

# Pulmonary Medicine

### RESEARCH AND TRAINING DETAILS



[Click to view members](#)

Faculty	26
Joint Appointment Faculty	5
Research Fellows	7
Research Students	19
Support Personnel	30
Direct Annual Grant Support	\$3,608,385
Direct Annual Industry Support	\$493,675
Peer Reviewed Publications	64

### CLINICAL ACTIVITIES AND TRAINING

Clinical Staff	91
Clinical Fellows	11
Other Students	10
Inpatient Encounters	697
Outpatient Encounters	9,873

# Research Highlights

## Recruitment

The Division of Pulmonary Medicine continues to expand its research focus with the recruitment of two leading senior pulmonary researchers, [A.P. Naren](#) and Assem Ziady. They have both rapidly integrated into the research culture at Cincinnati Children's and bring unique interests and talents to the Cincinnati area.

[A.P. Naren, PhD](#), is a professor and the Tom Boat Endowed Chair in Pulmonary Medicine, and he co-directs the Cystic Fibrosis Research Program at Cincinnati Children's. Naren joined the Pulmonary Medicine division at Cincinnati Children's in 2013. He was a professor of biophysics at the [University of Tennessee Health Science Center](#). His expertise is in macromolecular signaling complexes in cells, focusing on how the CFTR protein interacts with protein binding partners. Naren studies pulmonary and gastrointestinal diseases that result from CFTR dysregulation. For example, loss of CFTR function results in cystic fibrosis, while gain in function of CFTR results in secretory diarrhea. His interests also include personalizing therapies to treat cystic fibrosis by using patient-derived model systems to test novel therapeutics.

[Assem Ziady, PhD](#), is an associate professor in Pulmonary Medicine and directs the Biomarker Analysis and Assay Development Core within the Cystic Fibrosis Research Program at Cincinnati Children's. He joined the Division of Pulmonary Medicine at Cincinnati Children's in 2014. Ziady was an associate professor of pediatrics at [Emory University School of Medicine](#) in Atlanta. His expertise is in redox signaling in pulmonary disorders including cystic fibrosis, focusing on how CFTR dysfunction upsets the normal balance of oxidants and antioxidants. Ziady is also focused on enhancing non-viral vectors to increase the efficiency of gene delivery, and the use of proteomics to develop novel biomarkers of cystic fibrosis disease.

## New Imaging Technology

[Jason Woods, PhD](#), and [Zackary Cleveland, PhD](#), are pushing the envelope to advance magnetic resonance-based imaging of the lung in pediatrics. The team utilizes "ultrashort echo time," or UTE, MRI to obtain high-quality structural detail of the lungs, which has traditionally been hampered by technical limitations of MR imaging. These capabilities are being examined in pediatric pulmonary and neonatal populations. Woods and Cleveland have further advanced hyperpolarized gas imaging (129 Xenon) to quantify regional ventilation in the lungs, pushing these technologies into younger patients with rare lung disorders. The researchers have teamed up with [Bruce Trapnell, MD](#), to quantify pulmonary surfactant levels in patients with pulmonary alveolar proteinosis (PAP), serving to monitor response to interventions and potentially develop new treatments.

## Expanded Research Collaborations

The Pulmonary Medicine research team has developed new, and strengthened existing, partnerships with other Cincinnati Children's divisions: [Pulmonary Biology](#); [General and Thoracic Surgery](#); [Developmental Biology](#); [Biostatistics and Epidemiology](#); [Gastroenterology, Hepatology and Nutrition](#); and [Cardiovascular Imaging Core](#) through the Cystic Fibrosis Foundation (CFF) and supported CF Research Development Program (CF-RDP) under the direction of [JP Clancy, MD](#). This core grant supports CF-focused research and training across campus, and the nation, and was initially established by [Jeffrey Whitsett, MD](#), over 20 years ago. The theme of the Cincinnati Children's program is "Personalized Medicine for CF," and it is funded at \$470,000/year through 2019 (~25% increase over prior funding).

Pulmonary Medicine at Cincinnati Children's is also part of three additional CFF-supported programs that aim to transform disease. 1) The CF [C3N](#) (or Collaborative Chronic Care Network) aims to develop a learning health system to better inform and manage patients with CF. This program, headed by [Michael Seid, PhD](#), and [Peter Margolis, MD](#), who is with the [James M. Anderson Center for Health Systems Excellence](#), is currently completing the design phase, and will be rolling out new interactive care tools in the fall of 2015. 2) [Gary McPhail, MD](#), associate professor and [CF Care Center](#) director, and [Chris Siracusa, MD](#), assistant professor, have joined the recently inaugurated CFF Adherence Consortium. This national

network seeks to understand and develop new tools to improve adherence in CF, which directly impacts patient outcomes and quality of life. 3) The Cincinnati Children's CF Therapeutic Development Network grant was renewed, and the Cincinnati Children's site was identified as a top quartile-performing center, with increased funding and studies in young pediatric patients with CF.

