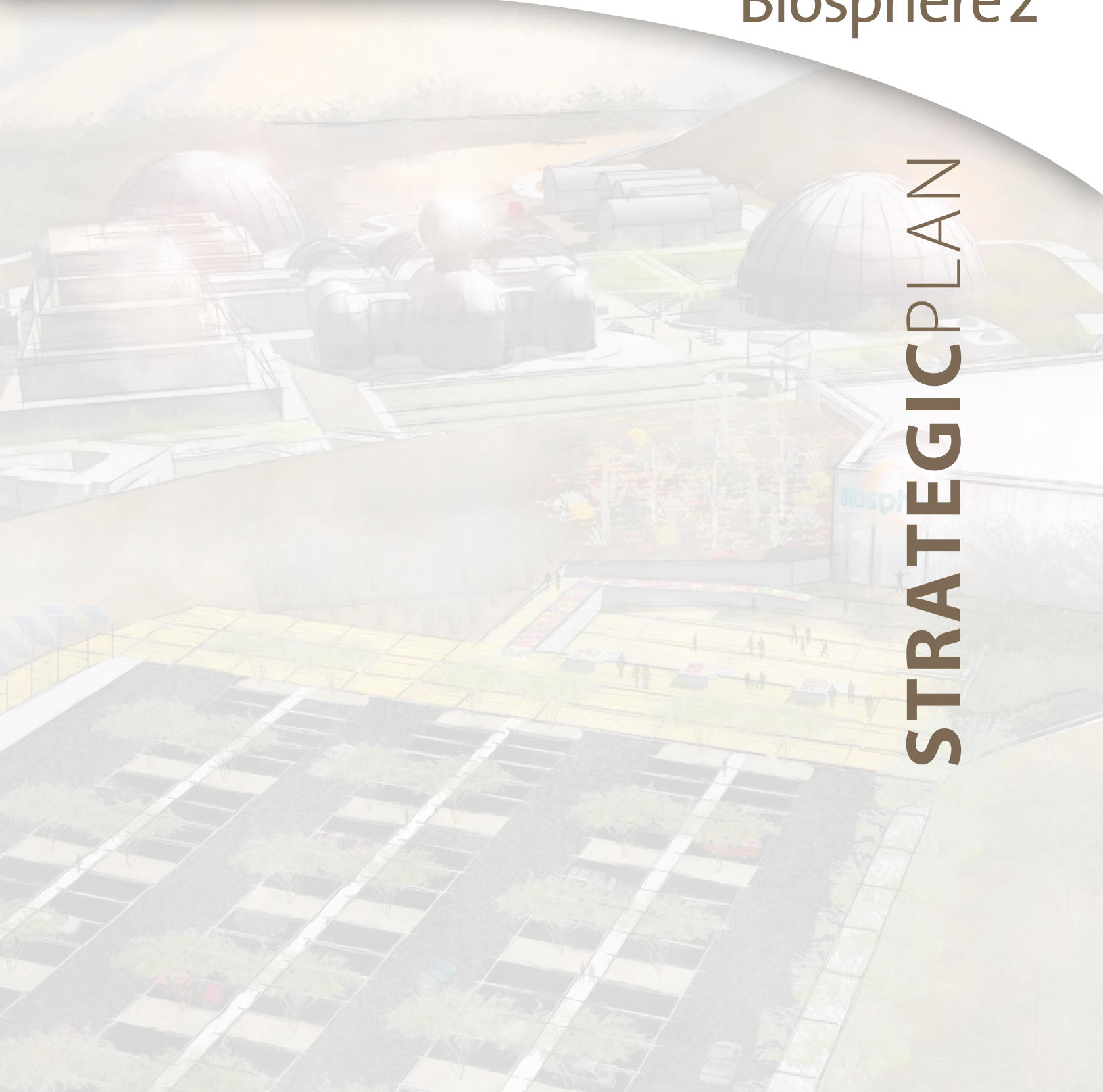





Biosphere 2



**STRATEGIC PLAN**

# SCIENCE





“The mission of The University of Arizona Biosphere 2 is to advance our understanding of the natural and man-made environment through unique experimentation, the training of interdisciplinary scientists, the education of society, and the organization of meetings to address grand challenges that affect the quality of life and the understanding of our place in the universe.”

*Joaquin Ruiz – Dean, College of Science*

## Introduction

The University of Arizona Biosphere 2 consists of a unique large-scale experimental apparatus housing seven model ecosystems, a team of multidisciplinary scientists, a broad science education and public outreach program, and a modern conference center. The seven model ecosystems are: 1) a mature rain forest with over 90 tropical tree species, 2) a 2600 m<sup>3</sup> ocean, 3) forested swamps dominated by mangrove trees, 4) a tropical savanna grassland, 5) a 1400 m<sup>2</sup> coastal fog desert, 6) three desert hillslope grass-shrubland landscapes, and 7) a 162,000 m<sup>2</sup> model city and urban ecosystem comprising Biosphere 2, its campus, and associated buildings and facilities. The Biosphere 2 Science Program addresses societal grand challenges related to water, environmental and energy management through design of large-scale experimentation in each of these model ecosystems. These experiments support the development of computer models that simulate the biological, physical and chemical processes to predict ecosystem response to environmental change. In return, these coupled-systems model simulations inform scientists about the next level of experimentation needed to advance understanding of these complex systems' responses that can be tested against observations in natural systems.

