the online magazine for design & technology education

JUNE 04

ties

In this issue:

Science Fiction
and Your Students: Perfect Together

Plus: **Furniture Design at Shiloh HS**

Pro/DESKTOP Tips

Take a weekly Inventamin.

We all wonder what the future will bring.

How will the world in which we live change?

What new ideas, inventions and technologies will shape this change?

Who will lead the way?

TCNJ

Dr. John Karsnitz
Chairperson
Department of
Technological Studies
karsnitz@tcnj.edu
609.771.2543

Dr. Sharon Sherman
Chairperson
Department of
Elementary Education
and Early Childhood
Education
sherman@tcnj.edu
609.771.2253

THE COLLEGE OF NEW JERSEY IS PLEASED

TO INTRODUCE THE MATH, SCIENCE, AND TECHNOLOGY (M/S/T)

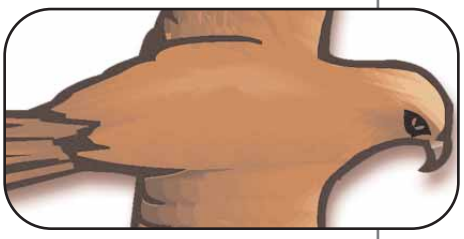
PROGRAM FOR EARLY CHILDHOOD AND ELEMENTARY EDUCATION MAJORS

At the college of New Jersey we know that a new paradigm consisting of mathematics, science, and technology literacy is necessary to meet the challenges of the 21st century. While most people understand the importance of mathematics and science in the general education curriculum, technology, as a critical force within our society, has only recently been recognized. The new integrated major in M/S/T will create teachers who know how to tap and develop the potential of generations of innovators to come.

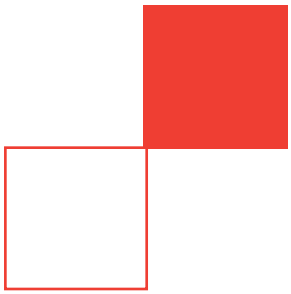
contents

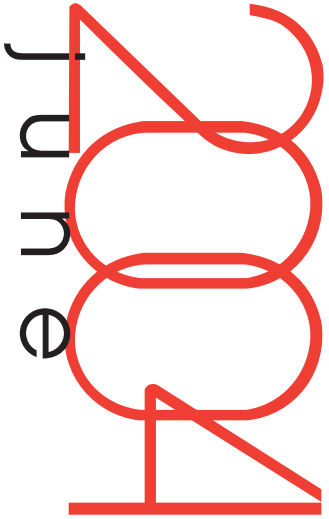
june

***TRIZ** a Russian acronym for the Theory of Inventive Problem Solving.



sponsors for this issue:





departments

- Preview
- Ties to a Broader Network
- The Work Plane
- Pro/Desktop Tips
- TSA Corner
- Literature Showcase
- Resource Center
- Mail Order Marketplace

preview

In our December 2003 issue, David Millson wrote a very interesting piece on the CNC program that Mark Smith developed at Shiloh High School in Hume, Illinois. This month he shares an in-depth look at one extraordinary student from that program.

Long-time readers will recognize an extraordinary author and engineer who has contributed many articles to *Ties*. Harry Roman is back and sharing his views on the power of science fiction to interest students in design, engineering and technology. We dusted off a science fiction piece, "*Through the Eyes of Falcons*", from a 1995 issue to use as an example of how the genre can contribute to imagination, investigation and learning.

Cal Haliburton, a retired technology teacher, piques teachers' interest with another sample of his "*Inventamins*" and with a story about his former middle school students who became entrepreneurs.

Have a relaxing and energizing summer vacation. Take that time to write an article on what you are doing in your classroom. We'd be happy to share your experiences with our readers.

Ken Maskell
Editor

a publication of

The College of New Jersey

president R. Barbara Gitenstein
provost Stephen Briggs

staff

publisher Ronald Todd
editor-in-chief/design direction Patricia Hutchinson
editor Kenneth Maskell
assistant editor Nicole Tracey Healy
business manager Jeanette Vega
LINKS/*ties* liaison Keith Finkral
Ad Sales Sandy Wah
art direction/design Lori Lozinski
consultants John Hutchinson, Bijan Sepahpour
webmaster Jesse Smith
founding publisher J. Michael Adams

advertising sales

NEW ENG./MID ATL./AL, FL, GA, LA, MS, NC, SC, TN *Sandy Wah*
ties Magazine/ The College of New Jersey
P.O. Box 7718
Ewing, NJ 08628-0718
tel: 609/771-3354 fax: 609/771-3330

MIDWEST *Mike Shevlin*
Didier & Broderick Inc.
95 Revere Drive, Suite H
Northbrook, IL 60062
tel: 847/498-4520 fax: 847/498-5911

editorial office

ties Magazine, The College of New Jersey
103 Armstrong Hall
P.O. Box 7718
Ewing, NJ 08628-0718
Phone: (609) 771-3332 FAX (609) 771-3330
email: ties@tcnj.edu www.tiesmagazine.org

ties **is produced using QuarkXpress, Adobe Photoshop, Illustrator, InDesign and Acrobat programs.**

on the cover

Cover design: Lori Lozinski

***ties* Magazine** (ISSN 1041-6587) is published by The College of New Jersey four times a year with the following cover dates: Sept., Dec., Mar., June. Executive, editorial and national advertising management offices are located at: The College of New Jersey, 103 Armstrong Hall, P.O. Box 7718, Ewing, NJ 08628-0718. Phone: (609) 771-3332; FAX: (609) 771-3330.

Published in U.S.A.
June, 2004 issue, Vol. 20, No. 1.

Looking?

Nearly half of all college students will change their majors!

- Courtney will graduate from TCNJ with her Bachelor of Science in Elementary/MST, with a specialization in technology, Spring '06.
- Courtney is a TCNJ Merit Scholar, and recently competed in the Communications contest at the TECA Eastern Regional Conference in Virginia Beach.
- Courtney is a CA, a mentor in the Minority Mentoring Program, and a mentor in their High School Overnight Committee.

"I really enjoy my technology classes; they are very intense, but fun!"

Courtney Johson is happy her major is M/S/T.

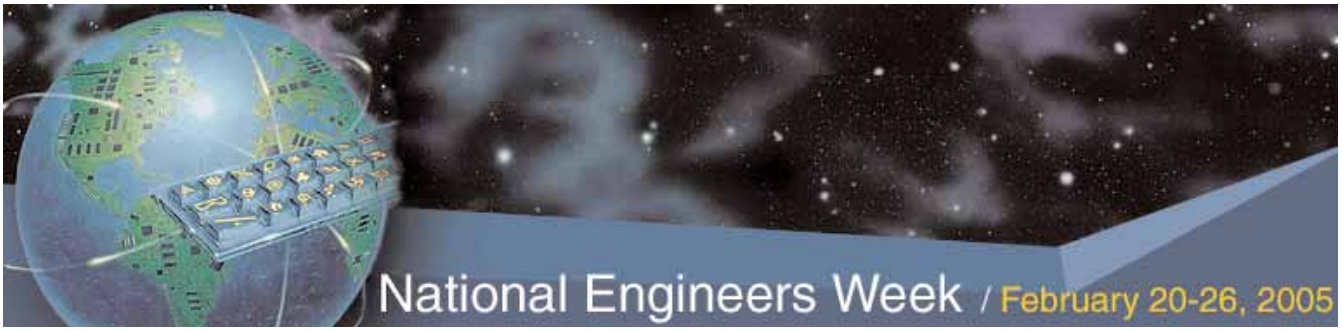
Department of technological studies

The College of New Jersey

TECHNOLOGICAL LITERACY:

use → manage → assess → understand

armstrong hall 181, 609.771.2543, or email karsnitz@tcnj.edu



ENGINEERS WEEK 2005 EXPANDS ITS GLOBAL OUTREACH

by Donald Lehr

With a focus on the international and the future, Engineers Week 2005 will bring initiatives that celebrate the engineering community and share its positive message around the world.

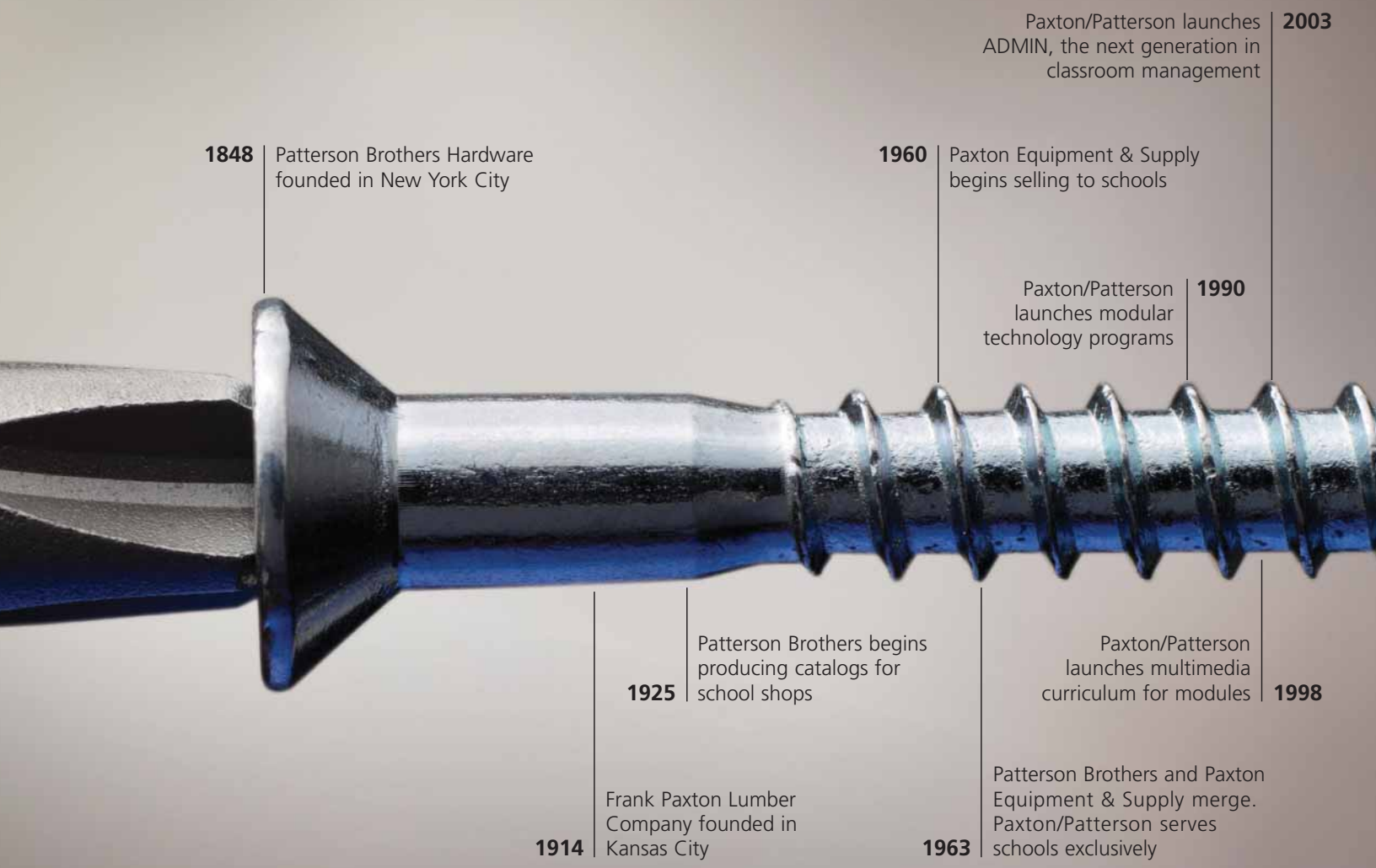
Co-chaired by ASME (The American Society of Mechanical Engineers) and BP p.l.c., Engineers Week, February 20-26, 2005, will launch a partnership with Engineers Without Borders™-USA, a non-profit humanitarian organization which delivers environmentally and economically sustainable engineering projects to communities worldwide to improve their quality of life. The activities of EWB-USA range from the construction of sustainable systems that developing communities can own and operate without external assistance, to empowering such communities by enhancing local, technical, managerial, and entrepreneurial skills.

ASME will spearhead the EWB-USA effort by working with engineering societies to organize multidisciplinary teams to adopt EWB projects and extend their reach by connecting students and young engineers with mentors and advisors of all ages. Projects usually take six months to a year from approval to installation by the teams, so those submitted by August 1, 2004 may be completed by Engineers Week 2005, while projects submitted by December can be completed through end of year 2005. Teams will be responsible for their own travel and material funds. More information is available through EWB branches or online at ***www.ewb-international.org*** or ASME online at ***www.asme.org/students/ewb.html***.

"We are excited about our role as lead engineering society for Engineers Week 2005. It's important that people understand the contributions of engineering and how it has impacted our quality of life," said Reginald I. Vachon, president of ASME. "We have teamed with Engineers Without Borders-USA to promote their mission to provide sustainable engineering solutions in developing areas worldwide. Through this endeavor we are enriching a new generation of engineers to continue the tradition of the engineering profession to be socially responsible, using their technical expertise to provide remedies to present and future engineering challenges," added Vachon.

In recognition of its growing international presence, the 2005 campaign, previously known as "National Engineers Week," will be referred to simply as "Engineers Week."

Returning for EWeek 2005 are many popular programs that will also underscore the profession's commitment to the world and the future. Connecting the World to Engineering brings together engineering undergraduates and young professionals with business leaders through Internet forums and live teleconferences. Established by EWeek 2004 co-chairs Fluor and IEEE, "Connecting the World" helps undergraduates reach into the global business world for guidance, ideas and encouragement as they go forward in their careers. Forums,



A history of learning inside every tool.

Paxton/Patterson has been helping America develop better students since before Lincoln was President. Today, we offer the full range of learning tools for educators. It might be a screwdriver for an industrial arts class. Or, a complete family of interactive learning modules and the technology lab and equipment that supports them. In all the ways you work with us, you'll discover our timeless commitment to helping students transition from school to life. And a dedication to those who point the way. **Paxton/Patterson. An American institution dedicated to helping yours.**

PAXTON/PATTERSON

EduSystems® Learning Systems | ADMIN™ | Vocational and Technology Tools

800.323.8484 | www.paxtonpatterson.com

addressing a variety of engineering disciplines and issues, are moderated by leading professionals and available at ***www.eweek.org***. Live teleconferences with corporate leaders explore cutting-edge topics and developments with engineering societies and their student sections and other university organizations.

New Faces of Engineering, developed in 2003 to showcase rising young stars in America's engineering profession, has also gone international and now includes engineers from around the world. By promoting contributions of young engineers and their benefits to people worldwide, New Faces provides stimulation and incentive for college-level students and encourages younger students to consider engineering careers. EWeek sponsoring societies nominate candidates from industry and academia - nominees must hold an engineering degree, be employed as an engineer from two to five years, and have been involved in projects that significantly impact public welfare or further professional development and growth. All New Faces are featured on ***http://www.eweek.org/site/Engineers/newfaces2004/index.shtml***.

One of EWeek's flagship programs, Introduce a Girl to Engineering Day, is slated for Thursday, February 24, 2005. Entering its fifth year, "Girl Day" allows thousands of women engineers - with support from their male counterparts - to mentor and share firsthand experiences of engineering to more than one million girls and young women each year. As part of Girl Day 2004, Engineers Week participated in a United Nations briefing, "Girls and Technology: New Educational Opportunities." Organizations, educational institutions, and individuals are invited to sign a follow-up statement at ***http://www.eweek.org/site/News/Eweek/2004_UNStatement.shtml*** supporting EWeek's global initiatives:

"We, the undersigned, encourage all nations to seek the talents, viewpoints and intellects of women in engineering and related mathematics and science fields. Encouragement, education and work opportunities for girls and women in these fields are imperative to generate and turn ideas into reality for the health, safety, and welfare of all."

