

# UNIVERSITY OF SOUTH FLORIDA



Division of Allergy and Immunology

Department of Internal Medicine

Joy McCann Culverhouse Airway Disease Research Center

and The James A. Haley V.A. Medical Center

Tampa, Florida

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**2014**

**Annual Report**

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## MORSANI COLLEGE OF MEDICINE

UNIVERSITY OF SOUTH FLORIDA

DIVISION OF ALLERGY AND CLINICAL IMMUNOLOGY (A/I)  
DEPARTMENT OF INTERNAL MEDICINE  
V.A. MEDICAL CENTER  
13000 BRUCE B. DOWNS BOULEVARD (111D)  
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(813) 972-7631  
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### FACULTY

RICHARD F. LOCKEY, M.D.  
Professor; Medicine, Pediatrics & Public Health  
Division Director, Internal Medicine A/I  
Joy McCann Culverhouse Chair

JOHN W. SLEASMAN, M.D.  
Professor; Pediatrics & Medicine  
Chief, Pediatric A/I & Rheumatology

NOORBIBI K. DAY-GOOD, Ph.D.  
Professor Emer; Pediatrics, Medicine & Public Health

ROGER W. FOX, M.D.  
Professor; Medicine, Pediatrics & Public Health

DENNIS K. LEDFORD, M.D.  
Professor; Medicine & Pediatrics  
Mabel & Ellsworth Simmons Professor

GARY LITMAN, Ph.D.  
Professor; Pediatrics & Medicine

MARK C. GLAUM, M.D., Ph.D.  
Associate Professor; Medicine & Pediatrics

MITCHEL J. SELEZNICK, M.D.  
Associate Professor; Medicine

SANDRA G. GOMPF, M.D.  
Associate Professor; Medicine

NARASAIK KOLLIPUTI, Ph.D.  
Associate Professor; Medicine & Pediatrics

MICHAEL TENG, Ph.D.  
Associate Professor; Medicine & Pediatrics

MARK BALLOW, M.D.  
Professor; Pediatrics & Medicine

PANIDA SRIARON, M.D.  
Assistant Professor; Pediatrics & Medicine

JENNIFER LEIDING, M.D.  
Assistant Professor; Pediatrics & Medicine

JIA-WANG WANG, Ph.D.  
Assistant Professor; Medicine & Pediatrics

GLENN WHELAN, Pharm.D.  
Clinical Assistant Professor; Medicine

ENRIQUE FERNANDEZ-CALDAS, Ph.D.  
Clinical Professor; Medicine

MANDEL SHER, M.D.  
Professor; Pediatrics & Medicine

NATHAN TANG, M.D.  
Associate Professor; Pediatrics & Medicine

MONROE J. KING, D.O.  
Adjunct Clinical Associate Professor; Medicine

BRETT E. STANALAND, M.D.  
Clinical Associate Professor; Medicine

G. EDWARD STEWART II, M.D.  
Clinical Associate Professor; Medicine

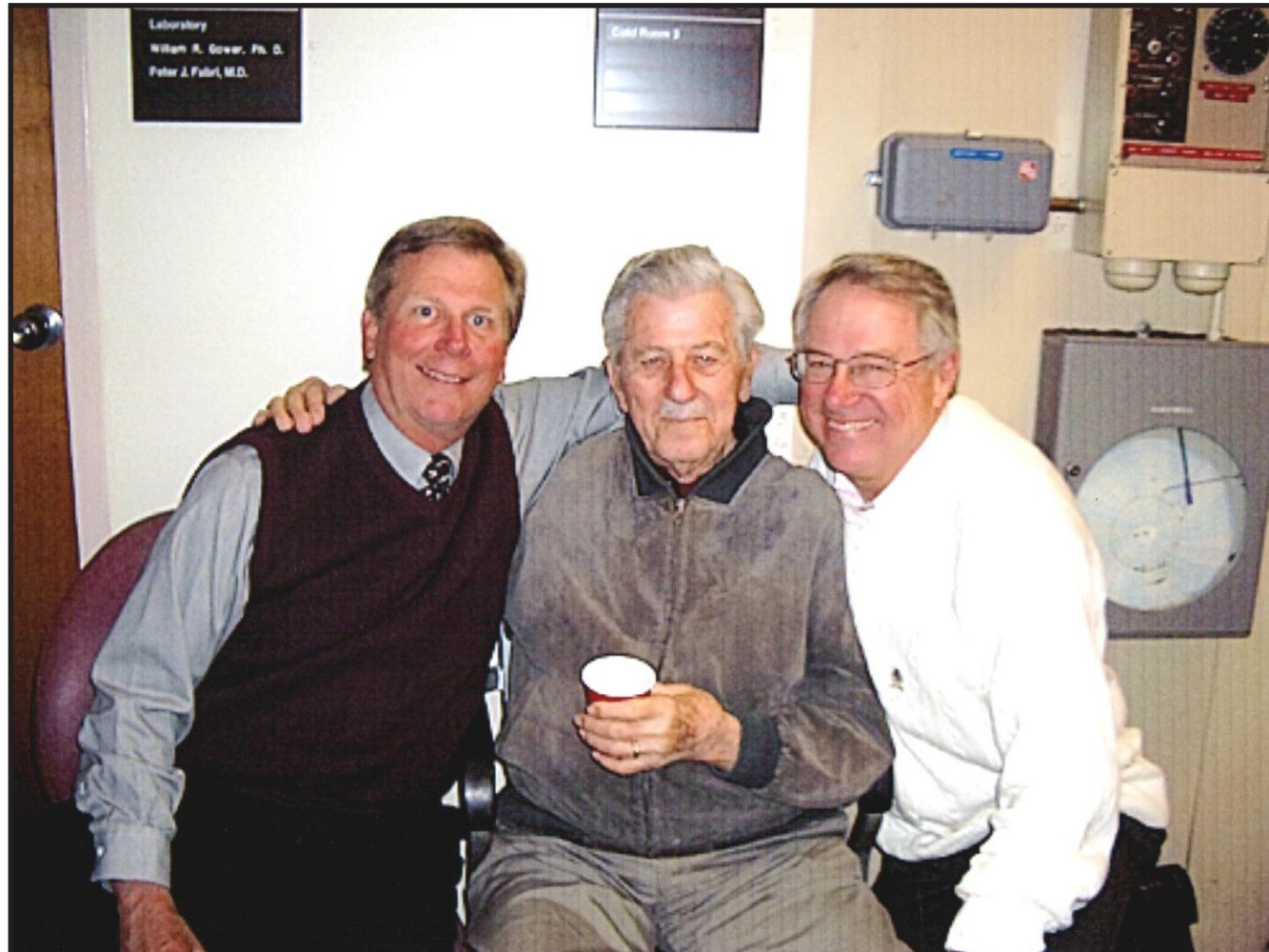
HUGH H. WINDOM, M.D.  
Clinical Associate Professor; Medicine

