an NIH-funded T32 research training program.

The division supports a broad-based research enterprise in clinical and translational science, working collaboratively to develop novel therapeutic approaches for the treatment of critical illnesses and pulmonary diseases. Areas of particular emphasis include advanced lung diseases, critical illness, interventional pulmonology, lung cancer, and pulmonary hypertension. The publications, honors, and grant funding received by division faculty this year highlight the quality and ingenuity of work being done in the division.



**15**  
**LUNG**  
**TRANSPLANTS**  
**IN 2021**

**20,812**  
**FY21**  
**OUTPATIENT**  
**OFFICE VISITS**

**\$43.6M**  
**FY21**  
**RESEARCH**  
**FUNDING**



Division of Pulmonary,  
Critical Care, Allergy  
and Sleep Medicine

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Our Faculty

On the Cover:  
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Gibbs BSN, RN, Lucy Linkowski  
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## MESSAGE FROM THE DIRECTOR



For the Division of Pulmonary, Critical Care, Allergy & Sleep Medicine, 2020-21 was a challenging and exceptional year. Despite the COVID-19 pandemic and its effect on all aspects of life, we have remained resolute in our commitment to find innovative solutions to care for our patients, mitigate disparities in health care, conduct research, and educate our residents and fellows.

Our ICU teams continue to provide high-quality patient centered care in the face of ongoing staffing shortages and the related stress and strain the pandemic has imposed on health care. Despite this ongoing challenge, the division is focused on strategic growth and recruitment activities. We added six new faculty this year with diverse areas of focus both clinically and with regards to research. Division faculty continue to provide critical leadership to MUSC Health regarding routine clinical operations and COVID-19 activities. We also lead a majority of MUSC's COVID-19 research activities.

With more clinic locations throughout the state and an increase in telehealth visits, we are able to provide better access to care with the goal of reducing the impact of health care disparities in vulnerable patient populations throughout the state.

Despite the increased demands, our faculty remain committed to the education of trainees and meeting their research commitments. In FY21, the division's aggressive pursuit of external funding was rewarded: 42 new grants were secured, and nine grants were continued. Division faculty and fellows have also been actively engaged in leading numerous COVID-19-related clinical trials and in continuing our ongoing research in other areas.

The current times stretch us, but the achievements presented in this report underscore our strength and commitment to meet the challenges of the pandemic and advance our mission to provide exceptional care for all.

### Dee Ford, M.D., MSCR

Professor and Director

Division of Pulmonary, Critical Care, Allergy & Sleep Medicine  
Medical University of South Carolina

### Six Convenient Locations:

**Rutledge Tower Pulmonary Clinic**  
135 Rutledge Avenue, 5th Floor  
Charleston, SC 29425

**Hollings Cancer Center Pulmonary Clinic**  
86 Jonathan Lucas Street, 2nd Floor  
Charleston, SC 29425

**Pulmonary Clinic Dantzler**  
2750 Dantzler Drive, Suite 100  
North Charleston, SC 29406

**East Cooper Medical Pavilion**  
1600 Midtown Avenue, 2nd Floor  
Mount Pleasant, SC 29464

**MUSC Sleep Center**  
4480 Leeds Place West  
North Charleston, SC 29405

**West Ashley Medical Pavilion**  
2060 Sam Rittenberg Boulevard  
Charleston, SC 29407

### Call for Appointments:

MUSC Pulmonary Clinics:  
843-792-5864

### Schedule a Virtual Visit:

[muschealth.org/virtual-visits](https://muschealth.org/virtual-visits)

# THE MUSC PULMONARY VASCULAR DISEASE PROGRAM:

## A Growing Center of Excellence

Article by Kat Hendrix, Ph.D.

Five years ago, developing a comprehensive program at MUSC to care for patients with pulmonary hypertension (PH) and other pulmonary vascular diseases (PVD) was a distant goal. But **Rahul Argula, M.D.**, a pulmonary and critical care specialist and director of the PVD program, is not afraid to dream big. Drawing input and support from like-minded colleagues including **Patrick Flume, M.D.**, who leads the Cystic Fibrosis & Bronchiectasis program and **Charlie Strange, M.D.**, who leads the COPD & Rare Lung Disease program, Argula saw his dream become reality in 2019 when the Pulmonary Hypertension Association accredited the MUSC PVD program, making it South Carolina's only Pulmonary Hypertension Comprehensive Care Center.

