

In December, 2007 and January, 2008, the Committee on Majors reviewed a proposal from the Department of Computer Science and a group of faculty from other departments for a Major in Computing and the Arts, to be governed by a committee appointed by the Dean of Yale College. The governing committee would consist of faculty from Computer Science and the other departments involved in the program, including Music, Art, History of Art, Theater Studies, and the School of Architecture. The Committee on Majors received testimony from Paul Hudak, Julie Dorsey, and Holly Rushmeier of Computer Science, Abraham Silberschatz, Chair of Computer Science, and Daniel Harrison, Chair of the Music Department. We also heard a report from the Deputy Provost for Undergraduate Education and the Deputy Provost for the Arts on the feasibility of the proposed major.

The Committee on Majors recommends that the Yale College Faculty approve the creation of the Major in Computing and the Arts for an initial five-year period, with the curricular requirements outlined in the attached document.

Computing is ubiquitous in today's world and now plays a prominent role in the arts: in testing concert halls, creating products like iPods, making films, and assisting architectural design or musical composition. Computing is important both to various modern forms of expression in the arts and to analysis, design, and preservation. The proposed major in Computing and the Arts will aim not just to understand the role of technology in the arts but also to understand the science behind the technology.

Yale is particularly well qualified to offer a major that bridges the sciences and the arts. The university has both breadth and depth in the arts and faculty with appropriate expertise and national prominence in Computer Science. Such peer institutions as the University of Pennsylvania and Dartmouth have offered programs in Digital Media, while Stanford has a particularly prominent model that has been in place for half a century. However, Yale's program will be unique in its integration of computing and a broad range of arts, and the Committee expects the Major in Computing and the Arts to become an international leader and a particular attraction for prospective undergraduates.

Curricular Design

Computing and the Arts is an interdisciplinary major that studies artistically-motivated problems whose solutions involve mathematics, computer science, and information technology. The major will require fourteen courses. In addition to the core of courses in Computer Science, the major will allow students to acquire an in-depth education in at least one of the arts-related disciplines represented by the major. The courses will be distributed evenly: seven in computer science and the other seven in one of five tracks (architecture, art and design, history of art, music, and theater studies). Students will take a full range of prerequisites in the art of specialization, so that their basic training will be comparable to that of majors in the arts. The requirements are demanding but reasonable and appropriate. All students will complete a two-term senior requirement. Participating departments have expressed considerable enthusiasm about the program.

Resources

The Computer Science department has agreed to commit the necessary faculty resources to ensure that this major will flourish. The DUS of Computer Science will administer the program in conjunction with a committee appointed by the Dean and including representatives from the various arts-related departments participating in the program. The major seems likely to attract external funding. It will also draw on the Digital Media Center for the Arts (DMCA), and the DMCA may require additional resources as the major grows.

The proposed Major in Computing and the Arts is an example of curricular innovation responding to the changing state of knowledge. It promises to become a highly successful model that will educate students in a combination of arts and sciences not possible elsewhere than at Yale.

Respectfully submitted,

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Proposed Major Requirements for Computing and the Arts

Revised Jan 31, 2008

Computing and the Arts is an interdepartmental major for students who are interested in computational and mathematical issues that arise in the arts, and specifically in Architecture*, Art, History of Art, Music, and Theater Studies. The major is focused in a Computer Science core, with relevant courses taken from one of five tracks in the arts.

The major requires fourteen term courses (beyond the pre-requisites), including a two-term senior project. Seven of the fourteen courses must be in Computer Science, including the following:

- CPSC 201a or b (Introduction to Computer Science).
(Note: CPSC 112a or b or equivalent is required as a prerequisite to CPSC 201 a or b.)
- CPSC 202a (Mathematical Tools for Computer Science).
(MATH 244a/AMTH 244a (Discrete Mathematics) may be substituted for CPSC 202a.)
- CPSC 223b (Data Structures and Programming Techniques).
(Note: Students are advised to complete CPSC 223 by the end of their sophomore year.)
- CPSC 491 (Senior Project).

The remaining courses are selected based on the chosen track in Architecture*, Art, History of Art, Music or Theater Studies, as described below.

Regardless of the track, the senior requirement is a project that is acceptable to both departments. Students must submit a written report (including an electronic abstract and web page(s)) to the Department of Computer Science.

***Architecture Track**

[Though we expect to offer an architecture track in the near future, Architecture requires more time to develop the track; we therefore wish to initially launch the major with just four tracks. *We are not currently asking for approval of the Architecture track.*]

Art/Design Track

(Note: ART 111 and 114 are prerequisites for this track.)

- Three courses at the 100 level beyond prerequisites (ART 111 Visual Thinking, ART 114 Basic Drawing), such as ART 132 Intro to Graphic Design, ART 138 Digital Photography, or ART 145 Digital Video.
- Two courses at the 200 or 300 level.
- One course at the 400 level.
- ART 495 (Senior Project).

The student must also take the following Computer Science courses:

- Two of the following three courses: CPSC 475 (Computational Vision and Biological Perception), CPSC 478 (Computer Graphics), and CPSC 479 (Advanced Topics in Computer Graphics).
- One additional Computer Science course at the intermediate or advanced level (excluding CPSC 490 and CPSC 491).

History of Art Track

- One course at the 100 level (HSAR 112a or 115b).
- One 400-level seminar (HSAR 402-HSAR 497).
- Two courses at the 200, 300, or 400 level. The courses must be from two different areas.
- One studio art course (*Note: students may need to take a prerequisite course in Art to prepare for the studio course*).
- HSAR 401 (Critical Approaches).
- HSAR 499 (Senior Essay).

The student must also take the following Computer Science courses:

- CPSC 478a (Computer Graphics).
- One of CPSC 437a (Introduction to Databases), CPSC 475b (Computational Vision) and CPSC 479b (Advanced Topics in Computer Graphics).
- One additional Computer Science course at the intermediate or advanced level (excluding CPSC 490 and CPSC 491).

Music Track

(Note: MUSI 205 and 210 are prerequisites for this track.)

- MUSI 325 (Fundamentals of Music, Multimedia Art, and Technology).
- MUSI 395 (Practical Applications in Music, Multimedia Art, and Technology I).
- MUSI 450 (Practical Applications in Music, Multimedia Art, and Technology II).
- Three courses from MUSI 312 (Composition Seminar I), 343 (Music Cognition), 412 (Composition Seminar II), 466 (Music and Multimedia Art), 471 (Independent Study), and 472 (Independent Study).
- Music 490 (Senior Essay).

The student must also take the following Computer Science courses:

- CPSC 431 (Fundamentals of Computer Music – Sound Representation and Synthesis).
- CPSC 432 (Fundamentals of Computer Music – Algorithmic and Heuristic Composition).
- One additional Computer Science course at the intermediate or advanced level (excluding CPSC 490 and CPSC 491).

Theater Studies Track

(Note: THST 110 and 111 are prerequisites for this track.)

- THST 210 (Introduction to Performance Concepts)
- Three courses in dramatic literature or theater history
- THST 237 (Design for the Theater) *(Note: this is a two-term course.)*
- THST 491 (Senior Project)

The student must also take the following Computer Science courses:

- CPSC 478 (Computer Graphics) or CPSC 479 (Advanced Topics in Computer Graphics).

- CPSC 431 (Fundamentals of Computer Music – Sound Representation and Synthesis) or CPSC 432 (Fundamentals of Computer Music – Algorithmic and Heuristic Composition)
- One additional Computer Science course at the intermediate or advanced level (excluding CPSC 490 and CPSC 491).