BLANCA CAMARETTI-MERCADO, Ph.D.  
Ass't Professor; Personalized Med & Medicine

ROSA CODINA, Ph.D.  
Clinical Assistant Professor; Medicine

MARY L. JELKS, M.D.  
Clinical Assistant Professor; Medicine

RONALD T. PURCELL, M.D.  
Clinical Assistant Professor; Medicine



From Left to Right: Roger W. Fox, MD, Samuel C. Bukantz, MD, Richard F. Lockey, MD

## I. GREETINGS!

The late Samuel C. Bukantz, MD, founded the University of South Florida College of Medicine, Department of Internal Medicine, Division of Allergy and Immunology in 1972. Richard F. Lockey, M.D. succeeded Dr. Bukantz in 1983 and is the current Director of the Division. Mrs. Joy McCann Culverhouse endowed the Division in 1997 and The Joy McCann Culverhouse Airway Disease Research Center was dedicated in February 1998. In 1998, Mabel and Ellsworth Simmons endowed the Division with a grant for education and research.

The goals of the Division are: first, to provide care to patients with allergic and immunologic diseases at the University of South Florida College of Medicine, Tampa General Hospital, James A. Haley V.A. Medical Center, All Children's Hospital, and H. Lee Moffitt Cancer Center; second, to train students, residents, and fellows in the subspecialty of allergy and immunology; and third, to conduct basic and clinical research in allergy, asthma, and immunology.

Individuals interested in collaborating with members of the Division may contact Richard F. Lockey, M.D. or any faculty member at (813) 972-.7631 (email: [rlockey@health.usf.edu](mailto:rlockey@health.usf.edu)).

Mandel Sher, M.D., Professor of Pediatrics & Interim Division Chief, Allergy and Immunology,, Department of Pediatrics, may be contacted at (727)-553-1258 (email: [drmrsher@aol.com](mailto:drmrsher@aol.com))

Richard F. Lockey, MD  
Distinguished University Health Professor  
Professor of Medicine, Pediatrics & Public Health  
Joy McCann Culverhouse Chair of Allergy and Immunology  
Director, Division of Allergy and Immunology  
University of South Florida Morsani College of Medicine  
Department of Internal Medicine  
and  
Chief, Section of Allergy/Immunology  
James A. Haley Veterans' Hospital  
Tampa, Florida

## II. FACULTY AND STAFF

### Core Faculty

\* **Richard F. Lockey, M.D.**, University Distinguished Health Professor; Professor of Medicine, Pediatrics, and Public Health; Division Director; Joy McCann Culverhouse Chair of Allergy and Immunology

**Thomas B. Casale, M.D.**, Professor of Medicine

\* **Roger W. Fox, M.D.**, Professor of Medicine, Pediatrics and Public Health

\* **Mark C. Glaum, M.D., Ph.D.**, Associate Professor of Medicine and Pediatrics

\* **Dennis K. Ledford, M.D.**, Professor of Medicine and Pediatrics; Mabel & Ellsworth Simmons Professor

**Narasaiah Kolliputi, Ph.D.**, Associate Professor of Medicine & Pediatrics

**Michael Teng, Ph.D.**, Associate Professor of Medicine & Pediatrics

**Jia-Wang Wang, Ph.D.**, Assistant Professor of Medicine & Pediatrics

### Joint Faculty

**Mandel R. Sher, M.D.**, Interim Division Chief; Clinical Professor of Pediatrics and Medicine

**Mark Ballow, M.D.**, Professor of Pediatrics and Internal Medicine; Director, Pediatric Allergy & Immunology

**Noorbibi K. Day-Good, Ph.D.**, Professor Emeritus; Pediatrics, Medicine & Public Health

**Blanca Camoretti-Mercado, Ph.D.**, Assistant Professor of Personalized Medicine and Medicine

**Jennifer Leiding, M.D.**, Assistant Professor of Pediatrics and Medicine

**Gary W. Litman, Ph.D.**, Professor of Pediatrics and Medicine; University Distinguished Health Professor; Andrew and Ann Hines Chair in Pediatrics

**Panida Sriaroon, M.D.**, Assistant Professor of Pediatrics and Medicine

### Clinical Faculty

**Enrique Fernandez-Caldas, Ph.D.**, Clinical Professor of Medicine

\* **Monroe J. King, D.O.**, Clinical Associate Professor of Medicine

\* **Brett E. Stanaland, M.D.**, Clinical Associate Professor of Medicine

\* **G. Edward Stewart II, M.D.**, Clinical Associate Professor of Medicine

\* **Hugh H. Windom, M.D.**, Clinical Associate Professor of Medicine

**Rosa Codina, Ph.D.**, Clinical Assistant Professor of Medicine

**Mary L. Jelks, M.D.**, Clinical Assistant Professor of Medicine

\* **Ronald T. Purcell, M.D.**, Clinical Assistant Professor of Medicine

**Nathan Tang, M.D.**, Clinical Professor of Pediatrics and Medicine

\* Have joint appointments in the Section of Allergy and Immunology, Department of Internal Medicine, James A. Haley Veterans' Hospital, Tampa, Florida



