



CHICAGO  
BIOMEDICAL  
CONSORTIUM

THE UNIVERSITY OF CHICAGO  
UNIVERSITY OF ILLINOIS AT CHICAGO  
NORTHWESTERN UNIVERSITY

# 2020 Perspectives



*The CBC gratefully acknowledges support from the Searle Funds at The Chicago Community Trust.*

## CBC Mission

The mission of the Chicago Biomedical Consortium (CBC) is to stimulate collaboration among scientists at Northwestern University, The University of Chicago, the University of Illinois at Chicago and others to accelerate discovery that will transform biomedical research and improve the health of humankind.

The CBC will:

- Stimulate research and education that bridge institutional boundaries,
- Enable collaborative and interdisciplinary research that is beyond the range of a single institution,
- Mentor and develop a strong cadre of biomedical leaders, researchers, and entrepreneurs in Chicago,
- Enhance and promote the development of the biomedical ecosystem in Chicago,
- Facilitate development of therapeutics that will, over the long term, improve the health of citizens of Chicago and beyond.

## CBC Leadership

### Luisa DiPietro, DDS, PhD

Scientific Director  
Director, Center for Wound Healing and Tissue Regeneration  
Professor of Periodontics  
Department of Periodontics  
University of Illinois at Chicago College of Dentistry

### Lucy A. Godley, MD, PhD

Scientific Director  
Hospira Foundation Professor of Oncology  
Section of Hematology/Oncology  
Departments of Medicine and Human Genetics  
The University of Chicago

### Richard Morimoto, PhD

Scientific Director  
Bill and Gayle Cook Professor of Biology  
Director, Rice Institute for Biomedical Research  
Department of Molecular Biosciences  
Northwestern University

## CBC Executive Director and Staff

### Richard Morimoto, PhD

Interim Executive Director

### Kimberly Corn

Associate Director, Business Operations and Finance

### Jolanta Glotzer, MS, MD

Communications Director

### Corinna Kitcharoen, MBA

Program Coordinator

### Sheryl Sloan, MBA

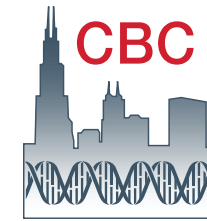
Executive Assistant to Executive Director

### Karen Snapp, DDS, PhD

Senior Associate Director

### Nancy Tyrrell

Associate Director for Translational Activities



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## 2020 Perspectives

The CBC was inaugurated in 2006 with a generous grant of \$5 million per year from the Searle Funds at The Chicago Community Trust. Through the end of 2020, \$65 million has been invested in the CBC. Having successfully completed the fourth year of Phase 2, efforts continue to leverage the strong foundation that has been established and to intensify the focus on translational research and entrepreneurship.

**As of the end of 2020, the CBC's most notable achievements since its inception include:**

- **A total of 358 awards** made to date to faculty members, postdoctoral fellows, and graduate students to support discovery and cutting-edge research in basic and translational science in nearly all areas of biomedical research including antibiotic resistance, cancer, diabetes, drug development, heart disease, infectious diseases, mental health, neurological disorders, etc.; *in 2020 a total of 18 awards were made including 3 COVID-19 Response Awards, 7 Catalyst Awards, 3 Accelerator Awards (Year 1 of funding), 4 Accelerator Award Renewals (Year 2 of funding) and 1 Director's Fund Award.*
- **Organizing 73 educational events including 17 annual symposia;** all showcasing research supported by the CBC and high-end technologies available at CBC universities; *in 2020, 3 citywide Information Sessions about the CBC Accelerator, Catalyst Award and Entrepreneurial Fellows programs, 2 CBC Accelerator Network (CBCAN) meetings, the 17th Annual CBC Symposium: "Epigenetics and Disease," and a COVID-19 Seminar Series were organized and sponsored by CBC.*
- **Achieving a milestone of over 2,650 peer-reviewed scientific articles** published based on CBC-funded research; *in 2020, 138 new publications were reported as attributed to CBC-supported research, including in high-impact journals such as Nature, Nature Biotechnology, Nature Nanotechnology, Nature Genetics, Nature Methods, Cancer Cell, Blood, Molecular Cell and Molecular Psychiatry.*
- Establishment of 6 national research centers at CBC universities; acquisition of state-of-the-art instruments to enable ground-breaking investigations of key biomedical questions and recruitment of 8 outstanding senior and junior faculty members who have gone on to receive numerous national awards.
- Professional development programs for graduate students and postdoctoral fellows; encouragement of a broad array of inter-institutional collaborations, including the Open Access Initiative; mentoring assistance for researchers interested in commercializing discoveries, exemplified by a robust involvement of pharma, biotech and other members of the Chicago biosystem.

