Vanderbilt Institute for Infection, Immunology and Inflammation (VI4)

An institute that serves as a foundation supporting the entire community of researchers in the areas of infection, immunology, and inflammation

Founded July 2017





Infection, Immunology, and Inflammation

Microbial Pathogenesis

Clinical Microbiology

Cancer Immunology

Microbiome

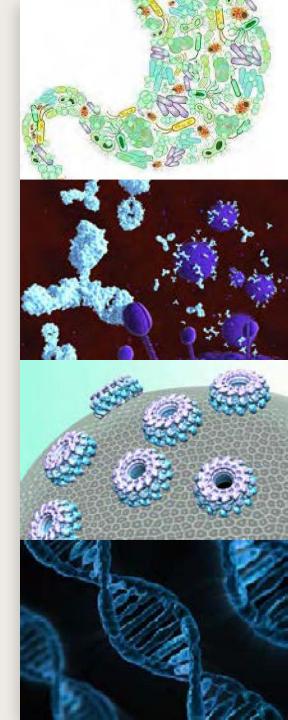
Immunotherapies

Personalized Medicine

Structural Pathogenesis

Emerging Infectious Diseases





Mission Statement

To train the next generation of scientists and physicians and make fundamental discoveries in the areas of infection biology, immunology, and inflammation with the goal of increasing knowledge and improving human health.

Supporting a Strong Community

Institutions

Vanderbilt Medical Center | Vanderbilt University | Meharry Medical College

Departments and Divisions

Adult Infectious Diseases | Allergy, Pulmonary, and Critical Care | Anesthesiology | Anthropology |
Biochemistry | Biological Sciences | Biomedical Engineering | Cardiovascular Medicine | Cell &
Developmental Biology | Chemistry | Clinical Pharmacology | Dermatology | Gastroenterology,
Hepatology and Nutrition | Hematology/Oncology | Molecular Physiology & Biophysics |
Ophthalmology and Visual Sciences | Pathology, Microbiology and Immunology | Pediatric Infectious
Diseases | Pharmacology | Rheumatology and Immunology | Surgery | Urology

Centers and Institutes

Center for Immunobiology | Center for Structural Biology | Diabetes Research and Training Center | Digestive Disease Research Center | Genetics Institute | Institute for Global Health | Institute of Chemical Biology | Vanderbilt-Ingram Cancer Center | Vanderbilt Vaccine Center | Vaccine Research Program

VI4 Leadership and Administration



Eric Skaar Director



Manny Ascano



Jim Cassat



Ivelin Georgiev





Maria Hadjifrangiskou



Mary Philip



Jeff Rathmell (Immunobiology)



Jamie Block Program Manager





Nichole Maloney Research Specialist Sr



Megan Schladt Lead Program Manager

VI4 Strategic Planning Committee



C. Buddy Creech II, MD, MPH Director, Vanderbilt Vaccine Research Program



Leslie Crofford, MD Director, Division of Rheumatology & Immunology



James Crowe, Jr., MD Director, Vanderbilt Vaccine Center



Mark Denison, MD Immediate Past Director, Pediatric Infectious Diseases



Kelly Dooley, MD, PhD, MPH Director, Division of Infectious Diseases



Anthony Flores, MD, MPH, PhD Director, Division of Pediatric Infectious Diseases



Tina Iverson, PhD Associate Dean for Faculty Development for Basic Sciences



Borden Lacy, PhD Director, Vanderbilt Center for Structural Biology



Simon Mallal, MBBS, FRACP, FRCPA Director, Vanderbilt Center for Translational and Clinical Immunology



Richard Peek, MD Director, Division of Gastroenterology



Ann Richmond, PhD Ingram Professor of Cancer Research



John Tanner Wilson, PhD Associate Professor, Biomedical Engineering, Chemical & Biomolecular Engineering

VI4 Diversity, Equity, and Inclusion Committee

Graduate students:



Deborah Gil



Kyle Enriquez



Azuah Gonzalez



Makayla Lowe



Isabella Sirit

Postdoctoral Fellows:



Juan Carvajal-Garcia



Kara Eichelberger



Chris Peritore-Galve



Sarah Price



Staff:

Valeria Reyes Ruiz

Faculty:



Ben Bratton



Mariana Byndloss



Melissa Farrow



Jeff Freiberg



Janet Markle



Henrique Serezani



Eric Skaar



Wenhan Zhu



Mariam Haider

VI4 External Advisory Board



William Goldman, Ph.D.

Professor of Microbiology & Immunology
University of North Carolina at Chapel Hill



Lora Hooper, Ph.D.

Professor and Chair, Department of Immunology
University of Texas Southwestern
Howard Hughes Medical Institute



Scott Hultgren, Ph.D.

Helen L. Stoever Professor
Department of Molecular Microbiology
Director, Center for Women's Infectious Disease Research
Washington University



Susan Kaech, Ph.D.

