

# SHOWING DARKNESS IN A WHOLE NEW LIGHT

**ROCHESTER,  
MANKATO, ST.  
PAUL SCHOOL  
DISTRICTS  
PUSH THEIR  
SCIENCE  
CURRICULUM  
FORWARD  
WITH STATE-  
OF-THE-ART  
PLANETARIUMS**



*Viewers at the Mankato East High School Planetarium were regaled by real-time images of the universe during the interactive Astronomy Night hosted by the White House on Oct. 7. Photo courtesy of Pat Christman, The Mankato Free Press*

*Bruce Lombard*

On the evening of Oct. 7, President Barack Obama played host for Astronomy Night at the White House. Our nation's schools were represented by 150 Washington, D.C.-area middle school students standing on the South Lawn, and students from three Minnesota school districts—seated more than 1,000 miles away.

The Rochester, Mankato and St. Paul school districts were among the invitees to the White House event. These three districts house planetariums featuring myriad state-of-the-art technologies. One component of that technology allows them to link up with other planetariums around the world via “domecasts.” On this particular night, the three Minnesota school planetariums hooked up with the GeoDome Theater in D.C., which showcased the President's Astronomy Night.

The Rochester Mayo High School Planetarium, operated by director Larry Mascotti, became Minnesota's first school-based planetarium when it opened back in 1966. Since that time, the 60-plus-seat planetarium has served nearly 800,000 visitors. Last year's attendance was more than 14,000.

The Mankato District 77 Planetarium—located at Mankato East High School—was built in 1973. Mankato held its first show for the public in 1997, the same year East science teacher Dave Burgess took over the astronomy program and the directorship of the planetarium. The East planetarium hosted 6,000 visitors last year alone.

St. Paul Public Schools' Como Planetarium, headed by director Dennis Brinkman, has been the anchor for elementary astronomy in the district since 1975. During the 2008-09 school year, the planetarium served more than 20,000 St. Paul students from 54 schools.

All three planetariums are open to all the schools within their respective school districts. Outside school districts (public, private or charter), education groups (home-schooled students, Scouts) and the community can also experience the planetariums for a nominal fee.

During the past school year, more than 8,500 students from 70 other school districts or home-school groups participated in astronomy lessons at the St. Paul planetarium.

Rochester has done outreach programs for 35 other school districts and for several local entities like community education classes, community colleges and the Rochester Astronomy Club.

Burgess said Mankato does classes and shows for groups like the YMCA, the Boy Scouts and after-school programs. Burgess supervises East's Astronomy Club, which puts on a free show each month.

## **A ROOM WITH A UNIVIEW**

All three school-based planetariums utilize the Uniview digital scaling machine. Uniview is a computer graphic platform that brings information databases to life in a completely interactive 3-D environment.

In 2007, Rochester became the first school-based planetarium in the *world* to install the Uniview program. Mankato and St. Paul followed suit during summer 2008.

"The American Museum of Natural History took all the astronomical data known to man and put it into a computer for educational use in classrooms," Burgess said. "It is actual data: when we show something, it appears as it is (in space)."

The Uniview digital scaling machine stores images of stars, planets, asteroids, galaxies and other astronomical objects—based on true data points taken from satellites and telescopes—into a computer. Through Uniview, the planetarium directors can run the program through a projector to display an immersive journey around the Earth and through the charted universe. These views of space are made even more remarkable when projected digitally off each planetarium's 30-foot-diameter domed ceiling, which gives an audience member the visual thrill of an IMAX-theater experience.

"(Uniview) shows us where things are in the universe," Burgess said. "These are actual data sets that are manipulated by the computer—not an artist's rendering. It shows you how things are right this minute on a grand scale."

The celestial coordinates can be altered with ease to give audience members detailed views — from close up or from great distances—of the Earth, the other planets in our solar system or any other outer-space objects.

All three planetarium directors praised the wonders of the Uniview system.

"For teaching science, this is very impressive, awe-inspiring and jaw-dropping," Burgess said. "People are amazed by the whole system. It allows us to go anywhere in the universe. You see the microwave radiation from the Big Bang, which has taken 14 billion years to reach Earth. It gives you a real perspective of our place in the universe. It is really humbling."

Burgess also noted that Uniview can display how far carrier waves (TV and radio signals) released first from Earth, post-World War II, have traveled.

Mascotti singled out the immersive quality of Uniview's digital IMAX-esque presentation.

"It makes you feel like you are totally in the picture," Mascotti said. "Instead of having your nose to glass, you are inside the aquarium."



*Dave Burgess' Mankato East High School planetarium features a wealth of state-of-the-art technologies. The Mankato and St. Paul school districts followed Rochester as the first school-based planetarium in the world to use the "awe-inspiring" Uniview digital scaling program.*

He added that in an immersive learning environment, all students improve, and that it's had an especially large effect on female students—which could possibly help turn the tide against the notion that girls are less interested in science than their male counterparts.

Mascotti quoted one elementary student's high praise, calling the presentation "better than cable."

Brinkman said words like "magnificent" and "awesome" are the ones he hears the most often to describe the Uniview presentation.

Brinkman played a crucial role in his planetarium's acquisition of Uniview. He subsidized the system through money he saved from doing public shows—volunteering his own time—to build up a revenue base.

"It was the fruit of a lot of labor," Brinkman said.

Rochester, Mankato and St. Paul—along with a handful of other planetariums, including some in Minnesota colleges—are part of the only group of planetariums to have a regional license for Uniview.

Along with the Uniview system, the three school planetariums also use optical projectors. Burgess and Brinkman both use the Spitz System 512, while Mascotti uses the Spitz AP3 Projector. Both instruments are capable of simulating the night sky from anywhere on Earth.