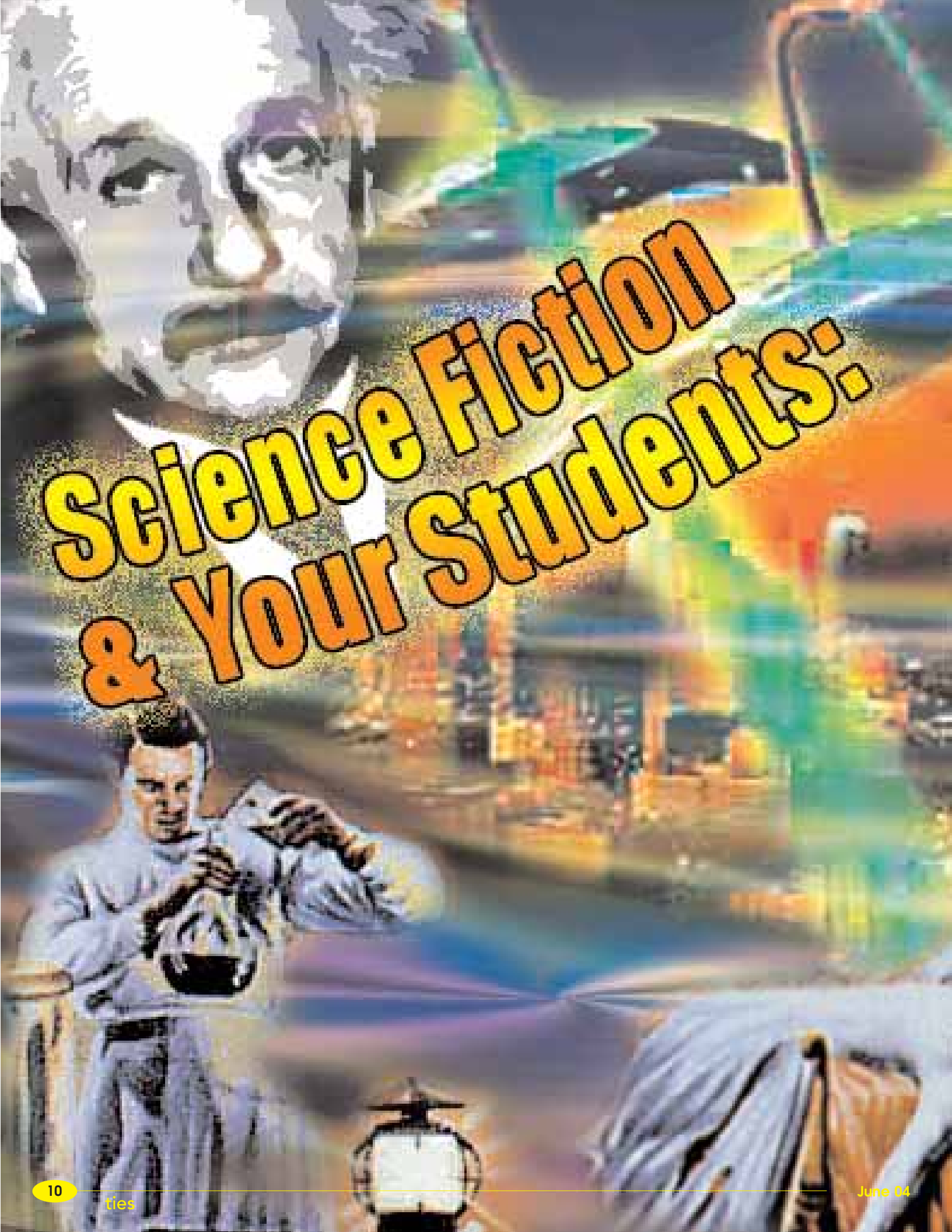
The Future City Competition™ returns for its 13th year, expanding to 38 regional sites after reaching more than 30,000 middle school students from 1,100 schools in 34 regions in 2004. The program teaches insights into potential careers in engineering, math and science through hands-on applications and teamwork. Students build computer and 3-D scale models of cities of tomorrow under the guidance of teachers and volunteer engineer mentors, and defend their designs before engineer judges at regional competitions in January. First place regional teams win a trip to Washington for National Finals, February 21-23, 2005. Visit ***www.futurecity.org*** for more information.

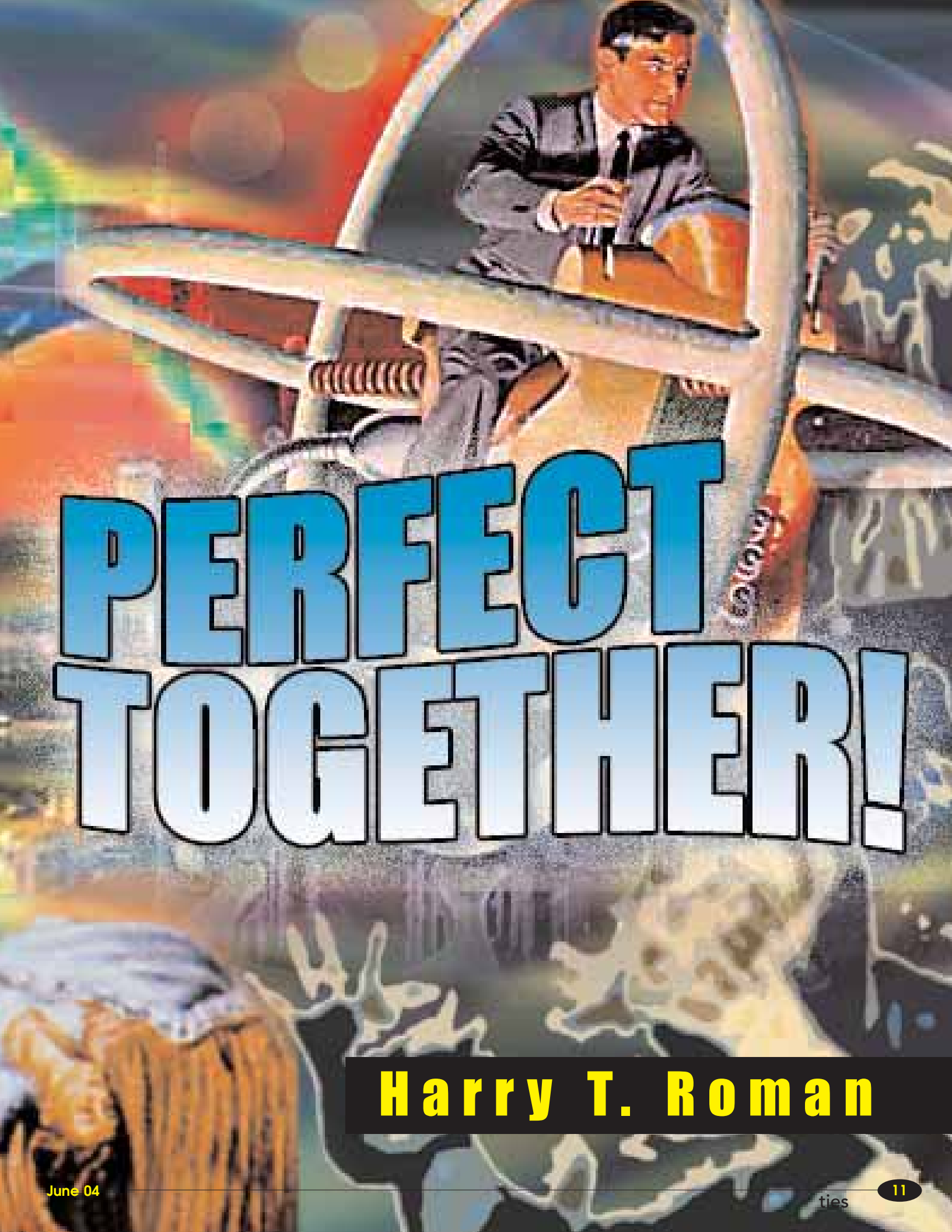
Ongoing projects with an Internet focus include the Sightseers Guide to Engineering (***www.engineeringsights.org***), celebrating engineering marvels from subtle to spectacular in all 50 states, and ***www.discoverengineering.org***, which invites middle school students to discover the how and why of becoming an engineer and provides links to educational, professional, and corporate sites.

Finally, the DiscoverE program, which launched EWeek's K-12 outreach in 1990, continues to provide educational materials to more than 45,000 engineers who work with five and a half million students and teachers in elementary through secondary schools each year through classroom visits and extracurricular programs.

Visit ***www.eweek.org*** for information on all Engineers Week programs and events.

Donald Lehr
is a Public Relations Consultant for the **National Engineers Week Future City Competition**


Science Fiction
& Your Students:


PERFECT
TOGETHER!
Harry T. Roman

Introduction

Science fiction is a most underrated genre of literature. How often we cavalierly dismiss its futuristic evaluation of possible worlds, technologies, alternative societies, and cultures. Yet it powerfully impacts our lives. Like a persistent, stubborn beacon, it urges us to speculate about our future.

Think of the social impact the popular space/technology adventure "Star Trek" has had on all of us. Remember the images created in your mind when you hear the terms……."Warp Speed"; "Klingons"; "Phasers"; "Tricorders"; "Photon Torpedoes"; "Shuttle Craft"? These terms have become indelible parts of our colloquial lexicon.

We hear the echoes of science fiction in our past classic literature:

20,000 Leagues Under the Sea – Jules Verne; **Frankenstein** – Mary Shelley; **The War of the Worlds/ The Time Machine** – H. G. Wells; **Dr. Jekyl and Mr. Hyde** – Robert Louis Stevenson; **A Connecticut Yankee in King Arthur's Court** – Mark Twain; **The Tales of Sherlock Holmes** – Arthur Conan Doyle; **1984** – George Orwell; and, **Brave New World** – Aldous Huxley.

While studying science fiction as literature, we often neglect to study it as the sweeping, integrative harbinger of the future that it is. We need to change this oversight. Science fiction has the power to teach, and fire the imagination and creative spirit of our youth — the essential and indispensable ingredient for a vibrant, healthy civilization.

1950

Up from its popularized start as a pulp fiction offshoot in the 1920s and 30s, science fiction gained respectability in the 1940s, 50s, and 60s. In fact, many of today's retirement-age giants in science, technology, and engineering were yesterday's space drunk teenage science fiction readers. We know its power to influence careers is beyond doubt. The question is, can we focus this power in the classroom to enhance technology education?

Let's take a quick look at the benefits of studying science fiction:

1. It is the only literary genre that systematically explores the interrelationships of science, technology, society, history…. examining future possible scenarios and cultural impacts.

2. This interdisciplinary look at the world is exactly what is now being encouraged in school curricula and standards. Technology education is the ultimate integrative school experience and its possible tie to science fiction is highly relevant.

3. The science fiction theme is a popular one, likely to draw interest from young students who generally warm-up to the topic of futurism.

4. This interdisciplinary program can be used to help participants recognize the connection between science, technology, and art.

"Any sufficiently advanced technology is indistinguishable from magic"

– Arthur C. Clarke, science fiction writer and futurist.

Where to Start?

To be sure, new technologies introduced into our society produced equally incredulous imagery among the general population. Wouldn't it be interesting to see what the perceptions of the general population were as writers talked enthusiastically about the potential of such new inventions and technologies like:

- Radio
- Flight
- Electricity
- Rocketry
- Television
- Atomic Energy

Why not have the class visit the Library to read old newspapers and magazines, uncovering the excitement of those time periods—the pseudo science fiction speculations of then popular writers and reporters—and compare what effects the technology actually turned out to have on our society 50-75 years later? A classic example is the renowned astronomer and mathematician Percival Lowell who speculated that the improvements in telescope optics could lead to us seeing what Martian actually look like. Shortly after Lowell's theories were carried in newspapers, H.G. Wells published *War of the Worlds*.This is a fine lesson in how change rumbles through our culture, getting filtered, and modified along the way. Care to speculate what genetic research today will engender in the next 50 years?

Arthur C. Clarke is credited with inventing the concept of geo-synchronous space communications satellites in 1946. Might he have

envisioned how we use such satellites today? This certainly could be researched and studied.

In 1940,

Isaac Asimov gave us fictional dreams of robots and robotic devices; influencing the very man who built the first industrial robots (Joseph Engelberger) in the early 1960s. Asimov's idea of a positronic brain is what powers "Commander Data" on The Starship Enterprise; not to mention Asimov's breakthrough concept of human-friendly robots designed to assist mankind…not being evil and trying to take over the world.

It's OK to have students read the grand masters of science fiction — Asimov, Clarke, Heinlien and others-to mine nuggets of technological speculation and to enjoy well written and entertaining stories. Heinlien's classic, "*The Moon is Harsh Mistress*" is a tale of colonialism and exploitation and the technology that develops from an isolated society; in many ways a mirror of Colonial America. The enigmatic and charismatic inventor Nikola Tesla, who invented alternating current equipment and developed its theory, was a master stage magician when he demonstrated his feats of electrical presti-digitation. He was able to light florescent tubes without electrical wiring, using his famous Tesla coils. The many electrical inventions and devices he dreamed of are still incredible by today's standards. It is worth studying this giant of the late 1880s technology scene.

Thomas Edison, the ultimate dreamer and inventor, was a contemporary of Tesla's and equally fascinating in his visions for the future. It is enlightening to compare what he foresaw as uses for his inventions and what they are actually doing today. An interesting and most fascinating example of this is his own understanding of what was his most important invention. Edison would have said his "talking machine." Those of us in the research business say it was his conceptualization of the industrial research lab, because once you have it, you can create an unlimited number of inventions.

Inventions have different potential for different people, based on how they see the world. The collective perceptions of many people, shaped by books, articles, technical papers, and of course the literature of science fiction, serve to steer the uses of technology. Look at nuclear power's bright potential back in the 1960s and what has happened to radically alter that original vision.

An especially interesting subject is the portrayal of technology in past World Fairs. Here the theme of science fiction is center stage as companies and organizations try to envision what the world will look like in 50-100 years. Artists, scientists, and engineers combine their ideas and imaginations to create a possible future scenario for humanity. The World's Fair of 1939 is a classic example of this legitimized dreaming. Much can be learned by studying past world fairs and the visions they offered.

The Connection to Art

Chesley Bonestell, America's premier space artist and illustrator, influenced many of today's rocket engineers and scientists to pursue their dreams. His bold and visionary graphic portrayals of planetary worlds fired the imaginations of a whole generation of science fiction writers, further fanning the flames. He took them to the solar system's most exotic places, long before Von Braun made it possible to dare to dream of space-flight.

What about your class viewing some of the great science fiction movies and later commenting upon how technology was used to provide entertainment, as well as the theme and subjects of the movies themselves. I would consider showing these cinematic classics:

Destination Moon

Forbidden Planet *(a superb classic-with Robbie the Robot)*

The Andromeda Strain

The Day the Earth Stood Still

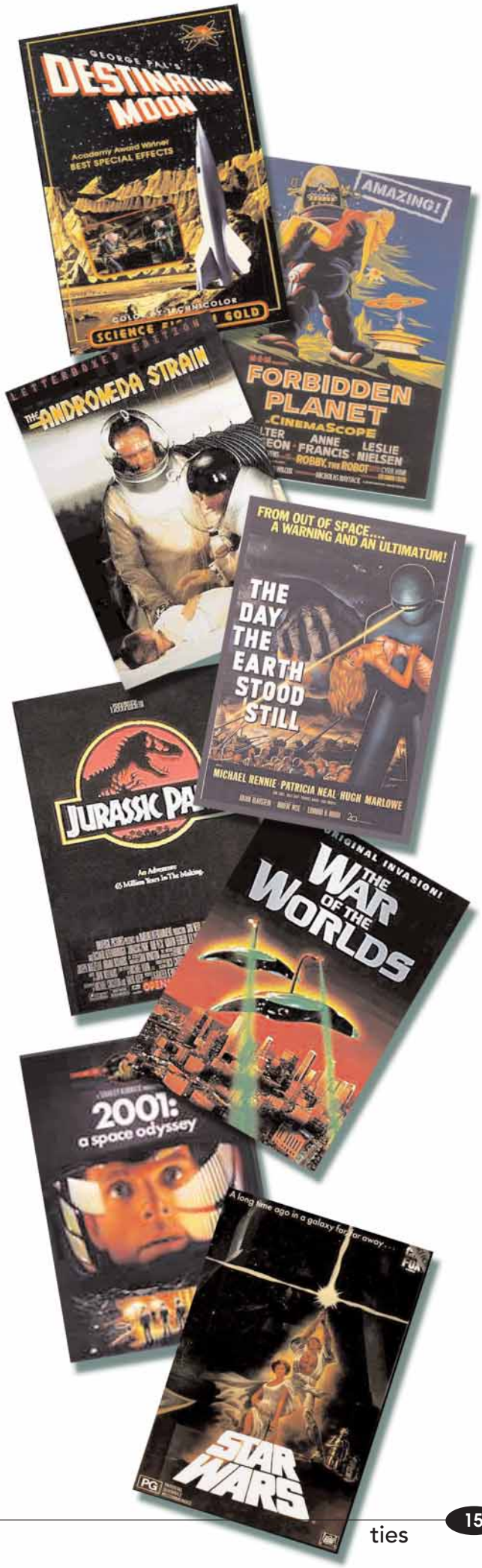
Jurassic Park

War of the Worlds

(discuss the radio scare of 1938)

2001-A Space Oddysey

Star Wars *(the first film)*



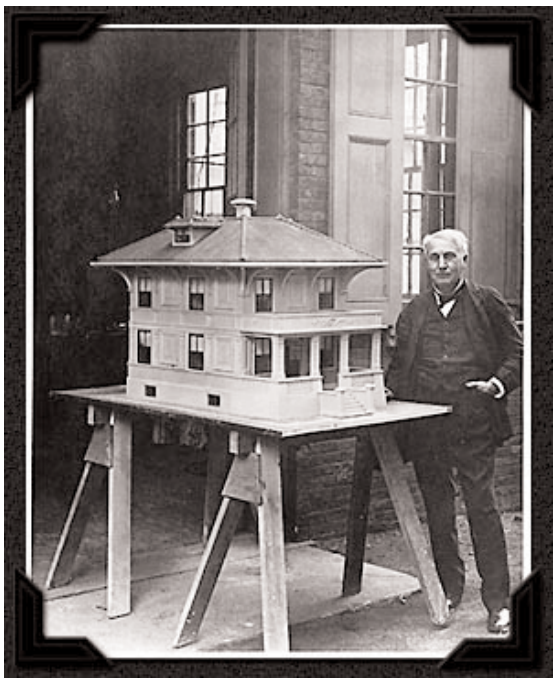
Take a look at past magazine advertisements and artwork that illustrated new technologies and how they might be used in the future. Everything from home appliances to cars to buildings is impacted by how and where we believe technology is going to take us. Look at how rapid advances in jet aviation in the 1950s and 60s inspired the sleek, fin-shaped refinements of automobiles of that period.