Asthma is the most common chronic disorder in pediatrics that touches numerous pediatric disciplines, including Pulmonary Medicine. Under the leadership of professors [Carolyn Kerckmar, MD](#), and [Theresa Guilbert, MD](#), who research to better understand and manage asthma in the inner-city community, the team has received a grant from the Luther Foundation in 2015. The team will conduct research to better understand the barriers and opportunities to improve asthma outcomes in difficult to treat pediatric populations, focusing on one of the key community health missions of Cincinnati Children's.

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## Significant Publications

[Clancy JP](#). [CFTR potentiators: not an open and shut case](#). *Sci Transl Med*. 2014 Jul 23;6(246):246fs27.

This is a requested expert review of two articles presented in the same issue of *Science Translational Medicine* (Veit *et al.* and Cholon *et al.*) Insights into the positive and negative effects of drugs to treat cystic fibrosis (CF) patients with a common mutation raise questions about how we discover and translate CF therapeutics. The articles delve deeper into the effects of ivacaftor on the common CF-causing mutant protein (F508del CFTR) after it has been localized to the plasma membrane. The results provide the CF research community with future therapeutic development considerations, including assessment of protein stability as part of the lead candidate selection process, and possibilities for different combinations of modulators within and between classes to be personalized for individual CF patients (targeting one or more types of CFTR dysfunction). The new data illustrate how much more there is to learn about CFTR in the post-modulator era and that scientific translation is an iterative process moving from the bench to the bedside and back.

Faro A, [Wood RE](#), [Schechter MS](#), Leong AB, Wittkugel E, Abode K, Chmiel JF, Daines C, Davis S, Eber E, Huddleston C, Kilbaugh T, Kurland G, Midulla F, Molter D, Montgomery GS, Retsch-Bogart G, Rutter MJ, Visner G, Walczak SA, Ferkol TW, Michelson PH; American Thoracic Society Ad Hoc Committee on Flexible Airway Endoscopy in Children. [Official American Thoracic Society technical standards: flexible airway endoscopy in children](#). *Am J Respir Crit Care Med*. 2015 May 1;191(9):1066-80.

Published technical standards on how to perform airway endoscopy (FAE) in children are lacking, despite it being an accepted and frequently performed procedure in the evaluation of known or suspected airway and lung parenchymal disorders. A multidisciplinary committee, approved by The American Thoracic Society (ATS) to delineate technical for performing FAE in children, completed a pragmatic synthesis of the evidence and utilized it to answer clinically relevant questions. Based predominantly on the collective clinical experience of committee members, recommendations were developed highlighting the importance of FAE-specific airway management techniques and anesthesia, establishing suggested competencies for the bronchoscopist in training, and defining areas deserving further investigation. These ATS-sponsored technical standards describe the equipment, personnel, competencies, and special procedures associated with FAE in children.

[Guilbert TW](#), Mauger DT, Lemanske RF Jr. [Childhood asthma-predictive phenotype](#). *J Allergy Clin Immunol Pract*. 2014 Nov-Dec;2(6):664-70.

The asthma-predictive phenotype is defined in children as having frequent, recurrent wheezing in early life and risk factors associated with the continuation of asthma symptoms in later life. Genetic, environmental, developmental, and host factors and their interactions may contribute to the development, severity, and persistence of the asthma

phenotype over time. Several asthma-predictive phenotypes were developed retrospectively based on large, longitudinal cohort studies. Key characteristics were determined by this study distinguishing the childhood asthma-predictive phenotype; including being male, having a history of wheezing with lower respiratory tract infections, parental asthma, or atopic dermatitis, early sensitization to food or aeroallergens, eosinophilia, or lower lung function in early life.

Powers SW, Stark LJ, Chamberlin LA, Filigno SS, Sullivan SM, Lemanek KL, Butcher JL, Driscoll KA, Daines CL, Brody AS, Schindler T, Konstan MW, McCoy KS, Nasr SZ, Castile RG, Acton JD, Wooldridge JL, Ksenich RA, **Szczesniak RD**, Rausch JR, Stallings VA, Zemel BS, **Clancy JP**. **Behavioral and nutritional treatment for preschool-aged children with cystic fibrosis: a randomized clinical trial.** *JAMA Pediatr.* 2015 May;169(5):e150636.

Evidence-based treatments that achieve optimal energy intake and improve growth in preschool-aged children with cystic fibrosis (CF) are a critical need. This randomized clinical trial was designed to test whether behavioral and nutritional treatment (intervention) was superior to an education and attention-control treatment. The results provide evidence that behavioral and nutritional treatment may be efficacious as a nutritional intervention for preschoolers aged two to six years with CF and pancreatic insufficiency. (clinicaltrials.gov identifier: [NCT00241969](#))

Pennati F, Quirk JD, Yablonskiy DA, Castro M, Aliverti A, **Woods JC**. **Assessment of regional lung function with multivolume (1)H MR imaging in health and obstructive lung disease: comparison with (3)He MR imaging.** *Radiology.* 2014 Nov;273(2):580-90.

