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



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 | Hearing and Speech Sciences | 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

Associate Directors



Maria Hadjifrangiskou



Mary Philip



Henrique Serezani



Jamie Block Program Manager



Fred Haywood Project 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



Tracy Frech, MD, MS
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 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 25 new faculty hires.

2024 - 2025



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



Alexander Bick, MD, PhD
Associate Professor of Medicine
Genetic Medicine



James Connelly, MD
Assistant Professor of Pediatrics
Hematology/Oncology



Tracy Frech, MD, MSCI Associate Professor of Medicine Rheumatology and Immunology



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

Faculty Recruitments and New Members

Since 2017, VI4 has contributed to 25 new faculty hires.

2024 - 2025



Robert Coffey, MD
Professor of Medicine
Gastroenterology, Hepatology
and Nutrition



Allison Walker, PhD
Assistant Professor of Chemistry



Megan Beers Wood, PhD
Assistant Professor of
Hearing and Speech Sciences



Jeffrey Freiberg, MD, PhD Assistant Professor of Medicine Infectious Diseases

Improving Research Infrastructure



STRATEGY

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 planned and paused





A "new building" focused on infection and immunology



PHASE 1 8,700 sq. ft





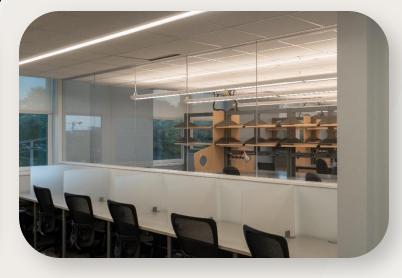






PHASE 2 7,700 sq. ft











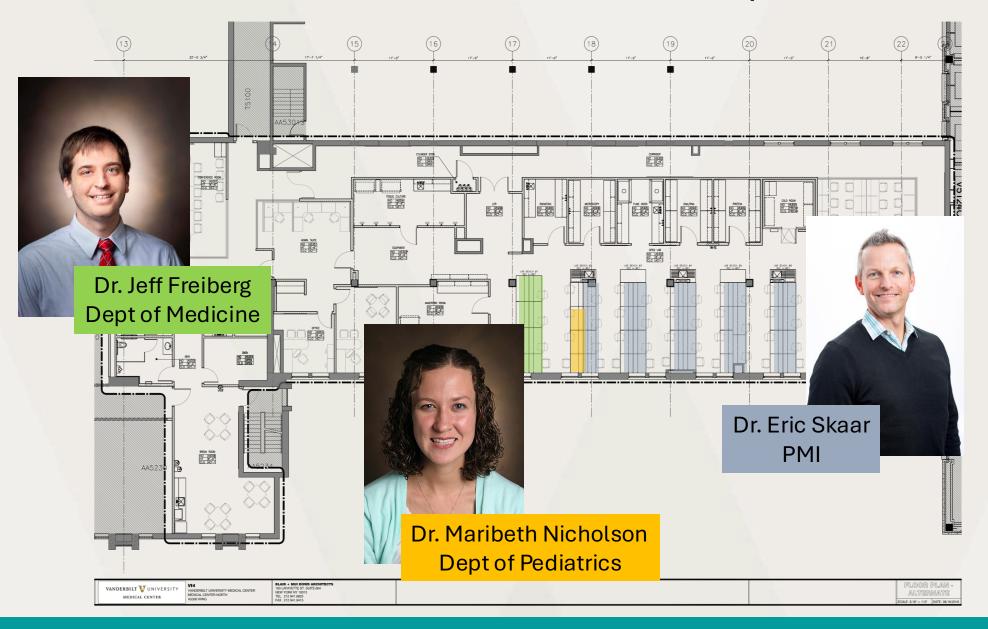
PHASE 3 14,000 sq. ft

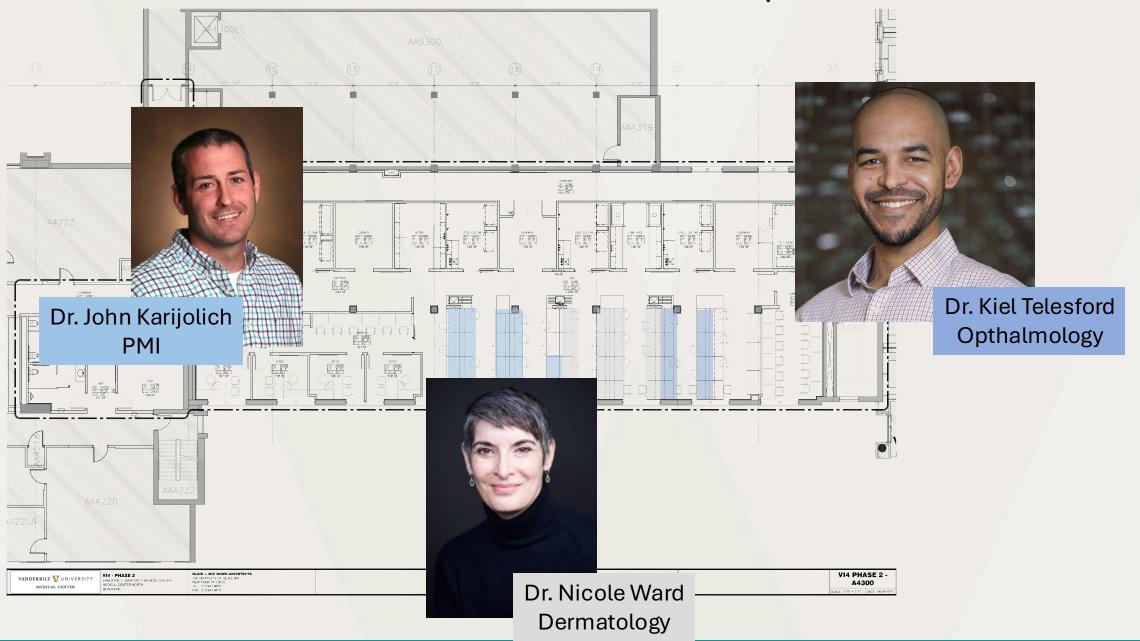


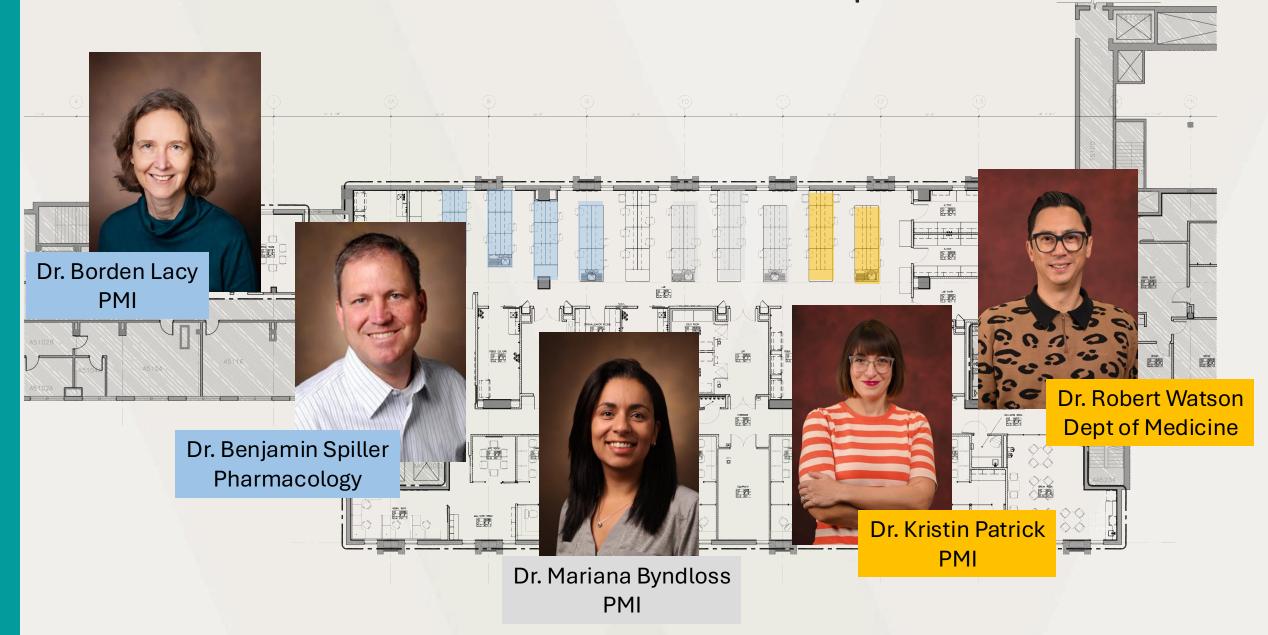










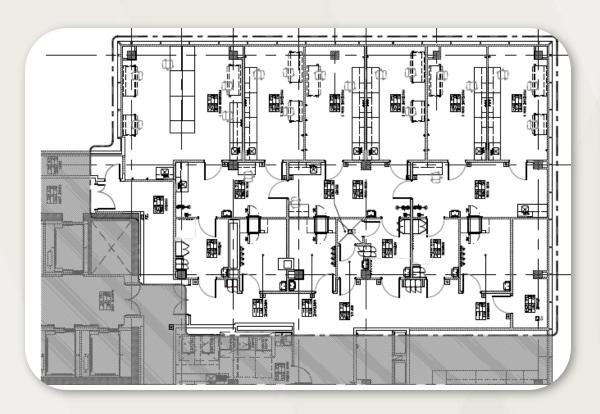




MICRO Facility

MRBIV Infectious Disease Core ResOurce (MICRO)

