

# ***3d Game Programming as a Computer Science Service-Learning Curriculum for High School Science Courses***

**Dr. Kris Stewart**

**Computer Science Department**

**San Diego State University**



# ***SDSU is an MSI (kinda)***

**Our curricula can tie in with local high school to promote smooth transition to the university**

**Our research can tie in with our teaching.**

**Most recent curriculum – Spr 06 and Spr 07**

**3d Game Programming for Simulation (Torque)**

**NSF EPIC research project and collaboration with SDSC Visualization (S Cutchin)**

**<http://www.stewart.cs.sdsu.edu/cs596.html>**



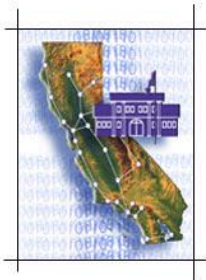
# Resources:

## CaIREN -2...



Corporation for Education Network Initiatives in California

Digital California Project



San Diego Supercomputer Center

CDL

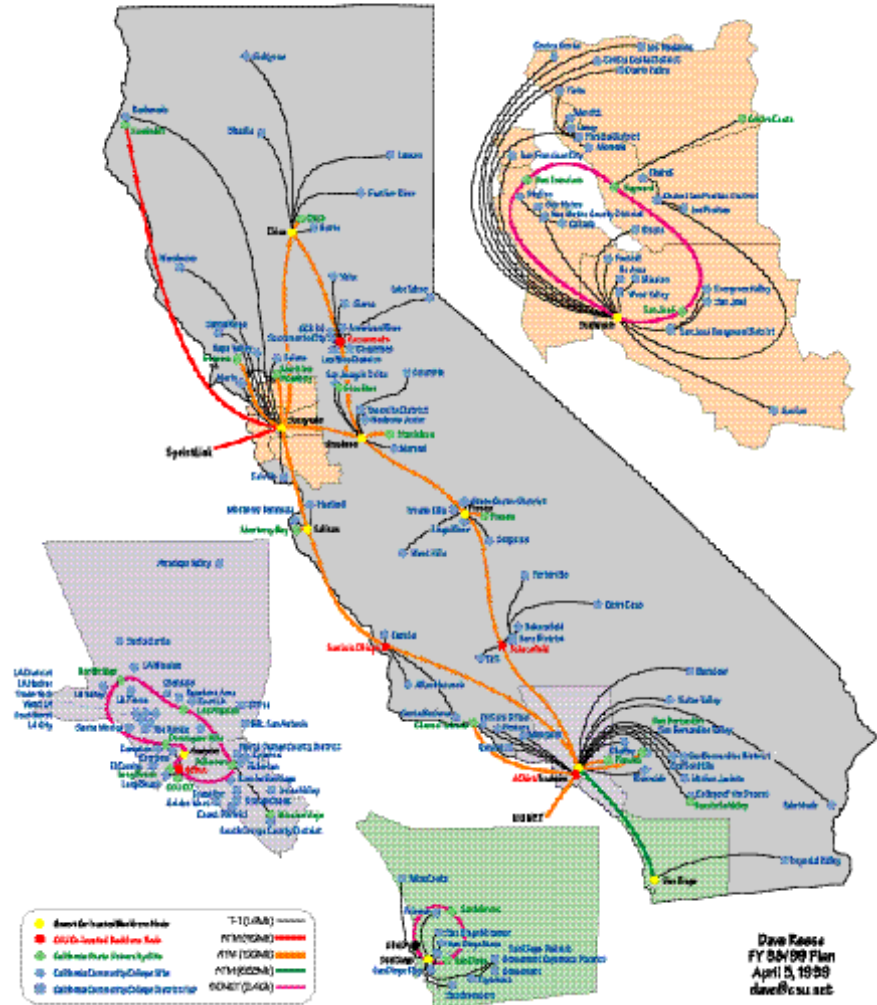
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4CNet

California State University and California Community Colleges



SAN DIEGO STATE UNIVERSITY

SIAM CSE07 – MS24 The Comp'l Sci Ed Pipeline



# ***Kris' Faculty Background***

*(Kris Stewart, CS Professor, San Diego State University, California State University)*

