



## October 2021

Hello! We hope you have all been staying safe and healthy during this uncertain time.

Below you'll find the latest ideas, action items, and news on the progress of the Human Immunology and Immunotherapy Initiative (HI<sup>3</sup>).

### HI3 NEW Leadership and Board of Directors

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The HI3 has undergone a leadership transition, starting July 1, 2021. **John Cambier**, the founding Director of the HI3 has retired and assumed an Emeritus Professor role at the university. He continues to play an active role in guiding the activities and priorities of the HI3. **Leslie Berg**, the Chair of the Immunology and Microbiology Department has taken over as the new HI3 Director. To assist with future HI3 initiatives, a Board of Directors has been established. **Aimee Bernard** (Assistant Professor, Immunology & Microbiology) and **Terry Fry** (Professor, Pediatric Hematology/Oncology) continue to provide leadership for this Board. Aiding their efforts, the following individuals have agreed to participate on the HI3 Board of Directors:

- **Kathleen Barnes**, Professor of Medicine, Division of Biomedical Informatics & Personalized Medicine
- **Andrew Fontenot**, Professor of Medicine, Chief of the Division of Allergy, Asthma & Clinical Immunology
- **Robert Fuhlbrigge**, Professor of Pediatrics, Head of the Section of Rheumatology
- **Peter Gottlieb**, Professor of Pediatrics, Barbara Davis Center
- **Michael Holers**, Professor of Medicine, Chief of the Division of Rheumatology
- **Matthew Seefeldt**, Executive Director, Gates Biomanufacturing Facility
- **Michael Verneris**, Professor Pediatrics, Division of Hematology/Oncology, Director of Bone Marrow Transplantation and Cellular Therapy
- **Wells Messersmith**, Professor of Medicine, Chief of the Division of Medical Oncology

### HI3 Human Immune Monitoring Shared Resource (HIMSR)

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Mission: To facilitate and support human immunology research and discovery

#### Busy year despite clinical trial closures!

HIMSR continues to process samples and assays for the COVID Biobanking Protocol. We collaborated with Dr. Joaquin Espinosa's research group in the generation of data for the [COVIDome Project](#). Multi-omics data from over 100 patient samples are publicly available on the COVIDome Explorer—check it out and see if your molecules of interest are changed during COVID-19 infection!

With clinical trials all starting back up, we are busier than ever processing clinical samples. Most studies are conducted in collaboration with the Pathology Shared Resource (PSR), who de-identify samples and record the collection in the patients' charts, then transfer them to HIMSR for processing and short-term storage. With the support of the HI3 and the Department of Immunology and Microbiology, we have started a Spleen Repository, a Rare Immunologic Disease Repository, and plan to expand to a repository for Severe Adverse Events related to Immunotherapeutics, giving basic and translational researchers access to these types of human samples! Thankfully we have a new lab member, Rachel Greer, helping us process all these samples!

#### Multiplex Imaging Updates

We have upgraded our beta MIBI instrument to the new commercial MIBIScope! We have successfully stained several tissue types with a [32-marker backbone](#) panel. This panel can be customized with up to 7 additional markers using Ionpath's metal ion antibody conjugation kits. We are very pleased to announce the formation of a MIBI Antibody Bank, with the support of HI3, the Gate's Center (Dr. Dennis Roop), and the Diabetes Research Center to develop antibodies of specific interest to these groups. Be on the lookout for a survey to HI3 members so that you can have a say in which antibodies are developed for the MIBI! We have also completed our MIBI

image analysis pipeline, developed by Dr. Chris Rickert and Dr. Mansooreh Ahmadian. These publicly available scripts will generate single cell expression and phenotyping data from MIBI images.

We are pleased to announce our partnership with the Genomics Shared Resource in providing the slide preparation for their new Nanostring GeoMX Digital Spatial Profiler! This instrument allows for staining of up to 3 protein markers for spatial context (to aid in region selection), and region or cell-specific whole transcriptome analysis in FFPE tissue. Please contact [katrina.diener@cuanschutz.edu](mailto:katrina.diener@cuanschutz.edu) for more information.

