

2022 Annual Progress Report

IMMUNOLOGY INSTITUTE

The University of Alabama at Birmingham

Immunology Institute Mission Statement

The mission of the Immunology Institute (II) is to serve as a **hub** for coordinating **immune** system research, education and outreach.

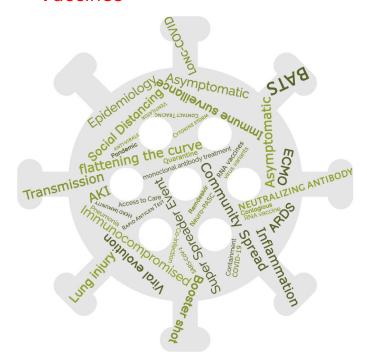
Immunology by its very nature (system) is **cross-disciplinary** and not limited to one department or division. The major goals of the II are to:

- Foster cross-disciplinary science
- Facilitate collaborations between the clinicians who bring immune-modifying therapies to their patients and the basic researchers who elucidate the fundamental principles of the immune system
- Drive discovery and implementation of better therapies to treat and prevent disease.
- Become a nexus for those interested in educating our campus, our community and our state on the critical role that the immune system plays in promoting health and well-being.

Why should we care about the immune system?

The Immune System is tightly interwoven with most acute and chronic diseases that impact human health and the therapies to treat these diseases are increasingly leveraging the power of the immune system

Host Defense against pathogens Vaccines



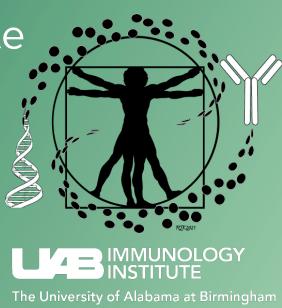
More than SARS-CoV-2! Viruses, bacteria, fungi, parasites

Immune-modulating treatments Inflammatory and used in cancer and chronic Immune-mediated Diseases inflammatory disease neutralizing antibodies Cancer, infections, chronic inflammatory diseases Autoimmune, transplant, neurologic,



FY22 Goals and Results

I. Establish and launch the Immunology Institute



1. Establish the UAB HSOM II leadership group



Co-Director
Paul Goepfert MD
Div Infectious Disease



Co-Director
Troy Randall PhD
Div Clinical Immunol &
Rheumatology



Director
Frances Lund PhD
Dept Microbiology



Program Director
Carol Ballinger PhD
Micro & II



Program Coordinator
Yu-Ting Lin MA
Micro & II

2. Establish Internal Advisory Board











Laurie Harrington
Professor CDIB
Director Immunology T32



Sixto Leal Jr MD PhD
Assoc Div Director Lab Med Pathology
Scientific Director SEBLAB

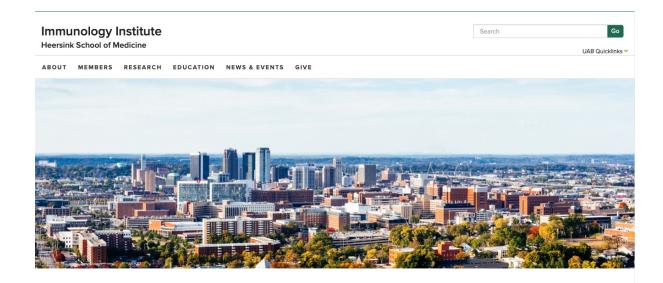
Emily Levitan
Professor Epidemiology
Co-Leader UAB RECOVER Program

Randy Cron MD PhD
Professor Pediatrics
Div Director Pediatric Rheumatology

Heather Bruns
Professor Micro
Co-Director UIP and
MED/DENT/OPT Immunology



3. Establish II Web presence (Website & Twitter)



A cutting-edge and interdisciplinary hub for faculty, researchers, clinicians, health policy experts, and educators who seek to advance the study of immunology and improve human health

www.uab.edu/medicine/immunologyinstitute

Immunology Institute List Serve



200+ followers (~55,000x fewer than Rihanna)

4. Introduce II - Open House and Town Hall



5. Establish Membership

Become a Member

Member Spotlight

Members

Members-Research Interests

Become a Member



Immunology Institute (II) membership is open to faculty, including basic scientists, clinicians, translational researchers, physician scientists and educators of UAB-affiliated campuses, who have a desire to understand how the immune system develops and functions to promote health and well-being. We also welcome postdoctoral researchers, graduate and undergraduate students as trainee members.

As a member of Immunology Institute, you will



Where is **Dr. Agarwal**? Works on the macrophage, which I believe is an immune cell?

