Crisis and Community

2020 Annual Report
“I am so thankful that I’m part of a group of people that cares so much about the thoughtful mentoring and education of the next generations of scientists. These are my people.”

Cottrell Scholar

“It was particularly hard during the pandemic to get in touch with fellow scientists, and I only recognized during the Scialog meeting how much I was missing these interactions. Thanks for making this possible.”

Scialog: Negative Emissions Science Fellow
Letter from the President

Along with the terrible losses and disruptions of 2020 came evidence for optimism about human resilience, scientific innovation, and the power of partnerships. The community of teacher-scholars that the Research Corporation for Science Advancement supports adapted to teaching online and to guiding their research groups remotely; long-term investigations were put on hold as efforts detoured toward improving coronavirus diagnostics, therapeutics, and vaccines; and physical scientists with expertise in molecular structure, chemical and materials design, and data analytics forged collaborations with microbiologists and immunologists to develop new strategies in the ongoing battle against human pathogens.

Throughout this difficult year, the foundation’s approach has been to listen to the needs of our community and to respond quickly with changes in our programs and support. We put on hold several initiatives to focus instead on funding promising ideas to tackle COVID-19, and on bringing together Cottrell Scholars to consider how to help students learn effectively and equitably online. Through Cottrell Conversations, we gave faculty opportunities to share their thoughts about the impact of the pandemic. In response to their concerns about keeping scientific careers on track at a time when most universities and colleges severely cut back their faculty hiring plans, we joined with the National Science Foundation to offer fellowships to senior postdoctoral fellows who in a non-pandemic year would have expected to be launching independent research programs. We also offered support for new instrumentation needed to continue research and learning at primarily undergraduate institutions.

By late 2020, with the experience we developed in organizing online discussions to promote collaborative, interdisciplinary approaches to complex challenges, we proceeded in partnership with the Alfred P. Sloan Foundation with the scheduled inaugural meeting of the Scialog: Negative Emissions Science initiative. For both Sloan and RCSA, our thinking was that despite the pandemic, climate change is such a pressing issue that we need to move ahead without delay to support the most compelling ideas to reduce atmospheric levels of greenhouse gases. We were delighted that the Thistledown Foundation joined Sloan and RCSA in the support of projects that emerged from that meeting.

We recognize that a return to “normal” will be neither rapid nor easy. Our support and programs will continue to focus on basic research in the physical sciences, while also paying close attention to how we can help improve the lives and careers of faculty in the sciences at universities, colleges, and research institutes. Please be in touch with your observations and advice as we all work together to put the pandemic behind us and to create a more diverse, equitable, and inclusive environment for scientific inquiry and student learning.

Daniel Linzer  
President & CEO  
Research Corporation for Science Advancement
2020 Awards

In 2020, Research Corporation for Science Advancement supported a diverse community of early-career scientists at colleges and universities in the United States and Canada through its Cottrell Scholar Program and Scialog, in addition to three emergency initiatives in response to the global pandemic: the COVID-19 Initiative, Cottrell Fellowships, and Cottrell Instrumentation Supplements.

The Cottrell Scholar Program develops outstanding teacher-scholars recognized by their scientific communities for the quality of their research programs, innovation in education, and potential for academic leadership. In 2020, Cottrell Scholar Program funding included $2.5 million for 25 initial Cottrell Scholar Awards, $75,000 for three Cottrell Scholars Collaborative Awards, and $565,000 for nine Cottrell Plus Awards (the competitive FRED, SEED, STAR, and IMPACT awards).

Scialog promotes dialogue and community-building to catalyze transformational science through collaborative, interdisciplinary research. In 2020, RCSA awarded $330,000 to early-career faculty for scientific research through Scialog Collaborative Innovation Awards. The contributions of partner philanthropies toward Scialog awards brought this total to $1,155,000. (Three other Scialog initiatives were postponed to 2021 due to the pandemic.)

The COVID-19 Initiative supported cutting-edge research into the detection and mitigation of the current and future epidemics. In 2020, seven teams of scientists were awarded a total of $715,000.

Cottrell Fellowships supported the work of postdoctoral fellows whose plans to start independent academic or research careers were delayed or derailed due to pandemic-related institutional hiring freezes. In 2020, RCSA awarded $831,250 to 13 Cottrell Scholars. Four of these awards were funded through a $340,000 grant from the National Science Foundation.

Cottrell Instrumentation Supplements supported new instrumentation (or updates to existing equipment) needed to continue research and learning at institutions struggling with the financial impact of the pandemic. In 2020, RCSA awarded 11 Cottrell Instrumentation Supplements totaling $141,000.
Cottrell Scholar Awards

$100,000 is awarded to each scholar for a total of $2,500,000.

Carlos R. Baiz
Chemistry,
University of Texas at Austin
Molecular Dynamics at Heterogeneous Oil-Water Interfaces and a New Approach to Addressing the Mental Health Needs of Graduate Students

Pengfei Huo
Chemistry,
University of Rochester
Enabling New Chemical Reactivities through Polariton Photochemistry

Kristin S. Koutmou
Chemistry,
University of Michigan
Chemical Modifications to mRNA Nucleosides: A New Frontier in Gene Regulation

Kateri H. DuBay
Chemistry,
University of Virginia
Teaching Entropy and Modeling the Sequence-Determinants of Surface-Initiated Copolymerizations

Catherine Kealhofer
Physics,
Williams College
Nonequilibrium Phonon Dynamics in Two-dimensional Materials

Kah Chun Lau
Physics, California State University, Northridge
Data-Driven Solubility Model Development of Concentrated Non-aqueous Electrolytes

Keary M. Engle
Chemistry,
Scripps Research Institute
Catalytic Difunctionalization of Alkenes Using Transient Directing Groups

Elena F. Koslover
Physics, University of California, San Diego
Physics of Cellular Distribution Networks: Morphology and Transport in the Endoplasmic Reticulum

Frank A. Leibfarth
Chemistry, University of North Carolina at Chapel Hill
Organocatalytic Kinetic Resolution Polymerization of Lactones
Huey-Wen Lin  
Physics, Michigan State University  
*Unveiling the Three-Dimensional Structure of Nucleons*

Song Lin  
Chemistry, Cornell University  
*New Catalytic Methods for Enantioselective Electrosynthesis and Introducing Electrosynthesis to College and Graduate Curricula*

Britt F. Lundgren  
Astronomy, University of North Carolina Asheville  
*Shedding Light on Star Formation Driven Galaxy Outflows across Cosmic Time*

Elisabetta Matsumoto  
Physics, Georgia Institute of Technology  
*Knotty Knits: Using Topological Constraints to Program Geometry and Elastic Response in Knitted Textiles with Lattice Defects*

Sharon R. Neufeldt  
Chemistry, Montana State University  
*Combined Experimental and Computational Approach to Improving Nickel and Palladium-Catalyzed Cross-Couplings*

