THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

IMMUNOLOGY INSTITUTE
The University of Alabama at Birmingham

UAB HSOM Immunology Institute Annual Review – Feb 2024

https://www.uab.edu/medicine/immunologyinstitute/

UAB HSOM Immunology Institute

UAB IMMUNOLOGY INSTITUTE
The University of Alabama at Birmingham

An interdisciplinary research hub for faculty, researchers, trainees, clinicians, health policy experts, and educators who seek to advance the study of the immune system and its role in health and disease

Today's Presentation

- Achievements 2023
  I. Membership and Funding
  II. Education, Outreach and Training
  III. External and internal engagement
  IV. Build Research Capabilities (Infrastructure)**
  V. Finances
- Goals 2024

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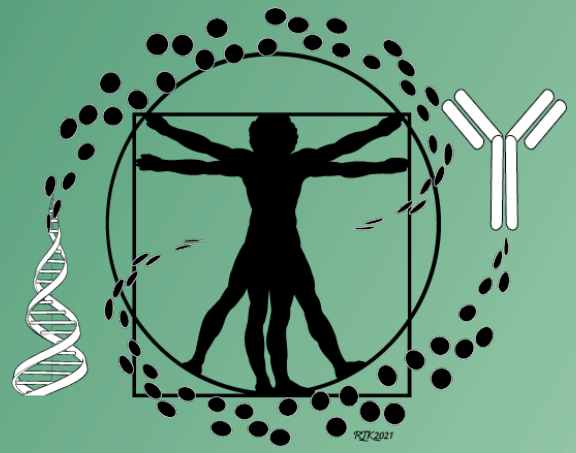
FY23 Achievements

I. Membership and Funding



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Growing the Institute - Staffing

New staff and (Lorenzo Thompson MD and Davide Botta PhD) and designated Institute administrative office space

Frances Lund, Ph.D.
Director

Paul Goepfert, M.D.
Associate Director

Troy Randall, Ph.D.
Associate Director

Immunology Institute Advisory Board

Carol Ballinger, Ph.D.
Administrative Director

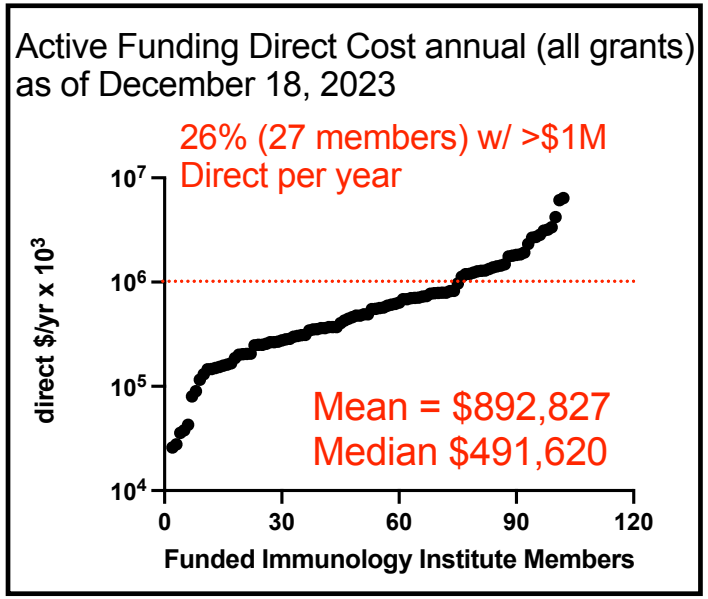
Davide Botta, Ph.D.
Research Manager

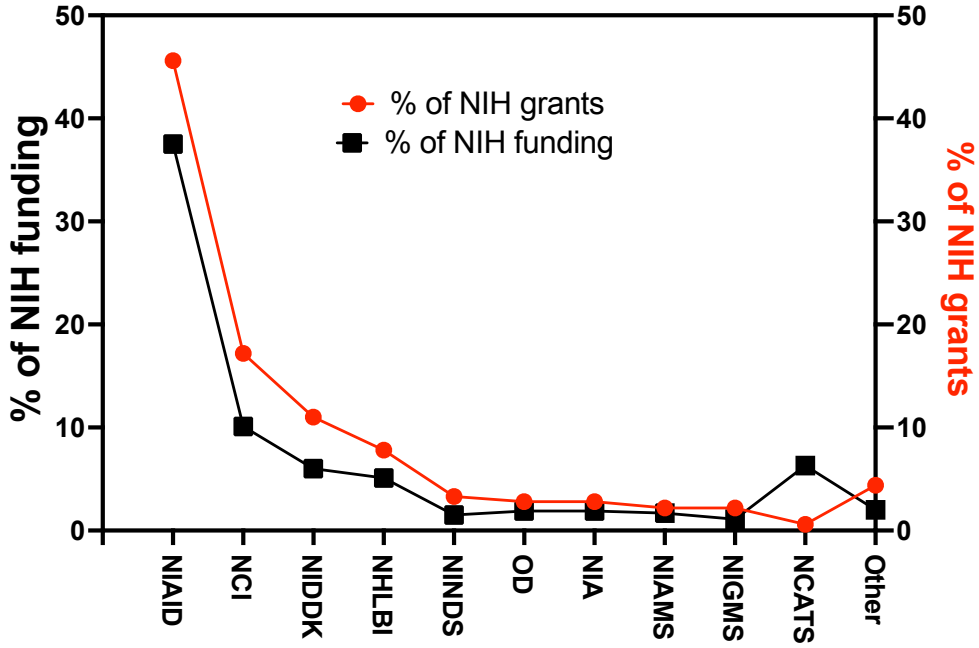
Yuting Lin, M.A.
Program Manager I

Lorenzo Thompson, M.D.
Manager - Clinical Research Adminstration

Immunology Institute Membership and Funding

- 158 faculty with 124 active researchers and 26 teaching/retired/emeritus/instructor faculty
- Faculty represent 24 Departments across 7 UAB Schools (90% in HSOM)
- 102/124 (82%) Research Intensive Faculty have current extramural funding
- 343 active grants (12/18/23) totaling $91M in *directs only for the current 1 yr* funding period
  - These include 182 NIH grants totaling $68.5M *in directs only for the current 1 yr* funding period
  - 75% of all member funding is from NIH
- II member grant portfolio includes 286 Pending Applications totaling $503M (direct+indirect, all years)
  - 175 of pending applications are to NIH ($296M total)
  - 59% of all member pending funding is from NIH





Impact of the studies conducted by II members

ICITE Report

ICite: Influence provides **Relative Citation Ratio (RCR)** values, which measure the scientific influence of each paper by field- and time-adjusting the citations it has received, and benchmarking to the median for NIH publications, the value of which is set at 1.0. Fields are defined for each article by using its co-citation network. This benchmarking process ensures that a paper with an RCR of 1.0 has received the same number of cites/years as the median NIH paper in its field, while a paper with an RCR of 2.0 has received twice as many cites/year as the median NIH-funded paper in its field. The displayed values are maximum, the mean, the SEM and the median of the papers in the group. **Weighted RCR** - is the sum of the RCRs for the articles in the group. This weights the article count by their influence relative to NIH-funded papers. A highly influential set of articles will have higher **Weighted RCR** than **Total Pubs**, while a set of articles with below average influence will have a lower **Weighted RCR** than **Total Pubs**

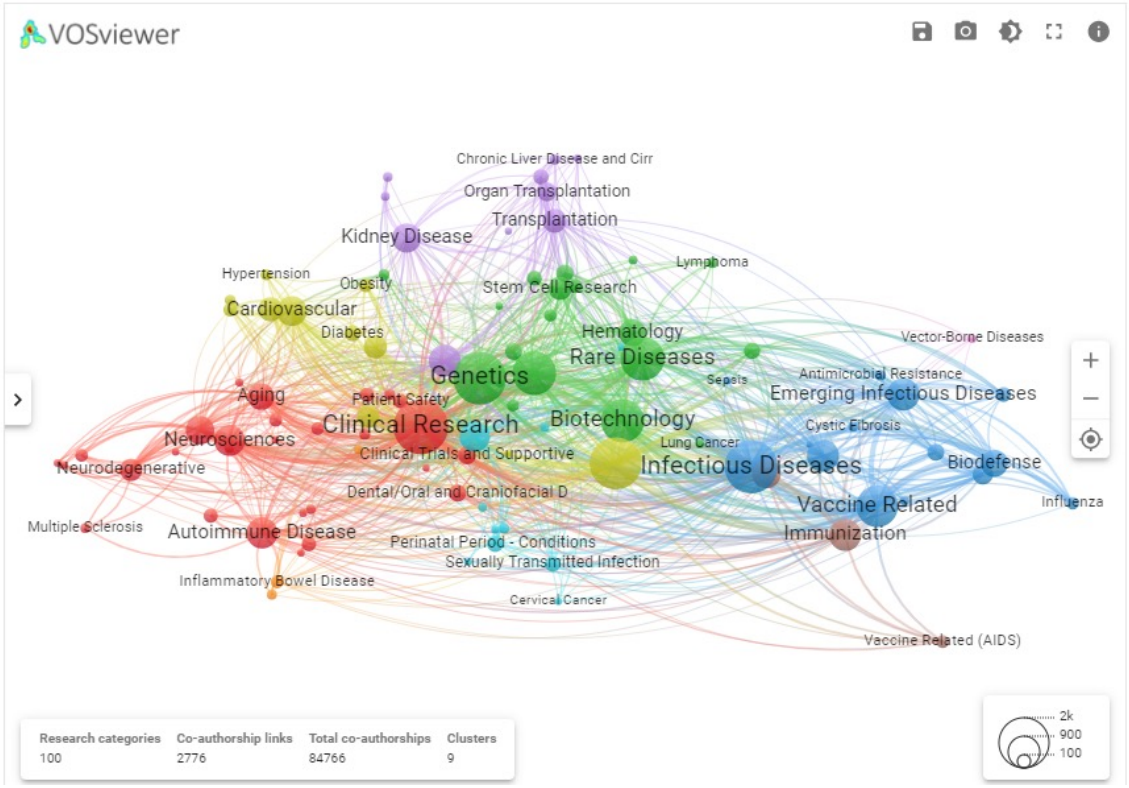
2018-2022 (98 faculty); 335 pubs; 170 pubs RCR/yr ≥ 1; mean RCR =2; weighted RCR = 713
2019-2023 (150 faculty), 386 pubs; 163 pubs RCR/yr ≥ 1; mean RCR =2; weighted RCR = 882

Based on these metrics, members of the II are publishing influential papers

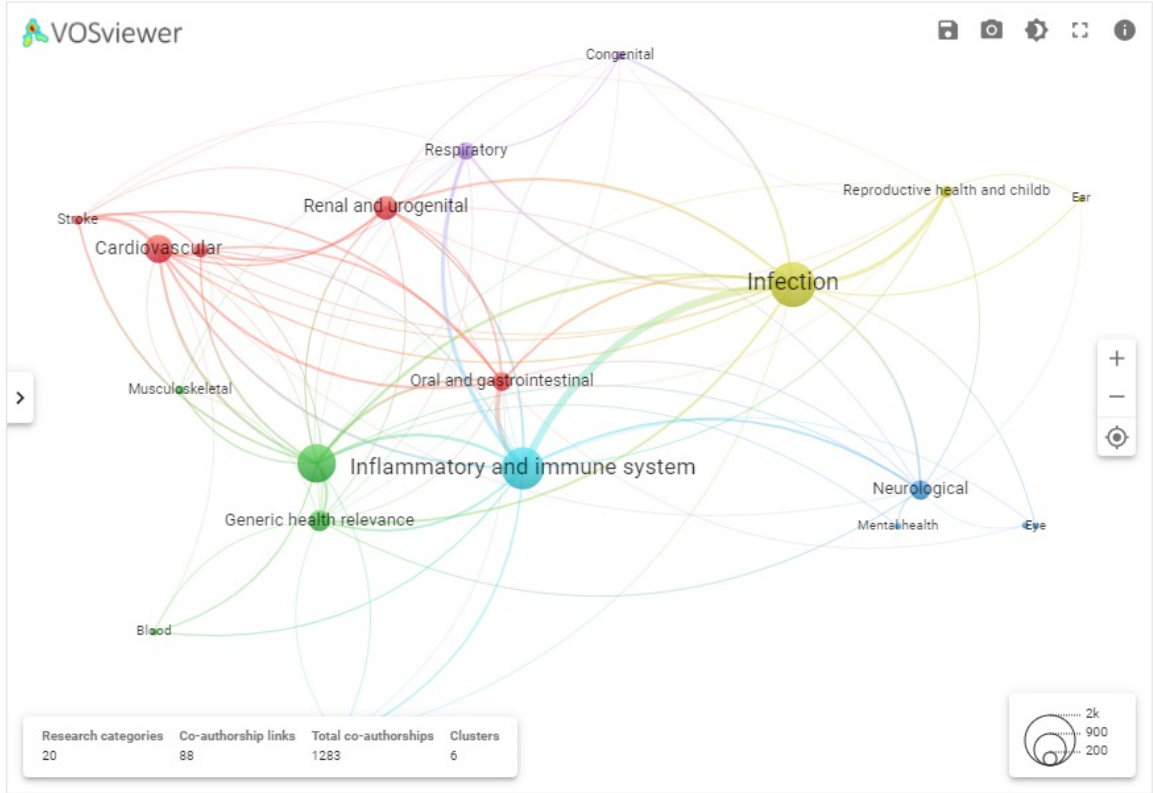
Research Networking between HSOM II Members

Dimensions analysis

9 broad research category clusters with 2776 co-authorship links



Opportunity to increase connectivity across research categories



We now have examples of new cross-discipline studies/grant applications

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FY23 Achievements

II. Support Education, Outreach, Training

STEM Education and Training Builds Diversity Among Next Generation of Biomedical Scientists

Posted on August 9th, 2022 by Jon Lorsch, Ph.D., National Institute of General Medical Sciences

Credit: National Institute of General Medical Sciences, NIH

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Community engagement and education

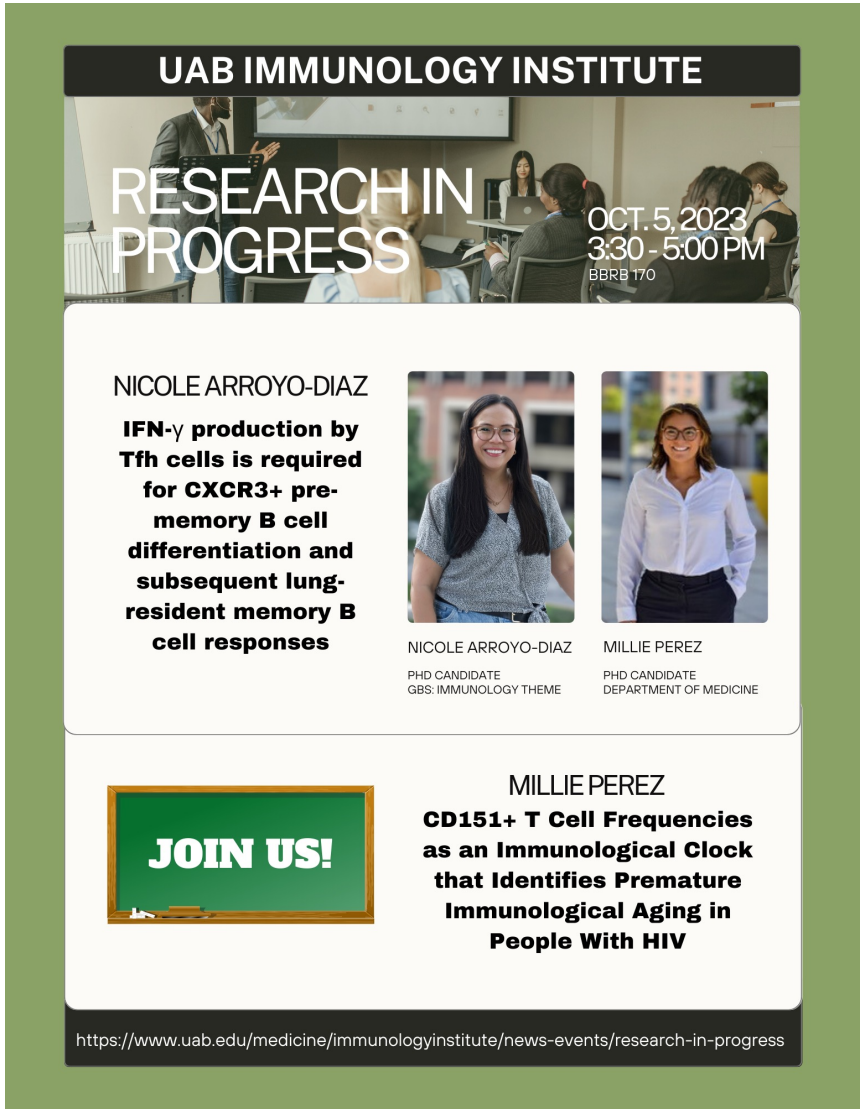
In 2023, the II supported the Undergraduate Immunology Society (UIS) in engaging approximately 200 participants in learning about immunology at McWane Science.