This study introduces a method based on multivolume proton (hydrogen [(1)H]) magnetic resonance (MR) imaging for the regional assessment of lung ventilatory function. The use of this method was investigated in healthy volunteers and patients with obstructive lung disease, the outcome of which was compared with the outcome of the research standard, helium 3 MR imaging. The findings of this study demonstrate that multivolume (1)H MR imaging, without contrast material, can be used as a biomarker for regional ventilation, both in healthy volunteers and patients with obstructive lung disease.

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## Division Publications

1. Arora K, Moon C, Zhang W, Yarlagadda S, Penmatsa H, Ren A, Sinha C, Naren AP. **Stabilizing rescued surface-localized deltaf508 CFTR by potentiation of its interaction with Na(+)/H(+) exchanger regulatory factor 1.** *Biochemistry.* 2014; 53:4169-79.
2. Beck AF, Huang B, Kerckmar CM, Guilbert TW, McLinden DJ, Lierl MB, Kahn RS. **Allergen sensitization profiles in a population-based cohort of children hospitalized for asthma.** *Ann Am Thorac Soc.* 2015; 12:376-84.
3. Biagini Myers JM, Simmons JM, Kerckmar CM, Martin LJ, Pilipenko VV, Austin SR, Lindsey MA, Amalfitano KM, Guilbert TW, McCoy KS, Forbis SG, McBride JT, Ross KR, Vauthy PA, Khurana Hershey GK. **Heterogeneity in asthma care in a statewide collaborative: the Ohio Pediatric Asthma Repository.** *Pediatrics.* 2015; 135:271-9.
4. Case LE, Bjartmar C, Morgan C, Casey R, Charrow J, Clancy JP, Dasouki M, DeArmev S, Nedd K, Nevins M, Peters H, Phillips D, Spigelman Z, Tift C, Kishnani PS. **Safety and efficacy of alternative alglucosidase alfa regimens in Pompe disease.** *Neuromuscul Disord.* 2015; 25:321-32.
5. Chang TS, Gangnon RE, David Page C, Buckingham WR, Tandias A, Cowan KJ, Tomasallo CD, Arndt BG, Hanrahan LP, Guilbert TW. **Sparse modeling of spatial environmental variables associated with asthma.** *J Biomed Inform.* 2015; 53:320-9.

6. Cheng J, Purcell HN, Dimitriou SM, Grossoehme DH. **Testing the feasibility and acceptability of a chaplaincy intervention to improving treatment attitudes and self-efficacy of adolescents with cystic fibrosis: a pilot study.** *J Health Care Chaplain.* 2015; 21:76-90.
7. Clancy JP. **CFTR potentiators: not an open and shut case.** *Sci Transl Med.* 2014; 6:246fs27.
8. Conrad C, Lymp J, Thompson V, Dunn C, Davies Z, Chatfield B, Nichols D, Clancy J, Vender R, Egan ME, Quittell L, Michelson P, Antony V, Spahr J, Rubenstein RC, Moss RB, Herzenberg LA, Goss CH, Tirouvanziam R. **Long-term treatment with oral N-acetylcysteine: affects lung function but not sputum inflammation in cystic fibrosis subjects. A phase II randomized placebo-controlled trial.** *J Cyst Fibros.* 2015; 14:219-27.
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10. Davidson Ward SL, Amin R, Arens R, Zhongping C, Davis S, Gutmark E, Superfine R, Wong B, Zdanski C, Khoo MC. **Pediatric sleep-related breathing disorders: advances in imaging and computational modeling.** *IEEE Pulse.* 2014; 5:33-9.
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12. Downes KJ, Rao MB, Kahill L, Nguyen H, Clancy JP, Goldstein SL. **Daily serum creatinine monitoring promotes earlier detection of acute kidney injury in children and adolescents with cystic fibrosis.** *J Cyst Fibros.* 2014; 13:435-41.
13. Edukulla R, Singh B, Jegga AG, Sontake V, Dillon SR, Madala SK. **Th2 Cytokines Augment IL-31/IL-31RA Interactions via STAT6-dependent IL-31RA Expression.** *J Biol Chem.* 2015; 290:13510-20.
14. Faro A, Wood RE, Schechter MS, Leong AB, Wittkugel E, Abode K, Chmiel JF, Daines C, Davis S, Eber E, Huddleston C, Kilbaugh T, Kurland G, Midulla F, Molter D, Montgomery GS, Retsch-Bogart G, Rutter MJ, Visner G, Walczak SA, Ferko TW, Michelson PH, American Thoracic Society Ad Hoc Committee on Flexible Airway Endoscopy in C. **Official american thoracic society technical standards: flexible airway endoscopy in children.** *Am J Respir Crit Care Med.* 2015; 191:1066-80.
15. Fleck RJ, Amin RS, Shott SR, Mahmoud MA. **MRI sleep studies: use of positive airway pressure support in patients with severe obstructive sleep apnea.** *Int J Pediatr Otorhinolaryngol.* 2014; 78:1163-6.
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18. Guilbert TW, Bacharier LB, Fitzpatrick AM. **Severe asthma in children.** *J Allergy Clin Immunol Pract.* 2014; 2:489-500.
19. Guilbert TW, Mauger DT, Lemanske RF, Jr.. **Childhood asthma-predictive phenotype.** *J Allergy Clin Immunol Pract.* 2014; 2:664-70.