Member Spotlight

The Immunology Institute Member Spotlight features one member every month, providing a platform to highlight the difference they make to the scientific research field. In February 2023, our featured sportlight is Dr. Sixto M. Leal, director of Clinical Microbiology, Fungal Reference Laboratory.

Sixto M. Leal
Associate Professor
Department of Pathology, Laboratory Medicine
Heersink School of Medicine

1. Can you describe your research?

My research interests are 4-fold and include 1. Expert laboratory support for a variety of Infectious Disease (ID) clinical trials,2.

Evaluation of new commercial diagnostic tests seeking FDA approval, 3. Development of novel ID diagnostics, and 4. The mechanistic evaluation of host and microbial factors mediating the outcome of invasive mold infections in otherwise healthy hosts including: COVID-Associated 2° mold infections (CAPA/CAM), fungal keratitis, phaeohyphyomycosis, and dimorphic fungal infections.

2. How did you become interested in this field?

As an undergraduate studying Pseudomonas aeruginosa I became enthralled by the ever evolving battle between microbes and the immune system.

Trainee Members

Susana Cheetham

Graduate Student, Clinical Immunology and Rheumatology

Researche Interests

Infection; Host Defense and Vaccination; Microbiome



Faculty Members

Khurram Bashir, M.D.

Professor, Neurology

Research Interests

Inflammation and inflammatory-mediated disease; Immune

Dysregulation and

autoimmunity; Neuroimmunology; Immunotherapies

VIEW PROFILE



Susan Bellis, Ph.D.

Professor, Cell, Developmental and Integrative Biology

Research Interests

Immunotherapies: Cancer Immunology

VIEW PROFILE



Tika Benveniste, Ph.D.

Professor and Senior Vice Dean for Research

Research Interests

Immune Dysregulation and autoimmunity; Allergy

VIEW PROFILE



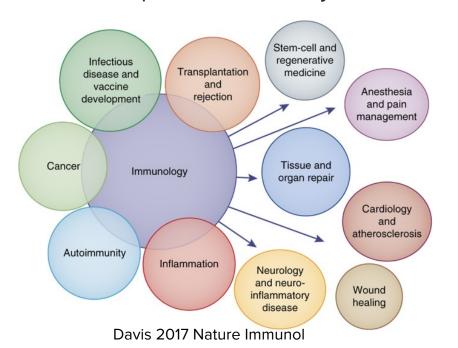
Immunology Institute List Serve

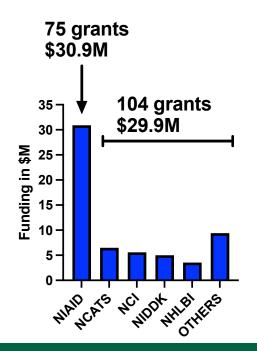


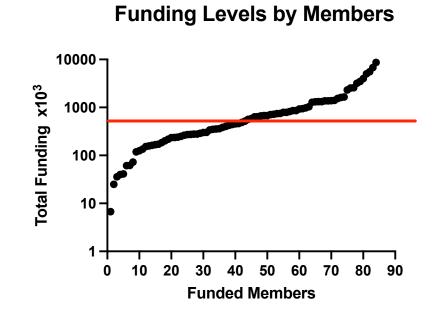
II Member Profile

- Currently 108 faculty members with 41 trainees
- 9 Schools, 40 Divisions and Departments
- 84 of 108 members have Active Funding
- Total active funding \$85,465,601 from 363 grants
- 182 NIH grants with \$61M in funding
- Avg per funded faculty member \$1.02M
- Median per funded faculty member \$502,000

- Large Spectrum of Research:
- Basic and clinical researchers working across the spectrum of immunology, infectious disease, cancer, autoimmunity, inflammation, transplantation, neurology, cardiovascular disease
- Funding from 16 NIH Institutes



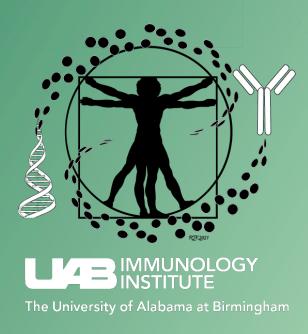






FY22 Goals and Results

II. Support Education, Outreach, Training



1. Begin participating in outreach programs

LiveHealth Smart Alabama in October 2022

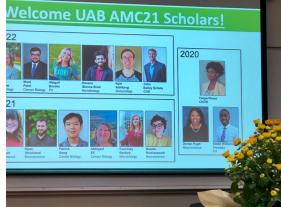
















AMC21 Welcome Reception on 9/26/2022

Habitat for Humanity Fall 2022



2. Established a new named lecture





Dorothy Oliver, Drucilla Russ-Jackson, and Dr. Anna Blakney

The UAB Department of Microbiology, Immunology Institute, and ASM Student Chapter Presents

Dorothy Oliver and Drucilla Russ-Jackson Vaccine Lecture

"Development of a self-amplifying RNA vaccine against COVID-19"

WEDNESDAY, MAY 18, 2022 12:00 P.M. | ZOOM

Ms. Oliver and Russ-Jackson were instrumental in increasing vaccination efforts in rural Alabama.

