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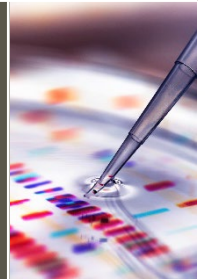
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Nov. 2023



Oklahoma Center for Respiratory and Infectious Diseases

# OCRID News



## Director's Message:

The highlight of this OCRID Newsletters is undoubtedly the triumphant achievement of securing the Phase III CoBRE grant from NIH. This substantial grant, totaling over 5.5 million dollars, ensures the continuation of our CoBRE program for the next five years.

In an impressive kick-off, we have awarded 5 pilot project grants to faculty members from 4 distinct colleges. A notable update is the rebranding of the OCRID seminar series, now enriched with presentations from both distinguished invited speakers and our esteemed center investigators. Additionally, all OCRID cores have successfully implemented fee schedules.

As we joyfully commemorate the 10-year milestone of OCRID, we are actively engaged in initiatives aimed at ensuring the sustained success of our center beyond the CoBRE program. Noteworthy among these efforts is the launch of a fundraising campaign via PhilanthroPete and the development of institutional training grants and program project grants.

I eagerly anticipate working with each of you to propel OCRID into its next phase, envisioning a sustainable research center specializing in respiratory and infectious diseases.

Lin Liu, Ph.D., FAPS  
OCRID Director

## OCRID Award Phase III! NIH Awards \$5.5 Million in CoBRE Funding

We are so pleased to announce that the Oklahoma Center for Respiratory and Infectious Diseases (OCRID) has received the Notice of Award for our Phase III CoBRE application. With this award OCRID completes a “firsts” hat-trick at Oklahoma State University (OSU). OCRID was the first CoBRE grant awarded to OSU, the first CoBRE grant moved to Phase II, and finally the first CoBRE grant moved to Phase III. We are excited to continue and expand on all the great opportunities that 10 years of OCRID has brought to Oklahoma.

This new NIH grant provides us another 5 years of funding totaling more than \$5.5 million. With this funding, we will be continuing our Pilot Project Grant Program, which provides seed grant funding to generate preliminary data for an extramural research grant application. Just recently, five pilot projects were awarded for 2023, see page below. Congratulations to the awardees! Additionally, we will continue to provide our scientific Core

Services. New services, new technologies, and new equipment have been or will be added to OCRID cores. Check back on the OCRID webpages for more details on Core capabilities. We will also be continuing our OCRID

**“We look forward to continuing to work with everyone in the next 5 years and to further advance OCRID into “Phase IV”, a sustainable research center of respiratory and infectious diseases.”**

Activity Series. This series hosts activities every week that include: our seminar series, work-in-progress meetings, journal club meetings, and annual research symposium.

This Phase III grant sees the addition of some exciting new faces and roles within our center. Dr. Tom Oomens will be taking on the new role of OCRID Associate

Director. Dr. Rudra Channappanavar will be taking on two new roles within the center. He will be taking on the position of Co-Director for the Animal Models Core (AMC) where he will be responsible for the BSL3 animal models. Dr. Channappanavar will assume the role of Director of the Immunopathology Core (IPC). In administering the IPC, he will be joined by Dr. Alexandra Ford, a board-certified

# OCRID Phase III Cont.:

anatomic pathologist who will serve as Co-Director and will handle the pathology component of the IPC. Besides these new appointments, Dr. Jordan Metcalf will continue to serve as OCRID Co-Director, Dr. Myron Hinsdale will continue to serve as Director of the AMC and Dr. Lin Liu will continue at the helm of OCRID and the Molecular Biology Core. Erin Langford-Loftis will continue managing the OCRID office.

Various external and internal advisory committees will provide advice on the center's administration and development. Our committed External Advisory Committee (Dr. Adolfo Garcia-Sastre, Dr. Kevin Harrod, Dr. Jay Kolls and Dr. Ralph Tripp) will continue providing valuable input and advice. Our Scientific Advisory Committee members (Dr. Clinton Jones, Dr. Susan Kovats, Dr. Lin Liu, Dr. Jordan Metcalf and Dr. Tom Oomens) will provide mentoring to pilot project leaders. Our Steering Committee will provide guides to the Center's operation. This committee is composed of core directors, a representative from pilot project leaders and institutional officials: Dr. Vibudutta Awasthi (OUHSC), Dr. Jerry Malayer (OSU) and Dr. Ron Van Den Bussche (OSU).

