

Periodic Tabloid

Chemistry and Chemical Engineering Division at Caltech

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CCE Chair Wins National Medal of Science

Dr. Jacqueline K. Barton, the Arthur and Marian Hanisch Memorial Professor of Chemistry and chair of the Division of Chemistry and Chemical Engineering has received the 2010 National Medal of Science, "the highest honor bestowed by the United States government on scientists."



"Nobody gets here on their own," said President of the United States Barack Obama. "Each of them succeeded because they had a great teacher, a great mentor, or a great partner. Some of them don't have to look far for inspiration. In fact, I hear that Jackie Barton's husband [Peter B. Dervan] won the same award she is getting today in 2006, and they plan to display their medals next to each other on a mantle at home..."

President Obama named seven eminent researchers as recipients of the National Medal of Science and five inventors as recipients of the National Medal of Technology and Innovation. The National Medal of Science was created by statute in 1959 and administered for the white house by the National Science Foundation (NSF). The ceremony at the White House took place on October 21, 2011. Dr. Barton's research group gathered in the group meeting room to watch the live webcast of the event with great pride. Celebrations will continue in the coming weeks.

Prof. Davis and Tirrell Elected to the Institute of Medicine



Dr. Mark E. Davis, Warren and Katharine Schlinger Professor of Chemical Engineering, and Dr. David A. Tirrell, Ross McCollum-William H. Corcoran Professor and Professor of Chemistry and Chemical Engineering have been elected to the Institute of Medicine (IOM), "an honor that is considered among the highest in the fields of health and medicine." Both Davis and Tirrell are already members of the National Academy of Sciences and the National Academy of Engineering. The membership in all three academies is a rare distinction, which was also granted to Dr. Frances Arnold, the Dick and Barbara Dickinson Professor of Chemical Engineering, Bioengineering, and Biochemistry in 2008. They are three of 13 living members of all three branches of the National Academies.



CCE welcomes incoming graduate students with a luncheon

A Divisional luncheon to welcome the 2011 incoming graduate students was held at noon on Monday, September 19th. Faculty, students, and staff were invited to meet the new students and enjoy a pizza lunch together. Agnes Tong, who is in charge of the chemistry graduate student records, coordinated the luncheon with help from a number of graduate students.

Welcome new grad students!

Chemistry

Taylor Adams
Allison Akagi
Heather Audesirk
Kevin Barraza
Philip Bartels
Carl Blumenfeld
Jackson Cahn
Azhar Carim
Paul Brandon Carroll
Kangway Chuang
Tania Darnton
Julian Edwards
Matthew Everhart
Ian Finneran
Seojung Han
Bryan Hunter
Nathaniel Kadunce
Marti Kallas
Jungwoo Kim
Kelly Kim
Boyu Li
Michael Lichterman
Brett McGuire
Laura Mertens
Greg Miller
Christine Morrison
Nicholas O'Connor
Noah Plymale
Michael Post
Joseph Qiu
Joseph Rheinhardt
Matthew Rienzo
Cezar Rodarte
Justin Rolando

Lauren Rosebrugh
David Selck
Linhan Shen
Nicholas Swisher
Victoria Tan
Anton Toutov
Kathleen Upton
Helen Yu
Baoqing Zhou
Theodore (Ted) Zwang

Chemical Engineering

Mark Deimund
Cristofer Flowers
Ryan Frederick
Renee McVay
Joshua Pacheco
Peter Rapp
Carolyn Richmonds
Joel Schmidt
Mu Wang
Michael Webb

Biochemistry and Molecular Biophysics

Shaobin Guo
Nadia Herrera
Qi Wen Li
Daniel Lin
Amanda Mock
Gwen Owens
Yutao Qi
Betty Wong



Professor Rustem F. Ismagilov joins the CCE Division faculty

Rustem F. Ismagilov was born in Ufa, Russia. He received his undergraduate education from 1990 to 1994 at the Higher Chemical College of Russian Academy of Sciences, Moscow, Russia. He then moved to Wisconsin to enter the graduate program of the University of Wisconsin, where he conducted his graduate research in Stephen F. Nelsen's laboratory. He began postdoctoral studies with George M. Whitesides in 1998. He became a member of the faculty of the Department of Chemistry at the University of Chicago in 2001. He has just joined our faculty as John W. and Herberta M. Miles Professor of Chemistry and Chemical Engineering. His lab is located in the Schlinger Building.



