158B official course description

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158B example syllabus

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158B Rubric

Music 158B follows on Music 158A to offer a semester long experience in the design of computer-based musical instruments that stretch from core software-based sound rendering engines to interaction with tangible user interfaces as well as higher level algorithmic processes.

The course presents the challenge of designing a musical “instrument”, defined as an interdependent chain of concerns situated in the human body and its myriad interactions with computational systems (computers, interfaces, carefully controlled data) for the overall purpose of musical expression. A greater understanding of music and possible musical outcomes will be obtained.

How do we define musical expression and how can we model such expressive affordances with computers and peripherals?

How do we define musical instrument for Music 158B?

controlling large-scale structures and generative process in real-time.

Where is deferred agency in this definition?

A goal to adapt physical interfaces to user intentions and musical realities

A goal to demonstrate how simple HCI interactions can bloom into large scale musical outcomes. Examples.

Encouraging approaches that enable “explorability” of problems that might be musical or technical. Rather than trying to get students to abstractly “solve” the fully designed instrument, encourage the gradual addition of greater “expressive” features, with the understanding that some expressive capability is already existing in the proto-instrument. Mine the current expressive limits to help discover broader expressive potentials. For example, a standard auto car horn is limited in expression -- add a controllable muting/filtering element to the instrument and its musical potential expands many fold. This would be an easier route than say trying to alter the car horn engine to gain control of fundamental frequency.

The idea here being that an “instrument” can reach milestones of functionality rather than be planned at start as a complete thing needing a bunch of work before we can tell if it is a music instrument.

From David Wessel

Composing an instrument

Composing is the reflective part of the design process. It benefits from musical actions and their consequences but often operates out of real-time. Composing a computer-based instrument involves the organization of musical material and the control structures that provide access to that material. Large data bases of musical material are commonplace. These materials can be queried. Features can be extracted. We can reason in terms of digesting such masses of material thus providing cultural nourishment to music creation. The abstractions we make about material are the key and we seek abstractions and models the have the potential to inspire creative manipulation. Composing an instrument does not mean composing a fixed piece but rather an instrument that could produce varied yet adaptable behaviors -- a world of behaviors.

Performing involves a practice, practice in skill development, body-ear coordination.and continual attentive judgment. With computer-based musical instrumentation practice involves continued interaction with evolving software control systems, evolving music processes, and evolving sonic rendering techniques. How are the adaptive aspects of our sensory-motor systems and the evolving features of the instrument managed?

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MUSIC 158B TEACHING APPROACHES

Music 158B Lecture/demonstrations into Lab: Run first weeks as classroom with lectures and special guests and demonstrations to underline core problems and goals. Then use last 4-8 weeks in lab set up in main room and possibly expand latter to the middle studio downstairs at CNMAT.

TODO: Organize a number of stellar demonstrations of what we mean by “instrument”.

spherical loudspeaker array?

Campion/Corail

Campion/NatSel

Question: how much building? soldering? arduino work if any etc..?

Collaborative working teams: teams and role-based working models based on skills and interests of students. idea is to have 3-student teams for each semester long project. Project manager -- identifying the various fabrication roles (software patch, sound engines, algorithmic control engines, interfaces and control I/O). For example, Student A might be doing all sound design and preparation of sound corpus, where partner Student B, will be designing control structures and interface, and Student C with project management and software patch architecture.

Final project sound installation/concert event: End goal will be to present a collective installation/concert. The key element is that all design teams will necessarily need to be aware of all on-going projects, particularly in terms of sonic output. All projects are presented in the same “installation” with the addition of particular time schedule for individual demos without others. For example, a group may be working in multi-channel space for overall ambient platform, where another group might specifically be working on a percussion instrument that takes into account the presence of the immersive multi-channel sound -- making all the design teams part of an Ensemble who must work in tandem to produce the overall public installation.

The focus will remain around CNMAT technologies. Basically, augmenting our existing objects and pedagogies and constraining activity in the class to CNMAT tools and techniques.

COURSE LOGISTICS AND MATERIALS MANAGEMENT/PREPARATION/UPGRAGE

Software environment: Max/MSP with focus on CNMAT tools and techniques (Odot, CNMAT objects, CNMAT Max/MSP pedagogy)

CNMAT Resource Library: a growing number of controllers and “situations” for instrument building. For the first beta-Music158B we do not need many. We do need a physical location, and a system for maintaining the materials

Core development and management of course materials will be stored and managed in CNMAT GitHub. CNMAT/CNMAT-Pedagogy.