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



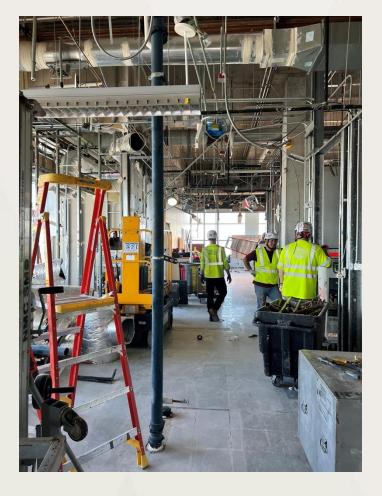




MICRO Facility









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)



VI4 Supported Programs and Centers

- Center for Personalized Microbiology
- Microbiome Innovation Center (VMIC)
- Center for Computational Microbiology and Immunology (CMI)
- Vanderbilt Center for Immunobiology (VCI)
- Program in Imaging of Infection and Immunity



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.
- 39 institutional and external projects (in progress and completed)



- Activities from projects resulted in 29 publications and >\$9M in federal grant support and 17 industry contracts for CPMi affiliated investigators
- Strategic emphasis in coming year is exploring avenues for partnership with emergent
 AMR initiative and its need for connectivity with clinical microbial resources



CO-DIRECTORS



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



Maribeth Nicholson,
MD, MPH
Associate Professor
Medicine
VUMC

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)

Gnotobiotic Mouse Facility



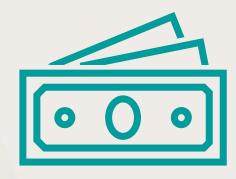
Anaerobic Chamber



Gnotobiotic Fish Room



Gnotobiotic Pilot Grants



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

Data Science Support



Nicole Kirchoff, PhD
Data Scientist, VI4/VMIC

- Support for members of VMIC on microbiome study design and microbiome data analysis
 - Includes 16S, metagenomics, and microbial RNASeq analysis
- Office hours Tues & Thurs 9-11am
 - Discuss hypotheses, study design, analysis, feasibility, etc.
- Assisted with 18 projects across 11 VU/VUMC labs
 - Manuscripts: 1 published, 1 in revision, 3 in-preparation
 - Grants: 1 awarded, 2 submitted
 - Sample analysis: analyzed data from pediatric IBD patients, preterm neonates, and murine models

Email Dr. Kirchoff at nicole.kirchoff@vumc.org

Center for Computational Microbiology and Immunology (CMI)

CMI publications:

 PLOS Computational Biology, Bioinformatics Advances, Cell, Structure, PLOS Pathogens, mBio

New funding:

 ARPA-H: Al-enabled generation of antigenspecific antibodies

Initiatives:

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

Ivelin Georgiev, PhD

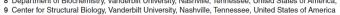
PLOS COMPUTATIONAL BIOLOGY



An expandable synthetic library of human paired antibody sequences

Toma M. Marinovo¹², Perry T. Wasdin^{1,2}, Gwen Jordaan¹, Alexis K. Janke¹, Alexandra A. Abu-Shmais^{1,3}, Ivelin S. Georgievo^{1,2,3,4,5,6,7,8,9}*

1 Vanderbilt Center for Antibody Therapeutics, Vanderbilt University Medical Center, Nashville, Tennessee, United States of America, 2 Center for Computational Microbiology and Immunology, Vanderbilt University Medical Center, Nashville, Tennessee, United States of America, 3 Vanderbilt Institute for Infection, Immunology and Inflammation, Vanderbilt University Medical Center, Nashville, Tennessee, United States of America, 4 Department of Pathology, Microbiology, and Immunology, Vanderbilt University Medical Center, Nashville, Tennessee, United States of America, 5 Department of Computer Science, Vanderbilt University, Nashville, Tennessee, United States of America, 7 Department of Biomedical Informatics, Vanderbilt University, Nashville, Tennessee, United States of America, 7 Department of Chemical and Biomolecular Engineering, Vanderbilt University, Nashville, Tennessee, United States of America, 8 Department of Biochemistry, Vanderbilt University, Nashville, Tennessee, United States of America, 8 Department of Biochemistry, Vanderbilt University, Nashville, Tennessee, United States of America, 8 Department of Biochemistry, Vanderbilt University, Nashville, Tennessee, United States of America, 9 Department of Biochemistry, Vanderbilt University, Nashville, Tennessee, United States of America, 9 Department of Biochemistry, Vanderbilt University, Nashville, Tennessee, United States of America, 9 Department of Biochemistry, Vanderbilt University, Nashville, Tennessee, United States of America, 9 Department of Biochemistry, Vanderbilt University, Nashville, Tennessee, United States of America, 9 Department of Biochemistry, Vanderbilt University, Nashville, Tennessee, United States of America, 9 Department of Biochemistry, Vanderbilt University, Nashville, Tennessee, United States of America, 9 Department of Biochemistry, Vanderbilt University, Nashville, Tennessee, United States of America, 9 Department of Biochemistry, Vanderbilt University, Nashville, Tennessee, United States of America, 9 Department of Bioche









