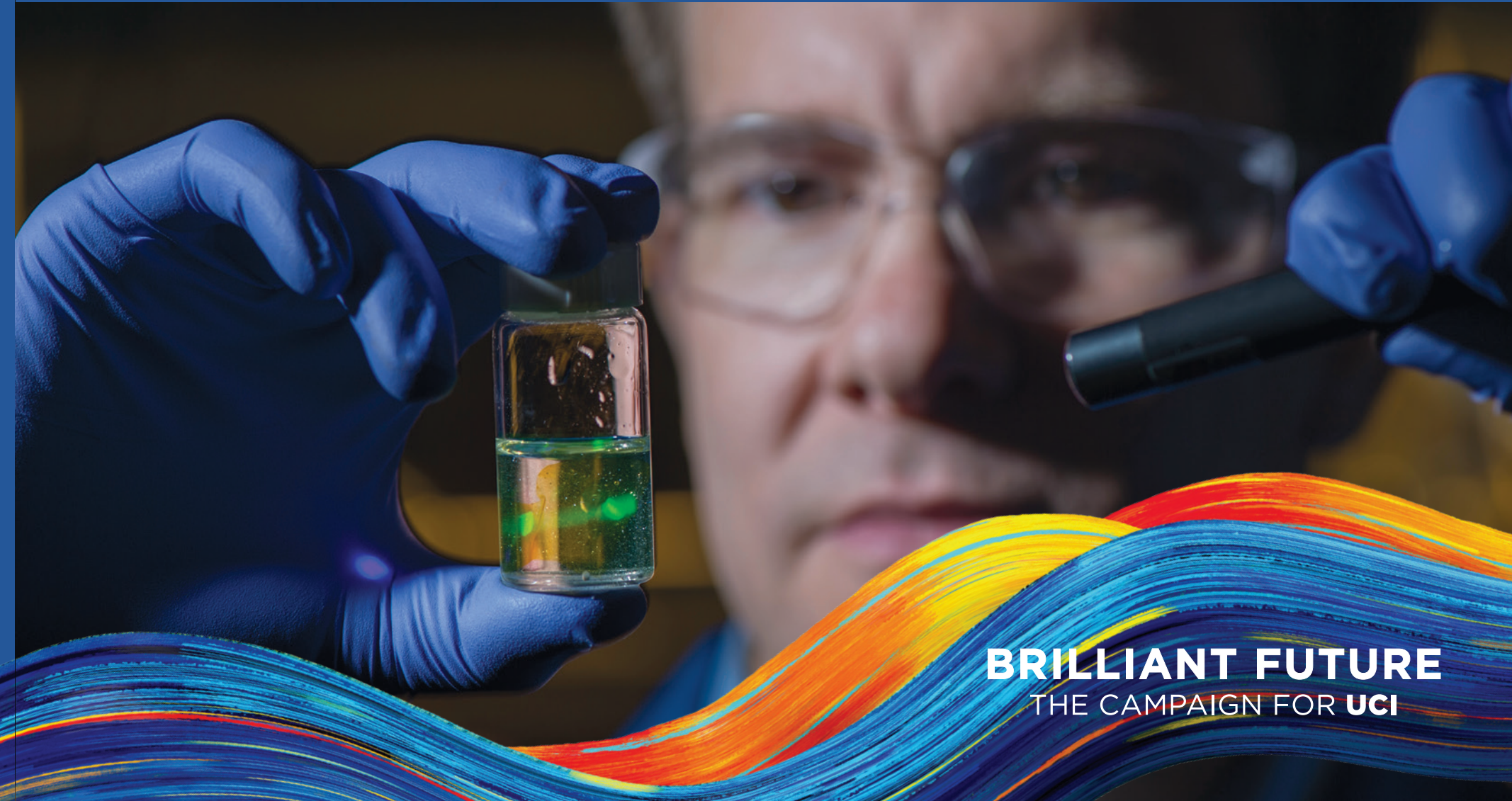





UCI School of
Physical Sciences

THE CASE FOR SUPPORT

164 Rowland Hall • Irvine, CA 92697
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BRILLIANT FUTURE
THE CAMPAIGN FOR **UCI**



“Today we are taking on even greater challenges, such as clean energy and climate change, quantum information and the fundamental makeup of the universe. It’s a special time at UCI, and I’m excited to be part of it.”

