UCIrvine | Institute for Virtual Environments and Computer Games

Search

Sample of Research Projects

Walt Scacchi

ivecg.uci.edu

November 2014

Motivation

What are we doing?

– *Empirical research* and *technology prototyping* of computer games/virtual worlds (CGVWs) that support challenge problems in science, health care, art, technology, software engineering, and defense.

– Collaborate with external R&D partners/sponsors

– Engage high risk, adventuresome research projects

Motivation

Why are we doing this?

– Computer games are both *technology* and *new media*

– *Play* and *work* are not fundamentally different activities

– Enable immersive and transformative learning experiences

– Engage new students and emerging scholars

– Realize the interests of more than 50 UCI faculty at IVECG

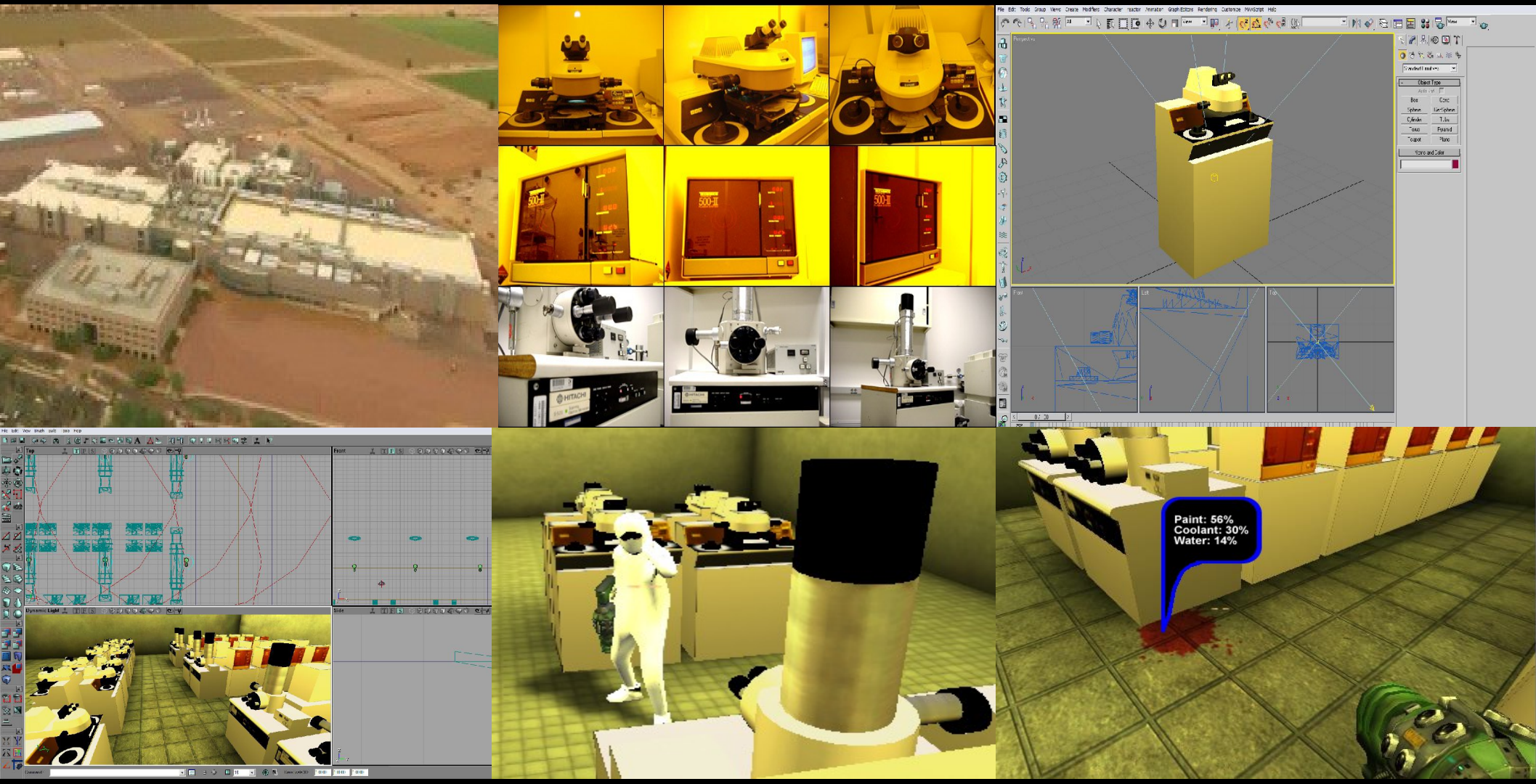
Some R&D projects of interest

- Science learning games for informal science education at *Discovery Science Center*
- Game-based semiconductor fabrication operations training simulator at *Intel*
- Virtual worlds for space science on a sphere at *DSC*
- Game-based decentralized command and control training simulator for *Naval Postgraduate School* and *Northrop-Grumman*
- Informal classical music learning game environment for *San Francisco Symphony*
- Experimental games for business, cultural critique, art and technology
- Facilitating local game development community
- New projects in progress:
  - Games for NeuroScience Education

Web-based science learning games for informal science education for K-6th grade students and families

Scacchi, W., Nideffer, R. and Adams, J. (2008), A Collaborative Science Learning Game Environment for Informal Science Education: DinoQuest Online, in *New Frontiers for Entertainment Computing*; P. Ciancarini, R. Nakatsu, M. Rauterberg, M. Roccetti (Eds.); Boston: Springer, 71–82.