Glen D. O’Neil  
Chemistry, Montclair State University  
*Neurotransmitter Detection using Light-Addressable Electrochemical Sensors: Investigating the Role of Metal Morphology and Coverage on Sensor Response using Scanning Electrochemical Methods*

Peter P. Orth  
Physics, Iowa State University  
*Probing Fractionalization and Entanglement in Quantum Spin Liquids: Theory of Two-dimensional Spectroscopy*

Cedric Owens  
Chemistry, Chapman University  
*Constructing a Better Nitrogenase by Uncovering Protein-protein Interactions That Protect the Enzyme and Expand its Chemistry*

Dennis V. Perepelitsa  
Physics, University of Colorado Boulder  
*Next-Generation Experimental Probes of Hot and Dense Nuclear Matter*
Leslie A. Rogers  
Astronomy, University of Chicago  
Searching for Water in Distant Worlds: Connecting the Atmospheric and Bulk Compositions of Sub-Neptune-Size Planets

David A. Strubbe  
Physics, University of California, Merced  
Light-induced Structural Dynamics in Materials: New Theoretical Insight into Ultrafast Phenomena

Jessica K. Werk  
Astronomy, University of Washington  
The Observational Signatures of Cosmic Gas Flows in a Hydrodynamic Framework

Brenda M. Rubenstein  
Chemistry, Brown University  
Advancing Chemistry through Data Science: Catalyst Design via Data-Enabled Quantum Chemistry and Integrating Data Science into the Chemistry Curriculum

Claire P. Till  
Chemistry, Humboldt State University  
Scandium and Iron: Parallels in Chemical Reactivity, and Reducing the Opportunity Gap in the HSU Chemistry Department and Beyond

Lorenzo Sironi  
Astronomy, Columbia University  
To B or Not to B: The Birth and Death of Magnetic Fields in the Universe

Jesus M. Velazquez  
Chemistry, University of California, Davis  
Achieving Energy Conversion Functionality through Compositional Modification: The Role of Metal Promotion in Chalcogenide Frameworks
Cottrell Scholars Collaborative Awards

At the annual Cottrell Scholar Conference, participants are encouraged to form teams and develop collaborative projects with potential national impact in science education. Through this Cottrell Scholars Collaborative program, RCSA funded three projects in 2020 at $25,000 each.

Moving the Dial: A Network for Systematic Change
This project seeks to support broader diversification and improved equity and inclusion in science by building a national network of Scholars researching specific areas of DEI and creating readily disseminatable products.

Lead Cottrell Scholar:
**Rory Waterman**
Chemistry, University of Vermont

In collaboration with additional Cottrell Scholars:
**Nandini Ananth**
Chemistry, Cornell University

**Ashleigh Baber**
Chemistry, James Madison University

**Lou Charkoudian**
Chemistry, Haverford College

**Laura Chomiuk**
Physics and Astronomy, Michigan State University

**Nancy Forde**
Physics, Simon Fraser University

**Carla Fröhlich**
Physics, North Carolina State University

**Jordan Gerton**
Physics and Astronomy, University of Utah

**Amanda Hargrove**
Chemistry, Duke University

**Rigoberto Hernandez**
Chemistry, Johns Hopkins University

**Geoff Hutchison**
Chemistry, University of Pittsburgh

**Kristen Koutmou**
Chemistry, University of Michigan

**Tim Kowalczyk**
Chemistry, Western Washington University

**Aaron Leconte**
Chemistry, Claremont MacKenna College

**Dinah Loerke**
Physics and Astronomy, University of Denver

**Gina MacDonald**
Chemistry and Biochemistry, James Madison University

**Ellen Matson**
Chemistry, University of Rochester

**Charles McCrory**
Chemistry, University of Michigan

**Nikki Pohl**
Chemistry, Indiana University Bloomington

**Sarah Reisman**
Chemistry and Chemical Engineering, California Institute of Technology

**Chad Risko**
Chemistry, University of Kentucky

**David Strubbe**
Physics, University of California, Merced

**Jesús M. Velázquez**
Chemistry, University of California, Davis
Seeing is Believing: Enhancing the Visualization of Atoms, Molecules, and Materials Using Augmented and Virtual Reality

This collaborative aims to develop a process for using augmented and virtual reality in aiding visualization of atoms, molecules, and materials in an effort to enable students in chemistry and physics courses to visualize concepts where conventional resources often prove inadequate.

Lead Cottrell Scholar:
Katherine Mirica
Chemistry, Dartmouth College

In collaboration with additional Cottrell Scholars:
Geoff Hutchison
Chemistry, University of Pittsburgh
Kah Chun Lau
Physics, California State University, Northridge
Huey-Wen Lin
Physics, Michigan State University
Günther Thiele
Inorganic Chemistry, Freie Universität Berlin, Germany

Diversity, Equity, and Inclusion in the Age of COVID-19: A New STEM Pipeline Model that Grows Undergraduate Research at Minority-Serving Institutions via Collaboration, Personnel Exchange and Online Training

The goal of this award is to increase underrepresented minority participation in STEM fields by developing a new pipeline model that combines high-quality collaborative research with research exchanges, available to first year undergraduates at historically Black or Hispanic-serving colleges and universities.

Lead Cottrell Scholar:
Shane Ardo
Chemistry, University of California, Irvine

In collaboration with additional Cottrell Scholars:
Shannon Boettcher
Chemistry and Biochemistry, University of Oregon
Tom Markland
Chemistry, Stanford University
Yogi Surendranath
Chemistry, Massachusetts Institution of Technology

And with:
Matt Minus
Prairie View A&M University
Niya Sa
University of Massachusetts, Boston
Yixian Wang
California State University, Los Angeles
Cottrell Plus Awards

As their scientific careers advance, Cottrell Scholars are eligible to receive post-tenure Cottrell Plus Awards to further support their research and educational activities. Cottrell Plus prizes include FRED, SEED, STAR, and IMPACT awards. FRED is the highest award ($250,000) for a high-risk, high-reward project with the potential to transform a significant area of research. SEED (Singular Exceptional Endeavors of Discovery) awards are competitive grants to launch new projects in research (at $50,000 each) or education (at $25,000 each). STAR (Excellence in Science Teaching and Research) awards recognize the outstanding research and educational accomplishments of Cottrell Scholars and encourage the improvement of science education at American and Canadian universities and colleges. STAR and IMPACT (recognizing the work of Cottrell Scholars who have had a national impact in science through leadership and service activities) each award $5,000 to winners.