- James Bullock
Dean of the School of Physical Sciences



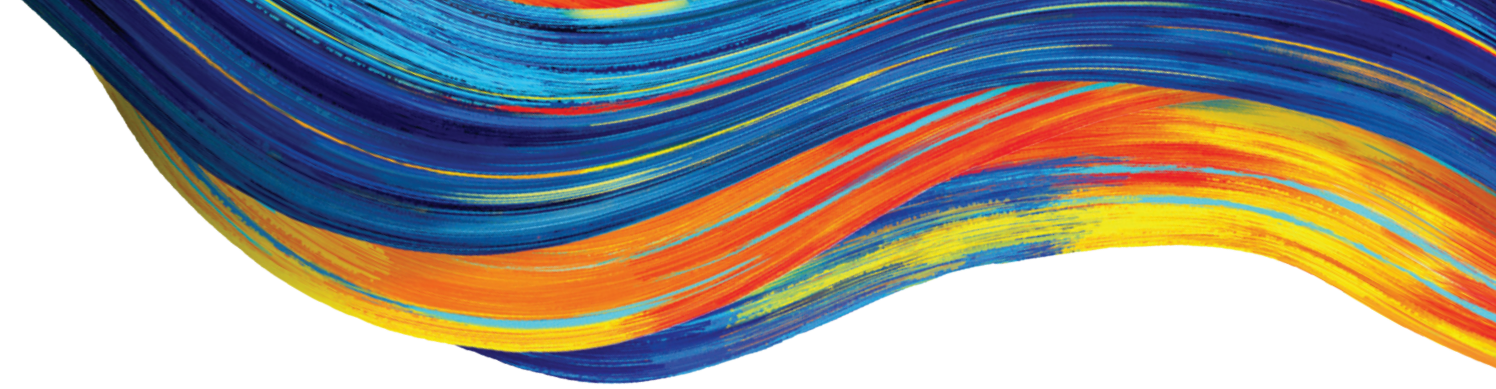
*UCI and Australian chemists have figured out how to unboil egg whites — an innovation that could dramatically **reduce costs for cancer treatments**, food production and other segments of the \$160 billion global biotechnology industry.*

The UCI School of Physical Sciences delivers scientific breakthroughs that reshape our understanding of the physical world and provide solutions to the most profound problems of our age. The school achieves this by asking hard questions; setting inspiring, visionary goals; and driving interdisciplinary research to chart new territory. Our dynamic, interdisciplinary approach leads us to tackle questions such as:

- **How do we predict** cancer tumor growth with mathematics?
- **Can we harness** quantum materials to enable a clean-energy economy?
- **How will** global coastal communities adapt to the imminent rise in sea level?
- **Is there life** on other planets, and if so, what is its physical and chemical makeup?

Our students thrive in this environment and emerge from our program ready to transform the world. Equipped with a premier education, technical acumen, and an ethos of creative thinking, our graduates go on to unearth new knowledge and help build a future for the broader good.

Despite the relative youth of our campus, the School of Physical Sciences has a rich history. We have already won two Nobel Prizes, which perfectly encapsulate the broad mission of this school: one in Chemistry for the discovery that chlorofluorocarbons (CFCs) deplete the ozone layer, and one in Physics for the discovery of a new elementary particle of nature, the neutrino. The first of these prizes embodies our mission to provide transformative discoveries that improve the world on a grand scale: It sparked a worldwide and triumphant effort to close the ozone hole. The second Nobel Prize was awarded to the founding dean of our school, who set out to discover the neutrino precisely because, “Everybody said you couldn’t do it.” This bold spirit of exploration and ingenuity guides our school today as we strive to answer deeper, more profound questions. With flagship **projects in the Environment, Health, and the Universe** we are advancing humanity through a deeper understanding of the physical science that governs the world.



「The Future of the Environment」

Designing Solutions for Global Environmental Change

How will our coastal communities adapt to the imminent rise in sea level? How do we harness quantum chemistry and basic physics to enable a clean energy economy? Can we use big data and statistics to understand social behaviors surrounding adoption of renewable energy technologies? How do we solve global shortages of clean water?