UIS/II will also host a series of immunology workshops at Vestavia Hills Elementary East and Vestavia Hills Elementary Liberty Park in March 2024.

(Under) Graduate Education and training

156 trainees and staff are II members
Activities for Trainees managed by II

- Trainee Research in Progress
- AMC21 Scholar Program – GBS
- Program in Immunology Seminar Series
- Annual UAB II Symposium (Vaccine Day)
- Southeastern Immunology Symposium



Program in Immunology Seminar Series

Thursdays from 3:30 to 5:00 pm at BBRB 170

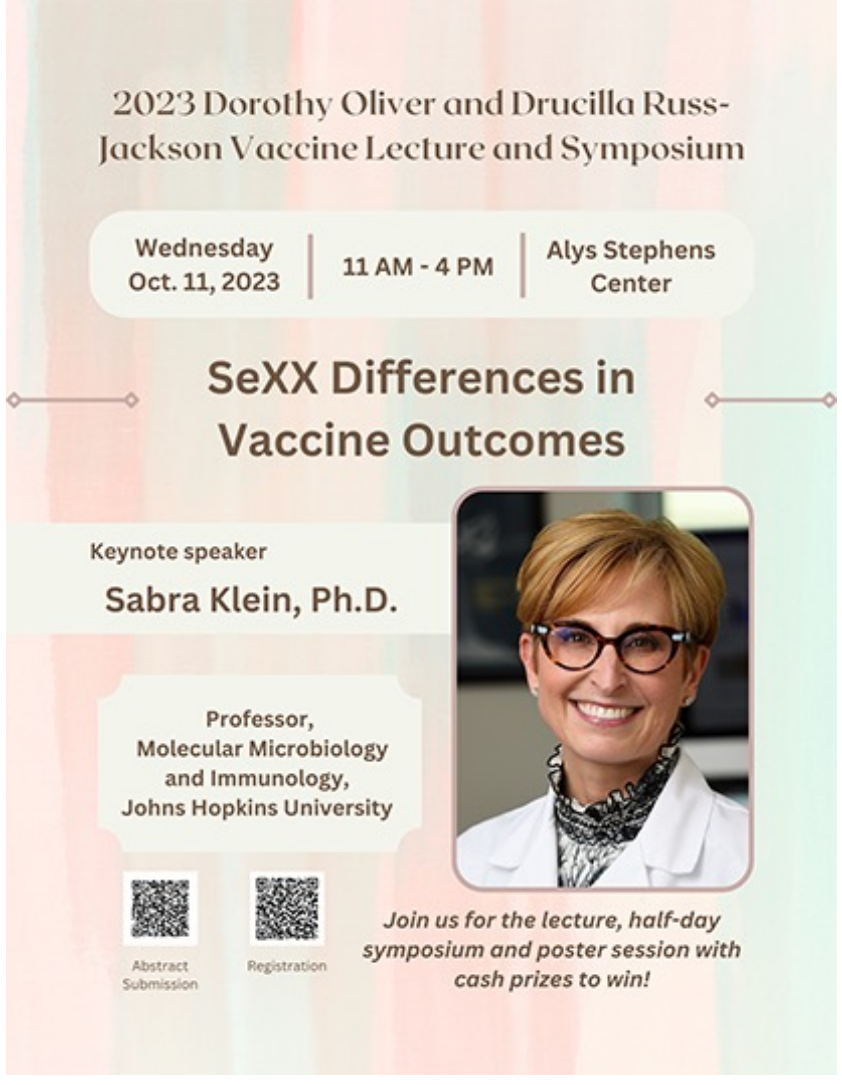
Mingle with colleagues and the speaker after the seminar!

23-24 Series: 19 External Speakers plus 8 Internal Speakers
24-25 Series: Completely booked 17 external + 9 internal

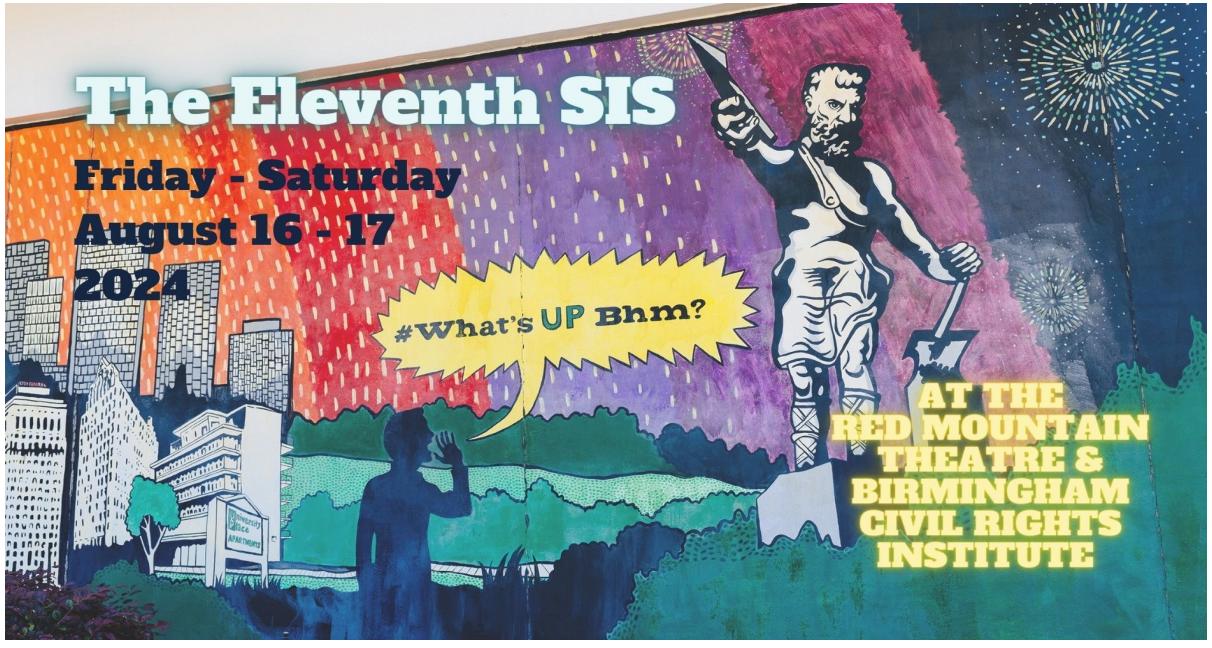
When speakers agree, the talks are posted internally for one week for viewing by those who can't attend the seminar

Symposia and Events

Annual Immunology Symposia



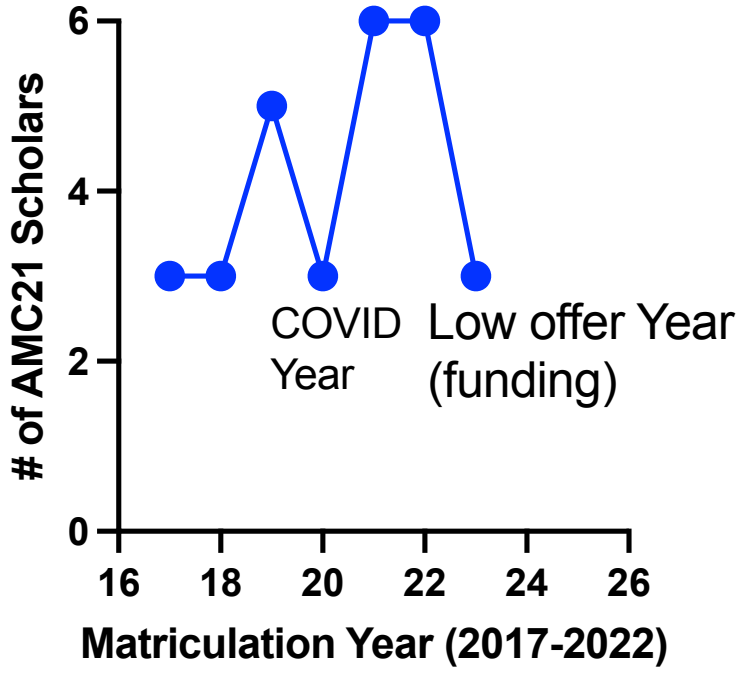
Annual Southeastern Immunology Symposia – BHM 2024!!



Jenny Ting, UNC
Jason Cyster, UCSF
Dave Masopust, UMinn

AMC21 Scholar Award Program

- Started program in 2017
- Renewed program in 2023, budgeted for 6 recruits/year
- 27 students recruited to date
- 5 students graduated
- Accept 32 nominations from themes each year
- Interview ~15 students
- Extend offers to 11-12 students



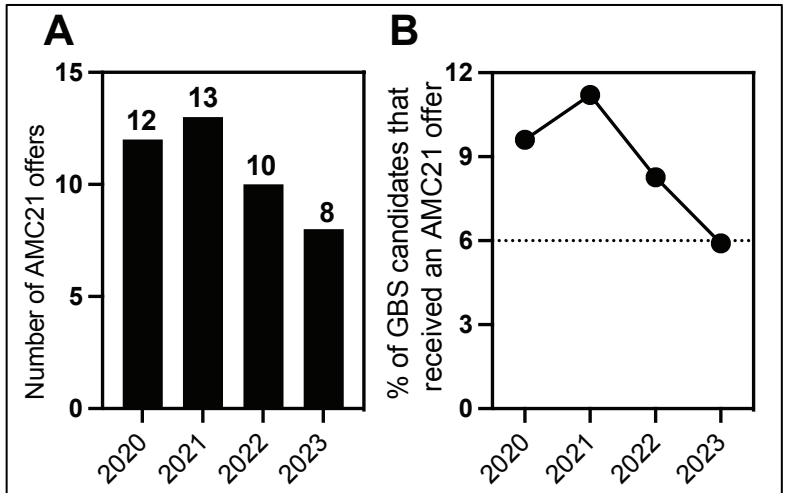


Figure 2: AMC21 Program Offers. (A) Number of offers extended by the AMC21 Selection Committee. **(B)** Percentage of GBS candidates who received an offer from the GBS and were subsequently offered a position in the AMC21 program.

New Partner!!

BRAIN PRIME

- Il (Davide Botta) will manage (day to day) program with updated selection committee
- Need to select a new Faculty Advisor for program
- Changed distribution of funding ($7500/yr to lab, $2500 award to applicant at time of matriculation, $7500 award to applicant for professional advancement

AMC21 Scholar Program

Our first graduates!!

Gunars Osis

PhD 2022
A. Agarwal Mentor
AHA Fellowship
4 Publications
Bioinformatician ASRT

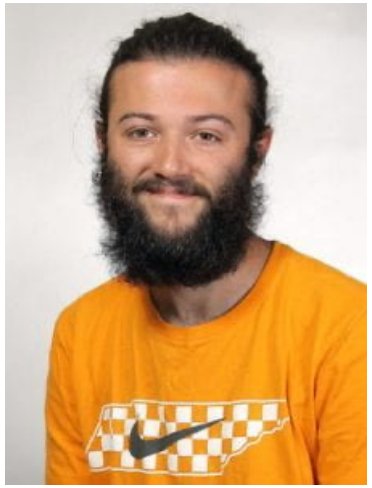
Rachel Andrews

PhD 2022
O. Kutsch Mentor
3 publications
Gov Contractor

Robert Phillips

PhD 2023
J. Day Mentor
T32 Recipient
6 publications
PDF Lieber Institute

Sam Mabry



PhD 2023
A. Galli Mentor
6 publications
PDF - Pitt

Jennifer Fisher

PhD 2023
B. Lasseigne Mentor
11 publications
Computational Biol.
CFD Corp

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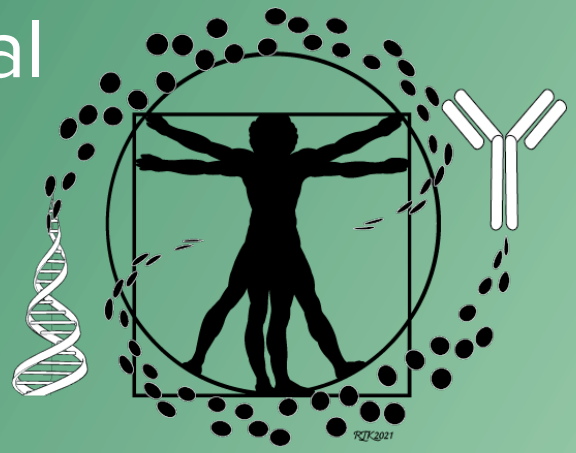
FY23 Achievement

III. Engagement with other External and Internal Research Units



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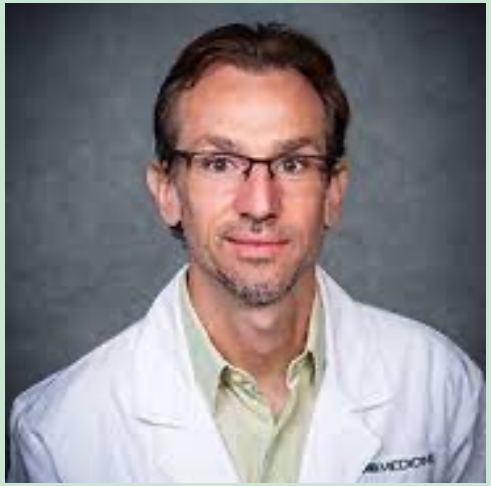
Recruitment and Retention Investments

Paul Goepfert
ID



Nathan Erdmann
ID

J. Victor Garcia-Martinez
Micro

Support also offered: Ballesteros-Tato, Leon, Collier, Hull but all said no ☹

Support multi-disciplinary grants

Metabolic risk factors and inflammation in PASC development ($1M award; first II cross-disciplinary grant initiative – 26 investigators across 4 schools (HSOM, SPH, SOHP, SON)

RECOVER
Researching COVID to Enhance Recovery
An Initiative Funded by the National Institutes of Health

Used this II supplement as a model for building Research Infrastructure to enhance competitive new applications

Research Opportunity Announcement OTA-21-015I:

RECOVER PASC IMMUNOPHENOTYPING CORE LABORATORIES

The NIH is soliciting applications in support of the goals of the Researching COVID to Enhance Recovery (RECOVER) Post-Acute Sequelae of SARS-CoV-2 Infection (PASC) Initiative and Investigator Consortium. This Research Opportunity Announcement focuses on immunophenotyping core laboratory analyses performed in biospecimens collected in the RECOVER adult and pediatric cohorts. The distribution of this research opportunity announcement is limited to sites participating in the RECOVER PASC Consortium.

