The Summer 1995 REU Program

The SDSC Summer 1995 Research Experiences for Undergraduates (REU) program is bringing five undergraduates to SDSC from June 19 to August 25 to conduct research projects supervised by SDSC researchers. The five participants were selected from 400 applicants based on their breadth of scientific interest and solid academic standing.

- Sean Adrean of the University of California, San Diego (UCSD), is working with UCSD chemistry professor Betsy Komives and SDSC computational chemist Kim Baldridge on a protein biochemistry project.
- Danielle Boyd of Valparaiso University (Indiana) is a former SDSC Science Scholar who is working with UCSD Applied Physics and Mathematics professor Bernie Jackson and SDSC senior staff scientist Mike Bailey on an astrophysics visualization project.
- Roman Ginis of the University of Rhode Island is working with SDSC staff programmer/analyst Dave Nadeau on enhancements to the Virtual Reality Modeling Language (VRML).
- Andrew Ross of Harvey Mudd College (Claremont, California) is working with Harvey Mudd mathematics professor Arthur Benjamin and SDSC senior staff scientist Bob Leary on a simulation of stochastic processes.
- Lisa Spievak of Claremont McKenna College (Pomona, California) is working with Leary on parallelizing an atomic cluster energy minimization code.

The REU program at SDSC is a national educational program funded by the National Science Foundation to introduce undergraduate juniors and seniors to computational science and to prepare them for graduate studies. REU participants conduct research projects supervised by SDSC researchers and university faculty from their home institutions. Research projects are selected from the range of disciplines that comprise computational science.

For more information, contact Bob Leary, leary@sdsc.edu, 619-534-5123; Mike Bailey, mjb@sdsc.edu, 619-534-5142; or see http://www.sdsc.edu/SDSC/Educ_Outreach/REU/REU.html. ◆

VIRTUAL WHEELCHAIR INTERFACE UPGRADED FOR SIGGRAPH 95

Optical encoders read the movement of standard wheelchair wheels and transfer the sensation of motion into a virtual wheelchair. The interface for this virtual wheelchair premiered at InSITE '94, a bi-national art exhibit between San Diego and Tijuana, as part of a collaboration between the UCSD Visual Arts Department and SDSC. Designed by Jason Ditmars and Brian Duggan, the virtual wheelchair will appear in the CitySpace exhibit at SIGGRAPH 95, where a new interface will allow users to remain in the comfort of their own wheelchairs.

SDSC Researchers at SIGGRAPH 95

Several SDSC researchers will participate in the 22nd International Conference on Computer Graphics and Interactive Techniques (SIGGRAPH 95), to be held in Los Angeles, California, August 6–11, 1995. Their participation includes the following.

- "Introduction to Computer Graphics," Course 21, will be chaired by Mike Bailey (SDSC/UCSD) and taught by Andrew Glassner (Microsoft) and Patricia Wenner (Bucknell University, SDSC senior fellow) on August 7. This course covers the fundamentals of computer graphics from a technical perspective.
- Bailey is also on the courses committee and will participate in the Graphics Performance Characterization group.
- Members of the Tecate (Project Sequoia 2000) group (Peter Kochevar, Santiago Becerra, Ryan Camoras, and Len Wanger) will demonstrate Tecate's 3D Web browser in the Interactive Communities exhibit. This exhibit will present leading examples from art, science, medicine, defense, music, and education at the Los Angeles Convention Center and, via high-performance networks, from locations around the L.A. Basin and worldwide.
- The Virtual Wheelchair project designed by Brian Duggan and Jason Ditmars (see article on next page) will be displayed at CitySpace, a virtual environment modeled after a typical city. (CitySpace is part of the Interactive Communities exhibit.)
- Teresa Larsen's video, "Looking into HIV" (see article on next page) will be shown in the Electronic Theater and at the Video Review.

For more information about SIGGRAPH 95, see http://www.siggraph.org/conferences/siggraph95/siggraph95.html. For more information about SDSC participation in the conference, contact Ann Redelfs, redelfs@sdsc.edu, 619-534-5032.

LOOKING INTO HIV AT SIGGRAPH 95

"Looking into HIV (Preview Edition)" is a preliminary version of a technical educational video about the molecular biology of HIV. The video is being produced by Teresa Larsen of The Scripps Research Institute (TSRI) based on collaborative research with scientists at TSRI and the Center for Advanced Biotechnology and Medicine at Rutgers University. The short preview edition will be shown at the Electronic Theatre and Video Review at SIGGRAPH 95.