"The idea was to build a multifaceted program that could care for patients with PH and other vascular diseases of the lung," says Argula. The enormity of this task becomes clear when you consider how many different types of patients develop PVDs, including those with lung, liver, kidney, heart, and rheumatological (autoimmune) diseases. Creating a center to care for all of them required developing a collaborative network of specialists across multiple divisions.

"This program is successful because of our collaborations," says Argula. "For example, Dr. Ryan Tedford and the heart failure team are great partners and ensure we have precise and correctly interpreted right heart catheterizations for diagnosis. We have a unique partnership with Dr. Richard Silver and the rheumatology team for systemic sclerosis-associated PH. Our program is only possible because of the experience, critical thinking skills, and collaborative opportunities at MUSC."

Now five members strong, the PVD team includes a full-time pharmacist, a program coordinator, and three physicians. "Drugs to treat PH can be difficult to acquire and quite expensive," says Argula. "So, this year, we were thrilled to welcome **Meghan Morrisette, PharmD**, our dedicated pharmacist. She provides our patients with timely access to specialized drugs through MUSC's specialty pharmacy, individualized counseling, and medication monitoring."



Dr. Denise Sese with patient.

Program coordinator, **Kristine Ritenour, RN**, also plays a central role. "She's really the linchpin of the program," says Argula. "Patients with PH are very complex and fragile. Some receive intravenous medications infused directly to their heart and lungs via a continuous delivery pump and a specialized catheter. Kristine is their point-of-contact and closely tracks these patients. She also trains other nurses on how to care for them as inpatients and interfaces with providers across MUSC to ensure they get the special oversight and coordinated care they need. We're lucky to have her at the helm," says Argula.

In 2021, **Denise Sese, M.D.**, a pulmonary and critical care specialist, joined Drs. Argula and Rismiller on the PVD team. "We're caring for more patients than ever as clinicians are recognizing PH more often," says Sese. Despite this uptick, persistent gaps remain. "Unfortunately, PH tends to be diagnosed two to three years after symptom onset. Without access to specialized treatment, patients get very sick because this is an incurable, progressive disease. It's important to recognize key symptoms early so they can come to a center with expertise. We hope by doing more outreach and education, patients will be diagnosed and referred earlier which will improve their overall outcomes including their quality and length of life," she says.

However, many health care providers are unaware that PH can be effectively treated. "Patients who get specialized care quickly do much better than those who don't. Although individual specialists may recognize PH, they don't have the resources to manage it within their regular practice," says Sese. "That's why having this Center of Excellence at MUSC is so important. It can prevent PH patients from being potentially under-treated or mismanaged. Plus, they don't have to go out of state for expert care."

Caring for PH patients goes beyond prescribing medications.



## THE ADVANCED LUNG DISEASE PROGRAM:

L-R: Amy Wisse, DNP, Timothy Whelan, M.D., Deborah Spehar, Luca Paoletti, M.D., and Kathleen Lindell, Ph.D.

### Remarkable Progress on a Sustainable Path

It's an exciting time to be part of the MUSC Advanced Lung Disease Program. "Our division has really grown over the past several years which is a testament to the leadership of Dr. Lynn Schnapp and Dr. Dee Ford. When I came here, there were about 15 total faculty in the pulmonary division and now we have about 34 faculty," says **Timothy Whelan, M.D.**, professor and medical director of the Lung Transplant Program.

That expansion is particularly noteworthy given the nature of advanced lung disease management which requires collaboration across a wide range of specialties. "We're a multidisciplinary team," says **Luca Paoletti, M.D.**, associate professor and medical director of Pulmonary Rehabilitation and Adult ECMO (extracorporeal membrane oxygenation). "Advanced lung disease is everything—cystic fibrosis, ILD (interstitial lung disease), COPD (chronic obstructive pulmonary disease), and non-idiopathic and idiopathic pulmonary fibrosis (IPF). We have to work in conjunction with our colleagues in radiology, pulmonology, pathology, and rheumatology to come up with the best strategy for each patient."