**Projects launched by the CBC have gone on to earn over \$851 million in additional funding, with a total estimated economic input exceeding \$3 billion for the Chicago economy overall.**

**Front Cover:** Bird's-eye-view of Chicago. Photo courtesy of Brian Kay, UIC. Other photographs: CBC, or courtesy of the CBC universities' websites.

Written by: CBC Staff. Design and layout: Jola Glotzer, CBC.

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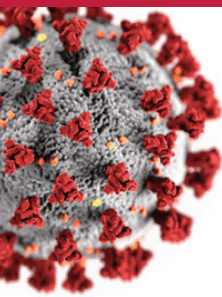
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The Searle Funds  
at The Chicago Community Trust



# Chicago Biomedical Consortium Awards \$1.5 Million for COVID-19 Research in Chicago

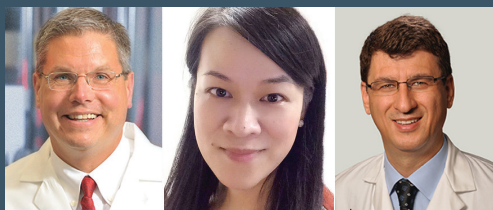


Three multi-institutional teams of investigators from NU, UIC and UChicago each received \$500,000 to pursue cutting-edge research

*“We are pleased to award what may be an unprecedented level of funding by a Chicago-based organization for COVID-19 research to the city’s multi-institutional teams of investigators,” said Rick Morimoto, CBC Interim Executive Director and Scientific Director for NU. “We were also thrilled to see the robust interest and response by all three institutions as driving collaboration is at the core of our mission.”*

After hearing concerns from members of the CBC community about the urgent need for support of the biomedical research related to the COVID-19 disease, CBC leadership decided to challenge investigators at the three CBC institutions by pledging **\$1.5 million** in total to award three research projects that would – in the classic CBC style – be high-risk/high-reward and would address urgent COVID-19-related problems. In alignment with the CBC’s mission of stimulating collaboration, applying teams were required to include representation from at least one principal investigator from each of the three CBC universities. The program was announced on June 10 and coined the **CBC COVID-19 Response Award**.

## 2020 COVID-19 Response Awardees



**G. R. Scott Budinger** (NU), **Jing Liu** (UIC) & **Gokhan Mutlu** (UChicago) for the project: *Targeting Aberrant Immune Responses in Patients with Severe COVID-19*



**Karla Satchell** (NU), **Vadim Gaponenko** (UIC) & **Viresh Rawal** (UChicago) for the project: *Covalent Inhibitors of the NSP16 2'-O-Methyltransferase of SARS-CoV-2*



**Melody Swartz** & **Jeffrey Hubbell**, (UChicago), **Evan Scott** (NU) & **Ying Samuel Hu** (UIC) for the project: *Novel Strategies for Enhancing Vaccine Efficacy Against SARS-CoV-2*

**Seventeen teams** submitted Letters of Intent and **14 teams** were invited to submit complete applications. A panel of **twenty-eight leading experts** in COVID-19 disease, the causative virus SARS-CoV-2 or related research from **top universities** and **research institutions across the United States**, was assembled by Nancy Tyrrell, CBC Associate Director for Translational Activities, to review the applications. **Three teams** were selected for the CBC COVID-19 Response program funding and were awarded **\$500,000** each.

