

# BREA NEWS

[www.bnl.gov/bera/activities/brea/](http://www.bnl.gov/bera/activities/brea/)

Volume 20, Issue 2

March/April 2020

## BREA Meetings

BREA meetings are held on the second Tuesday of every month (except for August), at 1 p.m. in one of the conference rooms in Bldg. 400 (except where noted).

All BREA members are invited to attend and participate.

### Meeting Schedule

March 10, 2020

April 14, 2020

May 12, 2020

### BREA Officers

#### President

Arnold Moodenbaugh  
[moodenba@optonline.net](mailto:moodenba@optonline.net)

#### Vice President

Lillian Kouchinsky  
[lkouchin@yahoo.com](mailto:lkouchin@yahoo.com)

#### Secretary

Pat Flood  
[pat@leonhardts.com](mailto:pat@leonhardts.com)

#### Treasurer

Leslie G. Fishbone  
[lgfishbonenn@gmail.com](mailto:lgfishbonenn@gmail.com)

\* \* \*

#### Newsletter Editor

Mona S. Rowe  
[msrowe.hi@gmail.com](mailto:msrowe.hi@gmail.com)



Read about BNL's top 10 science and technology achievements of 2019. See pages 2 & 3.

## From the President

by Arnie Moodenbaugh, [moodenba@optonline.net](mailto:moodenba@optonline.net)

To fellow BREA Members,

This issue features an article about the top-ten BNL science and tech achievements, looking back at 2019. Looking ahead, the scientific outlook for BNL was strengthened by the Department of Energy award to BNL of the Electron-Ion collider, or EIC (<https://www.bnl.gov/eic/>). This is a major project that will have an impact throughout BNL, also extending to the surrounding communities.

At the January BREA meeting, we had an informative and entertaining presentation about annuities by TIAA representatives Benny Goodman and David Donlon. This presentation was organized for us by Steve Shapiro and BNL Human Resources. We will try to make available information from the presentation on the BREA website.

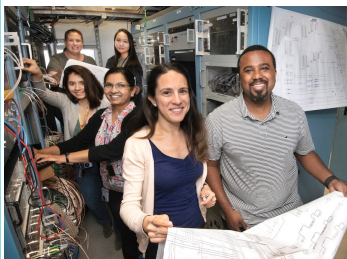
Notices for the February meeting were not distributed, but the meeting was well attended anyway. We hope to arrange a better back-up plan for our announcements.

Preliminary planning is under way for the annual luncheon. Lillian Kouchinsky and Liz Seubert have agreed to organize the event. This year we intend to have the luncheon in mid-June, much as in past years. We will distribute details of the luncheon

(continued on page 4)

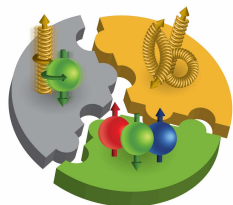
# Top-10 Science and Tech Achievements of 2019

In 2019, scientists at the U.S. Department of Energy's (DOE) Brookhaven National Laboratory dove deeper into proton spin, took a leap in quantum communication, and uncovered new details of plant biochemistry, battery cathodes, catalysts, superconductors, and more. Here, in no particular order, are the biggest advances of the year. Go to BNL's Newsroom online for details: <https://www.bnl.gov/newsroom/news.php?a=116966>.



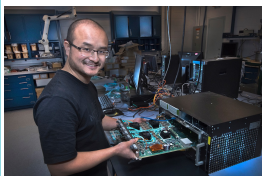
## World's First 'Bunched-beam' Electron Cooling at Collider

Accelerator physicists and engineers at the Relativistic Heavy Ion Collider (RHIC) demonstrated a groundbreaking technique that uses bunches of electrons to cool beams of particles at RHIC. The technique required a series of "world's-first" accelerator advances, fully implemented at RHIC for this year's run.