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UAB SCHOOL OF HEALTH PROFESSIONS
The University of Alabama at Birmingham

UAB SCHOOL OF PUBLIC HEALTH
The University of Alabama at Birmingham

UAB IMMUNOLOGY INSTITUTE
The University of Alabama at Birmingham

UAB INFORMATICS INSTITUTE
The University of Alabama at Birmingham

UAB NUTRITION OBESITY RESEARCH CENTER
The University of Alabama at Birmingham

UAB COMPREHENSIVE DIABETES CENTER
The University of Alabama at Birmingham

UAB DIABETES RESEARCH CENTER
The University of Alabama at Birmingham

Support multi-investigator grant applications ($54,616,588)

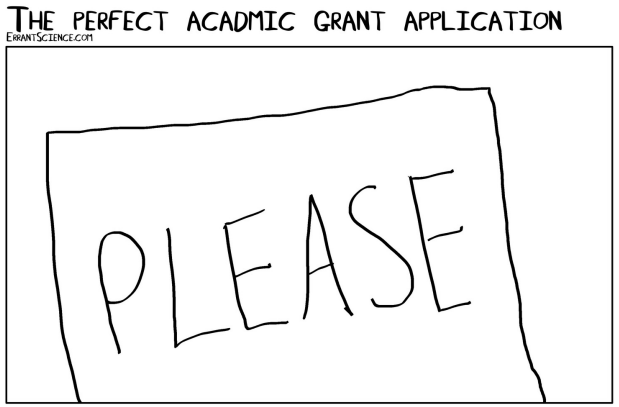
Dr. Carol Ballinger (II Admin Manager) provided all Administrative Support for II Member multidisciplinary grants

1. **T32** AI007051-46; Immunologic Diseases and Basic Immunology; Laurie Harrington, PhD (CDIB) PD/PI. $3,003,231 total requested. FUNDED

2. **U19** AI181105-01; Evolution and Durability of Human T and B Cell Responses; Frances Lund PhD (Micro) PD/PI. **$18,562,505** total – NOA expected. 14 investigators across 7 Dept/Divisions

3. **R24** AI176909-01A1; A Global Research Resource for Human Tuberculosis; Adrie Steyn PhD (Micro) PD/PI. $5,898,112 total requested. Submitted. 6 investigators including international institution

4. **BAA-NIAID-**75N93023R00002; Identification and characterization of immunodominant B cell HLA alloepitopes in transplant patients; Frances Lund PhD (Micro) PD/PI. **$9,592,805** total requested. Submitted. 11 investigators across 7 Depts/Divisions.



5. **R25** GM154342-01; Learning Immunology to Foster science Education (LIFE); Heather Bruns, PhD (Micro) PD/PI. **$1,350,000** total requested. Submitted 4 investigators across 2 schools

6. **U24** HL175764-01; Consortium Organization and Data Collaboration Center for the Human Virome Program. Elliot Lefkowitz (Micro) PD/PI. **$16,219,935** total requested. Submitted. 8 investigators across 4 institutions

Administrative and financial oversight of I-4ward

- Direct I-4ward Task Force
- Provide matching funds for single cell spatial proteomics and transcriptomics
- Provide matching support for single cell spatial informatics
- Direct the informatics working group
- HSF-GEF grant application and progress reports
- Communications and outreach to I-4ward research community

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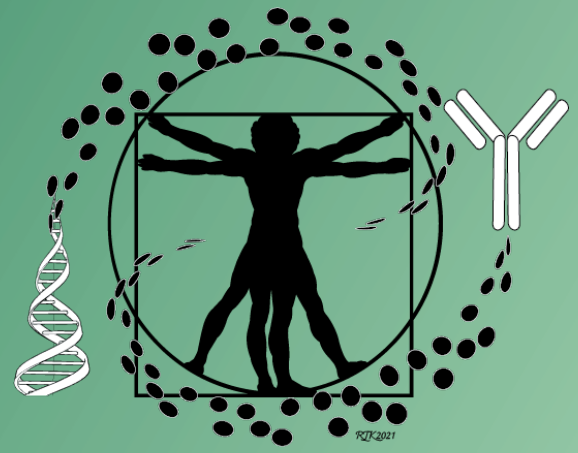
FY23 Achievements

IV. Build II Research Capabilities and Portfolio



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1. Immunology Institute Pilot Project Funds (with OCCC)

Awarded 3 pilots on Jan 1, 2024 ($50,000/yr for up to 2 years)

1. Sunil Sudarshan (Urology) and Lyse Norian (Nutrition Science): Oncometabolic Regulation of the Immune Response and Immunotherapy Efficacy in Kidney Cancer. *Funded as a match with OCCC for up to 2 years.*

2. Chander Raman (Dermatology) and Lin Jin (Dermatology): Elucidating interactive network of NKT and NK cell populations and skin resident cells in Hidradenitis suppurativa (HS) pathogenesis. *Funded 1 year.*

3. Xu Feng (Pathology): RANK Signaling Mechanism in the Immune System. *Funded for up to 2 years.*

2. Coordinate think tanks – II initiated multi-investigator projects

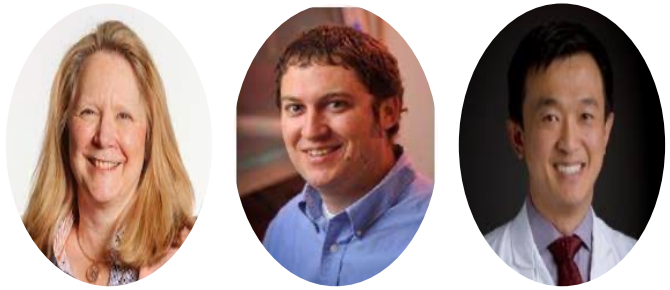
Cooperative Centers on Human Immunology

NIH

NOA expected – 8 Depts and Divisions, 6 clinical researchers, 7 basic researchers, 1 bioinformatician

Transplant&ObGyn

Transplant&Informatics



Immunol&Nephrology

Molecular&Structural Biol

Pulmonary
Immunol&ID&Transplant

Structural Biol

3. UAB Healthy Donor Cohort (with CCTS)

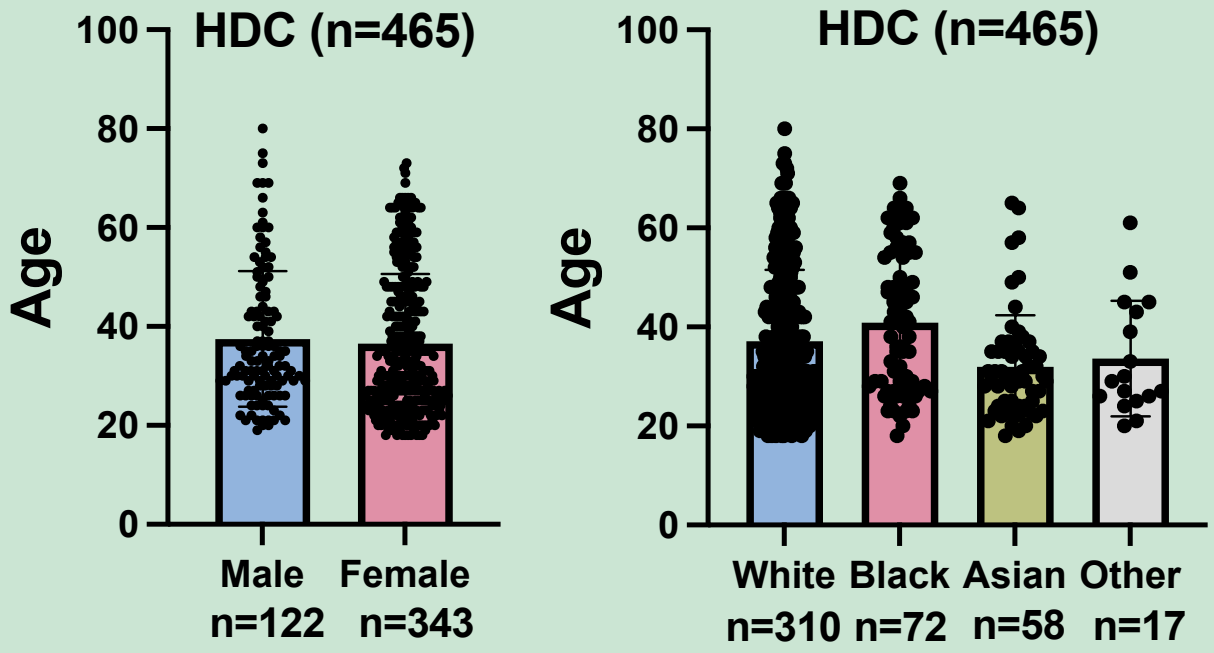
- Need healthy donor controls to compare to patient cohort samples
- Need healthy donor controls to troubleshoot and optimize methods
- Need healthy donor controls to study fundamental biologic processes (not disease-based)

Lorenzo Thompson

Carol Ballinger

Jennifer Croker

465 individuals enrolled in UAB Healthy Donor Cohort



- Age: Mean 36.8, min 18, max 80
- Sex: 26% male 74% female
- Race: 67% White, 15% Black,
- 12% Asian, Other 6%
- Ethnicity: 5% Hispanic/Latino

Research volunteers needed

by Jeff Hansen

UAB Reporter

Gillian Brooks of WBRC Channel 6 FOX News

2. Immunophenotyping Core (with FCSCC and OCCC)

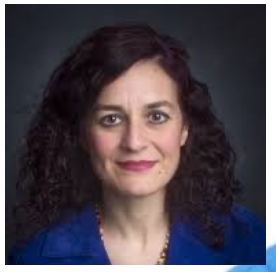
Advanced immunophenotyping: A powerful tool for immune profiling, drug screening, and a personalized treatment approach

Teresa Preglej Marie Brinkmann Günter Steiner Daniel Aletaha
Lisa Göschl*† Michael Bonelli*†

METHODS article

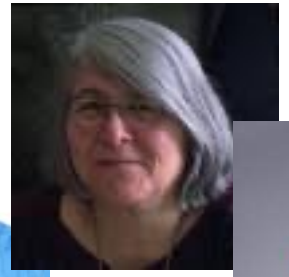
Front. Immunol., 24 March 2023
Sec. Autoimmune and Autoinflammatory Disorders: Autoinflammatory Disorders
Volume 14 - 2023 | https://doi.org/10.3389/fimmu.2023.1096096

Esther Zumaquero



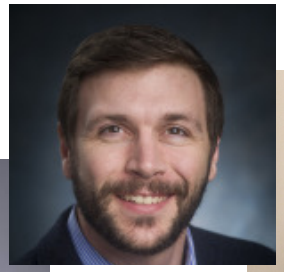
Harish Pal

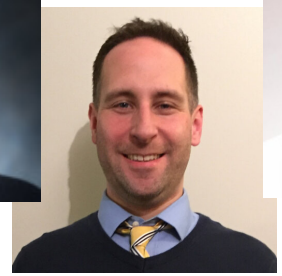
Steffanie Sabbaj



Davide Botta

Chris Fucile



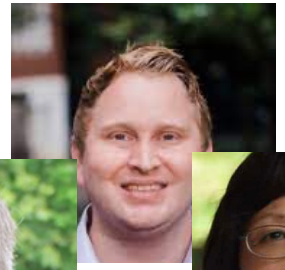


Rob Welner

Sagar Hanumanthu

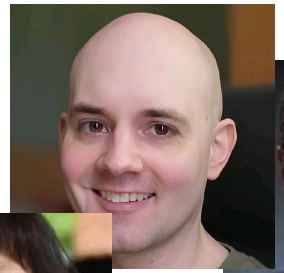
Troy Randall

Lorenzo Thompson



Fen Zhou

Jack Wimbish



Alex Rosenberg

Initial flow panels for human immunophenotyping

PBMC panel (29 markers: VALIDATED AND READY (Tissues and blood)

B cell panel (19 markers): VALIDATED AND READY (Tissues and blood)