*“The review process was rigorous,” said Lucy A. Godley, CBC Scientific Director for UChicago, “we were elated by the willingness of leading researchers throughout the country to participate, most of whom were already immersed in their own work but made time to contribute. It speaks to the national and global efforts of scientists to unite and solve this challenge.”*

The wide-ranging scope of the projects awarded by the CBC reflects the multifaceted needs in the COVID-19 research area and highlights the variety and excellence of research already being conducted in Chicago. The CBC awards cover three unique and important areas: understanding of the pathobiology of the disease, developing new therapeutics, and accelerating the development of an ultimate COVID-19-preventive measure – the COVID-19 vaccine (see graph on the opposite page).

Professors **Budinger, Liu, and Mutlu** grounded their project around questions addressing the pathobiology of the subset of COVID-19-infected patients – those who develop the most severe and frequently deadly acute respiratory distress syndrome (ARDS). By performing comparative genomic analysis of lung samples from COVID-19- positive and negative patients who suffered from severe pneumonia, the team has generated a compelling hypothesis as to why only some of the SARS-CoV-2-infected patients develop fibrosis, a rapidly progressive lung disease, resulting in the potentially fatal ARDS, whereas the majority of the infected population goes unscathed. It appears that, in the severely ill COVID-19 patients’ lungs, the delicate balance between the damaging and healing processes shifts towards the progressively damaging and unable to heal state.

The goal of this CBC-awarded project is to test the hypothesis behind the selective lung fibrosis occurring in severe COVID-19 patients and to further the studies on potential COVID-19 therapeutics that could interfere with the proposed model of COVID-19 lung damage / healing processes. If successful, the results of this research project could provide a better understanding of the innate lung defense mechanisms, and thus help steer the diagnostic and therapeutic efforts to help the most gravely affected COVID-19 patients.

As currently only limited treatments for COVID-19 exist, the **Satchell, Gaponenko and Rawal’s** research team aims to disable the SARS-CoV-2 virus before it begins to cause wreckage in the infected human body. SARS-CoV-2 is an RNA-type virus, thus, after infecting a cell, it hijacks the cell’s transcription and translation machinery generating numerous self-replicas. The new viral particles exit infected cells and attack the healthy ones. The virus replication process includes production and subsequent assembly of multiple “virus building blocks” within the infected cell. The awarded team proposes to “go after” one such “building block” – a viral protein called nsp16, which is an enzyme essential for the protection of the virus’s newly synthesized RNA from being recognized by the host’s immune system.

The Satchell, Gaponenko and Rawal team is in a unique position to “go after” SARS-CoV-2 nsp16 protein, as they have determined its crystal structure in a complex with its binding partners. The goal of the project is to synthesize and characterize novel compounds able to interfere with the nsp16 function. Such compounds would be prime candidates to be developed into COVID-19 therapeutics.

The third team that received the CBC COVID-19 Response Award will concentrate on the ultimate goal to halt the pandemic – the development of an anti-SARS-CoV-2 vaccine. Professors **Swartz, Hubbell, Scott** and **Hu** plan to use the SARS-CoV-2 virus’s “spike” protein as an antigen to stimulate the production of anti-SARS-CoV-2 neutralizing antibodies. Located on the surface of the virus, the spike protein is required for its binding to the receptors on the cell membrane of the epithelial cells which line the inner surface of human airways. Hence, the lungs are one of the primary targets of the SARS-CoV-2 virus.