Allergy & Immunology group - 1987

#### BACK ROW

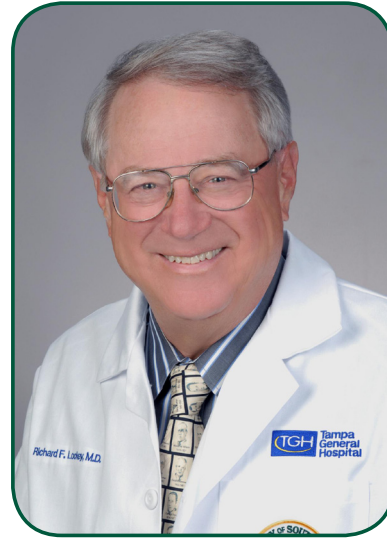
Left to Right: Mitchel Seleznick, Gerald Bucholtz, Walter Trudeau, Richard Lockey, David Wright, Robert Nelson, Dennis Ledford, Enrique Fernández-Caldas.

#### FRONT ROW

Left to Right: Donald Russell, Peggy Hales, Joe Diaz, Rama Ganguly, Pat Walsh, Irene Baird-Warren, Donnie Banerji, Roger Fox.

## Richard F. Lockety, M.D., M.S.

Dr. Richard F. Lockety received his B.S. degree from Haverford College, Haverford, Pennsylvania; M.D. from Temple University, Philadelphia, Pennsylvania (Alpha Omega Alpha); M.S. from the University of Michigan in Ann Arbor, Michigan where he trained in Internal Medicine and Allergy/Immunology (A/I) and was a Major and Chief of A/I at Carswell Air Force Base, Fort Worth, Texas, from 1970-1972. He received a medal from the Florida Academy of Sciences, Tallahassee, Florida, in 2000, for his dedication and work to improve the health and well-being of the community and citizens of Florida. He was also the recipient of the Southern Medical Society, Dr. Robert D. and Alma W. Moreton Original Research Award in 2012. The American Academy of Allergy Asthma and Immunology presented him with a Special Recognition Award in 1993, Distinguished Service Award in 1999, and Distinguished Clinician Award in 2008. He has the honor of authoring, co-authoring or editing over 600 publications and 35 books or monographs with colleagues and has lectured on numerous occasions nationally and internationally. He is the co-editor of two books and an encyclopedia of allergy/immunology, with Dennis K. Ledford, MD, published in 2014: *Asthma, Comorbidities, Co-Existing Conditions, and Differential Diagnoses*, Oxford University Press; *Allergens and Allergen Immunotherapy: Subcutaneous, Sublingual and Oral*, 5th edition, CRC Press/Taylor & Francis Group; and *Encyclopedia of Infection and Immunity*, Springer, Inc. Professional honors include President of the American Academy of Allergy Asthma and Immunology (1992), past Director of the American Board of Allergy and Immunology (1993-1998) and President of the World Allergy Organization (2010-2012). He has served as co-editor or participant of two WHO reports and served on many journal editorial boards.



Over 90 physician specialists and 50 international post-graduate PhDs or MDs in basic and clinical research and medicine, many of whom have assumed leadership positions in medicine throughout the world, have been trained in the Division. The Division's staff consists of 5 clinicians, 3 basic scientists, and approximately 60 other healthcare professionals including physicians, support, and laboratory personnel.

Areas of expertise and research: insect allergy; allergen immunotherapy; asthma; inflammatory lung diseases; pulmonary fibrosis; co-morbid conditions of asthma; and respiratory syncytial virus vaccine development.

## Thomas B. Casale, M.D.

Before joining USF in October 2013, as Professor of Medicine and Chief of Clinical and Translational Research, Dr. Thomas Casale was Professor of Medicine and Medical Microbiology and Immunology and Chief of Allergy/Immunology at Creighton University, Omaha, Nebraska. He did an allergy/immunology fellowship at the National Institutes of Health, Bethesda, MD, where he was chief medical staff fellow. From 1984 to 1996 he was at the University of Iowa where he attained the rank of Professor of Medicine and Director of Allergy/Immunology.



Dr. Casale is a member of the American Thoracic Society and served on their Board of Directors; American Society for Clinical Investigation; and a Fellow of the American College of Physicians and both the American College and American Academy of Allergy Asthma and Immunology. He is a Past President of the American Academy of Allergy Asthma and Immunology and the current Executive Vice President. He is a past member of the Board of Directors of the World Allergy Organization. He also served on the American Board of Allergy and Immunology and was Chair from 2005-2006.

Dr. Casale's clinical and basic research interests are directed toward the determination and treatment of the pathophysiologic mechanisms involved in asthma and allergic diseases. He has published over 300 scientific papers, reviews and chapters on these topics.

### **Roger W. Fox, M.D.**

After receiving his medical degree from St. Louis University School of Medicine, Dr. Roger W. Fox completed his 3 years of internal medicine and 2 years in allergy and immunology at the University of South Florida, Morsani College of Medicine, Tampa, FL. He joined the Division's faculty in July, 1980. He is a Fellow of the American College of Physicians and the American Academy of Allergy Asthma and Immunology.

He has been elected to "The Best Doctors in America" for the past decade. He serves as the Director of Education of the allergy/immunology fellowship training program and has helped train over 75 physicians in this specialty. He has published extensively and presented at local, national and international medical meetings and has served on various boards, including the Hillsborough County Medical Association, the Florida Allergy Asthma and Immunology Society of which he has been president, and numerous committees in the American Academy of Allergy Asthma and Immunology.

Dr. Fox enjoys being a clinician and mentor and in that capacity, sees patients at the University of South Florida Morsani Medical Clinics, the Veterans' Administration Hospital Allergy Clinic, as well as the other clinics affiliated with the University of South Florida. Dr. Fox is an attending physician at the James A. Haley Tampa VA Hospital and he has staff privileges at Tampa General Hospital, Moffitt Cancer Hospital, and Florida Hospital.

