FROM THE DEAN

It is my pleasure to share with you the incredible achievements of our students, faculty and staff. Their commitment to research and engagement create a vibrant community.

Alexandra Navrotsky

In the coming months, members of our Division will contribute to the future of UC Davis through the campus’s “Big Ideas” campaign. Big Ideas are transformative projects that can change the world. One example is the new Chemistry Discovery Complex, which will catalyze research and serve students from across campus. I look forward to the possibilities our faculty will suggest.

DIVISION ACTIVITIES

New faculty recruitment for 2016-2017 is underway in every department, with two searches in Chemistry; one search in Earth and Planetary Sciences; one search in Mathematics; two searches in Physics; and one search in Statistics.

The Division is building a Community Computing Cluster for use by all faculty in MPS. The MPS Community Cluster Advisory Committee, led by Professor Magali Billen, will guide the operation and evolution of this new resource.

The Division is preparing several proposals for the 2016 Hiring Investment Program (HIP). This program provides faculty hiring support and encourages linkages across departments. The Departments of Physics and Math completed five new hires in 2015 under their Physics and Mathematics of the Universe HIP.

Interim Dean Navrotsky has been meeting with Interim Dean Li Zhang (Social Sciences), Interim Dean Susan Kaiser (Humanities, Arts and Cultural Studies) and Provost Ralph Hexter to discuss the future administrative structure for the College. In the meantime, the three interim deans are working cooperatively together to manage the business of the College and their respective divisions. As indicated in the letter from the Provost on Jan. 21, the three divisional deans plan to stay on, and the divisional structure is to be maintained during a smooth transition to the new Dean. The dean search is underway, as is visioning for the new, more coherent College of Letters & Science.

The Center for Undergraduate Advising and Academic Programs (CUA2) hosted two events for students and faculty during Fall 2015 — the Women of MPS Night and the Chican@s & Latin@s in STEM Career Panel. The center also kicked off a new cohort of Ambassadors of MPS, a student outreach program for outstanding undergraduates.

Upon his retirement, former dean Winston Ko endowed a challenge grant in order to establish a Professorship in Science Leadership to recognize an outstanding faculty member in MPS. The first lecture funded by the grant will be given this spring by Professor Veronika Hubeny, newly appointed to our Physics Department as part of the Center for Quantum Mathematics and Physics (QMAP). Fundraising for the Winston Ko Professorship in Science Leadership continues — we welcome contributions of any size toward this goal. Make a gift.

Interim Dean Alexandra Navrotsky is teaching a graduate special topics course, EMS 298c, this quarter. This advanced course focuses on relating thermodynamics, structure and properties of materials.
CHEMISTRY

The Department of Chemistry celebrated joining the Green Chemistry Commitment on Oct. 8. By signing the commitment, the department joined more than 25 schools and universities in adding the principles of green chemistry to its formal curriculum. Read more.

Associate Professor Louise Berben (left) was named a UC Davis Chancellor’s Fellow. This program honors the achievements of outstanding faculty members early in their career. Eleven fellows were honored this year.

The Royal Society of Chemistry recognized Professor R. David Britt (left) for major contributions to ESR (electron spin resonance) spectroscopy in chemical or biological systems — naming him the recipient of the society’s 2016 Bruker Prize.

Professor Xi Chen was named a fellow of the American Association for the Advancement of Science. Dr. Chen is among four UC Davis researchers and 347 AAAS fellows nationwide honored in 2015 for their contributions to innovation, education and scientific leadership.

Professor Annaliese Franz was featured at “Science Night Live” in Lodi, discussing the question: Can sustainable fuels be created from algae? She was also a guest on Capital Public Radio’s “Insight” discussing the same topic. Listen to the interview.

Professor Emeritus William Jackson was selected to receive the 2016 UC Davis Distinguished Emeritus Award for his continuing involvement in teaching and mentoring and his dedication to equal opportunity and diversity. He will be honored at a Chancellor’s luncheon.

The Department of Chemistry celebrated National Chemistry Week in October at Sacramento’s Discovery Museum. This year’s theme was “Chemistry Colors Our World!” A group of faculty, staff and students led exciting activities and demonstrations exploring fluorescence, chemical indicators and color-changing chemistry with area families. Professor Kyle Crabtree shared some of their demonstrations on Good Day Sacramento.

The Chemistry Club received an Honorable Mention Award from the American Chemical Society for programs and activities conducted during the 2014-15 academic year. There are more than 900 student chapters nationally, and commendable awards were given to 99.
EARTH AND PLANETARY SCIENCES

Graduate student Natalia Lopez Carranza (above) was profiled in UC Davis Today: “Top Mexican grad students at UC Davis.”

Graduate student Alisha Clark received a best poster award at the 2015 Annual Meeting of the Consortium for Materials Properties Research in Earth Sciences (COMPRES). Her poster featured her work on “Pressure dependent elastic properties of amorphous silicates by GHz frequency ultrasonic interferometry and high pressure X-ray microtomography.” Clark is now a postdoctoral scholar at the Institute of Mineralogy, Materials Physics and Cosmochemistry in Paris.