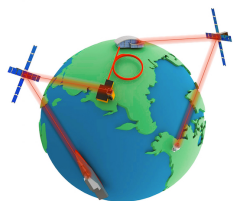
## Sea Quark Surprise Reveals Deeper Complexity In Proton Spin Puzzle

Nuclear physicists from the STAR collaboration at the Relativistic Heavy Ion Collider (RHIC) discovered quirky new information about how particles called antiquarks contribute to proton spin. The new results reveal that antiquarks contribute to spin differently depending on their "flavor," with less-abundant "up" antiquarks making a larger contribution to the spin than the more-abundant "down" antiquarks.



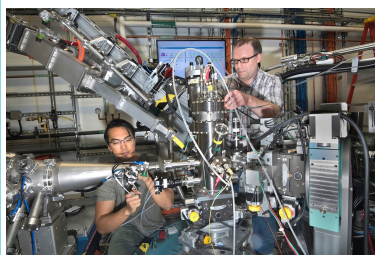
## Equipment Delivered for Global High-energy Physics Experiments

Scientists, engineers, and technicians at Brookhaven Lab finished constructing the 3.2 gigapixel sensor array for the Large Synoptic Survey Telescope, a massive telescope that will observe the universe like never before. Brookhaven also coordinated the completion of major upgrades to the ATLAS Experiment at CERN's Large Hadron Collider. The project focused on three components of ATLAS: the trigger/data acquisition system, the liquid argon calorimeter, and the forward muon detector.



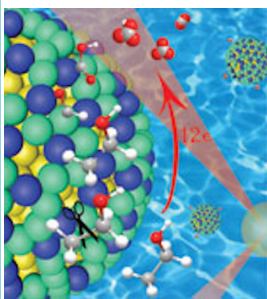
## Going the Distance for Quantum

Scientists from Brookhaven Lab's Computational Science Initiative, Instrumentation Division, and Physics Department and Stony Brook University have entered the technological race to develop the quantum internet. Based on the extraordinary phenomena of quantum physics, such a network could revolutionize the way we communicate and compute.



## Understanding Thin Films for Future Applications

Scientists at the National Synchrotron Light Source II used ultrabright x-rays to visualize and understand the growth and assembly of thin films. Thin films dominate some of the most important technologies in our daily lives, such as computer chips and solar cells.



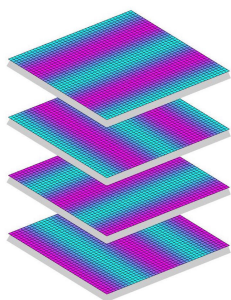
### Advances in Catalysts for Energy Production

Chemists at Brookhaven have developed new catalysts for energy reactions and methods for systematically optimizing their performance. In one study, they created a highly efficient catalyst for extracting electrical energy from ethanol, an easy-to-store liquid fuel that can be generated from renewable resources. A second study describes how chemists used molecular tethers to connect light-absorbing molecules to a “water-splitting” catalyst. This setup doubled the efficiency of this form of “artificial photosynthesis,” which generates hydrogen fuel from sunlight, and gives the team an easy way to study different chemical combinations and vary the distance to maximize performance.



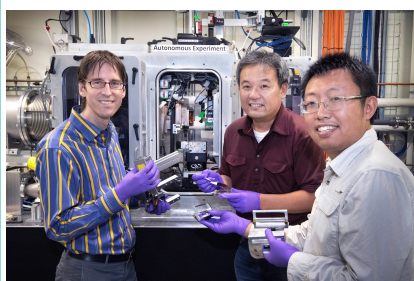
### New Strategies for Redirecting Plants’ Carbon Resources

Two unanticipated discoveries by plant biochemists suggest new strategies for redirecting where plants put their carbon, a building block of energy compounds. The work could result in new strategies for growing crops for energy or other useful products.