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57. Tiddens HA, De Boeck K, Clancy JP, Fayon M, H GMA, Bresnik M, Derchak A, Lewis SA, Oermann CM, investigators As. **Open label study of inhaled aztreonam for Pseudomonas eradication in children with cystic fibrosis: The ALPINE study.** *J Cyst Fibros.* 2015; 14:111-9.
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61. Walkup LL, Woods JC. **Translational applications of hyperpolarized 3He and 129Xe.** *NMR Biomed.* 2014; 27:1429-



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64. Ziady AG, Hansen J. **Redox balance in cystic fibrosis.** *Int J Biochem Cell Biol*. 2014; 52:113-23.
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## Faculty, Staff, and Trainees

### Faculty Members

**Raouf Amin, MD**, Professor

**Leadership** Director, Division of Pulmonary Medicine;; Endowed Chair, Hubert and Dorothy Campbell Professorship in Pediatric Pulmonology

**Research Interests** Cardiovascular morbidity of sleep apnea in children

**Thomas Boat, MD**, Professor

**Leadership** Executive Associate Dean, University of Cincinnati College of Medicine

**Ronald Bokulic, DO**, Associate Professor

**Lisa Burns, MD**, Assistant Professor

**Research Interests** CF Transition of Care;Pulmonary Vascular Disease

**Barbara Chini, MD, D-ABSM, FAAP**, Associate Professor

**Leadership** Director, Pulmonary Fellowship Program; Associate Director, Cystic Fibrosis Center; Medical Director, A7C1

**Research Interests** Sleep Disordered Breathing, Outcomes Research, Self-Management of Chronic diseases

**John P. Clancy, MD**, Professor

**Leadership** Thomas Boat Endowed Chair; Director, Clinical and Translational Research

**Research Interests** Airway and epithelial biology, examining novel targets to treat cystic fibrosis;

**Zackary Cleveland, Ph.D.**, Assistant Professor

**Joseph Crisalli, MD**, Assistant Professor

**Research Interests** Pediatric Sleep, Exercise Physiology

**Daniel Grosseohme, DMin, BCC**, Associate Professor

**Research Interests** Religion/ spirituality, adherence, coping, cystic fibrosis

**William Hardie, MD**, Professor

**Leadership** Director, Pulmonary Function Laboratory

**Research Interests** Molecular mechanism of pulmonary fibrosis, pediatric pulmonary function tests, pediatric pneumonia complications

**Patricia Joseph, MD**, Professor

**Research Interests** Cystic fibrosis infections and quality improvement

**Carolyn Kerckmar, MD**, Professor

**Leadership** Co-Director, Division of Pulmonary Medicine; Director, Asthma Center

**Research Interests** Asthma, inner city asthma, clinical outcomes and clinical trials, airway inflammation

**Satish Madala, PhD**, Assistant Professor

**Research Interests** Immunoregulatory Mechanisms in pulmonary inflammation and fibrosis; Stromal cell contribution in pulmonary fibrosis

**Karen McDowell, MD**, Associate Professor

**Leadership** Director, Infant Pulmonary Function Laboratory

**Research Interests** Asthma self management, utilization of technology for chronic disease management, bronchoscopy and wheezing/asthma, health care effectiveness, outcomes.

**Gary McPhail, MD**, Associate Professor

**Leadership** Director, Cystic Fibrosis Center; Associate Director, Fellowship Training Program

**Research Interests** Cystic fibrosis, quality improvement, clinical outcomes, pulmonary vascular disease

**Anjaparavanda Naren, PhD**, Professor

**Research Interests** Cystic fibrosis; secretory diarrhea.

**Hemant Sawnani, MD**, Assistant Professor

**Research Interests** Pulmonary Management of children with Neuromuscular diseases; sleep disordered breathing in Duchenne Muscular Dystrophy; Infant Apnea; Obstructive Sleep Apnea; Outcomes in Sleep Medicine

**Marc Schechter, MD**, Associate Professor

**Leadership** Medical Director, Pediatric Lung Transplant Program

**Research Interests** Risk factors affecting transplant outcomes and the impact of transplant procedures on recipients' quality of life.

**Michael Seid, PhD**, Professor

**Leadership** Director, Health Outcomes and Quality of Care Research

**Research Interests** Health outcomes for children with chronic health conditions, interventions to overcome barriers to care and adherence, clinical behavior and effects on self-management, quality improvement research

**Abu Shamsuzzaman, MD**, Assistant Professor

**Research Interests** Sleep and Cardiovascular Diseases

**Narong Simakajornboon, MD**, Professor

**Leadership** Director, Sleep Disorders Center; Director, Sleep Medicine Fellowship Program

**Research Interests** Sleep-disordered breathing in children, sleep apnea, restless legs syndrome, periodic limb movement disorders

