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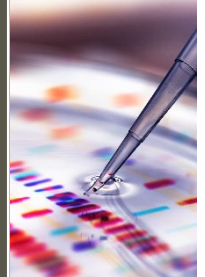
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October 2022



Oklahoma Center for Respiratory and Infectious Diseases

# OCRID News



## Director's Message:

*Believe it or not, OCRID is in the 10th year of CoBRE support from NIH. Phase III application to continue support of this program has been submitted and we will know the outcome soon. In the past 9 years, OCRID has supported 12 projects, 40 pilot projects, 3 core facilities, and 130 out-of-state seminar speakers; OCRID membership grew to 75 from the original 35, including 17 new tenure-track hires in respiratory and infectious diseases; OCRID investigators received a total award of \$146 million, with \$53 million, coming from CoBRE project leaders and pilot project leaders, including 43 NIH grants and 10 NSF and USDA grants; OCRID investigators published 1,200 papers, 400 of which were from CoBRE project leaders and pilot project leaders; and three research core facilities developed state-of-the-art technologies and provided services to 700 users. I am so proud of what OCRID investigators have achieved!*

*Lin Liu, Ph.D., FAPS  
OCRID Director*

## What OCRID Means to Me *OCRID Mentoring making a difference!*

From its inception in 2013, mentoring junior faculty has been a core pillar of OCRID. As we start our 10<sup>th</sup> year, we asked some of our project leaders on what OCRID has meant to them and how OCRID helped

both with their research and their professional development.

**Dr. Marianna Patrauchan, Ph.D.** Department of Microbiology and Molecular Genetics, Oklahoma State University – “Receiving the COBRE support and becoming a part of OCRID had a remarkable impact on the research progress in my group. The funding supported talented postdoctoral research and generated

exciting new data that helped publishing three papers, one of which was selected as an Editor Spotlight in the ASM journal of Applied and Environmental Microbiology. Based on the research advances, in collaboration with another OCRID members, we applied and were awarded two consecutive Academic Research Enhancement Awards R15 from the National Institute of Health. The COBRE funding allowed us to strengthen the preliminary data and in collaboration with one of the OCRID mentors, Michael Franklin, we have

applied for RO1, which is currently under review. Finally, being a part of the COBRE-supported OCRID community provided me and my group with many opportunities for networking with and learning from some of the

best scientists in the country, which has a tremendous long-term positive impact on our work and professional development.”

*“Being a part of the COBRE-supported OCRID community provided me and my group with many opportunities for networking with and learning from some of the best scientists in the country.”*

**Dr Yong Cheng, Ph.D.** – “I joined the Department of Biochemistry and Molecular Biology at Oklahoma State University in 2020. Luckily, our cystic fibrosis project was selected as one of COBRE

Phase II projects and Dr. Lin Liu became one of my mentors in OCRID. As a part of the OCRID mentoring program, I am scheduled to meet with my mentors frequently and discuss the project progress. Therefore, I got to know more about my mentor's work and resources available in OCRID. My mentors also strongly suggest and help me to use OCRID resources for new projects and potential grant applications. All these facilitate the development of the newly funded NIH R21 and

# 2022 OCRID Kick-Off Meeting:

*Phase III Application: OCRID submitted our Phase III application in May of this year. We are very positive about our prospects for getting funded. We had a strong application and first rate center to put up for review.*

## What to Look Forward to this Year:

This year we are returning to our pre-COVID schedule. All of our activities will be in person this year, including our Symposium in April. We invite you to attend as many activities as you can in person but we are keeping a Zoom option for now for those who need to quarantine or are outside of Stillwater.

## New Pilot Projects Announced:

OCRID has announced its 2022-2023 Pilot Projects. Each project was carefully selected after extensive review.

During the Kick-Off Meeting Pilot Project Leaders took this opportunity to discuss how they planned to incorporate their reviewers' comments into their research plans based on the recommendations of OCRID External Advisory Committee (EAC).

## Project Leader Presentations:

Project leaders gave updates on the status of their research projects and how they were planning on incorporating the comments they received from the EAC during the last OCRID Symposium.