His research interests include vocal cord dysfunction, urticaria and angioedema, comorbid conditions of asthma, allergic drug reactions and atopic eczema.



### **Mark C. Glaum, M.D., Ph.D.**

Dr. Mark Glaum received a B.A. in psychology from Fordham University in New York, NY. Following graduation, he returned to his home town of Philadelphia, PA, and earned a Master of Science in Physiology from the School of Graduate Studies at Hahnemann University. Dr. Glaum continued on at Hahnemann, where he was awarded an MD degree and a PhD in immunology. He completed internship and residency in internal medicine at Hahnemann Hospital and then pursued fellowship training in allergy and immunology at the University of Pennsylvania, where he received the Stanley E. Bradley Award for Bench Research in Internal Medicine.

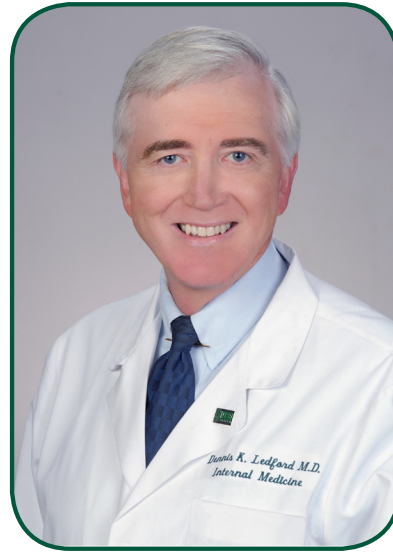
Dr. Glaum is board certified in both internal medicine and allergy and immunology and is a fellow of the American Academy of Allergy Asthma and Immunology (AAAAI). He has been elected to "Top Doctors in America" for the last several years and enjoys teaching medical students, internal medicine residents and allergy/immunology fellows. He sees patients at the University of South Florida Morsani College of Medicine as well as other university-affiliated clinics. He has staff privileges at Tampa General, James A. Haley Veterans' Administration, Moffitt Cancer, and Florida Hospitals. He has served on the boards of the Allergy and Asthma Foundation of America and Hillsborough County Medical Society and is the current Chair of Rhinosinusitis and Ocular Allergy interest section of the AAAAI.

Dr. Glaum's research interests include chronic rhinosinusitis, nasal polyps, mast cell biology and pollen identification.



### Dennis K. Ledford, M.D.

Dr. Dennis Ledford received his medical degree from the University of Tennessee Center for Health Sciences, Nashville, Tennessee. He completed his internal medicine residency there and served as chief medical resident for Dr. Gene Stollerman, M.D., Chairman of Internal Medicine at this same university. A fellowship in rheumatology and immunology followed at New York University and Bellevue Hospital in New York as well as a fellowship in allergy and immunology at the University of South Florida. He joined the faculty at USF Morsani College of Medicine and achieved the rank of professor of medicine in 2000.



Local and regional activities include past service as President of the USF Medical Faculty for the Morsani College of Medicine and President of the Florida Allergy Asthma and Immunology Society. He is current Head of the Allergy/Immunology Section, Florida Hospital, Tampa, FL. National contributions include current service as an associate editor of the *Journal of Allergy and Clinical Immunology* and chair of the Steering Committee for the Allergy Asthma and Immunology Education and Research Trust Fund. He also served as President of the American Academy of Allergy Asthma and Immunology, Co-Chair of the American Council of Graduate Medical Education (ACGME), Allergy/Immunology Residency Review Committee and Director of the American Board of Allergy and Immunology.

Clinical responsibilities and student and resident teaching are combined with research interests in severe, glucocorticoid-dependent asthma, allergen characterization, the association of gastroesophageal reflux and upper airway disease, and eosinophilic esophagitis.

### Narasaiah Kolliputi, Ph.D.

Dr. Narasaiah Kolliputi is an associate professor (tenured) and Division Director of Research Education for the Division of Allergy and Immunology, Department of Internal Medicine, at the USF Morsani College of Medicine, Tampa, FL. He received his postdoctoral training at Massachusetts General Hospital, Harvard Medical School, Boston, MA. Prior to that time, he received his BS in biology and chemistry in 1997 followed by an MS in biochemistry in 1999 at Sri Venkateswara University, Tirupati, India. He then went on to do his PhD in biochemistry at Osmania University, Hyderabad, India, which he completed in 2004.



Dr. Kolliputi has published 34 papers, including a paper in *Circulation Research and Immunology*. He currently serves as a grant reviewer for the National Institutes of Health, VA Merit Grants, USA Department of Defense and the American Heart Association. He is an associate editor for *Frontiers in Pharmacology*, *Frontiers in Physiology*, and *Frontiers in Genetics*, and is a guest associate editor for *Frontiers in Mitochondrial Physiology*. He is also an editorial board member for *Translational Medicine, Virology & Mycology* and *Journal of Biocatalysis & Biotransformation*. Dr. Kolliputi's research is funded by an NIH RO1 and an American Heart Association Scientist Developmental grant.

He is working on translational strategies to attenuate oxidative stress mediated acute lung injury (ALI), pulmonary fibrosis and pulmonary arterial hypertension.

### Michael Teng, Ph.D.

Dr. Michael Teng received his Ph.D. in immunology from the University of Chicago in 1993. He trained as a postdoctoral fellow studying viral pathogenesis at The Scripps Research Institute in La Jolla, CA. Subsequently, he became a research fellow at the National Institute of Allergy and Infectious Diseases, investigating the molecular biology of respiratory syncytial virus (RSV) and RSV vaccine development. In 2002, he accepted a faculty appointment in the Department of Biochemistry and Molecular Biology at the Pennsylvania State University, University Park, PA, where his laboratory continued studies on RSV pathogenesis.



Dr. Teng joined the faculty of the Division of Allergy and Immunology at USF Morsani College of Medicine in 2010 and is director of the basic research program in the Division. He holds joint appointments in the Departments of Pediatrics, Molecular Medicine, and Pharmaceutical Sciences (College of Pharmacy). Dr. Teng currently serves as a grant reviewer for the National Institutes of Health and the American Heart Association. His past and present research funding includes grants from the National Institutes of Health, the American Heart Association, and contracts with pharmaceutical companies.