**Cherie Torres-Silva, MD**, Assistant Professor

**Research Interests** Biomarkers in bronchoalveolar lavage and Pulmonary Outcomes in childhood cancer survivors

**Robert Wood, PhD, MD**, Professor

**Leadership** Director, Pulmonary Bronchology Program

**Research Interests** Airway abnormalities; pulmonary alveolar proteinosis

**Jason Woods, Ph.D.**, Professor

**Leadership** Director, Pulmonary Imaging Research Center

**Research Interests** Pulmonary MRI, translational imaging, and image-guided pulmonary interventions

## Joint Appointment Faculty Members

**Kelly Byars, PsyD**, Associate Professor (Psychology)

**Research Interests** Current research focuses on improving the assessment and treatment of pediatric insomnia and pediatric obstructive sleep apnea

**Rhonda Szczesniak, PhD**, Assistant Professor (Biostatistics & Epidemiology)

**Research Interests** Current areas of interest are Mixture Models and Functional Data Analysis with focus on Bayesian statistics, primarily using Markov Chain Monte Carlo. Content-specific areas include integration of fMRI and MEG modalities; developing statistical models to assess impact of OSA; CF outcomes research

**Bruce Trapnell, MD**, Professor (Neonatology and Pulmonary Biology)

**Nanhua Zhang, M.D.**, Assistant Professor (Biostatistics & Epidemiology)

**Research Interests** Missing data; comparative effectiveness; clinical trial design; meta-analysis; scale development; joint modeling; environmental health; community-based intervention; health disparity; behavioral intervention; health psychology

## **Clinical Staff Members**

- **Moutazz Abdulhadi, RPSGT**, PSG Tech/RRT III
- **Rosalynn Allie, RRT**, RT I
- **Denetra Bamonte, RRT, RPSGT**, PSG Tech III
- **Sallie Bauer, RRT, RPSGT**, PSG Tech III
- **Laura Bellew, RN**, Nurse Coordinator
- **Walter Blower, RRT**, Resp Therapist III
- **Marsha Blount, CNP**, Certified Nurse Practitioner
- **Kelli Brock, MA**, Medical Assistant II
- **Ginger Browning, RRT, BS**, Airway Clearance Specialist
- **Johnny Bryant, RRT, RPSGT**, PSG Tech
- **Carolyn Burrows, CNP**, Certified Nurse Practitioner
- **Monica Chapman, RN**, Nurse Coordinator
- **Jessica Co, CNP**, Certified Nurse Practitioner
- **Amy Cole, RRT, RPSGT**, Clinical Manager
- **Adrienne Conrad, RRT**, PSG Tech/RRT
- **Mindy Copens, , Patient Care Assistant**
- **Lisa Corlett, RT**, PSG Tech/RRT
- **Shannon Deidesheimer, RN**, Nurse Coordinator
- **Guido DiMarco, LSW**, Social Worker III
- **Geri Dinkins, RN**, Care Manager
- **Catherine Disney, RT**, PSG Tech !!
- **Melodie Dixon, RRT, RPSGT**, PSG Tech III
- **Amanda Dressman, CNP**, Certified Nurse Practitioner

- **Lori Duan, RN**, Clinical Manager
- **Rebekah Dunning, RRT**, RT II
- **Julie Feldstein, RRT, CPFT**, RTIII
- **Karla Foster, MS**, Exercise Physiologist
- **Shanda Furnish**, , PSG Tech Asst
- **Janice Gramke, RN**, Nurse Coordinator
- **Chuck Grone, RT**, RT III
- **Neepa Gurbani, DO**, Staff Physician
- **Robin Hamilton, RN**, Clinical Director
- **Joann Harmeyer, RRT, RPSGT**, Education Specialist I
- **Amanda Hatfield, RRT**, PSG Tech III
- **Samantha Hollandsworth, MA**, Medical Assistant II
- **Jami Johnson, CNP**, Certified Nurse Practitioner
- **Marion Johnson, RRT**, PSG Tech II
- **Robin Johnson, RRT**, PSG Tech I
- **Shannon Johnson, RN**, Clinical Manager
- **Sharon Kadon, RN**, Nurse Coordinator
- **Michelle Kaiser, RRT**, RRT III
- **Amanda Kelly, RRT**, PSG Tech
- **Michelle Kleinhenz, RRT**, PSG Tech II
- **Beth Koch, RRT, RPFT**, Clinical Manager
- **Margaret Landers, RRT, RPSGT**, PSG Tech III
- **Denise Leonard, RN**, Care Manager
- **Jean Luchini, RN**, Nurse Coordinator
- **Janice MacBrair, CNP**, Certified Nurse Practitioner
- **Julie Malkin, CNP**, Certified Nurse Practitioner
- **Holly Malone**, , PSG Tech Asst
- **Patricia Manaster, RN**, Registered Nurse
- **Carrie Martin, CNP**, Certified Nurse Practitioner
- **Karin Mauser, RN**, Registered Nurse II