Cindy Regal

**FRED**
Associate Professor of Physics, University of Colorado Boulder

The 2020 FRED Award was made to Cottrell Scholar 2014 Cindy Regal, associate professor of physics at the University of Colorado Boulder. The award will support her efforts to address challenges in nuclear spin detection and imaging, and to broaden approaches to precision mechanical sensing. Her pioneering work could create a new pathway for observing spins through force signatures and perhaps enable 3D imaging at the nanoscale.
Richard Brutchey
SEED Chemistry, University of Southern California
Optimization of Quantum Dot Nanofabrication Based on High-Throughput Continuous Flow Chemistry

Hanadi Sleiman
SEED Chemistry, McGill University
UDNA Hydrogels Promoted by Small Molecules: Highly Scalable Synthesis and Stimuli-Responsive Applications in Tissue Regeneration

Helen Blackwell
STAR Chemistry, University of Wisconsin, Madison
Cottrell Scholar 2005

Mark Bussell
SEED Chemistry, Western Washington University
Metal Phosphide-Oxide Hybrid Catalysts for Solar Fuels Production

Brian Stoltz
SEED Chemistry and Chemical Engineering, California Institute of Technology
Advancement of Small Molecule Electron Crystallography via MicroED: Leading the Transition from Proofs of Concept to Global Adoption

Julio de Paula
STAR Chemistry, Lewis and Clark College
Cottrell Scholar 1994

Seth Herzon
SEED Chemistry, Yale University
Practical Methods for Oxygen-oxygen Bond Formation

Ann West
SEED Chemistry and Biochemistry, University of Oklahoma
How Does an Anaerobic Microbial Pathogen Sense Oxygen Stress?

Rigoberto Hernandez
IMPACT Chemistry, Johns Hopkins University
Cottrell Scholar 1999
Scialog Collaborative Innovation Awards

The Scialog program was created in 2010 by RCSA, which oversees its administration. Scialog—short for “science + dialog”—funds early-career scientists to pursue transformative research with their fellow grantees on crucial issues of scientific inquiry. Scialog initiatives are a multi-year thematic investment, in which around 50 early-career Scialog Fellows, facilitated by 10 leading scientists, convene annually to discuss cutting-edge multidisciplinary themes and propose high-risk collaborative projects.

Due to the pandemic, RCSA convened one Scialog conference in 2020 in which awards were made—the virtual inaugural meeting of the Negative Emissions Science initiative. Through 2020 Scialog Collaborative Innovation Awards, RCSA along with funding partners the Alfred P. Sloan Foundation and the Thistledown Foundation provided a total of $1,155,000 in seed funding for eight teams’ research.
**Scialog: Negative Emissions Science**

**Year 1**

**Goal:** To catalyze chemists, engineers, environmental scientists and those in related fields to collaborate on new and innovative projects to accelerate breakthroughs in the fundamental understanding of capturing and utilizing or sequestering carbon and other greenhouse gases in the atmosphere and oceans that will lead to a sustainable future. Each of the 21 individual awards is $55,000.

**Shaama Mallikarjun Sharada** 2
Chemical Engineering and Materials Science, University of Southern California

**Burcu Gurkan** 2
Chemical and Biomolecular Engineering, Case Western Reserve University

**Xiao Su** 2
Chemical and Biomolecular Engineering, University of Illinois at Urbana-Champaign

**William Bowman** 2
Materials Science and Engineering, University of California, Irvine

**Eva Nichols** 2
Chemistry, University of British Columbia

**Robert Coridan** 2
Chemistry and Biochemistry, University of Arkansas

**Kathryn Knowles** 1
Chemistry, University of Rochester

**Carlos Morales-Guio** 1
Chemical and Biomolecular Engineering, University of California, Los Angeles

**Robert Coridan** 1
Chemistry and Biochemistry, University of Arkansas

**Rafael Santos** 3
School of Engineering, University of Guelph

**Pratik Dholabhai** 1
Physics and Astronomy, Rochester Institute of Technology

**Andrea Hicks** 1
Civil and Environmental Engineering, University of Wisconsin-Madison

**Nanette Boyle** 1
Chemical & Biological Engineering, Colorado School of Mines

**Chong Liu** 1
Chemistry and Biochemistry, University of California, Los Angeles

**Greeshma Gadikota** 3
Civil and Environmental Engineering, Cornell University

**Venkat Viswanathan** 3
Mechanical Engineering, Carnegie Mellon University

**Wilson Smith** 1
Chemical and Biological Engineering, University of Colorado Boulder

**David Kwabi** 1
Mechanical Engineering, University of Michigan

**Robert Gilliard** 1
Department of Chemistry, University of Virginia

**Nanette Boyle** 1
Chemical & Biological Engineering, Colorado School of Mines

**Shu Hu** 3
Chemical and Environmental Engineering, Yale University

**Bricks from The Ocean: Hybrid Microbial-Electrochemical Mineralization of CO₂**

**Nanette Boyle** 1
Chemical & Biological Engineering, Colorado School of Mines

**Robert Coridan** 1
Chemistry and Biochemistry, University of Arkansas

**Integrated Low-Temperature Electrified Process for CO₂ Direct Air Capture and Transformation to Solid Carbon**

**Total Funding by Source**

1: Sloan: $605,000
2: RCSA: $330,000
3: Thistledown: $220,000
COVID-19 Initiative
Detecting and Mitigating Epidemics

RCSA awarded seven teams of scientists a total of $715,000 for cutting-edge research that could contribute to the global effort to combat the coronavirus. For each proposal, team members were awarded $55,000 apiece to support the work.

Glycomimetics for Inhibiting SARS-CoV-2 Entry
Nicole Snyder
Chemistry, Davidson College
Collaborating with:
Laura Hartmann
Heinrich-Heine-Universität, Düsseldorf
Mario Schelhaas
Westfälische-Wilhelms-Universität, Münster
Pan-Covid-19 MultiValent Binders (MVBs) to Block Virus Entry
Rommie Amaro
Chemistry and Biochemistry, University of North Carolina at Chapel Hill
Carlos Simmerling
Chemistry, Stony Brook University
Establishing Swift, Sensitive, and Selective (3S) Sensing Technologies – Going Beyond RT-PCR
Ronit Freeman
Applied Physical Sciences, University of North Carolina at Chapel Hill

Modulating Ribosomal Frameshifts to Interfere with Viral Protein Translation
Stephen Fried
Biophysics, Johns Hopkins University
Matthias Heyden
Molecular Sciences, Arizona State University
Carlos Simmerling
Chemistry, Stony Brook University
Targeting the SARS-CoV-2 Frameshift Site Pseudoknot
Amanda Hargrove
Chemistry, Duke University
Katie Mouzakis
Chemistry, Loyola Marymount University
Collaborating with:
Victoria D’Souza
Harvard University
Gary Brewer
Rutgers Robert Wood Johnson Medical School

A New Technology to Assess COVID-19 Serosurveillance
Neil Kelleher
Chemistry, Northwestern University
Collaborating with:
Paul Thomas, Eleonora Forte, Rafael Melani, Richard LeDuc, Daniela Ladner, Alexander (Sasha) Misharin and Huiping Liu
Northwestern University

Detecting and Mitigating Epidemics

SARS-CoV-2 illustration: Rommie Amaro, University of California San Diego

Electric Field-Driven Antigen Enrichment to Achieve Detection of SARS-CoV-2 Nucleocapsid Protein in Urine at the Point-of-Need
Robbyn Anand
Chemistry, Iowa State University
RCSA awarded $831,250 to 13 Cottrell Scholars to support the work of postdoctoral fellows whose plans to start independent academic or research careers this year were delayed or derailed due to institutional hiring freezes. Four of these awards were funded through a $340,000 grant from the National Science Foundation.