Architects design buildings that have as much "theme" as they have functionality. Their structures make social and cultural statements. Technology and their speculations about how it impacts us, influences how they design and build structures.

Thomas Edison invented the very utilitarian concrete house. Look at what that technology produced in terms of "art" and compare it

against classical home building designs of the 1920s and 30s' and against some of the more modern designs. What do these designs say about how technology "feels" to you? Which type of home best fits your preferences? How might you feel in a world where the buildings did not fit your preferences?

Discuss how technological advances in paints, materials, and tools have allowed artists, painters, sculptors, and designers to boldly try new art forms. Look at how computer art and animation have completely changed our visual forms of entertainment. Compare this to the then revolutionary work of Walt Disney in the 1930s and 40s.



Thomas Edison invented the very utilitarian concrete house.

The Hollywood movie technique of "morphing" has allowed studio artists to create whole new families of imaginary characters and alien beings for movies. The eerie shape changing transformations produced by this cinematic technology has completely changed our ability to create almost unbelievable movie scenes at reasonable costs.

Epilogue

Albert Einstein once commented, "Imagination is more important than knowledge." — a most perceptive and unexpected quote from one of planet Earth's most towering scientific intellects.

Science fiction is constructive imagination, focused on how technology and science affect the future. Its premise is the impact that both have on society. What better way to explore what we envision technology education to be… the study of the human designed world.

Integrate science fiction into your classroom. Supercharge your students!

Harry Roman
is an engineer with Public Service Electric & Gas and an education advocate.

THROUGH THE EYES OF FALCONS

BY JAMES BRANDT

Harry Roman's preceding article challenged you to use science fiction as a way to stimulate discussion and focus attention on technology. This article was written for *Ties* in 1995 for that specific purpose. We present it here again to stimulate response to Mr. Roman's suggestions.

"John, wake up please."

"Go away."

"John, this is important. Wake up!"

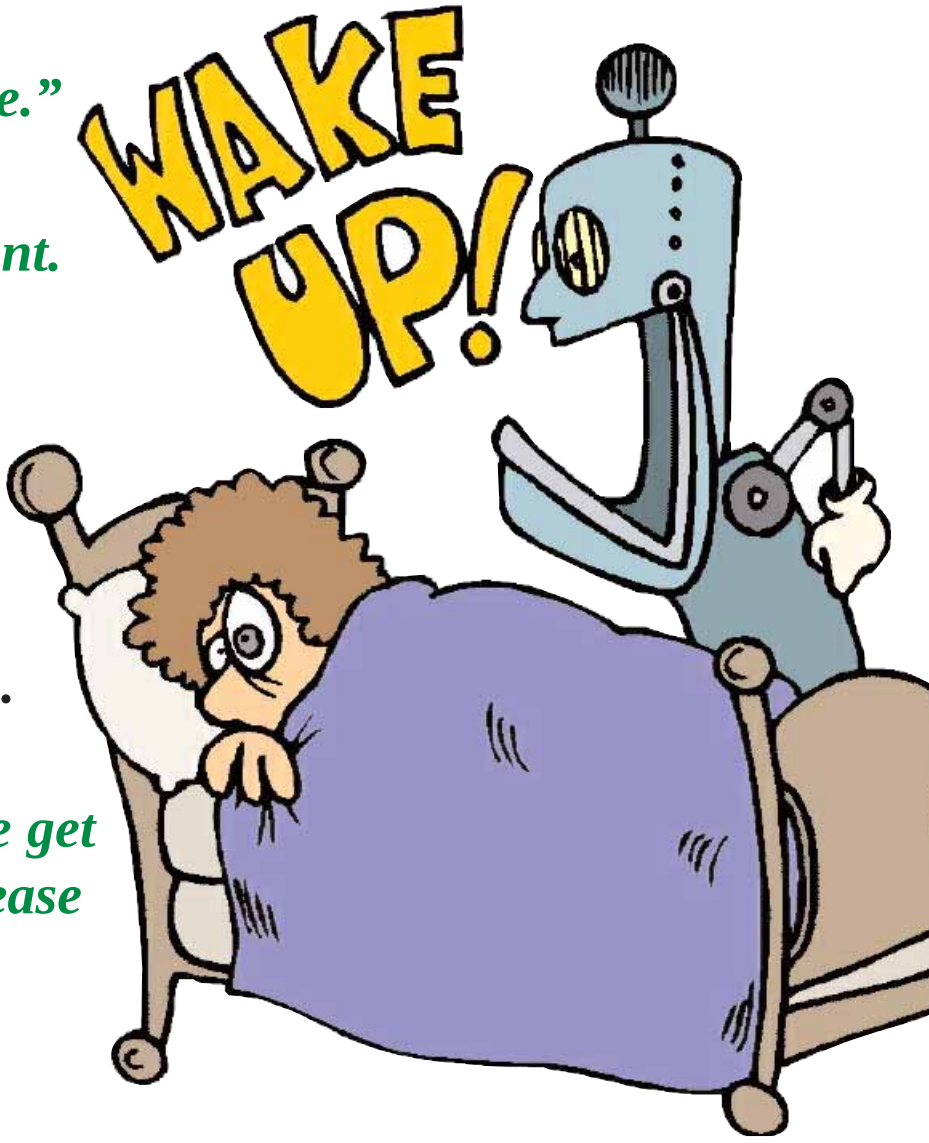
"What time's it?"

"It's 3:57:14. Please get up and come to the control room."

"It's only four? Go. A. Way."

"John, don't make me get pushy about this. Please get up."

"No."

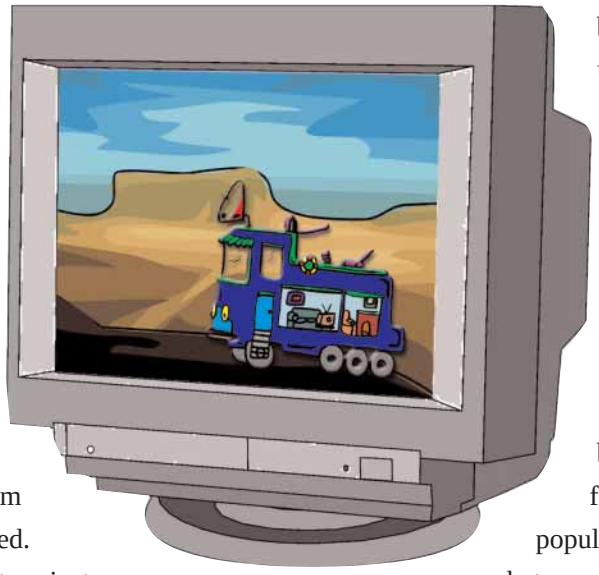


I pulled the covers over my head. I knew it wasn't going to do any good, but I was acting on impulse, not light speed.

"John, hiding under the covers never works. This is a Class Two Alert. Please come to the control room."

"All right!" I sat up in bed and the lights came on to dim—at least she gave me that much courtesy. I slumped out of bed.

I didn't bother dressing. There was only Sally and me in the tower and Sally didn't care how I looked. As I stumbled my way to the dilating door, she just thumped her tail a few times, then laid her head on her paws. Her internal clock knew it wasn't time for breakfast, so she didn't bother to rouse herself from the foot of the bed. She always crept up just after lights out no matter how often I explained that beds were not for dogs.



"Please come to the holo-deck," the computer asked, mercifully keeping the lights low and sending AFES, the utility robot, to the control chair with a steaming cup of pseudo-cocoa.

"Are you awake enough for input now, John?" she asked as I slumped into the chair and picked up the cocoa cup.

"No, but go ahead and start." She didn't argue even though that wasn't logical. But she had grown used to human idiosyncratic speech over the past few years and didn't demand rational answers.

The lexan cube over the holo-deck filled with the majestic image of the Pecos Wilderness Preserve just a few miles northwest of the tower. It was a beautiful sight, even with the computer enhancement to compensate for the darkness and cloud cover. The entire range was beautiful, now that much of northern New Mexico had been declared a wildlife preserve. That was a benefit derived from the sharp population decrease between 1990 and 2015, when AIDS had run rampant, devastating a large percentage of the North American Alliance's population. With the reduction in population, vast land areas had reverted back to wilderness recreational uses. Everything north and west of the old I-25 was razed, including Las Vegas, Mora, Las Galinas, Pecos, Tres Ritos, Eagles

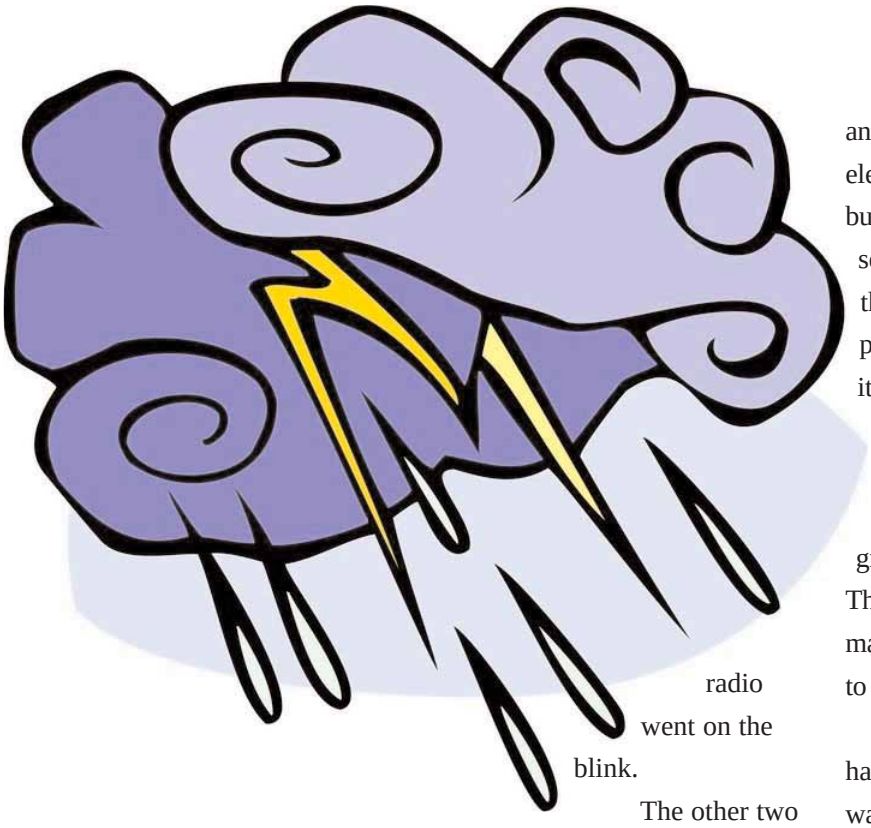
Nest—every town and settlement up to Taos—except Cimarron, which was maintained as a support base for the large Philmont Boy Scout Ranch—was gone and not greatly missed.

My Ranger Tower was located just outside Hot Springs, near the old Montezuma Castle. It was my job to watch over the wildlife, campers, backpackers, and assorted nature lovers who used the area. It was generally safe, so a Class Two Alert was something major.

As I watched, the computer generated a weather system. High cumulus clouds rapidly grew into a threatening anvil shape, heralding a severe thunderstorm. That was typical this time of year, when warmer valley air rose to meet colder air flowing from the former Canadian polar cap. This looked like a big storm and I could see why the computer was worried.

"Display locators, please." The holo changed to a topographical representation of the park's 4,364 square miles, including the Philmont Ranch. Sixteen amber lights blinked on with code numbers. Eleven of those were in the Philmont area so I didn't worry about them; if there was a problem on the Scout range they would notify me directly. The other five were my concern.

"Records," I asked. The data for the other campers glowed on the rear projection screen to my right. Three of the campers were in the Pendaries Village area. They were a group of travel trailers with direct radio control contact to the Tower. They shouldn't have a problem if they stayed inside. I told the computer to send a warning; their radio should hold it until they woke. The continuous tone acknowledgement set up would warn my computer if their



radio went on the blink.

The other two were more of a worry. One group was backpacking in the old Horse Shoe Corral Camp area by Falls Creek; that area was prone to lightning strikes and fires. The other campers were a survivalist group which could be more trouble. They dropped in by helicopter near Barrillas Peak and planned to work their way through Canon del Cuervito to Apache Canyon, then west to their transportation parked at the North San Ysidro ruins. That area was prone to flash flooding and could be a major problem for the group. According to the records, there were 28 first-timers and three guides.

I told the computer to go back to the weather display and enhance for electronic charges and ion paths. As I feared, the clouds were moving rapidly and scraping off a whole pack of electrons. The bottoms of the clouds were building heavy negative charges and sending searching fingers of ions toward the towering trees below. Likewise, the positively charged ground was sending its feelers skyward, using the tall trees as launching points. A path generates where the two ion tentacles touch and the charged particles flow to the ground so fast that the electrons glow. That's lightning. The heat it takes to make electrons glow is enough to set fire to a forest.

That was exactly what was happening along the storm's front. There was a steadily growing line of small fires preceding the deluge, some of them close enough to meet and grow even after the rains hit. The gusty winds were fanning the flames and the satellite video showed several hot spots that required a little personal attention.

I told the computer to upgrade the warning to the trailers just as a precautionary measure. Their radio would squeal until someone woke up and dumped the message stored in its memory. Storms were devastating along the Sangre Cristo Mountain range and, over the past three decades as the effects of ozone depletion made themselves felt on the weather, forecasting advances had strained to keep up with the instability of the upper atmosphere. Accurate forecasts didn't exist past two days and a storm like this could develop in a matter of

hours. Fortunately, with the world population down about 60 percent, the atmosphere was recovering. But it was slow, so very slow.

The Horse Shoe campers were in immediate danger from forest fires. I told the computer to immediately dispatch a communications drone to their site. Wrist communicators, required of all park visitors, were fine for location soundings, but the storm would prevent accurate communications without something more powerful. I wanted them to know that they were safe and someone was looking after them.

I then told the computer to launch six of my ten fire fighting drones from their hangers at the old Las Vegas airport. These stubby craft would handle the high winds well and I thought they would make a big impression on the developing fires; enough, at least, to allow the following rains to finish the job. I watched the monitor on Storrie Lake long enough to see each drone make its first scooping run in good order and wing toward the fire site at a good clip. The computer and communications drone would let me know of any other problems.

I turned my attention to the survivalist readout as it switched from amber to red. Someone was in trouble. Without waiting to be told, the computer enhanced the area until it covered about 25 square miles. Already I could tell they were in big trouble. The final dot pattern overlaid Commissary Creek, a good three and a half miles from their route. Worse, with the enlargement, I could see that two dots—one red—were separated from the group by a half mile of dense woods and the creek itself. They were near a major artery and, when the rain water began rushing down

the creek, they would be cut off from the rest of the group. It was time I took a personal look.

I sat the half-empty cup of cold cocoa down on AFES's tray and stepped over to the aviary tunnel. I opened the hatch and whistled, but nothing happened. I checked the display and saw that all three falcons were in their roost, but they were ignoring me. I clucked again and palmed on the light. Finally, Shae roused himself and hopped down the five foot long, two-foot square tunnel to the perch in the tower. He didn't look exactly happy, but he did accept my peace offering of soy-beef.

"Sorry, guy," I said. He cocked his head at me but his cold eyes did not look like they accepted the apology. "We have a problem out there and I need your help," I told him as I attached the mini-transmitter to his harness. "I need your eyes and your strength, because it's a nasty night out there."