Dr. Blakney, is a vaccine expert and Assistant Professor at the University of British Columbia's School of Biomedical Engineering and Michael Smith Laboratories.

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

or email Julie Decker julie@uab.edu.



3. Manage and Support Program in **Immunology Seminar Series and** special lectures

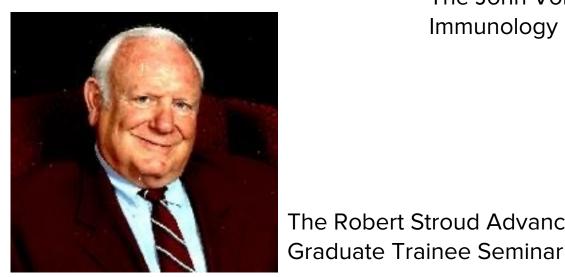


Program in Immunology Seminar Series

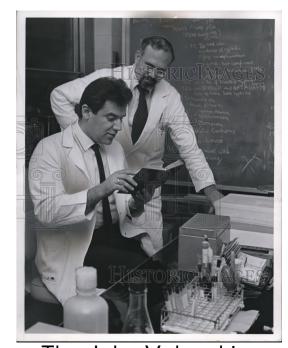
- O Thursday, February 16 | 4:00 pm
- Bevill Biomedical Sciences

Speaker: Eroboghene E. Ubogu, MD, FAANEM, FANA, Professor of Neurology and Neurobiology, Director, Division of Neuromuscular Diseases, Director, EMG and Evoked Potential...

Learn more



The Robert Stroud Advanced



The John Volanakis Immunology Lecture

4. Support for student programs and training

Undergraduate Immunology Program Undergraduate Immunology Society



Why Immunology?

Immunology at UAB is an interdisciplinary program between the Department of Microbiology in the School of Medicine and the Department of Biology in the College of Arts and Sciences. It provides an immunology-focused curriculum in addition to a broad-based education in the fundamental aspects of biology, microbiology, chemistry, physics, and mathematics. This curriculum will satisfy most pre-medical and pre-health requirements, making it an ideal choice for those students who have an interest in pursuing careers in:

- medicine
- · biomedical research
- · health-related professions, or
- science-related professions (including teaching science, science communication, or policy).

Learn More

Training Grant in Immunologic Diseases and Basic Immunology

Last Updated: December 9th, 2020



Training in Immunologic Diseases and Basic Immunology is focused specifically and comprehensively on the field of immunology. Over the years the preceptors and graduates of the program have made major contributions to the substantial growth of the research and training programs of the participating departments and units at UAB. More than 150 postdoctoral and predoctoral trainees have been supported since 1976. The majority have gone on to pursue academic careers in immunology.

History of the Immunology Training Program











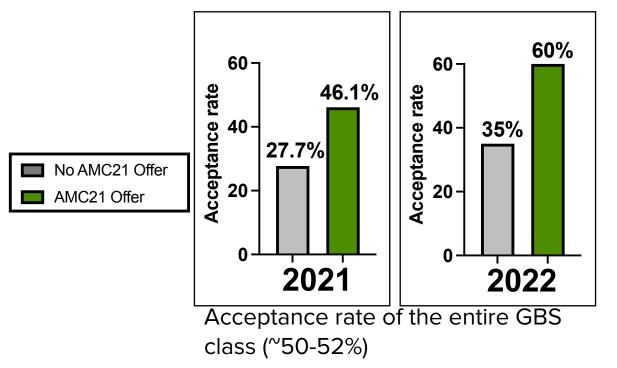
- Assisted with Immunology T32 submission
- Assisted with Diabetes T32 submission (JIT)
- Assisted with R24/25 Tuberculosis Center submission



5. Spearhead AMC21 Scholar Program

AMC21 Scholar Program improves acceptance of top GBS students who excel once at UAB

- Directed by Drs. Leon and Ballesteros-Tato
- Provides \$30K/student over 2 years (\$5K/yr for student, \$10K/yr for lab)
- First class started in 2017 (n=3), just graduating with PhDs now
- Students nominated for scholarship (~32/yr)
- Offers extended in 21 (n=14) and 22 (n=10)