Professor and Director

NOMIS Center for Immunobiology and
Microbial Pathogenesis

Salk Institute for Biological Sciences



Richard Locksley, M.D.
Sandler Distinguished Professor of Medicine
Director, Sandler Asthma Basic Research Center
University of California San Francisco
Howard Hughes Medical Institute

Enhancing Research, Education, and Clinical Care

THE GOAL

Establish Vanderbilt as the global leader in research focused on infection, immunology, and inflammation

- Targeted faculty hires
- Strategic infrastructure improvements
- Investments in education and training
- Provide resources to facilitate and enhance research
- Support services for multi-investigator grants
- Coordinated marketing campaign



Faculty Recruitment



Targeted Faculty Hires

STRATEGY

Grow where we have need and grow where we have strength

- Microbial Pathogenesis
- Structural Pathogenesis
- Clinical Microbiology
- Cancer Immunology

- Immunobiology
- Personalized Medicine
- Microbiome



Faculty Recruitments and New Members

Since 2017, VI4 has contributed to 23 new faculty hires.

2023 - 2024



Anthony Flores, MD, MPH, PhD Director, Division of Pediatric Infectious Diseases



Douglas Mitchell PhD, Professor of Biochemistry, Chemistry Director, VICB



Kristin Patrick, PhD
Associate Professor of PMI



Robert Watson, PhD, MPH Associate Professor of Medicine



Kiel Telesford, PhD Assistant Professor of Ophthalmology

Faculty Recruitments and New Members

2023 - 2024



Paul Blair, MD, MHS
Assistant Professor of Medicine,
Infectious Disease



Stephanie Rolsma, MD, PhD Assistant Professor of Pediatric Infectious Diseases



Allison Walker, PhD
Assistant Professor of Chemistry

Faculty Recruitments and New Members

2023 - 2024/5



Faculty Institutional Recruitment for Sustainable Transformation (FIRST)



Consuelo H. Wilkins, MD, MSCI
Senior Vice President
Senior Associate Dean for Health
Equity and Inclusive Excellence, VUMC
Professor of Medicine, VUMC



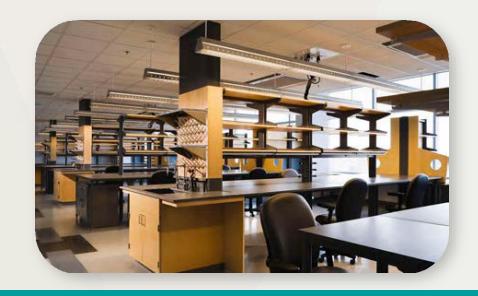
Vivian Gama, PhD
Associate Professor, Cell and
Developmental Biology
Associate Dean for Equity and Inclusive
Mentoring, Vanderbilt University

Improving Research Infrastructure



Create state-of-the art laboratory space for interdisciplinary research

- 4th and 5th floors of MCN, dry lab space in 2525, VI4 MICRO BSL3 Facility
- Approximately 60,000 square feet of renovated space is planned or complete
- Interdepartmental VI4 facilities for research and administration
- Phase 1 is complete (~8,700 sq ft)
- Phase 2 is complete (~7,700 sq ft)
- Phase 3 construction is complete (~14,000 sq ft)
- Phase 4 in planning stage





A "new building" focused on infection and immunology



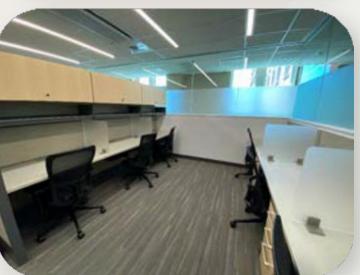
PHASE 1 8,700 sq. ft











PHASE 2 7,700 sq. ft











PHASE 3 14,000 sq. ft



















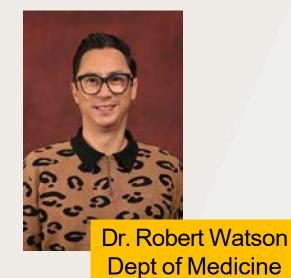




Dr. Benjamin Spiller Pharmacology



Dr. Mariana Byndloss PMI



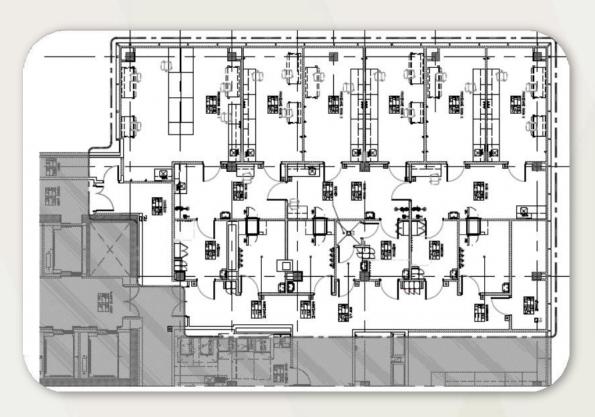
Dr. Kristin Patrick
PMI



MICRO Facility

MRBIV Infectious Disease Core ResOurce (MICRO)

State of the art facility for work at Biosafety Level 3 including Select Agent Research







MICRO Facility



5 - WORK ROOM P410A



7 - PROCEDURE ROOM P410C



6 - PROCEDURE ROOM P410C



8 - PROCEDURE ROOM P410B

Research



Research

STRATEGY

To provide resources to facilitate and enhance cutting edge research













Improve Technical Capabilities

Equipment purchases:

- Gnotobiotic Support (DAC)
- HT-PCR Viral Diagnostics (Pediatrics)
- Metalloproteomics (MSRC)
- Microbiome support (PMI)
- CISR (Nikon MP)
- Flow Core (Cytek Aurora)



microVU and the center for personalized microbiology





- We can consult on and support different projects requiring the use and analysis of multiple isolates or clinical samples from microVU
- Banking of >20k of isolates/specimens annually connected to the RDW and can be queried via Starbrite.
- 34 institutional and external projects (in progress and completed)

