MUCP 5690: Topics in Electroacoustic Music
Digital Sound Sculpting

Instructor: Jon Christopher Nelson, jon.nelson@unt.edu, 940-369-7531
Time and Location: Tuesdays and Thursdays, 9:30-10:50 AM, Music 2009
Office Hours: email is fastest, meetings arranged as per student request

OBJECTIVES:
Digital Sound Sculpting will focus on production techniques for the composition of computer music. The course will include analysis of contemporary computer music compositions (primarily recent works in the acousmatic tradition) and a survey of contemporary techniques for recording, digital signal processing, mixing, and other production techniques. The students will demonstrate their understanding of the materials through both an analysis of an electroacoustic composition and through the composition of a significant original stereo acousmatic composition for fixed media.

GRADING:
Final course grades will be determined according to the following formula:
- 40% class participation (attendance, class discussion, daily assignments)
- 20% analysis project
- 40% final composition project

ATTENDANCE/CLASSROOM COURTESY:
Attendance is expected and factors into the class participation component of the grade. Out of courtesy to others, please make every effort to arrive at class on time. If you must miss a class, it is your responsibility to find out about any missed materials. More than two unexcused absences will result in the final grade being docked one full letter grade.

CLASS PARTICIPATION:
Students are expected to come to class prepared, having read the required readings and prepared assignments. Assignments listed for a class date must be completed BEFORE the class begins. Participation in classroom discussion will be a primary factor for demonstrating class preparation. Assignments may include, but will not be limited to quizzes, programming assignments (primarily Max/MSP and Csound, but may also include other software), audio production exercises, and listening.

ANALYSIS PROJECT:
The analysis project will be a written analysis paper that is approximately 10-15 pages. Each student will choose a composition for fixed media, choosing from among the list of composers. The analysis should cover formal, timbral, harmonic, and spectro-morphological attributes of the approved composition. The paper must acknowledge any sources and conform to a recognized style manual (APA, MLA, or Chicago Manual of Style). Works for analysis to be selected from the following composers:
• Elizabeth Anderson
• Natasha Barrett
• Manuella Blackburn
• Jonas Broberg
• Luigi Ceccarelli
• Francis Dhomont
• Paul Dolden
• Ambrose Field
• Gilles Gobeil
• Jens Hedman
• Jonty Harrison
• Erik Mikael Karlsson
• Suk-Jun Kim
• Paul Koonce
• Mario Mary
• Adriain Moore
• Robert Normandeau
• Erik Nyström
• Åke Parmerud
• Jean-Claude Risset
• Elzbieta Sikora
• Denis Smalley
• Barry Truax
• Yu-Chung Tseng
• Hans Tutschku
• Horacio Vaggione
• Mario Verandi
• Scott Wyatt

**FINAL PROJECT:**
The final project will consist of an electroacoustic composition of 10-15 minutes duration that makes extensive use of audio processing techniques and exhibits pristine audio production technique as well as a carefully wrought formal structure. With instructor consideration and approval, group projects may also be proposed.

**LIBRARY RESERVE MATERIALS:**


U. Zölzer, ed. *DAFX Digital Audio Effects*. West Sussex, England: John Wiley & Sons Ltd., 2002. (available only through UNT library electronic resources)

