

Cystic Fibrosis Center of Excellence

Volume 7, Issue 2

September 2017

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Dear friends, patients, families, and colleagues,

We are happy to provide to you the summer 2017 issue of the Cystic Fibrosis Center of Excellence newsletter. It has been a very busy summer for us – I hope your summer has been more relaxing than ours!

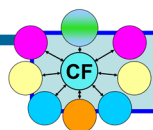
As many of you know, we have been growing our research program toward the long-term goal of a control/cure for cystic fibrosis as a disease. Along the way, one milestone that we have targeted is gaining funding for our Center via a special NIH grant mechanism called a “P30” grant. In early May, the NIH announced an upcoming opportunity to submit proposals for these highly-coveted grants, and our team spent the next 2.5 months working together to meet the July 20 deadline. Our submitted proposal for the **“CF@LANTA Research and Translation Core Center in CF-related Diabetes”** pulled together 54 investigators from Emory, Children’s, Georgia Tech, Georgia State, and the University of Georgia, some of whom are new to CF research. These grant mechanisms support “infrastructure” in the form of research cores that are intended to enable our CF research to be accomplished more efficiently and cost-effectively. In addition to the research cores, the grant would support a pilot & feasibility project program, plus some aspects of our educational program. The five research cores proposed are: (1) CF Biospecimen Repository and Human Subjects Research Core; (2) Nutrition and Metabolism Core; (3) CF Quantitative Molecular Phenotyping Core; (4) Experimental Models Core; and (5) CF Data Integration and Systems Modeling Core. These Cores take advantage of research strengths at Emory and Georgia Tech, and the outstanding investigators there plus others at Children’s, Georgia State University, and the University of Georgia. The proposal is currently going

through the long process of review at the NIH, and we anticipate receiving a funding decision by January 2018. Wish us luck!

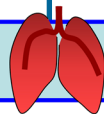
As Principal Investigator on the CF@LANTA Core Center grant, I want to express my deep gratitude to all of the faculty and staff that helped to prepare an outstanding proposal for submission. This was an enormous team effort.

Speaking of the “team,” I am very happy to report that we accomplished another major recruitment over the summer. Dr. Marvin Whiteley, formerly the LaMontagne Chair in Infectious Diseases and Global Health and Professor of Molecular Biosciences at the University of Texas in Austin, TX, has been recruited to the School of Biological Sciences at Georgia Tech, where he will be the Bennie H. & Nelson D. Abell Chair and Georgia Research Alliance Eminent Scholar in Molecular and Cellular Biology. We are really excited by this recruitment. Dr. Whiteley will serve as Associate Director of our Center for CF and Airways Disease Research, and will function as the anchor member of the growing arm of our CF research team at Georgia Tech. Dr. Whiteley is a widely known CF microbiologist, who already has outstanding collaborations with existing team members such as Dr. Joanna Goldberg. We look forward to getting the Whiteley lab integrated into our CF research program, starting September 1. For local team members, please note that we plan a meet-and-greet at 4:00 on October 4.

With best wishes and thanks for your interest,
Nael A. McCarty, PhD, [CF@LANTA](#)



Center for Cystic Fibrosis
and Airways Disease Research
Advancing Wellness in Patients Through Research



New Faculty: Steve Diggle, PhD



Steve Diggle, PhD

Steve Diggle is an Associate Professor in Microbiology at Georgia Tech (joined April 2017). He was born and grew up in Stockport, an industrial town in northwest England, about seven miles from Manchester. He traces his interest in microbiology back to his elementary school teacher Mrs. Liversage, who taught his class about the Great Plague of London in 1665. He began his scientific career by leaving school early to become a 'rock star', but this ended in failure. He then worked for several years as a laboratory technician in a variety of places, including the Paterson Institute for Cancer Research. Later, he studied for a degree in Biological Sciences at the University of Salford, before completing his PhD at the University of Nottingham. His PhD work focused on understanding bacterial cell-to-cell signaling (quorum sensing) in the opportunistic pathogen *Pseudomonas aeruginosa*, and he expanded on this work during his time as a Postdoc. He was awarded a Royal Society Research Fellowship in 2006 and the Microbiology Society Fleming award in 2010.

The Diggle Lab currently focuses on using molecular, evolution, ecology and genomics approaches to better understand chronic infections such as those found in cystic fibrosis lungs, diabetic ulcers and non-healing wounds. The main organisms that the group work on are the antibiotic resistant superbugs *Pseudomonas aeruginosa* and *Staphylococcus aureus*. By combining mechanistic and evolutionary approaches, we are not only able to work out how microbial behaviors are regulated, we can also address what fitness benefits certain behaviors provide to microbes, and how this influences virulence and antibiotic resistance during infection. By understanding cooperative behavior in microbes, the group hopes to better understand antibiotic resistance and to develop new antimicrobial strategies. Recently, Steve has worked with Humanities researchers to determine whether ancient medieval recipes can be used to treat infectious disease (ancientbiotics). The group reconstructed a 10th century recipe from 'Bald's Leechbook' and demonstrated that it has potent anti-Staphylococcal activity.