This still image from the video shows a model of HIV based on imaging data published in scientific literature. Protruding from the surface of the virus are several glycoproteins called "GP120." GP120 recognizes the receptors on the cells that HIV infects. The outer layer of HIV consists of a lipid membrane. Inside this layer lies a dense shell of matrix protein that gives HIV its spherical shape. Within this shell is the lateral body, which is believed to contain cellular debris extricated from the host cell that produced the virus.

The capsid core at the center of the virion, called the "club," comprises an ordered package of the viral RNA genome and other components necessary for the virus' survival. One component is a special enzyme unique to retroviruses—Reverse Transcriptase (RT)—which converts the single-stranded RNA genome into double-stranded DNA and directs the infected cell to make thousands of new viruses. Because of its unique function and critical role in the viral life cycle, RT has become a designated target for antiviral drug therapy. Researchers believe that by understanding how this enzyme works, they can design drugs uniquely suited to defeat HIV.

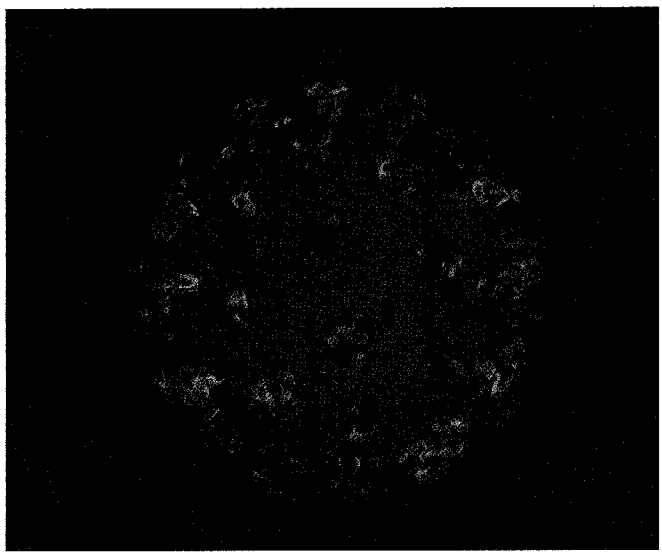
Larsen, who has been using SDSC visualization resources since 1993, produced part of the animation using Alias in the SDSC Advanced Scientific Visualization Laboratory. This is her second video produced at SDSC that will be shown in the Electronic Theater at SIGGRAPH.

For more information, contact Teresa Larsen at larsen@scripps.edu.

VIRTUAL WHEELCHAIR TRAVELS TO SIGGRAPH 95

A virtual wheelchair project designed by Brian Duggan, a graduate mathematics student at the University of California, San Diego, and programmer at SDSC, and Jason Ditmars, a kinetic sculptor with a background in electronic and interactive installations, will be featured as part of the CitySpace virtual reality project at SIGGRAPH 95 in August.

Duggan and Ditmars have designed a device that uses optical encoders to read the movement of standard wheelchair wheels and transfer the sensation of motion into a virtual landscape. The landscape was created using Alias, and real-time interaction with the environment was made possible by Performer. All work was performed on Silicon Graphics machines.



A MODEL OF HIV

A still image of the HIV molecule from a video produced by Teresa Larsen of The Scripps Research Institute (TSRI). The HIV model is based on research by Larsen and collaborators at TSRI and the Center for Advanced Biotechnology and Medicine at Rutgers University. The video, "Looking into HIV (Preview Edition)," will premiere at the Electronic Theater and Video Review at SIGGRAPH 95.

At SIGGRAPH 95, Duggan and Ditmars will provide a wheelchair-accessible interface to the Performer-driven virtual space of CitySpace. (See image on opposite page.) Attendees will be able to sit in a wheelchair provided by the designers or use their own to experience wheelchair mobility in a virtual city. This virtual environment draws on a metaphorical relationship between the journey taken by information on the Internet and the journey taken by those in wheelchairs on city pathways.

For more information, contact Jason Ditmars, u27534@sdsc.edu, 619-534-5000; or Brian Duggan, bduggan@sdsc.edu, 619-534-5164. *—ES & MW* ◆