T cell panel (33 markers): OPTIMIZING

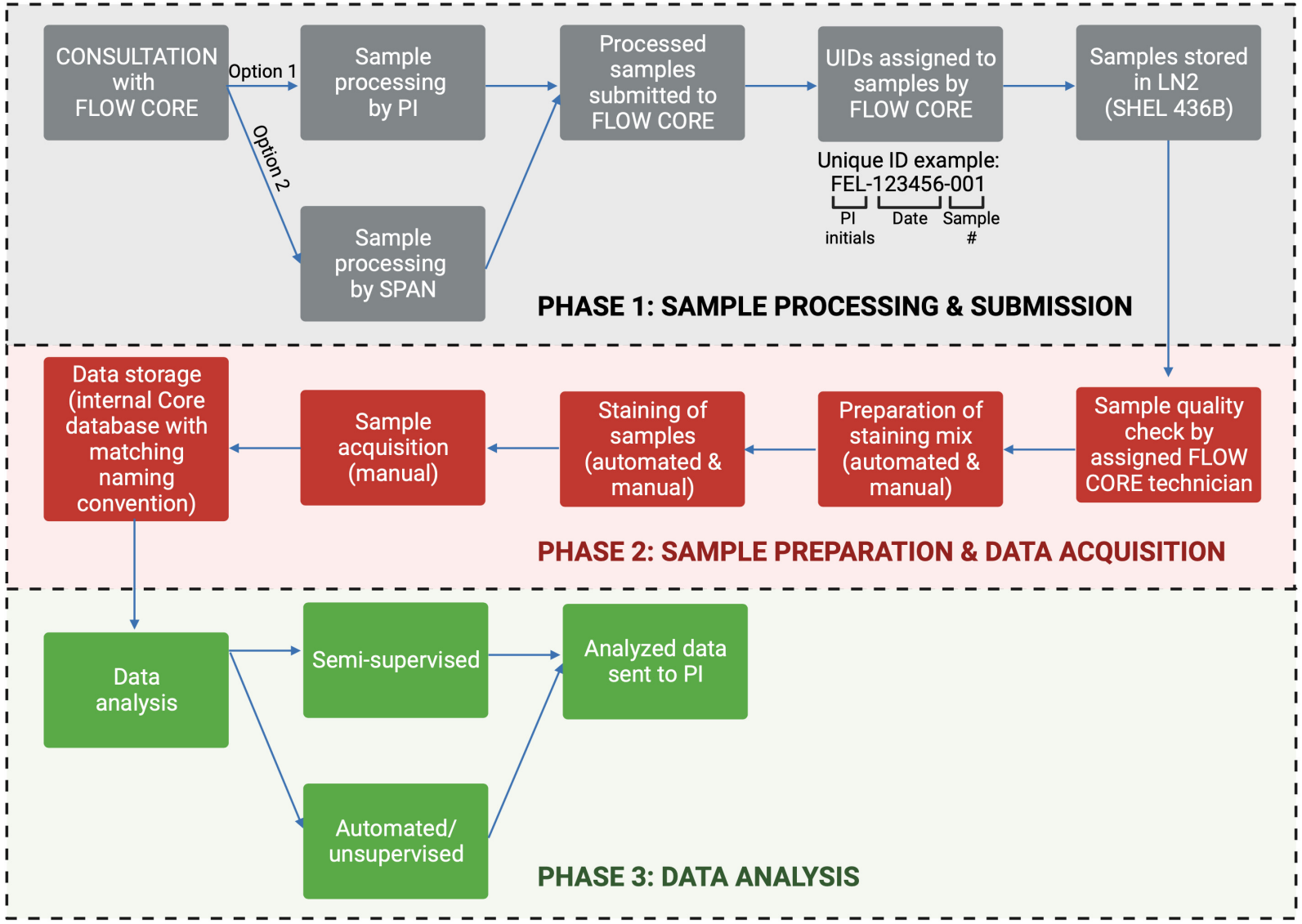
Myeloid lineage panel (34 markers): TESTING BEGAN IN JANUARY

NKT Cells	NKT cell	CD19-/CD14-/**CD3+**/**CD56+**
NK Cells	CD56bright CD16- NK Cell	CD19-/CD14-/CD3-/CD56bright/CD16-
	CD56+/dim CD16+ NK Cell	CD19-/CD14-/CD3-/CD56+/dim/CD16+
	CD56- CD16+ NK Cell	CD19-/CD14-/CD3-/CD56-/CD16+
CD3+ Cells	CD3+ T Cell	CD19-/CD14-/CD56-/**CD3+**
CD4+ Cells	CD4+ T Cell	CD19-/CD14-/CD56-/CD16-/**CD3+**/**CD4+**
	CD4 Naive T cell (Nav)	CD19-/CD14-/CD56-/CD16-/**CD3+**/**CD4+**/CCR7+/CD45RA+
	CD4 Central Memory T Cell (CM)	CD19-/CD14-/CD56-/CD16-/**CD3+**/**CD4+**/CCR7-/CD45RA+
	CD4 Effector Memory T Cell (EM)	CD19-/CD14-/CD56-/CD16-/**CD3+**/**CD4+**/CCR7-/CD45RA-
	CD4 Effector Memory RA+ T Cell (EMRA)	CD19-/CD14-/CD56-/CD16-/**CD3+**/**CD4+**/CCR7+/CD45RA-
	CD4 Anergic	CD19-/CD14-/CD56-/CD16-/**CD3+**/**CD4+**/PD1+/CD57+
	CD4 Senescent	CD19-/CD14-/CD56-/CD16-/**CD3+**/**CD4+**/PD1-/CD57+
	CD4 No-Expression	CD19-/CD14-/CD56-/CD16-/**CD3+**/**CD4+**/PD1-/CD57-
	CD4 Exhausted	CD19-/CD14-/CD56-/CD16-/**CD3+**/**CD4+**/PD1+/CD57-
CD8+ Cells	CD8+ T Cell	CD19-/CD14-/CD56-/CD16-/**CD3+**/**CD8+**
	CD8 Naive T Cell (Nav)	CD19-/CD14-/CD56-/CD16-/**CD3+**/**CD8+**/CCR7+/CD45RA+
	CD8 Central Memory T Cell (CM)	CD19-/CD14-/CD56-/CD16-/**CD3+**/**CD8+**/CCR7-/CD45RA+
	CD8 Effector Memory T Cell (EM)	CD19-/CD14-/CD56-/CD16-/**CD3+**/**CD8+**/CCR7 -/CD45RA-
	CD8 Effector Memory RA+ T Cell (EMRA)	CD19-/CD14-/CD56-/CD16-/**CD3+**/**CD8+**/CCR7+/CD45RA-
	CD8 Anergic	CD19-/CD14-/CD56-/CD16-/**CD3+**/**CD8+**/PD1+/CD57+
	CD8 Senescent	CD19-/CD14-/CD56-/CD16-/**CD3+**/**CD8+**/PD1-/CD57+
	CD8 No-Expression	CD19-/CD14-/CD56-/CD16-/**CD3+**/**CD8+**/PD1-/CD57-
	CD8 Exhausted	CD19-/CD14-/CD56-/CD16-/**CD3+**/**CD8+**/PD1+/CD57-
B Cells	B Cell	CD3-/CD14-/CD56-/**CD19+**
	Transitional B Cell	CD3-/CD14-/CD56-/**CD19+**/IgD-/CD27-/CD24++/CD38++/IgM+
	Naive B Cell	CD3-/CD14-/CD56-/**CD19+**/IgD+/CD27-/IgM+
	Unswitched Memory B Cell	CD3-/CD14-/CD56-/**CD19+**/IgD+/lo/CD27+/IgM+
	Switched Memory B Cell	CD3-/CD14-/CD56-/**CD19+**/IgD-/CD27+
	IgG+ Switched Memory B Cells	CD3-/CD14-/CD56-/**CD19+**/IgD-/CD27+/IgG+
	True IgM+ Memory B Cells	CD3-/CD14-/CD56-/**CD19+**/IgD-/CD27+/IgM+
	Double Negative	CD3-/CD14-/CD56-/**CD19+**/IgD-/CD27-
	IgG+ Double Negative	CD3-/CD14-/CD56-/**CD19+**/IgD-/CD27-/IgG+
	IgM+ Double Negative	CD3-/CD14-/CD56-/**CD19+**/IgD-/CD27-/IgM+
	DoubleNegative 2	CD3-/CD14-/CD56-/**CD19+**/IgD-/CD27-/CD11c+
	Plasmablast	CD3-/CD14-/CD56-/**CD19+**/IgD-/CD27++/CD38++/CD24-/CD138-
	Plasma Cell	CD3-/CD14-/CD56-/**CD19+**/neg/IgD-/CD27++/CD38++/CD24-/CD138+
Monocytes	Classical Monocyte	CD3-/CD19-/CD56-/CD8-/**HLA-DR+**/CD14+/CD16-
	Intermediate Monocyte	CD3-/CD19-/CD56-/CD8-/**HLA-DR+**/CD14+/CD16+
	Non-Classical Monocyte	CD3-/CD19-/CD56-/CD8-/**HLA-DR+**/CD14-/CD16+
DCs	DC	CD3-/CD14-/CD16-/CD19-/CD56-/**HLA-DR+**
	CD1c+ Conventional DC	CD3-/CD14-/CD16-/CD19-/CD56-/CD11b-/**HLA-DR+**/CD11c+/CD141-/CD1c+
	CD141+ Conventional DC	CD3-/CD14-/CD16-/CD19/CD56-/CD11b-/**HLA-DR+**/CD11c+/CD1c-/CD141+
	Plasmacytoid DC	CD3-/CD14-/CD16-/CD19-/CD56-/CD11b-/**HLA-DR+**/CD11c-/CD123+/CD303+

42 different immune cell subsets identified using the PBMC panel

Immunophenotyping Core workflow

Davide Botta



Jack Wimbish

Harish Pal

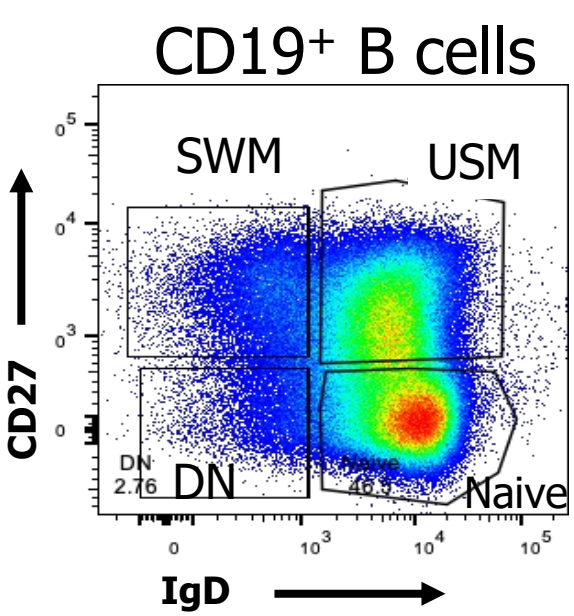
Sagar Hanumanthu

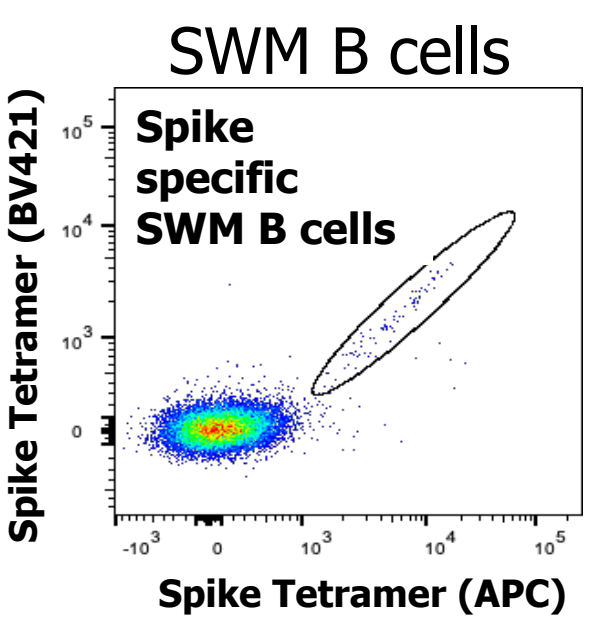
Fen Zhou

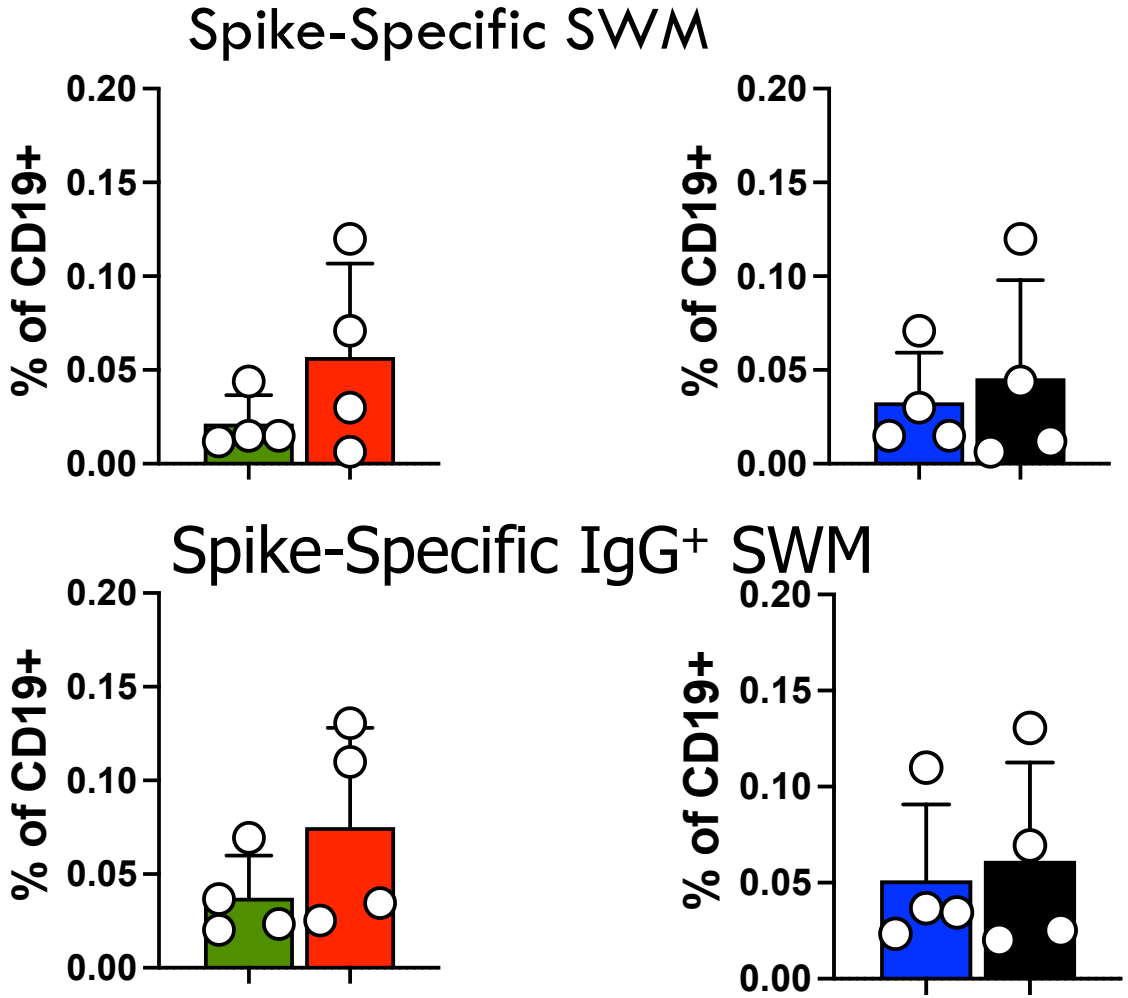
Alex Rosenberg

Panels analyzed in a templated format for large cohorts

SARS-CoV-2 specific memory B cells in Long-COVID (PASC⁺) patient blood samples (n=210 patients)







RECOVER
Researching COVID to Enhance Recovery
An Initiative Funded by the National Institutes of Health