Immunoinformatics

Negative binomial mixture model for identification of noise in antibody-antigen specificity predictions from single-cell data

Perry T. Wasdin ©1,2,3, Alexandra A. Abu-Shmais^{3,4}, Michael W. Irvin⁵, Matthew J. Vukovich^{3,4}, Ivelin S. Georgiev^{1,2,3,4,6,7,8,*}

¹Program in Chemical and Physical Biology, Vanderbilt University Medical Center, Nashville, TN, 37232, United States

²Center for Computational Microbiology and Immunology, Vanderbilt University Medical Center, Nashville, TN, 37232, United States ³Vanderbilt Vaccine Center, Vanderbilt University Medical Center, Nashville, TN, 37232, United States

Department of Pathology, Microbiology and Immunology, Vanderbilt University Medical Center, Nashville, TN, 37232, United States

⁵Multiscale Modeling Group, Computational Biology Hub, Altos Laboratories, Redwood City, CA, 94065, United States ⁶Department of Computer Science, Vanderbilt University, Nashville, TN, 37232, United States

⁷Vanderbilt Institute for Infection, Immunology and Inflammation, Vanderbilt University Medical Center, Nashville, TN, 37232, United States ⁸Center for Structural Biology, Vanderbilt University, Nashville, TN, 37232, United States

*Corresponding author. Department of Pathology, Microbiology and Immunology, Vanderbilt University Medical Center, Nashville, TN, 37232, United States. E-mail: ivelin.georgiev@vanderbilt.edu.

Program in Computational Microbiology and Immunology (CMI)









CMI Dry Lab Space – 2525 West End

Vanderbilt Center for Immunobiology



DIRECTOR



Henrique Serezani,
PhD
Associate Professor
Medicine, Infectious
Diseases
VUMC

The VCI believes in the value of basic science discovery in promoting innovation in personalized healthcare for immune diseases and excellence in immunology research and education.

The mission of the VCI is to advance discovery in human immunology and, through the basic biology and genetics of immune cells, promote understanding and education in immunology, as well as inform the treatment of immune and inflammatory diseases.

Vanderbilt Center for Immunobiology



Immunology Journal Club

- Has been meeting for over 35 years.
- Meets every Friday from Noon– 1:00 pm
- Students, faculty, and postdocs share their insights during discussions about all aspects of immunology.

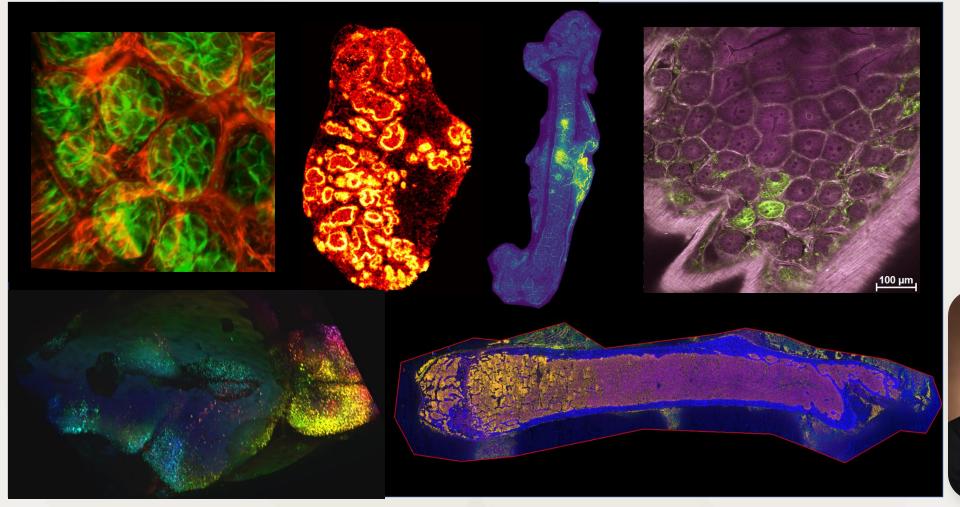
Data Club

- Meets on the 2nd Friday of every month from 9:00 to 10:00 am
- Member labs present current research.