- **Numerical Analyst\* led to**
- **Supercomputing and Undergraduate Education (SUE\*\*) led to**
- **Supercomputing Teacher Enhancement Program (STEP\*\*\*) led to**
- **Education Center on Computational Science & Engineering (EC/CSE) part of EOT-PACI (1997)**
- **ECCSE joins Engaging People in Cyberinfrastructure (EPIC) led to 3d Game Programming course at SDSU**

\* MS/CS SDSU 1979 (built IMSAI/Z80 kit computer), JPL 1981, PhD UNM 1987, SDSU 1984

\*\* SDSC (1991); UCES (DoEnergy 1994)

\*\*\* Smithsonian Research Collection (1996)



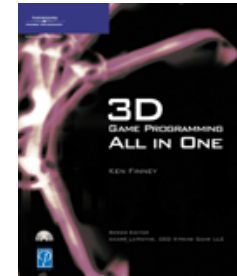
# 3d Game Programming

## Upper Division Course for Coders

- Using the Torque Game Engine from [www.garagegames.com](http://www.garagegames.com)



- Torque has an object oriented scripting language with an extensive library of game capabilities. A large user community has developed around this environment.
- 06 Text: Ken Finney, Thomson Pub
- 07 Text: Ed Maurina, GG Press



# *Game Programmer's Guide to Torque* *Spr07*

by Edward F. Maurina III

**Windows, Macintosh, Linux**



**Changes from Spr06 course:**

- 1. Application server on-line for student course project development in a secure campus environment [firewall updates just last week] – available on public internet to students**
- 2. Student *cooperative learning groups* with sample of *service learning***

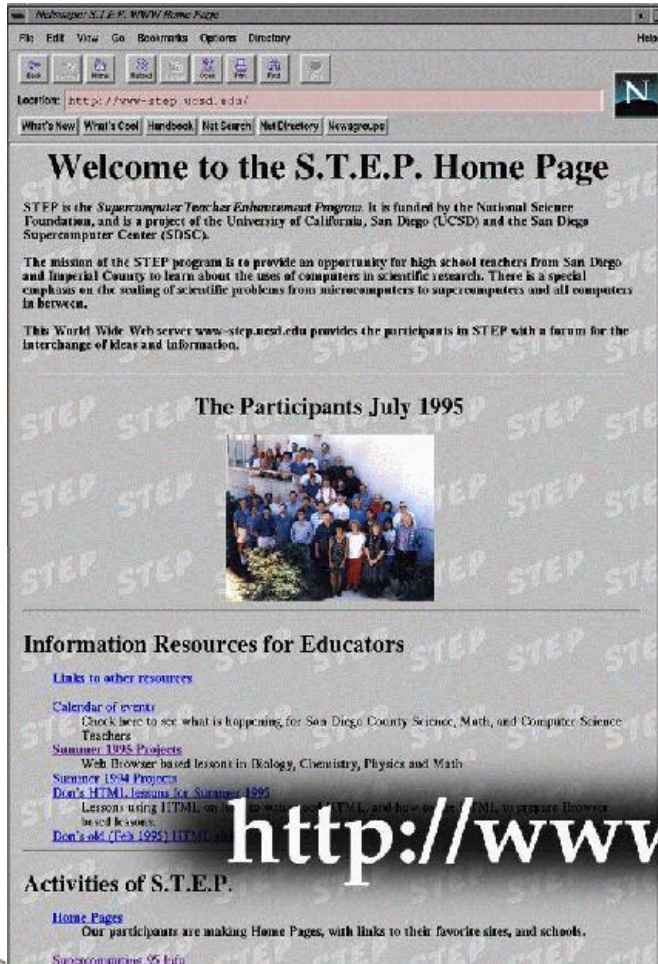


# *How the Ed Center on CSEng Lab has used Torque as part of NSF EPIC (2005-06)*

- **Hoover High School collaborators, Mr. Hal Cox (physics) and Mr. Robert North (chemistry)**
- **Both former STEP teachers**
  - Supercomputer Teacher Enhancement Program (1993-1996)
    - A Key outcome was the adoption of Web Browser in high school curriculum in 1994
    - Support from local infrastructure for network/computers in the classroom was earned