Professor Ismagilov's research group uses microfluidics to understand dynamics of complex chemical and biological reaction networks in space and time. This work involves development and validation of microfluidic technologies and using these technologies to answer questions the group is interested in. Recent technologies include development of droplet-based microfluidics to perform reactions and assays, Chemistrod and SlipChip technologies. Recent projects include 1) investigating metabolic and signaling interactions among microbes in microbial communities, 2) developing technologies for control of crystallization and aggregation of proteins in nanoliter volumes, 3) understanding the interplay of threshold kinetics and spatial structure in controlling the rate and outcome of blood clotting. Current interests include global health, developing new technologies for diagnostics, and integration of advanced diagnostics with drug discovery.

The research group is presently in the process of moving to their labs in the Schlinger building. We welcome them all!



Caltech has been rated the world's number one university in the 2011-2012 Times Higher Education global ranking of the top 200 universities.

Caltech was named world's top university in new Times Higher Education global ranking



CCE will miss our dear Professor Kuppermann, 85

Aron Kuppermann, professor of chemical physics, emeritus, at the California Institute of Technology (Caltech) passed away October 14th at home in Altadena, California. He was 85 years old.

A leader in the field of computational chemistry, Kuppermann was best known for his theoretical studies of the dynamics of chemical reactions. In the early 1970s, he completed the world's first complete three-dimensional quantum-mechanical calculation of a chemical reaction using an IBM 370. Later, he pioneered the use of supercomputers for predicting the cross sections and rates of chemical reactions.

"Aron will be known for the challenging work he did on fundamental quantum mechanical treatments of the dynamics of chemical reactions," says Rudy Marcus, the Noyes Professor of Chemistry and a longtime colleague of Kuppermann's. "He always went on, in a pioneering way, to increasingly challenging problems. The system of coordinates he developed and the equations that result from them provide a framework that others can follow."

Kuppermann developed the methodology for treating the complex relationships between electrons and nuclei in reactions, accounting for all possible relative positions and rotations in higher dimensional spaces. He started by treating a three-atom system involving just a single atom colliding with a diatomic molecule, and then moved on to systems with four or five atoms. Earlier in his career, he applied chemical physics to radiation chemistry and helped develop electron-impact spectroscopy.

In 2001, in a special issue of *The Journal of Physical Chemistry A*, several of Kuppermann's former students who have gone on to successful careers in chemistry wrote about their former mentor. In a tribute, they summed up his ability to span experiment and theory: "In doing his work, Aron combined a chemist's intuition for the way that reactions take place, with a physicist's knowledge of quantum mechanics, an engineer's insight into how to construct and maintain complex instrumentation, and an applied mathematician's interest in efficient and accurate numerical approaches for computational work—both for the theoretical work and the analysis needed to interpret experimental observations."

Born May 6, 1926, in São Paulo, Brazil, Kuppermann received his BS in chemical engineering in 1948 and another in civil engineering in 1952 from the University of São Paulo. He served as an assistant professor of chemistry at the Instituto Tecnológico de Aeronáutica in São José dos Campos from 1950-1951. In 1953, he traveled to the University of Edinburgh in Scotland where he studied for a year as a British Council Scholar before coming to the United States and the University of Notre Dame. Although he initially came to the U.S. as a fellow of the Institute of International Education, an advisor convinced him to stay at Notre Dame to earn his PhD, which he did in 1956.

Between 1955 and 1963, Kuppermann worked his way up the faculty ranks at the University of Illinois. He joined the Caltech faculty as professor of chemical physics in 1963, and became emeritus in 2010.