Dr. Teng's research focuses on the host-virus interactions important for RSV pathogenesis. In particular, he is interested in the mechanisms by which RSV inhibits innate immune responses to enhance viral replication. Understanding the interplay between RSV proteins and innate immunity may lead to the development of more immunogenic RSV vaccine candidates. Additionally, Dr. Teng studies the interactions between cellular signal transduction machinery and viral proteins, with a view to discovering potential targets for antiviral therapy.

### Jia-Wang Wang, Ph.D.

Dr. Jia-Wang Wang received an M.S. degree from Sichuan University, Chengdu, China and a Ph.D. degree from Wuhan University, Wuhan, China. He conducted postdoctoral research at the Chinese Academy of Medical Sciences, Beijing, China and at the Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA. He then worked as a research associate at the H. Lee Moffitt Cancer Center & Research Institute, Tampa, FL, before he joined the Division of Allergy and Immunology. Dr. Wang is a member of the American Academy of Allergy, Asthma & Immunology (AAAAI) and an editorial board member of several journals. He serves as an ad hoc reviewer of DOD grants and papers.



He has a strong background in genetics, immunology and molecular biology, discovered the lipopolysaccharide-responsive beige-like anchor (LRBA) gene, mutation of which causes immunodeficiency and autoimmunity, and contributed fifteen GenBank sequence entries. He has published more than 25 papers, some of which are in high profile journals including *Science*. He has more than fourteen conference abstracts including featured posters and oral presentations. He has three approved patents, one copyright computer program and three patents pending. Most of these intellectual properties are on microRNAs (miRNA), which have great promise as biomarkers and therapeutics for human diseases.

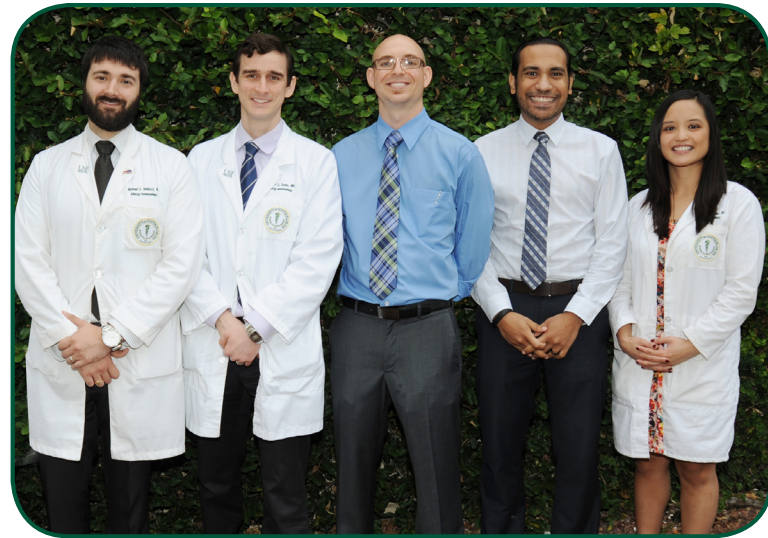
He also has extensive experience working with mouse models to study human diseases. He has successfully generated SHIP gene null and conditional knockout mouse models, two LRBA knockout mouse models, and four miRNA transgenic overexpression mouse models.



## DIVISION OF ALLERGY AND IMMUNOLOGY

### FELLOWS-IN-TRAINING (2013 to 2015)

**Michael Balduzzi, MD**, 2<sup>nd</sup> year fellow and chief resident, is scheduled to graduate in June 2015. Dr. Balduzzi received his medical degree from New York Medical College, Valhalla, NY. He completed his residency in internal medicine at the University of South Florida Morsani College of Medicine, Tampa, FL where he also spent time in his final year of residency as one of the program's chief resident. Dr. Balduzzi has research interest in local mucosal factors playing a role in chronic allergic and nonallergic rhinitis and improving asthma outcomes by controlling upper airway comorbid conditions.



From left to right: *Michael Balduzzi, MD, Andrew Cooke, MD, Adam Updegraff, DO, Adeeb Bulkhi, MD, Jennifer Ferguson, DO*

**Adam Updegraff, DO**, 2<sup>nd</sup> year fellow, is scheduled to graduate in June, 2015. Dr. Updegraff received his medical degree from Michigan State University College of Osteopathic Medicine in East Lansing, Michigan. He completed a combined residency in internal medicine and pediatrics from William Beaumont Hospital, Royal Oak, Michigan. Dr. Updegraff's research interests include asthma, atopic dermatitis, and food allergy.

**Adeeb Bulkhi, MD**, 1st year fellow, is scheduled to graduate in June, 2016. Dr. Bulkhi received his medical degree from Umm Al Qura University, Medical Collage in Makkah, Kingdom of Saudi Arabia. He completed his residency in Internal Medicine at Wayne State University/Detroit Medical Center in Detroit, Michigan. Within the field of Allergy and Immunology, Dr. Bulkhi has a specific interest in asthma and its pathophysiology. His long term goal is to improve patient understanding of asthma and other comorbid conditions with emphasis on self-management approach.

**Andrew Cooke, MD**, 1st year fellow, is scheduled to graduate in June, 2016. Dr. Cooke received his medical degree from Florida State University College of Medicine in Tallahassee, Florida. He completed a residency in Internal Medicine at University of Texas Southwestern in Dallas, Texas. Dr. Cooke's primary interests include asthma and chronic urticaria.

**Jennifer Ferguson, DO**, 1st year fellow, is scheduled to graduate in June, 2016. Dr. Ferguson received her medical degree from the Edward Via College of Osteopathic Medicine in Blacksburg, VA. She completed her residency in Internal Medicine at the University of South Florida Morsani College of Medicine in Tampa, FL. Dr. Ferguson's primary interest in allergy & immunology includes food allergy, atopic dermatitis, allergic rhinitis and asthma. Her long term goal is to promote patient education and understanding of these conditions to enhance medical care and improve disease outcomes.