Human Immunology Forum

- Meets on the 3rd Friday of every month from 9:00 to 10:00 am
- Brings together clinical, translational, and basic scientists to discuss diverse immune-related disorders among VUMC researchers.
- Encourages discussion of critical questions and new advances in the pathobiology of human immunobiology.

Program in Imaging of Infection and Immunity





Jim Cassat

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 (2022)
- Participation in NIH Shared Equipment Grant Applications
- Support for large grant submissions related to imaging

VI4 usage of CISR has increased significantly:

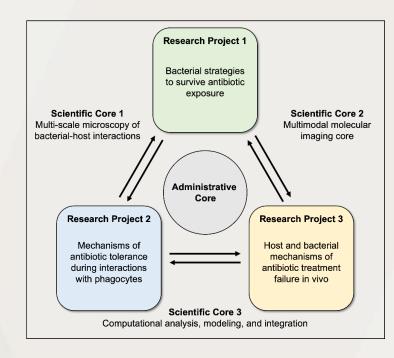
- ~20% increased microscopy time from 2022 to 2024
- 2025 on track for >50% increase in imaging time
- >50% reduction in "Consultation and Training" charges

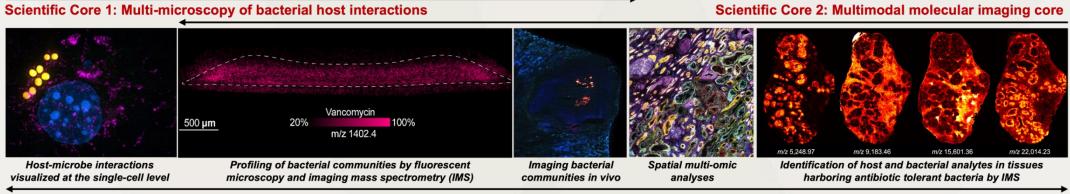


Program in Imaging of Infection and Immunity

Resubmission of a \$13.8 million P01 application

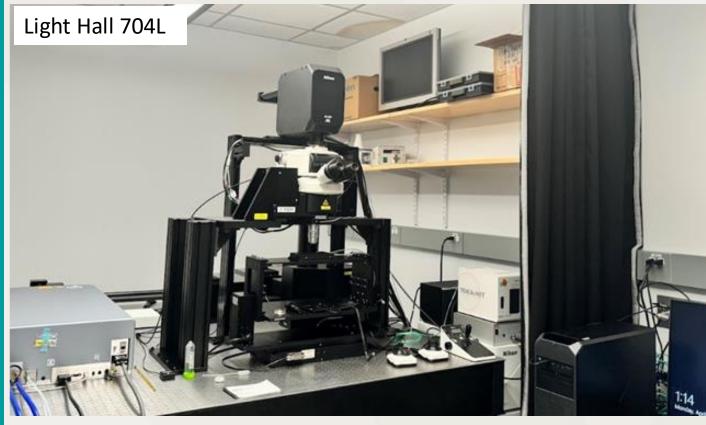
- Leverages Vanderbilt's strengths in imaging to study mechanisms of antibiotic treatment failure
- 6 sites, 3 Research Projects, 3 Scientific Cores and an Administrative Core





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

New capabilities for intravital microscopy



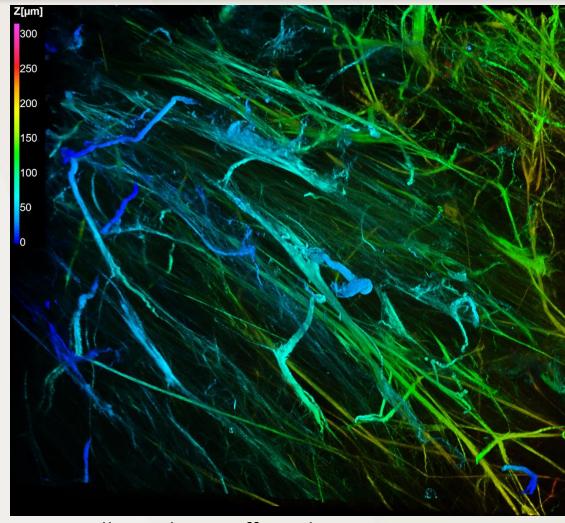
Nikon AX R MP Multiphoton Microscopy System

