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# SuperViz '94 Showcases Excellent Science -- Area HS Students Featured in Supercomputing Video

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**Columbus, Ohio** -- December 8, 1994 -- The Ohio Supercomputer Center (OSC) announces that five science video animations produced at the center were among the 34 selected for the International Supercomputing '94 Conference showcase video, SuperViz '94, as excellent examples of scientific research. With the assistance of OSC staff Tim Rozmajzl, Leslie Southern, and Rob Berry, two of the projects were created by high school students who participated in OSC's 1994 Summer Institute program.

Jonathan Berry, Rutherford B. Hayes H. S.; Bart Kelsey, Findlay H. S.; and Matthew McElheny, Hilliard H. S., teamed up to produce Surfaces, Lighting, and Viewing, an animation representing a surface generated with a mathematical function. The students investigated the effects of varying the amplitude and period of the sine trigonometric function over 180 iterations, generated polygonal geometries, and determined lighting and viewpoints.

Jason Abele, Gahanna Lincoln H. S.; Kevin Huffenberger, Upper Arlington H. S.; and Misha Leybman, Worthington Kilbourne H. S. produced N-Body Particle Dynamics, an animation representing several particles moving in space. The only force applied to the particles is the gravitational attraction of the other particles. Students investigated the effects of varying the mass of selected particles.

Three other projects were selected from Ohio's academic research community who use OSC resources. Prof. John Arnfield, The Ohio State Univ.; Prof. Glenn Johnson, Macquarie Univ., Sydney, Australia; and Tim Rozmajzl, OSC, visualize research on the Dispersion of Carbon Monoxide. The animation represents wind blowing across the top of city buildings causing a vortex motion within the urban canyon, and carbon monoxide being released from cars moving along the roadway. The ultimate objective of this research is to understand the relative importance of the factors that influence the climate of urban canyons and their importance in determining heat exchange with the urban atmosphere above.

OSC scientists Moti Mittal, Upper Arlington, and Tim Rozmajzl, Columbus, depicted Coal Particles in a Combustor with an animation showing the trajectory of coal particles that vary in size and react in a surrounding hot medium, such as observed in a furnace. Colors are used to represent temperature intensities with red indicating the hotter particles to blue for the cooler particles. This research strives to use advanced computational techniques to develop methods to more efficiently burn coal.

Dr. Comer Duncan, Bowling Green State Univ., and Dr. Phil Hughes, Univ. of

Michigan, produced Relativistic Jet Simulation. The animation depicts a simulation of a relativistic extragalactic jet with Lorentz factor of 5.0 and adiabatic index of  $5/3$  for the gas. A pattern of internal shocks, a bow shock, and the Kelvin-Helmholtz instability are evident. Studies show that the more relativistic flows are much less prone to disruption by the Kelvin-Helmholtz instability than are non-relativistic flows.

Supercomputing '94 was November 14-18, 1994, in Washington D.C. This conference focused on research and education in computational science and engineering. Particular emphasis was given to applications in biology and medicine, design and manufacturing, and environmental issues. The educational activities at Supercomputing '94 spanned the spectrum from K-12 through graduate school.

The OSC is chartered to advance the use of high performance computing resources and digital communications on the Global Information Infrastructure. OSC addresses the technology-related needs of Ohio's academic, industry, and research communities through varied initiatives including biomedical technology, visualization, support of k-12 and higher education, high-speed networking, information storage, industrial outreach, and public service.

**Subjects:**

Research