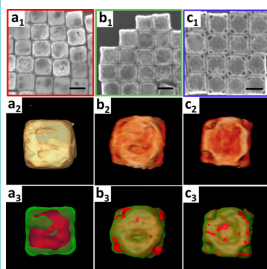
### High-temperature Superconductivity Hunt Heats Up

If you don’t know where to look in the first place, finding materials that conduct electricity without resistance at unusually high temperatures is like finding a needle in a haystack. But this year, Brookhaven Lab scientists studying copper-oxide (cuprate) materials got two more key clues to help guide the search for such high-temperature superconductors, which could enable zero-energy-loss power transmission lines across the electric grid and other energy-saving applications.



### New AI Techniques Accelerate the Pace of Discovery

New artificial intelligence (AI) approaches developed at Brookhaven are speeding up research in chemistry, nanoscience, and more by using algorithms to sift through data faster than humans can. In one study, scientists used machine learning to extract essential information about catalytic particles from x-ray data collected under real reaction conditions. In a second study, scientists developed an algorithm to make “smarter” decisions during an experiment.



### Synthesis by Assembly Encodes Greater Complexity into Nanomaterials

A high level of control is needed to engineer nanomaterials with the desired properties for particular applications. Scientists at Brookhaven Lab’s Center for Functional Nanomaterials are trying to achieve such control by developing synthesis-by-assembly techniques for organizing nanoscale components into precise architectures. The development of methods to achieve such precision assembly could lead to new materials for electronics, optics, medicine, and other applications.



## Renew BREA Membership

Membership expires on December 31 of every year no matter when you paid your dues (which are requested by January 31 of the following year). To stay on BREA’s mailing list, complete the form below and mail it to me along with your payment. Include your email address so BREA can send you timely information.

If you have questions or if your contact info has changed, email me at [hellobylin@yahoo.com](mailto:hellobylin@yahoo.com).

PLEASE PRINT

Last name: \_\_\_\_\_ First name: \_\_\_\_\_ MI: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_ Email: \_\_\_\_\_

Membership type:

annual (\$10)     5 years (\$40)    Life  (\$95)

Date: \_\_\_\_\_ Check amount: \_\_\_\_\_

### MAKE YOUR CHECK OUT TO BREA

I want to receive BREA News by mail via the U.S. Post Office.

I want to receive BREA News by email only. Do not mail it to me via the U.S. Post Office.

Mail form and check (made out to BREA) to:

Beth Lin, BREA Membership Chair  
81 Westchester Drive  
Rocky Point, NY 11778

– Beth Lin, Membership Chair  
[hellobylin@yahoo.com](mailto:hellobylin@yahoo.com)

## Perfection!

BREA member Chuck Schuster reported that retiree Ralph Wilson bowled a perfect game on January 10, 2020, at Coram Country Lanes. Wilson is the first in their Friday Morning Bowling League to reach the top. “It takes skill and luck,” said Schuster.



Wilson has been bowling for five years. “Like the rest of us,” said Schuster, “he bowls for the social and friendship aspects.”

## In Memoriam

We deeply regret to inform you of the passing of the following retirees.

Marian Ellison (Willis) LeFevre, 96, January 14, 2020  
Thomas Frank Prach, 88, January 30, 2020

More information may be found at BREA’s website: [www.bnl.gov/bera/activities/brea](http://www.bnl.gov/bera/activities/brea). To post an obituary for a deceased BNL employee or retiree, email information to [msrowe.hi@gmail.com](mailto:msrowe.hi@gmail.com) or mail it to BREA (see panel below for address).

## President’s Message (continued)

when they are set. For the following year (2021) and beyond, we would like to consider changes that might include moving the date to earlier in the spring. Your suggestions are welcome. Email me or send a note to BREA at the address in the panel below.

Arnie Moodenbaugh, [moodenba@optonline.net](mailto:moodenba@optonline.net)

## Brookhaven Retired Employees Association

BREA c/o BERA  
Brookhaven National Laboratory  
Bldg. 400 Brookhaven Avenue  
Upton, NY 11973

Phone: (631) 344-5090

Email: [BREA@bnl.gov](mailto:BREA@bnl.gov)

Web: <https://www.bnl.gov/bera/activities/brea/>