I slipped the micro-cam hood over his head and the computer OK'd the reception. The miniature steadi-cam kept the image relatively still in flight and the stereo-optic camera would give me a good view of everything he saw. The receiver in the harness guided him through slight electrical pulses; he would turn in the direction indicated by the location of the pulses in the harness.

Shae hopped over to the slide and I opened the door. He slid down the plastic chute almost like he enjoyed the short ride to the waiting drone's cockpit. The drone would fly Shae to an area near the trouble site, release him, and then return to the tower. It was the quickest way of getting a fully operational camera 15 miles across rugged mountains, and the falcon never objected to taking a fast ride in a rocket. Once the drone was airborne and streaking toward the trouble site, I strapped myself into the virtual reality viewing chair and lowered the helmet. The straps were necessary because the sensory input from a bird's point-of-view was often enough to generate extreme body reactions. No matter how many times I've seen it, when Shae dives, my knees involuntarily jerk and my arms start flailing to slow the plummet.

A few seconds later, the drone's lower doors opened and Shae was

airborne. I had to gulp back down the cocoa as the sudden perception of falling sent my stomach into flips. Then Shae's wings caught the wind and I steadied into the wonderful feel of free flight.

The computer directed us to the location of the emergency. I had a few more unpleasant moments as Shae slipped and slid and twisted through the tree branches searching for his target. When he settled on a branch and looked down at the ground, I had the computer switch to infra-red and was able to make out one figure lying on the ground with another kneeling beside.

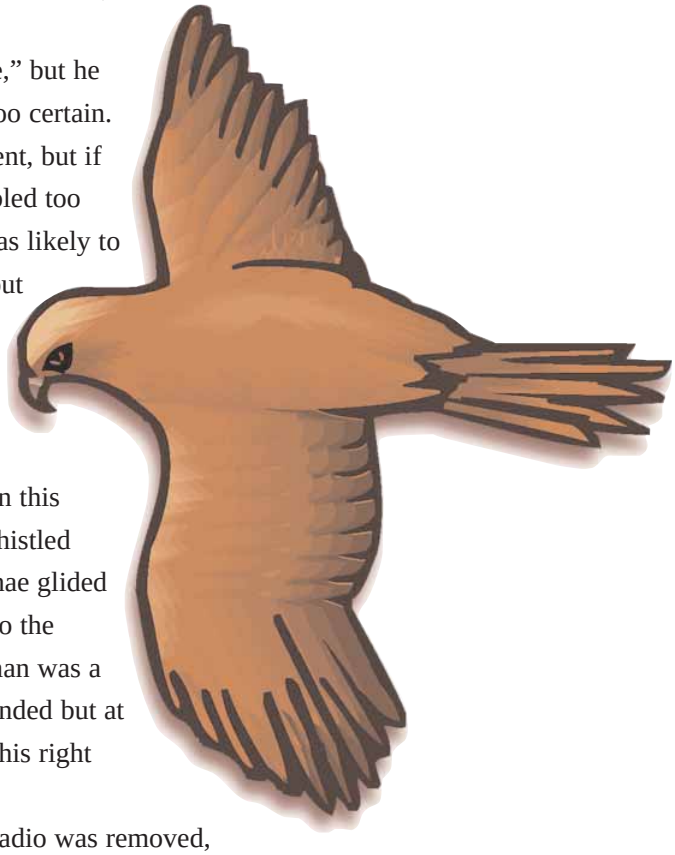
"Are you having trouble?" I asked, and the kneeling figure jumped up so fast I thought he was wearing rocket boosters.

"Who…where…?"

"This is the park ranger. I am using a spotter bird to reach you. He's in the tree to your left," I said and was gratified by having the camper turn his face toward the bird. Either he was bearded or he had a very dirty face. "Do you have a problem?"

"Yeah, we're lost, and I think Susan broke her leg. Look, this is the first time we've been on one of these things." I didn't have the time or patience to argue with him or listen to him complain. If he couldn't handle the trek, he should have stayed in his condo.

"Stay where you are," I interrupted. "I'm going to have the falcon drop to the ground. Carefully remove the RED box from his LEFT leg. That's a locator beacon and short range radio. Leave the Yellow one alone. Can you do that?"



"Yeah, sure," but he didn't sound too certain. Shae was patient, but if the hiker fumbled too much, Shae was likely to take a chunk out of his hand.

"OK, but be careful with the bird. He hasn't eaten this morning." I whistled sharply and Shae glided from the tree to the ground. The man was a little heavy-handed but at least he knew his right from his left.

When the radio was removed, Shae jumped back into the tree, leaving my stomach on the ground.

"I'm sending the bird for the others now. There's a storm coming fast. Can you build a shelter? It'll be a while before help can arrive."

"You're not leaving are you?"

"I'm sending the bird after the others. They should be here in less than a quarter hour. You're not that far away."

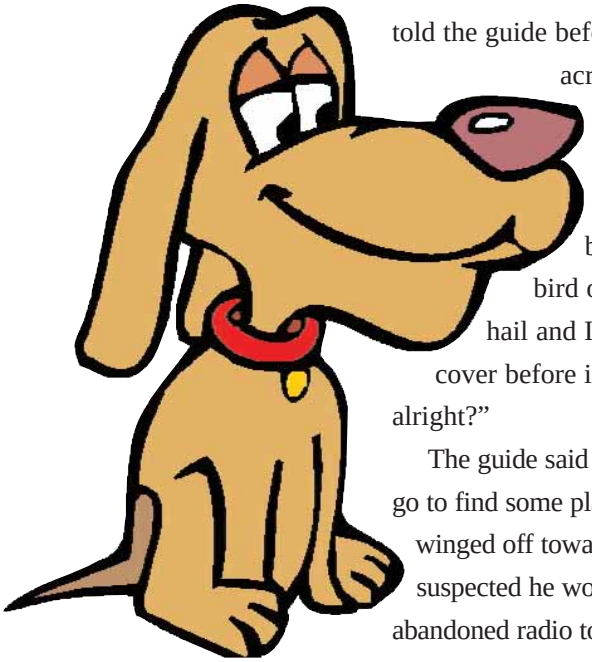
"But.."

"Build the shelter. You're a survivalist. Survive."

I whistled again and Shae took to the air. In a few minutes I would have the others headed in the right direction with their guides' radio tuned to the locator beacon. I notified the rescue squad in Santa Fe of a potential problem and they agreed to set out as soon as the front cleared and the winds died enough for their hoover sled to negotiate the mountain trails.

That might take awhile, so I sent a radio message to our automated warehouse in Rowe and a high-speed RoboTech med-drone rolled out of its garage and began sniffing the electronic trail to the injured hiker. It should arrive on site with shelter, med-pack and emergency transportation if the injury was too severe to wait for the hoover sled. It would take two hours for it to reach the hikers.

"There's not much I can do now," I told the guide before signing off. "Get across the creek quickly and get some shelters made. This storm is more than just a good blow. I'm sending the bird off now. There may be hail and I want him to find cover before it hits. Can you manage alright?"



The guide said he could and I let Shae go to find some place that suited him. He winged off toward San Juan. I suspected he would roost near the abandoned radio towers on Lone Butte near Blanchard. I took off the V-R helmet and paused to reorient myself before checking on the fire drones. I was a little surprised to find them all safely back in their hangers. The fires were manageable and the rain had started early, pelting the blazes into sodden ashes.

I tried to go back to bed. I stood up and looked out the tower windows. To the northwest, a solid line of black clouds was billowing its way towards me, just beginning to reflect the first rays of the morning sun creeping over the plateau of Mesa de los Carros. The five hundred foot tower swayed a little in the wind, but that never bothered me. I turned to go back to the bedroom when the door dilated open and Sally padded out, tail wagging and ready to play. So much for sleeping.

James Brandt is a freelance writer and media consultant who wrote this article for the January/ February 1995 issue of *Ties*.

DESIGN BRIEFS

So you you've got a story that catches kids imaginations. How does this become a learning experience? Start with some questions for discussion.

Technology

- Which of the technological devices and systems mentioned in the story are established currently cutting edge under development or purely speculative?
- Diagram in systems terms (or explain) how each of them works or might work If something is currently impossible propose what would be needed to make it feasible. Model the various systems and device mentioned.
- Envision that you are a designer/ technologist brought to the park to look for ways to improve safety and make the area more enjoyable and more efficiently run In teams of four identify at least fifteen specific problems that could be addressed (for example communication between campers and authorities flood control early weather warning system fire prevention and control communication with birds and housing and delivery of birds to trouble spots) Discuss these and then chose several to solve and develop specific design proposals.
- The use of the bird is a clever marriage of biological and technical systems Study falcons and make a model of how the bird-cam might work Can you think of examples of other natural/technological devices and systems that are currently used to solve problems or that have been used in the past'? Can you think of any ways to solve problems using plants or animals along with technological devices Don t forget about very small organisms.

Geography

What aspects of geography are mentioned in this story? Study a map of the American West to get a better vision of the changes that have taken place in the world at the time of the story Check population data, weather records, information on vegetation, etc. to see if the hinted at changes are feasible.

Science

The devastating reduction of human population described in the story is attributed to AIDS With data from the last 10 or 12 years is such a catastrophe actually possible? If the trends show that this scenario is real what steps need to be taken to prevent such a loss of life? What other factors might result in a population drop of this magnitude? Do some research — has anything like this ever happened in history?

Social Studies:

- What are the benefits of population reduction described in this story?
- If the earth's population were to drop this dramatically what other consequences might there be both positive and negative?

Art:

- What do these characters look like? What does the ranger station look like? Are there uniforms? If this story were to become a video or movie, what other physical features would have to be envisioned? With what the story tells us about the world of 2015 (or whenever this is after that time), what can we assume about styles of design?

Note: Connections to mathematics, languages, home economics, etc. are certainly very possible. We leave them to your speculation and urge you to send us your ideas. And if you try out a project like this, let us know how it goes.

June 2004

PTC News for Teachers

The Work Plane

This newsletter is for teachers who teach science, technology, engineering and math. It appears quarterly in *Ties*. Through the Design & Technology in Schools Program, PTC donates Pro/DESKTOP 3D design software to help K-12 teachers prepare students to live and work in a technological world. For more information, go to **www.ptc.com/go/schools.**

Sign up for summer training – and get ready to teach with Pro/DESKTOP this fall!

Pro/DESKTOP trainings are being scheduled throughout the country this summer. Be sure to check our website for new trainings that have been set up, or send an email to schools@ptc.com to request one to be set up near you. Go to: http://www.ptc.com/for/education/schools/training.htm

We have also updated our program information sheet, which can be found on the front page of our Design & Technology in Schools Program's website: http://www.ptc.com/for/education/schools/schools_program.pdf.

PTC is partnering with NASA's Coalition for Space Exploration

The Coalition for Space Exploration's goal is to increase awareness of and support for the nation's Vision for Space Exploration, including: The Space Shuttle's full return to flight; the completion of the International Space Station; and eventual journeys to the Moon, Mars, and beyond. In order to achieve this goal there is a significant need to inspire and prepare more students who will be able to address the engineering challenges that will be part of these missions. The Coalition has been established to help NASA, as the lead agency, fulfill the new Vision for Space Exploration.

PTC and the Coalition have partnered in order to help get more students interested in designing. As part of this partnership, PTC is donating Pro/DESKTOP software to schools participating in this initiative. The students of today will be the innovators and designers of tomorrow's space missions. For more information on this program, visit http://www.space-exploration.us/index.html, and to find out where the teacher trainings will be held as part of our partnership, please visit: http://www.ptc.com/for/education/schools/training.htm.

PTC Awards Competition

Over 250 students from the K-12 and college level participated in the PTC Awards Competition this year. In the Education, K-12 Category alone we had a lot of great entries from the United States, including three of the five finalists. The winner was a student from Serbia & Montenegro, who designed a diesel-electric locomotive using Pro/ENGINEER Wildfire. All of the designs were great, and each student that submitted one will receive a Certificate of Participation. You can take a look at all of the category winners here: http://www.ptc.com/appserver/mkt/ptcawards/winners.jsp

Vladimir Petkovic, from the Mechanical Engineering School in Serbia & Montenegro, designed this locomotive in Pro/ENGINEER Wildfire.

New Teacher Resource Pages: Now Even Easier to Navigate

Not only have we put a few new Pro/DESKTOP V8 projects onto the teacher resource pages, but we've also reorganized them so it's easier to navigate. Check out additions to the following pages: "*Getting Started with Pro/DESKTOP*" and "*Pro/DESKTOP Training Projects and Classroom Materials*":http://www.ptc.com/for/education/schools/teacher_resources.htm. If you have projects that you'd like to share with other teachers, please send

them to schools@ptc.com and we'll post them to our site.

Schools Plus – a great next step for your advanced students!

While Pro/DESKTOP is a great way to introduce all of your students to 3D design and technology, there are certain students who will excel and be ready for the next level. For these students, Pro/ENGINEER Wildfire is a great next step. To learn more about the Schools Plus program and how to get involved, check out our website: www.ptc.com/go/schoolsplus. Within the FAQs there's a document explaining how our two programs complement one another: http://www.ptc.com/for/education/schools/dat_benefits.htm

New Pro/DESKTOP Datasheet

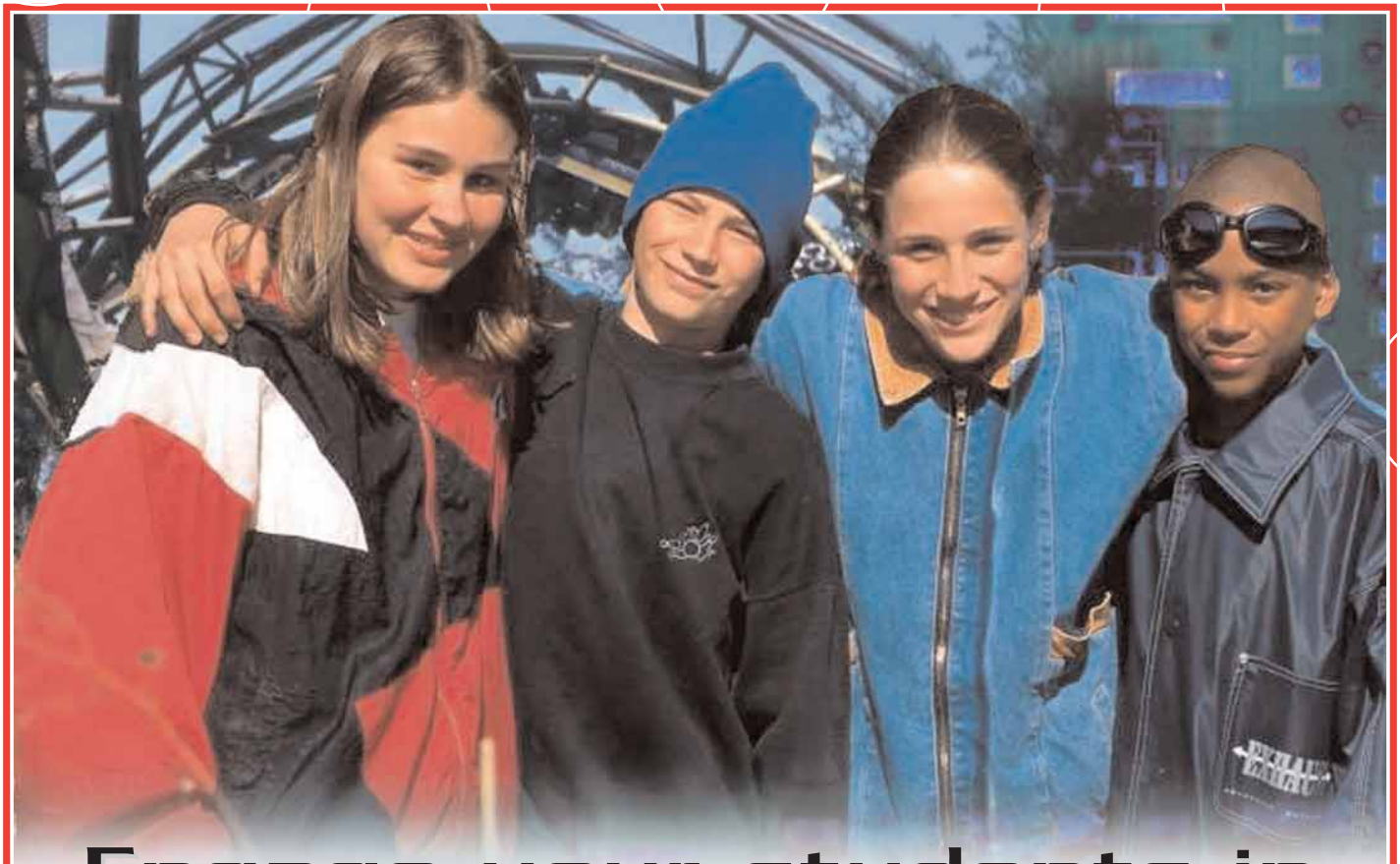
Have you ever wondered how robust Pro/DESKTOP V8 is? If so, you'll want to check out a new datasheet that we've developed that outlines the functionality of Pro/DESKTOP V8. Take a look and see what's included – there might be something that you aren't taking advantage of yet: http://www.ptc.com/products/desktop/prodesktop_ds.pdf

ITEA Wrap-Up

We had hundreds of teachers visit us at the ITEA show – for those who were there, thanks for stopping by our booth – it was great to see you. We're looking forward to Kansas City next year!