**Cottrell Fellowships**

**Seth Cohen** (on behalf of postdoc **Kyle Bentz**)
University of California, San Diego
*Cottrell Fellowship – Dr. Kyle Bentz – MOF-polymer Hybrid Materials*

**Jahan Dawlaty** (postdoc **Sohini Sarkar**)
University of Southern California
*Designer Electric Fields at Interfaces to Influence Electrocatalysis*

**Luis Campos** (postdoc **Rinat Meir**)
Columbia University
*Photon Upconversion Biomaterials for Light-Activated Tissue Engineering*

**Sarbajit Banerjee** (postdoc **Rachel Davidson**)
Texas A&M University
*Developing Design Rules for Accessing Metastable Solids through Global Exploration of Synthetic Landscapes*

**John Fourkas** (postdoc **Nikos Liaros**)
University of Maryland, College Park
*2-Beam Action Spectroscopy for Elucidating Complex Nonlinear Optical Phenomena in Emerging 2D Materials*

**Teri Odom** (postdoc **Shikai Deng**)
Northwestern University
*Core-shell Plasmonic Nanoparticle Lattices*

**Frank Leibfarth** (postdoc **Aaron Teator**)
University of North Carolina at Chapel Hill
*Metal-Free, Controlled Stereoselective Polymerization of Vinyl Ethers*

**Maura McLaughlin** (postdoc **Dustin Madison**)
West Virginia University
*Innovative Gravitational Research and Creative Curricular Development: A Bridge to a Career as a Teacher-Scholar*

**Lorenzo Sironi** (postdoc **Lucca Comisso**)
Columbia University
*Unveiling Particle Energization in Astrophysical Plasmas*

**Brent Melot** (postdoc **Ahamed Irshad**)
University of Southern California
*Solid Electrolytes with Dual Li+ and F- ion Conductivity to Overcome the Barrier of Gravimetric Capacity*

**David Ginger** (postdoc **Connor Bischak**)
University of Washington
*Machine Learning Guided Investigations of Structure Function Relationships in Organic Mixed Ionic Electronic Conductors*

**John Fourkas** (postdoc **Nikos Liaros**)
University of Maryland, College Park
*2-Beam Action Spectroscopy for Elucidating Complex Nonlinear Optical Phenomena in Emerging 2D Materials*

**Lorenzo Sironi** (postdoc **Lucca Comisso**)
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**David Ginger** (postdoc **Connor Bischak**)
University of Washington
*Machine Learning Guided Investigations of Structure Function Relationships in Organic Mixed Ionic Electronic Conductors*
Following listening sessions with Cottrell Scholars on the challenges of reopening research laboratories and programs during the COVID-19 pandemic, RCSA made awards totaling $141,000 for new instrumentation (or for updates to existing equipment) needed to continue research and learning at 11 primarily undergraduate institutions. The awards, tailored to individual needs in amounts from $10,000 to $20,000, were to be used as a matching-fund commitment for grant applications, or where at least half of the funds to purchase the instrument were identified.

**Mario Affatigato**  
Physics, Coe College  
*Purchase of a Vickers Microindenter for Glass Studies*

**Fadi Bou-Abdallah**  
Chemistry, SUNY Potsdam  
*Acquisition of an ÄKTA Go Chromatography System to Help Expand and Support Learning and Research at SUNY Potsdam*

**Mark Bussell**  
Chemistry, Western Washington University  
*Instrumentation for Raman Thermometry – Probing Photocatalysis at the Nanoscale*

**Jason Gillmore**  
Chemistry, Hope College  
*Into the Future – Updating a GC and GC/MS Instrumentation Suite at Hope College to Extend Instrument Life and Improve Network Security*

**Casey Londergan**  
Chemistry, Haverford College  
*A New Dynamic Light Scattering Instrument at Haverford College*

**Ryan McGorty**  
Physics, University of San Diego  
*Upgraded Laser-Scanning Confocal Microscope System for Research and Teaching*

**Gregory O’Neil**  
Chemistry, Western Washington University  
*WWU Benchtop NMR Supplement Request*

**Cedric Owens**  
Chemistry, Chapman University  
*A Request to Fund the Purchase of a Fermenter, A Vessel for Learning and Knowledge Creation*

**Shahir Rizk**  
Chemistry, Indiana University at South Bend  
*Surface Plasmon Resonance (SPR) for Analysis of Biomolecular and Surface Interactions*

**George Shields**  
Chemistry, Furman University  
*Acquisition of Computing Nodes to Support Experimental Research at Furman University*

**Thomas Solomon**  
Physics, Bucknell University  
*Instrumentation for Bucknell’s Biophysics Program*
January

An American Institute of Physics National Task Force to Elevate African American Representation in Undergraduate Physics & Astronomy (TEAM-UP) spent two years investigating reasons for the persistent underrepresentation of African Americans in physics. RCSA provided funding to support this groundbreaking report, “The Time Is Now: Systemic Changes to Increase African Americans with Bachelor’s Degrees in Physics and Astronomy,” which was released at the American Astronomical Society meeting. **Philip “Bo” Hammer**, Senior Director, American Institute of Physics, who often works with Cottrell Scholar Collaborative teams, played a key role as a task force member.

Cottrell Scholar 1999 **Karen Bjorkman** was named provost and executive vice president for academic affairs at The University of Toledo.

RCSA was a sponsor of the free Arizona Science Lecture Series for 2020, “Catalysts of Change,” in Tucson, Ariz. The lectures explored the catalysts—both positive and negative— influencing the pace of global change and how these scientific advances will profoundly impact how we live 20 years from now and beyond.

**Kimberly See**, Chemistry and Chemical Engineering, California Institute of Technology, was named the 2019 recipient of the prestigious international Science Award Electrochemistry. The award, a joint initiative of Volkswagen and BASF, is aimed at young scientists of excellence. Kimberly was recognized for her outstanding contribution to research into multivalent ion and sulfur batteries.

February

RCSA was honored February 19 at a daylong University of California, San Diego, symposium celebrating philanthropy’s role in the future of science. The event, “Anticipating the Future of Science: A Look Back and a Look Ahead,” brought together university officials, RCSA-funded scientists, and representatives from philanthropies to celebrate the importance of foundation support in driving scientific research. Early-career faculty at UCSD and the University of San Diego spoke on the impact of RCSA funding on their research and careers.
Three Cottrell Scholars and two Scialog Fellows received 2020 Sloan Research Fellowships of $75,000: CS 2017 Amanda Hargrove, Chemistry, Duke University; CS 2020 Frank Leibfarth, Chemistry, The University of North Carolina at Chapel Hill; CS 2018 Sean Roberts, Chemistry, The University of Texas at Austin; Advanced Energy Storage Fellow Kelsey Hatzell, Chemical & Biomedical Engineering, Vanderbilt University; and Time Domain Astrophysics Fellow Erik Petigura, Physics & Astronomy, UCLA.