Funded Recover/NOSI Grant

PASC⁺
PASCᵘⁿ
BMI >30
BMI <30

5. Immunology Institute supporting development and distribution of immunology-relevant clinical data bundles

- Rapidly obtain bundled clinical data sets that are semi-tailored for our research interests
- Can be used to determine whether potential cohort exists or to collect clinical information on an existing cohort
- Initial bundles are focused on diseases that are often treated with immune-modulating therapies

Immunology-relevant bundles

- Respiratory infection/disease
  - Acute and Long COVID
  - Viral and bacterial
- Rheumatic Disease
  - Lupus
  - RA
- Cancer Immunology
  - MM, Breast, Ovarian etc
- Transplantation
  - Kidney, lung etc

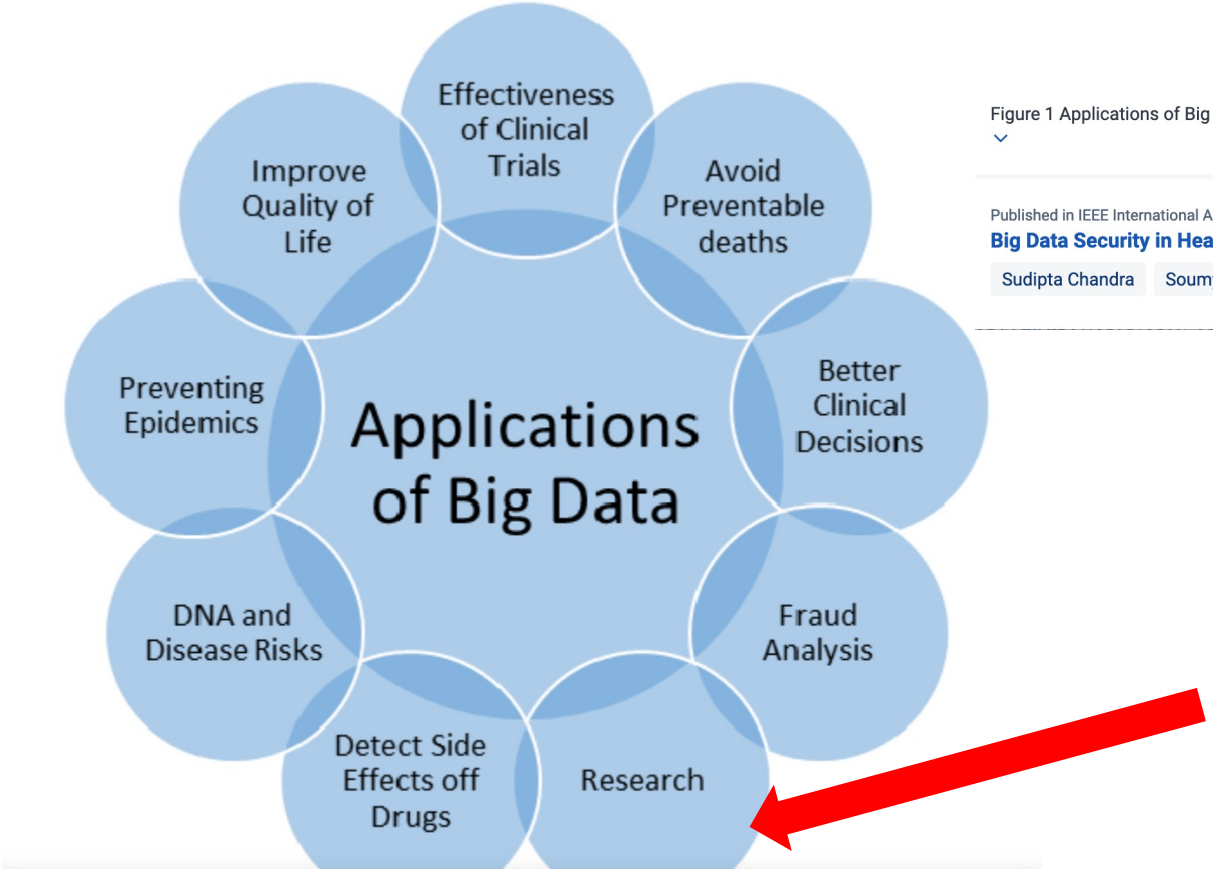


Figure 1 Applications of Big Data

Published in IEEE International Advance Computing Conference 2017

Big Data Security in Healthcare: Survey on Frameworks and Algorithms

Sudipta Chandra Soumya Ray R. T. Goswami

UAB Learning Health System (LHS) Platform

Cooperative effort with faculty and staff from COERE, Informatics Institute, RISC and CCTS

Michael J Mugavero, MD, MHSc
Professor, Infectious Diseases
COERE Director

Allyson Hall, PhD
Professor, Dept of Health Services Administration
COERE Co-Director

Reid Eagleson, MEng, MS
COERE Program Manager
Embedded Scientist

Matt Wyatt, MSHI
Informatics Institute, Director of Clinical Research Informatics

Dale Johnson, MS
Informatics Institute, Informatics Architect

James H. Willig, MD, MSPH
Professor, Infectious Diseases
RISC Co-Director/Informatics

Alfredo L. Guzman MEng, MSHI
RISC Information Technology Director

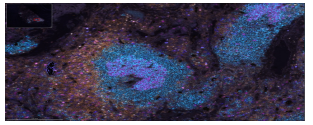
Greer Burkholder MD, MSPH
Assoc Professor, Infectious Diseases, RISC Director of Data Services

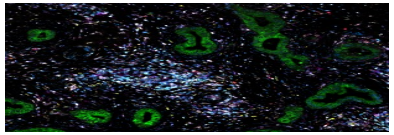
Mohit Varshney MD
RISC Clinical Data Specialist

Urva Tul Vusqa, MBBS
RISC Clinical Data Specialist

Suneetha Thogaripally, MEng
RISC Senior Data Analyst

COERE | Center for Outcomes & Effectiveness Research & Education





Clinical data bundles are reusable research data requests

Cohort definition

- The cohort can be patient- or encounter-centric
- The cohort will probably include important index dates
- Can include MRNs or de-identified data

Specification of the discrete data values needed, the level of detail needed, and how to organize that data

- The specifications can be a mix of “give me everything” and “give me aggregates for each person/encounter in my cohort”
- Aggregates can be most recent, earliest, Y/N flags, highest, lowest, etc.
- Aggregates can be date-windowed

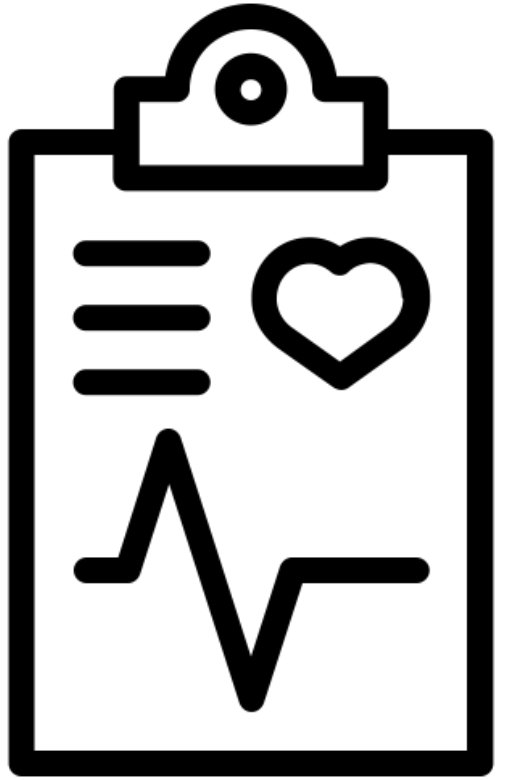
Reusable

- Once a bundle is defined for a specific disease – COVID, RA, SLE – anybody can apply that bundle to their own cohorts.
- We have off-the-shelf groups of common comorbidities, most-ordered labs, social history, and common vital signs that anyone can include in new bundle definitions.

Examples of information in a data bundle

(n>300 variables) for long-COVID data bundle

- Patient Identifiers
- Demographics
- Diagnoses
- Co-morbidities
- Vitals
- Hospitalizations/ICU
- Microbiology labs
- CBC/Lymphocytes
- Clinical labs (ALT, CRP etc)
- Medications (Home, Hospital)

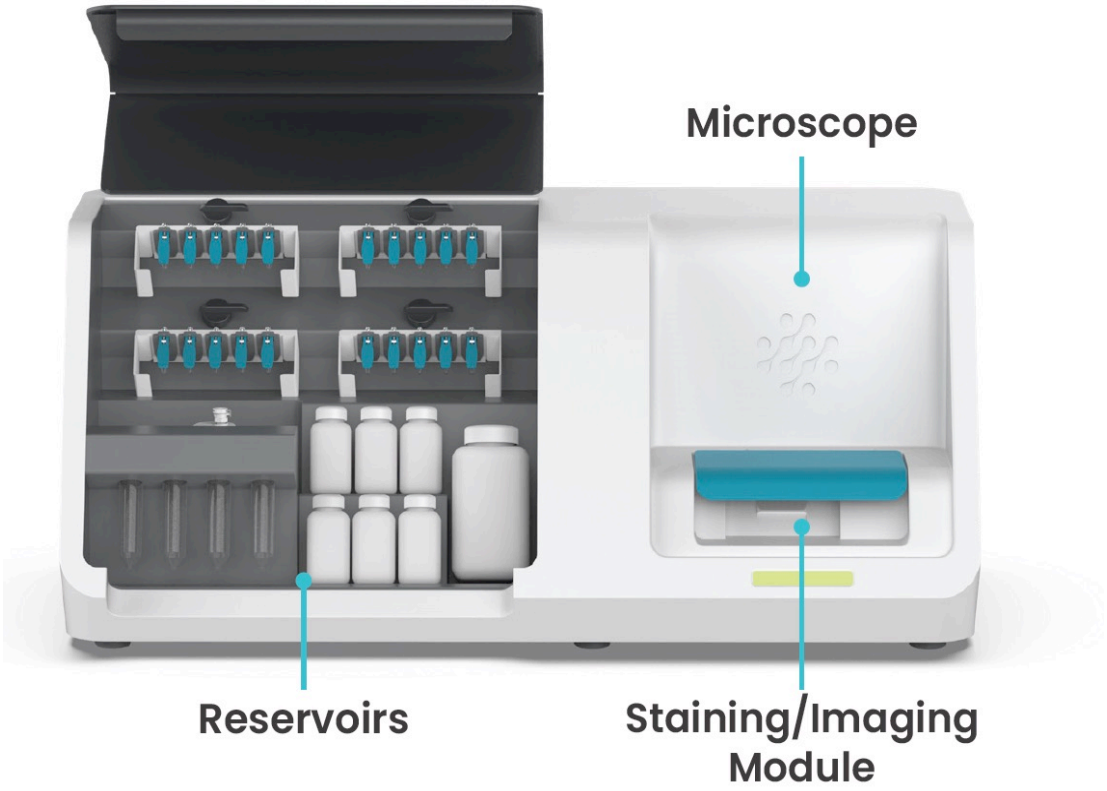


Created by Symbolon
from Noun Project

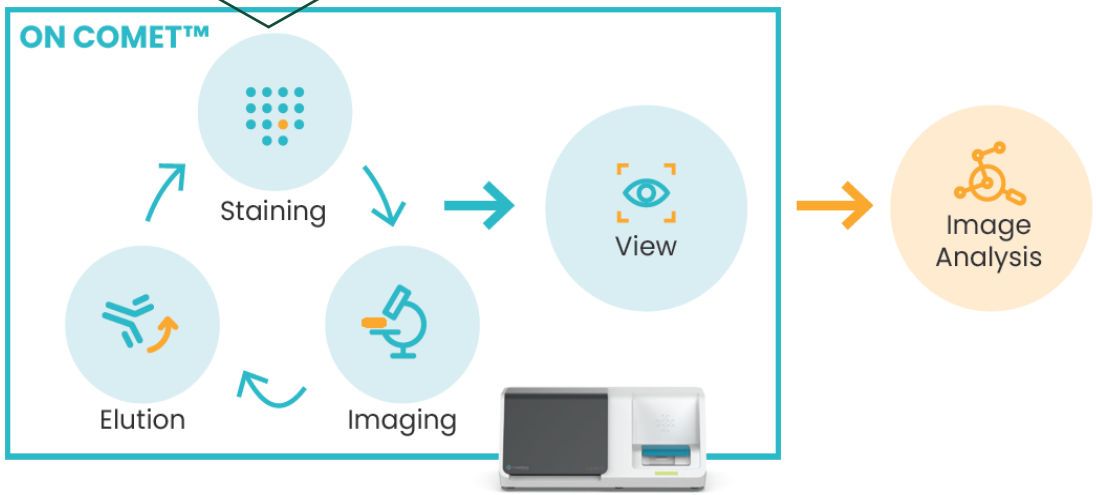
6. Investments in Research Infrastructure – Spatial proteomics and transcriptomics

Lunaphore COMET Multiplex Imaging System – single cell

Rapid hyperplex made easy –visualize up to 40 markers in a single sample in a day



Off the shelf primary and secondary antibodies. No conjugation or amplification required. Ideal to utilize optimized IHC banks



Investment by: Immunology Institute, I-4ward, OCCC

Lunaphore Comet and Visiopharm Analytic Software Suite

- Antibody panels developed and validated

- Human panels
  - n=28 antibodies
  - Colon Cancer Panel (20 antibodies)
  - PDAC panel (19 antibodies)
  - Lung panel (14 antibodies)

- Mouse panels
  - N=28 antibodies
  - PDAC panel (17 antibodies)
  - Lymphoid tissue (14 antibodies)
  - Breast cancer (8 antibodies)

- Visiopharm software
  - Deep learning-based algorithms
  - Kaltura channel training videos
  - Analytic seats available
  - Azure virtual computing systems

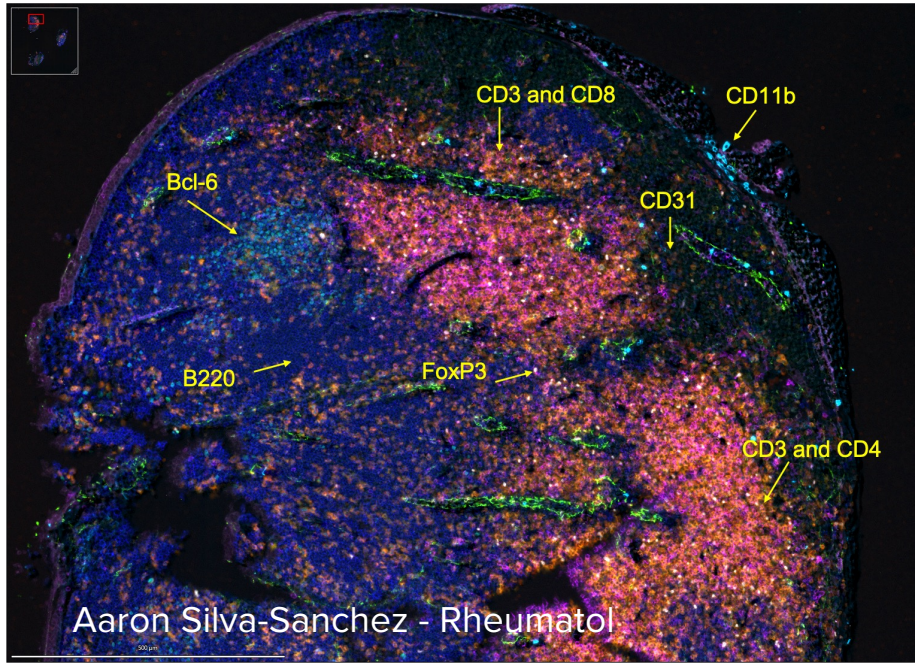
Julie Carstens

Harish Pal

Aaron Silva-Sanchez

UAB Research Computing: Scott Carson, David Fox, William Warriner, John-Paul Robinson, Jamie Witter, Ralph Zottola