## New Pilot Projects:

- 1.) Determining the Cellular Mechanisms Whereby Skeletal Muscle (Fiber Type) Prevents Influenza-Induced Mortality in Sarcopenic Obesity – Joshua Butcher, Ph.D., Physiological Sciences, CVM, OSU
- 2.) Genetic Loci Associated with SARS-CoV-2 Rapid Adaptation – Xufang Deng, Ph.D, Physiological Sciences, CVM, OSU
- 3.) Modeling Transmission Aerobiology of SARS-CoV-2 Aerosols in Human and Mouse Lungs – Yu Feng, Ph.D, Chemical Engineering, CEAT, OSU
- 4.) Interaction of human CTRP6 with SARS-CoV-2 NSP14 protein – Xia Lei, Ph.D, Biochemistry and Molecular Biology, DASNR, OSU

## Center Achievements:

### ➤ Collaboration landed two NIH grants totaling 3.4 million –

Congratulations to Drs. Yong Cheng and Lin Liu who have been granted multiple PI R01 and R21 grants from NIH! This is an outstanding achievement. Dr. Cheng was recruited as Assistant Professor in the Department of Biochemistry and Molecular Biology, Division of Agricultural Sciences and Natural Resources at Oklahoma State University (OSU) in 2020 and joined OCRID at the same year. He completed his postdoctoral training at the University of Notre Dame. Dr. Cheng's lab is focused on understanding the molecular and cellular mechanisms of the host-pathogen interactions during mycobacterial infections.

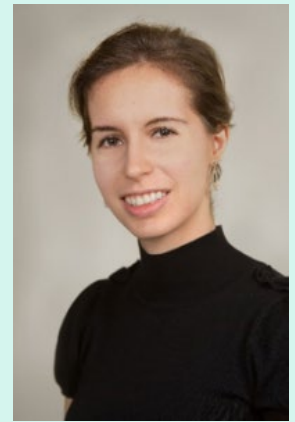
The R01 from NIAID is titled "The role of FENDRR in host defense against Mycobacterium tuberculosis infection" and totals nearly \$3 million in funding. This grant is a collaborative product utilizing expertise of Dr. Cheng in host-pathogen interactions during Mycobacterium tuberculosis infection and Dr. Lin Liu, OCRID director and a Regents Professor in the Department of Physiological Sciences, College of Veterinary Medicine, OSU in long non-coding RNA (lncRNA) biology. The grant is to understand the mechanism on how the host lncRNA regulates anti-tuberculosis activity in immune cells and animal models. Drs. Cheng and Liu have also worked together and secured a R21 grant titled "Genome-wide screening for host lncRNAs regulation host defense against Mycobacterial infection in macrophages." The R21 grant seeks to identify the host lncRNAs against Mycobacterium tuberculosis infection based on the CRISPR screen platform developed by the OCRID Molecular Biology Core directed by Dr. Lin Liu. The duo hopes to test a potential application of the host lncRNAs as a novel host-directed therapy for TB patients.



- Veronique Lacombe, Ph.D., OCRID Project Leader, served as Session Chair for the International Annual Society for Heart and Vascular Metabolism Scientific Meeting and was an invited keynote speaker at the Annual Australian Physiological Society Scientific Meeting at Griffith University in Australia.
- Rudra Channappanavar, Ph.D., OCRID Project Leader, served as an Ad-hoc reviewer for the VirB Study Section at the National Institute of Health.
- Marianna Patrauchan, Ph.D., OCRID Project Leader, was awarded the **Advising Excellence Award**.
- Junpeng Deng, Ph.D., OCRID Phase I Pilot Project Leader, was named **Sarkeys Distinguished Professorship in Agricultural Sciences**.
- Daniel Lin, Ph.D., OCRID Phase II Pilot Project Leader, received the **Regents Distinguished Research Award**.
- Lin Liu, Ph.D. FAPS, OCRID mentor received a score that is within the current payline for his R01 grant entitled “The role of iron in pulmonary fibrosis”
- Matthew Walters, Ph.D., OCRID Center Investigator, was awarded the **Provost’s Award for Research for Junior Faculty in Basic Science Research**.
- Heloise Anne Pereira, Ph.D., OCRID Center Investigator, received the **David L. Boren Governance Award** for her patent for Peptide Compounds and Methods of Productions and Use Thereof.

### ➤ OCRID Pilot Project Leader Receives TWO R01s –

Congratulation to Dr. Laura-Isobel McCall who has received TWO R01s totaling over \$3.78 million in funding. Dr. McCall is an Assistant Professor in the Department of Chemistry and Biochemistry at University of Oklahoma, Norman. She joined OCRID in 2019, when she received her pilot project grant. Her lab uses cutting-edge analytical chemistry instrumentation to answer critical biological questions.