# 1996 ComputerWorld/Smithsonian InfoTech Award for STEP

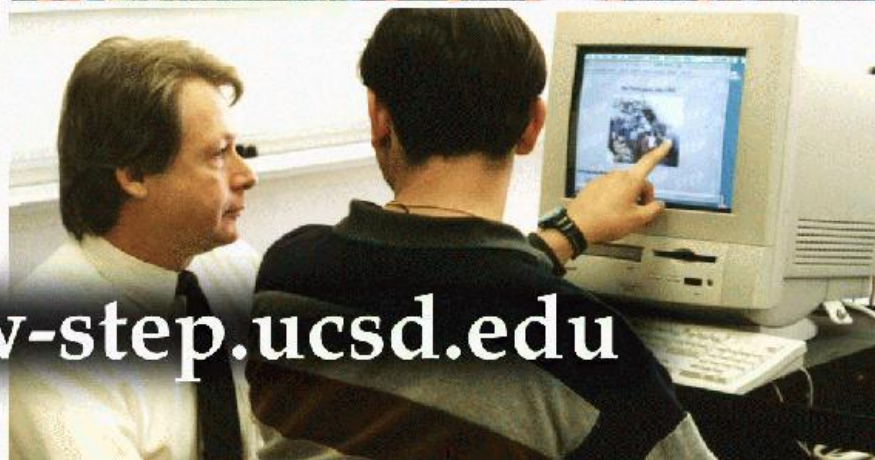


The screenshot shows a Netscape browser window with the address bar containing <http://www-step.ucsd.edu/>. The page title is "Welcome to the S.T.E.P. Home Page". The main text describes the STEP program as the Supercomputer Teacher Enhancement Program, funded by the National Science Foundation and the University of California, San Diego (UCSD) and the San Diego Supercomputer Center (SDSC). It states the mission is to provide high school teachers from San Diego and Imperial County with an opportunity to learn about computer uses in scientific research. A section titled "The Participants July 1995" includes a small photo of a group of people. Below that, "Information Resources for Educators" lists various links like "Calendar of events", "Summer 1995 Projects", and "Don's HTML lessons for Summer 1995". At the bottom, "Activities of S.T.E.P." includes a link for "Home Pages".



<Robert

<Hal



<Robert

<http://www-step.ucsd.edu>





# Web Page Development Adopted Quickly (wouldn't you prefer to have this young man on campus in the computer lab, than ...)



<http://www-step.ucsd.edu/projects95.html>



# STEP Lead Teachers (Hal Cox)

Netscape: Workshop C95/nc

File Edit View Go Bookmarks Options Directory Help

Location: <http://www-step.ucsd.edu/COX95/SC95Wksp/>

What's New What's Cool Handbook Net Search Net Directory Newgroups

## Outline Internet Staff Development

- Introductions – [Presenters](#) and Mentors
- Presentation Overview and [Assumptions](#)
- Workshop [Planning](#) Ideas
- Workshop [Presentation](#) Ideas
- [Summary](#) and Closing Thoughts

[Show the Cover Page](#)

Document last updated on November 28, 1995 by [Hal Cox](#)  
This file can be accessed through <http://www-step.ucsd.edu/>  
Send all corrections and comments to [Hal Cox](#)

### ■ Workshop Presentation Ideas

[Introduction](#)

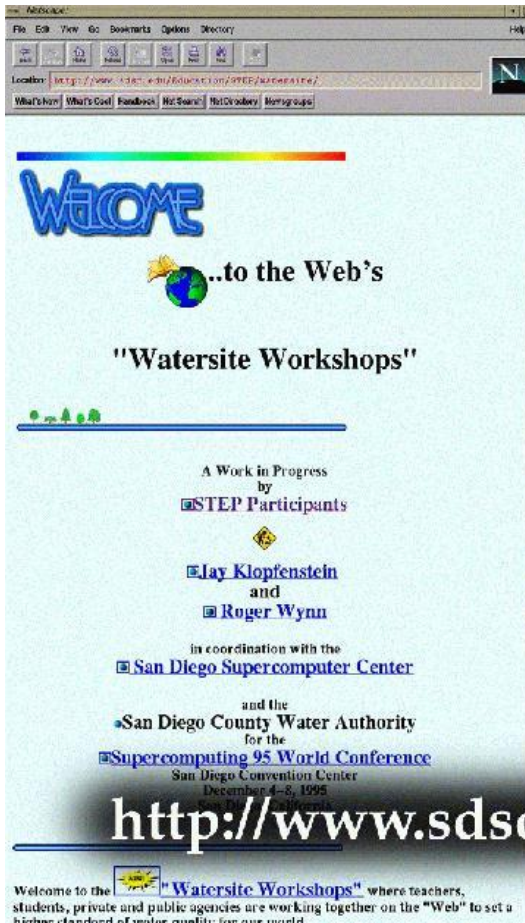
[The Internet and Networking](#)