Thank you to everyone within our center and leadership at participating institutions including OSU, University of Oklahoma and Oklahoma Medical Research Foundation that helped to make this application and our center a success! We look forward to continuing to work with everyone in the next 5 years and to further advance OCRID into "Phase IV", a sustainable research center of respiratory and infectious diseases.



(Photo from left to right: Dr. Kevin Harrod, EAC Member, Dr. Adolfo Garcia-Sastre EAC Member, Dr. Tom Oomens OCRID Associate Director, Dr. Jay Kolls EAC Chair, Dr. Jordan Metcalf OCRID Co-Director, Dr. Lin Liu OCRID Director)

## OCRID Pilot Project Leader Awarded USDA-NIFA Grant

Congratulations to Dr. Xufang Deng! Dr. Deng is an Assistant Professor in the Department of Physiological Sciences, CVM-OSU and has been awarded a USDA-NIFA competitive grant for \$650,000 for 4 years. The grant is titled, Defining Antagonism Hierarchy of Porcine Epidemic Diarrhea Virus for Live Vaccines Design. Dr. Deng aims to define the antagonism hierarchy of porcine coronaviruses for novel vaccine design.



## 2023 Pilot Projects Awarded:

Congratulations to our Pilot Project Award winners for 2023! After an intensive selection process, 5 pilots projects were funded this year!

- *Glycosylation and Structural Studies of SARS-CoV-2 Entry Membrane Protein TMPRSS2* – **Gabriel Cook, Ph.D.**, The Department of Chemistry, College of Arts and Sciences, Oklahoma State University
- *Interferon-Mediated Impairment in Macrophage Antibacterial Activity during SARS-CoV-2 and Klebsiella pneumoniae Co-Infection* – **Sunil More, Ph.D**, The Department of Veterinary Pathobiology, College of Veterinary Medicine, Oklahoma State University
- *siRNA-mediated gene silencing to identify functional NETosis pathways in a feline model for COVID-19* – **Jennifer Rudd, DVM, Ph.D**, The Department of Veterinary Pathobiology, The College Veterinary Medicine, Oklahoma State University
- *DRS to Identify Epitranscriptomic Changes in Response to Influenza and Smoking* – **Susan Schroeder, Ph.D**, The Department of Chemistry and Biochemistry, Microbiology and Plant Biology, Dodge Family College of Arts and Sciences, The University of Oklahoma
- *Identification of Antimicrobial Peptides against S. aureus produced by D. pigrum in the Nose*– **Reed Stubbendieck, Ph.D.**, The Department of Microbiology & Molecular Genetics, College of Arts and Sciences, Oklahoma State University



## **OCRID Project Leader Awarded Cystic Fibrosis Foundation Grant:**

OCRID Project Leader, Dr. Marianna Patrauchan, has been awarded \$125,000 from the Cystic Fibrosis Foundation for her proposal entitled, "A novel dual calcium and redox sensor controls virulence of *Pseudomonas aeruginosa*." *Pseudomonas aeruginosa* causes life threatening infections in patients with cystic fibrosis. Dr. Patrauchan has been working with calcium signaling within the center and showed that Ca<sup>2+</sup> positively regulates several virulence factors in *Pseudomonas aeruginosa*. She also identified a Ca<sup>2+</sup> -binding protein, EfhP, mutations in which cause multiple Ca<sup>2+</sup> -dependent defect in *Pseudomonas aeruginosa* virulence. Dr. Patrauchan hopes to prove that EfhP serves as a Ca<sup>2+</sup> sensor that binds the ion and transduces this signal towards regulation of *Pseudomonas aeruginosa* virulence and resistance in the host. Dr. Patrauchan will use this award to strengthen her preliminary data as she endeavors to secure R01 funding from the NIH.

