



EMERGENCE OF LIFE INITIATIVE

Questions about the origin of life are among the oldest questions of all.

In the middle of the 20th century, attempts to discover the truth migrated from the spheres of religion, cosmology, physics, astronomy and geology into chemistry, with UC San Diego School of Physical Sciences founding faculty member Stanley Miller and colleagues demonstrating how prebiotic matter could transform into the molecules of life. New breakthroughs at the nano and cosmic scales have rekindled urgency for arriving at answers. And once again, UC San Diego is the place to lead.

New discoveries of lifelike matter could enable transformative applications in

medicine and materials science that are not possible by simply reengineering existing lifeforms. Using stem cells, manipulated DNA and implantable RNA, scientists and bioengineers are now able to replicate and even construct living cells that serve simple, designed functions. However, limits remain when engineering the features of cells and what they can be programmed to do. Bioengineers approach their prototyping of cell forms through high-volume trial and error, utilizing large data sets and simulations. Learning the fundamental principles that drive the spark of life will collapse the time and resources needed for precision engineering exponentially.

At the opposite end of the spatial spectrum, astrobiology is a rising discipline, following paradigm-shifting discoveries of planets with environments similar to Earth – and even more exciting, those that are totally unlike the Earth. Planets have a far greater diversity than we ever dreamed of when we only knew about our own solar system. Through this initiative, we can pull from a range of possible “other Earths” to explore what life could emerge.

The benefits of understanding the emergence of cells are massive, inspiring renewed interest internationally in characterizing the emergence of life – and is further enhanced by the thrill of 21st-century space exploration. Home of the original experiments that illustrated how Earth’s primordial environment could foster evolving life, UC San Diego has continued to be a leader in chemistry, biochemistry, physics and biology, and is now building out world-class capability in astronomy and astrophysics. No less important, UC San Diego is at the forefront in applied bioethics, a focus critical for ensuring experimentation prioritizes the greater good.

\$1.73 BILLION

Sponsored research funding awarded for fiscal year 2024

5TH BEST GRADUATE SCHOOL PROGRAM

Physics of Living Systems, *U.S. News & World Report*

8TH BEST GRADUATE SCHOOL PROGRAM

Biochemistry, *U.S. News & World Report*

16 NOBEL PRIZE RECIPIENTS

Laureates who have taught at UC San Diego

5TH AMONG PUBLIC RESEARCH INSTITUTIONS

UC San Diego ranked 5th among public research institutions in the U.S. according to the *Nature Index Research Leaders 2024*.

10TH IN THE WORLD

In 2022, *Nature Index* ranked UC San Diego 10th in the world among the top 200 institutions in biomedical sciences.

At UC San Diego, we believe that what we don’t know today will forever change our tomorrows. Empowered by generosity and fueled by curiosity, we are unafraid to chase the unknown – to ask the questions no one has asked before and to push the boundaries of possibility. Together, we unite diverse people and unconventional perspectives to propel limitless impact. Because we know that when we come together, nothing is beyond us.



PHILANTHROPIC OPPORTUNITY

Visionary philanthropic support of UC San Diego's multidisciplinary Emergence of Life Initiative will catalyze robust, beneficial discovery that sets the standard for research in this space worldwide. Precision-designed cells will be a resource for improving the quality and longevity of human life and ecosystems. Following breakthroughs in fundamental science, we can create our own preface for unconstrained possibility – making life in the absence of life.

Your commitment will serve as seed funding for research that crosses multiple disciplines on our campus, across the Torrey Pines Mesa, and beyond. Projects involving multiple areas rely on flexible funding to ensure research faculty can spend their time on science, rather than the logistics of convening discussions and administering grants.

Support for graduate fellowships is especially powerful, enabling the university to enroll the highest-qualified candidates while sustaining research lab support and teaching assistance. Funding for a quarterly campus workshop be instrumental in transforming research connections into functioning and productive research partnerships.

Emergence of Life discovery will set UC San Diego on a thrilling course to lead development of new capacities for biochemical, medical and environmental innovation, while setting rigorous standards for safety and the ethical implementation of discoveries. Together we can learn what it means to move matter to life – the very process of becoming.

Together with your philanthropic support, we can build a diverse pipeline of student and faculty talent ready to blaze new trails to advance scientific understanding for global good.

Learn more at physicalsciences.ucsd.edu/giving.