 Acquired via NIH High-End Instrumentation S10 program

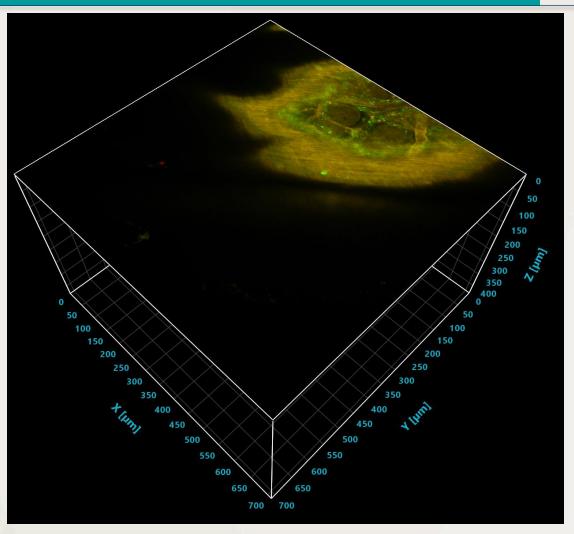
• Features:

- 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

Nikon MP Sample images



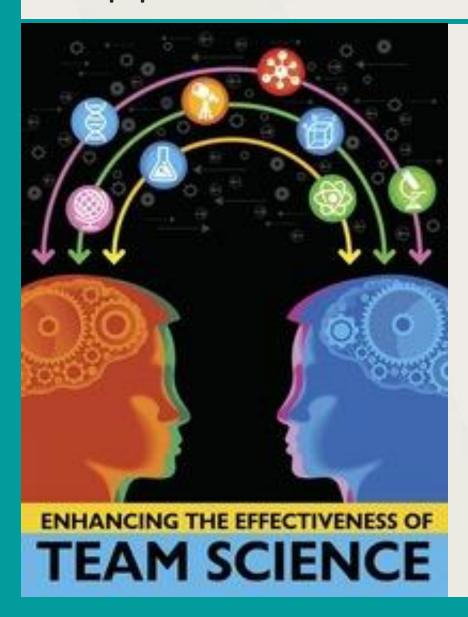
Maxwell Hamilton, Coffey Lab SHG imaging of colorectal cancer xenograft



Sarah Price, Skaar Lab Intestinal explant from mTmG mouse



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 AI (Awarded)

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

Imaging P01 (Reviewed/Scored)

- TITLE: Host and microbial determinants that drive antibiotic failure)
- PI: 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



New this year! Graduate Student attendance competition





MHI/MPI Graduate Student Seminar Attendance Challenge

Why Attend the VI4 & PMI Tuesday Seminars?

Learn & be inspired by research in pathology, microbiology, and immunology
Network at lunch with top researchers from around the country
Compete & win –3 graduate students with the best Fall 2025 attendance earn a
free dinner with a VU/VUMC faculty member of their choice







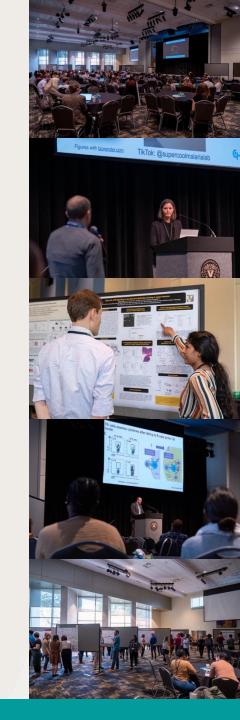


Annual Research Symposium

Save the date: April 30th, 2026 at the Student Life Center

- Citation Awards
- Poster Sessions
- Trainee Presentations





Graduate & Postdoctoral Programs

Administration of the Immunology and Microbiology Curricula

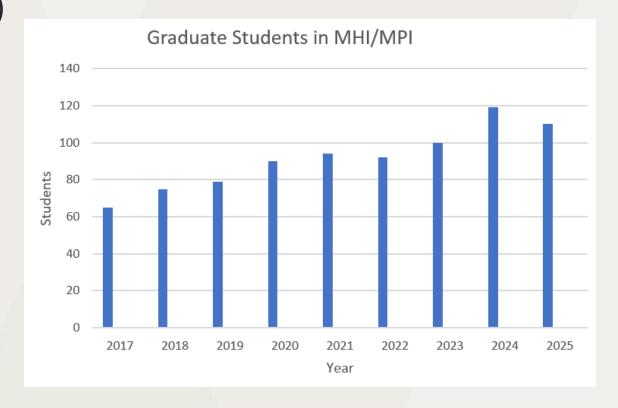
- Molecular Pathology and Immunology (MPI)
- Microbe-Host Interactions (MHI)