## **Congratulations to Dr. Yu Feng and his team who have been awarded a National Science Foundation Grant!**

Dr. Yu Feng and co-PI Dr. Chenang Liu (College of Engineering, Architecture and Technology) were awarded \$550,000 from the National Science Foundation (NSF) for their proposal titled "PFI-RP: Improving Inhaler Design and Efficacy with a Novel AI-assisted Digital Human Testing Platform".

Their project aims to develop a user-friendly and reliable virtual human testing platform. This platform holds the potential to precisely quantify inhaler performance in a manner that is both disease-specific and patient-specific. By accelerating inhaler innovation, the research holds far-reaching implications for refining drug delivery efficiency to targeted lung sites, thereby benefiting individuals afflicted with chronic lung diseases, including chronic obstructive pulmonary disease (COPD). The proposed all-in-one virtual human testing platform holds immense value for pharmaceutical and medical device design companies. By providing a reliable and comprehensive testing environment, the platform may fast-track inhaler technology development, leading to improved therapeutic outcomes and reduced side effects for patients."

Employing an AI-assisted approach, the project constructs representative whole-lung models for COPD, an innovation that helps pharmaceutical companies to gain insights into precise dosing within specific lung environments. The research introduces a non-invasive and cost-effective alternative for comparative bioequivalence studies related to inhaler engineering and design. This approach, in turn, benefits diverse population groups encompassing various lung diseases.

The collaborative efforts of Dr. Feng and Dr. Liu hold the promise of transforming inhaler technology, reshaping drug delivery practices, and ultimately enhancing the quality of life for patients grappling with respiratory conditions.



## **Dr. Jennifer A. Philips, MD, PhD Joins OCRID External Advisory Committee:**

OCRID welcomes Dr. Jennifer Philips to our External Advisory Committee (EAC)! Dr. Philips has graciously agreed to serve on our EAC after the departure of Dr. Bruce Stanton. We are very grateful to Dr. Stanton for his years of service and wish him all the best!

Dr. Philips is the Theodore and Bertha Bryan Professor in the Departments of Medicine and Molecular Microbiology at the Washington University School of Medicine. She is also the Co-director of the Infectious Diseases Division, and principal investigator of an NIH-funded lab that studies *Mycobacterium tuberculosis* (Mtb), the cause of TB, one of the world's most deadly infections. Dr. Philips presented an OCRID seminar in the Spring of 2022 on her work.

The long-term goal of the Philips laboratory is to help change the face of the TB epidemic. Mtb has infected humans for thousands of years and is second only to SARS-CoV-2 as an infectious disease killer. Mtb grows in macrophages and impairs the innate and adaptive immune response. As such, Mtb is a master at undermining host immunity. Dr. Philips investigates how Mtb evades the host immune response and works on strategies and drugs to overcome immune evasion. The Philips lab has made seminal discoveries and has shown for example that Mtb blocks lysosomal trafficking, alters host metabolism, and impairs antigen presentation. Her lab has also identified clinically available drugs that restore the ability of the host to clear Mtb, thereby overcoming key immune evasion strategies of Mtb. These findings may lead to novel host-directed therapies for TB. In her most recent work, she showed that the abundance of an Mtb-host co-metabolite in sputum and plasma distinguishes Mtb-infected patients from uninfected controls. This may enable development of biomarkers to help individualize TB treatment. In short, her group pursues fundamental discoveries in Mtb pathogenesis, hoping to enable better therapies, novel biomarkers, and effective vaccines for one of humankind's greatest afflictions.

# Core News:

## Molecular Biology Core:

Molecular Biology Core (MBC) continues to provide service and support to standard molecular biology techniques including gene silencing/knockout and overexpression, real-time PCR and bulk RNA sequencing. We highlight three of the State-of-Art technologies recently developed in the MBC.

**Droplet digital PCR:** The MBC houses a BioRad QX200 AutoDG Droplet Digital PCR system. Compared to real-time PCR, this system provides the most precise and sensitive absolute quantification of target DNA or RNA molecules.