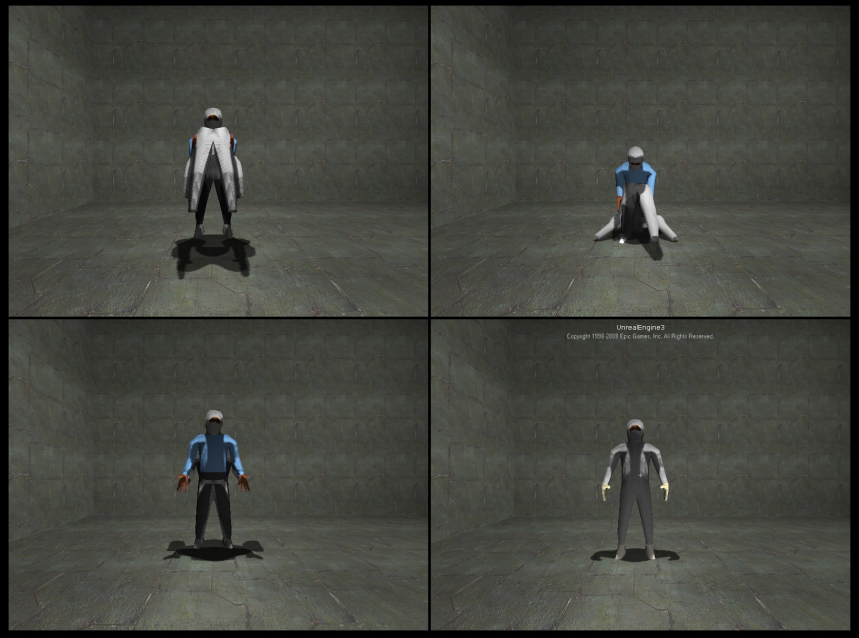
Semiconductor/nanotechology fabrication operations and diagnostics training game



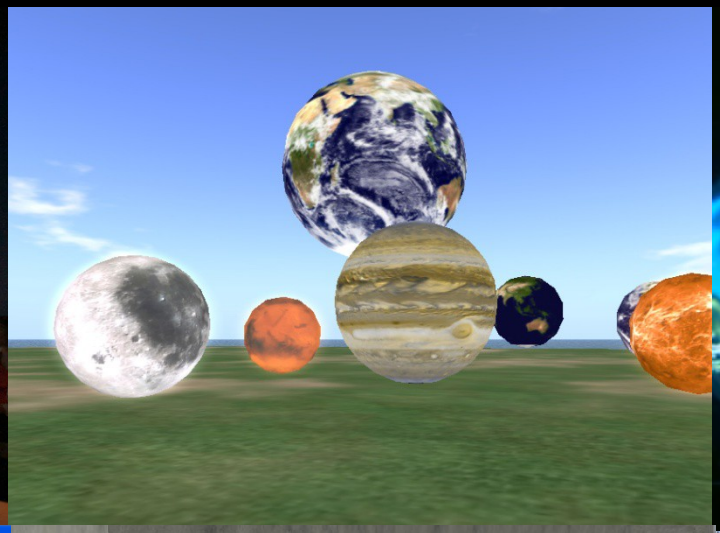
FabLab Demo Reel

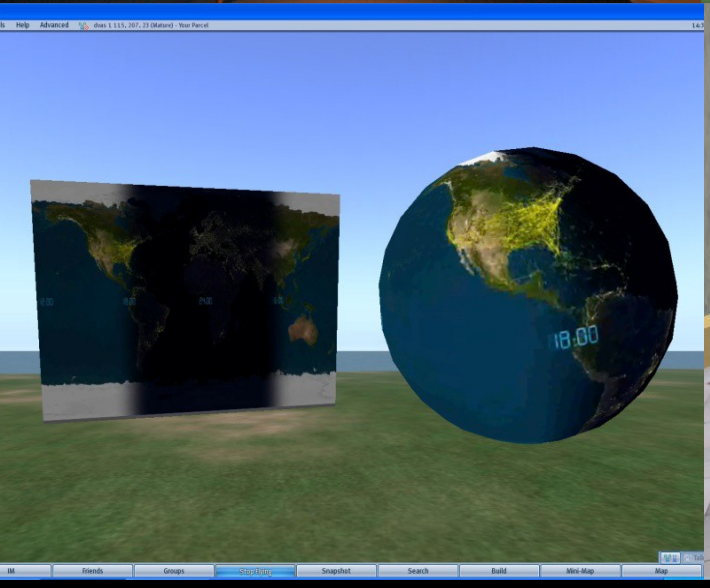
Scacchi, W. (2010). Game-Based Virtual Worlds as Decenralized Virtual Activity Systems, in W.S. Bainbridge (Ed.), *Online Worlds: Convergence of the Real and the Virtual*, Springer, New York, 225-236.