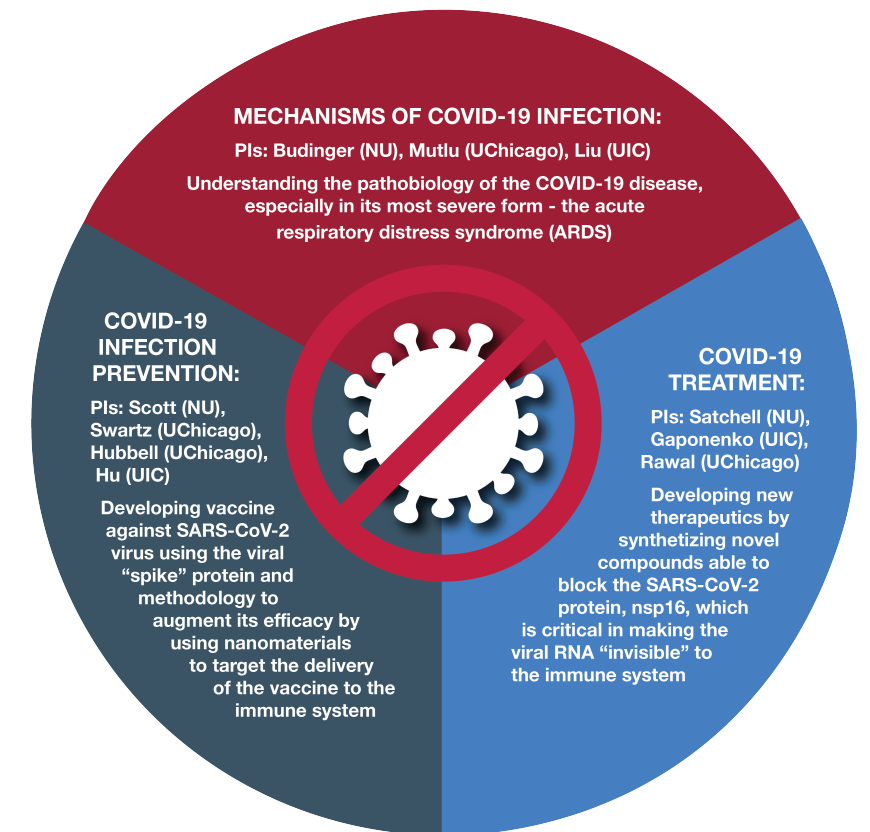
The team will not only pursue the vaccine development but will also test a possibility to use nanomaterials as “facilitators” of the vaccine’s targeted delivery to selected parts of the immune system. If successful, this novel methodology could speed up both antibody and memory T-cell production, priming the immune system to execute a rapid and effective response once a person becomes exposed to the live virus.

*The CBC is supported by the Searle Funds at The Chicago Community Trust. “We are grateful for the support received for over fourteen years,” said Luisa DiPietro, CBC Scientific Director for UIC. “The commitment of the Searle Family to support biomedical research in Chicago has enabled the CBC to develop exciting and impactful initiatives such as the COVID-19 Response, which will ultimately benefit Chicagoans and society at large.”*

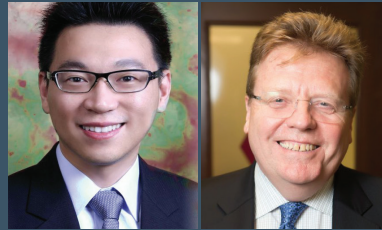
The CBC is proud to have been able to offer and execute the COVID-19 Response Award program in a record time of three months. It was a true team effort and a tribute to the organization’s years of dedication to supporting excellence in research and fostering the collaborative spirit among the Chicago-based scientists. Kudos to all of the applicants and to the awarded teams!

## The CBC COVID-19 Response Award Program Goals:

Developing three unique research approaches aiming to aid in the global efforts to halt the COVID-19 pandemic



## 2020 Accelerator Awardees (Year 1 of funding)



**Yun Fang and Matthew Tirrell**  
(UChicago) for the project:  
*Targeted Nanomedicine for Treating  
Arteriovenous Fistula Failure*

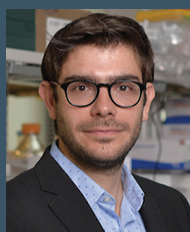


**Marcus Peter** (NU) for the project:  
*Development of a Novel Treatment for  
Ovarian Cancer Based on Toxic RNA*



**Jonathan Leis** (NU) for the project:  
*Prazole Analogs to Block the Budding  
of Viruses*

## 2020 Director's Fund Awardee



**Panagiotis Ntziachristos** (NU) for the  
project: *Mutant-specific Splicing Protein  
Inhibitors for the Treatment of Myeloid  
Neoplasia*

## Accelerator Award program propels projects down the commercialization pipeline

The **Accelerator Award** program supports translational research at the initial, and therefore highest risk, stage of commercially directed research focused on the development of a therapeutic or an associated biomarker or diagnostic. Awardees receive **\$100,000** of first year funding and, if the milestones are met, the projects become eligible for an additional **\$150,000** to support a second year of funding.