In his spare time, Steve plays the bass guitar and he played in a number of bands when he was based in the UK. This will be something he will be looking to develop in Atlanta in the future. .

~submitted by Steve Diggle, PhD

New Faculty: Sam Molina, PhD



Sam Molina, PhD

Dr. Samuel Molina, PhD, graduated with a BS in Biochemistry, Molecular Biology, and Biotechnology from Michigan State University in 2005. He then spent three years working for industry in both South San Francisco and Boston where his desire to become an independent researcher was cemented. He received his PhD in Biochemistry at Kansas State University in 2012

where he studied gap junction biology in the epithelia of the human lens. Dr. Michael Koval, who Sam met at a conference in 2011 in Ghent, Belgium, then recruited him to Emory University to study gap junction communication in cystic fibrosis.

Sam has been with CF-AIR for over five years, first as a Post-Doctoral Research Fellow and now as a junior faculty member in the Department of Medicine, Division of Pulmonary, Allergy, Critical Care and Sleep Medicine. He is currently the Associate Director of the CF@LANTA Experimental Models Support Core and brings over a decade of experience in biochemistry, molecular, and cell biology to CF-AIR's efforts in experimental cell biology.

Continued on page 5

Exploring NETs in cystic fibrosis using CF Discovery Core samples

Neutrophil extracellular traps in CF



Balázs Rada, PhD

I joined the Department of Infectious Diseases at the University of Georgia in Athens, GA in 2012. I am an assistant professor on tenure-track with expertise in mucosal immunology and neutrophil biology. A major research effort in my laboratory focuses on understanding the mechanism and clinical

relevance of neutrophil extracellular traps (NETs) in different diseases including cystic fibrosis (CF). NETs represent a unique mechanism by which neutrophils, essential innate immune cells of the body, fight pathogens. During NET formation the cells extrude their DNA and associated antimicrobial proteins to trap extracellular microbes. NET formation is, however, a double-edged sword and can contribute to tissue damage. A very exciting question in our focus is whether NETs abundantly present in CF airways promote microbial clearance or cause tissue damage. Translational consequences of our work could be targeting NETs to improve lung function and fight infections in CF patients.

I have studied the mechanism by which *Pseudomonas aeruginosa*, one of the main CF respiratory pathogens, induces NET formation in neutrophils in great detail. I identified secreted and surface-attached molecules of *P. aeruginosa* that are crucial to induce NET formation. This work revealed the detailed mechanism by which bacterial flagellum mediates this process. My group also discovered that *P. aeruginosa*-elicited NET formation depends on the bacterial growth stage adding additional complexity to neutrophil-*P. aeruginosa* interactions in CF. I also pioneered work to establish hybrid ELISA assays detecting NET-specific markers that help us better understand neutrophil fate in CF and other diseases including pseudogout,

gout, malaria, rheumatoid arthritis and tuberculosis. Recent results of my team also propose a potential, novel role of NETs in inducing autoimmunity in CF.

Collaborations and the CF Discovery Core

Shortly after my arrival at UGA, I established collaborations with excellent investigators at the CF Center of nearby Emory University and Children's Healthcare of Atlanta. Dr. Nael McCarty, PhD, the head of the center welcomed me as an eastern outpost and invited me to become a member of the Children's Healthcare of Atlanta Center for Cystic Fibrosis Research. In collaboration with Dr. Joanna Goldberg, PhD, I have studied bacterial virulence factors affecting NET formation. Work with Dr. Rabindra Tirouvanziam studies the presence of NETs in CF baby samples and association of NETs with resistin in adult patient samples. Ongoing studies in my laboratory seek to establish connections between NETs, lung function and autoimmunity in CF. None of these relevant studies would be possible without clinical samples that can be obtained from the CF Discovery Core. Dr. Arlene Stecenko, MD, the current director of the core, has helped my research and coordinated patient sample collection. My group has been receiving CF Discovery Core samples for years that generated several interesting new data leading to funded grants. I intend to keep using the CF Discovery Core for years to come since we have ambitious plans to tackle the question of association of NETs with CF lung function decline using longitudinal sets of CF clinical samples. For all the reasons mentioned above, I am very thankful to the CF Discovery Core for providing access to CF samples for outside investigators.

In my spare time when I do not think about NETs, I enjoy spending time with outdoor sports, movies, family and friends, but above all I am looking forward to enjoy becoming a father.

