

TECHNOGENESIS PROPOSAL

Research and Development of an Interactive Learning Display at the Liberty Science Center

Nicholas P. Catania
Engineering Physics
Music Technology
NCatania@Stevens.edu

David Musial
Affiliate Associate Professor
Department of Music Technology
DMusial@Stevens.edu

The mission behind my research will be to develop an interactive learning display that will potentially be installed at the Liberty Science Center. The goal of the research will be to develop a product capable of inspiring explorations and learning initiatives in Engineering Physics, Music Technology, Art Technology and Computer Science amongst younger individuals. My academic adviser, Professor David Musial & I, have met with executives at the Liberty Science Center recently, and with much excitement, have been given a verbal approval to make this proposal.

As a double major in Music & Technology and Engineering Physics, I would like to design the basis for a potential long-term technology installation which may be premiered at this outstanding, nationally acclaimed Science Center. Throughout my research, I will master the operation of the cutting-edge, interactive media arts software: MAX/MSP-Jitter, and develop a unique, creative, interactive experience where Music Performance as well as Visual Performance, is analyzed through an algorithm that I will design. My original will possibly incorporate user controlled sound, video & laser art, as well as physical art in real time. In addition, Alternative controllers such as the "Roland Dual D-Beam" RF- MIDI sensors, Moog Guitars, MIDI Percussion Pads, Electronic Wind Instruments (EWIs), MIDI Violins, Mallet Kats (percussion), iPads, Wii controllers, QWERTY Keyboards and Smart Phones, may all be part of the interactive display.

This past year, my SKIL classes in the Physics department have given me the opportunity to design engineering and science based projects that closely resemble the nature of this proposal. My various projects required me to develop an idea, form a list of materials, estimate expenditures, and produce a schedule of project goals obtainable by a strict deadline. Because I am also a music technology student, I chose to work on projects that would exercise skills from both of my majors. This past semester I was able to manufacture a plasma speaker that amplified the sound of a square wave produced by a 555 timer. The ionized nitrogen plasma was bridged across two electrodes and

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amplified the frequency by expanding and contracting molecules within the air. This frequency could then be modulated by adjusting a potentiometer to various resistive values. In addition, this semester I am producing a Chladni plate that will provide a visualization of a standing wave. A granular substance, such as sand or salt, will be placed on top of a large plate and the substance will move to the nodes of various wave patterns as an induced frequency is modulated to different resonance intervals inherent to the plate. These projects have served as excellent predecessors to this project proposal and I am confident that I will be able to produce an exciting interactive learning display that can be enjoyed by everyone.

My research will provide the basis for a grant application, which may provide the funds for the equipment needed as well as the man-power to construct this initial installation. With the success of this project, it may be possible to market the entire interactive interface to other Science Centers around the world. In addition, I hope to inspire media interviews, which may lead into more commercial applications of the installations at teen centers, novelty restaurants (ex. Mars 2112, Hard Rock, Chuck E. Cheese, McDonalds type of playgrounds), waiting areas at movie cinemas, county fairs, boardwalks, and many other venues. This project may also lead the way and inspire future Stevens students to build relations with the Liberty Science Center and develop their own exhibit ideas and creative initiatives.

As an aspiring innovator and entrepreneur, I am confident that this position is directly in line with my academic and career goals. This project will exercise the skills and imagination that I will need to be an excellent physicist and musician. I would be grateful for the opportunity to explore new ideas and develop a project that will truly benefit others and stand up to the Stevens reputation.

Thank you for considering me for the 2011 Summer Technogenesis Program.

Student will require on-campus housing.

Nicholas P. Catania

Professor David Musial