Share Your Experiences

If you have any feedback, want to share stories on how you are using Pro/DESKTOP in the classroom, or send us student designs for our website, please email schools@ptc.com.



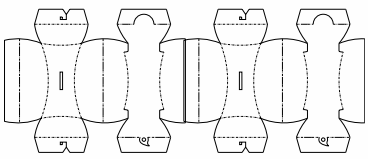
Engage your students in the world of technology...

...the world of mechanical toys, roller coasters, audio systems and 3D computer modeling... with contextual learning units that let them explore designs and implement solutions of their own. The Exploring Design & Engineering℠ (ED&E℠) Project's eight contextual learning units and one classroom text in Design & Technology provide middle school and high school students with real-world design problems through hands-on activities.

- Students investigate, design ideas, model solutions and test their designs using the engineering design process.
- The units provide realistic, enjoyable activities that are relevant to society and the work world.
- The activities allow students to see and understand the meaning of the concepts they are learning.

By designing activities from the context of life, the ED&E Project strives to create life-long learners, ones with the desire to continue learning about technology throughout their lives. For more information on these units and professional development workshops, please contact **Henry Harms, ED&E Project Coordinator, at 609-771-3339 or harms@tcnj.edu.**

exploring design & engineering



The College of New Jersey

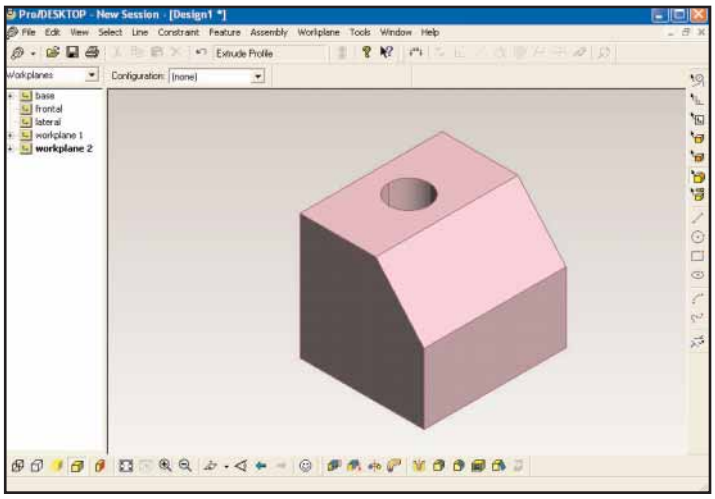
Pro/DESKTOP Tips

Project Assembly with Pro/DESKTOP

by
Steve Smith

One of the great advantages of Pro/DESKTOP as a design tool is its ability to create complete assemblies from individual design files. Here are the basic steps for creating an assembly in Pro/DESKTOP.

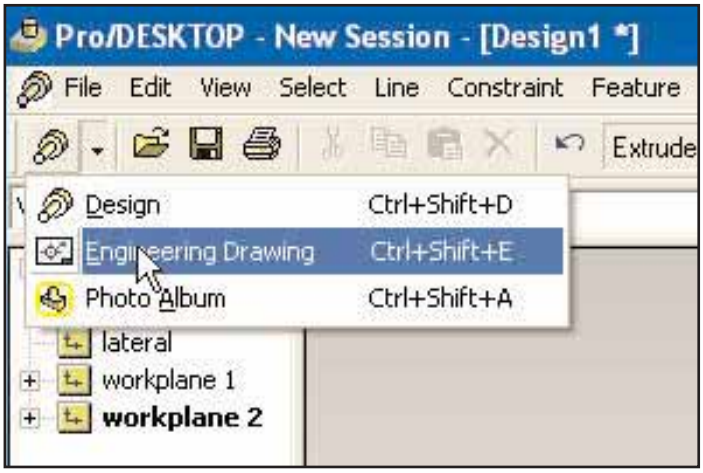
Creating 3 View Drawings from Pro/DESKTOP Designs.



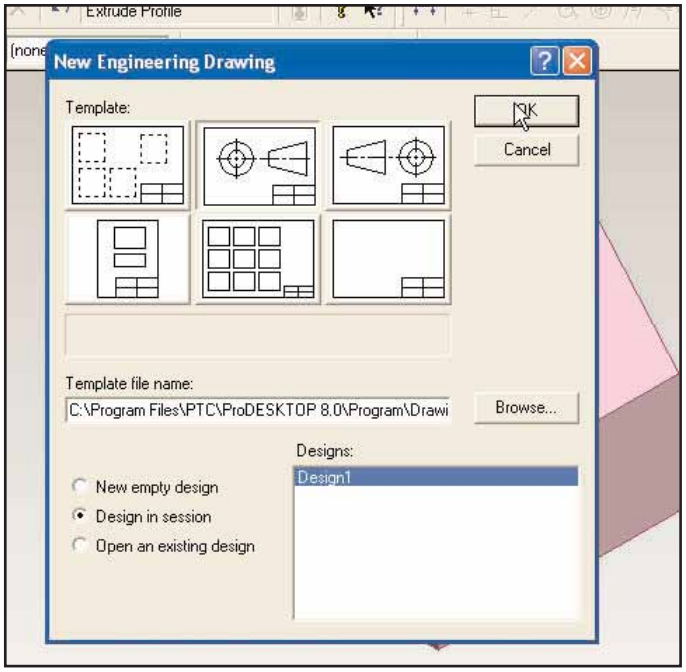
Designing projects in 3D has many advantages because at any time during the design process the project may be rotated giving the designer an accurate view from all sides and angles. This offers a realistic view of how the design looks as it evolves. A team working collaboratively on a design project will be able to gain a better sense of what an evolving project will look like enabling better design decisions throughout the process.

In some cases the 3D design can be produced directly via Computer Numerically Controlled machines (CNC), however nearly all manufacturing process still require an Engineering drawing to effectively communicate the design as an aid to manufacture and inspection. These drawings should contain the dimensional and tolerance information required to produce the product in a manufacturing environment.

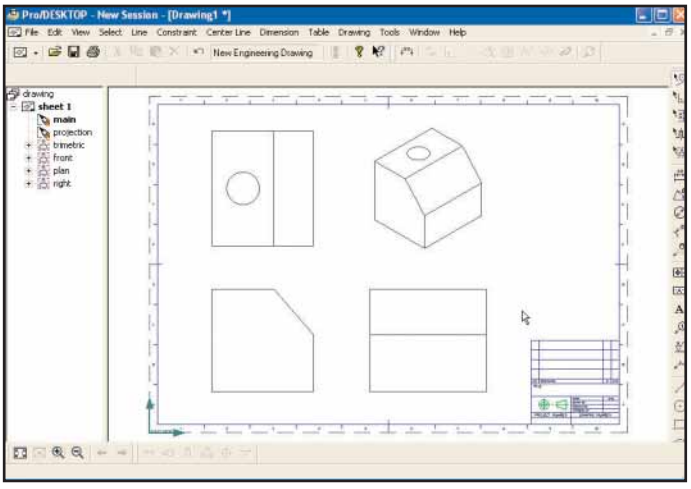
Producing an Engineering drawing in Pro/DESKTOP is very easy, and demonstrates one of the key benefits of 3D Solid Modeling. In a 2D CAD system the user has to try to visualize what their design looks like from different directions and then create the 2D geometry manually. With a simple click of the mouse, Pro/DESKTOP can automatically produce a drawing with the traditional orthographic views and add views of the project from any angle the user requires. Each and every view created is 100% accurate and dimensions can be added quickly and simply. The following few steps will demonstrate how to start this process…



In this example, a simple block incorporating a hole and a beveled edge is used to show how differing views and hidden lines will be rendered in the 3 view drawing.

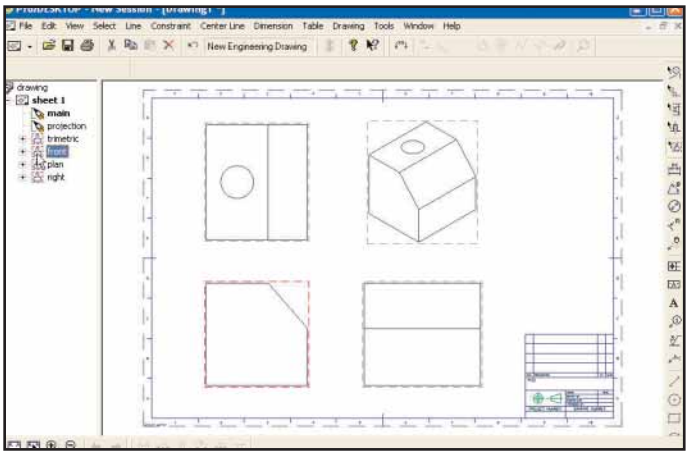


With the Design page open move the mouse to the dropdown menu in upper left hand corner of the page. Select Engineering Drawing.

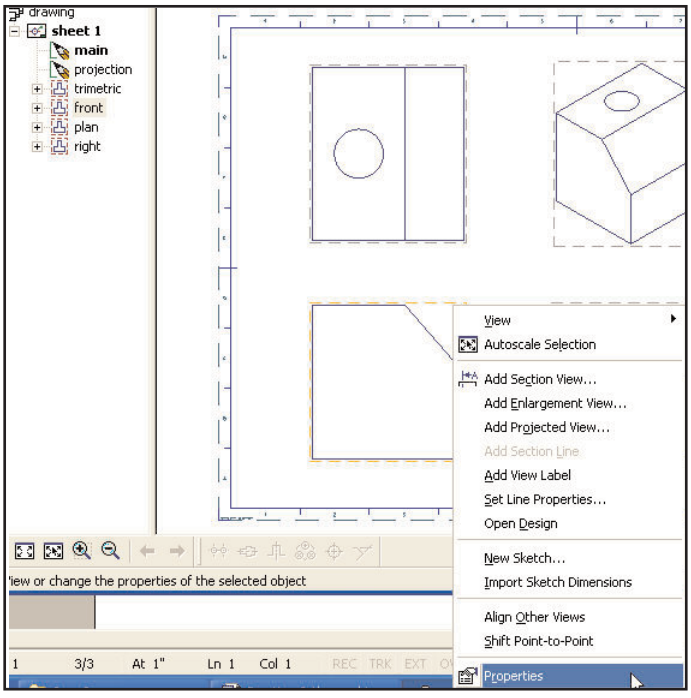


The New Engineering Drawing dialog box will appear; click OK.

A new drawing has been created showing Front, Plan, Right and Trimetric views.



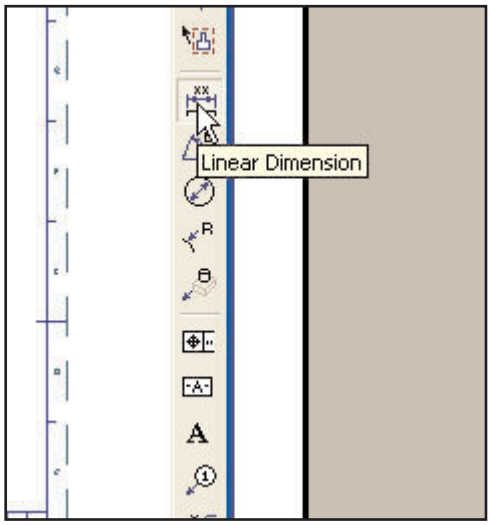
To show the hidden lines in the drawing, click on any of the views in the left hand history column. Dotted selection lines will now appear around each of the views.



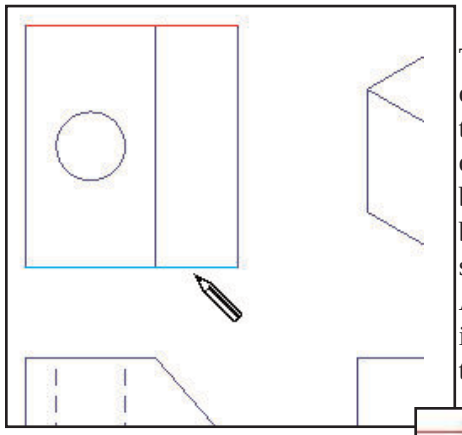
Right click on a dotted red line and select Properties. You will need to do this to each of the drawings.

In Properties, check Show Hidden Lines. Hidden lines will now appear in that view.

To Dimension the drawing, move your mouse pointer to the tool bar at the right-hand side of the screen. Select Linear Dimension.

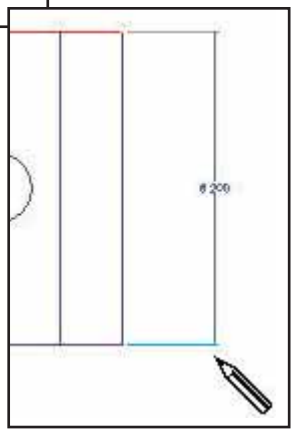


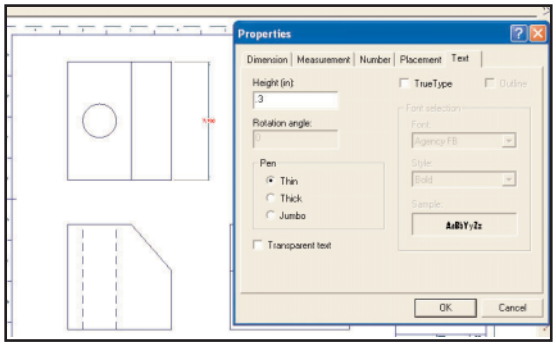
To begin dimensioning, select one side of the Drawing. It will turn red. As the mouse pointer is moved toward the other side of the object, it will turn blue. Hold down the left mouse button and pull away from the drawing—a dimension line will appear.



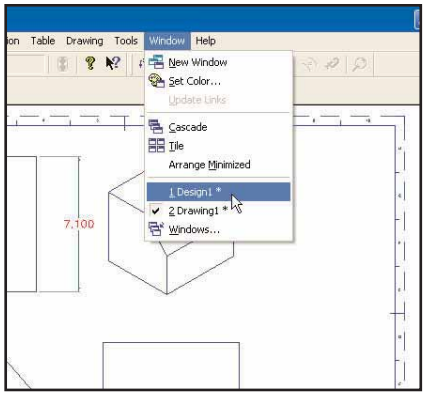
To enlarge the size of the text, click on the number in the dimension dialog box. A Properties box will appear, select the Text tab. A number around .3 is an easy to read text size.