2018 Cottrell Scholar Lisa Ryno, Chemistry, Oberlin College, is leading a new mentoring program for underrepresented students in the sciences, called PERSIST. She wants participants to interact with faculty, learn about work in a research lab, and leave the program thinking, “I can be a scientist.”

Judith Su, Optical Sciences and Biomedical Engineering, University of Arizona, was featured in the 2020 SPIE Women in Optics planner highlighting “women who are making a difference through their work and other contributions to the fields of science, optics, and engineering.” SPIE is the international society for optics and photonics. Su is a Scialog: Chemical Machinery of the Cell Fellow and a recipient of two Scialog Collaborative Innovation Awards.

Four Cottrell Scholars were named 2019 American Association for the Advancement of Science (AAAS) Fellows: CS 2004 Vicky Kalogera, Physics & Astronomy, Northwestern; CS 1999 Steve Bradforth, Chemistry, University of Southern California; CS 2013 Zach Schultz, Chemistry, The Ohio State University; and CS 1994 George Shields, Chemistry, Furman University.

CS 1994 George Shields was named a 2020 Council on Undergraduate Research Fellow for facilitating undergraduate research, scholarship, and creative activities through mentorship and demonstrated leadership activities.

CS 1999 Rigoberto Hernandez, Chemistry, Johns Hopkins University, was awarded RCSA’s 2020 IMPACT Award in recognition of more than a decade of effort helping scientists develop the skills they need to grow into leadership roles beyond the classroom or research lab, as well as his commitment to removing the barriers that inequitably affect scientists in pursuing research careers.

Two Cottrell Scholars were named recipients of 2020 STAR Awards. CS 2005 Helen Blackwell, Chemistry, University of Wisconsin, Madison, was honored as an innovator at the interface of chemistry and biology whose work is playing a pioneering role in the field of bacterial quorum sensing. CS 1994 Julio de Paula, Chemistry, Lewis & Clark College, was recognized as a researcher, educator and leader who is having a broad impact on science, his students and colleagues, and science education around the world.

March

CS 2013 Eric Schelter, Chemistry, University of Pennsylvania, received the American Chemical Society’s 2020 Inorganic Chemistry Lectureship Award. He presented his research on the challenges associated with recycling heavy-duty batteries and electronics at the ACS Fall National Meeting.

Rigoberto Hernandez was interviewed about his career and the need for diversity in the scientific community in the American Chemical Society’s student member magazine, inChemistry. “Diversity allows people to look at solving problems in different ways, using different perspectives,” he said.

CS 2020 Glen O’Neil, Chemistry, Montclair State University, earned a National Science Foundation CAREER grant to measure neurotransmission pathways in and around cells, and to increase retention of community college transfer students by engaging them in research.
April

About 120 members of the RCSA community—Cottrell Scholars, Scialog Fellows, and Scialog Facilitators—engaged in a series of online meetings the week of April 20 as part of RCSA’s COVID-19 Initiative: Detecting and Mitigating Epidemics. In facilitating the emergency initiative, RCSA aimed to spark collaboration and catalyze rapid responses through immediate funding opportunities for highly promising research projects directly addressing the current pandemic or future pandemics. Seven proposals were funded. (By late 2020, all teams had made progress, with a few notable attainments. The team led by Rommie Amaro, Chemistry and Biochemistry, University of California, San Diego, published a paper in ACS Central Science on molecular motions of spike protein and its impact on binding ACE2, its cellular receptor. These findings will enable teammates to design and test inhibitors of spike-ACE2 binding. Neil Kelleher, Chemistry, Northwestern University, secured add-on funding for his project researching a new technology to assess COVID-19 serosurveillance. Robbyn Anand, Chemistry, Iowa State University, has achieved uniform and reproducible electrokinetic concentration for lateral flow assay strips to enhance sensitivity. The current test strip is targeted to SARS-CoV-2, and can readily be adapted for any other viral antigen in the future.)

Five Cottrell Scholars were honored by the Dreyfus Foundation as 2020 Camille Dreyfus Teacher Scholars: CS 2020 Frank Leibfarth, Chemistry, University of North Carolina at Chapel Hill; CS 2019 Ellen Matson, Chemistry, University of Rochester; CS 2019 Katherine Mirica, Chemistry, Dartmouth College; CS 2019 Alison Narayan, Chemistry, University of Michigan; and CS 2018 Alex Spokoyny, Chemistry, University of California, Los Angeles.

CS 2005 Teri Odom, Chemistry, Northwestern University, was elected to the American Academy of Arts and Sciences. Academy members are world leaders in the arts and sciences, business, philanthropy, and public affairs.

May

Three Cottrell Scholars were elected members of the National Academy of Sciences in recognition of their distinguished and continuing achievements in original research: CS 1999 Scott J. Miller, Chemistry, Yale University; CS 1999 Dmitri Basov, Physics, Columbia University; and CS 2000 and 2018 Nobel laureate Donna Strickland, Physics, University of Waterloo, Canada.

Nearly 100 Cottrell Scholars met online May 26 and 29 to launch RCSA’s new series of virtual meetings, called Cottrell Scholar Conversations. In the absence of an in-person conference this year, the meetings were designed to keep the Cottrell Scholar community engaged through dialogue and problem-solving around issues of importance to teacher-scholars. The first meetings, on the topic of “Reopening Research Laboratories and Programs,” were attended by established faculty as well as members of the new Cottrell Scholar class of 2020. “Thank you for putting these conversations together,” one participant said. “It has been helpful to connect with my peers to share stories and to help each other through these challenging times.”

Research by CS 2016 Maiken Mikkelsen, Physics, Duke University, has demonstrated new ways to boost the brightness of fluorescent markers using plasmonic silver nanocubes, enhancing the ability of low-cost diagnostic tests to detect viruses and other biomarkers.

June

RCSA welcomed two outstanding teacher-scholars to its Cottrell Scholar community: Ann-Christin Pöppler, Chemistry, Julius-Maximilians-Universität Würzburg, and Günther Thiele, Chemistry, Freie Ann-Christin Pöppler Günther Thiele
Universität Berlin’s Institute for Chemistry and Biochemistry. Based on RCSA's Cottrell Scholar Award, the Fulbright-Cottrell Award recognizes junior faculty in chemistry, physics, and astronomy for integrating top-notch research with creative teaching. Recipients take part in RCSA's Cottrell Scholar conferences and meetings, and may collaborate on team projects.

A year after three astronomers met at a Scialog: Time Domain Astrophysics conference, sponsored by RCSA and the Heising-Simons Foundation, the research project they envisioned won a nearly $300,000 grant from the National Science Foundation. “This award would not have happened without Scialog,” said Jason Nordhaus, Physics, Rochester Institute of Technology National Technical Institute for the Deaf. As the project’s principal investigator, he will be collaborating with Philip Muirhead, Astronomy, Boston University, and Maria Drout, Astronomy and Astrophysics, University of Toronto. The project will study binary star evolution through an observational survey of galactic star clusters and will offer much-needed summer research opportunities for deaf and hard-of-hearing students at RIT.

