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RPPR Final Report
as of 05-Apr-2019

Agency Code:

Proposal Number: 73146LSCF **Agreement Number: W911NF-18-1-0122**
INVESTIGATOR(S):

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Organization: **Federation of American Societies for Experimental Biology (FASEB)**
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Country: USA
DUNS Number: 074816851 EIN: 520700497
Report Date: 31-Dec-2018 Date Received: 04-Apr-2019
Final Report for Period Beginning 01-Apr-2018 and Ending 31-Dec-2018
Title: FASEB SRC on Virus Structure and Assembly
Begin Performance Period: 01-Apr-2018 **End Performance Period:** 31-Dec-2018
Report Term: 0-Other
Submitted By: CMP Andrea Bauerfeind Email: srcgrants@faseb.org
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Distribution Statement: 1-Approved for public release; distribution is unlimited.

STEM Degrees: **STEM Participants:**

Major Goals: Rapid progress due to the development of new technologies.
This field is advancing rapidly as the result of new methods using X-ray crystallography, biophysical assays, mass-spectrometry, and high resolution cryo-electron microscopy (cryoEM). Those methods, along with longer established technologies, have resulted in a new era providing a deeper understanding mechanisms of the structures of viruses, their proteins and nucleic acids, and of the host components they interact with. The analysis of such data is a common theme in many presentations at this conference, and is rapidly driving the field into exciting new territory.

Studies of emerging and high impact viruses.
The meeting includes studies of all types of viruses, allowing comparisons of the structures of different viruses and their lifecycles, often revealing deep evolutionary connections that inform the field at a higher level. In the past few years many high-profile and high-impact viruses such as HIV, hepatitis C, Zika virus, Dengue virus, Ebola virus, Lassa fever, and various herpesviruses have been the focus of studies aiming at understanding their replication processes and leading to the development of new anti-viral therapies and vaccine approaches. This rapid progress results in a lively, topical and interactive conference replete with cutting-edge presentations, large well-supported poster sessions, and additional workshops that ensure the active participation of and involvement of all attendees.

Allowing discussion of a wide range of topics.
The conference starts with basic structural studies, progresses to more functional virus-host interactions, and also includes clinical and biotechnological applications that benefit an understanding of viral structures and functions. For example, blocking assembly or functions of viral components or interfering with viral entry are all attractive pharmacological targets for broadly-based therapeutics that may be deployed quickly to sites of outbreaks. Likewise, display of viral antigens in different formats can boost effective immune responses. Further, bacterial viruses (bacteriophages) are widely recognized as important components of all ecosystems, they play key roles in regulating the composition of microbiomes, and they also provide important models for eukaryotic virus structure and function. Phage also offer important biotechnological applications, such as phage display and CRISPR and anti-CRISPR systems. Viruses are also being exploited for therapeutic applications including drug delivery, gene therapy, new vaccine approaches, and as viro-oncolytic agents.

Provide opportunities for all scientists.
The meeting spans all investigator career stages, virus systems, and methods of study. We promote the development of unconventional and cross-disciplinary collaborations, and encourage graduate students, postdoctoral fellows and other trainees and junior investigators in their careers by offering opportunities for them to

present results, to meet many other and established researchers, and to appreciate the breadth of approaches used in the community that may be relevant for their on-going projects.

Accomplishments: The FASEB Science Research Conference on July 22-26, 2018 was a great success. The format was such that the data presented in talks or posters was cutting edge, and much of it had not have been published prior to the conference. There were 43 oral presentations of 25 minutes with 5 minutes for questions, or 12 minutes with 3 minutes for questions. In addition, we included 14 “Flash talks” by trainees (all were graduate students) that were 5 minutes long. There were 69 poster presentations over the period, divided into two poster sessions of 4 hours each. As a result, the attendees mentioned that they had learned a lot and had obtained insights into their own research. The FASEB survey has been sent to the attendees to solicit their opinions about the program, the venue, and to request suggestions for the organization of future meetings.

On the first night of conference Dr. Becky Dutch, University of Kentucky, and Dr. Ry Young, Texas A&M University, set the stage for the conference with their keynote lectures: “To Assemble or not to Assemble: Spread of Respiratory Viruses” and “Phage Single Gene Lysis: Exploring the Weak Points in Cell Wall Homeostasis”. Those talks raised a number of unanswered questions that lead to lively discussions. One of the important components of the format of this conference is that afternoons were largely unscheduled, allowing attendees to interact, form collaborations, discuss new research and experimental designs. The location in Steamboat Springs was remarked on by many attendees as being spectacular although rather expensive, especially for trainees to attend.