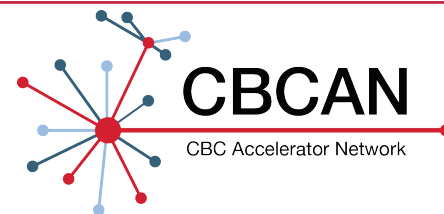
The CBC is excited to share that several Accelerator Award recipients have made **significant progress down the commercialization pipeline** in 2020. Recipients of the Spring 2019 Accelerator Award, **Steven Ackerman** and **Vadim Gaponenko**, UIC, have advanced their allergy and asthma technology into a start-up that raised ~\$7M to initiate validation studies to start an Investigational New Drug (IND) Application package. **Rick Silverman**, NU, who received an Accelerator Award in Spring of 2018, secured follow-on funding from NewCures, and a company is being formed to continue his studies on the development of hepatocellular carcinoma therapeutics. **William Muller**, NU received a follow-on National Cancer Institute Award to advance his research program in ischemia and reperfusion injury following myocardial infarction.

In 2020, 28 proposals were submitted and **3 new awards** (year 1 funding) were made (see left, top), bringing a total of **16 Accelerators** awarded to date. Also, within this year, **4 first year-funded Accelerators were renewed** and awarded the second year of funding. Eligible applicants of the Accelerator Award program who did not receive the award can be invited to apply to the **CBC Director's Fund (DF) Award of the Accelerator** program. Averaging approximately **\$30,000**, DF Awards are issued to address one or more project weaknesses, strengthening the proposal for future funding through CBC or other award/granting agencies. **One new DF Award** (see left, bottom) was made in 2020, resulting in a **total of 9 DF Awards** to date.

## Virtual CBCAN attendance breaks records in 2020

Launched in Phase 2 (2017), the **CBC Accelerator Network (CBCAN)** has become a fixture within the Chicago community, bringing together industry experts, university technology transfer representatives, university-based researchers, investors, and other members of the local and extended biomedical community. During CBCAN meetings, participants present and evaluate discoveries that may have commercial potential. The CBCAN serves as a much-needed early commercial guide to university-based researchers. The meetings are conducted under a confidentiality agreement to protect the proprietary aspects of the opportunities discussed. CBCAN events are central to both the **Accelerator Award** and the **Entrepreneurial Fellow (EF)** programs.

During the past three years, the CBC hosted a total of **17 CBCAN meetings** at venues that include Northwestern's Feinberg Pavilion, the University of Chicago's Gleacher Center and Chicago's Discovery Partners Institute (DPI). In the course of the 2020 COVID-19 pandemic, the CBCAN meetings have been held virtually via ZOOM, nevertheless attracting a record number of **over 100 attendees** at each event.



## CBC Entrepreneurial Fellows secure jobs at top Chicago area research institutions

The **Entrepreneurial Fellows (EF) Award** program supports the professional development of recent PhD recipients in the biomedical sciences who have a passion for driving innovative and transformative biomedical research towards clinical and commercial applications. The program provides Fellows a breadth of real-world experiences across the CBC universities and an active and central role in the development, refinement and implementation of CBC-funded awards including Accelerator, Director's Fund and Catalyst Award projects. From 17 applicants, **2 Awards** were made in 2019, the first to **Eric Schiffhauer** (PhD 2018, Johns Hopkins University School of Medicine, Dept. of Biochemistry, Cellular, and Molecular Biology) and the second to **Carissa Heath** (PhD 2019, NU, Dept. of Molecular Biosciences). Schiffhauer worked with Lakeside Discovery projects in the Ali Shilatifard lab (NU) on cancer therapeutics and the Beth McNally lab (NU) on pharmaceuticals for treatment of muscular dystrophies. In addition, Eric assisted over 10 faculty members at the 3 CBC universities with CBC-related projects and participated in CBC review panels and CBCAN events. In March 2020, Schiffhauer was hired by **NU's Innovation and New Ventures Office (INVO)** as the **Director of Drug Discovery Collaboration** for the **Lakeside Discovery** translator, a collaboration between Northwestern and Deerfield Management. Heath was involved in the Lakeside Discovery project experience with the McNally lab and helped to advance a number of other NU investigators' projects with one resulting in a CBC Accelerator Award. Carissa was senior author on a 2020 publication with Jonathan Leis, NU in *bioRxiv* and played an active role in CBC review boards, CBCAN events, and life science-focused events in the Chicago biomedical community. In October 2020, Heath accepted a position as a **Project Manager** on the **Clinical Science Team at Tempus Labs in Chicago**.