**Human lung tissue models:** Current *in vitro* cell culture systems and animal models do not faithfully replicate the pathology of human diseases. The MBC has developed iPSC-derived human alveolar organoids for respiratory pathogen infections and is offering the unique resource to Center investigators. They recapitulate the *in vivo* alveolar epithelium and are more physiologically relevant than other systems for studying human biology. These organoids express alveolar epithelial type II cell markers, have high expression of human angiotensin-converting enzyme 2 (ACE2) and transmembrane serine protease 2 (TMPRSS2) and are susceptible to SARS-CoV-2 and influenza virus infections. The MBC is currently developing iPSC-derived human alveolar organoids with mesenchymal and immune components.

**Single cell RNA sequencing:** scRNA-seq has become a popular tool in biomedical research, including the investigation of respiratory infectious diseases. Researchers can use single-cell data to characterize and identify heterogeneous cell populations, reveal novel cell types, characterize rare cell types, identify new cell markers and regulatory pathways and profile healthy and diseased tissue and organs. In the past year, MBC has established scRNA-seq data analysis pipeline by reanalyzing publicly available scRNA-seq datasets and will generate our own scRNA-seq datasets by November 2023. The MBC has Chromium iX from 10x Genomics in the Core and will be able to manage BSL2/3 samples for scRNA-seq.

### MBC Personnel:

Core Director: Dr. Liu Lin ([lin.liu@okstate.edu](mailto:lin.liu@okstate.edu))

Core Associate Director: Dr. Chaoqun Huang ([chaoqh@okstate.edu](mailto:chaoqh@okstate.edu))

Core Manager: Dr. Yurong Liang ([yurong.liang@okstate.edu](mailto:yurong.liang@okstate.edu))

## Core Facilities Survey:



OCRID core facilities are committed to providing top quality services and technical expertise in respiratory and infectious disease for center investigators as well as non-center investigators. We encourage you to fill out our quick 10 question survey so your answers, comments and suggestions can help us improve our services.

[CORE FACILITIES USER SATISFACTION SURVEY](#)

## Immunopathology Core:

The Immunopathology Core (IPC) provides immunology and pathology services for pilot projects, OCRID investigators, and external investigators. There have been some exciting changes in the past few months and we're delighted to share them with you!

In 2023, two new faculty were appointed to positions within the IPC. Dr. Rudra Channappanavar serves as the new IPC Director, and Dr. Alexandra Ford serves as the new IPC Co-director. Together, they are responsible for the immunology and pathology components of the IPC, respectively. To reflect these changes, a new and updated website was created ([https://ocrid.okstate.edu/immunopathology\\_core.html](https://ocrid.okstate.edu/immunopathology_core.html)) as well as a centralized email address to facilitate equipment reservations, general inquiries, etc. ([immunopathologycore@okstate.edu](mailto:immunopathologycore@okstate.edu))

Immunology support includes flow cytometry (including cell sorting), Bio-Plex/Multiplex cytokine assay, and ELISA. Other things the IPC may be able to assist with include sample collection and preparation, antibody choices and colors, compensation, protocols, gating and analysis, controls, assay development, experimental design, and training.

Pathology support includes necropsy, gross and histologic evaluation/interpretation of tissues, lesion scoring, tissue processing with paraffin embedding of tissue sections, routine (H&E) slide staining, special histochemical staining, photomicroscopy, digital slide scanning, and image analysis by a board-certified anatomic pathologist. Study design recommendations may be available upon request.

In the next few months, the IPC will be adding new equipment including an Agilent Biotek Cytation 5 Cell Imaging Multimode Reader, a Molecular Devices Spectramax Plus Microplate Reader, and a Leica CM1950 Cryostat. Much of this equipment will be free for use for a limited time! A free training seminar for investigators interested in learning how to use some of the equipment in the IPC will be announced soon, with an anticipated date in November or December! Please email us if you are interested in attending.

We are excited to work with you and support your research projects. Please don't hesitate to reach out to us, we are here to help!