In a series of interviews with grantees, three members of RCSA's first class of Cottrell Scholars recalled the long-term impact of their 1994 awards. René Walterbos, former head of the Department of Astronomy and professor emeritus at New Mexico State University, says it helped launch his early research on diffused ionized gas in nearby galaxies at a time when few people were working on it, enabling him to become established in the field. Discussions about peer instruction helped shape his approach to education. Nancy Makri, professor of chemistry and physics, University of Illinois at Urbana-Champaign, said give-and-take with her Cottrell Scholar colleagues has been invaluable to her as an educator, helping students make the connections they need to understand her research. Mark Bussell, professor of chemistry at Western Washington University, said being a part of the RCSA community has offered distinct benefits at different stages of his career.

July
More than 150 teacher-scholars gathered online July 8-10 for the 26th Annual Cottrell Scholar Conference, centered on the theme of “Challenges and Opportunities with Online Education.” Keynote speaker and CS 2007 Jordan Gerton, Physics & Astronomy, University of Utah, said the move to online education is an opportunity for meaningful change, urging faculty to “disrupt convention and lead efforts to remake STEM education into a more equitable and inclusive enterprise.”

CS 2002 Jané Kondev, Physics, Brandeis University, was named a 2020 Simons Investigator.

RCSA’s Scialog initiatives received kudos as effective ways for philanthropy to spark needed discoveries at a July webinar on clean energy storage hosted by the Climate Leadership Initiative and the Science Philanthropy Alliance. “We need new people in the field, and they need funding they can’t get from federal sources,” said Nobel Laureate M. Stanley Whittingham, inventor of the first rechargeable lithium ion battery and Facilitator at Scialog: Advanced Energy Storage, sponsored by RCSA and the Alfred P. Sloan Foundation. Scialog is “The kind of thing that may get totally new ideas into the pipeline.”

M. Stanley Whittingham

CS 1994 **Herbert Fertig**, Physics, Indiana University at Bloomington, published an Editors’ Suggestion in Physical Review Letters. This work is an unanticipated outcome from his 2019 Cottrell SEED award project.

Two members of the RCSA community were named 2020 Laureates of the Blavatnik National Awards for Young Scientists. CS 2012 and 2018 FRED Award winner **Will Dichtel**, Chemistry, Northwestern University, was noted for “pioneering methods to create novel, porous materials from simple, carbon-based building blocks.” Scialog: Time Domain Astrophysics Fellow **Brian Metzger**, Physics, Columbia University, was noted for “settling a long-standing question about the origin of gold and other heavy elements in the universe.”

CS 2014 **Cindy Regal**, Physics, University of Colorado Boulder, was named the 2020 recipient of RCSA’s Cottrell Frontiers in Research Excellence and Discovery (FRED) Award. The $250,000 award recognizes and rewards innovative research that could transform an area of science. Regal’s research program to date has focused on quantum information and quantum optics. She has both contributed to the development of atomic quantum bits and devised ways to cool and detect motion of tangible objects at their quantum ground state, bringing mechanical vibrations of solids to the toolbox of quantum physicists.

RCSA announced a new initiative to begin in 2021. Scialog: Advancing Bioimaging, sponsored by RCSA and the Chan Zuckerberg Initiative, with support from the Frederick Gardner Cottrell Foundation, will address challenges in enhancing high-resolution imaging of tissues to support basic science and the treatment of disease.

Scialog: Molecules Come to Life Fellow **Pankaj Mehta**, Physics, Boston University, and colleagues published a paper in Physical Review Letters selected as an Editors’ Suggestion and featured in Physics. The paper presents a model of how resource dynamics dictate species diversity for some types of ecosystems. Pankaj said: “We have gotten interested in trying to formulate a ‘statistical mechanics of ecology’ – in part due to the success of our Scialog project.”

**August**

Two Cottrell Scholars were selected 2020 American Chemical Society Fellows for outstanding achievements in and contributions to science, the profession, and ACS: CS 2009 **Penny Beuning**, Chemistry, Northeastern University, and CS 1994 **George Shields**, Chemistry, Furman University.

As part of its response to the COVID-19 pandemic, RCSA awarded more than $800,000 in 13 Cottrell Fellowships to support the work of postdocs affected by institutional hiring freezes. Four of these awards were funded through a grant from the National Science Foundation. “This stopgap funding has been so valuable,” said CS 2009 **Maura McLaughlin**, Physics, West Virginia University. As an example, support from the fellowship enabled McLaughlin’s postdoc **Dustin Madison** to co-author four publications, submit a first-author paper, continue his research, and secure several faculty interviews.

CS 2015 (and Scialog: Microbiome, Neurobiology and Disease Facilitator) **Emily Balskus**, Chemistry and Chemical Biology, Harvard University, was named a 2020 NSF Alan T. Waterman Awardee. The award recognizes researchers age 40 or younger who demonstrate exceptional individual achievements in scientific or engineering research. “Balskus has opened up novel ways to explore and exploit the chemistry and biology of microbes that live in our bodies and how they are linked to our health. And we’re already seeing the potential impact,” the NSF said in announcing the award.

RCSA made Cottrell Instrumentation Supplements of $141,000 for new instrumentation (or for updates to existing equipment) needed to continue research and learning at 11 primarily undergraduate institutions. The emergency initiative follows listening sessions with Cottrell Scholars on the
challenges of reopening research laboratories and programs during the COVID-19 pandemic. Many expressed concerns about the near- and long-term support for research activities at their institutions due to the devastating financial impact of the crisis. CS 1994 Mark Bussell said the supplemental funding allowed him to purchase components for a gas flow system (for in situ sample treatment) permanently installed adjacent to a new Raman microscope, instead of having to shuttle components from his lab, a 5-minute walk away. He called it “a real win-win situation for me and Western Washington University in general!”

Scialog: Time Domain Astrophysics Fellow Jackie Faherty, Department of Astrophysics, American Museum of Natural History, CS 2019 Kerstin Perez, Physics, Massachusetts Institute of Technology, and CS 2014 and FRED Award recipient Cindy Regal, Physics, University of Colorado Boulder, are three of the women scientists to be celebrated in a multicity public art series called FINDINGS. The project is supported by the Heising-Simons Foundation, co-sponsor of our Scialog TDA and Signatures of Life in the Universe initiatives.

CS 1999 Mike Schatz, Physics, Georgia Tech, and colleagues published a cover article in Physical Review Letters titled “Capturing Turbulent Dynamics and Statistics in Experiments with Unstable Periodic Orbits.”

RCSA announced six winners of its competitive SEED (Singular Exceptional Endeavors of Discovery) Awards for 2020. Recipients are: CS 2010 Richard Brutchey, University of Southern California; CS 1994 Mark Bussell, Western Washington University; CS 2012 Seth Herzon, Yale University; CS 2002 Hanadi Sleiman, McGill University; CS 2003 Brian Stoltz, California Institute of Technology; and CS 1999 Ann West, University of Oklahoma. This year’s recipients represent different subfields within chemistry, such as materials, biochemistry, organic chemistry and catalysis.