Accomplishments of Class 2017-2019 (n=9)

Funding (T32 or external funding) =4

Publications

8 first author publications 8 additional publications

Gunars Osis: Grant from American Heart Association

Samuel Mabry: Blazer Fellowship award

Rachel Andrews: President of the UAB Student American

Society for Microbiology

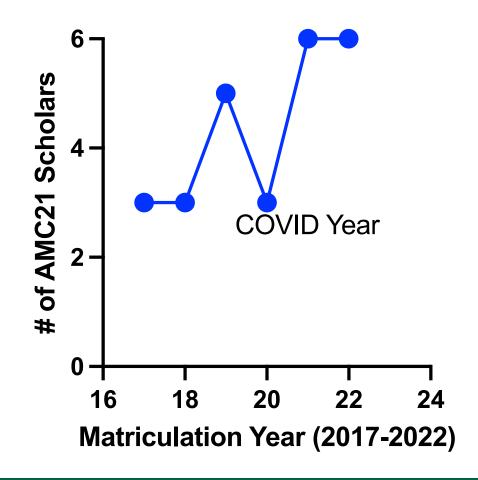
Robert Philips: Carmichael Scholar Fund

Julia Ziebro: O'Neal NextGen Scholar award

AMC21 Scholar Program – 2023 offers

Without additional funding this will be the last class we can take! Can we re-up the program for 2024?

Theme	Publications	Awards
GGB	3 first-author pubs	
CMDB	3 pubs; 2 first-	2022 Outstanding Junior, Dept Genetics and
	author	Biochemistry
PPP	6 pubs; 1 first-	Full scholarship from Shahid Beheshti
	author	Medical University/Iran
IMM	2 pubs; 1 first-	Represent the PLNU Biology Department at
	author	the Kyoto Prize Conference
GGB	3 pubs; 1 first	2022 – 2023 Goldwater Scholar; 2022 –
	author	2023 Astronaut Scholar
IMM	2 pubs; including	
	Cell	
MICRO	1 pub; 1 pub in	
	resubmission	
NEURO	1 pub	



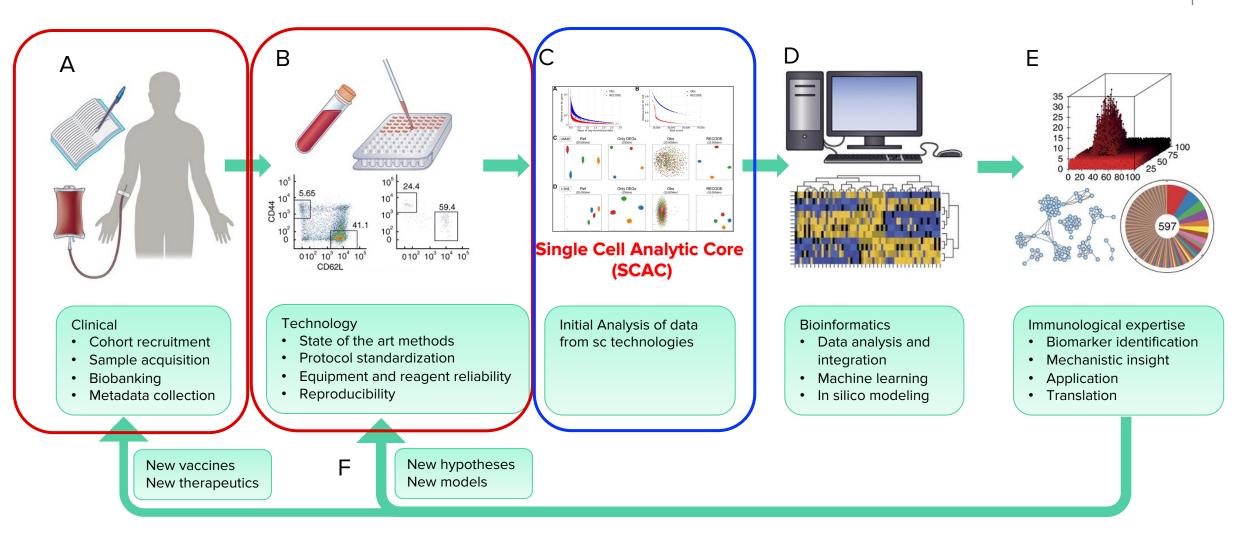


FY22 Goals and Results

III. Build II Research Capabilities and Portfolio



1. Build roadmap to enhance II-relevant research



Davis 2017 Nature Immunol

2. Establish and Support Healthy Donor Cohort



RESEARCH VOLUNTEERS NEEDED

UAB Healthy Donor Group

This group includes healthy adults who volunteer to be contacted when researchmathed controls are needed for UAB Research studies