- **Susan McCarthy, RRT, RPSGT**, PSG Tech III
- **Carolyn McHendry, RT**, RT II
- **Connie Meeks, RN**, Care Manager
- **Jamie Miller, LSW**, Social Worker
- **Alyssa Mohr, RN**, Nurse Coordinator
- **Steve Moore, RN**, Clinical Coordinator
- **Susan Moore, LSW**, Social Worker
- **Abigail Motz, RT**, RT II
- **Whitney Niles, ,** PSG Tech Asst
- **Patricia Norton, RN**, Clinical Program Manager
- **Andrea O'Brien, Ph.D, MSW, LSW**, Social Worker II
- **Laura Ogilby, RRT**, RT II
- **Teresa O'Hara, RN**, Care Manager
- **Kenneth Olding, RT**, PSG Tech/RRT
- **John Pack, RRT**, RT III (Bronch)
- **Jennifer Parson, ,** PSG Tech
- **Grace Pestian, RD**, Registered Dietician
- **Rebecca Quarles, RN**, Care Manager
- **Jeanne Race, RN**, Registered Nurse II
- **Steven Reimondo, RT**, PSG Tech/RRT
- **Melissa Rice, CNP**, Certified Nurse Practitioner
- **Rachel Sackenheim, MSW, LSW**, Social Worker
- **Valerie Sackenheim, RN**, Nurse Coordinator
- **Kathy Santoro, RD, LD**, RD III
- **Jennifer Schaber, RT**, PSG Tech/RRT
- **Kary Schmale, RN**, Nurse Coordinator
- **Leah Seals, RD**, Registered Dietician
- **Joshua Shannon, RT**, RT II
- **Erika Skovmand, RT**, PSG Tech II
- **Dusti Snider, RN**, Registered Nurse

- **Dianne Stratton, RRT, RT II**
- **Jackie Taylor, RD, LD, RD III**
- **Jenetta Thomas, RN, Nurse Coordinator**
- **Sarah Thomas, CNP, Certified Nurse Practitioner**
- **Karin Tiemeyer, RN, Care Manager**
- **Stephanie Torrens, RN, Registered Nurse**
- **Simone Urbach, CNP, Certified Nurse Practitioner**
- **Tracey Van Vliet, CNP, Certified Nurse Practitioner**
- **Aarhi Vemana, M.D., Staff Physician**
- **Allison Volpenhein, , PSG Tech Asst**
- **Brittany Waddle, CNP, Certified Nurse Practitioner**
- **Mark Washam, CNP, Certified Nurse Practitioner**
- **Debbie Webster, BA, RRT, RPSGT, RRT II**
- **Tonya Weddle, RRT, PSG Tech II**
- **Jeanne Weiland, CNP, Certified Nurse Practitioner**
- **Erin Wells, RN, Transplant Care Manager**
- **Jenny Werder, RN, Care Manager**
- **Kathy Witschger, RRT, RT II**
- **Lilianna Wooten, CNP, Certified Nurse Practitioner**
- **Brenda Young, RRT, PSG Tech**

### **Trainees**

- **Dan Benscoter, DO, PL-8, Geisinger Medial Center**
  - **John Brewington, MD, PL-5, Cincinnati Children's Hospital Medical Center**
  - **Justin Brockbank, MD, PL-6, Virginia Comm. Univ. Medical Center**
  - **Thomas Dye, MD, PL-6, Cincinnati Children's Hospital Medical Center**
  - **Zarmina Ehsan, MBBS, PL-5, Indiana University**
  - **Annette Lopez, MD, PL-4, University of Arizona Tucson, Arizona**
  - **Oscar Rodriguez, MD, PL-7, St. Louis Children's Hospital Medical Center**
  - **Geoffrey Rulong, M.D, MPH, PL-4, Children's Hospital of the Kings Daughter Norfolk, VA**
  - **Christopher Siracusa, MD, PL-5, Akron Children's Hospital**
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# Grants, Contracts, and Industry Agreements

Grant and Contract Awards

Annual Direct

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## Amin, R

### **Pediatric Sleep Research Program**

National Institutes of Health

K24 HL078989

3/1/2011-2/29/2016

\$139,466

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## Brewington, J

### **Clinical Fellowship Training Grant**

Cystic Fibrosis Foundation

7/1/2013-6/30/2015

\$49,750

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## Clancy, J

### **CFFT Biomarkers Consortium**

Cystic Fibrosis Foundation Therapeutics, Inc.

01/01/2015-12/31/2015

\$22,913

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### **CFF Therapeutics Development Center**

Cystic Fibrosis Foundation Therapeutics, Inc

1/1/2013-12/31/2015

\$146,889

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### **A Two-Part Multicenter Prospective Longitudinal Study of CFTR-dependent Disease Profiling in Cystic Fibrosis (PROSPECT)**

Cystic Fibrosis Foundation Therapeutics, Inc

7/1/2014-6/30/2019

\$49,136

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### **Upper and Lower Airway CF Microbiome: Pediatric Subject Characterization, Sample Acquisition, and Processing**

Cystic Fibrosis Foundation Therapeutics, Inc

7/1/2014-6/30/2016

\$36,545

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### **TDC ARC Award**

Cystic Fibrosis Foundation Therapeutics, Inc

12/1/2014-11/30/2016

\$83,153

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### **Personalizing Cystic Fibrosis Research Translation**