In addition, all patients seen in the program are medically complex by virtue of having advanced disease. "We provide care and treatment for the sickest of the sick using a full complement of medical therapies, including clinical trials that allow us to offer therapies that aren't available elsewhere," says Whelan. "If they don't respond to medical treatment,

we can offer ECMO support which is a key strategy for managing severely ill patients as a bridge to transplant for many of our patients including those with COVID who may need lung transplantation." Smaller hospitals cannot provide this array of multidisciplinary specialists or access to cutting-edge treatments and technologies.

Because various etiologies can cause lung disease and treatment differs based on the cause, the program receives high numbers of referrals from across the southeast. Recently, the program expanded its multi-disciplinary conference from once-per-quarter to weekly teleconferences to help physicians with challenging cases. "There's evidence that incorporating a wider range of opinions results in better agreement about the best diagnosis and management of these complex patients," says Whelan.

**Rachana Krishna, M.D.**, assistant professor in the Division of Pulmonary and Critical Care, agrees. "We have a formalized multidisciplinary approach to evaluation that is not available in smaller hospitals in the state. Our whole group of radiologists, pathologists, rheumatologists, and pulmonary and advanced lung disease specialists look at the patient together. We go over the imaging and get a consensus opinion on the best next steps. We talk about whether additional evaluation such as a surgical biopsy is needed or whether that's too risky. Physicians outside of MUSC sometimes bring their patients to conference so they can get a multidisciplinary consultation about how to best move forward."

Encouraged by previous successes, the team also plans to expand their robust involvement in clinical trials. "We're one of the larger enrollers in the country for clinical trials in pulmonary fibrosis," says Paoletti. "We participated in trials for the only two medications that are approved to treat IPF. Before that, transplant was the only treatment. That's still

an option, but now we have medications to try first. That said, we're continuing to look for treatments to stop disease progression or slow it down. We'd like to have even more options, if possible."

The team is also studying patients with residual lung damage following COVID-19 infection. "It's turning out that a lot of patients who have COVID develop COVID fibrosis as part of their disease process," says Paoletti. "So, we're learning what they respond to and what doesn't work. We'll be looking at how many COVID patients eventually need a lung transplant and how many may develop chronic lung disease. It'll be interesting to see what happens with their lung function. Does it continue to decline or does it stabilize?"

They've also noticed a rise in the number of patients with newly diagnosed lung disease that only became noticeable after they had a COVID infection. "In some cases, people had milder symptoms before COVID really set them back. When that relatively mild, existing disease was exacerbated by COVID, it rose to their attention enough to come in and get it diagnosed," says Krishna.

Part of the challenge is an overall lack of awareness about lung disease. "It affects patients' breathing and can be more severe and life-limiting than a lot of people realize," says Krishna. "People are aware of cancer—they know what that means. Some of the conditions we treat have a similar life expectancy but awareness is much lower. That's why it's so important that we care for the whole person and support their quality of life in addition to diagnosing and treating their illness. Making a meaningful impact on their quality of life is what really motivates me."

The team plans to add several new faculty members in the coming year to continue increasing patient volumes, expanding clinical trials, and reaching out to new patients

and referring providers. But their focus is also on the longer-term. "If we continue to build, we'll have a very strong advanced lung disease program but, more importantly, we'll be putting an infrastructure in place to ensure that—when faculty leave or staff changes—the program will endure," says Whelan. "We want to establish an infrastructure that reaches beyond us as individuals, so the program will keep functioning far into the future."

That's good news for patients throughout South Carolina. "Ten years ago, the division looked very different," says Whelan. "In another five years our program will be even bigger and better with a deeper bench to make sure it stands the test of time so we can keep doing even more than we ever thought possible."

*Article by Kat Hendrix, Ph.D.*



Dustin Parkhurst with girlfriend Victoria Kelehear as she holds their daughter Delaney for the first time on Aug. 31, 2021, outside of MUSC. Kelehear delivered while she had COVID-19, then was hospitalized for the first month of Delaney's life. She received MUSC's award-winning ECMO treatment - a final critical-care option for patients with severe lung injury. Not even a week later, on Sept. 5, Kelehear was discharged from the hospital. *Photo by Grace Beahm Alford (Post & Courier)*

## MUSC Adult ECMO Program Receives ELSO Center of Excellence Platinum Award

Under the leadership of Luca Paoletti, M.D., MUSC's Adult ECMO program received an ELSO Center of Excellence Platinum Award. This is the highest distinction within the ELSO organization. The MUSC Adult ECMO program now has joined the MUSC Pediatric ECMO program in this elite group of programs. There are over 300 ECMO programs worldwide and this award puts MUSC's program with a very small group of only 23 worldwide with this distinction. ELSO (Extracorporeal Life Support Organization) is the international non-profit consortium of health care institutions dedicated to novel therapies for support of failing organ systems and promotes broad multidisciplinary collaboration.