- Vanderbilt Patient Clinical Microbial Isolate

 Clinical Microbial Isolate

 Research Data microVU

 Warehouse
- Activities from projects resulted in 23 publications and >\$9M in federal grant support and 15 industry contracts for CPMi affiliated investigators
- Current U19 submission on anti-AMR technology (pending imminent review) would entail multi-institution/investigator program based on *microVU* samples
- Genome assembly and microbiome analysis workshop as part of the MHI/MPI STMP modules offerings this Spring



Program in Gnotobiotic Research

Gnotobiotic Mouse Facility



Anaerobic Chamber



Gnotobiotic Fish Room



Gnotobiotic Pilot Grants



Supported by a generous donation to VI4 from the Robert Lipman and Katherine Follin Fund

Vanderbilt Microbiome Innovation Center

CO-DRECTORS



Mariana Byndloss, DVM, PhD Assistant Professor Pathology, Microbiology and Immunology VUMC



Steve Townsend, PhD
Professor
Chemistry
VU

ASSOCIATE DIRECTORS



Megan Behringer, PhD

Assistant Professor
Biological Sciences
VU



Jane Ferguson, PhD
Associate Professor
Medicine
VUMC



Maribeth Nicholson,
MD, MPH
Associate Professor
Medicine
VUMC

Vanderbilt Microbiome Innovation Center

Microbiome Research

- Support for multi-omics analysis
- Partnership with genomics and metabolomics cores
- Increase access to gnotobiotic facilities
- Increase access to anaerobic chambers
- Pilot funding

Education

- Speakers in VI4 Seminar Series
- Incorporate Microbiome in undergraduate and graduate classes

Outreach

- Support community outreach performed by the Vanderbilt Microbiome Society (undergraduate society)
- Partner with VI4 in outreach efforts

Vanderbilt Microbiome Innovation Center

Data Science Support



Nicole Kirchoff, PhD
Data Scientist, VI4/VMIC

- Support for members of VMIC on microbiome study design and microbiome data analysis
 - Office hours Tues & Thurs 9-11am
 - Discuss hypotheses, study design, analysis, feasibility, etc.
- Future opportunities for support on VU/VUMC projects

Program in Computational Microbiology and Immunology (CMI)

Collaborative CMI publications:

 Nature Medicine, Nature Communications, J Immunology, J Virology, Cell Reports Medicine

Funding:

- NIAID contract: Influenza and RSV vaccine development and evaluation
- : Antibodies and Al (pending)

Initiatives:

Collab drylab, coding hour, ACCRE resources,
 IGP coursework, CMI journal club

Ivelin Georgiev, PhD

Development of LIBRA-seq for the guinea pig more for the evaluation of antibody responses to multivate vaccines

Authors: Matthew 3. Vukovich . Nagarajan Raju, Prudence Kgagudi, Nelia P. Manamela, Alexandra A. Abu-Shmals, Kathryn R. Gripenstraw, Perry T. Wasdin, Xiaoying Shen . Bridget Dwyer, Jumana Akoad, Rebecca M. Lynch, David C. Montefiori, Simone I. Richardson, Penny L. Moore . Ivelin S. Georgiev Show Fewer Authors INFO & AFFILIATIONS

Potent HPIV3-neutralizing IGHV5-51 Antibodies Identified from Multiple Individuals Show L Chain and CDRH3 Promiscuity Alexandra A. Abu-Shmais ; Rose J. Miller ; Alexis K. Janke ; Rachael M. Wolters ; Clinton M. Holt ; Nagarajan Raju ; Robert H. Carnahan ; James E. Crowe, Jr ; Jarrod J. Mousa ; Ivelin S. Georgiev + Author & Article Information

J. Immunol (2024) 212 (9): 1450–1456.

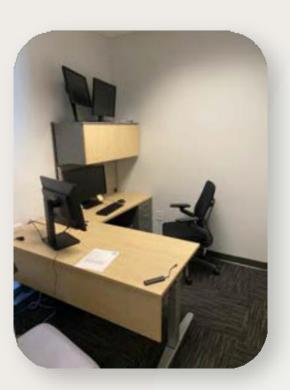
https://doi.org/10.4049/jimmunol.2300880 Article history :

Program in Computational Microbiology and Immunology (CMI)