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## **CURRICULUM OF THE COSMOS**

Burgess said that Mankato East offers three to four classes per semester through the planetarium, with class sizes ranging from 28 to 54 students per class. He conducts astronomy classes for K-5 students in the school district.

Burgess said he teaches students about constellation astronomy, the mythology of stars, and general “what is out there” courses.

Burgess also sees social studies applications for the program. For example, Uniview’s view of Earth’s eastern hemisphere, facing away from the sun, shows where the world’s population centers are based on the visible lights. A quick look at South Korea and North Korea makes it evident that the south is much more populous than its northern neighbor.

Burgess cited the influence his program had on one of his former students. East graduate Andy Monson, who helped start the Astronomy Club in 1997, is now an astrophysicist. In fact, Monson has discovered a star cluster no one had seen before.

“Once he took this class, it spurred his interest,” said Burgess.

Burgess said the East Astronomy Club currently has 25 members. He said that one night, with their parents’ permission, the club—comprised of several students with extremely full schedules—opted to stay up until midnight to prep for an upcoming show.

Mascotti refers to his planetarium as a “gymnasium for the mind” and the place that connects the “awe with the cerebral aha.”

“The universe is very attractive to kids, like dinosaurs,” Mascotti said. “Third graders like to ask: ‘Why are things the way they are?’ or ‘How does it happen?’ I feel so privileged to be in this position to answer these questions. What a gift I have been given.”

Mascotti said Rochester also utilizes a Magical Planet Digital Video Globe, a three-foot spherical computer screen, to help expand their curriculum to refocus more emphasis on Earth. He said they are just tapping in to viewing Earth from a meteorological perspective.

“Third graders come in for a two-hour session and do comparative studies of Earth, moon and Mars. From their study, they understand the role size plays in determining the surface features of a rocky planet. They then use their newfound knowledge to predict what other planet surfaces like Mercury and Venus will be like,” he said.

Through the digital video globe, students can also see how the world’s land masses were shaped when they were joined together as the Pangaea supercontinent hundreds of millions of years ago.

“We can show the story of life on this planet, the changing ocean currents and moving land masses,” Mascotti said. “You would have to go on a self-guided museum tour for that, but here it is a focused, guided instruction experience.”

Mascotti said you can just hit a keyboard command to obtain a slew of data. For example, NASA satellites can measure the height of waves that are generated from earthquakes that can create a tsunami.

“On the digital video globe, it is easy to see such a local event become a global one that we see from across the world,” he said.

St. Paul’s planetarium offers online support to its teachers for the implementation of the district’s Basic Astronomy Curriculum. Planetarium program is a key component of St. Paul’s Elementary Science Framework, allowing students engaging and hands-on access to 48 percent of the state-required Earth and Space Science benchmarks in grades K-5. Overall, the planetarium supports instruction in nearly 10 percent of all K-12 science standards in the district.

“Our curriculum is designed to match the test specs,” Brinkman said. “The curriculum is driven by standards to improve our test results.”

Brinkman said visits to the planetarium from first, third, fifth and eighth graders are built in to curriculum. “The planetarium is extended classroom space and not a field trip,” he said.

“The kids really do like the planetarium,” Brinkman said. “We are able to show them so much more now. This has expanded my ability to teach . . . we are doing things we couldn’t do two years ago.”

## **SUPPORT FROM ABOVE**

All three planetarium directors praised their respective superintendents and school boards for championing their programs.

“Our superintendent and board members are big supporters of the planetarium,” Brinkman said.

“There are a lot of forward thinkers (in the administration and on the school board),” Mascotti said. “I appreciate the hard work those people do to support quality education. The former superintendent, Jerry Williams, and the new superintendent, Romain Dallemard, have been real supporters of our system.”

“I have to give Ed Waltman credit,” Burgess said, recalling a Uniview demonstration/pitch meeting in summer 2008 with the then-superintendent of Mankato Area Public Schools. “Ed said he only had time for 10 minutes—but he stayed for a half hour.”

Burgess said after raising a considerable amount of money himself to obtain Uniview, the school board kicked in nearly half of the cost.

“The school board was very instrumental in allowing for this to happen,” Burgess said. “The board members thought it was a worthwhile program and a worthwhile machine.”

Burgess followed up the demonstration for Waltman with one for the community and other educators. “Everyone was blown away by public showing,” he said.

## **‘THE SKY IS NOT THE LIMIT’**

Brinkman, Burgess and Mascotti said they all have a good relationship with one another. The three directors meet once annually and are always in communication. The three can link their planetariums together for presentations or for staff development.

All three directors singled out Joel Halverson, program consultant for the Minnesota Planetarium Society, for his efforts and assistance.

“Joel Halverson is the driving force behind all the planetariums in Minnesota,” Brinkman said.

To a man, the directors have unbridled passion for their programs.

“We are excited to be on the leading edge of technology,” Brinkman said. “It opens the door for a lot of ways to use it.”

Recalling the Oct. 7 White House Astronomy Night, Mascotti said, “The President reaffirmed that the sky is not the limit, it is only the beginning. We’re looking at other ways to use (Uniview). At some point, it may get down to the atomic level.”

## **USEFUL LINKS**

**Rochester Mayo High School Planetarium**  
<http://www.rochester.k12.mn.us/school1109/planetarium>

**Mankato Area Public Schools**  
<http://www.isd77.org/>

**St. Paul Como Planetarium**  
<http://www.planetarium.spps.org/>

**Minnesota Planetarium Society**  
<http://www.mplanetarium.org/>

**Uniview**  
<http://www.scalingtheuniverse.com/>

**Global Imagination**  
<http://www.globalimagination.com/>



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