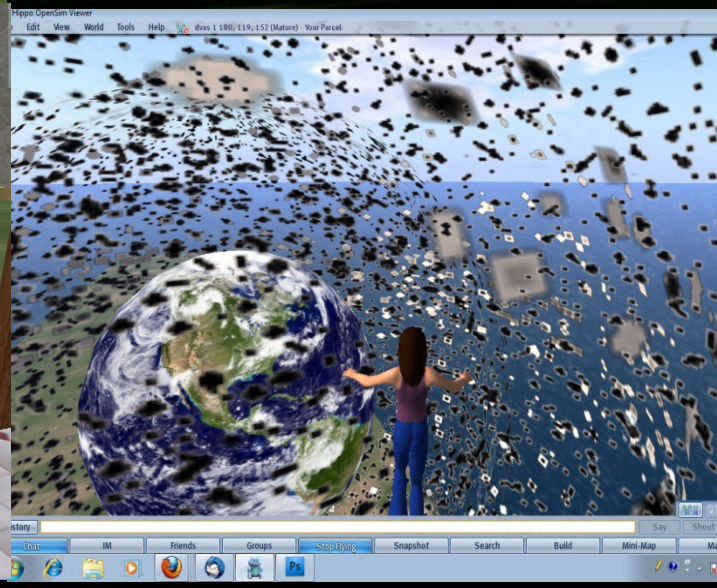
Semiconductor/nanotechology fabrication training game: "Gowning processes"



Planetary science data visualization and "spherecasting" support: *NOAA Science on a Sphere* installation in *Opensim* VW platform