Cystic Fibrosis Foundation

	3/1/2012-6/30/2015	\$384,368
Satish K. Madala, PhD	Molecular Mechanisms of Pulmonary Fibrosis in Cystic Fibrosis with $\Delta$ F508 CFTR mutation	\$65,000.00
Jason Woods, PhD	Regional Structure-function	\$65,000.00
David Haslam, MD	Whole bacterial genome sequencing applied to the care of cystic fibrosis patients	\$65,000.00
Jeffrey A. Whitsett, MD	Transfenic Core	\$50,000.00

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**Pilot Development of Translational Primary Human Airway Model Systems to Advance CF Care**

Cystic Fibrosis Foundation

7/1/2014-6/30/2015 \$58,865

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**2015 TDN Spring Meeting**

Cystic Fibrosis Foundation

2/1/2015-7/31/2015 \$6,250

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**Early Intervention in Pulmonary Exacerbation**

Cystic Fibrosis Foundation Therapeutics, Inc (Children's Hospital and Regional Med Ctr - Seattle)

6/1/2012-7/31/2015 \$6,127

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**Early Intervention in Pulmonary Exacerbation**

Cystic Fibrosis Foundation Therapeutics, Inc (Children's Hospital and Regional Med Ctr - Seattle)

8/13/2013-8/12/2016 \$17,831

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**OPTIMIZE Multicenter Randomized Trial**

National Institutes of Health(Children's Hospital and Regional Med Ctr - Seattle)

U01 HL114623 9/15/2013-6/30/2018 \$8,023

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**MR Predictors of Infection, Inflammation, and Structural Lung Damage in CF**

National Institutes of Health

R01 HL116226 9/26/2012-6/30/2016 \$392,283

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**Hardie, W**

**Ruth L. Kirschstein National Research Service Award Short-Term Institutional Research Training Grant**



National Institutes of Health		
T35 HL113229	5/1/2012-4/30/2016	\$51,550
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<b>Heubi, J</b>		
<b>Baby Observational and Nutritional Supplement (BONUS) Study</b>		
Cystic Fibrosis Foundation Therapeutics, Inc(Children's Hosp & Reg Med Ct-Seattle)		
	5/1/2015-4/30/2016	\$7,227
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<b>Baby Observational and Nutritional Supplement (BONUS) Study_Reimbursement</b>		
Cystic Fibrosis Foundation Therapeutics, Inc(Children's Hosp & Reg Med Ct-Seattle)		
	5/1/2015-4/30/2016	\$1,370
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<b>Kramer, E</b>		
<b>Cystic Fibrosis Foundation Clinical Fellowship Grant</b>		
Cystic Fibrosis Foundation		
	7/1/2014-6/30/2016	\$48,000
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<b>Madala, S</b>		
<b>Role of TGF<math>\alpha</math>-induced Fibrocytes in Pulmonary Fibrosis and Pulmonary Hypertension</b>		
American Heart Association		
	1/1/2012-12/31/2015	\$70,000
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<b>The Role of IL-31 Cytokine-Drive Systemic Sclerosis</b>		
National Institutes of Health		
R03 AR062832	6/17/2013-5/31/2016	\$50,000
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<b>Molecular Mechanisms of TGF (alpha)-driven Pulmonary Fibrosis</b>		
Parker B. Francis Fellowship Program		
	7/1/2013-6/30/2016	\$52,000
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<b>McPhail, G</b>		
<b>CFF Success with Therapies Research Consortium</b>		
Cystic Fibrosis Foundation Therapeutics, Inc		
	8/1/2014-7/31/2017	\$25,000
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<b>Cystic Fibrosis Center Program Accreditation And Funding</b>		
Cystic Fibrosis Foundation		

7/1/2013-6/30/2018

\$117,110

**Naren, A****CF-Patient Specific Enteroids from Small Intestine and Colon**

Cystic Fibrosis Foundation Therapeutics, Inc

7/1/2014-6/30/2015

\$205,956

**Inhibition of an Apical cAMP/cGMP Transporter (MRP4) in the Gut Induces Diarrhea**

National Institutes of Health

R01 DK080834

9/18/2013-3/31/2018

\$222,346

**LPA2 Receptor-containing Complexes in Regulating Secretory Diarrhea**

National Institutes of Health

R01 DK093045

8/1/2013-6/30/2015

\$195,750

**Characterization of an Inhibitory Protein Complex for Cystic Fibrosis Therapy**

National Institutes of Health(University of Tennessee Health Science Center)

R01 HL123535

8/15/2014-6/30/2019

\$11,368

**Ruppert, K****Simultaneous Xe129 MRI of Regional Lung Ventilation and Gas Uptake in COPD**

National Institutes of Health(University of Virginia)

R01 HL109618

12/23/2013-5/31/2016

\$12,300

**Seid, M****A C3N for CF: Design and Development of a Peer-Produced Learning Health System**

Cystic Fibrosis Foundation Therapeutics, Inc

7/1/2014-9/30/2015

\$500,054

**FL3X: An Adaptive Intervention to Improve Outcomes for Youth with Type 1 Diabetes**

National Institutes of Health (University of North Carolina)