Luc Van Kaer

Kristin Patrick

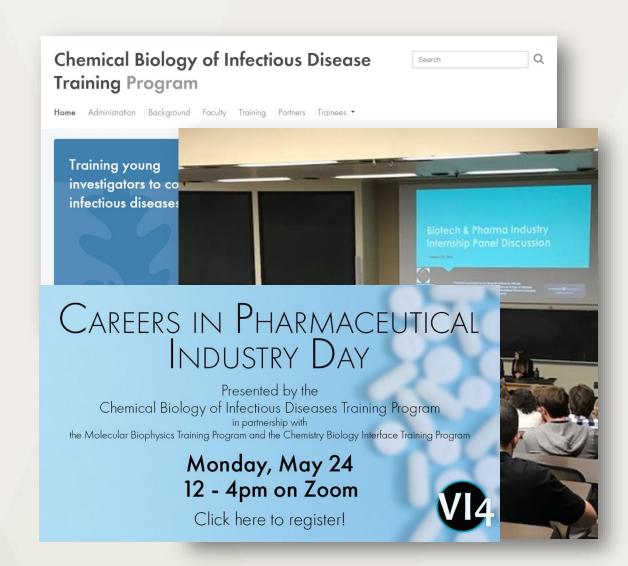




CBID T32 Training Program

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

CBID was officially renewed!!





Global Scholar Program

- Partnership with VIGH
 - Support PhD externship with global partner
 - Brynn Roman
 The Aurum Institute Thembisa | Gauteng, South Africa
- Applications are considered on a rolling basis
 - Email megan.schladt@vumc.org for more info



Junior Faculty Programs



Junior Faculty Leadership



Ruben Martinez Barricarte, PhD



Megan Behringer, PhD



Will Wan, 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.

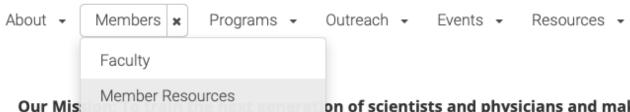


Lab Start Up and Resources

- 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
 - Alternative Funding Opportunities
 - Recruitment Assistance
- 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,

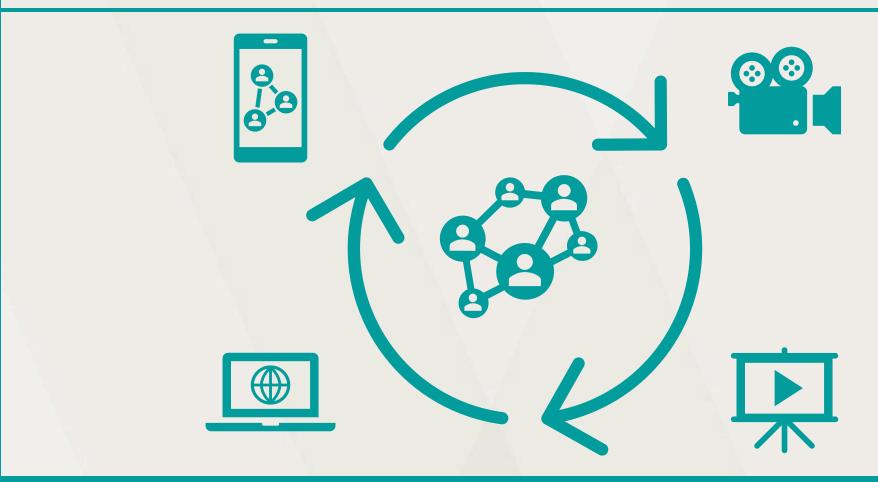
Marketing & Engagement



Marketing & Engagement

STRATEGY

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

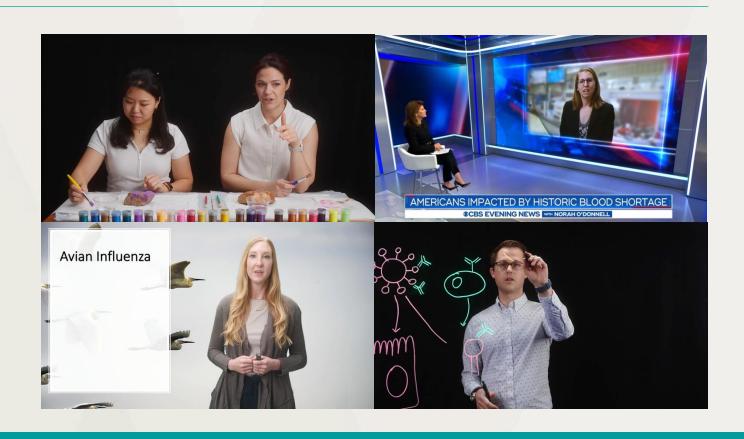


The Studio

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

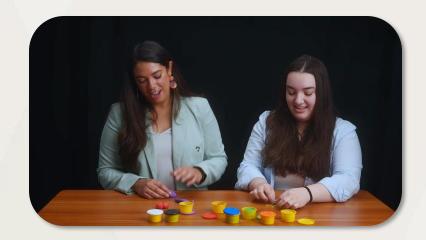


Marketing & Engagement

Faculty & Trainee
Spotlights



VI4 Scientists Doing Things



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

We can help you advertise your open positions

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 Center

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



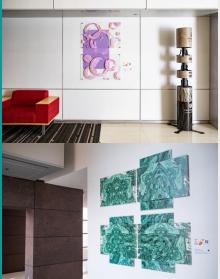
Opportunity:

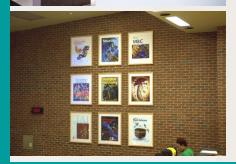
-YOUR JOB HERE -

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

VI4 Artist in Residence Program







- 5 of 6 years supported by external funding
 - BWF renewal for 2025 (\$75,000)
- 2024 Annual report available online

Over last five years...

- Over 100 student artists
- Over 40 labs
- Over <u>30 covers accepted</u> (more coming!), graphics in <u>15 publications</u>, and hundreds of animations, and other media for science conference, websites, and social media

Summer 2025 Program

- 17 students worked with *Cell Trends*
 - Integrating generative AI and data science tools

















Neuro















Community Outreach

MEGAMicrobe – September 27, 2025 Jones Paideia Elementary School, 9:30am-2pm



www.vumc.org/viiii/MEGAmicrobe











Science Communication Internship





Georgia CasoPhD candidate in
Dr. Timothy Cover's Lab



Jia MeiPhD candidate in
Dr. Jim Cassat's lab



KeAndreya
Morrison, PhD
Recent PhD Graduate at
Meharry Medical College and
worked in Dr. Tina Iverson's lab



Cherie Saffold

PhD candidate in

Dr. Heather Pua's Lab

 Social Media, Writing, Graphic Design, Photography and Video Production



THE DEPARTMENT OF PATHOLOGY,
MICROBIOLOGY AND IMMUNOLOGY



vumc.org/viiii/scicomminternship

Things to look for in 2025



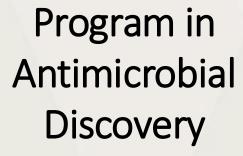
Program in Antimicrobial Discovery

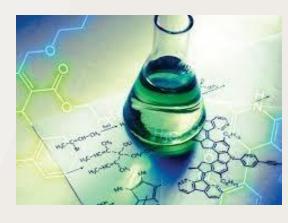


CBID



Immunotherapeutics





VI4-Warren Center



Microbial Therapeutics

Graduate Student Exchange Program

- "Mini-sabbatical" style program
 - 4 week internship
 - Piloted program in 2024 with UCSD
 - Will expand to 7 US institutions starting next year
- First cohort summer 2026
 - Applications to open spring 2026
 - Email megan.schladt@vumc.org for more info



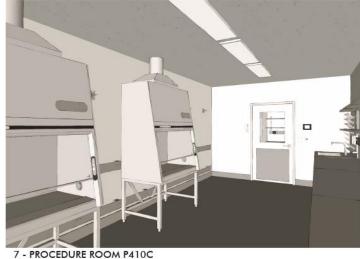




VI4 MICRO Opening









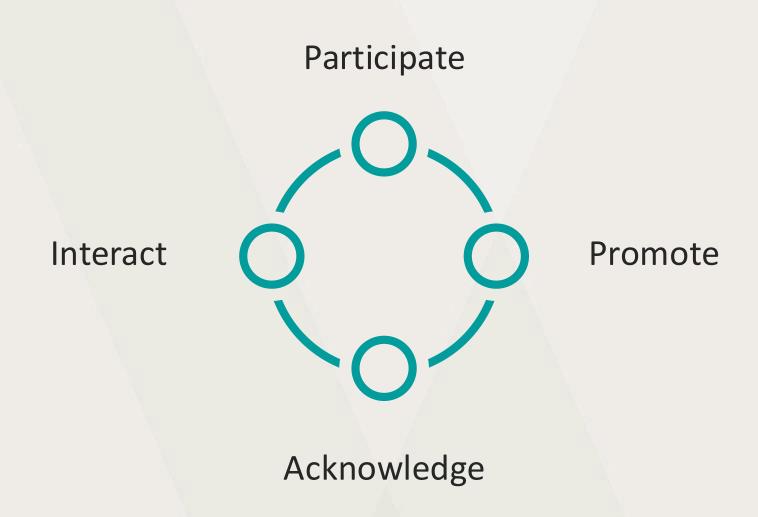
6 - PROCEDURE ROOM P410C



8 - PROCEDURE ROOM P410B

Expected Completion May 2026

How You Can Help



Vanderbilt Institute for Infection, Immunology and Inflammation (VI4)