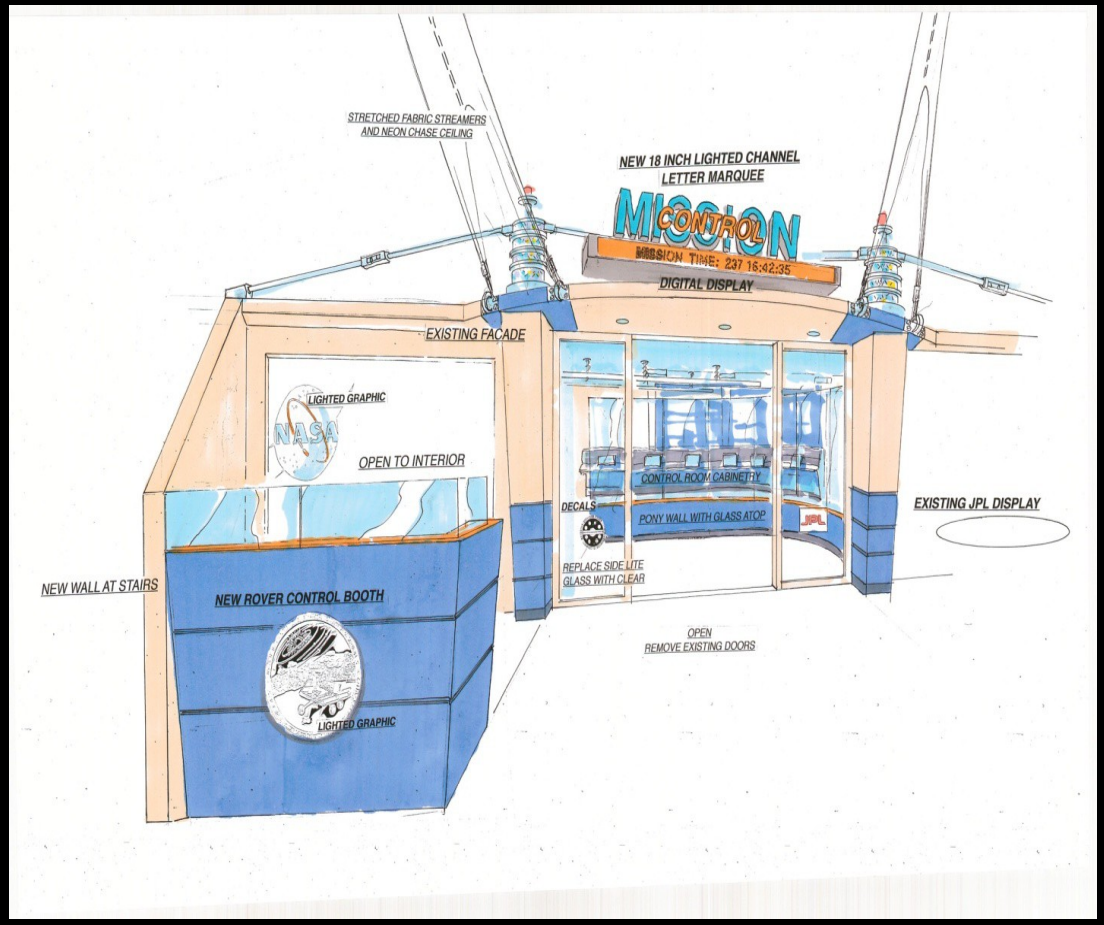


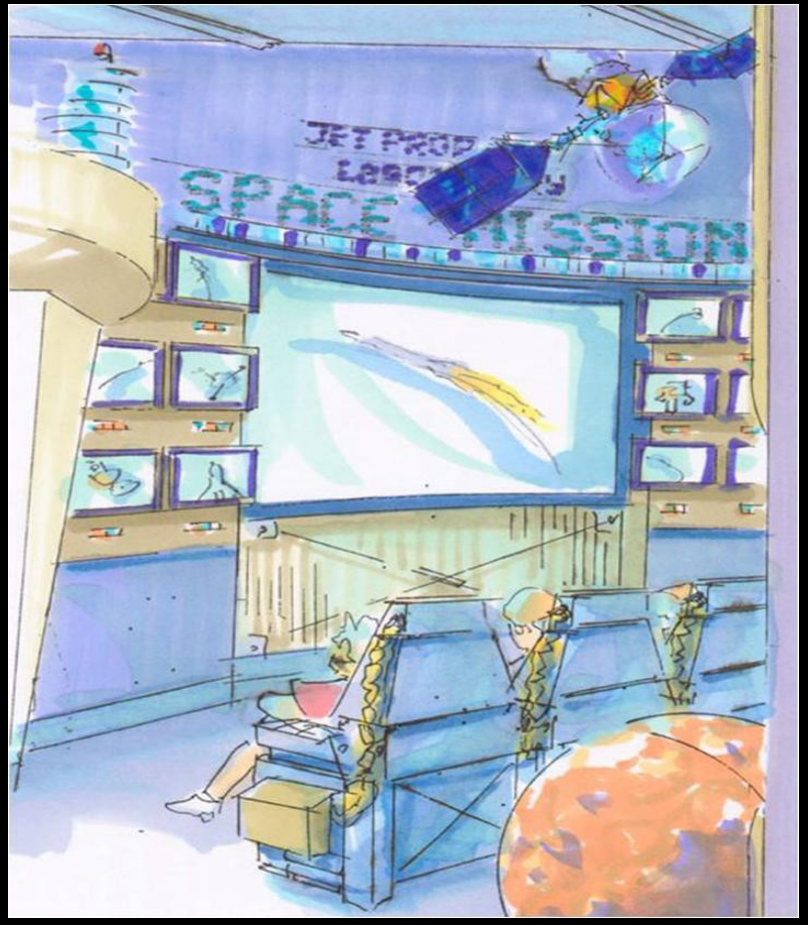




Supporting virtual exploration of planetary and near-earth objects (space debris, small satellites, near-earth asteroids)

Mission Control Room: Vision for *Discovery Science Center*





VW for experimental studies in decentralized command and control centers using *OpenSim*

Informal Classical Music Learning Game Environment for San Francisco Symphony: *SFSKids.org*

SFSKIDS
FUN & GAMES WITH MUSIC

Discover Music

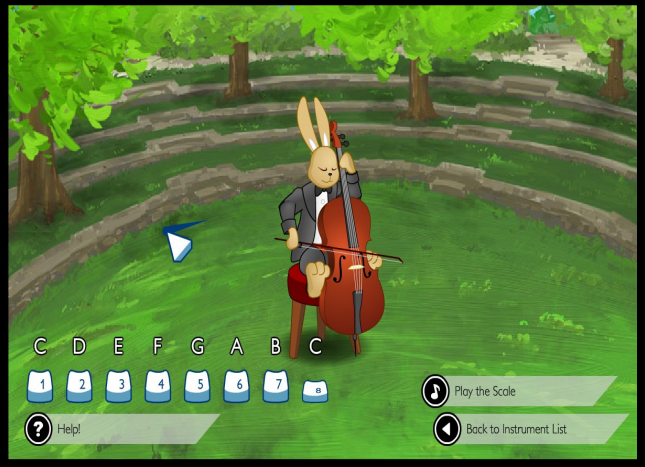
Under the Sea of Knowledge.

