



THE CAMILLE & HENRY DREYFUS FOUNDATION

2017 in Review



Michele Parrinello, 2017 Dreyfus Prize winner

Letter from the President, Henry C. Walter



striking to see the variety of ways this area of chemistry has an important and broad impact.

Michele Parrinello, Professor at USI Università della Svizzera italiana and ETH Zurich, won the 2017 Dreyfus Prize. His pioneering advances, from the Parrinello–Rahman and Car–Parrinello methods to his current work in metadynamics, have established him as a giant in the field. It was a pleasure to recognize him with the Dreyfus Prize at his home institution in Lugano, Switzerland.

Following the awarding of each Dreyfus Prize, the Foundation sponsors a one-day symposium on that year's prize topic at the subsequent national meeting of the American Chemical Society. The symposium on Theoretical and Computational Chemistry will be held at the ACS meeting in New Orleans on March 20, 2018. Several of the world's most influential theorists, including Michele Parrinello, will give talks. Further details are found in this report and on the Dreyfus website. We hope you will be able to join us.

Last year Dreyfus discontinued the Postdoctoral Program in Environmental Chemistry. When this program was initiated in 1996, the principal goal was to establish environmental chemistry as an important component of research departments in the chemical sciences. After twenty years, that goal has been essentially accomplished. The program provided crucial research support in fields such as atmospheric chemistry, climate change, aquatic and marine matters, toxicology, green chemistry, and

It is fascinating to read the Dreyfus Prize nominations submitted in support of truly outstanding chemists from throughout the world. The 2017 prize topic was Theoretical and Computational Chemistry, and it was

many others. Through this program, the Foundation awarded nearly \$20 million to support almost 200 postdoctoral fellows to conduct crucial chemistry research related to the environment, many of whom are now on the faculty of top institutions.

As with any program that is so successful and popular, it is bittersweet to close it down. Dreyfus plans to find other important areas of chemistry that need “startup” support, with the hope that something similar will happen in a dozen or so years.

In closing, I would like to recognize two Dreyfus Board members, Marye Anne Fox and John Brauman, both of whom became emeritus in 2017. The Dreyfus Foundation has long benefited from the guidance of these esteemed scientists. John first joined the Foundation in 1988 and was elected to the Board in 2006. Marye Anne started her association with us in 1991 and became a Director in 2002. All of us at the Dreyfus Foundation are grateful for their years of service and substantial contributions to our mission to advance the chemical sciences. We will miss their counsel but look forward to continuing our association and friendship with them in the years ahead.

Thank you as always for reading, and best wishes to all for 2018.

Henry C. Walter



Marye Anne Fox and John Brauman, 2014 Teacher-Scholar conference

Michele Parrinello Wins 2017 Dreyfus Prize



Michele Parrinello, Professor at USI Università della Svizzera italiana and ETH Zurich, received the 2017 Dreyfus Prize in the Chemical Sciences, which was conferred in Theoretical and Computational Chemistry. The international prize, awarded biennially, consists of \$250,000, a medal, and a citation. The award ceremony was held at Università della Svizzera italiana in Lugano, Switzerland, on September 20 and featured a lecture by Parrinello.

Parrinello was honored for his groundbreaking developments of molecular dynamics simulation methodology and associated landmark studies of chemical, material, and biomolecular systems.

“Innovations in theoretical and computational chemistry underpin our understanding of biological interactions, chemical dynamics and structure, as well as many beneficial chemical technologies. Michele Parrinello is a giant in the field, whose innovations are widely used in chemistry, biology, materials science, and engineering,” stated Matthew Tirrell, Chair of the Dreyfus Foundation Scientific Affairs Committee and Founding Pritzker Director of the Institute for Molecular Engineering at the University of Chicago.

The impact of Parrinello’s work is such that he is one of the most cited scientists in the present day. He is renowned for co-devising the Car–Parrinello method for computer simulation of the movements of atoms and molecules. This work brought together, for the first time, the classical approach of molecular dynamics with a quantum theoretical approach for electron densities. This enabled the realistic exploration of a wide range of physical situations. Prior to this Parrinello had become distinguished for developing the Parrinello–Rahman method to study phase transitions in crystals.

More recently, he has developed what is called metadynamics and subsequently announced an efficient variational sampling

process. This has allowed the calculation of complicated phenomena such as protein folding, crystallization from a liquid, or the binding of drugs to protein receptors.

Henry C. Walter, President of the Dreyfus Foundation, said, “Michele Parrinello’s contributions to chemistry are immense. The Dreyfus Foundation is proud to honor him with the Dreyfus Prize, and as the first recipient from outside the United States.”