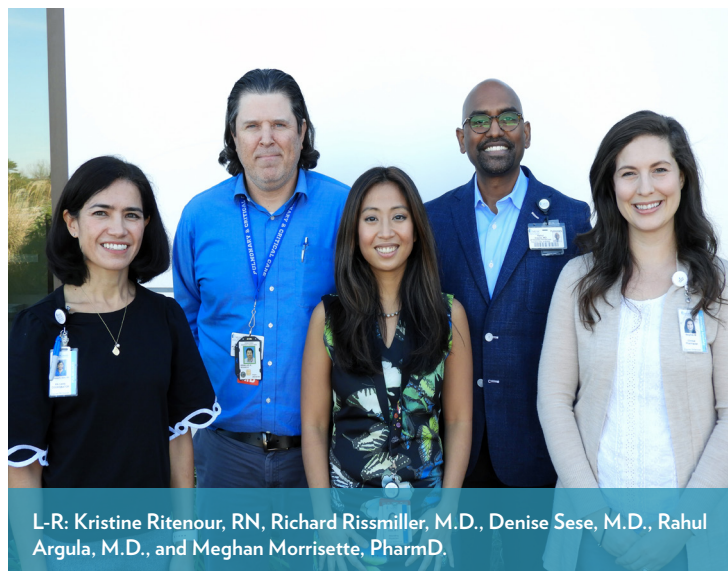
## PULMONARY VASCULAR DISEASE PROGRAM (continued)

“They have special needs including adjusting to their diagnosis and learning to deal with the disease, new symptoms, and treatment side effects,” says Sese. “Part of what we’re good at is meeting them where they are and helping them achieve their goals.”

The three pillars of the PVD program are clinical care, research, and education. Future plans for patient care include opening new statewide clinics and adding an advanced practice provider at MUSC to improve outpatient access and inpatient continuity of care.

The program will also continue building its impressive record of research. “We want to broaden our portfolio of trials,” says Argula. “This year we were part of the first successful trial of an inhaled medication for pulmonary fibrosis patients with PH. The results were published in the New England Journal of Medicine. It’s a big breakthrough and we’re very excited to be part of this landmark study.”

The opportunity to participate in clinical trials gives patients a distinct advantage, and the MUSC PVD program is a leading enroller in several national trials. “Our patients get access to cutting edge therapies long before they become commercially available,” says Argula. “Also, because of our excellent track record, drug companies and the NIH want to partner with us.



Our patients get access to new technology/drugs while playing a vital role in advancing the science.”

The PVD program also benefits medical students, residents, and fellows in training at MUSC. “PH overlaps with so many areas—hepatology, rheumatology, nephrology, cardiology, to name a few. Trainees who come through our clinics get valuable exposure to managing these complex patients,” says Argula.

With its focus on collaborative partnerships and keeping patients at the center of the circle of care, there’s no doubt that MUSC’s Pulmonary Vascular Disease program will continue to flourish.

## FELLOWSHIP PROGRAM NOTES



A major focus of the **Division of Pulmonary, Critical Care, Allergy and Sleep Medicine** at MUSC is training the next generation of leaders in pulmonary and critical care medicine. The division offers a three-year combined Pulmonary and Critical Care Medicine Fellowship Program directed by **Edward Kilb, M.D.**, (top left) to provide training leading to board eligibility in both pulmonary medicine and critical care medicine, and a two-year Critical Care Medicine Fellowship directed by **Andrew Goodwin, M.D.**, (middle,



left) to prepare the trainee for board eligibility in critical care medicine. Additionally, we offer a one-year accredited Sleep Medicine Fellowship directed by **Andrea Rinn, M.D.** (bottom, left), and an NIH-funded T32 research training program. The fellowship program offers customizable schedules to train physician-scientists and clinician educators. Daily conferences are dedicated to clinical topics, research, or career development. We pride ourselves in providing robust and productive mentoring for all of our fellows.

