



# CENTER FOR THE STUDY OF COMPLEX SYSTEMS

Using similarities to analyze and understand systems composed of many components

Late last century, a diverse group of scholars with a shared intellectual interest in topics ranging from cooperation and adaptation to networks and systems began meeting informally to share ideas under the broad rubric of complexity studies. Those meetings included luminaries such as Arthur Burks, John Holland, Douglas Hofstadter from Computer Science; Bob Axelrod and Michael Cohen from Political Science; Carl Simon from Economics and Mathematics; and William Hamilton from Biology. Those faculty members went on to great prominence, winning MacArthur genius awards, being awarded Russell lectureships, and obtaining memberships in national academies. Their intellectual vision resulted in the creation of a formal center to study complexity.

Today, the Center for the Study of Complex Systems (CSCS) is an interdisciplinary program at the University of Michigan that encourages and facilitates research and education in the general area of nonlinear, dynamical, and adaptive systems. Its core and affiliated faculty represent nearly every college of the university. CSCS supports a diverse body of research, training, and educational initiatives. These include resources for agent-based modeling, a weekly seminar series, workshops, special events, and both an undergraduate minor and a Graduate Certificate Program.

The Center for the Study of Complex Systems (CSCS) features an outstanding roster of faculty who continue the tradition and evolution of interdisciplinary and trans-disciplinary research. The center also offers courses in complexity, networks, dynamics, and modeling in topics ranging from epidemiology and physics to public policy and sociology. Online courses by CSCS faculty have attracted nearly one-quarter of a million students. As part of its educational mission, CSCS runs a Graduate Certificate Program that attracts students from dozens of disciplines and a new undergraduate minor that attracts some of our brightest and most innovative undergraduate students.

## STUDENT INNOVATION FUND

CSCS boasts two active student groups, one of graduate students and the other of undergraduates. Both groups supply ideas and energy for programs, speakers, seminars, online educational initiatives, and software. Gifts of \$10,000 to \$50,000 annually to the Student Innovation Fund would provide resources for students to improve CSCS from the bottom-up (as we say in the complexity sciences). The Student Innovation Fund will allow CSCS to enrich the graduate and undergraduate experience by supporting student groups to enhance the program's offerings with workshops, visiting lectures, and research projects.

## STUDENT RESEARCH FUND

To carry out their research, CSCS faculty rely on graduate and undergraduate student researchers. Some of these students perform hourly work while others devote entire summers or semesters to working on projects with faculty. Annual gifts of \$50,000 to \$100,000 will be used to pay for undergraduate research opportunities and graduate research fellowships.

## BURKS-HOLLAND FELLOWS

Art Burks and John Holland were the two driving intellectual forces behind the center. They advocated intensive interactions among small groups of diverse scholars as a method for scientific advancement. Burks-Holland Fellowships will be awarded to postdoctoral students who show exceptional promise to work across disciplines, and to visiting faculty. The cost of a Burks-Holland Fellowship is \$1.5M endowed or \$70,000 annually.



"I declared a Complex Systems minor as a sophomore to compliment my major in Mathematics. I wanted to supplement my pure methodological work with applications and interdisciplinarity. I enjoyed the material so much I switched my career plans to continue my study of complex systems. The courses offered in Complex Systems challenged my previous perceptions and skill sets learned in a wide variety of areas, including ecology, dynamics, sociology, and philosophy of science. By far the most useful skills I learned in undergrad came from my work in CSCS.

I learned how to effectively work with people from different backgrounds than I and use our differences as an advantage instead of a hindrance (collective intelligence!). I learned concepts and methodologies, such as network science and agent-based modeling, that have informed research on interdisciplinary projects I have been involved in as diverse as ecology, political science, mathematics, and American history. From basic scientific and computational skills to researching and writing original published research, taking the Complex Systems minor has radically improved my collegiate education."

— Kaiser, B.S. '19; Ph.D. student in Complex Networks and Systems from Indiana University

## NAMING THE CENTER FOR STUDY OF COMPLEX SYSTEMS

A transformational endowed gift of \$10M to name the Center for the Study of Complex Systems would enable it to become a permanent part of the intellectual landscape at the University of Michigan. With funds for a full-time research scientist position to help undergraduates, graduate students, and faculty with their research, the center would encourage and facilitate research and education. In addition, funding would support:

- CSCS Research support position
- One Holland-Burks Fellow
- Two graduate student fellowships
- Undergraduate research support
- Seed funding for innovative research projects

## WAYS TO FUND YOUR GIFT

Your partnership connects the college's rich past to a boundless and bright future. You can change lives with gifts of cash, pledges, or appreciated securities, and create a meaningful legacy through your bequest, trusts, gift annuities, and other planned gifts. Your generosity makes an impact on what's next, for a better tomorrow.

for what's next ▶

**Look to Michigan**

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