Professor Tessa Hill was named a 2016-17 Public Engagement Fellow of the Leshner Leadership Institute by the AAAS. The fellowship program funds a week of intensive training in public engagement and science communication at AAAS headquarters.

Professor Louise Kellogg was awarded $700,000 through the Sloan Foundation’s Deep Carbon Observatory for a new effort to model Earth’s entire carbon cycle from crust to core. The “Global Model of Carbon Pathways” project will create new ways to model and visualize deep Earth processes through time.

Shlemon Professor Nicholas Pinter, a nationally recognized expert on flood risks and management, was featured in the New York Times and The Economist for his perspective on Mississippi River and Missouri River flooding.

Professor Sarah Stewart’s iron vaporization work was #62 on Discover’s list of 100 top stories of 2015. Stewart was also elected president of the American Geophysical Union: Planetary Sciences Section for 2015-2017.

Professor Dawn Sumner, a member of NASA’s Mars Rover team, was a guest on Capital Public Radio’s “Insight”: “Mars Orbiter Team Discovers Evidence Of Water Flow.” Sumner and her group discovered microbial mats in an Antarctic lake that generate small oases of oxygen. Article in New Scientist: “Hidden oasis of oxygen suggests life took first breath in lakes.”
Ian Agol, a mathematics professor at UC Berkeley, was awarded the 2016 Breakthrough Prize in Mathematics. Professor Agol was a Visiting Research Assistant Professor at UC Davis from 1998-2000, under the mentorship of Professor Joel Hass. The prize was awarded “for spectacular contributions to low dimensional topology and geometric group theory.” Agol has gifted part of the prize’s $3 million award to endow a lectureship in memory of the late Professor William Thurston.

2011 graduate Tom Denton published an article in the August 2015 issue of Notices of the American Mathematical Society describing his experiences as a Fulbright Scholar involved in mathematics education and research in Kenya in 2012-2013. Read his article.

Krener Assistant Professor Rafael Granero (left), who received his Ph.D. in Mathematics in 2013 from the Autonomous University of Madrid, was awarded the Vincent Caselles Prize. The prize is an early career award for researchers under the age of 30 who have defended their Ph.D. theses in mathematics in Spain within the last three years.

Robert Hildebrand (left) received the prestigious Herman Goldstine Memorial Postdoctoral Fellowship at IBM Research for 2015–2016. Hildebrand completed his Ph.D. in Applied Mathematics in 2013. His thesis, Algorithms and Cutting Planes for Mixed Integer Programs, was supervised by Professor Matthias Köppe.

Distinguished Professor Emeritus Arthur Krener (right) was honored for a lifetime of accomplishments with the 2016 Institute of Electrical and Electronic Engineers (IEEE) Control Systems Award.

Assistant Professor Kevin Luli was awarded a 2016 Faculty Early Career Development (CAREER) Award from the National Science Foundation. The award recognizes excellence in research and education.

Graduate student Axel Saenz won a fellowship from the Kavli Institute for Theoretical Physics (KITP) at the University of California, Santa Barbara. The fellowship will enable him to spend six months at the Institute in 2016.

Professor Mariel Vazquez (right) was interviewed for the educational video series “Numberphile.” The interview formed the basis for a two-part video titled “The Shape of DNA” and “How DNA Unties Its Own Knots.” Watch the videos: Part 1 and Part 2.
**PHYSICS**

The **Center for Quantum Mathematics and Physics**, or QMAP, held its opening reception Oct. 29. QMAP is a new HIP initiative at UC Davis aimed at addressing foundational questions in modern theoretical and mathematical physics.

Professor **Marusa Bradac** (left) was featured in a BBC Earth story about the search for dark matter.

Professor Emeritus of Physics Thomas Cahill and School of Law alumni Virginia Cahill have made a $300,000 gift to create the **Cahill Applications of Physics to Environmental Problems Research Fund**. The fund will support faculty and graduate student research in physics that addresses critical environmental concerns.

Professor **Manuel Calderon de la Barca Sanchez** (left), along with Strength Through Equity and Diversity (STEAD) Committee members, won the 2015 Faculty Citation of the UC Davis Soaring to New Heights Diversity & Principles of Community Award. Calderon de la Barca Sanchez is also lead science advisor for crowdfunding 3-D IMAX film “Secrets of the Universe” about the physics of the Large Hadron Collider.

Professor **Nemanja Kaloper** (right) and co-author Tony Padilla of the University of Nottingham were awarded second place in the 2015 Buchalter Cosmology Prize for their paper, “Sequestering the Standard Model Vacuum Energy,” published in Physical Review Letters. The $5,000 prize recognized the researchers’ novel cosmological collapse mechanism, which predicts a finite Universe and includes an explanation of dark energy.