<http://www-step.ucsd.edu/COX95/SC95Wksp/>



# Computing Power a Decade Ago

(look familiar to you, or were you born digital?)



< Hal

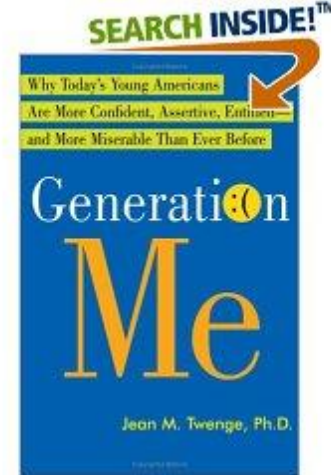


# ***2007 - We in Computational Science are Indebted to the Gamers [our students]***

- **The Power They Needed to Effectively Run Interactive Games pushed the CPU Envelope**
- **The Resolution in Graphics and Run-time Response has Engaged this Audience (market-driven, video games more \$'s than DVD movies)**
- **We in Higher Ed Need to Engage this Audience**
- **We can Tune the Curriculum to Benefit our Students and a Larger Audience**
- **Service-based Learning is Rewarding to the Spirit (they may not know *they need this*)**



# Generation ME



- Why Today's Young Americans are more Confident, Assertive and more Miserable than ever before
- Jean M. Twenge, PhD, (Psychology Dept SDSU) **¿ possible new collaborator ?**



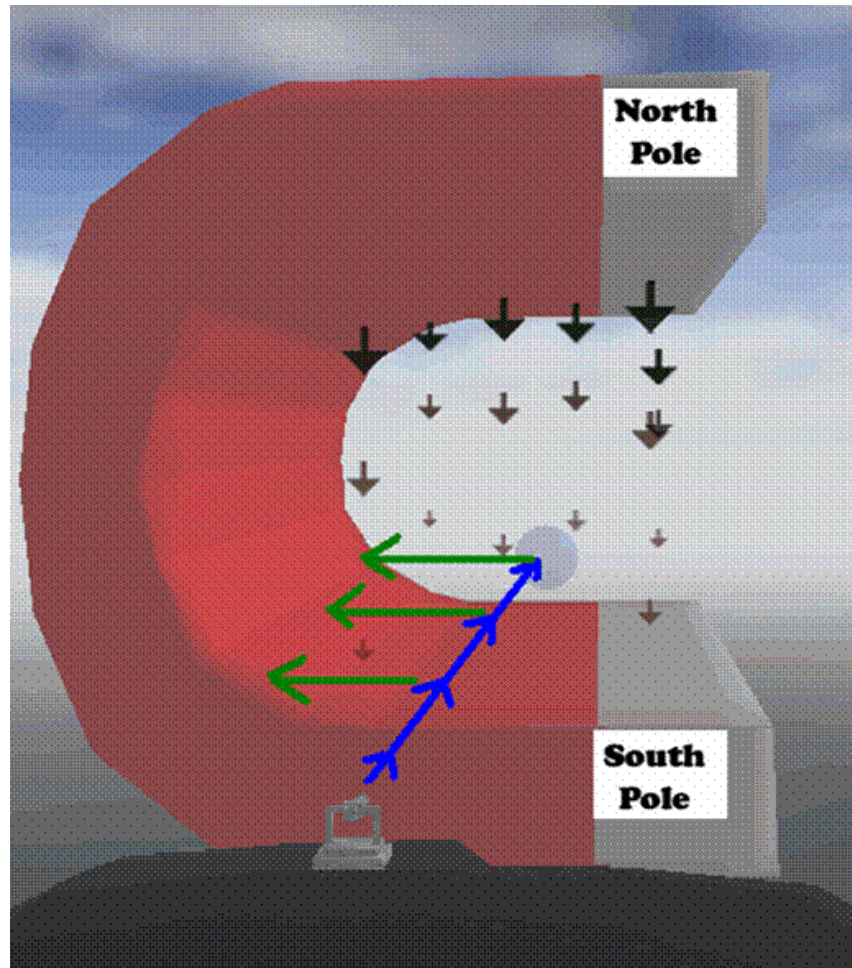
# *ECCSE collaboration with Steve Cutchin*