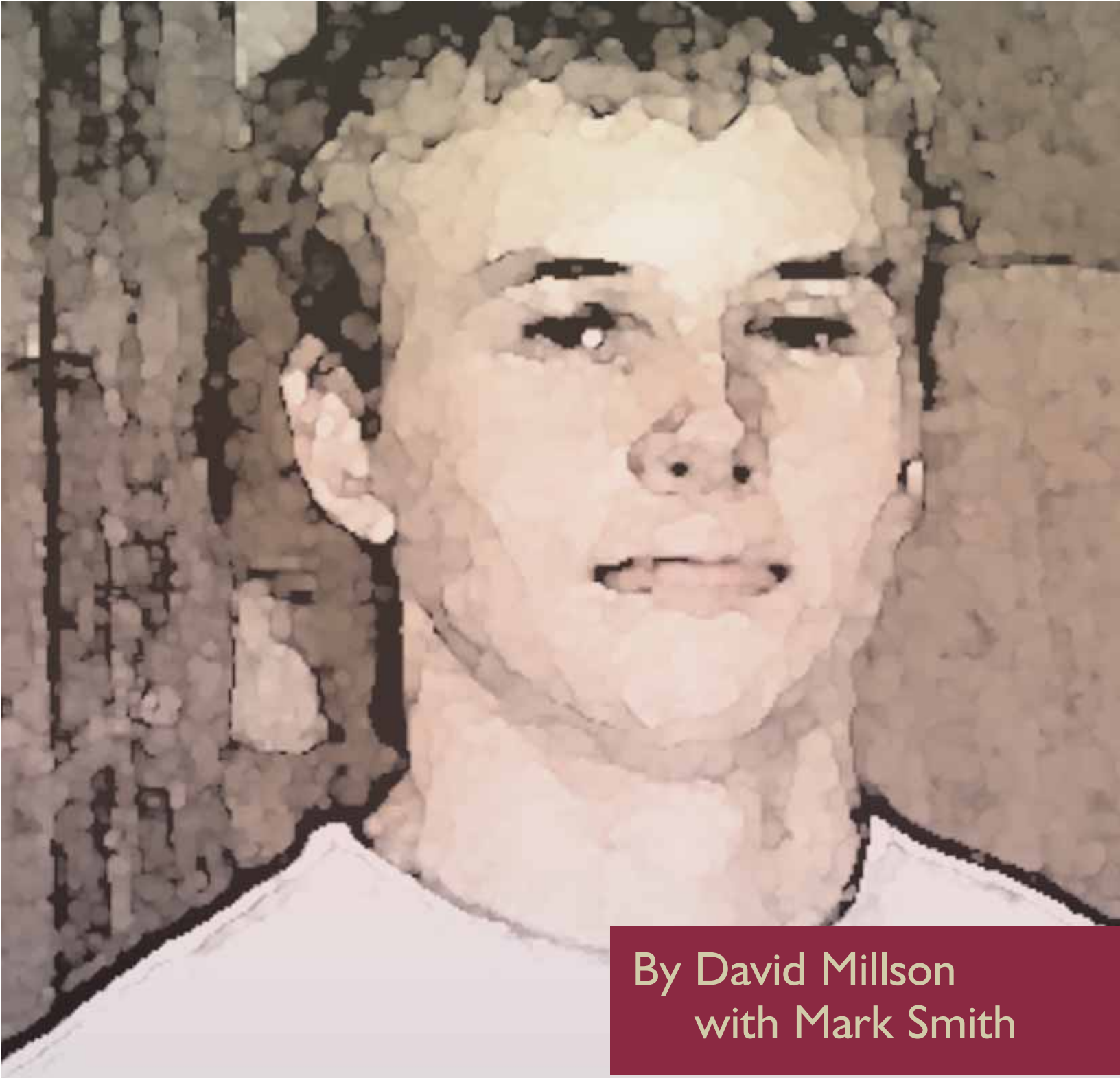
One of the great features of Pro/Desktop is that it allows the designer to switch back and forth between Design and Drawing views. Drawings are automatically updated as modifications are made in 3D design.





And there you have it, a complete set of dimensioned drawings which can be utilized in the in the planning and construction of student projects.





By David Millson
with Mark Smith

your youth will see visions

Encouraged by his and other Shiloh High woodworkers' smashing success at the 2003 AWFS (Association of Woodworking and Furnishings Suppliers) Show, senior Emory Luth vowed to create a dramatic entry for 2004. Undaunted by the unexpected elimination of secondary school entries in the show, Emory, with his teacher's help, remained faithful to his goal. This is a story of one student's successful research into professional production techniques that brought his dream to life.

Mel Gibson's character in the Sci-Fi film, *Signs*, declares, "There are no coincidences." That's perhaps a valid way of looking at the confluence of two threads that we began to explore in the *ties Online* December 2003 article, "A Phoenix Rising From Its Ashes."

One industry's problem

According to the *Wall Street Journal*, and reports for the past few years in American wood products journals, U.S. furniture makers have been steadily watching their manufacturing sector evaporate in the face of offshore competition. The U.S. manufacturing sector has shed about 55,000 jobs between 2000 and 2003 alone. In that same time, imports filled over 40 percent of the American furniture market.

"Send us CNC-trained workers" is the hue and cry in the furniture industry. The readily reproducible, high-quality results of CAD/CAM design and production may well be the lifesaver of an industry barely keeping its head above offshore waters… but where are these skilled CNC woodworking technicians to come from?

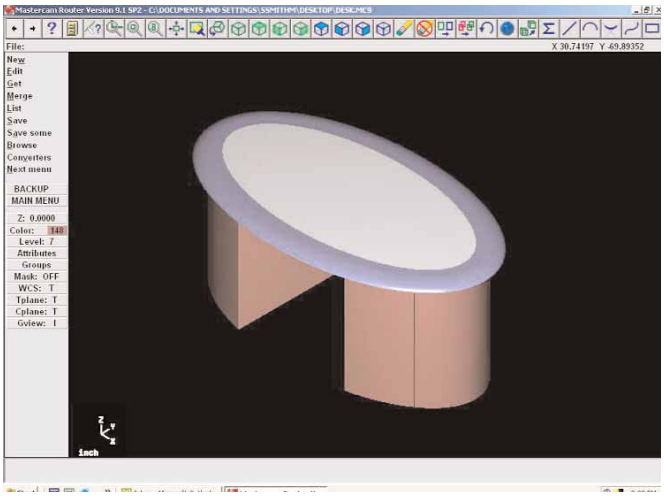
Shiloh Industrial Technology students represent their program at the 2002-03 AWFS Student Competition in Anaheim Convention Center in California. From L to R Paul Wilson, Emory Luth, Katie Weber, Heidi Kibbler, Brandon Draper and Adam Carrington, and teacher Mark Smith. Paul and Emory received their AWFS Finalist awards that year.

One man's answer...

In the summer of the 2000 school year, Industrial Technology Teacher Mark Smith at Hume, Illinois' Shiloh High School (*marks@shiloh.k12.il.us*) received a call from Larry Hilchie of WoodLINKS in the US (*http://www.woodlinks.com/*). That Mr. Hilchie volunteered as the organization 's leader in addition to his full time job serves as a sign of that organization's recognition of woodworking manufacturers' desperate need for CAD/CAM-trained people. Mr. and Mrs. Smith accepted his invitation to the Association of Woodworking and Furnishings Suppliers (AWFS) show in Atlanta. There he stood amid, as he put it, monster floor space. "We walked around for three days, all day, and saw only three-quarters of the show. It was a real eye-opener; I saw processes there that were completely new to me."

"We attended WoodLINKS USA meetings and heard the industry leaders serving as guest speakers. We learned what practical steps were needed for Shiloh High School to become a WoodLINKS USA site. We were excited because of the potential WoodLINKS could offer our program and, once we began to use their resources and curriculum, what that would do for our students." Shiloh High School 's Industrial Technology Program became the first WoodLINKS USA high school site in Illinois.

Industrial Technology/WoodLINKS USA Teacher Mark Smith stands by proudly as Emory Luth, right and Paul Wilson display the WoodLINKS USA certificates they received at the 2003 AWFS show. Shiloh High School was the first in Illinois to become a WoodLINKS USA center.



The Art Deco concept master executed in Mastercam solids. It owes its visual consistency to the ease Mastercam's associativity lends to the creation of scaled-down jigs for the drawer casements.

...and its result

Last year Four of Mr. Smith's students received their WoodLINKS USA certificates during the 2002-2003 school year. Two of them, Emory Luth and Paul Wilson were selected to exhibit their work in the AWFS Student Design Contest and received their WoodLINKS USA certificates at the banquet honoring all the AWFS award winners on August 1, 2003.

Fast forward: 2004

What do winners do in the face of disappointment?

Emory Luth's response was immediate and decisive. He set to work during the first three months of the 2003-2004 school year drawing and re-drawing his plans for the very essence of his competitive dream: an Art Deco executive desk built virtually from scratch. Emory's design was complex and required him to create in-house-laminated cherry veneer plywood, vacuum molded to conform to his original competitive plan for an elliptical form.

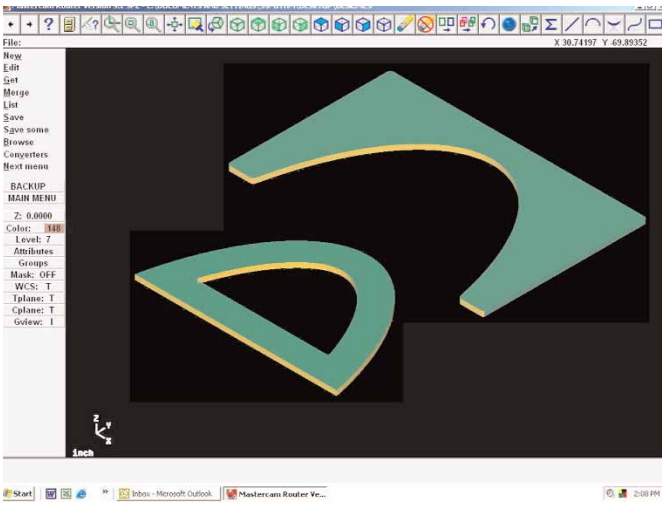
"I liked the look of a curved panel," Emory said, "and the fluid lines of a geometric ellipse appealed to me. But the main reason I chose an ellipse was that I had never seen an elliptical desk before and I thought it would be unique to have one."

Determined to follow industry practice as nearly as possible, Emory sought information on laminating, veneer and wood molding techniques, and materials selection criteria from woodworking professionals. Joe Farlow, of **Wood Wonders** of Tampa, Florida, (*www.woodwondersoftampa.com/*) and Jason Susnajara at **Thermwood, Inc.**, manufacturers of the school's

CNC router (*www.thermwood.com*), freely gave critical advice to Emory during the planning and forming stages of the project.

Mr. Smith notes that "Ken Wilcox of **GL Veneer**, Huntington Park, CA (*www.glveneer.com*) helped us with technical questions and gave us greatly reduced prices; **Franklin Adhesives' Heather Dages** (*www.covinax.com/*) donated four gallons of their Titebond® woodworking adhesive; and LaVern Schlabach of **Das Holz Haus** gave us technical support on drawer box hardware." Das Holz Haus is among the Shiloh IT Program's business and industry supporters.

An added challenge brought the project into closer focus on real-world manufacturing constraints; Emory and Mr. Smith had agreed to finish the desk in time to make the deadline for this article. In its own way, the deadline paralleled manufacturers' striving for on-time delivery. As you can see, they met the challenge.



Male and female jigs for forming the casements are shown here as a composite of images created by Mastercam toolpath verification, the geometry of which will be toolpathed and posted for the Thermwood to achieve extraordinary accuracy in the finished pieces.

Macro-dimensional accuracy?

While we usually think of accuracy in machining/moldmaking terms as <.001", with the prospect of having to reproduce his elliptical geometry in proportionally reduced and, in some cases truncated form, Emory decided to use Mastercam® Solids (by CNC Software, Tolland, CT (*www.mastercam.com*) to create toolpaths for the desk surface, casework (the drawer sections that support the desktop, and jigs and fixtures. Mr. Smith remarks, "We have always been able to depend on the Mastercam technical support staff in any project we've undertaken. Will Slota and Jamie Madison were of special help this time around."

As the story of this project continues, bear in mind that Mastercam's associativity allowed Emory to reduce the major ellipse – the desktop – to create smaller concentric ellipses for other desk surface work as well as the casing shapes — truncating the elliptical paradigm into mirror-image parabolas — and interior drawer parts as well. It took Emory, with Mr. Smith's help and encouragement, nearly another two months to make the final working jigs.

Something from "nothing"

Emory chose vacuum forming as the primary process for shaping and laminating all curved pieces. "We were originally going to use solid cherry, steam the wood, then bend it," Emory recalls. "I learned through talking to professionals that we couldn't hope to generate the enormous pressure to bend solid 3/4" wood." He and Mr. Smith also thought they would be able to use 1/4" plywood for the forming surface of the vacuum jigs to bend the successive laminates — maple/bendable plywood/maple/bendable/maple — to the elliptical casework exterior profile. It was not to be: way wide of the mark.

After successive crashes under less-than-production amounts of vacuum, Mr. Smith suggested handing the

A 1/16" perforated steel form rests on cross-braced ash supports. An industrial vacuum forming bag bends and compresses thin plies into parabolic sections of veneered plywood. Because the layers are glued with the grain alternating at right angles, the drawer caseworks gain strength at minimum weight.

geometry over to one of Shiloh's resource professionals, Ed Cler of Paul's Machine and Welding in Villa Grove, Illinois. Mr. Cler, skilled in combining laser cutting and CNC, donated and cut 1/16" steel to size, drilled mounting holes, and bent it to the predetermined elliptical shape. The CNC accuracy of the vacuum jig uprights, and Mr. Cler's metalworking skill combined for a perfect fit upon assembly.

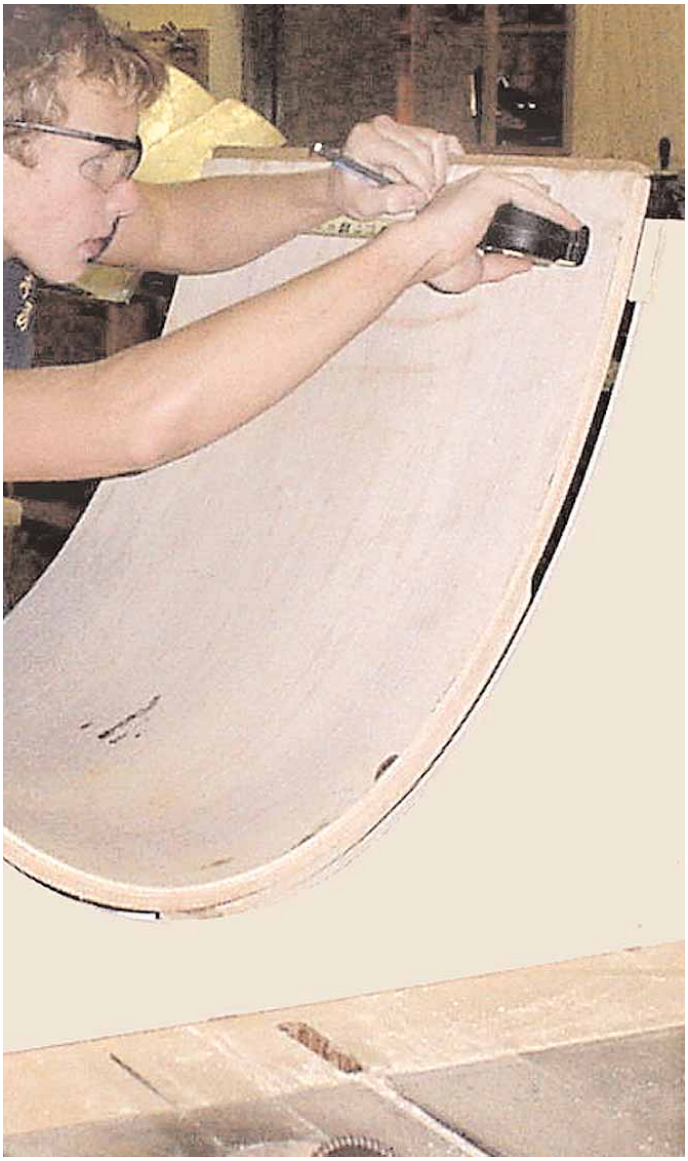
When enough is too much

Emory and Mr. Smith screwed the steel to their first support structure, fired up the vacuum pump… and found that their shop-made vacuum bag couldn't draw tightly enough. When they received their commercial bag, the understructure collapsed under what, they now realized, was an enormous amount of pressure on the 30" x 40" steel plate.

Emory made "all kinds of calls" to determine the strength needed for the internal braces. He determined that a latticework of 9-ply 3/4" Baltic birch plywood would hold. Emory screwed the steel to the birch support-work, countersunk the screws, and Bondo-ed them flush but Mr. Smith says, "It was creaking the whole time during our final 4-hour test under vacuum on March 3rd. It held and we glued the first one up."

According to Emory, "That glue-up failed because we didn't water down the glue enough to combat dry time; and because we didn't cover up the parts being glued with a piece of bendable to apply even pressure. We were essentially making plywood that, with final lamination after the drawers were cut, showed cherry veneer on the top surfaces."

Using measurements from the left-side drawer casework, Emory prepares parts for the jig to hold the piece for the table saw pass that will square off the ends.



A strip of bendable plywood will be screwed to the molded plywood as a guide for the table saw operation. Here, Emory measures in order to position the holes, which will be filled later.

Done in jig time

Emory built a jig to hold the casework exteriors to cut the ends on the table saw. Since these cuts would true up the casework to the top and provide parallel mounting edges for the interior covering — the sides next to your knees if you sat at the desk — the saw cuts had to be perfect. "To set it up right," Emory recounts, "we clamped piece of bendable to the top, used that as a guide for our router with a flush-trim roller bit to get the first straight edge to begin trimming with the saw."

"It took two tries with the router to get it exactly perpendicular to the outer surface of each piece. Then we just set the table fence at the proper distance for the finished height of the ellipses and rotated the other end of the piece against the table saw blade. We screwed it to the jig, which holds the piece at the right angle to cut the short edges. The jig bracing had to be less than the exposed height of the saws blade in order to go all the way through the laminate."

"That went right first time," Mr. Smith recalled, with something sounding very much like relief. "If we had a 5-axis machine, we could have created Mastercam toolpaths and zipped right through this job without taking the time to make a jig."

Squaring the circle parabola

Emory solved the challenge of cutting the rectilinear pattern of the drawer fronts, projected on the curved surface of the casework desk-ends, with yet another Mastercam-defined and produced jig. Almost more important than getting square corners was the need to make certain that the saw cuts were parallel to the inside, kneehole faces of the desk ends. Even a degree or two of skew would prevent the normal travel of the drawers when opened: also parallel with the kneehole.

