

Sustainability (Complex Adaptive Systems Science), PhD

SUSUSTCPHD

Research and develop solutions to sustainability challenges that bridge disciplines. Learn from leading scientists and scholars in this flexible, interdisciplinary program that focuses on both sustainability and complex adaptive systems.

Program description

Degree awarded: PHD Sustainability (Complex Adaptive Systems Science)

Complex adaptive systems science is the study of interactive and dynamic systems that change over time.

The complex adaptive systems science concentration program under the PhD in sustainability trains the next generation of scientists in advanced concepts and methods needed for approaching diverse phenomena in the social and life sciences. The program is tightly integrated with varied, ongoing, university-wide research on complex adaptive systems science at Arizona State University and emphasizes the value of a complex adaptive systems science perspective for better insight and an active role in seeking solutions to a broad array of critical issues facing society today. Students become fluent in the common language of complexity while also receiving a solid foundation in the domain knowledge of existing academic disciplines.

By broadly embedding an understanding of complex adaptive system-relevant approaches into the practice of normal science, students gain the ability to transform science. The program promotes the development and testing of more robust theories and sophisticated methods in a wider array of research settings needed in order to develop a deeper understanding of the nature and dynamics of complex adaptive systems, which are grounded in concrete examples and applications.

The program prepares students to become scientists and leaders in research and to investigate the urgent sustainability challenges of this century. Graduates possess an understanding of the need for a transdisciplinary approach to solving sustainability challenges; the ability to communicate their work to professionals in other disciplines, to policymakers and to the general public; and the breadth of vision to recognize the interconnectedness of social, economic, environmental and technical systems. Their critical

thinking skills enable them to approach sustainability challenges from a systems perspective; they also have the skills needed to work effectively in interdisciplinary teams and the technical skills to formulate and solve problems at the appropriate scale.

In addition to the common learning outcomes, graduates are able to conduct research on particular sustainability challenges using standard skills, including the capacity to identify problems; to formulate and test hypotheses; to use statistical, econometric and geographical information system techniques to construct and analyze datasets; and to build and apply models. They are prepared to lead others in the analysis and design of the built environment and institutions' policies, regulations and technologies to support sustainable development and lead others in applying these concepts and methods to the development of sustainable strategies for water, land, air and urban management at the local and global levels. Graduates understand the concepts and methods of a number of critical disciplines bearing on the sustainability of systems at different spatial and temporal scales.

At a glance

- **College/School:** [College of Global Futures](#)
- **Location:** [Tempe](#)

Degree requirements

86 credit hours, a written comprehensive exam, a prospectus and a dissertation

Required Core (8 credit hours)

SOS 510 Perspectives on Sustainability (3)

SOS 520 Research Design and Methods for Sustainability (3)

SOS 589 Community of Graduate Student Scholars (2)

Solutions Workshop Electives (6 credit hours)

Open Electives (36 credit hours)

Concentration (12 credit hours)

CASS fundamentals (3)

mathematics of CASS (3)

modeling CASS (3)

application of CASS approaches (3)

Research (12 credit hours)

SOS 792 Research (12)

Culminating Experience (12 credit hours)

SOS 799 Dissertation (12)

Additional Curriculum Information

For open electives and concentration coursework, students should see the academic unit for the approved course list. Students should note that only six credit hours of 400-level coursework can be included on the plan of study.

When approved by the student's supervisory committee and the Graduate College, this program allows 30 credit hours from a previously awarded master's degree to be used for this degree. If students do not have a previously awarded master's degree, the remaining coursework is made up of appropriate electives.

Admission requirements

Applicants must fulfill the requirements of both the Graduate College and the College of Global Futures.

Applicants are eligible to apply to the program if they have earned a bachelor's or master's degree in any field from a regionally accredited institution. The school encourages applicants with diverse educational backgrounds and experiences that are relevant to the school's core objectives.

Applicants must have a minimum cumulative GPA of 3.25 (scale is 4.00 = "A") in the last 60 hours of their first bachelor's degree program, or a minimum cumulative GPA of 3.25 (scale is 4.00 = "A") in an applicable master's degree program.

All applicants must submit:

1. graduate admission application and application fee
2. official transcripts
3. statement of intent
4. three letters of recommendation
5. resume or curriculum vitae
6. proof of English proficiency

Additional Application Information

An applicant whose native language is not English must provide [proof of English proficiency](#) regardless of their current residency.

The statement of intent should not exceed 600 words and should describe how the applicant's background will contribute to success in the program, describe how completion of the degree will support the applicant's long-term career goals and explain why the applicant is applying to the College of Global Futures and, more specifically, the doctoral program with a complex adaptive systems science

concentration. The statement of intent should elaborate on key research questions the applicant wishes to address or problems they wish to solve as part of the plan of study, and it should identify potential faculty advisors.

Letters of recommendation must be from three people who can attest to the applicant's academic and professional achievements. At least one letter should be academic in nature.

Tuition information

When it comes to paying for higher education, everyone's situation is different. Students can learn about [ASU tuition and financial aid](#) options to find out which will work best for them.

Application deadlines

Fall

[expand](#)

Global opportunities

Global experience

Studying abroad is encouraged for graduate students. Nearly all of the College of Global Futures faculty-directed programs offer graduate credit. In addition, the Global Education Office offers more than 50 program opportunities, with programs on every continent.

Faculty-directed programs tend to be the best fit for graduate students; taking courses with ASU professors over the summer or during academic breaks offers students close mentorship and professional network growth in many fields of study while they earn ASU credit. Exchange program participation is also possible with careful planning.

Students can find programs specific to their interests on the [College of Global Futures Study Abroad webpage](#), and additional opportunities and information on the [ASU Global Education Office website](#). These sites also include additional information about applying for funding to support global travel.

Graduate students are also encouraged to apply for funding for international research, study and professional development through ASU's [Lorraine W. Frank Office of National Scholarships Advisement](#).

Career opportunities

Professionals with expertise in complex adaptive systems science are in high demand across sectors and industries, including business, government and academia. Experts in complexity, who can serve as a bridge between disciplines and scholars, are essential to solving a variety of sustainability challenges.

From the School of Sustainability's 2022 alumni employment survey, 100% of doctoral program respondents are employed. Of those respondents employed, 100% have jobs directly related to sustainability.

Career examples include:

- chief sustainability officer
- energy engineer
- environmental economist
- environmental restoration planner
- environmental sciences professor
- industrial ecology
- natural science manager
- professor
- program director
- research scientist
- sustainability consultant

Contact information

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[Admission deadlines](#)