Actual course materials for delivery in class is to be determined as we move forward with the physical aspect -- what materials, where stored, what support on machines etc…

Supplemental repositories can be with the CNMAT SPA account

New CNMAT website can assist with equipment resource management. Course materials can be stored and made available from the site -- for example, guest lecture/documentation or link space to examples in the real-world and historical.

Goals:

Ability to pass on the course to future graduate student instructors.

Create modules in such a way that allow for growth and linking to other existing materials and activities.

ROUGH TOPICS FOR COURSE MODULES

Bootcamp History of Instrument Design, to identify the basic music instrument paradigms (blow, strike, pluck, bow, strum). What new affordances do computer-based tools provide? (unencumbered air performance, larger sensor networks, Wacom surfaces..).

Initial Design discussions and demonstrations: Music 158B design anatomy of instrument building. Taking a project and breaking it down backwards -- starting with the finished instrument, and little by little arriving at a design anatomy (workflows, problem isolation, roadblocks, time to completion estimations, known knowns, known unknowns, and of course unknown unknowns).

Exploration/Discovery period. Playfulness/fun with clear examples of principles in real musical outcomes/instruments. The look at all the possible controllers/situations (CNMAT Resource Library) available to the course

Identify the project managers, create a set of deadlines and deliverables that answer specific questions leading to the implementation phase of the project. Include milestone deadlines for project updates and proof of concept.

What is the role of deferred agency in the course. This would happen in the sound engine design -- the ability to get under the hood and tweek an engine and return to instrument.

Metaphors for control (after Wessel -- “dipping” and “driving”)

-surface interaction

-unencumbered (cameras, remote sensing)

-wearable/biometric

-hand and limb sensing technologies

-GUI/Direct manipulation/keyboard/pointer/webcam pedestrian movement/Skeuomorph

-sounding objects

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> These leaves off things like the gametrak, augmented instruments, etc.

> and is a folksonomy. We can attack the problem as orthogonocal design value systems too

> and see how that dices up the space.

GROUND RULES

In addition to the pre-requisite of Music 158A, students must gain the permission of instructor to join the Music 158B.

Consider a Pre-course Survey for students finishing Music 158A (google forms) who are interested in being accepted to Music 158B …

What is your Major?

How many semesters of college have you complted?

Your reasons for taking this courses? (breadth requirement, experience with computers)

I am confident using a computer language to accomplish tasks.

I am musically traine

I can read music

I work frequently with music and technology softwares

I like to compose music

I have experience working in collaborative teams

I am comfortable working in collaborative teams.

What are your expectations for taking this course?

Your perceptions of yourself -- (artistic/technical, likes to take risks, creative, analytical, used to thinking computationally and feel comfortable with mathematics, feel I am very broad minded culturally, feel I am aware of many different cultural trends in art and music)

What did you learn in Music 158A? About computers and music? about music?

What do you expect to get out of this course?

Require a post-Music 158B survey:

Harder than you thought?

Working in groups?

did you learn anything new about music?

About computing?

Were you challenged creatively?

Have your perceptions changed in the way you view yourself as more artistic or more technical?

Were you pleased with the outcome?

Was there too little music in the course?

Was there too little computer content in this course?

How would you rate the balance between music and computational science?

BLOGGING PROCESS

consider having each team maintain a blog describing process, planning, progress, and outcome. Final project submission would include documentation of instrument with video/audio and postings.

GRADING

broken down into a set of goals/deadlines through the semester

How will you be graded in the team?

What roles were assigned to you in the first weeks of class and what were your duties and responsibilities to the group project.

Did you meet the deadlines and show progress on your duties.

What specifically did you contribute to the final outcome instrument?

Did the project team achieve a final result that matched the initial design goals. If not, why not?

Long term goal for Music 158B would be to synchronize with Invention Lab or other fabrication EECS courses -- this would allow inclusion of larger building projects both circuit and physical

Other loose ideas that Ed is thinking about:

time (rhythm, duration)

frequency (spectra, note to noise continuums)

ornament melodic generation with subtle temporal and expressive frequency additions