~submitted by Balázs Rada PhD
University of Georgia

Great Strides Walk 2017

As many of you know, our Center partners with the GA Chapter of the Cystic Fibrosis Foundation in many ways. One prominent way is in support of the Great Strides Walk-a-Thon, which is the Chapter's largest fundraising event each year. This very popular event has seen steady growth in participation from all across the metropolitan Atlanta region and beyond – essentially, the catchment area for our clinical program. On May 20, 2017, Great Strides Atlanta was held at the Suwanee Town Center in Suwanee, GA. The walk-a-thon moved to this new location because it had overgrown the space used previously at Georgia Tech (thanks for the memories, Tech!). Over 3,500 people attended the walk, including our pals from Children's, Hope and Will. It's always a great time.

For the fifth year in a row, Great Strides Atlanta brought in a record-breaking amount of funds in support of the excellent work of the CF Foundation. As of walk day, this totaled \$2,100,100. Really outstanding work, for which we congratulate and thank our GA Chapter.

We also want to remind you that the GA Chapter has recently moved its office. They are now just around the corner from Emory, and across the street from the new Center for Advanced Pediatrics building (still under construction) where the Emory and Scottish Rite outpatient CF clinics will move next year. Welcome, neighbors! New address: Cystic Fibrosis Foundation, GA Chapter; 57 Executive Park S., Suite 380; Atlanta, GA 30329.



New Faculty: Sam Molina, PhD, continued

Dr. Molina's research interests lie in how airway epithelia regulate nutrient availability in the airway surface liquid that lines the airway. His research will help understand how basic defects in innate immunity manifest in the airway epithelia of cystic fibrosis and diabetic patients. By understanding the role that airway epithelia play in regulating nutrients in the airway, he hopes to find therapies that mitigate airway infections in meaningful ways in

order to reduce the burden of infection already present in so many patients' lives.

Outside of the lab, Sam enjoys eating his way through Atlanta, cooking for friends, playing competitive adult kickball, and hiking in the North Georgia Mountains. He and his wife Barbara also frequently travel to spend time with their families in Michigan and Germany.

~submitted by Sam Molina, PhD

Recent CF-AIR Publications

Recent publications by CF-AIR members can be viewed online here:

<http://www.pedsresearch.org/uploads/blog/doc/2017-08CF-AIRNewsletterPubs.pdf>

CF-AIR Brags

- 2016-2017 RDP Fellows Announced:
 - Sheyda Azimi, PhD: postdoc in Diggle Lab
 - Ashley Cross: graduate student in Goldberg Lab
 - Camilla Margaroli: graduate student in Tirouvanziam Lab
- Sam Molina, PhD promoted to Instructor of Medicine
- Joshua Chandler, PhD promoted to Assistant Professor of Pediatrics
- P30 grant submission in July — thanks to all who contributed to this huge center grant to support the future of CF research in our center!



Events for Researchers

Each month there are several opportunities for CF-AIR researchers to get together to discuss their work.

- CF-AIR Faculty and Trainees Research (CF-TR):
On the first Tuesday of the month, faculty chalk talks on either the overall work in their lab, or on a grant proposal planned for submission soon. On the third Tuesday of the month trainee chalk talks discussing planned manuscripts or fellowship proposals. Meet at noon in various rooms in ECC and HSRB, check the calendar.
- CF-AIR Workshop:
A weekly Wednesday meeting for research-in-progress and journal club presentations. Meet at 4:00 pm in ECC 302.
- CF Scholars Meetings:
A monthly program for CF Scholars, Friday afternoons, see website schedule.

More information and current schedules can be found on
www.pedsresearch.org/research/centers/cf-air/seminars-workshops/
 and
www.pedsresearch.org/research/centers/cf-air/cf-center-of-excellence/education-outreach/cf-scholars-program/

Clinics:

Children's Healthcare of Atlanta
 CF Care Center:
 Children's at North Druid Hills
 1605 Chantilly Drive NE
 Atlanta, GA 30324
 404-785-2000

Children's at Scottish Rite
 Cystic Fibrosis Affiliate Program
 5455 Meridian Mark Road, Suite 200
 Atlanta GA 30342
 404-785-2898

Emory Adult CF Clinic: 404-778-7929

Website:

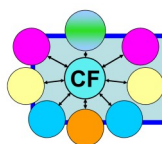
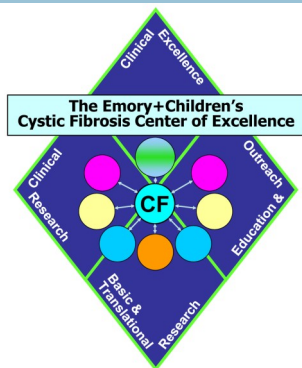
www.pedsresearch.org/research/centers/cf-air

If you are interested in supporting our research and outreach programs please visit:
www.pedsresearch.org/research/centers/cf-air/donors-visitors/

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