After he cut the drawer fronts, Emory glued a thin piece of solid cherry on the top of each, covering the top, multi-ply cross section to make the drawers appear to be solid cherry. Back at the table saw, he sliced off a corresponding

The rouged pieces are stacked for inspection before the shelf-and-drawer combinations are attached. The design of this top was scrapped in favor of a simpler, four-part inlay that displayed the grain to best advantage.

thickness from the bottom of the drawers so they would fit back into their openings. Using another industry-standard method, Emory edge-banded the drawer sides with glue-backed veneer from a roll, heated the top surface to melt the glue into the plywood, and filed the excess away.

At this point, the outward sides of the drawer fronts and the main body of the casework sections were still without their top layer of cherry veneer. Emory put each casework section back on the vacuum form, with its cookie-cutter drawer fronts taped in place from the rear.

"I didn't realize at first," Emory recalls, "that the outside veneer wouldn't flatten unless there was something more than the bag holding it tight against the layer beneath. For the final ply on the casework shapes, we laid an unglued layer of bendable to press the top veneer flat. Once that set, I cut through the veneer with a utility knife to free the drawer fronts, and cleaned the edges up with a flush trim router, thus leaving the edges of the drawer-front edge veneer covered by the drawer front layer."

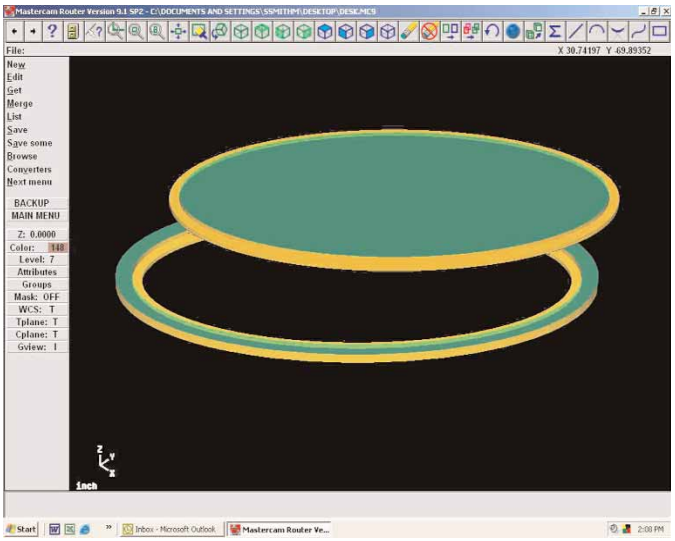
An inside job

Once again using the basic ellipse geometry, Emory cut three 3/4" plywood pieces to the horizontal cross-section of each desk end, offsetting the toolpath by the thickness of the composite around the curve. They also left space inward from the front edges of the kneehole sides for the inset of a finishing flat panel.

The uppermost of these pieces is flush with the top of the desk-end and will be used to anchor the desktop to the desk ends. The remaining two sit just below each of the two drawer bottoms on either side. These will accept the Blum Hardware bottom-mount drawer-slide hardware. All of these pieces provide structural integrity for the desk-ends, resulting in a rigid base for the desktop.

Emory next cut already veneered flat pieces, edge-trimmed to the interior parabolic shape, to cap the ends of the parabolas to finish the kneehole sides of the bases. Using another researched furniture industry practice, he

Early on, Emory laid out tentative shapes until he found the proportions for the ellipse he liked best. This is the selection we see in production.



The quality of fine joinery is built into the tabletop by creating the geometry applied to forming the transition ring and the outside curve of the central segments from the outer ring. Routed to the exact curve at the joining line, first the transition curve, then the segments, are shaved .005" at a time until they press-fit into a sturdy assembly.

inset these end caps past the desk-end edges. With the interior and edges of the parabolas veneered, all still appear to be solid cherry, with the addition of the eye-appealing enrichment of quality-enhancing detail.

Topping it off

Emory's design for the elliptical desktop called for a dual approach: a cherry outer oval ring, to appear solid; a band of maple as a visual transition and to reinforce the elliptical major design element; and an inner, concentric section — the main area of the desktop — in quadrants ending with the inner curve of the solid maple transition ring. For appearance and durability, Emory created toolpaths for a series of roughed solid cherry pieces butt end-to-end and extending beyond the width of the outer ring geometry. He used the Thermwood with Mastercam accuracy to ensure that the four joints were as nearly perfect — and, thus, as strong — as possible. Once cut out, the segments were dowelled-and-glued together. The maple transition ring was produced in much the same way. Wayne Sutter of **Woodline USA** (*www.woodbits.com*) donated router bits for the project; additional CNC tooling

CAM/CNC accuracy resulted in the perfect fit of all pieces. Note the maple accent band in contrast to the solid cherry outer ring and the central segments, also in cherry.

Emory is one proud technician and craftsman as he shows off his completed Art Deco desk. Look for it in five more years with a nameplate on it and a workstation behind it.

came from **Onsrud Cutter** (*www.plasticrouting.com*) through Jim Servis.

The center four wedges of quarter-sawn 1/32" Pacific madrone veneer were also CNC-cut and mounted on a 3/4" + 3/4" plywood sandwich — and the entire 1-1/2" thick assembly milled, associatively using the original geometry, to the exact inner curve of the solid cherry ellipse. "We then began to shave the madrone-veneer oval .005" at a time until it made a tight press fit within the maple band," Mr. Smith continues, "which occurred after six passes."

Emory picks up: "I surface sanded the completed outer ring piece for a true plane surface; then finally milled it from the back with another Mastercam toolpath to 1- 1/2" thickness. Now this 60-pound assembly was almost as solid as a single piece, due greatly to the toolpath accuracy and reference points from Mastercam. Screwing it on through the top casework shelf and adding the drawer pulls were was simplest parts of the project."

Buying boxes, making them their own

As many in the industry do, Mr. Smith purchased four ready-made maple drawers of the correct width and depth. They were considerably longer than needed to leave stock to conform at the front to the already formed curved drawer fronts. The remainder was cut away consistent with the front profile, an industry technique Emory gleaned from networking among manufacturers' representatives.

Emory used the drawer fronts as jigs for the inner drawer box fronts that would join the box to the veneered outer faces. The box fronts were also vacuum formed as a

maple veneer laminate with solid pieces of maple on top to make them appear solid. Once a curved piece was placed inside the box, Emory coarsely trimmed the sides on a band saw and then used the trim router to flush them and the drawer bottom as well. He glued and screwed the box front from the sides and bottom, covering the holes with dowel plugs.

Finishing up

After final touch-up sanding with abrasives donated by **National Detroit**'s Gary Swanson (*www.nationaldetroit.com*) and Robert Newman of **Mirka Abrasives, Inc.,** Twinsburg, Ohio (*www.mirka-usa.com*), Emory finished the desk with Valspar™ Facette®, a pre-catalyzed lacquer finish, "harder than normal lacquer but not as hard as varnish," according to Mr. Smith. Emory used two coats on the desk sides and three coats for the top. **Paints and Solvents** of Arthur, Illinois donated the lacquer to the project. The proprietor, Stan Sanner, is a member of Shiloh High School's Advisory Council, which helps generate direction, support, and ownership among the school, and community and industry leaders.

But the real finish to the story is Emory's plan to save his unique desk for "the big office I'm going to have some day." Some day may not be too far off for Emory Luth. He is working toward a WoodLINKS scholarship and has been accepted to the University of Illinois College of Engineering, considered to be the fourth-ranked program in the country — and he is on the waiting list at MIT.

"I'm going to study Mechanical Engineering and," Emory hopes, "become involved in designing machinery and workflow patterns for woodworking factories. I'm also working on getting an internship at Thermwood®, either now or after a year in college. But any way my career goes, I intend to 'pay it forward' for the experiences and professional insider tips I've received through work on this project, and for the contact with the people I have met from a lot of really great companies through the AWFS events. I also have a tough yardstick to measure

Once instructor Mark Smith learned the techniques, Shiloh tech students helped upgrade and equip their lab by producing and installing professional-grade cabinetry for family, friends and others who had seen their work. The DeWitts stand in their new "*Cabinets by Shiloh*" kitchen, with different views of the complex job at the four corners.

my own willingness to help students, when my time comes; Mark Smith, a mentor in all of the best senses of the word — teacher, friend, example, coworker, coach — will be a tough act to follow."

Still on the rise

As we learned in *Ties Magazine* last December, Mr. Smith and his students, with the proactive support of school, administration and industry partners, created a first-rate, wood-based Industrial Technology facility from a rusty, dusty relic. Today, Shiloh sends many students like Emory out as interns in industry; places some graduates into production-grade jobs; and sends others into post-secondary and college to study in fields ranging from design engineering to computer-animated graphics.

From the beginning Mr.Smith felt that, "Over time, the school would be proud of our students and they would serve as examples to the community of what our young people could do when given across-the-board support. I truly believe that if we can help adolescent students — kids at a very vulnerable stage in their lifetime development — gain confidence and feelings of self-worth from patently obvious results, we will have given them a gift for life."

CNC Software, Inc./Mastercam

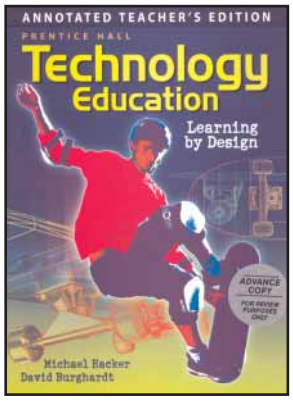
can be reached at
(800) 275-6226 or
(253) 858-6677- 5717
Wollochet Drive NW
Gig Harbor, WA 98335
http://www.mastercamedu.com

David Millson,
editorial consultant to CNC Software, Inc./Mastercam, works from his home in New Haven, VT as a free-lance journalist and advertising copywriter.

Mark Smith
is the Industrial Technology WoodLINKS teacher at Shiloh High School, Hume, Illinois.

LITERATURE showcase

These fine suppliers of educational materials are offering **FREE** brochures and catalogs about their products. Check out their websites or call for information and or materials.



Technology Education: Learning by Design

Michael Hacker and David Burghardt (Prentice Hall)

Technology Education: Learning by Design by Michael Hacker and David Burghardt (Prentice Hall) is an exploratory course in technology systems and design. It is the first middle school program based on the standards for technological literacy. The text integrates math and science skills, key to completing design projects and developing technological literacy. The textbook's striking visuals are sure to appeal to middle school students.

Technology Education: Learning by Design integrates a unique Informed Design approach to design projects. Rejecting trial-and-error methods, the Informed Design approach is based on research, presentation and critique of project ideas, and refinement of project plans.

Each chapter in *Technology Education: Learning by Design* contains a "How Technology Works" feature that is linked to an engaging, 3-D Web activity that brings technological concepts to life.

The program also includes a Student Activity Workbook, Annotated Teacher's Edition, Teacher's Resource Binder, computerized Test Bank, and Timeline poster.

Ideate* with confidence. Take a weekly Inventamin.™

BY CAL HALLIBURTON

In May 2001, I completed my 34th year of teaching technology to eighth grade students. During the last few years of my career I was seeking methods to improve the problem solving abilities of my students. I investigated and implemented several problem-solving approaches in my classroom and sometimes I saw a modest improvement in student ability. I also provided my students with simulated business experiences to encourage them to become entrepreneurs. In my quest for improvement, I discovered TRIZ (a Russian acronym for the Theory of Inventive Problem Solving) and Ideation International. Ideation International is a company that consults on difficult problems and teaches TRIZ primarily to engineers in industry. Together we developed a program called Entrepreneur's Grow on TRIZ. It combines the Theory of Inventive Problem Solving and entrepreneurial education in a unique and powerful way.

*TRIZ a Russian acronym for the Theory of Inventive Problem Solving.

the WOW factor

ENTREPRENEUR'S GROW ON TRIZ HAS TWO OBJECTIVES:

- For students to learn a new, effective method of thinking and making decisions and
- To excite and motivate students with the possibility of learning the Theory of Inventive Problem Solving (TRIZ) and becoming entrepreneurs themselves.

TAKE A WEEKLY INVENTAMIN!

Entrepreneur's Grow on TRIZ provides an organized system of thinking that supports a young person's openness to new things. It appeals to their sense of possibility, provides the methods and tools to guide their thinking, and demonstrates respect for what they are capable of accomplishing. It structures an environment that encourages them to explore their own thinking and supports them as they ask their own questions and test their own possibilities.

WHAT IS TRIZ?

In 1946, Genrich Altshuller began developing TRIZ in what was then the Soviet Union. It was virtually unknown outside the Soviet Eastern Block until the 1990 fall of the Soviet Union, and the subsequent immigration of many scientists and engineers to Israel, Western Europe, and the United States. TRIZ is currently being used in business and industry in a variety of applications and is now being introduced to education. While most creative methods are based in psychology, the foundation of TRIZ is in technology and is based on research of the patent literature. Currently more than 3 million patents have been researched to develop the principles and inventive recommendations contained in the TRIZ tools, methods, and body of knowledge.

Altshuller extracted several principles from his study of patents.

1. A clear definition of an inventive problem
2. Levels of inventiveness
3. Patterns of Invention
4. Patterns of Technological Evolution
5. Numerous standard solutions
6. Numerous inventive recommendations
7. Special procedures for modeling and solving inventive problems

WHAT ARE THE TRIZ CONCEPTS WE TEACH OUR STUDENTS?

The TRIZ knowledge base is extensive and time is finitely limited by school schedules so we are able to teach only a few key concepts at a time. The concepts introduced by the Entrepreneurs Grow on TRIZ program are:

- Function—focusing on the function or purpose of the product instead of its name
- Ideality—using "invisible" resources
- Contradiction—overcoming contradictions by using four separation principles
- System Approach—sequentially viewing all aspects of the problem

THE PROGRAM

At Ames Middle School, the first two phases of the program took place over a two-week period. During that time there were four hours of instruction and sixteen hours of available student work time. At the end of the two weeks, thirty-five students in thirteen teams produced eighteen new products of which six were immediately marketable and two could have been patented. The level of learning was high, the products were excellent, and twenty percent of the participants worked to continue and establish a real business. Today eight students own Swivel Ideas, LLC, a company devoted to the manufacture and marketing of their products. Their first product, The Chill Chaser blanket, is now being marketed. I asked one of the student participants, "What word would you use to describe this program?" Without hesitation she said, "I don't know what the word is, but it means fun, exciting, challenging, and creative." The results of Entrepreneurs Grow on TRIZ exceeded my greatest expectations. Tom Peters, international business speaker and consultant, calls this sort of result, “Wow!”

I have now replicated the program eight times in six different schools with excellent results. Experience has shown that providing even a few of the basic concepts of TRIZ aids students in their inventive endeavors. TRIZ books and learning materials for education are currently being written for middle school students ages eleven to fifteen. You can obtain more information about TRIZ and the Entrepreneur's Grow on TRIZ program at these web sites:

Halliburton Associates, LLC
www.halliburtonassociates.com

Ideation International, Inc.
www.ideationtriz.com

Swivel Ideas, LLC
www.swivelideas.com

The Chill Chaser

Following a successful seminar we were challenged to become real entrepreneurs. We worked through the second semester of our eighth grade year and through the summer to create our company.

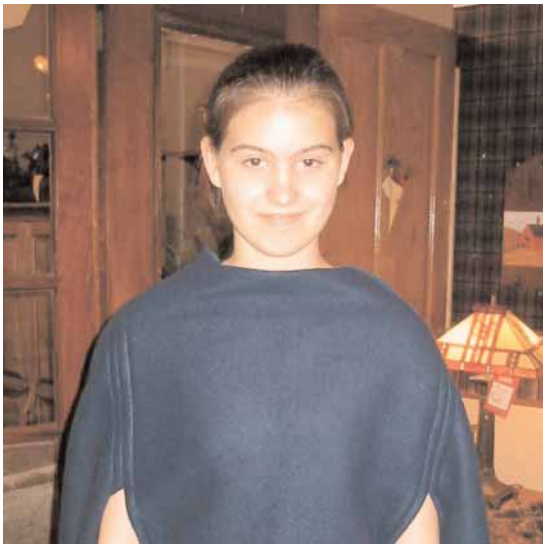
Features:

- **Approximately 58-60 inches square**
- **Scooped neck**
- **Slits for arms**
- **Soft, warm fleece**
- **Light weight**
- **Attractive navy blue color**
- **Larger than most lap blankets**

Great for reading in bed or for reading or watching TV in the recliner It keeps you covered and your hands free to hold a book or remote.

We released our first product, the **Chill Chaser**, June 20, 2002, and we plan for more products to hit the market soon. Keep your eyes open for innovative products from our unique company!