## Strategic Goals

Our overall goal is to grow the Biosphere 2 Science Program into a sustainable and community-oriented research program that is poised to address and solve fundamental scientific challenges regarding water, environment and energy management. In order to reach this goal we need to establish:

- Cutting-edge research programs in each of the seven model ecosystems led by faculty at Biosphere 2 and the University of Arizona;
- An outreach program to conduct research with participation of the general public and K-12 students and educators to foster environmental literacy;
- Ancillary professionally-staffed analytical, computational and cyber-infrastructure facilities at Biosphere 2;
- Dedicated interdisciplinary teaching programs at the undergraduate and graduate level to train the next generation of environmental scientists.

## Strategic Approach

To realize these strategic goals we will implement the following:

- Engage the national and international research community to seek funding for collaborative science projects in each of the seven model ecosystems;
- Work with Federal, State and non-governmental funding agencies to align our science mission with funding priorities;
- Develop transparent governance plans to facilitate collaborative scientific community access to the research infrastructure;
- Interact with other components of Biosphere 2 (B2 Institute and Conference Center) to invest in seed funding for high-risk high-return research proposals;
- Collaborate with UA departments within the School for Earth and Environmental Science (SEES) to provide a base for B2 research faculty and context for our teaching programs.

# INSTITUTE



Great Events  
Marketing Solutions





The mission of the B2 Institute is to initiate and nurture interconnected global collaborations that develop transformative approaches to the solution of the scientific, engineering and societal issues associated with long-term sustainability.

Achieving that mission relies on the development of global alliances and partnerships with a broad spectrum of academic, industrial, commercial, and government partners.

These alliances are initiated, developed and nurtured by the B2 Institute. This think tank and research incubator provides a non-traditional structure that facilitates open dialogue and interaction. It relies on the combined expertise of a broad range of scientific and engineering fields and from a wide spectrum of interdisciplinary talents, building upon The University of Arizona's reputation as a trailblazer in interdisciplinary research.

The growth of the B2 Institute relies on a multifaceted strategy. It includes:

- The broad engagement of faculty, researchers and students from multiple colleges of the Arizona Regents Universities and from other partner institutions of higher learning;
- The worldwide development of strategic partnerships and alliances with educational and research organizations, government agencies, and private sector partners and foundations;
- The participation of a wide spectrum of stakeholders and policy makers at all levels of government, from the local to the State and the national levels;
- Substantial efforts in developing and enhancing communication and educational tools adapted to a varied audience and focused on the needs of specific target audiences;
- Targeted fund-raising activities aimed at achieving these goals.

The B2 Institute serves as the umbrella organization for a number of centers and activities, with major focal points comprising Water, Energy and Education.

### **UMI 3157**

This Mixed International Unit promotes collaborative research between U.S. and French scientists and between the social, natural and physical sciences. Its overarching theme is "Water systems in arid and semiarid areas" and its focus is the interaction between water, society and environment in a contemporary context.

### **Arizona Center for STEM Teachers (ACST)**

The Arizona Center for STEM Teachers is a resource and training center whose goal is to expand the quality and retention of Science, Technology, Engineering and Mathematics (STEM) teachers in Arizona.

### **Artist-in-Residence Program**

Professional artists seeking to explore and nurture the vibrant intersection between Art and Science are invited to apply to our residency program and to develop strong interactions and collaborations with the scientists working at Biosphere 2, and to communicate with the broad spectrum of Biosphere 2 visitors.

### **The Biosphere 2 Conference Center**

The conference center provides an ideal venue to carry out the mission of the B2 Institute. It provides a perfect setting for seminars, conferences, workshops, retreats, summer and winter schools and between natural and social scientists, humanists, educators, policy makers, artists, and the general public.

# EDUCATION AND OUTREACH





# Biosphere 2 Education and Outreach

## Strategic Goals and Approaches

Our overall goal is to grow the Biosphere 2 Education and Outreach Program into a sustainable and community-oriented program that is poised to address fundamental scientific challenges regarding water and energy management in semi-arid environments. In order to reach this goal we need to establish and require an understanding of the process of science in addition to the content of a particular discipline.

### Strategic Goals

- Education and outreach programs that highlight the complex coupling of life, energy and water in the dynamics of our world to inspiring our students and the general public, including K-12 teachers and students;
- Programs that train leaders among university faculty and students in communicating science to the general public;
- Education and outreach programs which are responsive to the needs of diverse stakeholders and audiences.

### Strategic Approach

To realize these strategic goals we will implement the following:

- Promoting active national and international partnerships that expand the scope of our inquiry and its impact;
- Developing the campus facilities and infrastructure to support a dynamic research program in a public setting;

- Enhancing the sustainability of Biosphere 2 through comprehensive fundraising and stakeholder engagement;
- Identify and establish partnerships with key education community stakeholders, UA Early Academic Outreach, Tucson Unified School District Science Resource Center, Science Foundation Arizona;
- Develop hands-on, standards based activities designed around Biosphere 2's water and energy research themes for K-12 visitors;
- Develop hands-on and citizen science opportunities to both foster science literacy and create a unique and dynamic experience that compels multiple visits by participants;
- Develop a site display plan, and display standards, that allocate space among the primary science literacy themes and map out short and long-range timelines and partnerships;
- Seek sustainable funding and an on-going mission for current programs: Arizona Center for STEM Education, Research Experiences for Undergraduates;
- Collaborate with UA departments within the School for Earth and Environmental Science (SEES) to provide a base for B2 research faculty and context for our training programs and campus curricula;
- Identify partners and implement an assessment plan for the Education and Outreach program.



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