

Computation for Design and Optimization Program

The interdepartmental MS program in Computation for Design and Optimization (CDO) was approved by the MIT Faculty on December 15, 2004. Since that date, CDO has secured temporary office space and administrative support and has conducted its first admissions cycle. The first CDO students will enroll in the program in September 2005.

Program Premise

Intensive computation for design and optimization has become an essential activity in both the design and operation of many complex engineered systems, from micromachined devices, guidance/control systems, imaging systems, and distribution networks to telecommunication systems and transportation systems. The critical role that computation now plays across all engineering disciplines, as well as the industry-based demand for engineers who are literate in computational sciences, has created a clear need to educate tomorrow's engineers in computational science for design and optimization. The CDO interdepartmental master's program is designed to address this need by educating students in the formulation, analysis, and critical application of computational approaches to designing, predicting, controlling, and optimizing engineering systems. Successful CDO students will model, optimize, control, and operate the important engineered systems of the next decade, as well as contribute to our own increasingly computationally intensive research programs here at MIT.

Current Goals

Our current goals are to develop and operate the CDO program in its inaugural year, AY2006. This involves stabilizing our administrative structure and support and developing and executing our operating plan. An additional goal is to secure other funding for both students and affiliated faculty.

Accomplishments

Admissions

CDO received 70 applications for its inaugural year; we admitted 24 students, of whom 18 accepted our offer of admission and will start the program in September 2005.

Research Support and Singapore–MIT Alliance

CDO submitted a proposal to the Singapore–MIT Alliance (SMA) with colleagues from the National University of Singapore for a collaborative research and educational program, which was subsequently approved. On the research side, the CDO program and CDO-affiliated faculty will receive approximately \$1.8 million per year from SMA. The educational component is comprised of a two-year dual degree program in computational engineering (CE), wherein students who are accepted and enrolled in CE receive a CDO master's degree at MIT and a CE degree at the National University of Singapore. Up to 16 SMA fellowships are available for CDO through the SMA CE program. Twelve of the 18 students enrolling in CDO in September 2005 are recipients of these SMA fellowships.

Initiatives

CDO is planning to run a distinguished speakers series in which 5–10 world-renowned researchers each year will present their latest research on topics relevant to computation for design, control, simulation, and optimization. This seminar series will commence in September 2005.

CDO is developing publicity and marketing plans to promote the CDO program both at MIT and at other universities. To accomplish this, we are creating a brochure, writing articles for *TechTalk* and the MIT Faculty Newsletter, placing print advertisements in professional journals, and preparing a large mailing to relevant faculty at other universities.

Finances and Funding

As noted above, through SMA the CDO program and its affiliated faculty receive approximately \$1.8 million per year in research funding. These funds should continue through 2010. During this time, it is incumbent upon CDO to seek other sources of funding for our students as well as for faculty.

Future Plans

Our future plans include the following:

- Stabilizing our administrative support structure
- Securing space for the CDO program
- Generating student and faculty funding as noted above
- Publicizing the CDO program both on and off campus

Personnel Information

The CDO codirectors are Professor Robert Freund (Sloan School of Management) and Professor Jaime Peraire (Department of Aeronautics and Astronautics). Laura Rose provides administrative and secretarial support for CDO. Laura Koller is the temporary CDO communications coordinator.

CDO has approximately 20 affiliated faculty members. We hope to expand this number to 30–40 in the coming year.

Robert Freund, Codirector and Theresa Seley Professor of Management Science
Jaime Peraire, Codirector and Professor of Aeronautics and Astronautics

More information about Computation for Design and Optimization can be found online at <http://web.mit.edu/cdo-program/>.