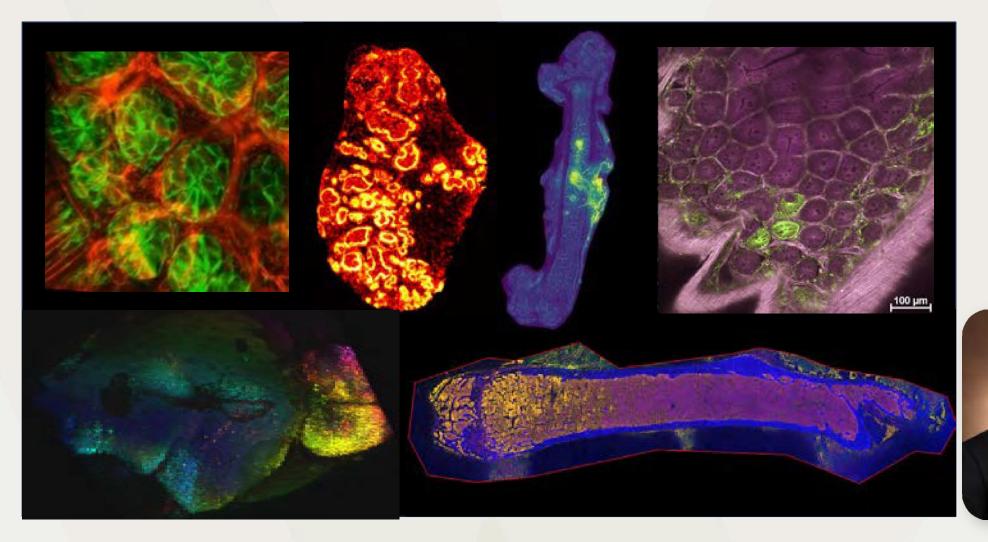






CMI Dry Lab Space – 2525 West End

Program in Imaging of Infection and Immunity





Program in Imaging of Infection and Immunity

VI4 Investments in imaging research:

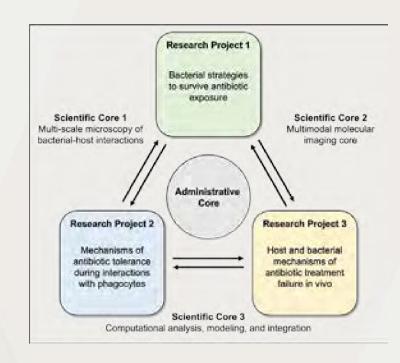
- Partnering with core facilities to ensure access, resources, and SOPs for researchers operating at higher biosafety levels
- Hiring of Dr. Tegy Vadakkan, Senior Research Specialist within the CISR
- Strategic infrastructure investments
- Participation in NIH Shared Equipment Grant Applications
- Support for large grant submissions related to imaging

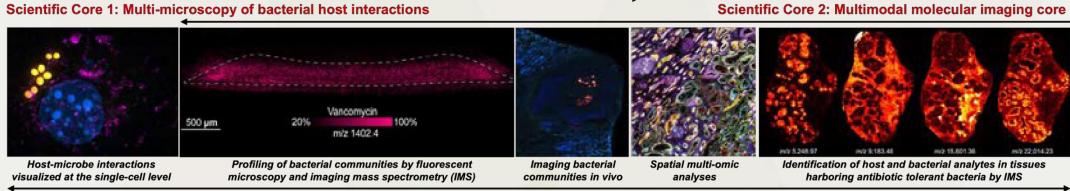


Program in Imaging of Infection and Immunity

Resubmission of a \$13.3 million P01 application

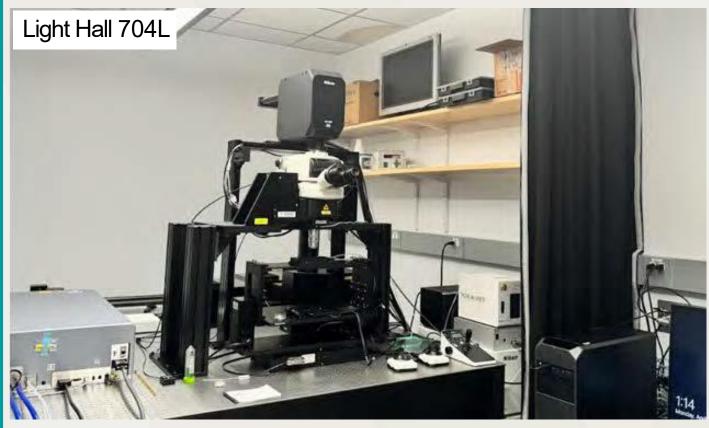
- Leverages Vanderbilt's strengths in imaging to study mechanisms of antibiotic treatment failure
- 6 sites, 3 Research Projects, 3 Scientific Cores and an Administrative Core





Scientific Core 3: Computational analysis, modeling, and integration core

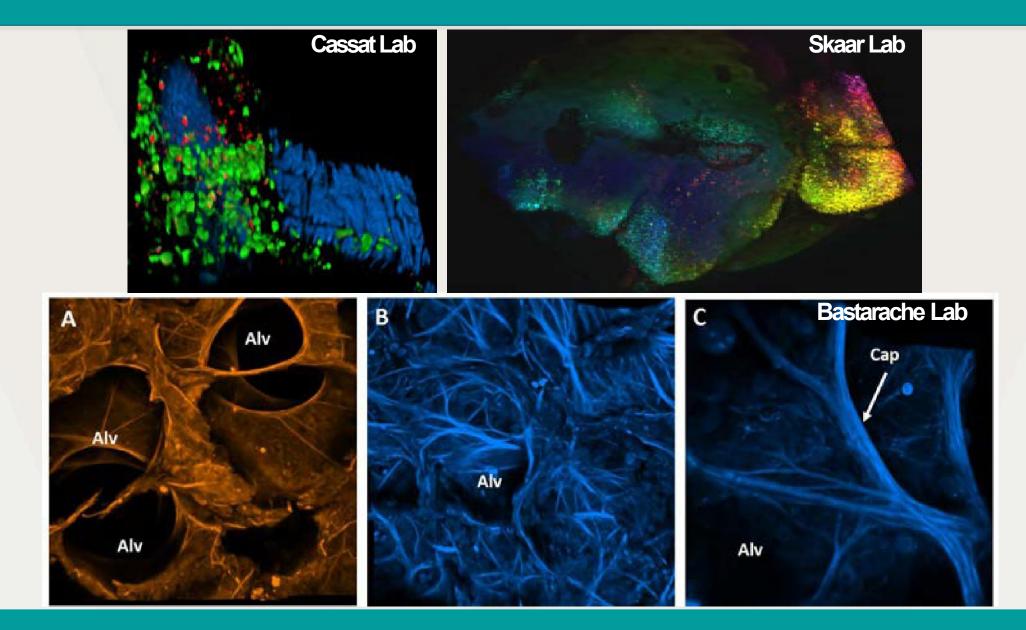
New capabilities for intravital microscopy