### IPC Personnel :

IPC Director - Dr. Channappanavar: [rchanna@okstate.edu](mailto:rchanna@okstate.edu)

IPC Co-Director - Dr. Ford: [Alexafo@okstate.edu](mailto:Alexafo@okstate.edu)

IPC Lab Manager - Shannon: [Shannon.r.cowan@okstate.edu](mailto:Shannon.r.cowan@okstate.edu)

## Animal Models Core:

At the Animal Models Core (AMC), we excel in supporting a wide range of approaches using animal models to answer important research questions that require an in vivo component. Our research staff include Dr. Myron Hinsdale as co-director of biosafety level 2 studies and new this year Dr. Rudragouda Channappanavar as co-director in charge our new biosafety level 3 component. Ms. Emma Dillsaver is our AMC technician. Our services serve as key tools to mechanistically investigate respiratory disease. Here are some examples of the services and type of experiments we can help you with:

For those researchers unfamiliar with genetic animal models and who want to expand their in vitro research to exploring genetic mechanisms or transgenic models of respiratory disease, we can establish and manage mouse colonies of specific lines of mice or rats. We can also aid in training laboratory personnel to organize, operate, and maintain a colony with precision and reliability. This allows you to establish a research tool by which to delve into studies in more detail at the organ, physiologic, whole animal level.

We can also help with the choice of animal model for your studies. Whether you're investigating the efficacy of a new drug, a new pathogen, pulmonary dysfunction due to a combination of pathogens, or any other experimental manipulation design involving animal models, our experts can assist in crafting a robust and ethically sound research plan.

In regards to the task of grant applications, we help and guide your preparation of vertebrate animal-based research descriptions, experimental manipulation, timeline, vertebrate animal sections for your grants.

Furthermore, when it comes time to get your animal experiments started, our team can help you develop and refine your animal use protocols and navigate the complex regulatory landscape, ensuring your experiments adhere to ethical standards and obtain IACUC approval.

For those exploring regenerative medicine or cell-based therapies or primary cells, we offer expertise in isolation, for example, in isolating and characterizing adipose tissue and bone marrow Mesenchymal Stem Cells and using them in respiratory disease models. New this year we have added to the AMC a gentleMACS tissue dissociator with heaters from Miltenyi for the isolation of specific cell types from the lung or any other organ that can be used downstream for analyses or therapeutic applications.

If you're researching infectious respiratory diseases, our team can assist with the introduction of viral and bacterial agents, helping you create models for disease progression and treatment. We have luminescence pathogens (viral and bacterial, see below) that can be used for in vivo imaging. New this year, Dr. Rudragouda Channappanavar, an expert in coronavirus studies, has joined the AMC as co-director and will be providing research animal studies specifically focused on SARS-Cov-2.

In studies exploring respiratory function and mechanics, we provide in-depth analyses of respiratory physiology and pulmonary organ dysfunction to generate crucial data for your research. New next year, we will be acquiring a Buxco FinePointe whole body plethysmography instrument. Unique about the Buxco instrument is that it allows measurements of respiratory functions without the use of anesthesia or restraint.

In addition, physiologic changes such as blood oxygen levels and percentage oxygenation can be measured to assess disease progression or response to therapy. Whether you're researching neonatal development or adult physiology, our real-time continuous blood oxygenation analyses can provide continuous data for a variety of experimental designs.

Finally, for studies requiring detailed tracking and visualization of pathogens and cells within animal bodies, our in vivo luminescent imaging capabilities enhances research in diverse fields, from oncology to microbiology. Luminescent influenza, streptococcus, and cancer cells are just some examples of our imaging that can be used to study respiratory disease.

At the Animal Models Core, we're committed to helping you bring your research to life. These examples demonstrate how our services can play a pivotal role in advancing your scientific inquiries. We look forward to hearing from you regarding your ideas as to how we can help your research program move into, explore new frontiers, or incorporate respiratory disease into your laboratory. We encourage you to schedule a meeting to discuss opportunities for AMC support for your projects. You can reach us by e-mail using the link provided on the OCRID website.

**AMC Personnel:**

Core Director: Myron Hinsdale, Ph.D.

Core Co-Director: Rudra Channappanavar, Ph.D.