### RESEARCH STAFF MEMBERS

**Lakshmi Galam, Ph.D.**, Research Instructor

**Jutaro Fukumoto, M.D., Ph.D.**, Postdoctoral Fellow

**Kunyu Li**, Biological Scientist

**Kim Teng**, Senior Biological Scientist

**Michelle Reiser, M.S.**, Research Technician

### STUDENTS AND VISITING RESEARCH SCHOLARS

**Ruan Cox**, Graduate Student

**Sara Garcia**, Research Student

**Matthew Ho**, Research Student

**Amanda Hodgkins**, Research Assistant/Student

**Michelle Kaminsky**, Research Assistant/Student

**Anu Stephen**, Research Student

**Grant Wallenfelsz**, Research Student

**Jillian Whelan**, Graduate Student

**Rebekah Cook**, Volunteer Research Student

**Olivia Smith**, Volunteer Research Student

**Bangmei Wang**, Volunteer Research Student

## ADMINISTRATIVE PERSONNEL

\* **Peggy Hales**, Program Assistant

\* **Rebecca Carter**, Administrative Secretary

\* **Geeta Gehi**, Administrative Secretary

\* Also James A. Haley Veterans' Hospital, Tampa, FL

## CLINICAL RESEARCH UNIT

**Shawna Ogilbee, CRC**, Clinical Research Administrator

**Jeaneen Ahmad, BA**, Lead ALA Coordinator, Clinical Research Coordinator

**Catherine Renee Smith, CMA, CCRC**, Clinical Research Coordinator

## ALL CHILDREN'S HOSPITAL

**Amy Baldwin**, Administrative Specialist

## Clinical Research Unit



Left to Right:  
Shawna Atha, Catherine Renee Smith, Tom Casale, Jeaneen Ahmad

## III. JOY MCCANN CULVERHOUSE AIRWAY DISEASE RESEARCH CENTER

### A. **Basic Research Projects**

#### 1. **Akt as a therapeutic target for respiratory syncytial virus (PI: Teng)**

Two aspects of Akt activity in RSV infection are being explored. First, RSV phosphoprotein has been identified as a target for Akt phosphorylation and the role of this phosphorylation on viral replication is under investigation. Second, the process of understanding the viral factors responsible for Akt activation during RSV infection is being researched. These studies are being done in collaboration with Dr. Biao He (University of Georgia, Athens, Georgia).

#### 2. **Structural determinants of NS2 for pathogenic functions (PI: Teng)**

We have previously published that NS2 blocks interferon induction by binding to RIG-I. In addition NS2 appears to have additional functions associated with viral pathogenesis, including NFkB induction and STAT2 degradation. Trying to separate these activities by mutagenesis to understand how NS2 accomplishes each function is under investigation. The focus is on differentially altering the functions to develop an attenuated RSV vaccine candidate that maintains its immunogenicity.

#### 3. **Enhancing immunogenicity of RSV vaccines by altering NS1 function (PI: Teng)**

This is part of a program project in collaboration with Dr. Mark Peeples (Nationwide Children's Hospital, Columbus, OH). The hypothesis that decreasing the ability of NS1 to inhibit interferon responses can enhance the immunogenicity of RSV vaccine candidates is being researched.

#### 4. **Mechanism of RSV temperature sensitivity due to cis-acting sequences (PI: Teng)**

Previous studies show that a single nucleotide change in the M2 transcription start sequence is sufficient to confer temperature sensitivity to recombinant RSV. The mechanism is being investigated by which this mutation affects RSV replication and transcription at non-permissive temperatures.

#### 5. **RSV M protein trafficking and virus assembly (PI: Teng)**

This is a long-term collaboration with Drs. David Jans and Reena Ghildyal (Monash University, Melbourne, AUS) to determine the role of M protein trafficking in RSV morphogenesis and the importance of nuclear translocation in M function.

**6. Effect of NALP-3 inflammasome on epithelial permeability (PI: Kolliputi)**

Our previous reports demonstrate the inflammasome, a proinflammatory cytokine processing complex, plays an important role in the production of early inflammatory cytokines associated with edema. Ceramide is a critical mediator of pulmonary edema, however the ability of ceramide to activate the inflammasome has not been elucidated. Utilizing macrophages in vitro, we discovered that ceramide induced inflammasome activation results in significant cytokine secretion. Genetic silencing of inflammasome components abolished the ability of ceramide to induce inflammasome activation, and a rescue of the barrier integrity of alveolar epithelial cell (AEC) in co-culture was observed. These novel results reveal that ceramide induced cytokine secretion and AEC permeability occurs through an inflammasome dependant mechanism

**7. Effect of microRNA 16 on epithelial sodium channel in human alveolar epithelial cells (PI: Kolliputi)**

Removal of edema from the air spaces of the lung is a critical function of the epithelial sodium channel (ENaC) and also involves the serotonin (5HT) transport system. Recent studies suggest that microRNA-16 (miR-16) targets the serotonin transporter (SERT). However, the role of miR-16 on its targets SERT and ENaC have not been studied. The expression patterns of miR-16, SERT, ENaC and serotonin are being investigated in mice exposed to room air and hyperoxia. The effects of miR-16 overexpression are being observed in vitro. MiR-16 and ENaC down regulation in mice exposed to hyperoxia correlates with an increase in SERT expression and pulmonary edema. Overexpression of miR-16 in alveolar epithelial cells suppresses SERT and increases ENaC $\beta$  levels. These data suggest that miR-16 upregulates ENaC, a major sodium channel involved in resolution of pulmonary edema in acute lung injury (ALI).

