# 2020 MP3 COVID-19 Seed Grant Awards

EMORY UNIVERSITY

**Project Title:** Development of 2019-nCov-specific antibodies from lampreys.

**Max D. Cooper**, MD (Professor, SOM);
**Masayuki Hirano**, PhD (Asst. Professor, SOM);
**Balwan Singh**, PhD (PI, CDC)

**Award Total:** $123,806 over 1 year.

**Abstract**
The outbreak of a novel coronavirus (2019-nCoV, now also called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)) represents a pandemic threat that has been declared a public health emergency. The coronavirus Spike (S) glycoproteins (CoV S) promote infection by fusing the viral and cellular membranes. Widely available immunoglobulin-based monoclonal antibodies (mAbs), which are specific to SARS-CoV S, do not bind to 2019-nCoV S, suggesting antibody cross-reactivity may be limited. We will generate lamprey mAbs, which are composed of Leucine-rich repeat modules, with exquisite specificity for 2019-nCov S.

**Project Title:** Landscape of coronavirus recombination across scales.

**Anice Lowen**, PhD (Assoc. Professor, SOM);
**Mehul Suthar**, PhD (Asst. Professor, SOM);
**Katia Koelle**, PhD (Assoc. Professor, ECAS)

**Award Total:** $150,000 over 1 year.

**Abstract**
Recombination of coronavirus genomes has been observed both in vitro and in naturally circulating viruses. This type of genetic exchange can have major implications at the population level because genetic diversity generated during this exchange expands viral adaptive potential. With the goal of anticipating epidemiologically significant recombination events involving SARS-CoV-2, we will use experimental, modeling, and phylogenetic analysis approaches to quantitatively examine recombination of human coronaviruses at cellular and population level scales. By integrating our findings across these scales, our overall objective is to identify genomic signatures of recombination that are likely to be adaptive for this family of viruses.

**Project Title:**  SARS-C0V-2 pathogenesis, immune responses, and treatment: from macaques to humans.

**Mirko Paiardini**, PhD (Assoc. Professor; Yerkes/SOM);
**Anne Piantadosi**, MD, PhD (Asst. Professor, SOM);
**Raymond Schinazi**, PhD (Professor, SOM)

**Award Total:**  $150,000 over 1 year.

**Abstract**
This project leverages a novel model of SARS-CoV-2 infection to characterize the immune response to the virus; define the main anatomical sites and kinetics of viral replication and evolution; and test novel strategies targeted at SARS-CoV-2 that could be directly translatable to the clinic. These analyses will be performed utilizing a cross-scales approach, from cellular and molecular immunology to whole-host analysis. Simultaneously, the non-human primate data will be coupled with data generated from human specimens to understand intrahost and population level viral evolution. These results will be integrated to generate novel insights to inform the direct care of infected individuals.