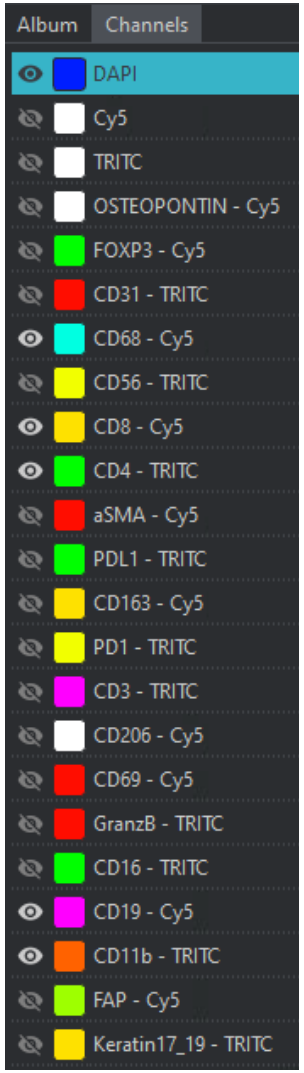
mdLN D8 post-influenza

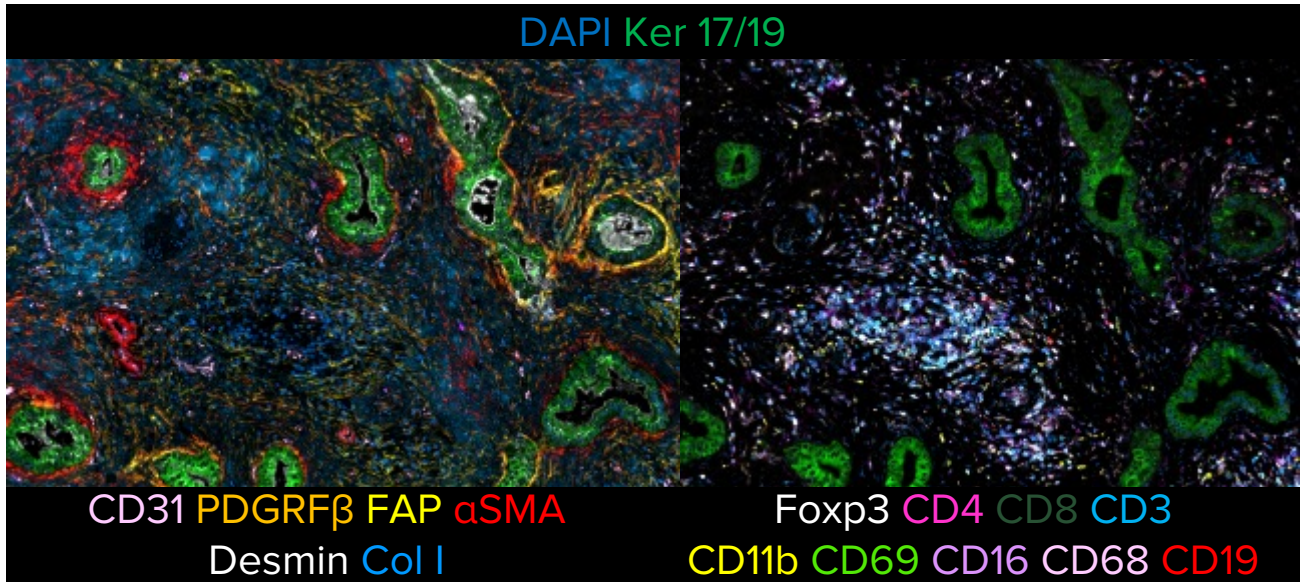


CD31
CD3
CD8
CD4
B220
CD11b
FoxP3
Bcl6

Interrogation of features based on any type of grouping

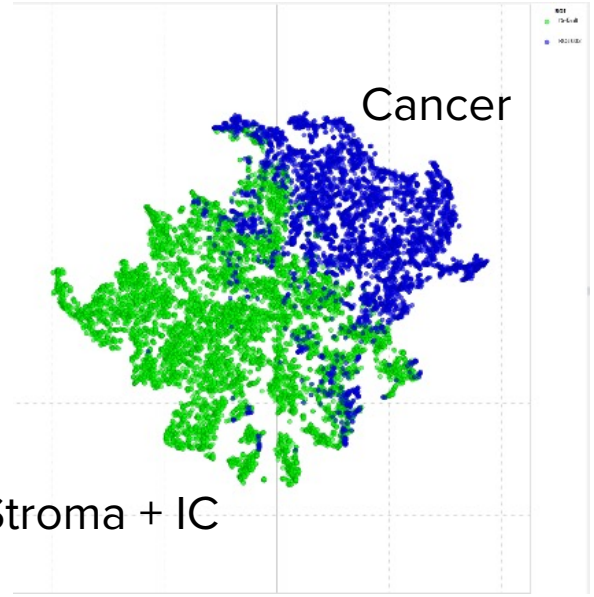
(e.g. responders, drug treatment, genotype etc)





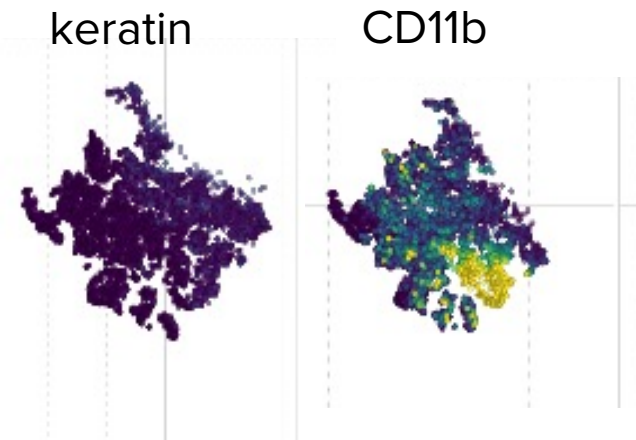
UAB tissue repository
PDAC

Julie Carstens – Heme Onc

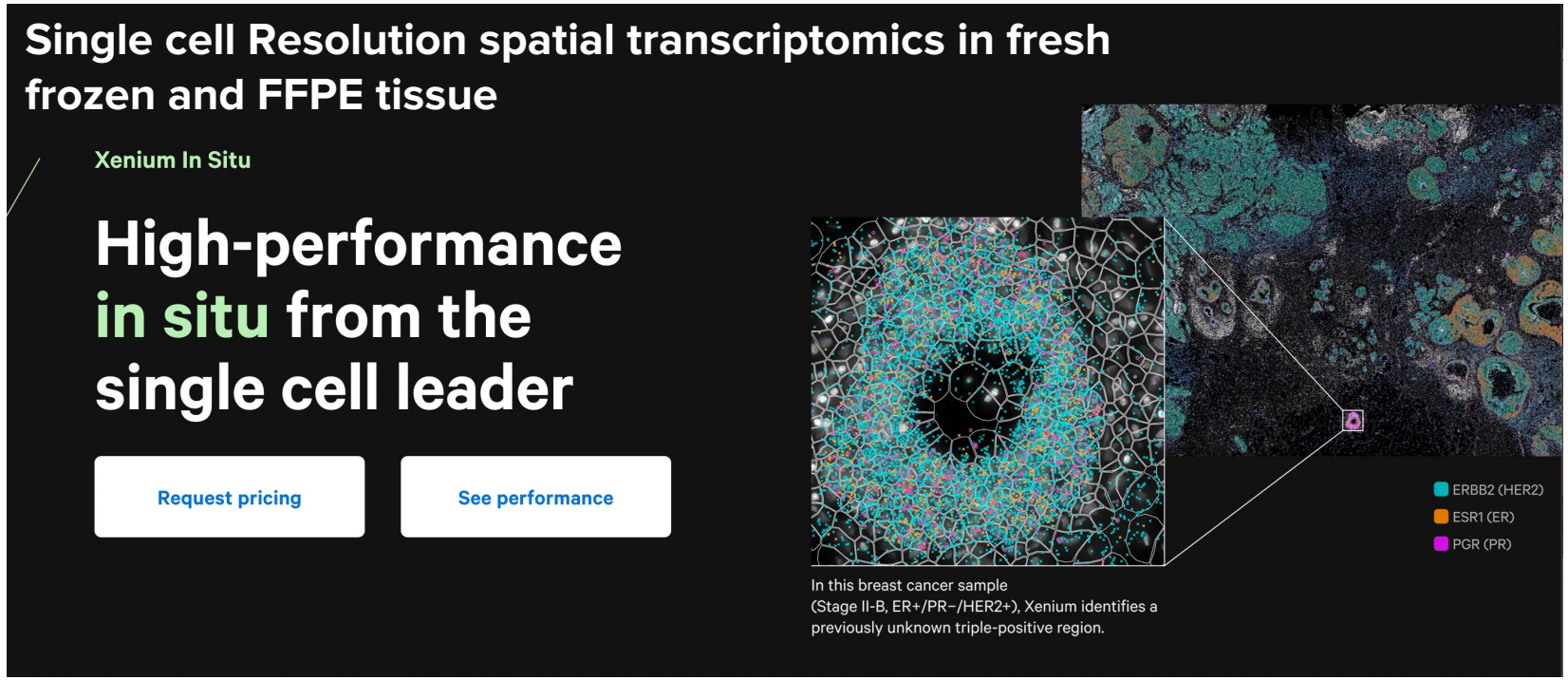


Visiopharm Software

Tissue Segmentation
Cell Segmentation
Cell Phenotype
Interactive TSNE



Single cell resolution spatial transcriptomics (Xenium) on the same tissue sample that is used for spatial proteomics

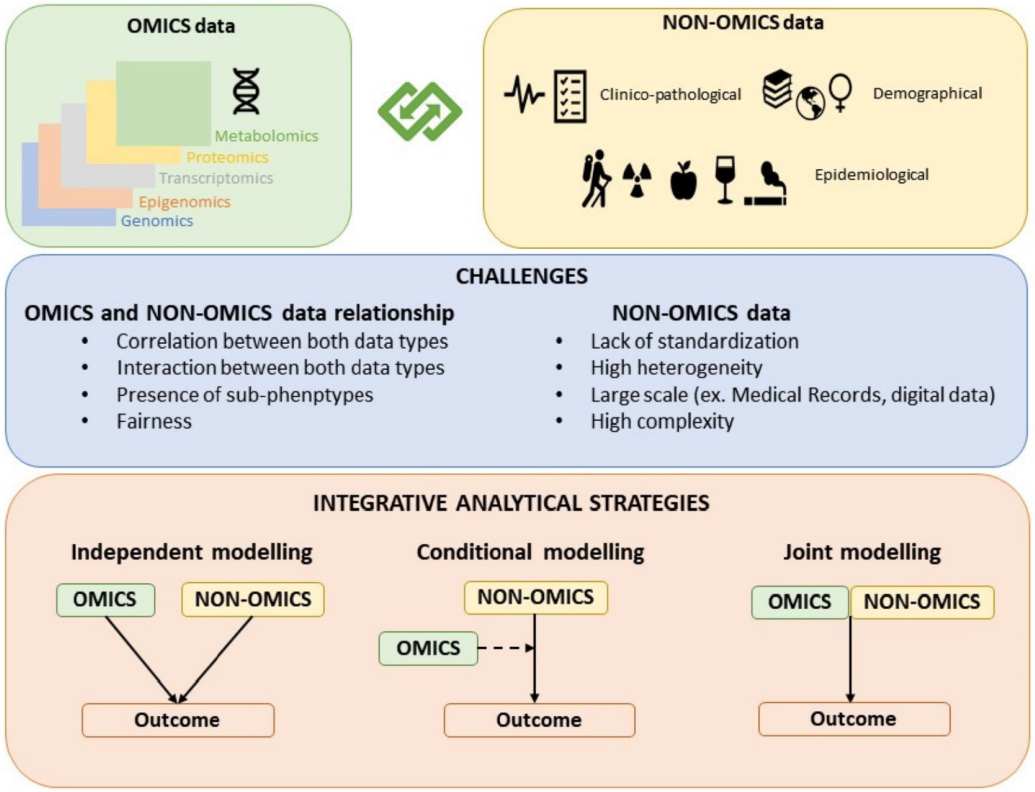


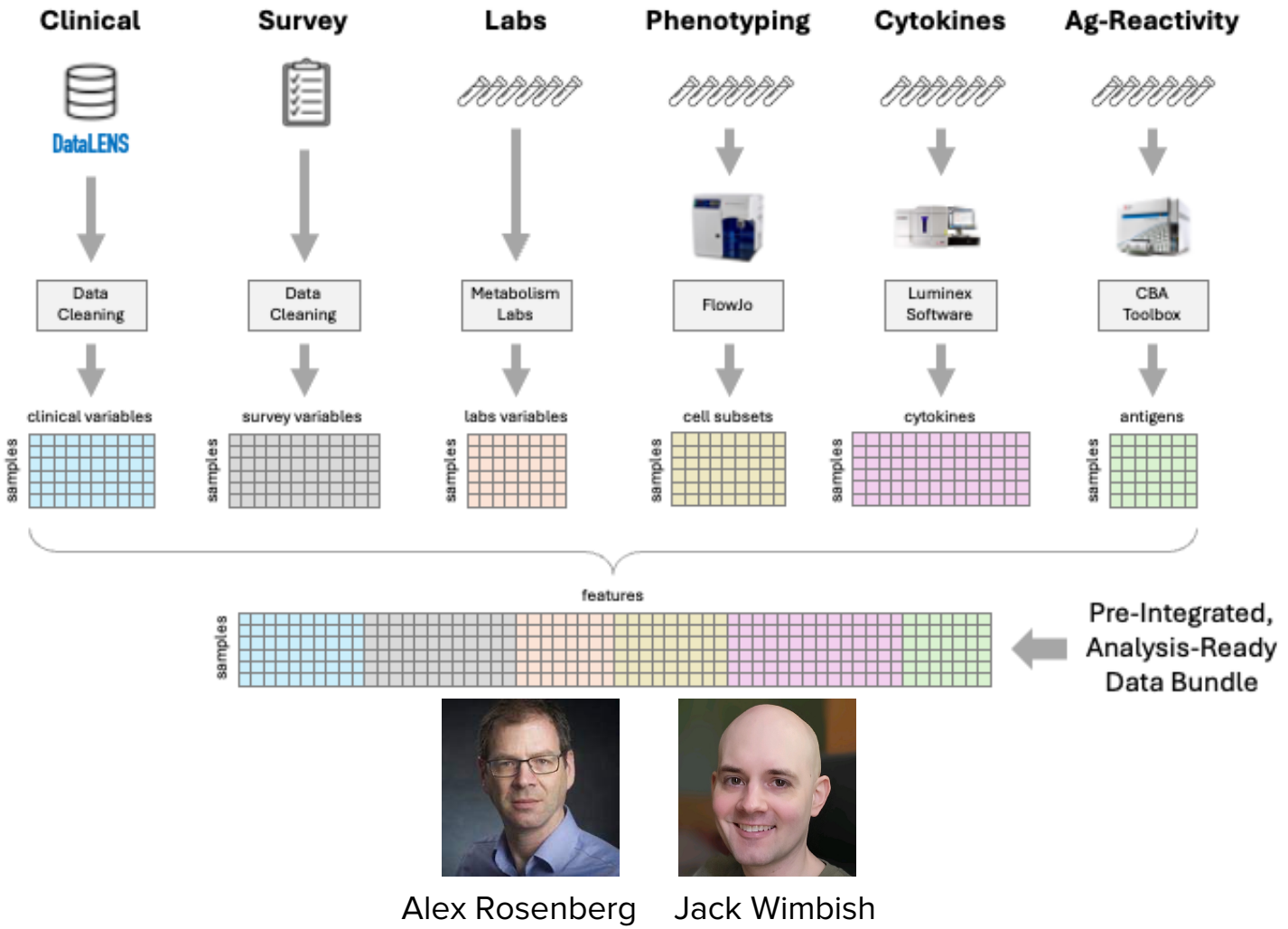
Xenium was delivered in late December, awaiting installation