**COURSE OUTLINE:**

<table>
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<tr>
<th>Week</th>
<th>Topic</th>
<th>Reading Assignment</th>
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<tr>
<td>1/19</td>
<td>Syllabus and Intro</td>
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<tr>
<td>1/21</td>
<td>Csound and Max overview</td>
<td>CB Chpt. 1-3</td>
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<td>1/26</td>
<td><strong>Basic Sample Manipulation</strong></td>
<td>CMT Chpt. 1, 3-4</td>
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<tr>
<td>1/28</td>
<td>Granulation</td>
<td>CMT Chpt. 5</td>
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<tr>
<td>2/2</td>
<td>Granulation</td>
<td>MS Chpt. 3-5</td>
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<tr>
<td>2/4</td>
<td><strong>Analysis Resynthesis</strong>—linear prediction</td>
<td>MS Chpt. 6, CB Chpt. 26-28</td>
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<tr>
<td>2/9</td>
<td>convolution, phase vocoding, heterodyne analysis/resynthesis</td>
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<tr>
<td>2/11</td>
<td>ATSA (spectral analysis/resynthesis)</td>
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<td>2/16</td>
<td><strong>Delay-Based DSP</strong>—FIR and moving average filters</td>
<td>CMT Chpt. 10-11</td>
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<tr>
<td>2/18</td>
<td>IIR, lattice, alpha, transverse, nth order FIR and IIR</td>
<td>DAFX</td>
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<tr>
<td>2/23</td>
<td>biquad filters</td>
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<tr>
<td>2/25</td>
<td>Comb filters</td>
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<tr>
<td>3/1</td>
<td>allpass filters</td>
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<tr>
<td>3/3</td>
<td>bandpass, notch, SVF</td>
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<tr>
<td>3/8</td>
<td>acousmatic analysis presentations</td>
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<tr>
<td>3/10</td>
<td>acousmatic analysis presentations</td>
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<td><strong>3/15 &amp; 17 SPRING BREAK</strong></td>
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<td>3/22</td>
<td>Time-varying filters (wah-wah, chorus, vibrato, echo, phasor, rotary speaker)</td>
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<td>3/24</td>
<td>multiband FX</td>
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<td>3/29</td>
<td><strong>Non-Linear effects</strong>—AM, RM, FM, saturation, feedback</td>
<td>CMT Chpt. 6</td>
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<tr>
<td>3/31</td>
<td>waveshaping</td>
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<tr>
<td>4/5</td>
<td>Dynamics processing</td>
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<td>4/7</td>
<td><strong>Physical Modeling</strong>—karplus strong, waveguides</td>
<td>CMT Chpt 7, RSS</td>
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<tr>
<td>4/12</td>
<td>strings, stiffness, pluck point, pickup location, scattering junctions</td>
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<td>4/14</td>
<td>bowed/friction model</td>
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<tr>
<td>4/19</td>
<td>flute</td>
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<td>4/21</td>
<td>clarinet, brass and bottle</td>
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<td>4/26</td>
<td>banded waveguides</td>
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<tr>
<td>3/28</td>
<td>waveguide meshes</td>
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<tr>
<td>5/3</td>
<td>final project work</td>
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<tr>
<td>5/5</td>
<td>final project work</td>
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<td><strong>5/12, 8:00-10:00 AM—Final Exam (present works in MEIT)</strong></td>
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*CB= The Csound Book
CMT= The Computer Music Tutorial
DAFX=Digital Audio Effects
RSS=Real Sound Synthesis for Interactive Applications
MS=microsound*
SUPPLEMENTAL BIBLIOGRAPHY:

Acousmatic Topics:

General Computer Music Theory:
_____ "Interview with Marvin Minsky," CMJ, 4:3, 25-39.

Digital Signal Processing:
http://www.dafx.de/ This is the DAFX annual conference web site with PDFs of all conference papers. The site contains many articles on both DSP and Physical Modeling.

Physical Modeling:
http://www.dsprelated.com/dspbooks/pasp/


**Max/MSP/Jitter:**


**Csound:**


**PD (Pure Data):**


http://crca.ucsd.edu/~msp/


**SuperCollider:**


**Mathematics:**


http://www.dsprelated.com/dspbooks/mdft/


http://www.dsprelated.com/dspbooks/sasp/
More Physical Modeling:


A more comprehensive bibliography with more than 500 physical modeling citations can be found at Julius Smith’s web site: https://ccrma.stanford.edu/~jos/pasp/Bibliography.html

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**ACADEMIC DISHONESTY**

Students caught cheating or plagiarizing will receive a "0" for that particular assignment or exam [or specify alternative sanction, such as course failure]. Additionally, the incident will be reported to the Dean of Students, who may impose further penalty. According to the UNT catalog, the term “cheating” includes, but is not limited to: a. use of any unauthorized assistance in taking quizzes, tests, or examinations; b. dependence upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments; c. the acquisition, without permission, of tests or other academic material belonging to a faculty or staff member of the university; d. dual submission of a paper or project, or resubmission of a paper or project to a different class without express permission from the instructor(s); or e. any other act designed to give a student an unfair advantage. The term “plagiarism” includes, but is not limited to: a. the knowing or negligent use by paraphrase or direct quotation of the published or unpublished work of another person without full and clear acknowledgment; and b. the knowing or negligent unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.