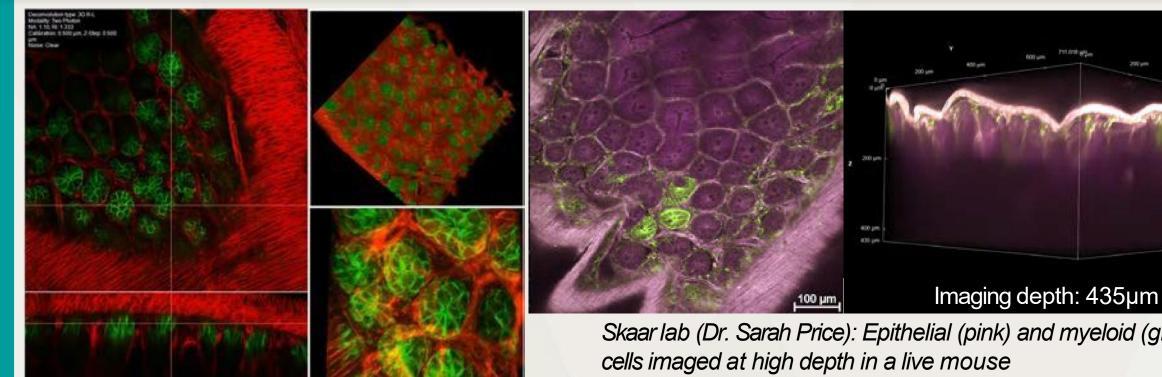
Nikon AX RMP Multiphoton Microscopy System

- Acquired via NIH High-End Instrumentation S10 program
- Features:
 - High-definition imaging of deep tissues / thick specimens
 - >600 microns
 - High spatial resolution
 - Up to 8K x 8K across a 22mm field of view
 - High temporal resolution
 - Up to 720 fps

Sample images



Case Study – Imaging of intestinal physiology



Lau Lab: Paneth cells in the base of small intestinal crypts; imaged through the outer muscular wall of the intestine

Skaar lab (Dr. Sarah Price): Epithelial (pink) and myeloid (green)



Support of Grant Submissions

Feedback from grant reviews:

K99 application:

"Exceptional environment for the intended studies and for the applicant within the confines of Vanderbilt Institute of Infection, Immunology and Inflammation"

R01 application:

"Center [sic] for Immunity, Infection & Inflammation at Vanderbilt is world class center with numerous skilled and productive investigators for constructive impute, especially working effectively with the mass spectrometry research center for sophisticated IMS in in vivo systems brought to bear on this application."

U application:

"VUMC and VU is an outstanding environment for the proposed studies, especially given the school's recent establishment of the VI4 structure for infectious disease and microbiology research"

F32 application:

"The applicant will have significant access to VI4 resources, including diverse seminar series and symposium that will strongly enhance training. / The recently-created VI4 will provide vast scientific support to the applicant, where access to world leaders in infection biology is guaranteed."

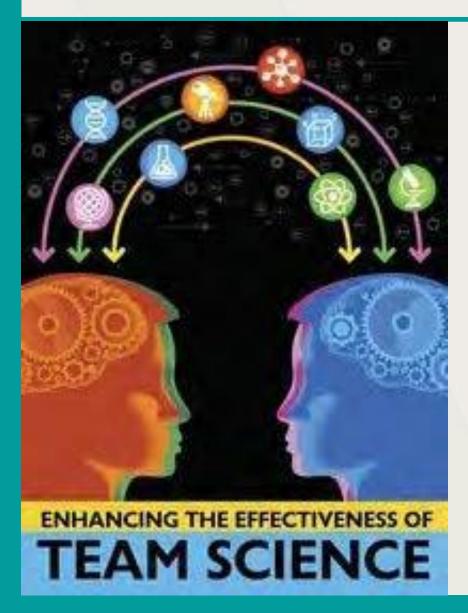
F31 application:

"The Vanderbilt Institute for Infection, Immunology, and Inflammation (VI4) has great infrastructure for performing infectious disease research."





Support of Team Science



VANDy-CdV U19 (Awarded)

- Title: Vanderbilt Antibody and Antigen Discovery for Clostridioides difficile Vaccines
- PI: Borden Lacy
- Project Leads: Lacy, Spiller, Kroh, Skaar, Creech, Nicholson, Georgiev, Olivares-Villagomez

Antibodies and Al (Pending)

- Title: Al-Enabled Generation of Antigen-Specific Antibodies
- Pl: Ivelin Georgiev
- Project Leads: Park, Hadjifrangiskou, Goettel, Skaar

Imaging P01 (Submitted)

- TITLE: Host and microbial determinants that drive antibiotic failure)
- Pl: Jim Cassat
- Project Leads: Conlon (UNC), Helaine (Harvard), Tyska, Spraggins (Vandy), van de Plas (Delft), Goncalves (Delft)

Education and Training



Education and Training

STRATEGY

Enhance existing training programs focused on infection, immunity, and inflammation





Seminar Series

Every other Tuesday at 10:30am in LH 512

Check our newsletter for the most up to date information.