**8. Role of enhancer of zeste homolog 2 on pulmonary artery smooth muscle cell proliferation (PI: Kolliputi)**

Pulmonary arterial hypertension (PAH) is characterized by excessive proliferation of the pulmonary arterial smooth muscle cells (PASMCs). EZH2 regulates cancer cell proliferation; however, the role of EZH2 in the proliferation of PASMCs is not clear. Therefore, the expression of EZH2 is being investigated in normal and hypertensive mouse PASMCs. The effects of EZH2 overexpression on the proliferation of human PASMCs also are being tested. EZH2 protein expression in mouse PASMCs correlates with decreased right ventricular function. The overexpression of EZH2 in human PASMCs enhances proliferation and migration and decreases the rate of apoptosis. EZH2 transfected cells demonstrated an increase in proliferation and a significant decrease in apoptosis. These findings show that EZH2 plays a role in the migration and proliferation of PASMCs. More importantly, EZH2 may serve as a potential target for new therapies for PAH.

**9. Effect of mir-206 on pulmonary artery smooth muscle cell proliferation and differentiation (PI: Kolliputi)**

Pulmonary arterial hypertension (PAH) is a progressive devastating disease characterized by excessive proliferation of the pulmonary arterial smooth muscle cells (PASMCs). MicroRNA-206 (miR-206) is known to regulate proliferation however, the role of miR-206 in PAH has not been studied. Therefore, the expression patterns of miR-206 are being investigated in normal and hypertensive mouse PASMCs. The effects of miR-206 on cell proliferation, apoptosis and smooth muscle cell marker expression in human PASMCs also are being measured. MiR-206 expression in mouse PASMCs correlates with an increase in right ventricular systolic pressure. Reduction of miR-206 levels in hPASMCs causes increased proliferation and reduced apoptosis. These results suggest that miR-206 is a potential regulator of proliferation, apoptosis and differentiation of PASMCs, which could yield a novel treatment strategy in PAH.

**10. MicroRNAs as biomarkers and therapeutics for asthma (PI: Wang)**

MicroRNAs (miRs) are ~22 nucleotides long non-coding RNAs that inhibit mRNA translation by the base pairing rule at the accuracy of one base. It is believed that most human genes and the entire spectrum of biological pathways are tightly and delicately controlled by the miRNome. Deregulation of miRs may contribute to various diseases. The mechanism underlying miR regulations of immunity is under investigation. Developing miR biomarkers and therapeutics for inflammatory diseases, such as asthma, using cell culture and mouse models are goals of this research.

**11. LRBA, a novel regulator of immune disorders (PI: Wang)**

Lipopolysaccharide (LPS)-responsive beige-like anchor (LRBA) is a novel gene essential for the normal function of the immune system. It is the eighth common variable immunodeficiency (CVID) gene, mutation of which causes CVID and autoimmunity. LRBA is involved in some critical cellular processes such as cell proliferation, apoptosis and autophagy. It may interact with multiple important signal transduction pathways. The molecular mechanism by which LRBA regulates the immune system is being explored.

## **B. Clinical Research Projects**

**1. Effects of pine cone extract on IgE levels in patients with allergic rhinitis (PI: Ledford)**

Pine cones and their aqueous extracts (PCE) were thought to have medicinal properties as far back as 2000 years ago in Japanese populations. Anecdotal reports suggest that the use of PCE improves allergic rhinitis symptoms; it significantly reduces serum IgE levels in mouse models. The purpose of this study is to determine if oral PCE extract administered in a double-blind fashion significantly reduces IgE levels in patients with evidence of perennial allergic rhinitis.

**2. Pollen and mold counts and molecular quantification of outdoor allergens (PI: Glaum)**

The Division houses the Pollen and Mold Counting Station for Tampa that has two devices adapted to collect pollen. One collector utilizes traditional methods, the other is adapted to collect pollen samples suitable for molecular analysis. The collectors are located on the roof of the James A. Haley V.A. Medical Center Research Building. Pollen counts are performed once weekly. Dr. Mark Glaum is in charge of reading and interpreting pollen counts. The purpose of this study is to determine if it is feasible to utilize molecular methods to quantify aeroallergen content from volumetric air samples. Pollen-specific genes will be identified, quantitated and compared to pollen levels obtained by established standard counting methods.

**3. A comparison of microRNA in patients with allergic rhinitis and other forms of rhinitis (PI: Ledford)**

The evaluation of rhinitis is often hindered by limited measures to assess the pathogenesis of mucosal disease. This project builds upon a prior study and involves sampling the nasal mucosa of the inferior turbinates in subjects with various forms of rhinitis diagnosed with currently available clinical procedures. The expression of microRNA will be related to the diagnosis and current therapy. The intent is to explore possible biologic pathways that are modulated in different forms of rhinitis as well as to assess the feasibility of using microRNA as a diagnostic tool.

**4. Effect of oxymetazoline hydrochloride in combination with nasal glucocorticoid on the apnea hypopnea index (AHI) (PI: Lockey)**

“Nocturnal Oxyhemoglobin Saturation, Snoring, and Sleep Quality in Subjects with Persistent Nasal Congestion. A Double Blinded, Placebo Control, Cross Over Prospective Trial” is designed to evaluate the effectiveness on the apnea/hypopnea index (AHI) of adding oxymetazoline to intranasal mometasone, and on other sleep parameters. The study will be carried out in subjects with persistent nasal congestion secondary to allergic or non-allergic rhinitis despite treatment with the highest recommended doses of intranasal mometasone.

**5. A study of function of respiration and cognition in the elderly (The FORCE study) (PI: King)**

The purpose of this study is first, to determine which diagnostic tool, impulse oscillometry (IOS), a measurement of respiratory impedance using sound impulses or spirometry, is more feasible for the elderly population to measure pulmonary function; second, to determine if cognitive performance is related to the ability to perform spirometry and IOS; and third, to determine the relationship between biomarkers, cognitive performance, and asthma diagnosis.

**6. Evaluation of calcium and vitamin D intake in children on inhaled or intranasal corticosteroids compared to normal children (PI: Lockey)**

The specific aims of this project are to evaluate the dietary calcium intake of asthmatic children (4-17 years) who are receiving long-term treatment with inhaled or intranasal corticosteroids versus healthy controls using a validated food frequency questionnaire.