Daniel Rabinovich, professor of chemistry at the University of North Carolina at Charlotte, will receive the 2021 American Chemical Society National Award for Research at an Undergraduate Institution, sponsored by RCSA. Dan is a previous RCSA awardee who received Cottrell College Science Award funding in 1998 and 2001.

Two Cottrell Scholars were American Chemical Society 2021 national award winners. CS 2004 Paul Chirik, Chemistry, Princeton University, will receive the Gabor A. Somorjai Award for Creative Research in Catalysis. CS 2006 Melanie Sanford, Chemistry, University of Michigan, Ann Arbor, will receive the ACS Award in Organometallic Chemistry.

Two Cottrell Scholars were American Chemical Society 2021 national award winners. CS 2004 Paul Chirik, Chemistry, Princeton University, will receive the Gabor A. Somorjai Award for Creative Research in Catalysis. CS 2006 Melanie Sanford, Chemistry, University of Michigan, Ann Arbor, will receive the ACS Award in Organometallic Chemistry.

CS 2012 (and FRED Award recipient) Sarah Reisman, Chemistry & Chemical Engineering, California Institute of Technology, and CS 2008 Tehshik Yoon, Chemistry, University of Wisconsin, Madison, were among the authors of an editorial in ACS Central Science arguing for the importance of diversifying the chemistry community.

In partnership with the U.S. Department of Agriculture, RCSA announced a new initiative, Scialog: Mitigating Zoonotic Threats. Set to begin in 2021, it aims to address the global threat to human health from animal-borne infectious diseases.

September

Nearly 50 teacher-scholars met online September 15 and 18 to discuss “Maintaining Student Engagement During COVID-19,” the latest in RCSA’s series of Cottrell Scholar Conversations. Participants said that while they and their students face multiple challenges with online or hybrid models of education, some online tools and techniques present opportunities for better and more equitable teaching.

Eight members of RCSA’s community were named 2020 American Physical Society Fellows. Cottrell Scholars include: CS 2009 Kathy Aidala, Physics, Mount Holyoke College; CS 2009 Robert McDermott, Physics, University of Wisconsin, Madison; CS 2014 Joe Subotnik, Chemistry, University of Pennsylvania; and CS 2013 Xiaodong Xu, Physics, University of Washington. Scialog Fellows include: Molecules Come to Life Fellows Ajay Gopinathan,
Physics, University of California, Merced, and Raghuveer Parthasarathy, Physics, University of Oregon; and Chemical Machinery of the Cell Fellow Kandice Tanner, Cell Biology and Physiology, National Cancer Institute. Also named was a 2003 Cottrell College Science Award recipient, Scott Franklin, Physics, Rochester Institute of Technology.

RCSA’s Senior Program Director Richard Wiener was named a 2020 American Physical Society Fellow “for leadership on creating Scialog, a unique and highly effective platform for networking early-career scientists and seeding high risk interdisciplinary research to make advances in fundamental science with the long-term goal of solving important global challenges.” Wiener joined RCSA in 2006.

In a paper published in ACS Science, COVID-19 Initiative awardee and Scialog: Chemical Machinery of the Cell Facilitator Rommie Amaro described how she used molecular dynamics simulations to model SARS-CoV-2 spike glycan shield, illustrating how it modulates conformational dynamics and binding to host protein ACE2. This computational effort laid the groundwork for further experiments on potential inhibitors.

October

Reinhard Genzel, University of California, Berkeley, and the Max Planck Institute for Extraterrestrial Physics, Garching, Germany, was awarded a share of the 2020 Nobel Prize in physics for his work with Andrea Ghez, UCLA, to discover a “supermassive compact object at the center of our galaxy.” Genzel and Ghez shared the Nobel Prize with Roger Penrose, Oxford University. Genzel was part of the German collaboration that helped launch the RCSA-supported Large Binocular Telescope (LBT) on Mount Graham in Arizona, as well as a 1982 RCSA grant recipient for a far-infrared and submillimeter laser for astronomical spectroscopy. Reinhard is the 41st RCSA awardee to become a Nobel laureate.

Gordon Jones, Physics, Hamilton College, was awarded the American Physical Society’s 2021 Prize for a Faculty Member for Research in an Undergraduate Institution. The award is sponsored by RCSA. Jones was cited for “outstanding contributions to fundamental neutron physics, development of neutron polarizers using optically polarized helium-3, and extraordinary engagement and education of undergraduate students.” The physics department at Hamilton College is a previous recipient of an RCSA Department Development Award. “I have been blessed with a departmental culture of research which was fostered and encouraged by the Department Development Award,” Jones said. “That was a short period a long time ago, but it has had an outsized impact on our culture, and will for a long time to come.”

Rommie Amaro, one of RCSA’s COVID-19 Initiative awardees and a Facilitator of Scialog: Chemical Machinery of the Cell, was featured in a New York Times article, “The Coronavirus Unveiled.” Accompanied by visualizations of the coronavirus created by her lab, it highlighted the work Rommie and her team are doing using simulations of the virus to try to understand how it infects cells.

Meeting at Scialog: Time Domain Astrophysics sparked the idea, and an RCSA team award provided support for the initial proof-of-concept study by three researchers: Scialog Fellows Sukanya Chakrabarti, Physics & Astronomy, Rochester Institute of Technology, Daniel Huber, Astronomy, University of Hawaii, and Robyn Sanderson, Physics & Astronomy, University of Pennsylvania. The team won new National Science Foundation (NSF) funding that will allow them to apply this method
to a much larger sample, mapping distances across the galaxy, and to involve local undergraduates in an astronomical research program.

More than 60 researchers with a wide variety of expertise in chemistry, biology, and related fields explored ideas for collaborative research at the third meeting of Scialog: Chemical Machinery of the Cell, held virtually on October 9. Cosponsored by RCSA and the Gordon and Betty Moore Foundation, the initiative aims to develop interdisciplinary projects that advance understanding of chemical machinery and reactions in the intact, living cell.

Fellow Chad Risko, Chemistry, University of Kentucky, is the principal investigator on the project. CS 2016 Scott Shaw, Chemistry, University of Iowa, and Scialog AES Fellow Susan Odom, Chemistry, University of Kentucky, are co-PIs. Baskar Ganapathysubramanian, Iowa State University, and Sara Mason, University of Iowa, are also co-PIs. The team credits their multiple RCSA connections for sowing the seeds of the project.


G.W. Gant Luxton, Molecular and Cellular Biology, University of California, Davis, said being a Fellow at Scialog: Chemical Machinery of the Cell played an important role in being named an Allen Distinguished Investigator. “Being able to talk about our research with representatives from funding agencies like the Paul G. Allen Frontiers Group gives Scialog participants invaluable opportunities to become more than a name on a grant application,” he said. Gant and his collaborator Daniel Starr received the award to study a protein complex known as LINC, which enables cells to sense and respond to mechanical forces.