Technician: Emma Dillsaver



This year OCRID is participating in the PhilanthroPete Drive through the OSU Foundation. PhilanthroPete is a crowd source funding campaign hosted by the OSU Foundation.

We are hoping to raise \$10,000 to continue to offer our Seminar Series and annual OCRID Research Symposium free of charge! We need your help to reach the goal.

Below is a link to our fundraising website!

**DONATE HERE!!**

## Upcoming Conferences:

- [Gordon Research Conferences 2024](#)  
Biology of acute respiratory infection (Galveston, Texas) -  
February 25 – March 1, 2024
- [Keystone Symposia: Tuberculosis: The Host-Pathogen Interface](#) (Keystone, CO) –  
March 24-27, 2024
- [American Physiology Summit](#) (Long Beach, CA) –  
April 4-7, 2024
- [International Society for Influenza and other Respiratory Virus Diseases Symposia 2024](#) (Lexington, Kentucky) –  
April 8-10, 2024
- [American Association of Immunologists annual meeting](#)  
(Phoenix, AZ) –  
May 3-7, 2024
- [American Thoracic Society \(ATS\) International Conference](#)  
(San Diego, CA) –  
May 17-22, 2024
- [American Society for Microbiology Microbe 2024](#) (Georgia,  
Atlanta) –  
June 13-17, 2024
- 9th biennial National IDeA Symposium of Biomedical  
Research Excellence (DC) –  
June 16-20, 2024
- [American Society for Virology 2024](#) (Columbus, Ohio) –  
June 24-28, 2024
- The following websites let you select a variety of Infectious  
Disease Conferences in 2024 and 2025 per country or city.  
[www.clocate.com/](http://www.clocate.com/)  
<https://conferencenext.com/>

## Grant Opportunities:

### **NIH Notices of Special Interest**

[NOT-ES-20-018](#) - (expires 5/30/2024)  
Promoting Fundamental and Applied  
Research in Inflammation Resolution

[NOT-HL-22-004](#) - (expires 9/7/2025)  
Pediatric COVID-19 and Respiratory Viral  
Co-infection

[NOT-HL-22-030](#) - (expires 9/7/2025)  
Studies of Cellular/Molecular  
Pathobiological Mechanisms of Lung  
Diseases Using Human 3-Dimensional  
Cellular Systems (R01)

[NOT-AI-23-049](#) - (expires 7/16/2026)  
Using Targeted Degradation of Protein and  
non-Protein Targets for the Development of  
Novel Anti-Infectives

[NOT-AI-23-050](#) – (expires 7/17/2026)  
Advancing Biomedical Research in  
Pulmonary Non-Tuberculous Mycobacterial  
(NTM) Infections

[NOT-HL-23-099](#) – (expires 9/08/2026)  
Lymphatic System in Health and Disease  
(R01)

### **International Society for Infectious Disease**

[Grant opportunities for early career researchers](#) (within 8 years of PhD or MD)

### **Cystic Fibrosis Foundation**

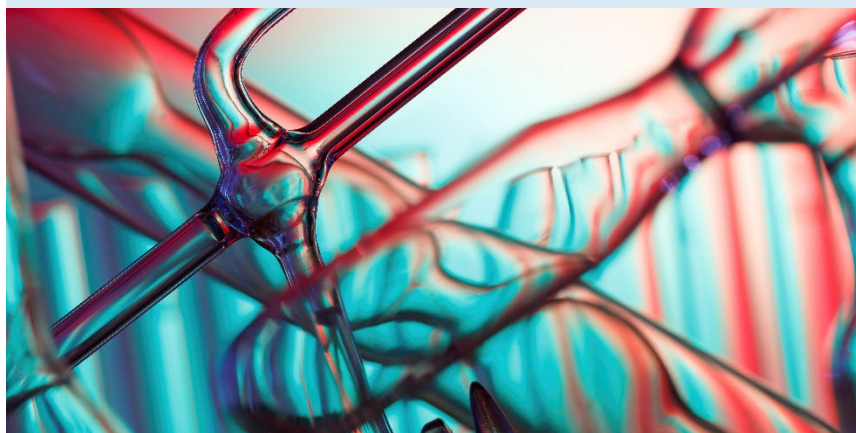
#### [Academic Funding Opportunities](#)

#### **NSF**

#### [Grant Research Opportunities](#)

### **Burroughs Wellcome Fund**

[Investigators in the pathogenesis of infectious disease PATH](#) (annual award for assistant professors only, by invitation; award closed for 2023).