We are home to the the nation's first Department of Earth System Science, established to quantify changes to our environment and discover ways we can adapt. The Department of Chemistry is world-renowned for understanding and mitigating air pollution, with more atmospheric chemists than any department in the nation.

The most successful privately funded clean-energy fusion company in the world (TAE technologies) was founded by plasma physicists from UC Irvine. Together researchers in all departments are working to invent new devices that produce and store energy that is clean, renewable, and affordable.

Our faculty regularly influence global policy through important contributions to the IPCC, National Academy of Sciences, and other agencies. Our glaciologists are renowned for measuring the rate at which ice sheets are melting globally and how this will affect sea levels. As global water shortages become more problematic, researchers are spearheading groundbreaking work in desalination to deliver potable water for the nearly one billion people worldwide who need it most.

「The Future of Health」

Science Transforming Health

*How do we develop artificial antibodies to defeat disease?
Can we detect and destroy cancer with the same device?
Can we crack the code of the human immune system and
program it to defeat HIV? How do we predict tumor growth
with mathematics? Can someone easily and affordably test
at home for kidney disorders using biosensor technology?*

Mathematics, physics, and chemistry provide invaluable 21st-century biomedical tools that allow us to comprehend biology at the most fundamental level and to treat disease with new technologies and a deeper physical understanding than ever before. We have a history of identifying the intricacies of disease in order

to alleviate human suffering. Faculty are blazing new pathways in biomedical research, including creating artificial antibodies with mechanical energy that can show how proteins might be chemically manipulated to treat human disease. Our chemists, physicists, and mathematicians inject quantitative analysis to biological systems, working to understand disease at the core of its fundamental mechanisms. Nanodevices are the future, and our faculty are leading the way, building the next generation of sensors, specifically the enzymes and receptors that recognize disease-associated molecules. Researchers working within the convergent areas of laser physics and material science are developing next-generation techniques to detect and destroy cancer cells with the same device.



UCI chemists Ken Shea and Jeff O'Brien developed a broad-spectrum snake venom antidote.



「The Future of the Fundamental」

Understanding Our Universe

Does life exist on other planets, and if so, what is its physical and chemical makeup? How do we build a quantum computer? What secrets of the universe will the largest telescopes reveal? Where did we come from?

The most exciting frontiers of scientific understanding lie at opposite extremes of size: the microscopic realm of quantum mechanics and macroscopic realm of the galaxy and the universe itself. Researchers within our school are working

to understand the nature of quantum information, an effort that may spark a new computational revolution. Others are using the most powerful telescopes on Earth to identify potentially life-bearing worlds beyond the sun — a discovery that could transform our understanding of biology and what it means to be alive. These efforts are complemented by faculty leading experiments at the most powerful atom smashers ever built to unlock fundamental explanations for why the universe exists and its ultimate fate.



Are you ready to join us on these bold new journeys into everything from the tiniest cancer cells to the rising seas and farthest reaches of the galaxy?



Strategic Giving Opportunities

School naming gift \$85-100M investment

The UCI School of Physical Sciences seeks a historic philanthropic commitment — a school naming gift. Funding of this magnitude will empower the school to elevate its strong academics and research to elite levels of excellence. A naming gift would ensure that we are able to grow our flagship projects, hire the most dynamic and modern faculty to support our student and research growth, provide premier research facilities, attract and support the best students, and deliver comprehensive innovation through intellectual property protection and commercialization.

A naming gift would honor the intrepid spirit and interdisciplinary innovation at the heart of our school. Additionally, the impact of a naming gift for Physical Sciences at UCI will have the ability to completely transform our School. Our 50 years of precedence has established a prestigious level of scientific tradition while allowing great flexibility in shaping future outcomes for our school.

「lead the march into future scientific inquiry」

Revolutionizing the student experience

\$10M investment for endowed student and faculty support

The Departments of Chemistry, Mathematics, Physics & Astronomy, and Earth System Science will revamp both the undergraduate and graduate curriculum to better incorporate student participation into faculty research and provide superior education that will equip graduates to succeed in modern science.

Changing the way we teach our students would benefit from an injection of capital through endowed scholarships and fellowships in each department to further energize our student base in addition to hiring more faculty to teach our classes. For departments targeting professional master's degrees programs, recruitment fellowships would allow student enrollment to immediately expand and build the foundation for a sustainable program.