- HSF-GEF Awarded $180,000 to Immunology Institute (Lund), I-4ward and Brain Health (Jeremy Day and Fran Lund), Flow Cytometry and Single Cell Core (Troy Randall), Biologic Data Sciences Core (Liz Worthey)
- Matching Support: $629,500
  - HSOM, SOE
  - UAB Centers and Institutes (n=14)
  - HSOM Departments and Divisions (n=11)
  - HSOM Strategic Research Groups
- full time bioinformatics support for pipeline development and tools

7. Immunology Institute supporting integrative analysis of big ‘omics and clinical data sets

Assembling the data “blocks” (containers) necessary for integrated analysis of ’omics and non-omics data





Lopez de Maturana et al

https://doi.org/10.3390/genes10030238

Alex Rosenberg

Jack Wimbish

Feature correlation matrices identify omics variables that are co-regulated in Long-COVID cohort samples

Alex Rosenberg

Cluster 1 Cytokines

IL-1a, IL-6, IL-13, IL-4, IL-12p40, sCD40L, IL-8, TNFb, IL-10, IL-15, IL-9, IL-5, IL-7

Cluster 2 Cytokines

FGF-2, VEGF, IL-12p70, IL-1b, IL-2, Flt-3L, Fractalkine, IL-1Ra, IFNg, IL-17A

Cluster 3 CMDS

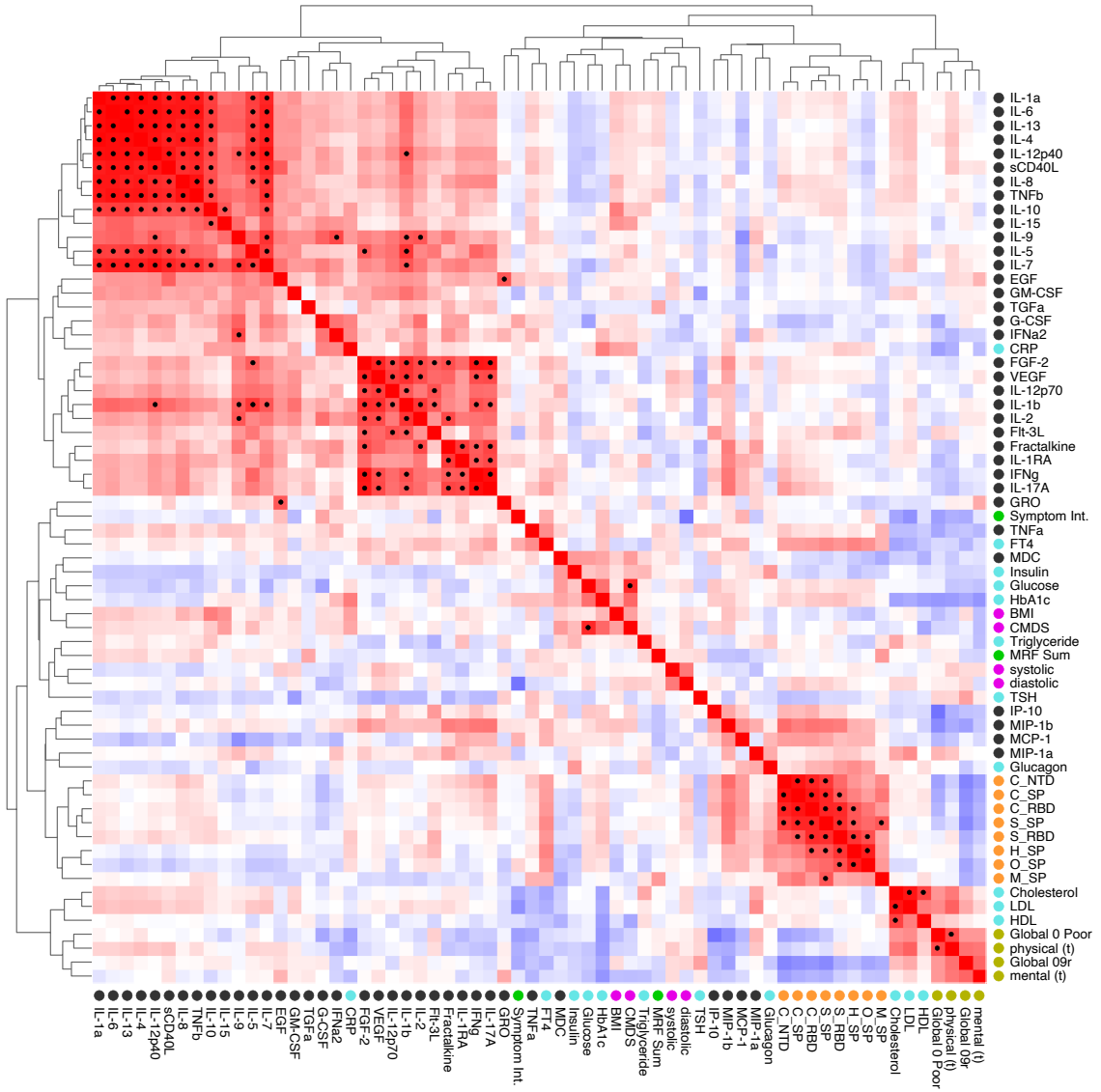
Glucose, HbA1, BMI, CMDS

Cluster 4 Abs

C-NTD, C-Spike, C-RBD, S-Spike, S-RBD, H-Spike, O-Spike

Cluster 5 QOL

Cholesterol, LDL, HDL, QOL physical, QOL mental



- Cytokine (n = 35)
- Metabolism Labs (n = 11)
- Serum Reactivity (n = 8)
- Clinical (n = 4)
- PROMIS (n = 4)
- Metabolic Risk (n = 2)

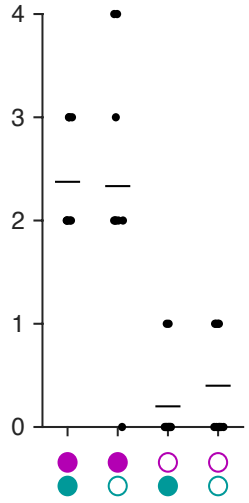
Correlation Coefficient

Using ’Omics and clinical data to identify correlates of Long-COVID

QOL
Cluster 5

S.I. Level

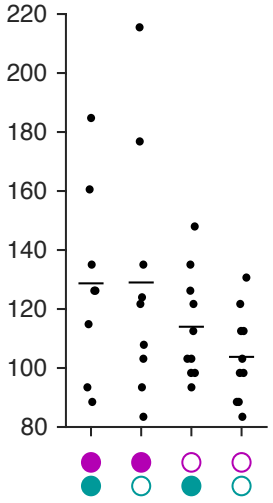
p_{LC} = 0.00000
p_{OB} = 0.74666
p_{INT} = 0.62233



Cytokines
Cluster 1-2

G-CSF

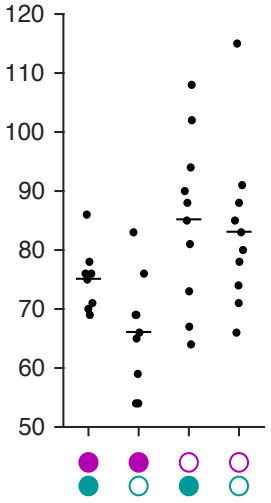
p_{LC} = 0.04105
p_{OB} = 0.60086
p_{INT} = 0.57943



CMDS
Cluster 3

Diastolic

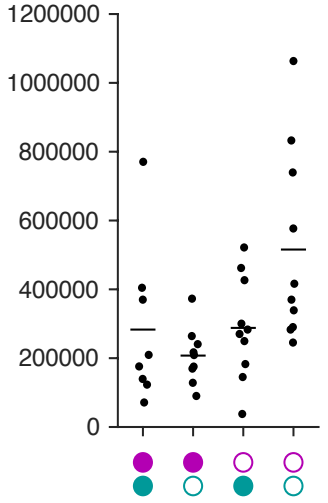
p_{LC} = 0.00129
p_{OB} = 0.15789
p_{INT} = 0.37521



Antibody
Cluster 4

C SP

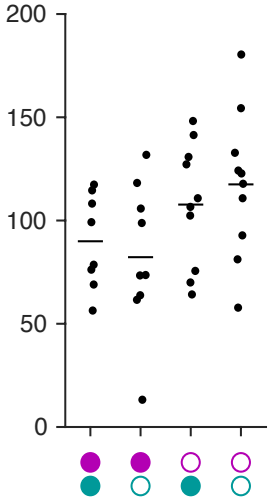
p_{LC} = 0.02363
p_{OB} = 0.25707
p_{INT} = 0.02797



QOL
Cluster 5

LDL

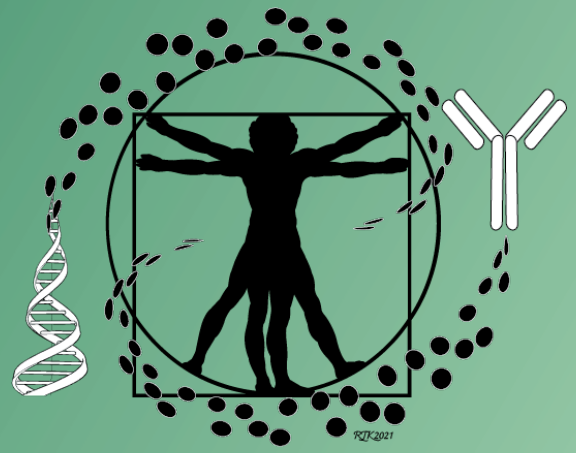
p_{LC} = 0.01625
p_{OB} = 0.92166
p_{INT} = 0.40957



Long COVID
Obese

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

FY23 and FY24 Finances



UAB IMMUNOLOGY INSTITUTE

The University of Alabama at Birmingham

FY23 Budgeting Buckets

FY23 Expenditures

- AMC21 Scholars
- Research Infrastructure (HDC, Immunophenotyping Core, Data Dictionary)
- Education and Outreach (PII, vaccine symposia, UIS)
- Capital Equipment (COMET; Xenium in FY24)
- Admin & Discretionary
- Pilot Project Funding (funds flow in FY24)
- Faculty Recruit/ Retain (funds flow FY24)
- Underspent by ~$1M in FY22

CATEGORIES	BUDGETED	PAID OUT
AMC21 Scholars Program	150,000.00	125,000
Research Infrastructure	300,000.00	213,555
II Education and Outreach: PII, seminars, symposia, Workshops	90,000.00	22,732
Capital Equipment	200,000.00	125,000
II Administrative and Discretionary Support	285,000.00	102,306
Pilot Funding	150,000.00	
Lund Research Support (3123731)	200,000.00	200,000
TOTAL	**$1,375,000**	**$788,593**
Endowed Chair (direct to Endowed Chair acct) COMPLETE	500,000.00	500,000
Faculty Recruitment (no payouts yet)	500,000.00	------

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FY24 Budgeting Buckets

- On track to spend FY24 budget and significant amounts of CF from FY22 & FY23
- Pilot funding 2024 – 3 projects funded: Sudarshan/Norian; Raman; Feng
- Host SIS 2024 in BHM
- Vaccine Lecture and Symposium with Matthew Laurens (Univ MD)
- Faculty Recruitment and Retention - Funds requested for Erdmann Retention package ($125,000 lump sum) and Goepfert Retention package ($50,000/yr, 5 yrs)

CATEGORIES	BUDGETED	PAID OUT	PLANNED EXPENSES
AMC21 Scholars Program	150,000.00	170,000	
Research Infrastructure	300,000.00	46,736	546,051
II Education and Outreach: PII, seminars, symposia, Workshops	90,000.00	10,675	135,075
Capital Equipment (final year commitment)	250,000.00	80,280	5,000
II Administrative and Discretionary Support	285,000.00	53,039	234,442
Pilot Funding	150,000.00	107,000	100,000
Lund Research Support (3123731)	200,000.00	200,000	
	$1,425,000	**$667,730**	**$1,020,568**
Faculty Recruitment/Retention	500,000.00		175,000

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AMC21 Scholar Award Projected Budget Finances

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		
	$40,000	FY20 AMC21 Scholars Year 2 – Owiredu (Prof Funds paid), 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)
	$130,000	
	$50,000 total surplus	
FY24		
	$80,000	FY21 AMC21 Scholars Year 2 - Adamson, Barkley, Eli, Remiszewiski (no stipend support), Song, Strickland
$5,000/yr, 2 yrs Prof. funds	$90,000	FY22 AMC21 Scholars Year 1 – Banna Siam, Brooks, Denslow, Echols, Patel, Sahlberg
$10,00/yr, 2 yrs stipend support	($30,000)	Co-Directors Year 5 (to be paid out from 3115431)
	$170,000	
	$150,000	HSOM commitment
	$30,000 total surplus	