# PULMONARY & CRITICAL CARE FACULTY



**Jaqueline Angles, D.O.**  
Associate Professor  
Subspecialty: Adult and Pediatric Sleep Medicine, CPAP



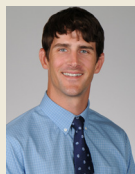
**J. Terrill Huggins, M.D.**  
Professor  
Subspecialty: Pulmonary Disease Medicine, Interstitial Lung Disease



**Richard Rissmiller, M.D.**  
Associate Professor  
Subspecialty: Critical Care Medicine, Pulmonary Disease Medicine, Interstitial Lung Disease, Sarcoidosis



**Rahul Argula, M.B.B.S, MPH**  
Associate Professor; Medical Director of Pulmonary Vascular Disease Program  
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**W. Ennis James IV, M.D.**  
Assistant Professor; Program Director, Susan Pearlstone Sarcoidosis Center of Excellence  
Subspecialty: Pulmonary Disease Medicine, Sarcoidosis



**Denise Sese, M.D.**  
Assistant Professor  
Subspecialty: Pulmonary Hypertension, Advanced Lung Disease



**Tatsiana Beiko, M.D., MSCR**  
Associate Professor  
Subspecialty: Critical Care Medicine



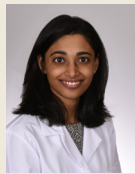
**Edward Kilb III, M.D.**  
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**Barry Sigal, M.D.**  
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**Alice M. Boylan, M.D.**  
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**Rachana Krishna, M.D.**  
Assistant Professor  
Subspecialty: Pulmonary Disease Medicine, Interstitial Lung Disease



**Gerard A. Silvestri, M.D., MS**  
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Subspecialty: Pulmonary Disease Medicine, Lung Cancer



**John B. Cox, M.D.**  
Professor  
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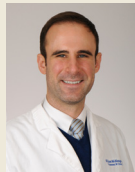
**Chitra Lal, M.D.**  
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**Michelle Spiegel, M.D.**  
Assistant Professor  
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**Patrick A. Flume, M.D.**  
Distinguished Univ. Professor; Powers-Huggins Endowed Chair; Ass. Vice Chair for Clinical Research  
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**William McManigle, M.D.**  
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**Charlton B. Strange, M.D.**  
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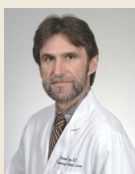
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**Christina Mingora, M.D.**  
Instructor  
Subspecialty: Pulmonary Disease Medicine



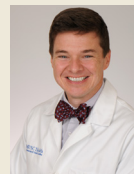
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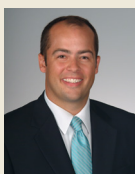
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**Charles Terry, M.D.**  
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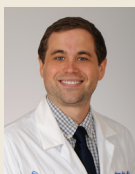
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**Bradley Petkovich, M.D.**  
Assistant Professor  
Subspecialty: Critical Care Medicine, Pulmonary Disease Medicine



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**Adam Fox, M.D.**  
Instructor  
Subspecialty: Pulmonary Disease Medicine



**Andrea Rinn, D.O.**  
Associate Professor  
Subspecialty: Adult Sleep Medicine, CPAP



**David Zaas, M.D., MBA**  
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## THE MUSC DEPARTMENT OF MEDICINE

Founded in 1824 in Charleston, The Medical University of South Carolina is the oldest medical school in the South. Today, MUSC continues the tradition of excellence in education, research, and patient care. MUSC educates and trains more than 3,000 students and residents, and has nearly 17,000 employees, including approximately 1,500 faculty members.

As the largest Department in the MUSC College of Medicine, the Department of Medicine provides essential leadership to numerous programs across the university, MUSC Health, and South Carolina. Our Department—made up of 10 divisions engaged in care at two hospital systems and multiple ambulatory practices—is guided by our vision to provide superior patient care, to educate the next generation of physicians, and to generate groundbreaking scientific discoveries to improve human health.

Changing What's Possible