## *SDSC <http://vis.sdsc.edu/>*

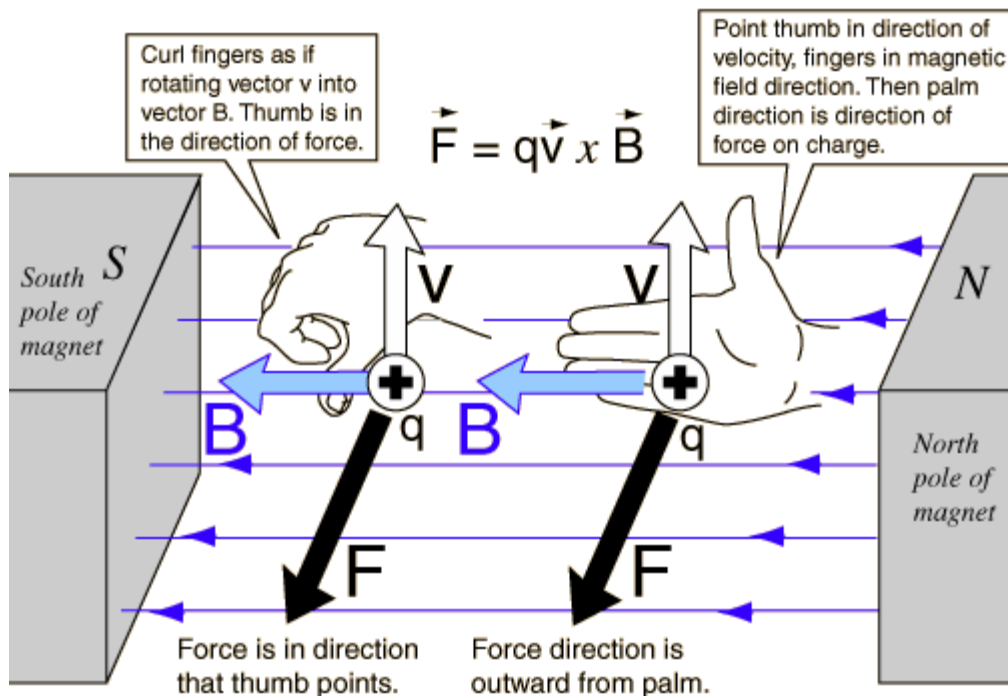
- <http://visservices.sdsc.edu/projects/explore/> hosts our Chemistry and Physics modules



# *Magnetic Particle Emitter*



# Directions – Right Hand Rule/Left Hand Rule





# *Live Demonstration?*

- **Running on my Dell notebook – you can download your own copy to run on your PC**
- **Start the Game (tab for avatar)**
- **Proceed slowly to read the background information**



# Ryuhei Kitamura @ Comic-Con

*Last Month in San Diego*



Azumi – “I want to make samurai version of *Mad Max*”

<http://www.publicbroadcasting.net/kpbs/arts.artsmain?action=viewArticle&pid=31&sid=8&id=948591>

•**KPBS interview with Azumi creator by Beth Accomando**

I have watched it once now and the story line, as English subtitles, is compelling.



# Outside Wisdom – JSB

John Seely Brown – 17Jan05 @ SDSU



## GROWING UP DIGITAL

*How the Web Changes Work,  
Education, and the Ways People Learn*

By John Seely Brown



In 1831 Michael Faraday built a small generator that produced electricity, but a generation passed before an industrial version was built, then another 25 years before all the necessary accoutrements for electrification came into place—power companies, neighborhood wiring, appliances (like light bulbs) that required electricity, and so on. But when that infrastructure finally took hold, everything changed—homes, work places, transportation, entertainment, architecture, what we ate, even when we went to bed. Worldwide, electricity became a transformative medium for social practices.