Or email:

VI4Research@vumc.org

Fall schedule available at vumc.org/viiii

Thank you speakers

for an amazing '23-'24 VI4 Seminar Series!





Annual Research Symposium

Save the date: April 24th, 2025 at the Student Life Center



- Citation Awards
- Poster Sessions
- Trainee Presentations



2024 Symposium



DEI Seminars & Symposium

Save the date: September 30th, 2024

Quarterly events

- Winter, Spring, Fall Seminars
- Fall Symposium "Careers in STEM: Perspectives from Immigrant Scientists"





Scan to register!





DEI Mentorship Program

Fall information session coming soon!

- Program has doubled since 2021.
- 24 Mentor/Mentee pairings during 2023/2024 year (VU, VUMC and now adding Meharry students)
- Meet ~once a month
- Create a safe space to discuss personal and career goals
- New year kicks off this month!

Photos from the Mentorship Program Happy Hour in April 2023





Graduate & Postdoctoral Programs

Administration of the Immunology and Microbiology Curricula

- Molecular Pathology and Immunology (MPI)
- Microbe-Host Interactions (MHI)



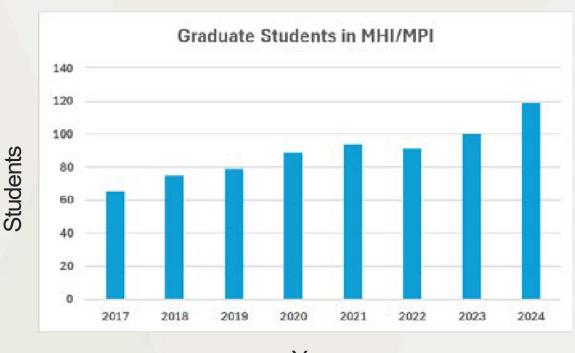
Jeff Rathmell



Jay Jerome



Maria Hadjifrangiskou

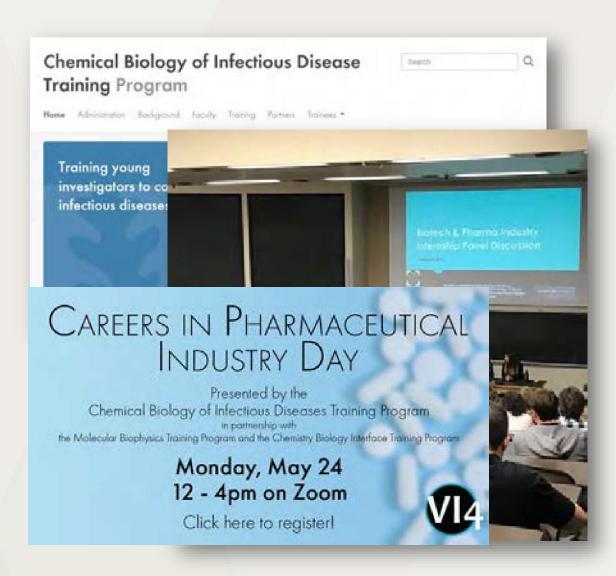


Year



Supported T32 Training Programs

- Supported 43 students to date
- Internships in Big Pharma
 - Pfizer, AstraZeneca, renewed agreement with Merck
 - Multiple trainees have found jobs from internship
- Hosted industry panel discussion, January 2018
- Careers in Pharma Day, April 2019, May 2021, May 2023, Life
 Sciences Showcase July 2024
- Immunobiology T32





Global Scholar Program

- Partnership with VIGH
 - Support PhD externship with global partner
 - Jonathan Davies
 Institute for Tropical Medicine at Universidad Peruana Cayetano Heredia, Lima, Peru
- Applications are considered on a rolling basis (Second student accepted)



Junior Faculty Programs



Junior Faculty Leadership



Ruben Martinez Barricarte, PhD



Megan Behringer, PhD



Heather Pua, MD, PhD



Monica Santisteban, PhD

Events & Resources

- Mini- Sessions
- Social/Networking
- Peer Review Groups
- Bi-annual Retreats
- Lab Startup Guide





Visit vumc.org/viiii/junior-faculty for Peer Review Group information, Lab Startup Guide, and other Resources.