Our Vectra Polaris continues to be a powerhouse of data generation! While we also continue to operate our original Vectra 3.0, we have now developed over 140 7-color and 9-color panels for human and mouse tissue on the Polaris and have over 200 human antibodies and over 80 mouse antibodies available for customized panel design! We have been honored as an Akoya Center of Excellence and are taking on custom panel design projects for some of their customers. We have also partnered with Akoya's Diversity Action Network (DANG) to award two underrepresented graduate students and post-docs with funds for a customized multiplex IHC project. This is a yearly award just for our campus, so be on the look out for the RFA next spring 😊

### The Multiplex Imaging Seminar Series - on the first Thursday of every month

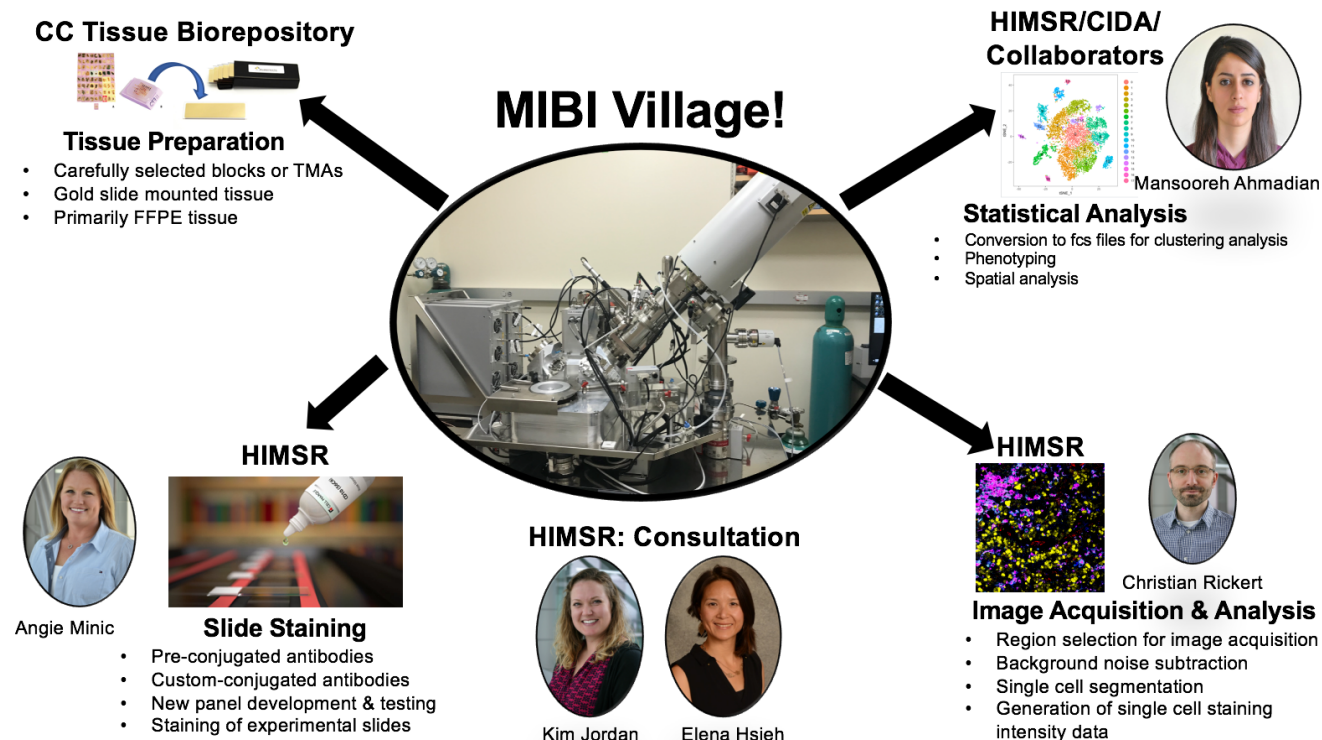
This seminar series will begin again in person starting Thursday October 7<sup>th</sup> at 2pm. Akoya will be presenting CODEX and new analysis options for this platform: As a member of Akoya's STEP program, we are offering slide preparation and project coordination for investigators interested in CODEX assays performed at Akoya. We also have some exciting talks planned for the rest of the year! If you are interested in being added to the seminar announcement list, or would like to present your data, please contact [Kimberly.Jordan@cuanschutz.edu](mailto:Kimberly.Jordan@cuanschutz.edu).