“I am overjoyed and humbled by the honor,” said Parrinello. “I would like to dedicate this prize to my mentor Anees Rahman, the founder of modern atomistic molecular dynamics, a superb scientist, and a great human being. It was my good fortune to have met him as well as the very many talented colleagues and students with whom I had the pleasure to collaborate.”

Born in Messina, Italy, Parrinello received his Italian *Laurea* in physics from the University of Bologna in 1968. He has received many international honors including the Dirac Medal, the Rahman Prize, the Hewlett–Packard Europhysics Prize (all with Roberto Car), the Schrödinger Medal, the Enrico Fermi Prize, the Swiss Science Prize Marcel Benoist, and the American Chemical Society Award in Theoretical Chemistry. He is a Fellow of the American Physical Society, *Socio corrispondente* of the *Accademia Nazionale dei Lincei* (Italy), and a Member of the Royal Society (UK), the European Academy of Sciences, the National Academy of Sciences, the American Academy of Arts and Sciences, and others.

Further information, including a brief video and an interview with Parrinello, is available at <http://www.dreyfus.org/forum/>.



Parrinello and members of his group, Dreyfus Prize reception

Dreyfus Teacher-Scholar Conference, October 2018

The Camille and Henry Dreyfus Teacher-Scholar awards, the Dreyfus Foundation's flagship program, recognize emerging leaders in the chemical sciences. Since its inception in 1970, the program has made awards to 870 young faculty members at universities and colleges throughout the United States.

The fifth biennial Teacher-Scholar conference will be held at the New York Academy of Sciences on October 26, 2018. Approximately 40 of the most recent Dreyfus Teacher-Scholars will present posters and produce brief videos about the significance of their research. In addition, Zhenan Bao (Stanford), Sean Decatur (Kenyon), John Hartwig (UC Berkeley), and Timothy Swager (MIT) will give talks on their current work. James Anderson (Harvard) will speak about recent innovations in teaching the chemical sciences.

The talks given at previous Dreyfus Teacher-Scholar conferences, as well as the videos produced by many recent Teacher-Scholars, are available on the Dreyfus YouTube page, <https://www.youtube.com/user/CandHDreyfusFdn>.



2016 Teacher-Scholar conference

Camille and Henry Dreyfus Lectureship at University of Basel

The Foundation honors the heritage of the Dreyfus brothers and promotes scientific exchange between U.S. and Swiss chemists through the annual Dreyfus Lectureship at the University of Basel, where Camille and Henry Dreyfus were awarded their Ph.D.s. David A. Weitz, the Mallinckrodt Professor of Physics and Applied Physics at Harvard University, was the 2017 Dreyfus Lecturer. Weitz's group studies the physics of soft condensed matter, with the goal of probing and understanding the relationship between mesoscopic structure and bulk properties. While at the University of Basel, Weitz gave two lectures: *Dripping, Jetting, Drops, and Wetting: The Magic of Microfluidics* and *Droplet Microfluidics for Single Cell Studies*.



David Weitz at the University of Basel

Jean Dreyfus Lectureship for Undergraduate Institutions

Jean Dreyfus Lectureships provide funding to bring a leading researcher to a primarily undergraduate institution to give a technical lecture in the chemical sciences, a more general lecture that is open to the public, and to meet with students



Geraldine Richmond at Iona College

and faculty. The award also provides funding to support two undergraduates in summer research. The program has supported 32 lectures since it was initiated in 2010. These Lectureships were held in 2017:

Elizabeth Boon (SUNY Stony Brook) at Kenyon College

Gerald Bruce Hammond (U. of Louisville) at California State University, Fresno

Eric Jacobsen (Harvard) at University of Puget Sound

Elizabeth Nolan (MIT) at University of Evansville

Geraldine Richmond (U. of Oregon) at Iona College

ACS-Dreyfus Symposium in Theoretical and Computational Chemistry



The Dreyfus Foundation will sponsor a one-day symposium on Theoretical and Computational Chemistry, the topic of the 2017 Dreyfus Prize, at the spring national meeting of the American Chemical Society in New Orleans on Tuesday, March 20, 2018. The distinguished speakers include Michele Parrinello, the winner of the 2017 Dreyfus Prize. The symposium is sponsored by the ACS Multidisciplinary Program Planning Group and co-sponsored by the Physical Chemistry and Computers in Chemistry divisions. The speakers are (in sequence): Emily Carter (Princeton), Glenn Fredrickson (UCSB), Kendall Houk (UCLA), Mark Ratner (Northwestern), Wolfgang Domcke (Tech. U. of Munich), Sharon Hammes-Schiffer (Yale), Roberto Car (Princeton), and Michele Parrinello (USI Lugano and ETH Zurich).