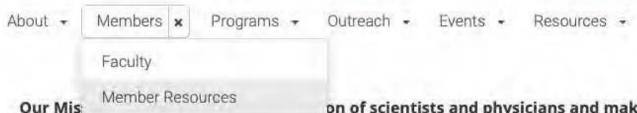


Lab Start Up and Resources

- Quick reference guide for new and junior faculty
 - VI4 Administrative and Grant Resources
 - Lab Start Up Contacts and Tips
 - Important Dates and Events
- Additional resources to be added
 - Provide suite of resources for junior faculty
 - Eg. Hiring and management, recruiting students
- Available on website and emailed directly to new hires



Vanderbilt Institute for Infection, Immunology and Inflammation

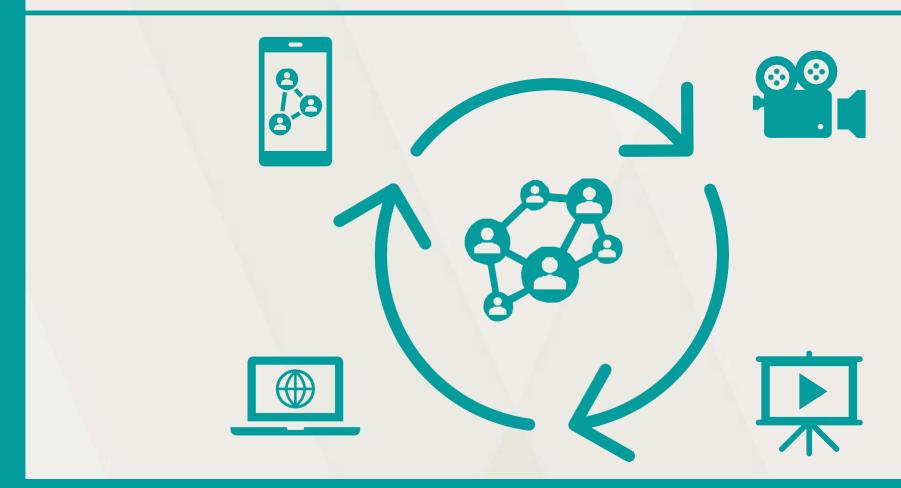


on of scientists and physicians and make fundamental discoveries in the areas of infection biology,



STRATEGY

Run a coordinated marketing campaign to highlight VI4 research within and outside Vanderbilt





Social Media Audience: 2023 Year in Review

274 K X(Twitter)

95 K Instagram

28 K YouTube





The Studio

Located in MCN T2309, the studio is a comfortable creative environment that utilizes efficient workflows and automation to allow all users to easily come in, make a great video, and get back to work.

Virtual Seminars
Remote Interviews
Video Abstracts
Dissertation Defenses
Asynchronous Class Videos
Presentation Practice
Resource Commercials
And more!

vumc.org/viiii/studio

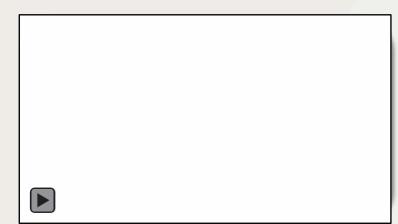


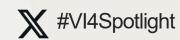
Faculty & Trainee Spotlights

Resource Commercials VI4 Scientists
Doing Things



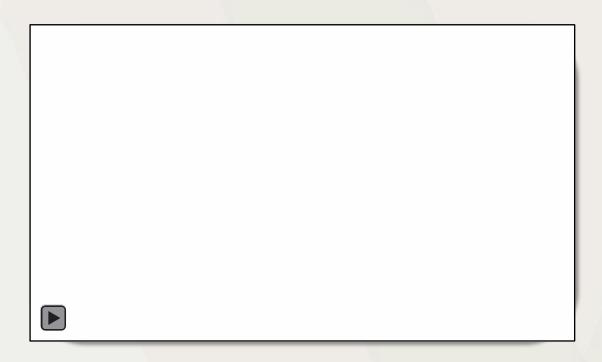






Community Outreach

MEGAMicrobe – October 26, 2024 Whitsitt Elementary School, 10-2 (closed "sensory hour" 9-10am)





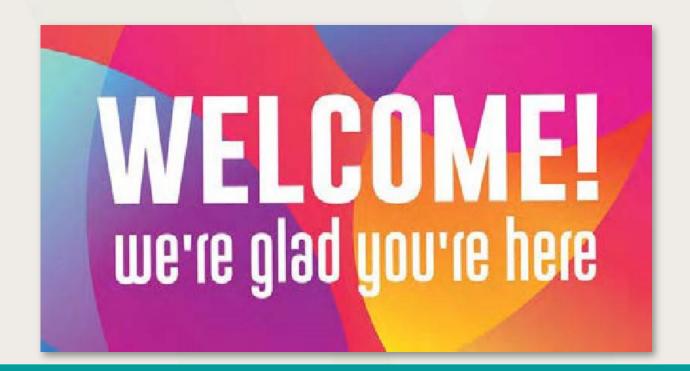






DEI Recruitment & Retention

- Focus on creating a supportive and inclusive environment within VI4
- Involvement in faculty recruitment efforts
- Presence at upcoming scientific conferences (SACNAS, ABRCMS)



Science Communication Internship

Spring 2023 Interns



Alexandra Abu-Shmais Georgiev Lab



Casey Butrico
Cassat Lab



Kaitlyn BrowningMerrikh Lab



Matt Vukovich Georgiev Lab



Rachael Wolters, DVM Crowe Lab

- Social Media, Writing, Graphic Design, and Video Production
- Currently restructuring this program



vumc.org/viiii/scicomminternship

VI4 Artist in Residence Program



- 4 of 5 years supported by external funding (BWF \$75,000)
- 2023 Annual report available online



Over last five years...