"Aron was an important part of the Caltech family for almost fifty years, says Jackie Barton, Chair of the Division of Chemistry and Chemical Engineering. "He was concerned about his students and helped always to mentor his young colleagues. He will be missed by all of us."

He was a member of the advisory board of the *International Journal for Radiation Physics and Chemistry* (1968-1976) and a member of the editorial board of the *Journal of Physical Chemistry* (1965-1970). He also worked to improve the state of chemical education and research in other countries, especially his native Brazil—he was a

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member of the Joint U.S.-Brazil Science Cooperation Program on Graduate Teaching and Research in Chemistry sponsored by the National Academy of Sciences between 1969 and 1973 and served as its chairman from 1973 until 1976.

Throughout his career, Kuppermann won many accolades—he was made a fellow of the American Physical Society and the American Institute of Chemists—and was an honored lecturer and visiting professor at many universities and institutions.

At Caltech, Kuppermann was selected for recognition by both undergraduate and graduate students as a leading teacher and mentor on campus. In an autobiography included in the special issue of *The Journal of Physical Chemistry A*, Kuppermann wrote that he had "derived enormous pleasure from the interaction with (his) students... I could not have made whatever contributions to science I was involved in without their collaboration."

"I couldn't have asked for a better mentor," says Ravinder Abrol, a former student of Kuppermann's who is now a scientific researcher at Caltech. "Aron took personal interest in every student and ensured he was available for both professional and personal issues. He gave us freedom of thought by allowing us to grow and learn naturally but ensured that we didn't deviate too much from the intended path."

Kuppermann worked as a consultant for organizations such as the Argonne National Laboratory, the Armour Research Foundation of the Illinois Institute of Technology, the Central Institute of Chemistry of the University of Brasília, the Instituto de Energia Atômica in São Paulo, the Jet Propulsion Laboratory, TRW Systems, Inc., Varian Associates, and the World Bank. He was also Councilor for Chemistry to the International Association for Radiation Research and to the Radiation Research Society, as well as a member of the Advisory Panel on Atomic and Molecular Properties for the National Standard Reference Data Program.

Kuppermann is survived by his wife, Roza, and four children—Baruch, Miriam, Nathan, and Sharon.

More Faculty Awards



Long Cai



Bil Clemons

- Dr. Long Cai, Assistant Professor of Chemistry, will receive the NIH New Innovator Award, which is "meant to both stimulate highly innovative research and support promising new investigators."
- Dr. Bil Clemons, Assistant Professor of Chemistry, received the NIH Pioneer Award to promote "pioneering and possibly transforming approaches to key challenges in biomedical and behavioral research."

The October 2011 @Caltech News for Alumni features great stories about Caltech and Alumni in the News. They have launched the redesigned alumni website. The website continues to share information with Millennium, so any contact information updates made to personal profiles by alumni is shared with MIL. The URL is http://www.alumni.caltech.edu/alumni_in_news

CCE Division's Golf Tournament is once again a success

The Divisional Golf Tournament took place on Friday, September 30th, 2011. CCE faculty, staff, and students were invited to play a four-person scramble golf game at the Brookside Golf Course in Pasadena. The event was coordinated by Joe Drew, who is in charge of the stockroom. Though the weather was not perfect (it rained a little), the general mood was friendly and cheerful.



CCE Seminar Day 2011

Once a year, the Division of Chemistry and Chemical Engineering holds a Seminar Day, when presentations are made by graduate students and postdoctoral scholars. Prizes are given to participants at the conclusion of the presentations. These talks are followed by a poster session, then dinner and refreshments.



This year's CCE Seminar Day was held on October 7th, 2011 in 153 Noyes, beginning at 1:30 in the afternoon.

There was a coffee and snacks break between the seminars. The seminars were followed by a dinner in the Schlinger Courtyard ending the event at 8:00 o'clock in the evening. The participation was once again very encouraging to the coordinators, who were a number of graduate students working with Agnes Tong, who handles graduate records in Chemistry. It was a great chance for the Division to come together to celebrate the outstanding research being done in CCE.



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