**ACCEPTABLE STUDENT BEHAVIOR**

Student behavior that interferes with an instructor’s ability to conduct a class or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Dean of Students to consider whether the student's conduct violated the Code of Student Conduct. The university's expectations for student conduct apply to all instructional forums, including university and electronic classroom, labs, discussion groups, field trips, etc. The Code of Student Conduct can be found at [deanofstudents.unt.edu/conduct](http://deanofstudents.unt.edu/conduct)

**ACCESS TO INFORMATION – EAGLE CONNECT**

Your access point for business and academic services at UNT occurs at [my.unt.edu](http://my.unt.edu). All official
communication from the university will be delivered to your Eagle Connect account. For more information, please visit the website that explains Eagle Connect and how to forward your e-mail: eagleconnect.unt.edu/

ADA STATEMENT
The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with an accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the Office of Disability Accommodation website at disability.unt.edu. You may also contact them by phone at (940) 565-4323.

Spring Semester Academic Schedule (with Add/Drop Dates)

Final Exam Schedule
http://registrar.unt.edu/exams/final-exam-schedule/spring

Financial Aid and Satisfactory Academic Progress

Undergraduates
A student must maintain Satisfactory Academic Progress (SAP) to continue to receive financial aid. Students must maintain a minimum 2.0 cumulative GPA in addition to successfully completing a required number of credit hours based on total registered hours per term. Students cannot exceed attempted credit hours above 150% of their required degree plan. If a student does not maintain the required standards, the student may lose their financial aid eligibility.

If at any point you consider dropping this or any other course, please be advised that the decision to do so may have the potential to affect your current and future financial aid eligibility. Please visit http://financialaid.unt.edu/sap for more information about financial aid Satisfactory Academic Progress. It is recommended that you to schedule a meeting with an academic advisor in your college or visit the Student Financial Aid and Scholarships office to discuss dropping a course being doing so.

Graduates
A student must maintain Satisfactory Academic Progress (SAP) to continue to receive financial aid. Students must maintain a minimum 3.0 cumulative GPA in addition to successfully completing a required number of credit hours based on total registered hours per term. Students cannot exceed maximum timeframes established based on the published length of the graduate program. If a student does not maintain the required standards, the student may lose their financial aid eligibility.
If at any point you consider dropping this or any other course, please be advised that the decision to do so may have the potential to affect your current and future financial aid eligibility. Please visit [http://financialaid.unt.edu/sap](http://financialaid.unt.edu/sap) for more information about financial aid Satisfactory Academic Progress. It is recommended that you schedule a meeting with an academic advisor in your college or visit the Student Financial Aid and Scholarships office to discuss dropping a course being done so.

**RETENTION OF STUDENT RECORDS**

Student records pertaining to this course are maintained in a secure location by the instructor of record. All records such as exams, answer sheets (with keys), and written papers submitted during the duration of the course are kept for at least one calendar year after course completion. Course work completed via the Blackboard online system, including grading information and comments, is also stored in a safe electronic environment for one year. You have a right to view your individual record; however, information about your records will not be divulged to other individuals without the proper written consent. You are encouraged to review the Public Information Policy and the Family Educational Rights and Privacy Act (FERPA) laws and the university’s policy in accordance with those mandates at the following link: [essc.unt.edu/registrar/ferpa.html](http://essc.unt.edu/registrar/ferpa.html)

**Student Perceptions of Teaching (SPOT)**

Student feedback is important and an essential part of participation in this course. The student evaluation of instruction is a requirement for all organized classes at UNT. The short SPOT survey will be made available **April 18th – May 1st** to provide you with an opportunity to evaluate how this course is taught. For the spring 2016 semester you will receive an email on **April 18th (12:01 a.m.)** from "UNT SPOT Course Evaluations via IASystem Notification" ([no-reply@iasystem.org](mailto:no-reply@iasystem.org)) with the survey link. Please look for the email in your UNT email inbox. Simply click on the link and complete your survey. Once you complete the survey you will receive a confirmation email that the survey has been submitted. For additional information, please visit the spot website at [www.spot.unt.edu](http://www.spot.unt.edu) or email [spot@unt.edu](mailto:spot@unt.edu).