Play with Music

Above the Musical Skies

Perform Music

In the Instrument Garden

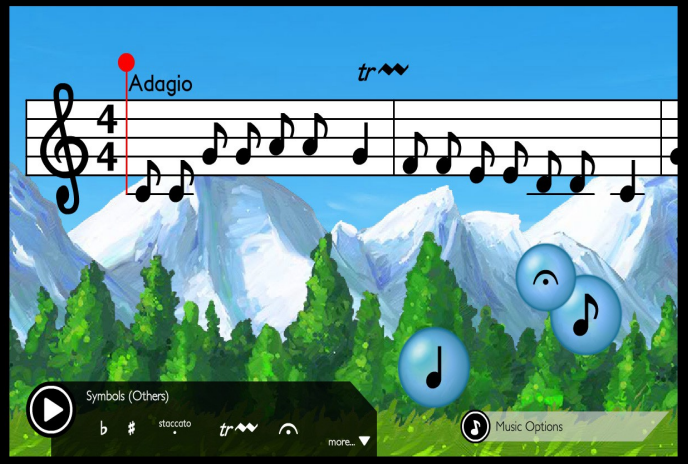


Conduct Music

At the Symphony Hall

Compose Music

Atop the Mountain of Muses

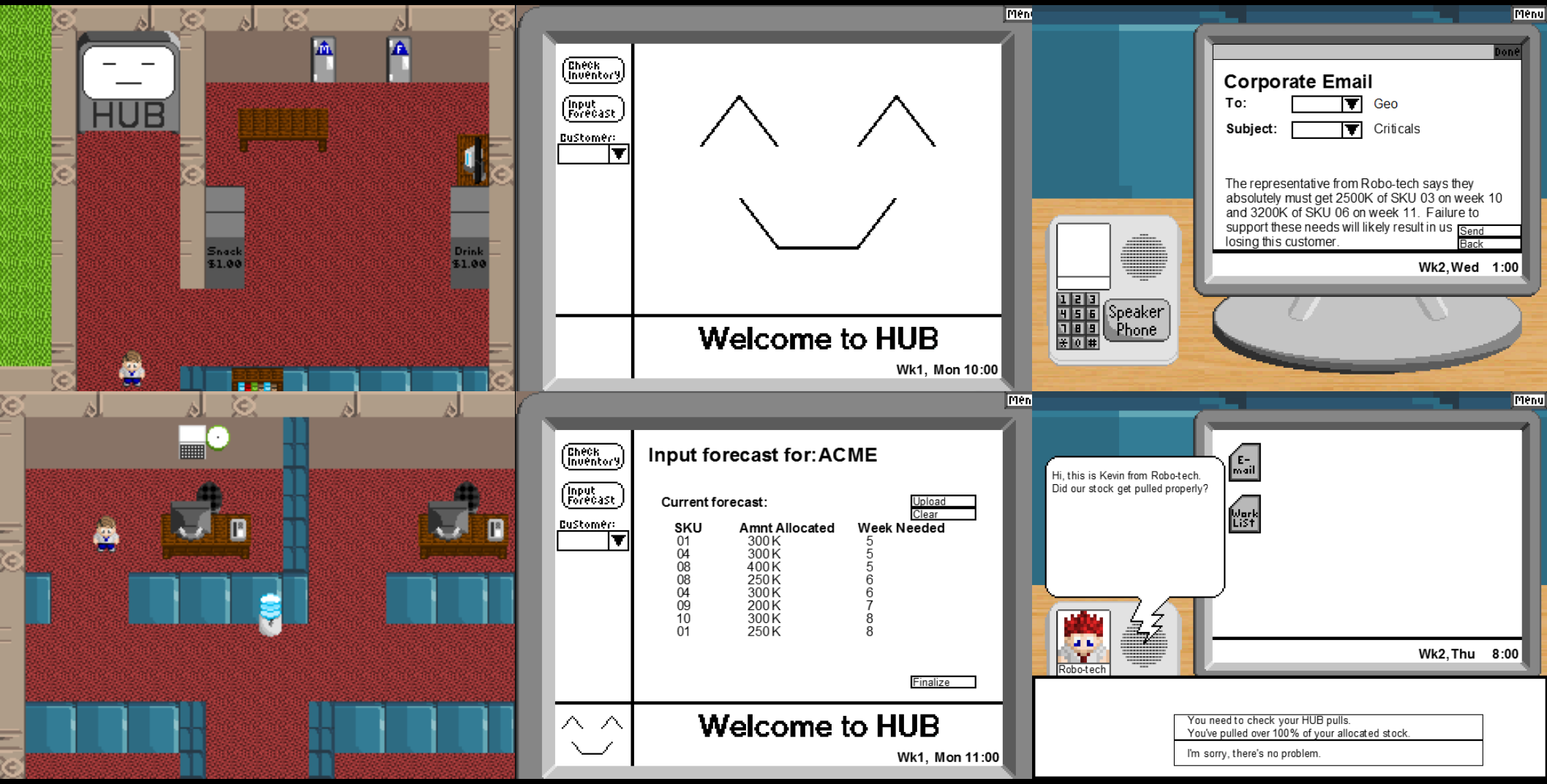


Potential extensions to SFSKids.org

SFSKids.org, an instance of the *World of Music* platform, is designed for extension, modding, or customization of:

- Recorded music catalog
- Music history
- Music genres (Opera, Jazz, World,...)
- Musical instruments
- User-created music+imagery (“music videos”)
- Localization (internationalization)
- Integration with Science, Technology, Engineering, Arts, and Mathematics (STEAM) learning initiatives