Strengthening our infrastructure

\$50M investment for new and existing spaces

Your gift will allow Physical Sciences to lead the march into future scientific inquiry in functional, interactive, and interdisciplinary spaces where students and faculty collaborate. Augmenting current space and expanding out of our current physical capacity is necessary for the enhanced educational experience of our students and required by our researchers.

A new Mathematics and Computations Building would alleviate overcrowding in certain buildings, but would also allow for new interactive spaces for our students and faculty to come together. Making current spaces more efficient and user friendly is also high on our list of priorities, some of which we are already undertaking in recent renovation projects.

With the expected opening of the new Interdisciplinary Science Building in late 2020, the UCI School of Physical Sciences will have

the opportunity to assign spaces to faculty that presently or prospectively collaborate with the Schools of Engineering and Computer Science. While this speaks directly to Physical Sciences' mission and vision, we require more than just a percentage of this allotted space.

Science advocacy and community partnerships

\$1M-\$5M investment

Developing partnerships with a variety of key organizations would add immediate and lasting value to our students and faculty. Partnerships would likely exist in two different paradigms — one geared toward better preparing our students to enter the marketplace by building direct paths to industry through internships; and the other would be geared toward serving community needs through research and science (and math) advocacy, and supporting the expansion internship opportunities, solutions driven centers, and public events and programs..

James Bullock, professor of physics & astronomy at the University of California, Irvine has been reaching for the stars throughout his career. Now, he's extending that reach as the newly appointed dean of the School of Physical Sciences.

"It's a tremendous honor to be named the next dean of physical sciences and to help build upon a history that is staggeringly inspirational," Bullock said. "Our faculty and students are the best in the world at what they do, and we are poised to redefine how we live and understand the world around us."

Bullock joined UCI in 2004. As chair of physics & astronomy, he has overseen the recruitment of nine new faculty members and the establishment of the UCI Center for 2D Materials Research. He is a past director of the UCI Center for Cosmology.

"Today we are taking on even greater challenges, such as clean energy and climate change, quantum information

and the fundamental makeup of the universe," Bullock said. "It's a special time at UCI, and I'm excited to be part of it."

Bullock's research interests include cosmology, galaxy formation, dark matter and the Milky Way. He is currently chair of the users committee for NASA's flagship James Webb Space Telescope, successor to the Hubble Space Telescope. He has been honored as a Chancellor's Fellow and has received two UCI Celebration of Teaching Awards. In 2008, he was named a fellow of the American Association for the Advancement of Science.

Before joining UCI, Bullock was a Hubble Postdoctoral Fellow at Harvard University and a postdoctoral fellow in astronomy and physics at Ohio State University. He earned a bachelor's degree in physics and mathematics at Ohio State University and a Ph.D. in physics at UC Santa Cruz.

「today we are taking on greater challenges」

Science Fueling Technology \$5M investment

In the past five years, the UCI School of Physical Sciences has made great strides to move faculty research out of the lab and into the marketplace. Alongside, and in addition to, basic science and mathematics studies, Physical Sciences produces applied science and mathematics advances which fuel new company formation and large industry projects. Our faculty and students have formed numerous new companies over the last 20 years and many of our graduates are employed in a range of entrepreneurial activities. Well over half of our alumni work in industry with careers applying their science and math education to current cutting-edge problems.

Through the thoughtful investment of the Beall Family Foundation, Physical Sciences has benefited from a proof-of-concept funding program, and through this effort,

individual faculty have forged excellent industry ties. Additional gifts would allow faculty to apply for project funding designed to encourage continued growth in lab-to-market products.

Institutionalizing Our Flagships \$5M per flagship; \$2M per endowed chair

Our flagship projects grew out of collaborations between faculty members from different disciplines. With discretionary endowed funds in each flagship project, Physical Sciences will invest in faculty research in an entirely new way. Those whose work falls into one of the projects can seek additional funds from the respective endowment. Such directed funding also opens possibilities for interdisciplinary endowed chairs and graduate student fellowships. For example, an endowed chair in “Transformative Science and Health” could be used to recruit faculty that would add significant value to one of our flagships, but not be limited to a singular academic discipline.



