INTERACTIVE MUSIC SYSTEMS

COS 597B: Princeton University Fall 2012

GENERAL INFORMATION

Seminar: Tuesdays and Thursdays 3:00–4:20 PM, location TBA

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Web: http://www.cs.princeton.edu/courses/archive/fall12/cos597B/

DESCRIPTION and OBJECTIVES

We will explore challenges in designing, deploying, and evaluating interactive human-computer systems in music performance, composition, education, entertainment, and research. The foundation of this reading- and discussion-oriented course will be current academic research in computer science and computer music; we will also discuss significant artistic works and relevant commercial systems. The course will include a final research or software development project of the student's choosing.

Upon completion of the course, students will:

- Understand the history and scope of academic research related to interactive music systems.
- Be familiar with the significant research challenges in this area, and deeply understand some of the key current research threads.
- Understand the breadth and nature of computational challenges and human-computer interaction design challenges posed by interactive music application contexts. Understand how computational techniques, as well as sensors and other hardware, are employed in the implementation of real-time interactive music systems. Also understand how perspectives and methods from computer science fit into a larger, interdisciplinary landscape.
- Be familiar with the research methods employed in the design and evaluation of interactive music systems.
- Have gained research experience, as well as knowledge and skills related to a topic of particular interest, through the process of proposing and completing the final project.
- Be familiar with the conventions of academic research and writing in this domain.
- Have strengthened skills and gained practice in academic speaking (through in-class presentations), writing (through the final project reports), and critical reading and discussion (through written assignments and in-class discussion of papers).
- As a consequence of the above, be prepared to pursue further research in this area.

PREREQUISITES

The course is open to any interested graduate students, and to undergraduates with instructor permission.

Topics discussed in the course will be related to areas including music technology, contemporary music performance practice, music theory, musicology, machine learning, signal processing, human-computer interaction, and interaction design, among many others. **It is unlikely that any student will come to the course with significant experience in all of these areas.** That said, having **some** experience (e.g., a course at the 300-level or above, or extracurricular practice) in at least **some** of these areas is desirable. If you haven't had any exposure to any of these topics, you will have to put in some extra time catching up.

Part of the fun of the course will be to draw on the ideas and experiences of a diverse set of students. While all final projects should aim for a publishable contribution to the field of music technology, beyond that, there will be considerable leeway to tailor projects to students' backgrounds and goals.

COURSE ORGANIZATION

Format: The seminar meetings will consist primarily of student-led discussions and presentations related to research papers and foundational topics.

Grading:

- Reading responses and other assignments: 25%
- Discussion leadership, tutorial presentation(s), and participation: 35%
- Final project: 40%

Reading responses: Prior to class discussion, each student will read and prepare a written response to each paper (typically one or two papers per meeting). These responses will take the form of free-form writing and/or structured critique modeled after the academic peer review process. The reading responses will help ensure that the seminar time can be devoted to discussing the material at a deep level, and they will help students gain experience as critical academic readers in this topic area.

Responses are due no later than 8 AM the day of the class to which they pertain. No late responses will be accepted, but the lowest two response scores will be dropped at the end of the term.

Occasionally we will have small assignments to deepen students' understanding of discussion and lecture topics.

Discussion leadership: Students will take turns leading discussion of individual papers, in order to help guide the class towards a deeper understanding of the work's significance and approach. Our discussions will focus on both the technical points in a paper (i.e., *how* was something done?) as well as a broader critical examination (why was it done? how is this work useful? what other questions does it raise? what are some shortcomings? etc). Discussion leaders should therefore do their best to help their peers with understanding technical content, as necessary, perhaps coming up with additional examples or better ways of explaining ideas or methods. Leaders should also work to structure the discussion in a meaningful way, preparing useful questions for the class. This isn't a presentation; the majority of preparation work will go into thinking critically about the paper, looking through the written responses of other students, and possibly doing some background reading or Web searching to help put the paper into context.

Tutorial presentations: Sometimes it will be necessary to include lectures or tutorials on foundational topics, in order to help students better understand the technical details of the course readings, or the broader context of some course topic. Each student will participate in the preparation and delivery of at least one of these tutorials.

Participation: Participation grades will reflect the quality of the student's preparation and analysis as well as the student's contribution to the process of discussion: making connections with other students' remarks, raising overlooked issues, asking good questions, making good summaries. It is likely that the students who put some effort into reading the papers and preparing the written responses will be better able to contribute to the discussion. Note also, though, that effective participation requires a great deal of listening as well speaking, and in particular requires careful listening to other students, and not just to the instructor.

Each class, we'll reserve some time for someone to briefly (5 minutes) and informally present a "System/Work of the Day:" an instrument, interactive system, tool, or musical or artistic work that is historically significant, inspiring, or thought-provoking. All students should contribute throughout the semester. Videos/demos are encouraged. Feel free to present something you know about already, or take the opportunity to learn about something new.

Students are also encouraged to participate in discussion of papers, systems, music, etc. outside of class, using Piazza.

Final projects: All students will conduct final projects on a topic of their choosing within the domain of interactive music. There is some flexibility to tailor projects to students' backgrounds and interests. Final projects will include a written proposal, an oral presentation, and a written paper in a format suitable for publication in a computer music journal or conference.

COLLABORATION and ACADEMIC INTEGRITY

Discussion and collaboration with your classmates is generally fine. Please prepare reading responses and any other written work on your own, unless otherwise noted in the instructions.

Please create your own presentation materials unless you have a clear reason to use someone else's, and in which case you should ask instructor permission and provide proper attribution.

If your final project includes an implementation component, you may find that you want to use code from various sources (e.g., code you find online, third-party libraries, code you wrote in another class). This is fine as long as you tell us in writing (e.g., in a README file submitted with your project) what code is not yours and where you got it, and you also clearly indicate in your code itself (using comments) which code is not your own original work. This will enable us to grade you on the basis of your original contributions, and it will enable you to abide by the guidelines of Princeton's policies on academic integrity.

Your final project must have a significant component that is unique to this class (i.e., don't just write another paper on your independent work / generals project).

IMPORTANT DATES

October 29–November 2: Fall break, no class
* November 4: Written project proposal due
* Week of November 5: 30-minute meetings with RAF to discuss proposed project
November 20: Pre-Thanksgiving, class status TBA
November 22: Thanksgiving, no class
* Week of December 3: 30-minute meetings with RAF to discuss project progress
January 8, 10 (reading week): Final project presentations (during class time)
January 15: Dean's Date, final projects (reports, slides, code, etc.) due 5:00 PM

** If you'd like to get started on your project earlier in order to ensure a more relaxing winter holiday, you're welcome to submit proposals & schedule project meetings earlier in the semester.*

PIAZZA and COURSE WIKI

Please sign up for Piazza. We'll use this for announcements, discussion, and Q&A outside of class:

https://piazza.com/class#fall2012/597b

Last updated 12 September 2012.

Please also sign up for a Princeton CS Wiki account and bookmark the Wiki page:

http://wiki.cs.princeton.edu/index.php/COS597b_Fall2012

We'll be using the Wiki for the course schedule and readings, and for people to sign up for slots for leading discussions & tutorials.

FINAL REMARKS

As students enrolled in a graduate seminar, **you** will shape the day-to-day experience of the course. Do the readings, but also ask questions, share your opinions and ideas, bring insight from the music you play and the research you do, share examples of technologies and performances and commentary from the Internet, be involved.

The course content, organization, and course management tools are all flexible. If you have ideas for improving the class experience, please share them!

Last updated 12 September 2012.