CBA: Customer relations work practices simulator implemented using low-cost, rapid micro-development cycle



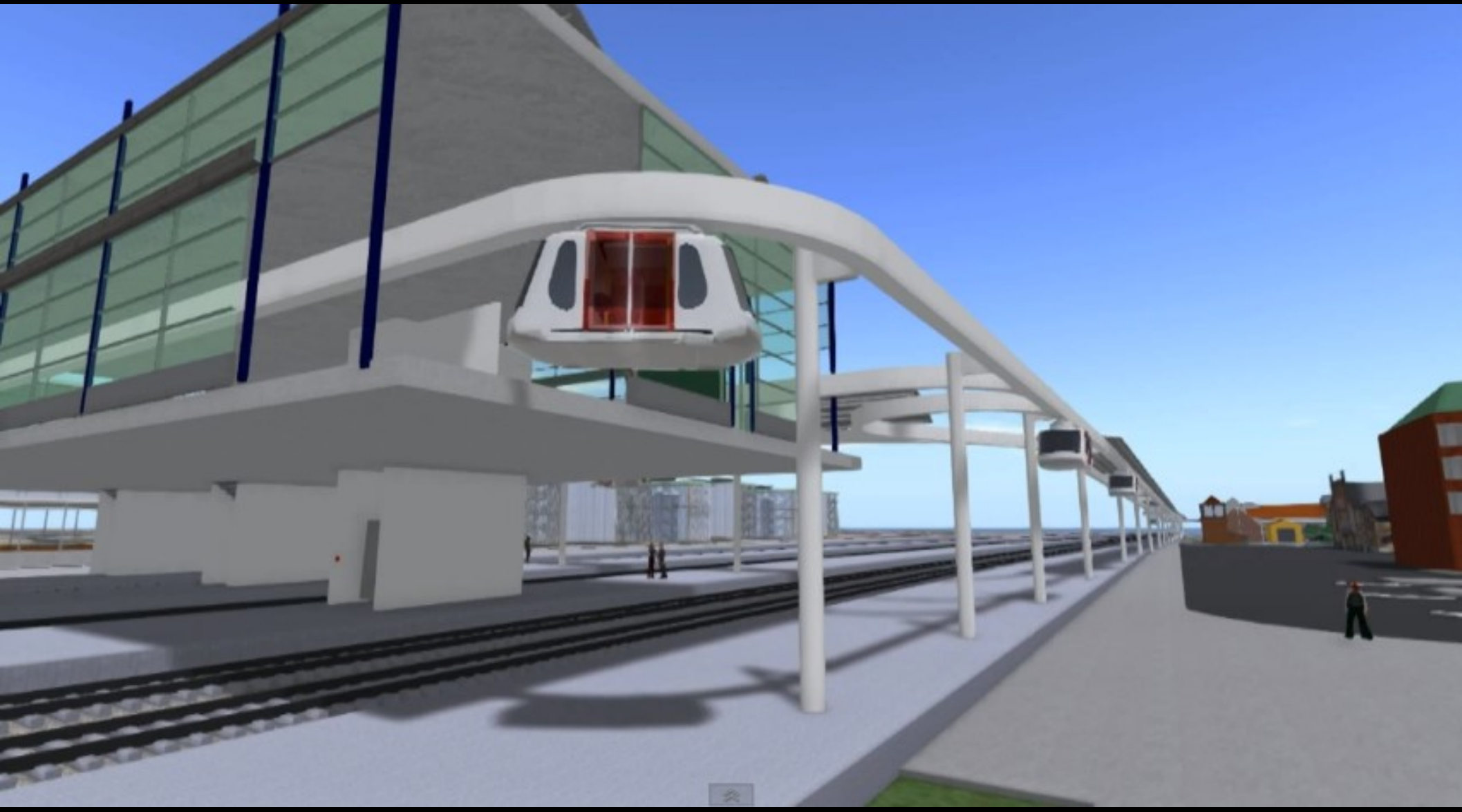
2D, side-scrolling, *World of Warcraft* inspired, role-playing game and CGVW development/modding kit

Aoedipus.net

Envisioning a virtual social computing world

Virtual Life Demo Reel

Modeling and Si mulating the design of a Personal Rapid Transit system for Uppsala, Sweden



Game-based VW simulator interfaces for immersive motorsports racing experiences: *cost* vs *realism?*

$500 vs. $5000 vs. $50,000 vs. $500,000 vs. $5,000,000

High fidelity motorsports game?