UC4 DK101132

9/15/2013-6/30/2018

\$387,514

**Measures of Hypoglycemia and Glycemic Variability Using Continuous Glucose Monitoring in the FL3X Intervention for Youth With Type 1 Diabetes**

The Leona M &amp; Harry B Helmsley Charitable Foundation (University of North Carolina)

1/1/2014-12/31/2016

\$13,700

**Woods, J****Severe Asthma Research Program**

National Institutes of Health(Washington University)

U10 HL109257

2/1/2013-5/31/2017

\$5,586

**Ziady, A****Dysregulation of Nrf2 in CF Epithelia**

National Institutes of Health

R01 HL109362

4/22/2015-4/30/2015

\$229,955

**Current Year Direct****\$3,608,385****Industry Contracts****Clancy, J**

Cystic Fibrosis Fdn Therapeutics, Inc

\$2,529

Gilead Sciences, Inc

\$18,456

Kalobios Pharmaceuticals, Inc

\$34,361

Nivalis Therapeutics

\$49,442

Bayer Healthcare Pharmaceuticals Inc

\$13,500

Vertex Pharmaceutical Incorporated

\$106,239

**McPhail, G**

Nivalis Therapeutics

\$24,828

Vertex Pharmaceutical Incorporated

\$31,538

**Naren, A**

Ironwood Pharmaceuticals

\$19,332

Vertex Pharmaceutical Incorporated

\$63,398

**Simakajornboon, N**

Jazz Pharmaceuticals Inc.

\$112,823

**Woods, J**

Vertex Pharmaceutical Incorporated

\$17,229

**Current Year Direct Receipts**

**\$493,675**

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**Total**

**\$4,102,060**

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# Understanding of Cystic Fibrosis Leads to Novel Findings About Drug-Induced Diarrhea



Anjaparavanda Naren, PhD

PUBLISHED MAY 1, 2015

*The Journal of Biological Chemistry*

Research by Anjaparavanda Naren, PhD, into the underlying mechanisms of cystic fibrosis — a disease marked by impaired fluid secretions in the lung — is providing insights into why 7 percent of patients develop diarrhea as an adverse effect of certain prescription drugs.

Naren is the Thomas Boat Chair in Cystic Fibrosis Research and Co-Director, Cystic Fibrosis Research Center. He and a Pulmonary Medicine research team that included Chang Suk Moon, PhD, Kavisha Arora, PhD, and Sunitha Yarlagadda have identified an interplay between multidrug resistance protein 4 (MRP4) and the cystic fibrosis transmembrane conduct regulator (CFTR), a chloride channel on epithelial cells that retains and releases fluids. In cystic fibrosis, the channel underperforms, keeping fluids in the lungs; in diarrhea, the channel over-performs and releases fluids into the intestines and bowel.

“Until now, we did not have a good model system to study intestinal biopsies, because the tissue samples are so small,” Naren explains. His team deployed stem-cell technologies to create intestinal organoids, called “enteroids,” from tissue biopsies from mice. The enteroids were exposed in the laboratory to two drugs and monitored for excessive secretions — the symptoms of diarrhea. The enteroids also were monitored to determine how they responded to anti-diarrhea treatments.

The study in *The Journal of Biological Chemistry* involved irinotecan (a colon cancer drug) and AZT, an antiviral drug for HIV/AIDS. The drugs inhibited MRP4, producing compartmentalized accumulation of cAMP (3'-5'-cyclic adenosine monophosphate) in close proximity to the CFTR, activating the channel function and causing excessive fluid secretion and diarrhea.

“Our findings have broad implications and may help to identify therapeutic targets for ameliorating medication-induced diarrheas,” Naren says. “Enteroids allow us to use stem-cell techniques to develop a better index of chloride channel function, giving us the kinds of tools to move into personalized medicine.”

## RESEARCH AND TRAINING DETAILS

Faculty	26
Joint Appointment Faculty	5
Research Fellows	7
Research Students	19
Support Personnel	30
Direct Annual Grant Support	\$3.6M
Direct Annual Industry Support	\$493,675
Peer Reviewed Publications	64

Moon C, Zhang W, Ren A, Arora K, Sinha C, Yarlagadda S, Woodrooffe K, Schuetz JD, Valasani KR, de Jonge HR, Shanmukhappa SK, Shata MT, Buddington RK, Parthasarathi K, Naren AP. Compartmentalized accumulation of cAMP near complexes of multidrug resistance protein 4 (MRP4) and cystic fibrosis transmembrane conductance regulator (CFTR) contributes to drug-induced diarrhea. *J Biol Chem.* 2015;290(18):11246-11257.



A study led by Cincinnati Children’s researchers was featured on the May 2015 cover of *The Journal of Biological Chemistry*. The study reports that CFTR-MRP4-containing macromolecular complexes play an important role in the pathogenesis of drug-induced diarrhea, a finding that could have important clinical implications in the hunt for novel agents to mitigate it.

“Enteroids allow us to use stem-cell techniques to develop a better index of chloride channel function, giving us the kinds of tools to move into personalized medicine.”