Throughout the conference there were numerous invited talks per session that included topics such as molecular virology, virus structure, and protein functions in replication. Highlights of the eight special session talks included Dr. Tuli Mukhopadhyay, Indiana University discussed the structure and functions of alphaviruses; Dr. David Bhella University of Glasgow “Structural insights into calicivirus attachment, entry and endosome escape” revealed a new tail structure that formed on the capsid after receptor binding; Dr. Alan Davidson, University of Toronto, “Defining the conserved functions of proteins comprising PVC/Afp related contractile systems” discussed a protein system in bacteria that is related to phage tail structures; Dr. Susan Schroeder, University of Oklahoma discussed “The Challenges of Predicting Viral RNA with Multiple Functional Structures”, an important topic for the understanding of RNA activities in cells and in viral genomes; Dr. Paula Traktman, with Medical University of South Carolina, discussed the structures and functions of the vaccinia (pox virus) life cycle; Dr. Cara Pager, University of Albany – SUNY, discussed the “The Methylome to the Epitranscriptome: RNA Viruses Lead the Way”; Dr. Nichole Steinmetz, University of California, San Diego, discussed the use of viral nanoparticles as delivery vehicles; and Dr. Felix Rey, Institut Pasteur – Paris, France, who discussed the functions of Class II fusion proteins in viral and cellular proteins, and their connections.

Training Opportunities: Nothing to Report

Results Dissemination: Nothing to Report

Honors and Awards: Nothing to Report

Protocol Activity Status:

Technology Transfer: Nothing to Report

PARTICIPANTS:

Participant Type: PD/PI
Participant: Colin R. Parrish
Person Months Worked: 1.00 **Funding Support:**
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

RPPR Final Report
as of 05-Apr-2019

FINAL REPORT

FASEB SCIENCE RESEARCH CONFERENCE:
FASEB SRC on Virus Structure and Assembly
Steamboat Springs, Colorado
July 22-27, 2018

Conference Organizers:
Dr. Colin R. Parrish, Professor of Virology, Cornell University
Dr. Karen Maxwell, Assistant Professor, University of Toronto

Highlights of sessions and topics discussed:

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France, who discussed the functions of Class II fusion proteins in viral and cellular proteins, and their connections.

Meet the Expert Sessions. These were held after each morning session during lunch, which allowed the trainees to meet with the speakers. Day One: Carol Teschk (Univ. of Connecticut) and Ken Stedman (Portland State University) at Table 1, and Tuli Mukhopadhysy (Indiana Univ.) and Felix Rey (Institut Pasteur) at Table 2. Day Two: Welkin Pope (Univ. of Pittsburg) and Paul Jardine [Table 1]; Phoebe Stewart (Case Western Reserve Univ.) and Craig Cameron (PSU) [Table 2]. Day Four: Julie Thomas (RIT) and Carlos Catalano [Table 1] and Audray Harris (NIH) and Hyeryun Choe (Scripps) [Table 2].

Other optional activities. A "Diversity Power Hour" included a discussion of underrepresentation in science, with a focus on ideas for empowering women and underrepresented groups. That was attended by over 60 of the participants, and resulted in an extended discussion.
A Career Development Workshop included 5 attendees from different areas of the world, and with different career experiences (Felix Rey, Paula Tracktman, Alasdair Steven, Welkin Pope, Francis Reyes), and that was attended by more than 40 of the attendees, in particular the trainees. Questions from the attendees addressed issues of different career choices, and options for doing science in North America and Europe.

Overview of the funding outcomes:

Each speaker/session chair received approx. 54% of their travel and registration/lodging/meal costs. Most trainees were speakers. Trainees and junior faculty who were US citizens or permanent residents of the US (15) received $6,500 each from NIH R13 funds and $10,000 from Department of Defense funds. The breakdown of funds received and expenses are listed below.

F. Hoffmann-La Roche, Ltd.	$5,000.00
Open Question LLC	$4,000.00
Thermo Fisher Scientific (FEI)	$2,000.00
PLOS	$250.00
DOD - Navy	$10,000.00
NIH - NIAID	$6,500.00

Extra expenses:

Reception	$1,209.30

Overview of the attendees:

The conference was attended by 124 scientists, physicians, students and fellows from the US and 8 other countries, including Germany, Denmark, Sweden, Australia, and Canada. Of the 8 invited session chairs, 5 were women (62%), and of the 25 invited speakers, 9 were women (36%). The conference program included abstract-driven short talks and all trainees who presented abstracts were given the opportunity to make an oral presentation along with a poster presentation.

Summary of the Business Meeting:
The Business Meeting was held Thursday afternoon, July 26, 2018. The attendees appeared very pleased with the scope and presentations at the conference, and expressed unanimous support for a conference in 2020. The attendees also expressed positive feedback regarding the organization of the sessions and the types of sessions including the Flash Talk sessions. The group expressed enjoyment at having the conference at Steamboat Springs, CO. The group suggested that FASEB entertain the notion of reduced registration for trainees in the future. The group also made the suggestion that the next conference be held on the east coast of the US to encourage more Europeans to attend.

Proposed future topic as a FASEB conference: The 2018 FASEB Science Research Conference is a recurring meeting every two years. The next meeting will be in the summer of 2020. We anticipate the conference title to be: Virus Structure and Assembly 2020 FASEB Science Research Conference. Organizers will be Dr. Terje Dokland, University of Alabama, Birmingham and Dr. Susan Hafenstein, Penn State University. The group is made up of one phage and one eukaryotic virus researcher who are very active in their research activities, and who are familiar with current trends and hot topics in renal physiology and pathology. They will submit a proposal to FASEB by the 2020 deadline.