Game-based VW simulator you can actually drive in physical world! -- *OutRun* @ UCI

http://www.conceptlab.com/outrun

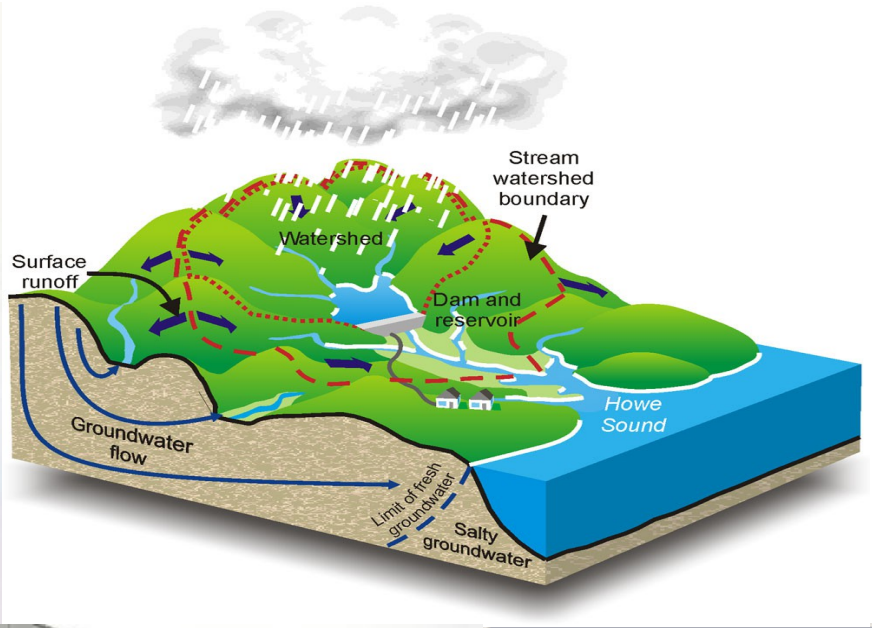
Community development concept: Supporting UCI video game developers club projects (sample)

Community development concept: Supporting UCI video game developers club via Computer Game Science Laboratory

Community development concept: *IEEE Intercollegiate Computer Game Development Showcase* (2012-2015)

Large group conferences in virtual world: *OpenSim Community Conference* (2013-2014)

Participatory Drought Management and Water Quality Game (Vision with *UCI Urban Water Research Center*)



CGVW Research Agenda produced for *National Science Foundation*

Game-Based Worlds for Neuroscience

Adventure/Quest games for learning neuroscience via experiments in simulated brain/anatomical testbeds to study:

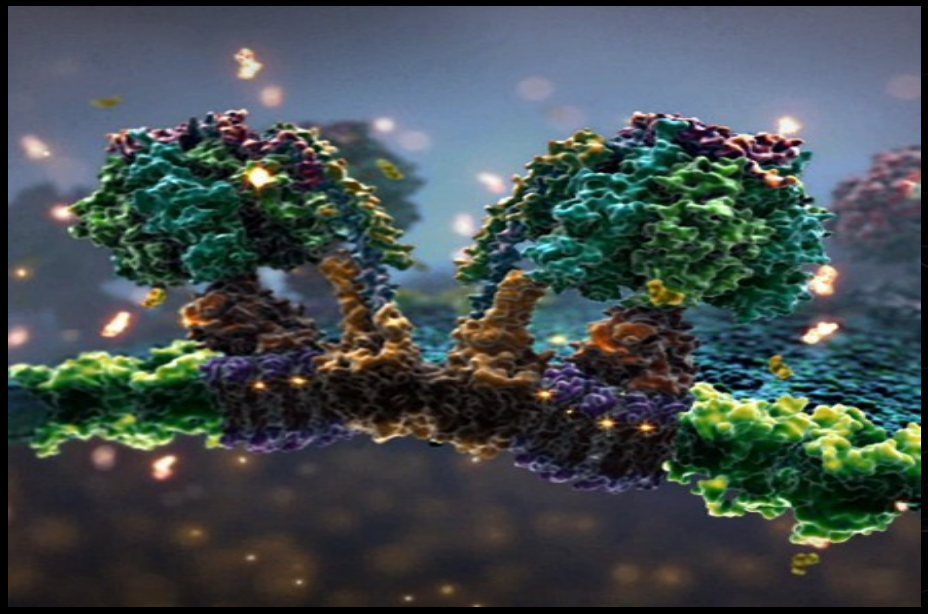
- Neurobiological processes

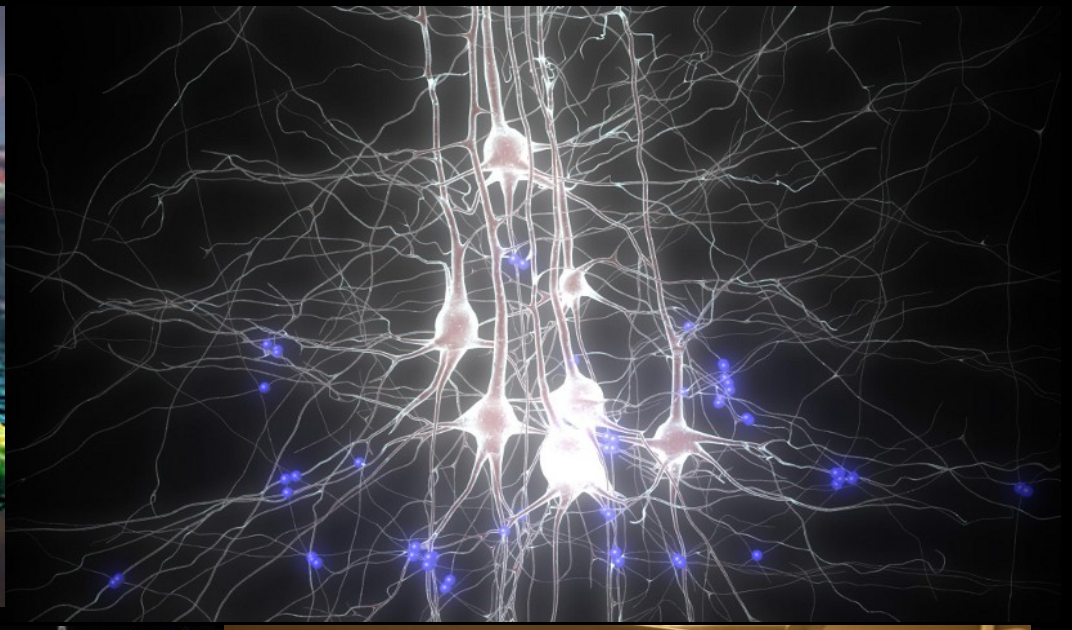
- Disease and drug pathologies

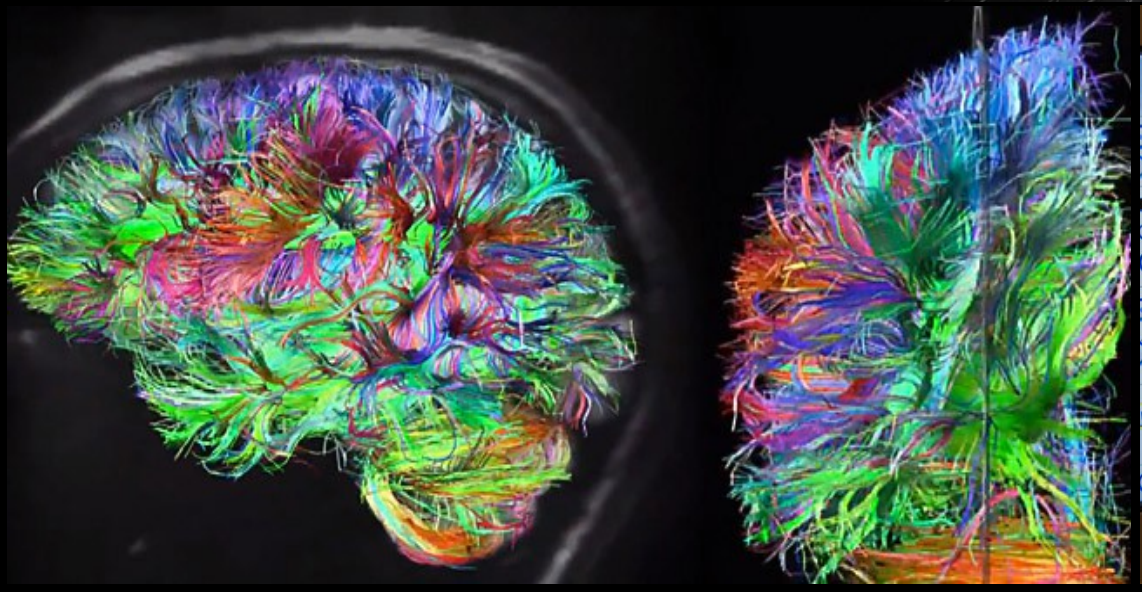
- Brain repair and rehabilitation

- Brain-computer interaction (HMD, EMM, EEG, 5.1 headphones)

Games for (CalBRAIN) NeuroScience?







Research Collaborators

Faculty

– Robert Nideffer (RPI), Thomas Alspaugh, Yunan Chen, Steve Cramer, Magda El-Zarki, Garnet Hertz (Emily Carr U), Alfred Kobsa, Crista Lopes, Gloria Mark, Bonnie Nardi, David Redmiles, Richard Taylor, and many others

Research Staff

– Craig Brown (NomNom Games), Yuzo Kanomata (IGB), Kari Nies (ISR), Alex Szeto (American Honda, ISR), and others

Students

– UCI Video Game Developers Club

Acknowledgements

– National Science Foundation, grants #0808783, #1041918, #1256593
– Discovery Science Center, Naval Postgraduate School (Center for Edge Power), Intel, Northrop-Grumman, San Francisco Symphony, UCI (School of Medicine) Anatomy & Neurobiology, (School of Biological Sciences) Neurobiology and Behavior.
– Digital Industry Promotion (DIP) Agency, Daegu, South Korea
– UCI Video Game Developers Club

- *No review, approval, or endorsement implied*.