Since our beginning we have traveled on business trips, made presentations to schools, presented to the International TRIZ Conference and worked to prepare our inventions as products for the marketplace.



Inventamin.

Transform an Object's Shape

Consider changing the shape or form of an object by replacing an element with one of greater mechanical strength or changing its shape to increase its strength. Make use of ribs, corrugations, double-T shapes, channels, box constructions, etc. Make use of rounds where there are squares or vice versa. Make use of dents where it is flat, etc.

Examples:

- Roofing material made from metal or fiberglass is often corrugated to increase its strength.
- Cardboard is strengthened with corrugated material.
- Angle iron, pipe, or hollow square tube is stronger in multiple directions than a flat piece of equivalent material.
- A round pen rolls off of the desk. Change it's shape to make it square or make one side flat.
- A cup that is wide at the top and narrow at the bottom tips over easily. Change the shape to wide at the bottom and narrow at the top.

Practice

Your Examples:

What examples can you find of where this Inventamin™ has been used? Search for how or where the recommendation "Transform an Object's Shape" might be used to improve or strengthen something.

Identify non-technical applications of where shape adds strength to the material. Identify natural applications where " Transform an Object's Shape " might have occurred.

HINT: When working with a recommendation the objective is to use it as one possible pathway to solving a problem. A recommendation is also a resource to help you solve a problem. The use of resources is important to solving inventive problems. When working to solve an inventive problem we would like to find an "ideal" solution. The ideal solution means that everything remains the same, nothing changes, and the problem is solved. Rarely is this ever achieved, but it should be the innovator's objective. Resources (substances, energy, functions, information, space, time, etc.) that exist within the system are what we use to move toward the ideal goal. Understanding and revealing resources in your system helps you apply recommendations (Inventamins™), and provides a means for looking at the system in more detail. Some people do this naturally — but most people need some guidance. People who are great innovators or who have the ability to apply the Theory of Inventive Problem Solving, TRIZ, have mastered the art of revealing resources and recombining them in new ways to achieve innovative results.

Lesson:

Think about what people see when they are looking to "Transform an Object's Shape." Select an object. Look at it. Think about how "Transform an Object's Shape" could be used to improve or strengthen it. List several possible ways and write them down or draw them. Even those ideas that seem silly could turn out to be useful. Discuss your ideas with your partner or the class. Display drawings of your examples. Bring examples to share or display for the class.

How are people using Inventamins™?

- Teachers are using them as innovation/creative homework assignments, enrichment, or enhancement exercises to provide weekly stimulation of student thinking
- Friends are sharing them with friends
- Parents are sharing them with children
- And adults in all walks of life are using them to stimulate their own thinking

Teacher Suggestions:

Use of the weekly Inventamin™ will vary considerably from teacher to teacher. Some prefer to use them in brief lessons at a regular time during the week. Some prefer to use them to fill in the end of a class. Some like to use them as a problem of the week to be posted on Monday and discussed on Friday. Some like to use them as homework assignments or enhancement and extra credit opportunities. A teacher's creative use of the inventive recommendation may also shape the lesson—How would you use the Inventamin in your classroom?

Additional Information

What Is a TRIZ?

TRIZ, (*pronounced as trees*) is a Russian acronym for the Theory of Inventive Problem Solving. It is a problem-

*I·de·ate to form an idea, imagine or conceive

Webster's New World Dictionary

solving method that is based on technology rather than psychology. In 1946, Genrich Altshuller, a Russian inventor, determined that the process of inventing could be significantly enhanced with a system that provided:

- A systematic step-by-step procedure
- Guidance through the solution space to the area of the best solutions
- Reliable and repeatable results
- Access to the knowledge contained in patents
- Access to the accumulation of human innovation experience

As the TRIZ knowledge base grew, rigorous analysis revealed an objective, verifiable set of patterns and regularities related to the evolution of technological systems. What began as a powerful set of problem-solving tools has evolved into a true science of innovation. Inventamins™ are developed from the knowledge and analytical tools of TRIZ.

Invitation to subscribe to Inventamins™

Subscribe to Inventamins™ by contacting Cal Halliburton at his e-mail address below. Each week, you'll receive another Inventamin™ and an opportunity to practice using it.

You can learn more about TRIZ at: *www.ideationtriz.com*

And you can contact Cal to subscribe to Inventamins™ at *CalH42@aol.com* or visit his web site at *www.halliburtonassociates.com*

You can learn more about TRIZ from Ideation International at: www.ideationtriz.com

Ideation International provides publications, software, and analytical and consulting services for the application of Ideation-TRIZ (ITRIZ) to business and industry. New products for K-16 education are being developed and are becoming available at their web site.

Cal Halliburton

taught at Ames Middle School and Ames Hight School in Ames, Iowa for thirty-four years. In addition to working with Ideation International, he teaches teachers through Drake University, has his own business, and develops materials and promotes the use of the Theory of Constraints (TOC) thinking processes in schools.

IWITTS Has Two WomenTech Train-the-Trainer Workshops Coming Up Soon!

July 12 & 13 in Boston and August 9 & 10 in San Francisco.
womentechstore.org/womentech/wtschedule.html

Strategies that work! Learn "How To" Recruit & Retain Women and Girls in the Technology Classroom this semester and train others. Directly from the nation's expert on preparing women and girls for technology careers. Donna Milgram, Executive Director of IWITTS, conducts her fast-paced interactive workshop for technology instructors, school-to-career coordinators, counselors, school administrators and equity coordinators. The woman behind the WomenTech Project, *WomenTechWorld.org*, and IWITTS's role in the Cisco Gender Initiative.

The WomenTech Training is based on best practices, is solutions oriented, and our participants say that it's even a lot of fun for both male and female educators. Develop a plan for recruiting women to your traditionally male-dominated classes that you can put to use right away. Both high school and community college recruitment strategies. Work through case studies with your colleagues on retention problems that arise in classes where the number of female students is small. Help female students withstand negative peer pressure and connect with female role models. In-depth module on recruiting women to IT (Information Technology).

Boston Workshop
http://www.womentechstore.com/edtr0330704.html

San Francisco Workshop
http://www.womentechstore.com/edtr0260804.html

> *"The best part of this WomenTech training was the abundance of solutions and recommendations to address the problems we face in the classroom and the workplace."*
>
> Charnell B. Slaughter
> Outreach Coordinator
> Puget Sound Center for Teaching and Learning Technology
> Bothell, Washington

ROBONEXUS

RoboNexus is the international consumer, educational and business development event for personal, service and mobile robotics (*http://www.robonexus.com*). The conference and exposition will be held at the **Santa Clara Convention Center, Santa Clara, CA on October 21-23, 2004**.

The robotics market is growing at a rapid pace in both consumer and industrial applications and RoboNexus provides a unique chance for people to see and learn about the robots of today and tomorrow.

RoboNexus is expected to draw over 15,000 attendees, making RoboNexus the largest robotics event held in North America.

The RoboNexus education and instruction event will be on October 22, 2004 and will address the outstanding issues related to the use of robotics as educational instruments and provide an overview of the full range of educationally focused robotics applications, as well as robotic platforms, projects and competitions designed specifically as educational tools.

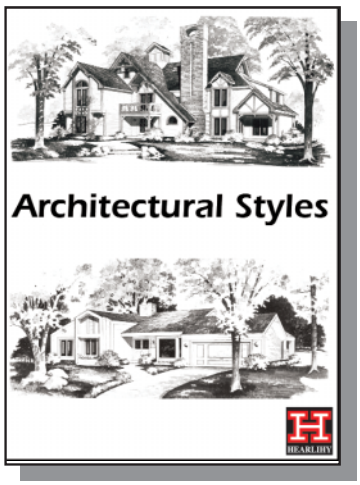
Examples of the educational robotics connections include:

- Sony Aibo and Lego Mindstorms as Educational Tools
- Kit and Contests
- Teacher Training
- Robotics labs
- Trends in Educational Robotics
- Team Development and Project Management
- Selecting A Research Robot
- Adding Robotics to a School Curriculum
- Educational Robotics Platforms
- Open Source Software
- Robotics in the Classroom

In October 2003, Robotics Trends Publishing launched *http://www.roboticstrends.com*, an online magazine serving the robotics industry. For teachers and students, it is an excellent source of information on the most current technology.

A Visual Aid to `Architectural Styles'

Book describes 45 residential architectural styles found in U.S.



From quaint Cotswalt cottages of eleventh-century England to minimally ornamented American contemporary structures, *Architectural Styles* presents the historic and modern characteristics of 45 major residential architectural styles found in the United States.

Scores of architectural renderings and labeled line drawings illustrate the primary features of each style and show how most houses borrow characteristics from several different styles to achieve a new eclectic design. A variety of curious facts about early housing styles – such as the original purpose of Dutch doors and how the Southern Pacific Railroad influenced architecture in the American southwest – makes this a memorable introduction to the art of residential design.

Architectural Styles helps students recognize and acquire the vocabulary to describe key characteristics of major architectural styles, their geographic origins, and approximate date of development. And, students lear the original, very practical reasons for many of the architectural features they see in houses every day.

The 38-page, spiral-bound book includes an overview of primitive shelters and early Greek and Roman architecture as well as an illustrated glossary of key architectural terms.

To learn more about this and other Hearlihy drafting products and resources, visit *www. hearlihy.com* and request a free catalog.

TSA Does NOT End After High School:

Consider Your Role As An Alumni, Judge, Mentor Or Technology Educator The TECHknow Project is Creating Lessons Emphasizing Science, Technology, Engineering and Math

BY LYNSEY STUART, NATIONAL TSA REPORTER

How many times have you been stopped and asked what in the world is TSA and what does it mean to be a TSA member? You've probably been asked that question more than a dozen times, and each of us has his or her own answer. But what does it really mean to be a TSA member and what opportunities do you have after graduating to stay involved in TSA?

Being a TSA member means a variety of things. First, it means you are a part of the fastest growing student organization and one of about 200,000 members in 47 states and two countries. But that's just a snapshot. For some, being a member means participating as a strong competitor, always geared up for conference. For others, being a TSA member is all about service, active in TSA's service partnership. Many TSA members define their membership through leadership and the many roles they play and grow in leadership. Somer serve as chapter officers, others are national officers. Most TSA members, however, embody all three of these definitions of being a member: they are strong competitors, loyal service participants, and active leaders.

But what happens after you graduate and you are no longer a member who competes; is there anything you can do to stay involved with TSA? The answer is YES! You can be an active alumni helping local chapters; judging events; and serve as a mentor for TSA members. You can even become an advisor by majoring in technology education and starting your own TSA chapter. No matter what, there is always a way to stay involved in TSA, continue to be a TSA member, and craft your own definition of what it means to be involved in TSA.

Make A Plan For Change

Learn How To Make A Difference In TSA

BY GEORGIA VARLAN, NATIONAL TSA SECRETARY

In and outside of TSA, people often talk about ways to make a difference and affect positive change. As National Officers, we talk a lot about running for office as a way to bring change. In addition to this, though, there are other ways to cause positive change in TSA. One way is something that any TSA member can do: propose business at our annual business meeting nationals. If you feel that something in TSA needs to be changed, then proposing a resolution to be debated is one way to have your issue heard. Amendments to the TSA bylaws, the governing document of our association, can also be submitted for discussion. Unlike regular resolutions, all proposed amendments must be submitted in writing to the President of TSA, Inc. at least 90 days prior to the business meeting.

If you have ideas on how to improve competitive events, then you can submit suggestions and opinions to the Competition Regulations Committee. This group of people helps publish our events guide and coordinate all of the events at nationals. Student ideas in the past have helped to change event guidelines and even create totally new events. You can find ways to contact members of this committee on the TSA website.

So, the next time that you have an idea on how you could change TSA for the better, don't just think about it — act on it! Whether you submit a resolution, make a bylaw amendment, or campaign for new event rules, take advantage of the opportunities that we— the members — have to make a difference in our association.

Ever Considered Becoming An Astronaut? TSA Helps Lay The Foundation

BY BRANDON WALTERS
NATIONAL TSA SERGEANT-AT-ARMS

The National TSA Officer Team attended the International Technology Education Association's conference from March 17-20 where we interacted with technology-industry leaders. One meeting, with a National Aeronautics Space Administration (NASA) representative, was most memorable. Our conversation led to my asking, "How do TSA competitions help train future astronauts?" As I browsed through the TSA Competitive Events Guides and the Information Directory while in my hotel room, I found that the answer was complex. These are just some TSA competitions that help prepare future astronauts:

Agriculture and Biotechnology: Many space shuttle missions have to do with the effects of space on different plants and items that are genetically modified.

Computer Systems and Troubleshooting: In astronaut training, much time is devoted to troubleshooting computer problems that might occur during space flight.

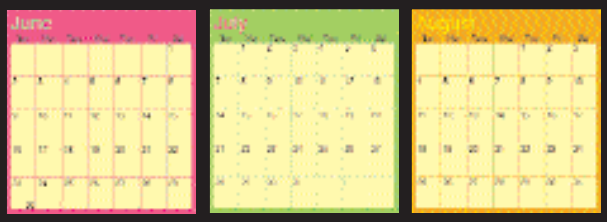
Flight Endurance/Flight Challenge: This competition shows the elementary principles behind any form of air flight, including gravity and force. People interested in flight must know these subjects.

Prepared Presentation: Many astronauts give presentations at schools and community events.

R/C Transportation: Astronauts use robots for many tasks. They often retrieve satellites, fix telescopes and do numerous other tasks with robots on missions.

TSA does lay the foundation for many future astronauts, as well as almost any other career choice. As our mission states, we strive to "prepare our membership for the challenges of a dynamic world by promoting technological literacy, leadership and problem solving, resulting in personal growth and opportunities." We, in TSA, look to the future by teaching students valuable life lessons, as well as instructing our members on the importance of "learning to live in a technical world."

scan



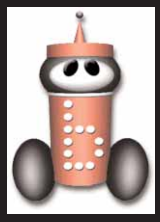
A calendar of professional meetings, conferences, & conventions

To help you organize your travel for the coming year:

June 20-24, 2004

25TH ANNUAL NATIONAL TSA CONFERENCE
Gaylord Opryland Resort and Convention Center, Nashville, Tennessee
For information or registration details call 703-830-9000.

July 25-29, 2004



NATIONAL CONFERENCE ON EDUCATIONAL ROBOTICS and the **BOTBALL 2004 NATIONAL TOURNAMENT** are tentatively scheduled to coincide with the American Association for Artificial Intelligence Conference in San Jose, CA, ***www.botball.org***

April 3-5, 2005

The **67TH ANNUAL ITEA CONFERENCE AND EXHIBITION** will be held in Kansas City, MO. The conference theme is "*Preparing the Next Generation for Technological Literacy.*" If you are interested in becoming a presenter at the Kansas City conference, the presenter application form is available on the ITEA website at ***www.iteawww.org/D2.html.*** **DON'T DELAY - THE APPLICATION DEADLINE IS JUNE 15, 2004!**

TSA CORNER

Nashville, Tennessee, is the site of the 26th annual National TSA Conference, so come prepared for the challenge and time of your life.

Tennessee TSA will host the conference in Nashville from June 20-24, at the Gaylord Opryland Resort and Convention Center.

Check out the newly released Conference Information Booklet for registration details. Most information can be found on the TSA website at www.tsaweb.org. Click on the Conferences & Programs tab on the upper left side, then on National Conferences, then 2004. Conference Registration and Competitive Events Forms can be downloaded in PDF format. For the hotel's website, click on the Gaylord Opryland link. Make the most out of your conference experience.

Planting The Seeds For A Successful Career Starts With Your TSA Involvement

BY AMY GRONER, NATIONAL TSA PRESIDENT

Architect, computer programmer, engineer: These are all careers that most people assume the members of the Technology Student Association are preparing for. Little do they know that news anchor, pharmacist, pilot, politician, doctor, lawyer and every other field could be added to that list. No matter what your career interests are, TSA is the place for you to begin your journey.

Traveling across the country, competing in events, and running for leadership positions are opportunities that are instilling each of us with essential tools for success. Not only does TSA teach us about communication, transportation, construction, manufacturing, and bio-related technologies, we are also learning abstract skills. The problem solving it takes to transport a Rube Goldberg device from Atlanta to Denver should not be underestimated. The ability to step on stage in front of hundreds of your peers and give a speech requires a skill not found in everyone. The two hours needed to build a balsa-wood bridge demonstrates immense determination. All of these are pre-requisites for many of today's careers.

Just as our mission statement promises, TSA is "preparing us for the challenges of a dynamic world by promoting technological literacy, leadership and problem solving, resulting in personal growth and opportunities." Be sure to take advantage of opportunities offered within TSA. No matter what career you choose tomorrow, one day, you will reflect back on your TSA experiences as "the good old days."