Questions about [HIMSR services](#) or the inclusion of HIMSR services in your next grant application? Contact [Kimberly.Jordan@cuanschutz.edu](mailto:Kimberly.Jordan@cuanschutz.edu)

### Using the MIBI - It takes a village!

Check out the MIBI Village infographic to learn more about all of the people here on the CU AMC dedicated to helping you with the MIBI.

**Questions?** Contact [Kimberly.Jordan@cuanschutz.edu](mailto:Kimberly.Jordan@cuanschutz.edu) or [Elena.Hsieh@cuanschutz.edu](mailto:Elena.Hsieh@cuanschutz.edu)



## HI3 Pre-clinical Human Immune System Mice (PHISM) Shared Resource

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Mission: To provide a nexus for multiple aspects of translational immunology research

### PHISM offers Human Immune System “humanized” mice as a pre-clinical model

- **Hu-CB-BRGS mice** - Injection of human hematopoietic stem cells isolated from umbilical Cord Blood into immunodeficient BRGS (Balb/c, Rag2<sup>-/-</sup> IL2R C<sup>-/-</sup> SIRP<sup>NOD</sup>) newborns. Human B, T and myeloid cells develop and are tolerant of host.
- **Hu-PBL-BRGS mice** - Injection of human peripheral blood cells into adult BRGS mice. Reconstitution is activated T cells that induce GVHD over 4-6 weeks.
- Immune analysis is performed by flow cytometry, ELISA or custom assays. Human tumors, such as cells lines or PDXs, can grow in these immunodeficient mice. Custom recipients are available upon request, such as NSGS or NBSGW mice that are capable of developing a more robust myeloid lineage or NSG-IL15 mice that develop functional, mature NK cells.

With these HIS models, investigators have studied combination immunotherapy treatments to a variety of human tumors, immune responses to human pathogens, and the development of the human immune system.

### Additional studies possible with HIS-mice

- CAR-T cell studies by developing CAR-T cells from the HIS mice that are thus immunologically tolerant (10)
- Immunotherapy-induced cytokine release syndrome (CRS) assays: This short-term assay uses a PBMC-HIS mouse (injection of adult PBMCs into immunodeficient mouse) with treatments performed ~6 days post injection. Serum samples collected 6 hours later are analyzed for inflammatory cytokines (11)\*.
- Genetic manipulation of genes in human hematopoietic stem cells and analysis in an in vivo setting following “humanization” of mouse with altered CD34+ stem cells (12)\*. \*PHISM has performed preliminary studies.

### Other PHISM news

- PHISM welcomes Pragya Nepal, a PRA, who came to us in December 2020, from Kathmandu, Nepal via way of North Carolina. Pragya has a Masters in biotechnology. She uses her expertise in mouse studies performed during her master’s program to manage our humanized mouse colony and perform tumor growth studies. We also welcome Jordi Lanis, a Micro/Immuno PhD Research Associate who hails from the University of Oklahoma, and most recently finished a 6-year postdoc studying mucosal immunology in Sean Colgan’s lab here on campus.
- PHISM has been awarded a 3-year contract (PIs-Lang/Pelanda, 10/20-9/23) from the NIH/NIAID as part of an effort to perform studies to improve the Human Immune System mouse model.
- PHISM is now a developing core of the University of Colorado Cancer Center. The subsidies offered by the Cancer Center will help lower the cost of our HIS-mice to University of Colorado investigators.
- The PHISM website was recently updated with most up-to-date services and pricing:  
<https://medschool.cuanschutz.edu/immunology-immunotherapy/phism/phism-meet-the-team>

To learn more about human immune system (HIS) mouse models and the services offered through PHISM contact: [Julie.Lang@cuanschutz.edu](mailto:Julie.Lang@cuanschutz.edu) or [Roberta.Pelanda@cuanschutz.edu](mailto:Roberta.Pelanda@cuanschutz.edu)

## HI3 Translational Immunology Seminar Series VIRTUAL for AY2021/2022

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Mission: To extend our understanding of translational immunology and assist in clinical problem solving

- The HI3 Translational Immunology seminar series is designed to connect investigators across campus and beyond who perform research within immunology and/or treat patients with immune-mediated disorders to learn from one another and extend our understanding of human translational immunology
- **GOT IDEAS FOR SPEAKERS?** Send us an email ([Aimee.Bernard@cuanschutz.edu](mailto:Aimee.Bernard@cuanschutz.edu)) with your speaker ideas (internal and/or external) and we can take it from there. *The virtual platform allows us to invite people from all over the world!* Check out our global guest speaker list on the next page.
- If you missed a seminar, you can access and watch most of them on the **Office 365 HI3 channel** using the instructions below.