FY25		
	$90,000	FY22 AMC21 Scholars Year 2 – Banna Siam, Brooks, Denslow, Echols, Patel, Sahlberg
	$45,000	FY23 AMC21 Scholars Year 1 – Ennis, Sanati, Suinn
	$15,000	FY24 AMC21 Scholars cash award [Invites pending now]
	$30,000	Co-Directors Year 6
	$180,000	
	$150,000	HSOM commitment
	$0 total surplus	
FY26		
	$45,000	FY23 AMC21 Scholars Year 2 – Ennis, Sanati, Suinn
	$67,500	FY24 AMC21 Scholars Year 1 [Invites Pending Now]
	$15,000	FY25 AMC21 Scholars cash award
	$30,000	Co-Directors Year 7
	$157,500	
	$150,000	HSOM commitment
	$7,500 total deficit	
FY27		
New HSOM commitment begins*	$67,500	FY24 AMC21 Scholars Year 2 – [Invites Pending Now]
$2,500 cash award in 1st semester	$67,500	FY25 AMC21 Scholars Year 1
$7,500/yr, 2 yrs stipend support	$15,000	FY26 AMC21 Scholars cash award
$3,750/yr, 2 yrs, Prof. funds	$30,000	Co-Directors Year 8
	$180,000	
	$180,000	HSOM commitment*
	$7,500 total deficit	

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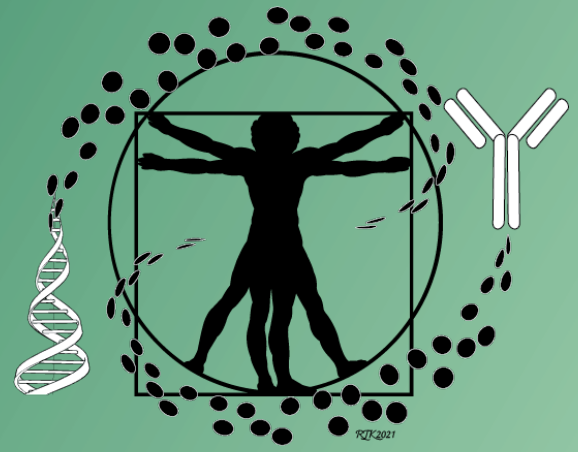
FY24 Goals



UAB IMMUNOLOGY INSTITUTE
The University of Alabama at Birmingham

2024 Priorities

1. Continue our initiatives in education and outreach

2. Host 2024 SIS in Birmingham in August

3. Establish an external advisory board

4. Initiate cluster hire for I-4ward and II relevant researchers – we are at a tipping point due to loss of significant cadre of wet lab researchers

Leaving/Left: Hubert Tse, Amy Weinmann, Beatriz Leon, Andre Ballesteros-Tato

Retired (or near retirement) or switched to non-research: Lou Justement, Janny Kabarowski, Noel Childers, John Kearney, Louise Chow, Jim Collawn, Chris Klug, Alex Szalai, Phil Smith, Harry Schroeder, Mike Saag, Jiri Mestecky, Lou Bridges

2024 Research Priorities

1. Introduce and publicize new cores (HDC, Immunophenotyping, Clinical Data bundles, single cell technologies) to UAB Researchers – *welcome suggestions on how best to do this*

2. Rollout and operationalize new capabilities/cores to users – *we are using individuals/labs as guinea pigs to test (what are the hiccups) before going live with cores*

3. Support informatic pipeline development for analyses of these complicated data sets

4. Establish new serology core

5. Begin new round of planning for future research infrastructure/core investments

Next up – II Antibody and Serology Core (Summer 2024)

Cytometric Bead Array services

Cytoflex

Simultaneous measurement of antigen-specific Abs (IgG, IgM, IgA).

Available arrays for β-Coronaviruses and Influenza antigens.

Flexible system configurable to 18 antigens in a single assay.

Luminex multiplexing services

MagPix

Measures up to 48 proteins in a 25 µl sample (pg/ml sensitivity).

Up to 80 samples per assay (serum, plasma, sups, BAL, etc...).

>500 human analytes available, including cytokines/chemokines.

Ab binding kinetics services

Alto SPR

High-throughput, benchtop Surface Plasmon Resonance (SPR) system.

Handling of 2 µl sample volumes.

Applications: Kinetics/affinity characterization, epitope mapping/binning, quantitation.

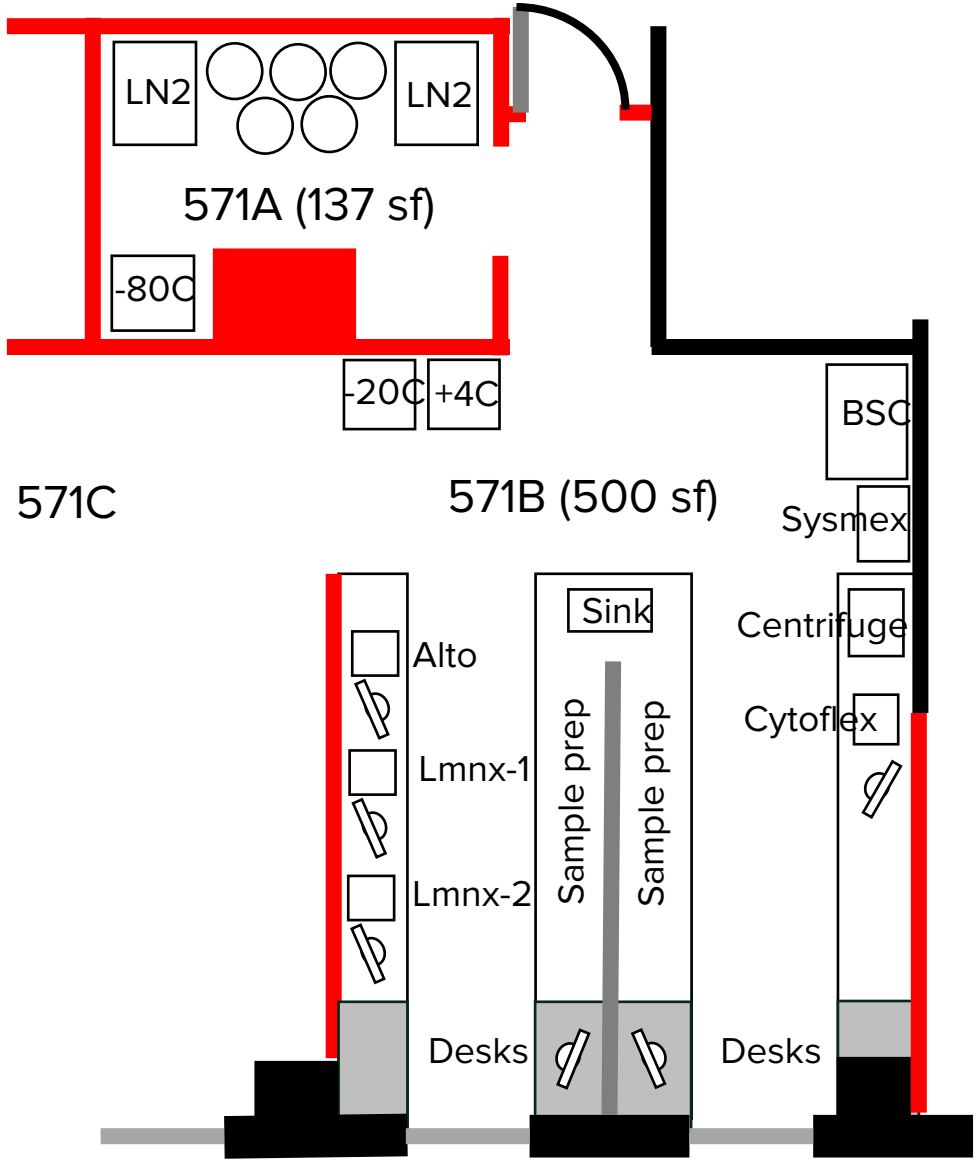
Operationalize II wet lab space

Proposed Immunology Core Space 1
5th Floor Shelby

To house two Immunology Institute Cores
(see next page for diagram)

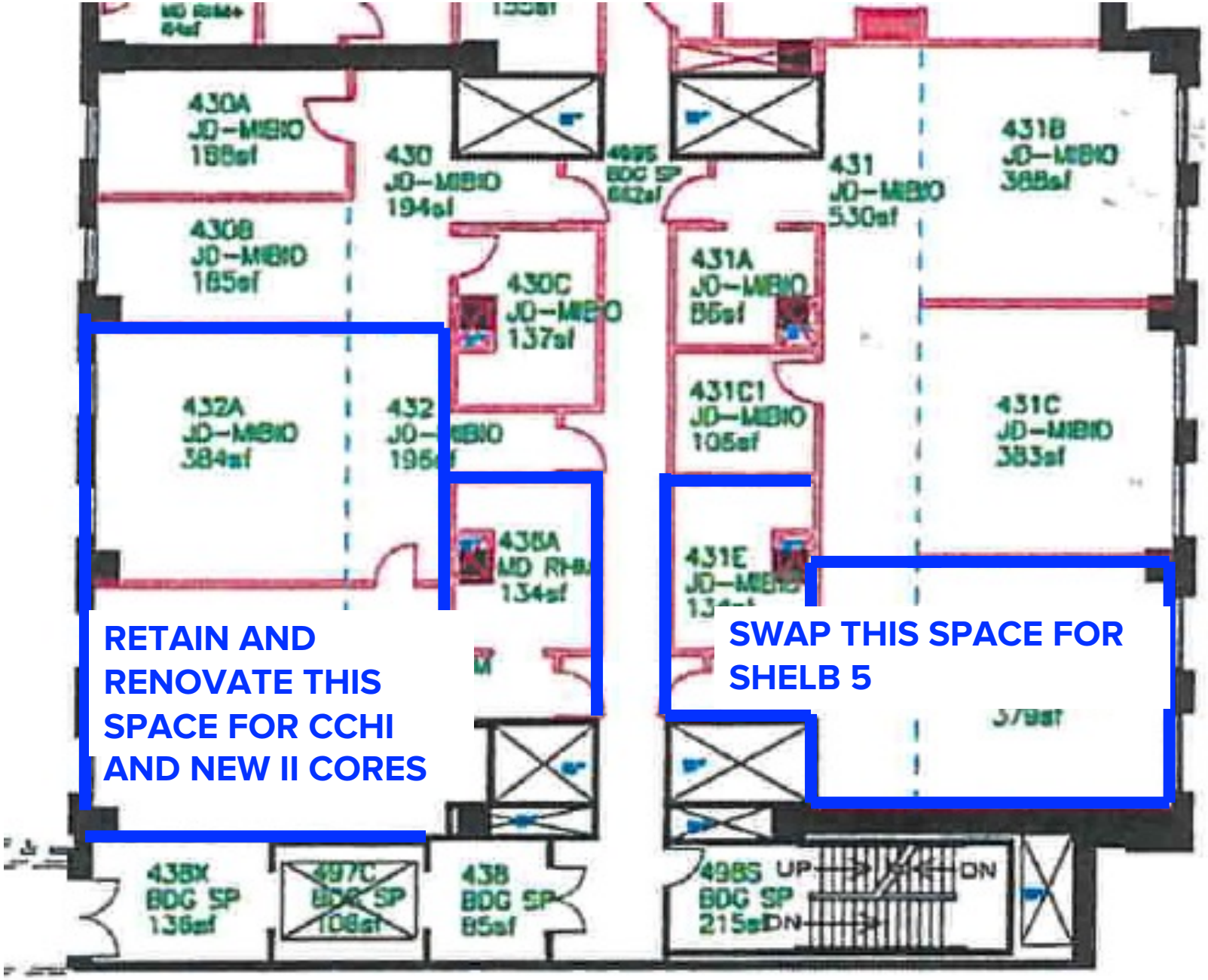
1. Immunophenotyping Core. To include:
LN2 sample storage space and -80C storage
Sample prep space, robot, centrifuges,
biosafety cabinet and small equipment

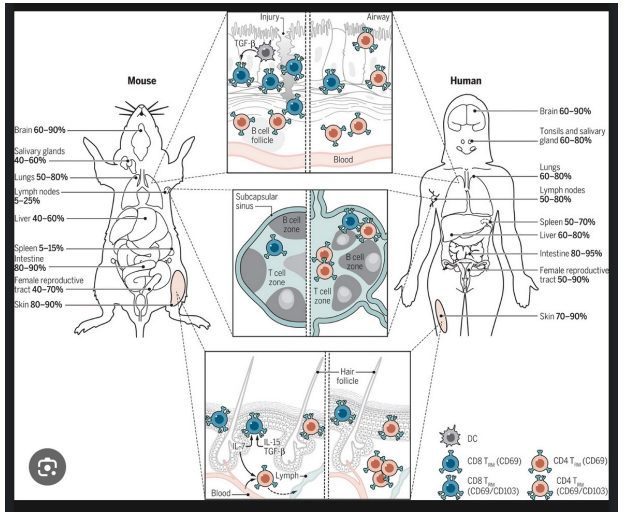
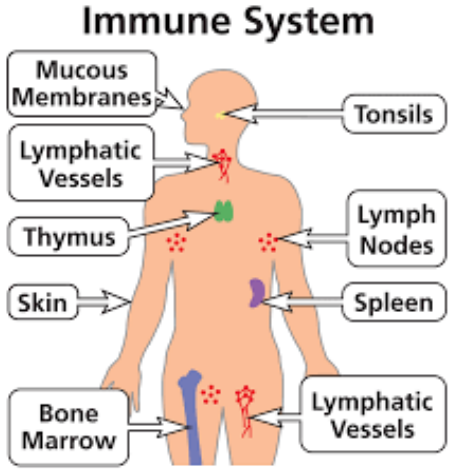
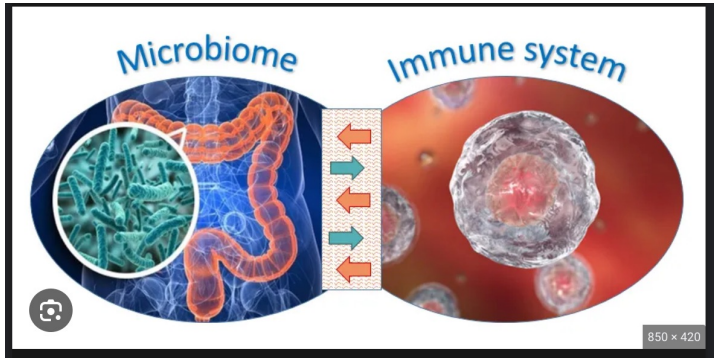
2. Serology Core. To include:
ALTO SPR, Cytoflex CBA, Luminex
instruments, and sample prep space



4th Floor Shelby

Current U19 CCHI Core Space
Blue outline would like to trade 431D and 431E for 5th floor space (see earlier diagram)



Future Research Priorities?

- Dirty Mouse Colony
- SEBLAB Immunologic Assay Core
- Human Lymph Node Biopsies, bone marrow aspirates, fat biopsies
- Human Tissue-derived Immune Cell Core
- Disease Cohort samples
- Vaccine and immunophenotyping for pre-clinical and clinical investigator and industry-initiated trials
- Microbiome initiatives (since loss of microbiome center)