Innovative Technology for Autism Spectrum Disorders
ENGR599
Fall Semester 2009
Class Hours: Wednesday 5:30 - 8:20 pm
Office Hours: Wednesday 4 - 5 pm (or by appointment, location TBA)
Location: VHE217
Instructor: Professor Olga Solomon
Contact: olga.solomon@usc.edu
Blackboard address: TBA
(changes may be made at a later date)

Prerequisites:
Doctoral standing in ENGR, OS/OT, PT, PSYCH and related fields.
Masters students will be able to enroll with instructor’s permission.
Units: 4

Introduction and Purpose:
Technology has become an integral part of everyday life for people of all ages in the United States and in many countries around the world. Increasingly, children grow up and develop in a world where technology mediates and organizes how they communicate, learn and play. For individuals with autism spectrum disorders (ASD), their families and the professionals who work with them, the ubiquitous presence of technology offers a unique opportunity to marshal new resources for participation and engagement in everyday life.

This course is a USC’s contribution to the Innovative Technology for Autism Initiative launched by the Autism Speaks Foundation to promote development of new technologies for those living with autism and their families. Innovative Technology for Autism is an interdisciplinary field that promotes creativity and innovation and integrates fields such as engineering, occupational science, neuroscience, psychology and anthropology. The course is designed to be of interest to graduate students in Engineering and Computer Science, Occupational Science and Occupational Therapy, Physical Therapy, Psychology, and related fields.

Course Objectives:
The goal of the course is to provide students with understanding of Autism Spectrum Disorders as a foundation for future research, for development of technologies for ASD, and for their use in clinical practice. Bringing together graduate students in Engineering and Computer Science, OS/OT, PT, Psychology and related fields will provide the experience of interdisciplinary collaboration. The course will be taught in a seminar format and will combine discussion and critical analysis of assigned readings, guest lectures, practical experience and grant writing.

The specific objectives of the course are:
• Become familiar with main theories of ASD.
• Gain appreciation of how ASD impact personal experience and family life.
• Understand basic issues underlying the use of technology for ASD.
• Become familiar with literature on innovative technology for ASD.
• Gain an understanding of the capabilities and limitations of technology for ASD.
• Experience collaboration with colleagues working in other fields.
• Practice implementation of your original ideas in designing an innovative technology for ASD.
• Gain the ability to formulate your ideas in a grant proposal.

Course Requirements:
Weekly blog commentaries:
Before each class students are required to post at least one interpretive commentary on the readings assigned for that class on the class blog. These posts will be graded with a minus, a check mark, or a plus for each class meeting, to indicate that the requirement was met. The blog commentaries should demonstrate students’ understanding and critical assessment of the readings and generate topics and questions for class discussion. Late blog posts will be accepted once during the semester with no penalty provided they are posted before the following class meeting (due no later than 24 hours before class time, 15% of the final grade).

Team leading of class discussion:
Students will be grouped into small teams (2-3 per team) to lead class discussion of the readings for the week using PowerPoint format. The students in each team will be leading class discussion based upon instructor’s recommendations and blog commentaries for the week. Every student in the course will be expected to participate in class discussion each week independently of being part of the team leading the discussion. PowerPoint slides from class discussion will be posted on the course website. (2 team presentations per semester, 30% of the final grade for each team member)

Group Project: Grant Proposal of a Design for an Innovative Technology for ASD
Throughout the semester, students will be working in interdisciplinary groups to design a new technology for ASD. To facilitate communication among students, the groups will consist of the students who already have been part of the teams leading the discussion. Depending on the number of students in the course, two or three teams will be combined into one group (4-6 students per group). The design project will be primarily conceptual with a clinical application component. As a group final paper, students will write an interdisciplinary grant proposal to the Autism Speaks Innovative Technologies for Autism board for a new technology for ASD. The proposal should consist of three main sections: 1) review of the literature relevant to the proposed technology (using four class readings and two sources found independently), 2) design of proposed technology and 3) clinical application of proposed technology. The group projects will be presented in class in weeks 14 and 15, and will be guest refereed by two USC faculty with a distinguished record of ITA research. The proposals recommended by these referees will be considered for a student ITA design competition organized by Autism Speaks ITA board. (Group final papers due Wed. finals week, 50% of the final grade for each team member)

Course grading:
Weekly blog commentaries 15%
Team leading of class discussion 30%
Group project / Grant proposal 50%
Course participation 5%

Statement for Students with Disabilities
Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.

Statement on Academic Integrity
USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one’s own academic work from misuse by others as well as to avoid using another’s work as one’s own. All students are expected to understand and abide by these principles. Scampus, the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions
are located in Appendix A: http://www.usc.edu/dept/publications/SCAMPUS/gov/. Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: http://www.usc.edu/student-affairs/SJACS/.

Required texts:
Links to articles and book chapters will be posted on the Blackboard course website.

Week 1 Aug. 26
Introduction to the course

Week 2 Sept. 2
Diagnosis of ASD

Week 3 Sept. 9
ASD and Technology
Guest speaker: Matthew Goodwin (MIT and Grodin Center)

Week 4 Sept. 16
Theories of Autism: Theory of Mind

Week 5 Sept. 23
Theories of Autism: Weak Central Coherence and Social Cognition

Week 6 Sept.30
Theories of Autism: Impairment of Executive Function
Guest Speaker: Portia Iversen (Autism Speaks)

Week 7 Oct. 7
Theories of Autism: Sensory Integration, Embodiment, Agency

**Guest Speaker: Sharon Cermak (Division of OS/OT, USC)**

**Week 8 Oct. 14**  
**Theories of Autism: Sensory Integration, Engagement and Participation**


**Week 9 Oct. 21**  
**Family Life and Family Perspectives on Autism**


**Guest Speaker: Mary Lawlor (Division of OS/OT, USC)**

**Week 10 Oct. 28**  
**Socially Assistive Robotics**


**Guest Speaker: Maja Mataric’ (VSoE, USC)**

**Week 11 Nov. 4**  
**Experience, Therapeutic Interventions and Automated capture applications**


**Guest Speaker: Gillian Hayes (Dept. of Informatics, UC Irvine)**

**Week 12 Nov. 11**  
**Virtual reality: Albert (Skip) Rizzo (Institute for Creative Technologies, USC)**

Reading TBA

**Week 13 Nov. 18**  
**Project Presentations Part 1**  
**Guest Referee: TBA**

**Week 14 Nov. 25**  
**Project Presentations Part 2**  
**Guest Referee: Portia Iversen**

**Week 15 Dec. 2**
Project Presentations Part 3
Guest Referee: Shri Narayanan (VSoE, USC)