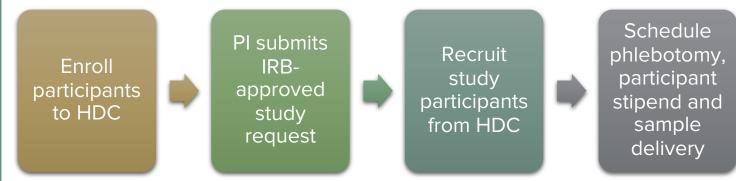
- Are you 18 years of age or older?
- Do you weigh more than 110 pounds?
- Do you consider yourself to be in overall good health?
- Are you willing and able to donate blood samples for UAB Research?

If you answered YES:

Go to:

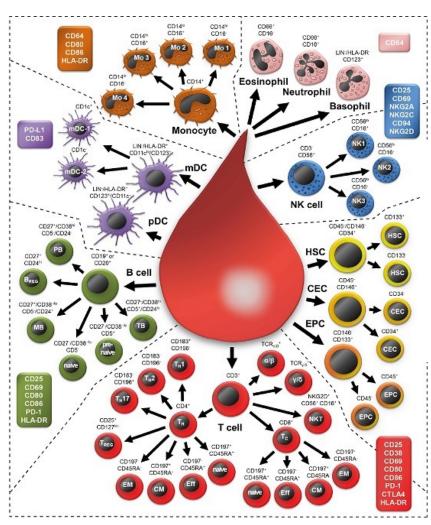
REDCap/UABHealthyDonor Group

for more info about the group, participation methods and possible compensation. Goal: To provide a source of healthy donor PBMCs to investigators who need controls for patient samples and/or who are studying human immune cells



- Protocol designed, written and submitted with IRB now
- Job description approved and posted

3. Establish Immune monitoring core



Goal: to provide investigators with tools and core services to monitor the immune system in clinical trials that test immunomodulatory drugs and to assess patient responsiveness to therapy

CCR FOCUS

The Where, the When, and the How of Immune Monitoring for Cancer Immunotherapies in the Era of Checkpoint Inhibition

aacrjournals.org

Priti S. Hegde¹, Vaios Karanikas², and Stefan Evers²

- Working group established
- % effort assigned for Flow Core staff and faculty who are currently evaluating panels
- Determining structure of core

Int. J. Mol. Sci. 2016, 17(8), 1316; https://doi.org/10.3390/ijms17081316

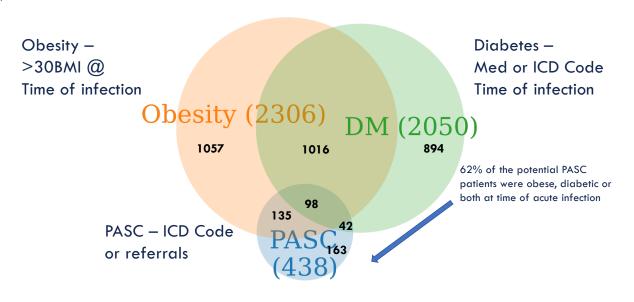


4. Develop immune-focused data dictionary to provide clinical data to investigators

Goal: To provide clinical data that can be matched to biologic samples or define cohorts for analysis

Infected April 2020-Dec 2021 (Wuhan, α , β , δ variants)

Participant characteristics	# Participants (hospitalized)
Dx COVID19 ⁺ 2020-2021	4381 (3536)
Diabetic (defined by med)	823 (742)
Diabetic T2D (ICD code)	925 (808)
Class I Obesity (>30 BMI)	2045 (1686)
Class II Obesity (>34 BMI)	1201 (1001)
PASC (ICD code)	262 (172)
PASC (Clinic Appt)	125 (63)



- Established Task Force
- Committed Effort for informatics staff
- Data Dictionary ~125 mapped variables
- Prototyping in DataLens



FY22 Goals and Results

IV. Engagement with other External and Internal Research Units



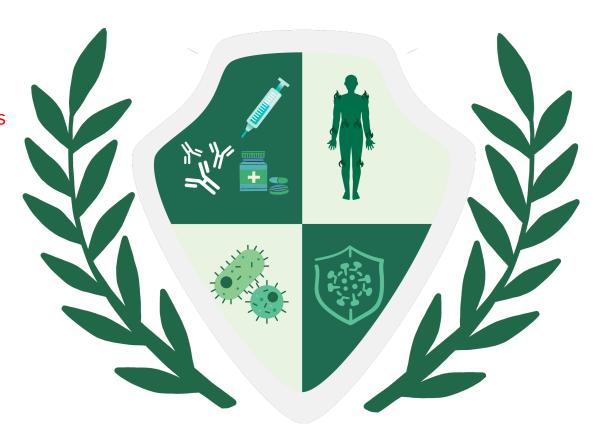
1. I-4ward Strategic Planning and Implementation