**7. Identification of plasma miRNAs as potential biomarkers in asthma exacerbation (PI: Lockey)**

It is hypothesized that there is a statistically significant difference in miRNA profiling and expression in subjects with asthma exacerbation compared to a baseline level or following effective treatment of an exacerbation of asthma. Therefore, plasma miRNA profiling may provide highly specific and sensitive biomarkers for asthma exacerbation detection and treatment follow-up.

**8. Differences in mold counts from January 1995 to December 2011 (PI: Lockey)**

Allergic diseases are due to complex interactions between genetic and environmental factors. Airborne mold and pollens are known to trigger allergic respiratory disease in sensitive individuals. Yet little is known about possible changes as related to climate change in pollen and mold counts over the last 16 years. Daily pollen and fungal spores sample data between January 1995 to December 2010 are available for Sarasota, FL. These data will be compared to weather data for Sarasota available from the National Climatic Data Center. The objectives of this study are to determine if changes in pollen/mold counts can be correlated with climate changes.

**C. Clinical Research Unit (CRU)**

The University of South Florida, Asthma, Allergy and Immunology CRU was established in 1977 to improve the treatment of patients who suffer from asthma, allergic and immunologic diseases.

The CRU provides quality research in a variety of clinical areas which include the following: allergic conjunctivitis; allergen immunotherapy; allergen skin testing; allergic rhinitis; asthma; atopic eczema; bronchitis, acute and chronic; contact dermatitis; chronic obstructive pulmonary disease; exercise induced asthma; headache (migraine and tension); hereditary angioedema; immunodeficiency diseases; insect allergy; intravenous immunoglobulin; nasal polyps; sinusitis, acute and chronic; temporomandibular joint disease; urticaria and vasomotor rhinitis.

Studies funded by pharmaceutical companies are conducted at the Division's CRU. The CRU is also a member of the American Lung Association's Asthma Clinical Research Center network, one of 19 centers throughout the United States.

## **IV. BASIC AND CLINICAL RESEARCH SUPPORT**

### **ENDOWMENTS**

Joy McCann Culverhouse Endowment and Chair in Allergy and Immunology

Mabel and Ellsworth Simmons Professorship for Asthma Research

### **EXTRAMURAL FUNDING**

#### **Government Funding**

National Institutes of Health (NIAID)

National Heart, Lung and Blood Institute

#### **Non-Profit Funding**

American Lung Association

American Heart Association

American Academy of Allergy Asthma and Immunology, ARTrust

#### **Pharmaceutical Funding (past or present)**

Ablynx, NV

Almirall Pharmaceuticals

CSL Behring

Cytos

Dyax Corporation

Forest Laboratories

Genentech Inc

GlaxoSmithKline

Jerini, US

Merck and Co., Inc.

MedImmune

Novartis Pharmaceuticals

Pfizer

Pharming Inc.

Roche

Sanofi-Aventis Pharmaceuticals

Schering-Plough Corporation

Shire

Teva Pharmaceuticals

Viropharma

## **V. PUBLICATIONS FROM THE DIVISION**

### **BOOKS PUBLISHED**

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Lockey RF, Ledford DK (eds): *Allergens and Allergen Immunotherapy: Subcutaneous, Sublingual, and Oral*, 5th edition. CRC Press/Taylor & Francis Group, New York, NY, 2014.

Ledford DK, Lockey RF (volume eds): *Encyclopedia of Medical Immunology: Allergic Diseases*, (editors-in-chief, Rose NR, Mackay IR), Springer, Inc., New York, NY, 2014.

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### **INTERNET PUBLICATIONS**

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## **VI. FACULTY AND STAFF AWARDS**

Dennis K. Ledford, MD

American Academy of Allergy, Asthma and Immunology, "Distinguished Clinician" Award, February, 2014.

Thomas B. Casale, MD

ARTrust and Stephen D Lockey Lectureship, AAAAI, San Diego, CA, March, 2014.

Thomas B. Casale, MD

Betty Wray Lectureship, Georgia Allergy and Immunology Annual Society Meeting, Atlanta, Georgia, April, 2014.

## VII. VISITING PROFESSOR EDUCATIONAL PROGRAM

**Seong H. Cho, MD**, Assistant Professor, Division of Allergy/Immunology, Department of Medicine, Northwestern University, Feinberg School of Medicine, Chicago, IL, “Coagulation System, A New Target for Asthma”, January 30, 2014

**Stephen R. Durham, MD**, Head, Section of Allergy & Clinical Immunology, Imperial College London, National Heart & Lung Institute, Dovehouse Street, London, UK, “Advances in Sublingual Immunotherapy”, March 5, 2014.

**Rachel Zemans, MD**, Assistant Professor, Division of Pulmonary, Critical Care & Sleep Medicine, Department of Medicine, National Jewish Health, Denver, CO, “Resolution of Epithelial Permeability in ARDS”, April 3, 2014.

**Ray Stokes Peebles, MD**, Professor of Medicine, Department of Allergy, Pulmonary & Critical Care Medicine, Vanderbilt University Medical Center, “IL-13 Inhibits Th17 Function”, April 4, 2014.

**Prof Claus Bachert, MD, PhD**, Head, Upper Airways Research Laboratory (URL), Chief of Clinics ENT Department, University Hospital Ghent, Ghent, Belgium, “Endotypes of Chronic Rhinosinusitis and Therapeutic Consequences - The Future Already Began”, Monday, September 22, 2014.

**Professor Zuhair K. Ballas, MD**, Professor and Director, Immunology Division, Department of Internal Medicine, University of Iowa, “Impact of Diet-Induced Obesity on Tumor Response to Immunotherapy”, October 8, 2014.

**Dr. David A. Khan, MD**, Professor of Medicine, Program Director, Allergy & Immunology, University of Texas Southwestern Medical Center, Dallas, TX, “Dx Testing in Drug Allergy”, October 30, 2014.



**Thanks to members of the Division!**



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