## Celebrating 100 + 1 Catalyst Awards supporting collaborative biomedical research

The longest running CBC program – the **Catalyst Award** – provides funding of up to **\$250,000** for one- or two-year new inter-institutional collaborative research projects that address fundamental biological and biomedical research questions that are high-risk/high-reward, innovative and transformative. The program requires a **collaborative team** composed of PIs from at least two CBC universities who have the skills, expertise and resources to address the proposed ground-breaking research. Since the program's inception in 2006, CBC funds have been awarded to **101 Catalyst teams**. In 2020, **7 Catalysts** were awarded: **4** to teams that applied in the Fall 2019 application round and **3** to teams that applied in the Spring 2020 round (see right). To date, **over 1200 researchers** have submitted **494 Catalyst applications**. Awarded Catalyst projects have produced important discoveries in a wide array of fields, and these findings have been reported in over **675** peer-reviewed journal articles. Projects that have received seed funding from Catalyst Awards (\$21.65 million) have gone on to earn **\$287.8 million** in follow-on funding, a leverage factor of **13.3-fold**. Basic biomedical discoveries funded by Catalyst awards, allow faculty researchers to better understand biological pathways which could potentially fuel the development of therapeutics and the formation of a biotech company or partnership with a pharmaceutical company. An impressive **20%** of Catalyst projects have already yielded intellectual property that is at various stages of the disclosure/patenting process.

## Entrepreneurial Fellows



**Eric Schiffhauer and Carissa Heath**,  
NU, currently at INVO and Tempus  
Labs, respectively

## Spring 2020 Catalyst Awardees



**Marcelo Nobrega** (UChicago) and  
**Gemma Carvill** (NU) for the project:  
*The Impact of Altering Genome  
Organization in Epilepsy Etiology*