Immune-modulating treatments

Cancer, infections, chronic inflammatory diseases



Viruses, bacteria, fungi, parasites



I-4ward (Infection, Inflammation, Immunity, and Immuno-Therapy)

Inflammatory diseases

Neurologic, pulmonary, endocrine, cardiovascular

Immune-mediated diseases

Autoimmunity, allergy, transplant rejection



2. Establish Programs with External and Internal Research Units



Support departments, divisions and centers with immunology centric recruitment and retention



Support UAB cores and shared facilities





Support multidisciplinary immunology research



Establish ties with pharma/industry partners to provide immunology-relevant expertise to clinical trials, pre-clinical modeling and drug discovery programs



Establish collaborations with Immunology Institutes at other universities

3. Metabolic risk factors and inflammation in PASC development (\$1M in 1 yr; first II cross-disciplinary grant initiative)



An Initiative Funded by the National Institutes of Health

Immunology Team Leaders

¹Frances Lund <u>flund@uab.edu</u>

²Nathan Erdmann nberdmann@uabmc.edu

³Troy Randall troyrandall@uabmc.edu

²Paul Goepfert <u>pgoepfert@uabmc.edu</u>

Metabolism Team Leaders

⁴Anath Shalev <u>ashalev@uabmc.edu</u>

⁶James Hill hilli@uab.edu

⁶Tim Garvey <u>garveyt@uab.edu</u>

⁵Carrie Howell <u>chowell@uabmc.edu</u>

Medical & Bio Informatics, Biostatistics and Epidemiology Team Leaders

²Greer Burkholder <u>aburkholder@uabmc.edu</u> ¹Alex Rosenberg <u>afr@uab.edu</u>

⁷Emily Levitan <u>elevitan@uab.edu</u>

⁸Dustin Long <u>dmlong@uab.edu</u>

recoverCOVID.org



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SCHOOL OF PUBLIC HEALTH

The University of Alabama at Birmingham



The University of Alabama at Birmingham



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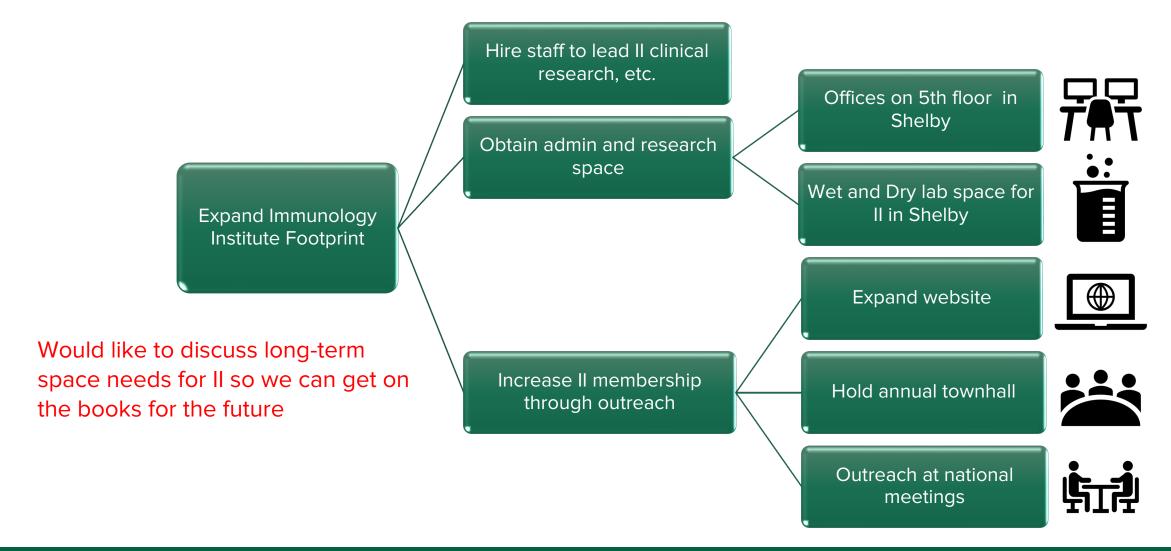
The University of Alabama at Birmingham