She received a NIGMS R01 titled “An LCMS-guided bioanalytical approach for rational natural product library design and optimization.” Dr. Robert Cichewicz serves as MPI for the R01. High-throughput screening of compound libraries is a fundamental starting point to drug development efforts, and natural product libraries are one of the most valuable sources of novel bioactive molecules. Until now there have been few evidence-based rules for the rational design of natural product libraries. Dr. McCall seeks to demonstrate the utility of bioanalytical liquid chromatography-mass spectrometry to address this biological need, and lead to accelerated drug development in the long term.

Additionally, Dr. McCall was awarded a NIAID R01 titled “Deciphering the mechanism of action of carnitine, a novel treat for chronic Chagas disease.” Chagas disease, caused by Trypanosoma cruzi parasites, is an important cause of heart failure with no effective treatment in late-stage disease. Dr. McCall seeks to build on her findings that L-carnitine treatment improves chronic Trypanosoma cruzi infection severity, to determine the mechanism of action of L-carnitine in chronic Chagas disease treatment.



### OCRID Phase I Project Leader Dr. Tom Oomens One of Four Named 2021 President's Fellows Faculty Research Award Recipients –

During the last five to 10 years, Oomens’ lab at OSU has begun to translate the accumulated knowledge into vaccine design and testing and has generated novel vaccine prototypes. This award will help the lab continue to develop and test safe vaccines.

This award will also help expand the lab’s infrastructure and train graduate students who will become the future generation of researchers to fight pandemics.



### OCRID Grants:

Grants Awarded April, 2021 – March, 2022

- \$7,287,485

### OCRID Publications:

Publications April, 2021 – March, 2022

- 134

For more information visit the [OCRID Website](#).

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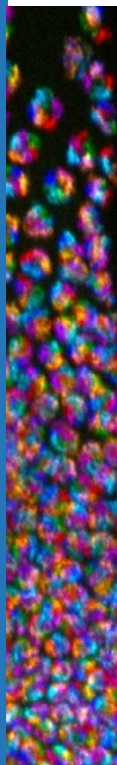


# Core News:

## Immunopathology Core:

The Immunopathology Core functions as a critical resource for pilot projects and OCRID investigators by providing flow cytometry, fluorescence-activated cell sorting (FACS), immunofluorescent immunohistochemistry (IFA-IHC), and multiplex immunoassay (MIA) analyses.

Services provided by the IPC include a broad range of immunology and pathology support including: Flow cytometry, Fluorescence-Activated Cell Sorting (FACS), multiplex immunoassay (for cytokine/ antibody analysis), gross necropsy and tissue collection, tissue processing, sectioning of either frozen or paraffin-embedded tissues, routine and special stains, immunohistochemistry (IHC), immunofluorescence (IFC), and coordination of ancillary services (clinical pathology, bacteriology, virology, toxicology). The laboratory is equipped with a state-of-the-art BD FACS Aria III equipped with 4 lasers allowing simultaneous analysis of 15 parameters. The IPC is also equipped with a Bio-Plex® 200 Multiplex Reader, a unique suspension array system which offers protein and nucleic acid analysis of up to 100 biomolecules in a single sample through a multiplex assay. By combining 2 lasers, high-throughput fluidics, and real-time digital signal processing, this technology can distinguish up to 100 different color-coded bead sets, each representing a different analyte.



## Molecular Biology Core:

The overall objective of the Molecular Biology Core (MBC) is to provide centralized services and cutting-edge technologies and expertise in molecular biology.

MBC provides the following service and support, 1) functional studies using RNAi and CRISPR/Cas9, transgene overexpression, mutagenesis and deletion, lentiviral, adenoviral and non-viral vectors for gene transfer, 2) genome-wide gene profiling using bulk RNA sequencing 3) genome-wide CRISPR gene activation, knockout and interference screens, 4) molecular assays including reporter assays, real-time PCR and droplet digital PCR, 5) reagents for respiratory and infectious disease research including respiratory viruses and bacteria, and reporter viruses, cell lines, primary lung cells, and human lung organoids, and 6) advice and consultation on various aspects of molecular biology, developing or adapting new methods as needed and disseminating core resources and technologies. Other State-of-the-art technologies under development include knockout and transgenic cell lines, single-cell RNA sequencing, and spatial gene profiling.