Professor **Lloyd Knox** (below, middle) and his hunt for answers about the universe’s creation were featured in the *Sacramento Bee*: “Understanding the Big Bang? It happens on a dusty blackboard at UC Davis.”

Professor **Kai Liu** (right) was named a fellow of the Institute of Electrical and Electronics Engineers. The board of directors recognized Liu’s contributions to the “understanding of magneto-transport effects and magnetization reversal in nanostructures.” His research has implications in the field of integrated circuits and microprocessors — their energy consumption and structural integrity.
PHYSICS, CONTINUED

Distinguished Research Professor David Pines (left) was awarded the 2016 Julius Edgar Lilienfeld Prize of the American Physical Society. The prize recognizes outstanding contributions to physics with $10,000, a certificate and expenses for three lectures.

Professor Robert Svoboda (right) was named a UC Davis Chancellor’s Fellow. This program honors the achievements of outstanding faculty members early in their career. Eleven fellows were honored this year.

Professor Jiming Jiang (right) is one of two recipients of the first Former Postdoc Achievement Award by the National Institute of Statistical Sciences. He received the award at the 2015 Joint Statistical Meetings in Seattle, Washington.

Distinguished Professor Jane-Ling Wang (right) has won the Gottfried E. Noether Senior Scholar Award for 2016. The award is presented annually to a distinguished senior researcher/teacher in nonparametric statistics. The recipient is invited to deliver a special lecture.

Statistical Research Professor Ethan Ande- 

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“Creative Sketching Workshop: 20 Sketch Crawl Ideas and Exercises,” was authored by Pete Scully (North Light Books, $24.99, 176 pages). Graduate co-ordinator in statistics, Scully is an urban sketcher whose new book provides ideas and techniques for those who want to capture the world with pen and pencil on pad.
PURSUING A DREAM

John Bikoba’s path to UC Davis began in a country torn by violence.

Bikoba came to Davis in 2007 from the Democratic Republic of the Congo (DRC). The DRC’s rich mineral deposits helped fund the five-year-long Second Congo War, which ended in 2003. The fighting claimed more than 5.4 million lives.

As the youngest of 11 brothers and sisters, Bikoba mined gold to pay his school fees. His father was laid off from work and couldn’t afford to send him to high school. Each week, after school, Bikoba pounded rock into sand by hand, grinding and washing the grains to extract precious metals. This was before conflicts over the rights to gold and rare earth metals fueled war in the DRC.

Bikoba finished his master’s degree this fall under the guidance of Earth and Planetary Sciences Professor Magali Billen. He examined the mechanics of deep earthquakes using the KeckCAVES.

“He has ended up with a strong, observationally-based geophysics master’s thesis for which he has had to overcome never before having access to use a computer,” Billen said. “His work has inspired new dynamical models that I am now putting together.”

Although he expects to make his career in this country, Bikoba said he also hopes to help Congolese people sever the link between the country’s mineral resources and its militias. Because he struggled to pursue an education amid warfare in the eastern Congo, Bikoba also dreams of helping others earn their degrees.

“The guys I worked with in the mine didn’t even know these were conflict minerals. The country is struggling because of its own resources,” he said. “It’s not safe to go back permanently, but I feel like there are so many ways I could help,” he said.
Division of Mathematical and Physical Sciences  July 2015—January 2016

OUR SEARCH FOR ANSWERS and the knowledge
we create seed innovation throughout the planet,
far into the next century and beyond.

PASSINGS

Associate Professor Emeritus Alan Fenech, 71, died on Jan. 3. Fenech (left) joined the Mathematics Depart-
ment as an assistant professor in 1973 and transferred to the newly formed Inter-
college Division of Statistics (later renamed the Depart-
ment of Statistics) as one of its founding members in
1979.

Distinguished Professor Peter Hall (below) died on Jan. 8 He held a joint appointment with UC Davis and the University of Melbourne, Australia. Among his many honors, he was named an officer of the Order of Australia, the highest honor of that country, and elected as a Foreign Associate of the National Academy of Sciences in the U.S.

Former geology instructor Rand Schaal, whose lively teaching style inspired and entertained thousands of undergraduates, died on Sept. 11, 2015. Rand was a beloved member of the Geology Department, receiving his B.S. in 1973 and Ph.D. in 1991, both in geology. A legacy of Schaal’s commitment to teaching is present on campus—the Ted and Rand Schaal Auditorium in Warren and Leta Giedt Hall. Schaal also created the Rand Schaal Field Fund, challenging alumni to match his contributions to support the Geology Department’s efforts to get students into the field. Rand and his father were also generous contributors to the campus through a major gift to build the Ted and Rand Schaal Aquatics Center. Share memories of Schaal online here.

CREDITS:

Produced for the Division of Mathematical and Physical Sciences: Alexandra Navrotsky, Interim Dean

Writer: Becky Oskin, MPS Marketing and Communications

Design: Morissa Rubin, UC Davis Strategic Communications

Special thanks to all of our department contributors!