FY23 Goals



I. Expand Immunology Institute Footprint



II. Support Education, Outreach, Training



Support Immunology Education and Training

- Support AMC21 and UIP
- Support 2024
 Southeastern
 Immunology Symposium
- Host 2023 Vaccine Lecture and Symposia
- Revamp PII
- Initiate trainee-focused Research in Progress

Implement
Immunologythemed
outreach
programs

- Support UIP outreach
- Create/share/post educational content on Twitter for UAB UIP

Support 2024 Southeastern Immunology Symposium and UIP Educational Outreach Program



- Secondary Education Science Teachers
- McWane Science Center
- Vestavia Hills City Schools



Dorothy Oliver and Drucilla Russ-Jackson Vaccine Lecture

Oct. 11, 2023

Dr. Sabra Klein, Johns Hopkins University

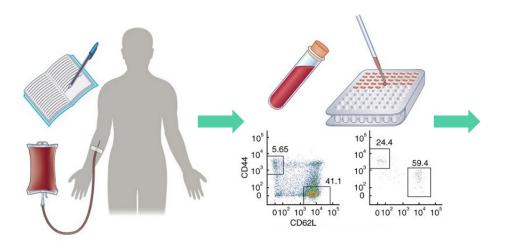


Program in Immunology & Trainee-focused Research in Progress



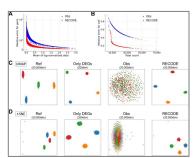
Enhance engagement, connection, and communication

III. Advancing Research



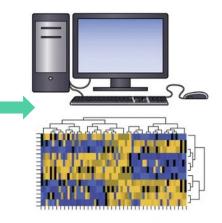
- Data Dictionary selfserve rollout
- Healthy Donor Core opened
- Begin planning for "Healthy Donor Tissue Cell Biorepository)
- Animal Pre-clinical model development (dirty mice, humanized mice, hamsters)

- Rollout methods and panels for high dimensional flow cytometry
- Open Immunophenotyping core
- Contribute to single cell technology instrumentation



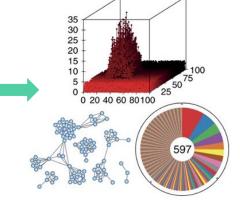
Single Cell Analytic Core (SCAC)

- Participate with I-4ward in developing SCAC
- Develop and validate batch programs for schigh dimensional flow cytometry



Bioinformatics

- Data analysis and integration
- Machine learning
- In silico modeling



Immunological expertise

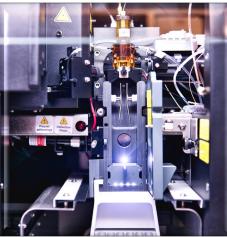
- Support pilot projects that are cross-disciplinary
- Hire trained staff for initiatives
- Participate in a cluster hire for Immunology focused researchers



IV. Engagement with other External and Internal Research Units



Support departments, divisions and centers with immunology centric recruitment and retention



Support UAB cores and shared facilities



Support multidisciplinary immunology research at UAB and other sites (national and global collaborations)



Establish ties with pharma/industry partners to provide immunology-relevant expertise to clinical trials, pre-clinical modeling and drug discovery programs



Support I-4ward strategic planning and implementation

V. Large Programmatic initiatives

Advancing our understanding of the mechanisms regulating human immune response

The *Cooperative Centers on Human Immunology* (CCHI) were awarded in response to RFA-Al-17-040 to support studies that will advance our understanding of the mechanisms regulating human immune response. The CCHI U19 mechanism supports mechanistic and hypothesis-testing studies to understand human immunity applicable to the biodefense effort; i.e. innate, adaptive and mucosal immune responses to infection, vaccination and adjuvants. Studies on immune-mediated diseases (e.g. airway allergy, food allergy, autoimmunity, organ transplant rejection) are also of interest, as these data will provide a more comprehensive understanding of the human immune system. The program supports the

January 2023 DAIT Council-Approved Concepts

Innovations in Functional B Cell Epitope Discovery

Broad Agency Announcement - proposed FY 2024 initiative

Contact:

Deborah Blyveis

blyveisd@niaid.nih.gov ₪

Objective: This program supports the discovery of novel B cell epitopes, elucidation of mechanisms of antibody-mediated protective immunity and/or mechanisms of antibody-mediated pathology, and use or expansion of advanced technologies for epitope discovery and validation. Data from previous cycles of this program have been used to predict cross-protective epitopes among related pathogens, generate diagnostic and therapeutic antibodies, and inform the development of epitope-based vaccine strategies.