Eight years after brainstorming the idea for a collaborative project at the second Scialog: Solar Energy Conversion conference, Gordana Dukovic, Chemistry, University of Colorado Boulder, and Sean Elliott, Chemistry, Boston University, published their results in the prestigious journal Proceedings of the National Academy of Sciences. The paper describes a system in which semiconductor nanocrystals are coupled to an enzyme to catalyze CO2 reduction. “Scialog really made this project happen,” Elliott said.
Rae Robertson-Anderson

CS 2010 and Scialog: Molecules Come to Life Fellow Rae Robertson-Anderson, Physics, University of San Diego, said her career is a great example of how early seed funding can create opportunity over time. For her, early-career discoveries led to cycles of new funding, new avenues of research, and new collaborations.

Three Scialog Fellows were among 20 innovative early-career researchers named 2020 Packard Fellows for Science and Engineering — Scialog: Chemical Machinery of the Cell Fellow Keriann Backus, Chemistry, University of California, Los Angeles; Scialog: Advanced Energy Storage Fellow Kimberly See, Chemistry and Chemical Engineering, California Institute of Technology; and Scialog: Advanced Energy Storage and Scialog: Negative Emissions Science Fellow Haotian Wang, Chemistry, Rice University.

CS 2017 Monika Schleier Smith, Physics, Stanford University, was named a 2020 MacArthur Fellow. She is an experimental physicist advancing understanding of many-particle quantum systems.

November

Scialog: Chemical Machinery of the Cell Fellow Judith Su, Optical Sciences and Biomedical Engineering, University of Arizona, received a $1.82 million award from the National Institute of General Medical Sciences, part of the National Institutes of Health, to advance her research in ultrasensitive optical sensing.

Ongoing collaborations involving two Cottrell Scholars in chemistry from SUNY Stony Brook University, CS 2018 Jarrod French, and CS 2001 Carlos Simmerling, have resulted in three papers on the group’s research into photoreceptor proteins activated by blue light.

CS 2012, 2017 FRED Award winner and Scialog: Solar Energy Conversion Fellow Sara Skrabalak was appointed Editor-in-Chief of Chemistry of Materials and ACS Materials Letters.

The team led by Rommie Amaro, one of RCSA’s COVID-19 Initiative awardees and a Facilitator of Scialog: Chemical Machinery of the Cell, has received the Association for Computing Machinery’s first Gordon Bell Special Prize for High Performance Computing-Based COVID-19 Research. Ongoing collaboration between Amaro, Ronit Freeman and Carlos Simmerling funded by RCSA builds on this work to leverage the insights and convert them into lead compounds to inhibit viral infection.

Scialog: Time Domain Astrophysics Fellows Daniel Huber, Astronomy, University of Hawaii, and Melissa Ness, Astronomy, Columbia University, posted a paper on arXiv presenting a new, data-driven technique to infer stellar properties from light curves. The research stems from their 2018 Scialog Team Award. Undergraduate researcher Maryum Sayeed is the first author on the paper.

Ten members of RCSA’s scientific community were elected Fellows of the American Association for the Advancement of Science in recognition for important contributions to STEM disciplines! For chemistry: CS 2012 William Dichtel, Northwestern University; CS 2003 Nicola Pohl, Indiana University; CS 1997 Daniel Raftery, University of Washington; CS 2012 Sara Skrabalak, Indiana University; CS 2009 Rory Waterman, University of Vermont; and 2000 Research Innovation Award recipient Peidong Yang, University of California, Berkeley. For engineering, Scialog: Solar Energy Conversion Fellow Michael Chabinyc, University of California, Santa Barbara, and Scialog: Negative Emissions Science Facilitator Ah-Hung (Alissa) Park, Columbia University. For physics, CS 1995 Eberhard Bodenschatz, Max Planck Institute, and Eric Mazur, Harvard University, keynote speaker for Scialog and Cottrell Scholar conferences.
The inaugural meeting of Scialog: Negative Emissions Science initiative was held virtually November 5-6. More than 50 Fellows—from chemistry, engineering, materials science, physics, and related disciplines—were guided by a group of nine Facilitators in brainstorming ideas to advance fundamental science in the design of novel approaches for removing and utilizing or sequestering greenhouse gases, and for making those technologies globally scalable. Keynote speaker Julia King of the University of Cambridge, Chair of the United Kingdom’s Carbon Trust, spoke about the urgent need to decarbonize the global economy, and the potential economic impact.

December
The Cottrell Emerging Scholars Program, which received one of four $25,000 Cottrell Scholar Collaborative awards from RCSA in 2019, is harnessing the power of the Cottrell Scholar network to enhance faculty diversity in the physical sciences at both research-intensive universities and primarily undergraduate institutions. Project lead is CS 2006 Keivan Stassun, Astronomy, Vanderbilt University, collaborating with: CS 2006 Darren Johnson, Chemistry, University of Oregon; CS 2006 Adam Leibovich, Physics, University of Pittsburgh; and CS 2018 Grace Stokes, Chemistry, Santa Clara University.

CS 2004 Paul J. Chirik, Chemistry, Princeton University, received the 2020 Linus Pauling Medal Award presented by the American Chemical Society Oregon, Portland, and Puget Sound Local Sections. Chirik is recognized for his work to discover new catalysts based on transition metals abundant in Earth’s crust and is editor in chief of the ACS journal Organometallics.

CS 2007 Carlos Meriles, recipient of RCSA’s first FRED Award in 2016, said his award has done more than help him make scientific advances opening new routes to quantum information processing and nanoscale sensing. He said the funding enabled his lab to do more mentoring and training to help bring new people at the minority-serving City College of New York into the scientific life.

Scialog: Solar Energy Conversion Fellow Ray Schaak, Chemistry, Pennsylvania State University, was named recipient of the Akron Section Award presented by the American Chemical Society Akron Section. Schaak, whose research focuses on the development of new synthetic tools for catalysis, photonics, and energy conversion and storage, has also served on RCSA’s Cottrell Scholar Selection Committee.

In Memoriam
Kathleen Eckert, RCSA Senior Program Assistant
Susan Odom, Scialog: Advanced Energy Storage Fellow
2020 Financial Summary

Program Expenses, Including Grants & Awards 87%
General & Administrative Costs 13%

Total Expenses $8.3 million

Cottrell Scholars Awards 46%
Scialog Collaborative Awards (excludes $800K in partner awards) 6%
Cottrell Career Advancement, FRED, Collaborative Awards 12%
Discretionary Grants & Special Initiatives 5%
Emergency Initiatives
Cottrell Fellowships (includes NSF support of $300K) 15%
Cottrell Instrumentation Supplements 3%
COVID-19 Initiative 13%

Grants and Awards $5.3 million

Net Assets at Beginning of Year $188.5 million
Net Assets at End of Year $215.6 million

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