Dreyfus-Sponsored ACS Awards

Since 1998, the Dreyfus Foundation has sponsored two annual awards that are administered by the American Chemical Society: Encouraging Women into Careers into the Chemical Sciences and Encouraging Disadvantaged Students into Careers in the Chemical Sciences. In 2017, these awards were made to Judith M. Iriarte-Gross, Middle Tennessee State University, and Sandra Y. McGuire, Louisiana State University, respectively.

Each award consists of \$5,000 to the awardee and a grant of \$10,000 to an eligible non-profit institution, designated by the recipient, to strengthen the objectives of the award. McGuire directed her grant to endow the Sandra Yancy McGuire Outstanding Supplemental Instruction Leader Award at the Center for Academic Success at Louisiana

State University. Iriarte-Gross designated her grant to be directed to the Women in STEM Fund at Middle Tennessee State University.



Judith Iriarte-Gross, Richard Zare, Sandra McGuire, and Scott Walter

News of the Board & Advisors

Richard Zare, the Marguerite Blake Wilbur Professor in Natural Science at Stanford University and a Director of the Dreyfus Foundation, won the 2017 Othmer Gold Medal, the preeminent award of the Chemical Heritage Foundation. The medal honors individuals who have made multifaceted contributions to chemistry through outstanding activity in such areas as innovation, entrepreneurship, research, education, public understanding, legislation, or philanthropy.

Daniel Nocera and **John Rogers** have been elected to serve as Advisors to the Dreyfus Foundation, effective April 2018. Nocera is the Patterson Rockwood Professor of Energy at Harvard University. His group has pioneered studies in renewable energy conversion and invented the artificial leaf and bionic leaf. Rogers

is the Louis Simpson and Kimberly Querrey Professor of Materials Science and Engineering, Biomedical Engineering, and Neurological Surgery at Northwestern University. His research seeks to understand and exploit interesting characteristics of “soft” and unusual classes of materials. These include polymers, liquid crystals, biological tissues, and semiconductor micro/nanomaterials. His focus is on bio-integrated systems and bio-inspired designs.

JoAnne Stubbe received the 2017 Pearl Meister Greengard Prize. Awarded by Rockefeller University, the prize recognizes accomplishments of outstanding women in science. Stubbe is the Novartis Professor of Chemistry and Biology Emeritus at MIT and retired from serving as a Dreyfus Advisor in 2017.

Board of Directors

Henry C. Walter
President

Dorothy Dinsmoor
Vice President and Secretary

H. Scott Walter
*Treasurer and Chair,
Finance and Audit Committee*

Matthew V. Tirrell
Chair, Scientific Affairs Committee

John R. H. Blum

Edward A. Reilly

Richard N. Zare

Paul Woitach

Directors Emeritus

H. Marshall Schwarz

Marye Anne Fox

John I. Brauman

Past Presidents

Camille Dreyfus, 1946-1956

Jean Dreyfus, 1956-1991

Dorothy Dinsmoor, 1991-2009

Advisors

Louis E. Brus

Arup Chakraborty

David E. Hansen

Francois M. M. Morel

Honorary Advisors

James G. Anderson

Dudley R. Herschbach

Mario J. Molina

JoAnne Stubbe

John C. Tully

Staff

Mark J. Cardillo
Executive Director

Gerard Brandenstein
Associate Director

Adam Lore
Operations Manager

Heather Loza
Office Assistant

The mission of the Camille and Henry Dreyfus Foundation is *to advance the science of chemistry, chemical engineering, and related sciences as a means of improving human relations and circumstances throughout the world.* Established in 1946 by chemist, inventor, and businessman Camille Dreyfus as a memorial to his brother Henry, the Foundation became a memorial to both men when Camille Dreyfus died in 1956. Throughout its history the Foundation has sought to take the lead in identifying and addressing needs and opportunities in the chemical sciences.