Due April 5

Focus on immune responses to transplanted solid organs (lung, kidney, uterus)

Likely due in Summer/Fall 2023

Focus on discovery of new HLA epitopes that contribute to chronic antibody mediated rejection



V. Large Cross-Disciplinary Programmatic initiatives

Transplant (Surgery, Nephrology, HLA Lab)



Set MEDICINE
Set Management





Immunology/ID
(ID, Rheum, Micro)







Structural Biology (Micro, Anesthesiology)











FY22 and FY23 Finances



FY22 Budgeting Buckets

- Underspent by ~\$1M didn't get started with II until late summer
- workshops/symposia/seminar series are now being spent (started in Fall)
- Pilot funding first call will be in Oct 23, will spend funds over next 4 yrs
- Research Infrastructure job ads approved and posted, % effort for others now applied to account
- Faculty recruitment (promised to Diabetes/Peds, ID/Peds, Micro Chair package)

CATEGORIES	BUDGETED	PAID OUT
AMC21 Scholars Program	150,000.00	125,000
COVID-19 Research	,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Enterprise (direct to ID)	190,000.00	190,000
II Education and Outreach:		
PII, seminars, symposia,		
Workshops	90,000.00	1859
Pilot Funding	150,000.00	
Capital Equipment	500,000.00	135796
Research Infrastructure	300,000.00	
II Administrative and		
Discretionary Support	285,000.00	56447
Lund Research Support		
(3123731)	200,000.00	200,000
Endowed Chair (direct to		
Endowed Chair acct)	500,000.00	1,000,000
Faculty Recruitment (no		
payouts yet)	500,000.00	
TOTAL	\$2,865,000	\$1,709,100

FY23 Budgeting Buckets

- For FY23 we are on track to spend our budget
- Pilot funding will go out by Jan 2024
- New hires planned (HD program, data warehouse, Informatics support, Immunophenotyping core staff, in conjunction with FCC)
- Capital equipment single cell modalities and software workstation
- Host SIS2024 in BHM

CATEGORIES	BUDGETED	PAID OUT	PLANNED EXPENSES
AMC21 Scholars Program	150,000.00	135,000	
Il Education and Outreach: PII, seminars, symposia, Workshops	90,000.00		105,000
Pilot Funding	150,000.00		150,000
Capital Equipment	200,000.00		200,000
Research Infrastructure	300,000.00		300,000
II Administrative and Discretionary Support	285,000.00		230,000
Lund Research Support (3123731)	200,000.00	200,000	
Endowed Chair (direct to Endowed Chair acct)	500,000.00	500,000	
Faculty Recruitment/Retention	500,000.00		100,000
	\$2,375,000	\$835,000	\$1,035,000

AMC21 Projected Budget -no funds to support scholars named in FY24

• Any commitments made in **FY24** will carry over into **FY27** for which we have no future II commitment

FY22		
	\$75,000	FY19 AMC21 Scholars Year 2 – Bollar, Childers, Fisher, Hunter, Ziebro
	\$45,000	FY20 AMC21 Scholars Year 1 – Owiredu, Pierre, Pugh
	(\$30,000)	Co-Directors Year 3 (paid out from 3115431)
	\$120,000	
	\$30,000 total surplus	
FY23		
	\$45,000	FY20 AMC21 Scholars Year 2 – Owiredu, Pierre, Pugh
	\$90,000	FY21 AMC21 Scholars Year 1 – Adamson, Barkley, Eli, Remiszewiski, Song, Strickland
	(\$30,000)	Co-Directors Year 4 (to be paid out from 3115431)
	\$135,000	
	\$45,000 total surplus	
FY24	\$90,000	FY21 AMC21 Scholars Year 2 - Adamson, Barkley, Eli, Remiszewiski, Song, Strickland
	\$90,000	FY22 AMC21 Scholars Year 1 – Banna Siam, Brooks, Denslow, Echols, Patel, Sahlberg
	(\$30,000)	Co-Directors Year 5 (to be paid out from 3115431)
	\$180,000	
	\$15,000 total surplus	
FY25		
	\$90,000	FY22 AMC21 Scholars Year 2 – Banna Siam, Brooks, Denslow, Echols, Patel, Sahlberg
	\$75,000	FY23 AMC21 Scholars Year 1 – TBN this year - ~ 5 (8 offers pending)
	(\$30,000)	Co-Directors Year 6 (to be paid from II AMC21 parent acct)
	\$165,000	
	\$0 total surplus	
FY26		
		FY23 AMC21 Scholars Year 2 – TBN this year; (8 offers pending)
		FY24 AMC21 Scholars Year 1
	(\$30,000)	Co-Directors Year 7 (to be paid from II AMC21 parent acct)
	\$150,000	





Thank you!