# New Members:

OCRID continues to grow with new and dynamic investigators!



## Akash Deep Ph.D. –

Dr. Deep is an Assistant Professor in the School of Industrial Engineering and Management in the College of Architecture, Engineering, and Technology at Oklahoma State University. His lab

focuses industrial data science/AI with applications in smart systems and novel manufacturing processes (including bioprinting). Read more about Dr. Deep [here](#).

## Srikanthan Ramesh Ph.D. –

Dr. Ramesh is an Assistant Professor in the School of Industrial Engineering and Management in the College of Architecture, Engineering, and Technology at Oklahoma State University. Dr. Ramesh's lab focuses on advanced manufacturing, with a primary focus in streamlining 3D bioprinting with data-driven approaches. Read more about Dr. Ramesh [here](#).



## Ciarán Shaughnessy,

**PhD** – Dr. Shaughnessy is a new Assistant Professor in the Integrative Biology Department in the College of

Arts and Sciences at OSU. His work studies mechanisms of ion transport by the CFTR protein that causes cystic fibrosis, as well as its endocrine and pharmacological regulation. You can read more about Dr. Shaughnessy [here](#).

## Carolyn Ibberson, Ph.D. –

Dr. Ibberson is an Assistant Professor in the School of Biological Sciences in the Dodge Family College of Arts and Sciences at OU. Her research centers around understanding bacterial physiology and behavior in situ during chronic human infection, with a focus on elucidating the mechanistic links between co-infecting microbes and disease severity. You can read more about Dr. Ibberson [here](#).



**Dursun Delen, Ph.D.** – Dr. Dursun Delen is the holder of William S. Spears Endowed Chair in Business Administration, Patterson Family Endowed Chair in Business Analytics, Director of Research for the Center for Health Systems Innovation, and Regents Professor of Management Science and Information

Systems in the Spears School of Business at Oklahoma State University. Read more about Dr. Delen [here](#).

# OCRID Activities

We are looking forward to seeing everyone in person at our events.

Locations: McElroy Hall Rm 101 - Zoom Meeting ID: 984 1502 3546  
Zoom Passcode: 144376

Date:	Activity:
September 27	OCRID Fall 2023 Seminar Series: Dr. Catherine Bosio, PhD. – Chief, Innunity to Pulmonary Pathogens Section of the NIAID <i><u>Metabolic Meyhem: How the metabolic milieu of the lung shapes the outcome of infection</u></i>
October 25	OCRID Fall 2023 Seminar Series: Dr. Andrew Pekosz, PhD. – Professor and Vice and Chair of the W. Harry Feinstone Department of Molecular Microbiology and Immunology at Johns Hopkins University <i><u>Virus Surveillance and the Identification of the novel Genetic Mutations that Facilitate Virus Circulation</u></i>
November 8	OCRID Fall 2023 Seminar Series: Dr. Jenna Bartley, PhD. – Assistant Professor in the Department of Immunology at the UCONN Health School of Medicine <i><u>Aches, Age, and Influenza: A Pathway to Muscle Loss and Disability</u></i>
November 15	OCRID Seminar Series: Dr. Susan Kovats, Ph.D
November 29	OCRID Fall 2023 Seminar Series: Dr. Edward Janoff, M.D. – Professor of Medicine, Immunology and Microbiology at the University of Colorado Denver <i><u>Complementary Mechanisms of Mucosal Defense Against the Pneumococcus</u></i>
December 13	OCRID Fall 2023 Seminar Series: Dr. Lin Liu, Ph.D. – Regents Professor of Physiological Sciences, Oklahoma State University <i><u>Noncoding RNAs: Are they Therapeutic Targets for COVID-19?</u></i>

Contact us at **405-744-7481**

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