## 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](#)



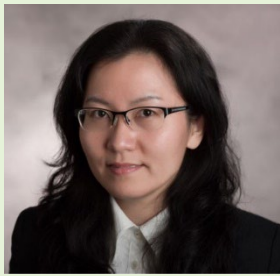
## Animal Models Core:

The goal of the Animal Models Core is to provide consistent care, experimental procedures, and husbandry that are important to the success of research. The Core's main focus is to help up-and-coming young investigators break new in pulmonary disease and gain important animal model training to prepare them for promising independent research careers.

Animal Models Core services include: (1) mouse colony management, genotyping, and husbandry (2) Animal model experiment design (3) Assistance with Vertebrate Animals section of grants (4) Assistance with animal use protocol, IACUC (5) Isolation of adipose tissue MSCs and characterization (6) Therapeutic intratracheal instillation of MSCs (7) Viral and bacterial instillation for respiratory disease models (8) Respiratory physiology and mechanics analyses (9) Blood analyses for clinical chemistries and blood gases (10) Real time continuous blood oxygenation analyses, neonatal to adults (11) Full anesthetic support (12) In vivo luminescent imaging with precise animal anatomic localization of mammalian and bacterial cells.

# New Members:

OCRID continues to grow with new and dynamic investigators!



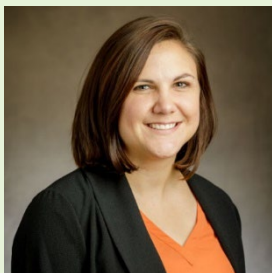
**Xia "Shelley" Lei**  
Ph.D. –

Dr. Lei is an Assistant Professor in the Biochemistry and Molecular Biology Department in the Division of Agricultural

Sciences and Natural Resources at Oklahoma State University. Her lab focuses on investigating the metabolic regulation of CTRP family members in physiology and disease. Read more about Dr. Lei [here](#).

**Jennifer Rudd, DVM**  
Ph.D. –

Dr. Rudd is an Assistant Professor in the Veterinary Pathobiology Department in the



College of Veterinary Medicine at Oklahoma State University. Dr. Rudd is an avid teacher and lifelong student of all things infectious, with particular interest in bacterial diseases and complex pneumonias. Read more about Dr. Rudd [here](#).



**Gabriel Cook Ph.D.**

–  
Dr. Cook is an Assistant Professor in the Department of Chemistry in the College of Arts and

Sciences at Oklahoma State University. Dr. Cook's lab is currently studying the effects of post-translational modification on membrane proteins involved human diseases. They use in vitro glycosylation to study the changes that occur when a sugar group is attached to a protein. Read More about Dr.

**Girish Patil, Ph.D. –**

Dr. Patil is an Assistant Professor in the Physiological Sciences Department in the College of Veterinary Medicine at Oklahoma State University.



# OCRID Activities

This year we are excited to return to our pre-COVID activities. We are looking forward to seeing everyone in person at our events.

Locations: McElroy Hall Rm 101 - Zoom Meeting ID: 482 603 2491  
Zoom Passcode: 565331

Date:	Activity:
Wednesday, October 26, 2022	Seminar – <b>Dr. Asrar Malik, PhD</b> – Hosted by Dr. Jordan Metcalf Schweppe Family Distinguished Professor and Department Head of Pharmacology at the University of Illinois at Chicago Title: TBA
Wednesday, November 2, 2022	Seminar – <b>Dr. Robert Kirchdoerfer PhD</b> – Hosted by Dr. Xufang Deng Assistant Professor in the College of Agricultural and Life Sciences at the University of Wisconsin-Madison Title – <i>Co-Factor Interaction in Alpha and Betacoronavirus Core Polymerase Complexes</i>
Wednesday, November 9, 2022	Journal Club Meeting – <b>Dr. Yong Cheng</b>
Wednesday, November 16, 2022	Seminar – <b>Dr. Dawn Newcomb, MD, PhD</b> – Hosted by Dr. Susan Kovats Assistant Professor of Pathology, Microbiology and Immunology at the Vanderbilt University Medical Center Title – <i>Sex Hormones Regulate Allergic Airway Inflammation in Asthma</i>
Wednesday, November 30, 2022	Seminar – <b>Damian Krysan, MD, PhD</b> – Hosted by Dr. Karen Wozniak Professor of Pediatric-Infectious Diseases at the University of Iowa Carver College of Medicine Title – <i>Transcriptional Regulation of Candida Albicans Morphogenesis During Mammalian Infection</i>
Wednesday, December 7, 2022	Work in Progress Meeting – <b>Dr. Rudra Channappanavar</b>

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

[ocrid.okstate.edu](http://ocrid.okstate.edu)



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