John Seely Brown is the chief scientist of Xerox and director of its Palo Alto Research Center.

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Change • March/April 2000

Change • March/April 2000

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UNIVERSITY

SIAM CSE07 – MS24 The Comp'l Sci Ed Pipeline



# **JSB**

***[www.johnseelybrown.com](http://www.johnseelybrown.com)***

- **Having the credentials that a computer science geek respects (Chief Scientist, Xerox; Director Xerox PARC)**
- **Having publications that the education community validates (he joined the HBR debate on “IT matters to Higher Ed”<sup>\*</sup> in letter to editor)**

**\*HBR May 2003 IT Doesn't Matter – Nicholas G. Carr**

**\*Does IT Matter to Higher Education? – Jack McCredie, Educause Review Nov02**



# *What's Next?*

- **CS440 being taught Fall 2006**  
**Expect interesting feedback from students on their opinions on the *Digital Age*, given they were *born digital***
- **Applaud you for joining us today and challenge to ensure awareness of IT in higher education**
- **Expect interesting changes in the learning environment and its support on campus**



# *Apply JSB Insights to CS 440*

- **Students have grown up digital; faculty are analog**
- **Capitalize on creativity by honoring the vernacular of today's students (multimedia-literate)**
- **Communicate complexity simply (great skill)**
- **MIT's architecture studio – all work in public (development and critique) – in context**
- **Learning to learn “in situ” is key**



# ***Apply JSB Insights to CS 440***

***early in the semester, just the start***

- **JSB highlights**

**multimedia literacy**

- **CS440 Student Learning Outcomes**

**student group presentations were great (but classroom venue was not up to it)**



# *Gamer Groups Spr 2006*

## *Great Classroom (AH1112) – Varying Engagement*





# *Group Gamers for Spr 07*

- **Peer Review**
- **Instructor selects group based on student preferences, but student input, to create support group for classroom isolate (2:9 Johnson, Johnson, Smith)**
- **Clear criteria for success set by instructor**
- **Formulate, Share, Listen, Create – neighbor interaction (2:21 JJS)**
- **Restructure class room – lecture only when appropriate – move towards distance learning**
- **Modify SUNY Learning Network to bB to embrace distance learning (K. Siddiqui)**



# References – pICT-SDSU Aug06

www.stewart.cs.sdsu.edu/PPT/  
stewart-pICT-GameProgCollabCurric.ppt

Ed Center on Computational Science & Engineering

<http://www.edcenter.sdsu.edu/>

Stewart Home Page: curricula

[www.stewart.cs.sdsu.edu](http://www.stewart.cs.sdsu.edu)

John Seely Brown

<http://www.johnseelybrown.com>

## Active Learning: Cooperation in the College Classroom

David W. Johnson, Roger T. Johnson, Karl A. Smith  
Intertion Book Company, Edina, Minnesota  
<http://www.co-operation.org>

**Asynchronous Learning, Fredonia NY** Khalid Siddiqui

<http://sln.suny.edu>

**San Diego Supercomputer Center** [www.sdsc.edu](http://www.sdsc.edu)



# *More Information?*

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- **www.edcenter.sdsu.edu**



[www.eotepic.org](http://www.eotepic.org)

This work supported by NSF 520146

[www.nsf.gov/awardsearch/showAward.do?AwardNumber=0520146](http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=0520146)

and SDSU Qualcomm Institute for Innovation & Education Success








# Hobbies?

<http://www.stewart.cs.sdsu.edu/mypix>



## Dwight Crum Pier-to-Pier Swim 2006

- ◆  [Finish by Manhattan Beach Pier](#)
- ◆  [We had surf at end \[Lifeguard\]](#)
- ◆  [Kris wins her age group](#) [hurray for being 55!]
- ◆  [Janet Beard](#) [with Hermosa Beach Pier in background]
- ◆  [My Mom](#) (81, you go girl!)