THE CAMILLE
& HENRY DREYFUS
FOUNDATION

555 Madison Avenue
New York, New York 10022
T: (212) 753-1760
F: (212) 593-2256
www.dreyfus.org

2017 Awards

Dreyfus Prize in the Chemical Sciences

Michele Parrinello, *USI Università della Svizzera italiana* and *ETH Zurich*

Camille Dreyfus Teacher-Scholar Awards Program

Chase L. Beisel, *North Carolina State University*

Brandi M. Cossairt, *University of Washington*

Jason M. Crawford, *Yale University*

Aaron P. Esser-Kahn, *University of California, Irvine*

Alison R. Fout, *University of Illinois at Urbana-Champaign*

Randall H. Goldsmith, *University of Wisconsin-Madison*

Robert R. Knowles, *Princeton University*

Julius B. Lucks, *Northwestern University*

Thomas E. Markland, *Stanford University*

Christian M. Metallo, *University of California, San Diego*

Michelle A. O'Malley, *University of California, Santa Barbara*

William A. Tisdale, *Massachusetts Institute of Technology*

Guihua Yu, *The University of Texas at Austin*

Henry Dreyfus Teacher-Scholar Awards Program

Lauren Benz, *University of San Diego*

Juliane L. Fry, *Reed College*

Amelia A. Fuller, *Santa Clara University*

John D. Gilbertson, *Western Washington University*

Benjamin M. Swarts, *Central Michigan University*

Helen K. White, *Haverford College*

Douglas D. Young, *The College of William & Mary*

Postdoctoral Program in Environmental Chemistry

Jillian F. Banfield, *University of California, Berkeley*

Theodore A. Betley, *Harvard University*

Lea Hildebrandt Ruiz, *The University of Texas at Austin*

Kyle M. Lancaster, *Cornell University*

Scot T. Martin, *Harvard University*

Nga Lee Ng, *Georgia Institute of Technology*

Alexander T. Radosevich, *Massachusetts Institute of Technology*

William A. Tisdale, *Massachusetts Institute of Technology*

Jean Dreyfus Lectureship for Undergraduate Institutions

Franklin & Marshall College

Pomona College

Providence College

Santa Clara University

Towson University

Dreyfus-Sponsored Awards

ACS Award for Encouraging Women into Careers in the Chemical Sciences

Judith M. Iriarte-Gross, *Middle Tennessee State University*

ACS Award for Encouraging Disadvantaged Students into Careers in the Chemical Sciences

Sandra Y. McGuire, *Louisiana State University*

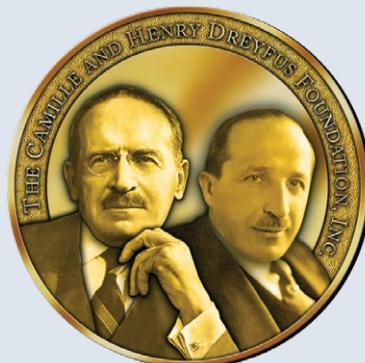
Award Programs and 2018 Deadlines

The Dreyfus Prize in the Chemical Sciences,

awarded biennially, consists of a monetary award of \$250,000, a medal, and a certificate. The prize, which is open to international nominations, is awarded to an individual in a selected area of chemistry to recognize exceptional and original research that has advanced the field in a major way.

Announcement of topic: fall 2018

Deadline: early 2019



The Camille Dreyfus Teacher-Scholar Awards

Program supports the research and teaching careers of talented young faculty in the chemical sciences at Ph.D.-granting institutions. Based on institutional nominations, the program provides discretionary funding to faculty prior to their sixth year of appointment. Criteria for selection include an independent body of scholarship attained as independent researchers and a demonstrated commitment to education. The award provides an unrestricted research grant of \$75,000.

Deadline: February 8, 2018

The Henry Dreyfus Teacher-Scholar Awards

Program supports the research and teaching careers of talented young faculty in the chemical sciences at primarily undergraduate institutions. Based on institutional nominations, the program provides discretionary funding to faculty who are within the fourth and twelfth years of their independent academic careers. The award is based on accomplishment in scholarly research with undergraduates, as well as a compelling commitment to teaching. The award provides an unrestricted research grant of \$60,000.

Deadline: May 17, 2018

The Postdoctoral Program in Environmental Chemistry has been suspended.

The Jean Dreyfus Lectureship for Undergraduate Institutions

provides an \$18,500 grant to bring a leading researcher to a primarily undergraduate institution to give a series of lectures in the chemical sciences, at least one of which is promoted and accessible to the general public. The lecturer is expected to substantially interact with undergraduate students and faculty over the period of the visit. The program provides funds to host the speaker and to support summer research opportunities for two undergraduate students.

Deadline: May 17, 2018

The Camille and Henry Dreyfus Foundation sponsors the American Chemical Society awards **for Encouraging Disadvantaged Students into Careers in the Chemical Sciences** and **for Encouraging Women into Careers in the Chemical Sciences**.

The awards recognize significant accomplishments by individuals in stimulating these students to chose careers in the chemical sciences and engineering. Each award consists of \$5,000, a certificate, and a grant of \$10,000 to an eligible non-profit institution, designated by the recipient, to strengthen its activities in meeting the objectives of the award. See the American Chemical Society's website for additional information on these awards: <http://www.acs.org>.
Deadlines for both awards: November 1, 2018