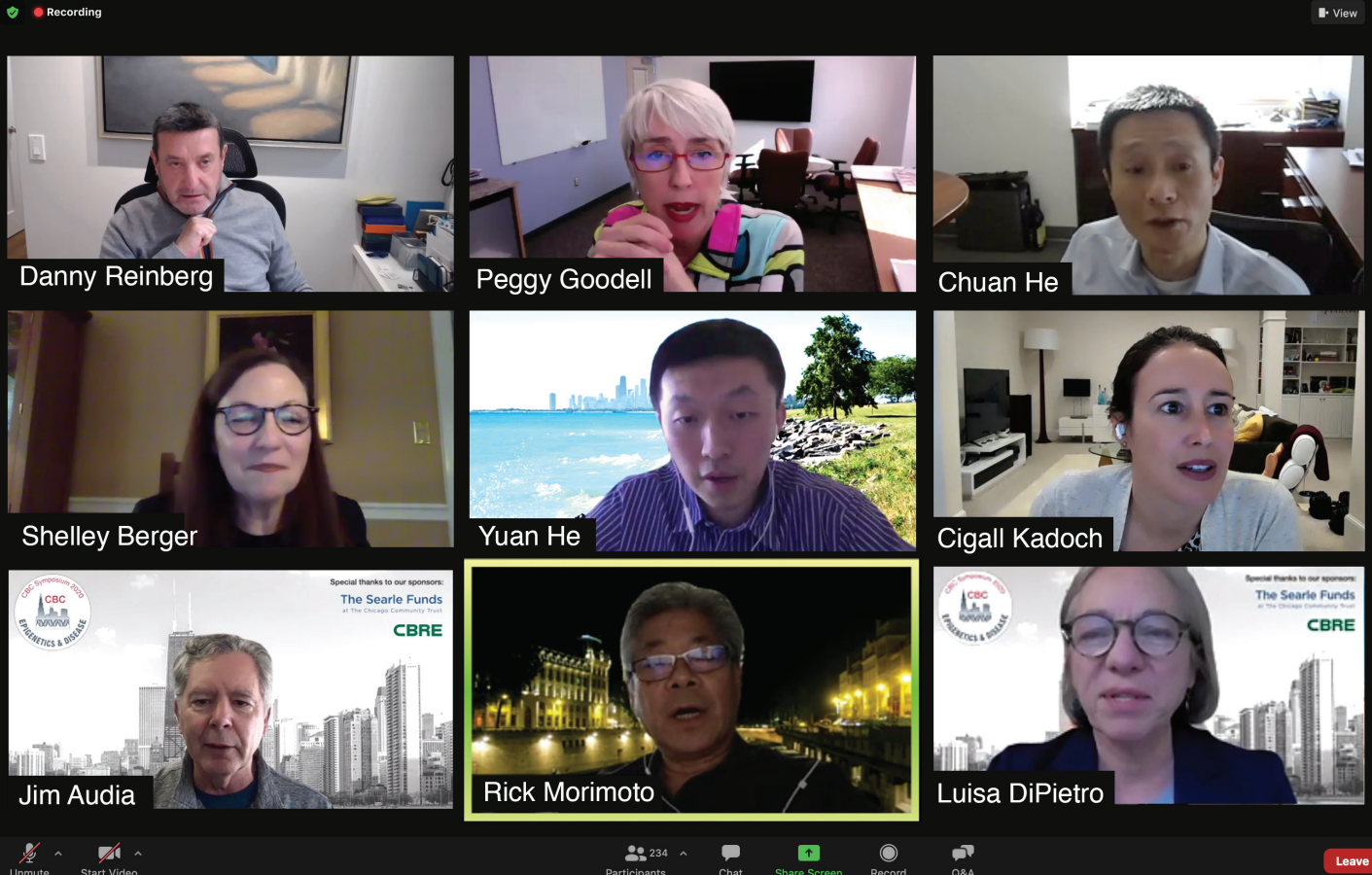
**Lee Alkureishi** (UIC) and **Russell Reid**  
(UChicago) for the project: *Bending the  
Bone – Developing 21<sup>st</sup> Century Tools  
for Bony Manipulation in the Operating  
Room*



**Tiffany Schmidt** (NU) and **Xincheng  
Yao** (UIC) for the project: *Functional  
Optophysiological Mapping of  
Intrinsically Photosensitive Retinal  
Ganglion Cells*

# CBC Annual Symposium, “Epigenetics and Disease,” Draws International Attention

The CBC held its **17th Annual Symposium: “Epigenetics and Disease”** on October 30, 2020 as a virtual webinar. The event was organized by **Jim Audia**, Former CBC Executive Director, and the CBC Scientific Directors, **Luisa DiPietro** (UIC), **Lucy Godley** (UChicago) and **Rick Morimoto** (NU) who is also CBC’s Interim Executive Director. The symposium offered six remarkable scientific presentations by world-renown experts in the field: **Danny Reinberg** (NYU), **Margaret “Peggy” Goodell** (Baylor College of Medicine), **Chuan He** (UChicago), **Shelley Berger** (UPenn), **Yuan He** (NU) and **Cigall Kadoch** (Harvard University/Dana Farber/Broad Institute). In addition, a virtual poster session was held and moderated by Dr. DiPietro. **Corinna Kitcharoen**, CBC Program Coordinator, and the CBC staff ran the event without a single glitch!



It would not do justice to say the event was highly successful! It actually broke all previous records:

- Total number of participants: **490** including **477** from the US, representing **16** states and **41** cities;
- Total foreign country participants: **13** representing **6** countries (Brazil, China, Egypt, India, Saudi Arabia, UK);
- Total (world-wide) represented: **39** universities; **23** companies, **12** institutes/teaching hospitals/foundations;
- Total number of the CBC website visitors on symposium day: **376** viewers and **1,245** web page visits, including **764** views of the symposium-related pages and **290** views of the symposium virtual poster session.

The CBC would like to thank everyone who attended this first-ever CBC virtual symposium, our fantastic speakers who participated in the event and our sponsors, the **Searle Funds at The Chicago Community Trust** and **CBRE**, whose generosity allowed us to offer the symposium at no charge. This would not have been possible without their support!