## INSTRUCTIONS to ACCESS HI3 CHANNEL SEMINAR VIDEOS

- In Office 365 in the upper left corner, click on the Applications icon
- Click on the Video icon
- Click on Channels
- Select the HI3 folder
- Select the video of interest



Channels



## CONGRATULATIONS

### to the new 'Center for Mucosal Immunobiology and Rheumatic Disease Pathogenesis'

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V. Michael Holers, MD, chief of the Division of Rheumatology in the Department of Medicine, and colleagues have been awarded a \$3.7 million, five-year [grant](#) from the National Institute of Arthritis and Musculoskeletal and Skin Diseases to establish a Center for Mucosal Immunobiology and Rheumatic Disease Pathogenesis on our campus. The P30 grant will allow boost efforts to understand the molecular origins and mechanisms that cause rheumatic and autoimmune diseases. Mike will be the director of center and Kristi Kuhn, MD, PhD, associate professor of medicine, will be associate director.

## UPCOMING EVENTS and ACTION ITEMS

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### OCTOBER

- **October 7.** HIMSR Multiplex Imaging seminar series meeting at 2:00-3:00pm. Location TBD  
Akoya will be presenting CODEX and new analysis options for this platform.

### NOVEMBER

- **November 4.** HIMSR Multiplex Imaging seminar series meeting at 2:00-3:00pm. Location TBD
- **November 17.** HI3 Translational Human Immunology Seminar  
Guest speaker [Marcel van den Brink, MD, PhD](#) 4:00-5:00pm on Zoom  
<https://www.mskcc.org/research/ski/labs/marcel-van-den-brink>

### DECEMBER

- **December 2.** HIMSR Multiplex Imaging seminar series meeting at 2:00-3:00pm. Location TBD
- **December 15.** HI3 Translational Human Immunology Seminar  
Guest speaker [Sarah Henrickson, MD](#) 4:00-5:00pm on Zoom  
<https://henricksonlab.org/>

### JANUARY

- **January 6.** HIMSR Multiplex Imaging seminar series meeting at 2:00-3:00pm. Location TBD
- **January 19.** HI3 Translational Human Immunology Seminar  
Guest speaker NEEDED 4:00-5:00pm on Zoom

### FEBRUARY

- **February 3.** HIMSR Multiplex Imaging seminar series meeting at 2:00-3:00pm. Location TBD
- **February 16.** HI3 Translational Human Immunology Seminar  
Guest speaker [Ignacio Sanz, MD](#) 4:00-5:00pm on Zoom  
<http://www.emorydailypulse.com/2017/01/13/emorys-lowance-center-human-immunology/>

### MARCH

- **March 3.** HIMSR Multiplex Imaging seminar series meeting at 2:00-3:00pm. Location TBD
- **March 16.** HI3 Translational Human Immunology Seminar  
Guest speaker [Stu Tangye, PhD](#) 4:00-5:00pm on Zoom  
<https://www.garvan.org.au/research/immunology/immunology-and-immunodeficiency>

## **APRIL**

- **April 7.** HIMSR Multiplex Imaging seminar series meeting at 2:00-3:00pm. Location TBD
- **April 20.** HI3 Translational Human Immunology Seminar  
Guest speaker NEEDED 4:00-5:00pm on Zoom

## **MAY**

- **May 5.** HIMSR Multiplex Imaging seminar series meeting at 2:00-3:00pm. Location TBD
- **May 9-11.** HI3 2.5-day 'FUN-SIZE' Immunology Workshop – registration capped at 20  
<https://docs.google.com/forms/d/e/1FAIpQLScwlmoLMt64vUk2IKdiwn7boj6pbF42cWdgmNoy7mQuQp-rCg/viewform>
- **May 18.** HI3 Translational Human Immunology Seminar  
Guest speaker NEEDED 4:00-5:00pm on Zoom