- 98 student artists
- 41 labs
- Over 30 covers accepted (more coming!), graphics in 15 publications, and hundreds of animations, and other media for science conference, websites, and social media

Summer 2024 Program

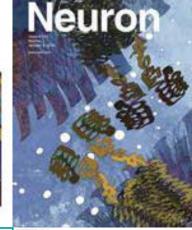
19 students worked with Cell Trends











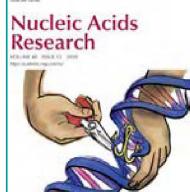




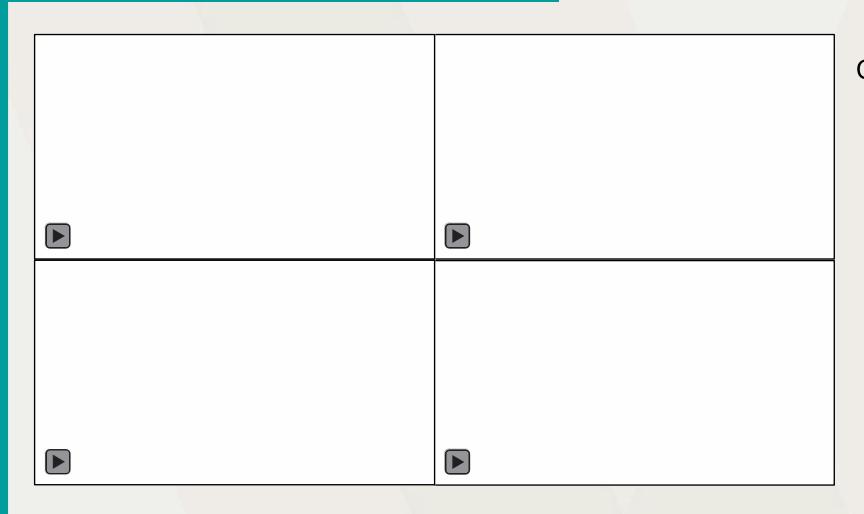








Resource Commercials



Cell Imaging Shared Resource (CISR)

Center for Structural Biology (CSB)

VANTAGE

Translational Pathology Shared

Resource (TPSR)

Vanderbilt University Institute of

Imaging Science (VUIIS)

Support for Recruiting



Opportunity:

-YOUR JOB HERE -

We can help you promote your open positions to audiences in and outside of the Vanderbilt community.

Newsletter

- Hiring -



Post-Doc Opportunity

The Center for Drug Safety and Immunology is looking for post-doc interested in human immunology, drug allergy, pharmacogenomics & cuttingedge single-cell technology!

Contact elizabeth.j.phillips@vumc.org or drugsafetyresearch@vumc.org for more info.

Website

Current Opportunities

Postdoctoral Scholar - Karijolich Lab at Vanderbilt University School of Medicine

Research Assistant I or II - Doran Lab at Vanderbilt University Medical Center

Postdoctoral Scholar - Denison Lab at Vanderbilt University Medical Center

Postdoctoral Fellow - Joyce Lab at Vanderbilt University Medical Center

Postdoctoral Fellow and Research Assistant Positions - Georgiev Lab at Vanderbilt University Medical Genter

Postdoctoral Fellow - Norris Lab at Center for Vaccines and Immunology at the University of Georgia

Staff Scientist - Vanderbilt Center for Immunobiology (VCI) at Vanderbilt University Medical Center

Research Assistant I or II - Patrick Lab at Vanderbilt University Medical Center

Research Assistant II - Behringer Lab at Vanderbilt University

Faculty Position - Program in Computational Microbiology and Immunology at Vanderbilt University Medical Center

Twitter



Movie Showing

HOLOBIOME: Film and Interactive Discussion

Mon Sep 23, 2024 5:30 PM - 6:30 PM

Turner Hall at Blair School of Music, 37212

All are invited!

Blair School of Music

Monday September 23rd



Things to look for in 2025 VIA

Faculty Recruitment

Establish Consortium of Institutes Across Country

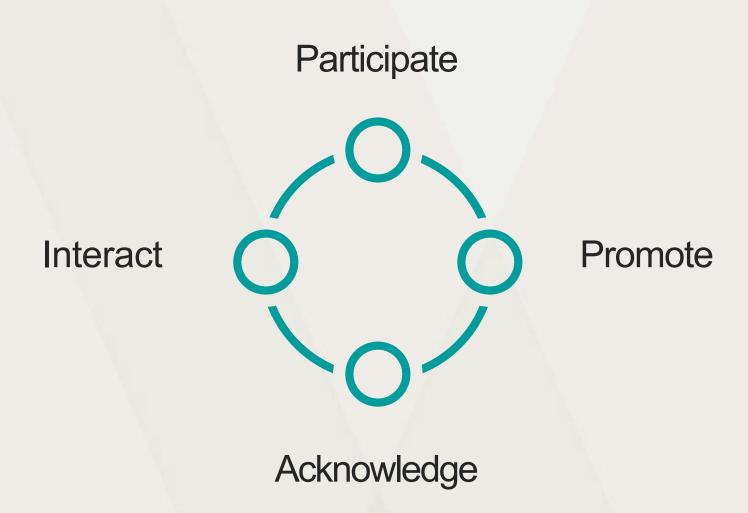
Launch of MICRO BSL3?

Establish Clinical-Translational Resource

Ramp up marketing

Build worldclass infrastructure







New membership structure

- To focus resources and communication
- Two levels: Full and Associate
- Determines access to VI4 benefits
- Participation dictates membership level



Vanderbilt Institute for Infection, Immunology and Inflammation (VI4)



