

# Getting It\* Done

With

# CACT

**Centers for  
Applied  
Competitive  
Technologies**

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NUMBER **5**

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## Optical Instrument Design Course

A series of three courses for Optical Instrument Design was started in 2007 by the Center for Applied Competitive Technologies in Irvine, CA. The center is partnered with the Advanced Technology & Education Park, an emerging campus of the South Orange County Community College District, and the Optical Society of Southern California, the local section of the Optical Society of America.



*First Lens Design graduates with instructor Valentina Doushkina (front row, second from left).*

Lens Design, Optical System Design and Opto-Mechanical System Design are three sequential courses that offer hands-on training in the design of optical instruments. CACT's series of courses is unique because it provides practical education and design experience for students in the optics industry as well as students with different technical backgrounds.

It is rare to find a person skilled in both optical and opto-mechanical engineering, a growing demand of the industry, especially for small companies and start-ups in optics and photonics. The courses use state-of-the-art optical and mechanical design tools like Zemax™ and 3D SolidWorks™.

The first course is an introductory hands-on lens design course which provides manual design, design code, and design philosophy. The second course covers advanced optical systems design and analysis. The third course covers opto-mechanical systems design and integrates the optics with mechanical systems. From this course series, students learn that optical instruments are the result of successful integration of optical and mechanical designs derived from given specifications.

These courses and the other optics and photonics courses at the Irvine CACT have been developed and implemented to fill the growing needs of local optics companies and companies using optics. The hands-on design series was presented to technology educators by CACT instructors Valentina Doushkina and Donn Silberman at the SPIE annual conference "Optics+Photonics" on August 28 in San Diego, CA.



### \*Business Solutions & Workforce Training

*Delivered Through  
Community Colleges  
and Their Partners*

Initiatives of  
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- Advanced Transportation,  
Technology & Energy
- Applied Biological Technologies
- Performance Improvement
- Environment, Health, Safety  
and Homeland Security
- Health Care
- Multimedia & Entertainment
- Applied Competitive Technologies
- International Trade
- Small Business Development
- Workplace Learning

Administrator, Kay Ferrier  
Dean, Economic Development  
State Chancellor's Office



# Sierra College Success Stories

## CCFS: Partnering to Produce Engineers

The San Francisco Center for Applied Competitive Technologies (SF-CACT) launched a new partnership with the San Francisco Unified School District to build a new pre-engineering pathway at Washington and Burton High Schools. Funded mainly through a partnership with the San Diego CACT using SB70 funds, the SFCACT, the S.F. Unified Office of School-to-Career and teams of teachers and counselors have adopted the use of a rigorous pre-engineering curricula developed by the national non-profit organization, Project Lead the Way. This Quick Start funding enabled SFCACT to furnish training for participating teachers in the first course of the series, Introduction to Engineering Design.

In June of 2007, Burton High School was selected by the National Academy Foundation to become one of thirteen new Academies of Engineering in the nation. Academy general education teachers must contextualize their curriculum to align with the engineering coursework. NAF students remain as cohorts throughout their high school years with their team of specially trained teachers. This small learning community model has been successful in over 500 schools across the nation. Burton High was the only school in Northern California awarded Academy of Engineering status.

The National Academy Foundation with Project Lead the Way and the National Action Council for Minorities in Engineering, have embarked on an initiative to address the need for qualified engineers. According to the Bureau for Labor statistics, four of the top thirty fastest growing occupations through 2014 will be in engineering-related fields. Current trends show the supply of U.S. educated engineers is waning. Not enough students are graduating high school with sufficient math and science skills to meet the growing need.

Washington High School, although not selected to be an official Academy of Engineering will work in parallel with Burton High School. They will mirror the Burton team in planning, collaboration, professional development, and implementation. The National Academy Foundation intends to name 110 Academies of Engineering across the nation by 2010; we anticipate that San Francisco's Washington High School will be selected.

## CACT Soldering Training updates 2Wire Team

2Wire (www.2Wire.com) provides global telecom carriers with broadband service platforms that enable an integrated triple play of networked data, voice and media services. For the past three consecutive years, the company has ranked on the Inc. 500 list of the fastest-growing private companies in the United States. With its corporate headquarters in San Jose, 2Wire also has nearly 50 employees based at its research and development facility in Nevada City.

2Wire sought out Sierra College CACT to provide state-of-the-art IPC 610 Standard RoHS compliant soldering training in order to increase reliability and meet the technical challenges of moving to lead-free component technology.

"The electronics industry is trending toward smaller components, more complicated package types, and lead-free soldering," said Lance Kesner, manager of engineering labs and technician services. "This training program helped us update our engineering rework skills and processes to keep pace with these trends."

Sierra College CACT tailored the course to focus on the key skills 2Wire needed, and delivered the material in less time than traditional IPC 610 Standard training.

The on-site course also eliminated travel costs and allowed for more participants. "Because Sierra College offered the training on-site, it was convenient for our research and development engineers to attend the program," said Kesner.

"Sierra College was extremely flexible, the course material was very relevant to our business, and the instructor fine-tuned the training based on our needs. On the whole, the training course was very well done."

## Abso refines Project Management

Abso (abso.com) services include hosting corporate career websites, talent management tools, background and drug screening services, a virtual end-to-end hiring solution. It delivers all the factual, up-to-date information required to make intelligent hiring decisions in the shortest possible timeframe at an affordable cost.

Based in Roseville, the fast growing company of 128 employees, has added new products for applicant tracking that require project management and on-going follow-up. "With teams of people working on projects, Abso needed a consistent system of tracking tasks, assignments, deadlines and completions, and training to use the project management system effectively," said LeAnn Filbrun, Abso's Training Manager.

Managers reported that that the training was very relevant to their work. "Everyone enjoyed going through the class," said Filbrun. "They

all gained more confidence in their project management skills. The training was very professional and everything met our expectations – quality, content and the instructor. It says a lot when an organization delivers what they promised, I'd recommend Sierra College's Training & Development program."

## South Placer Robotics Club makes semi-finals at UCD regional competition

On Friday and Saturday, March 29-30, high school students participating in the South Placer Robotics Club participated in the FIRST regional competition at UC Davis. The team is sponsored by the Sierra College CACT, Intel, NEC Electronics America Inc., and private donors. Over 40 teams



South Placer Robotics Club competes at FIRST semi-final competition held at UC Davis.

from the western United States – including representatives from California, Washington, Oregon, Montana and Arizona – were there to vie for a shot at winning and competing at the National competition in Atlanta. Much like a major sports event, spectators in the stands cheered, music played

nonstop, and teens and their mascots danced on the game floor.

South Placer's team, "Renovatio" and their entry "RunAway Runway" were selected to compete in the semi-finals on Saturday. Up against an alliance of three school teams that included the Northwest Regional Champions, the rounds were as follows: First round, WIN; Second round, TIE; Third round, LOSS; Fourth round, TIE (seven other alliance matches since concluded); Fifth round, LOSS.

For many students, it was the first time that they had applied mathematics, physics, design, communication and computer programming to something real, according to faculty advisor, Stephen Miller. "This is experiential learning in its truest



Students learn about circuits in Sierra College's June 2007 Ropeway Maintenance (Ski Lift Technician) training course.

form," said Miller. "As a result of being on the team, many of my former students have gone on to pursue engineering and technical careers."

## Sierra College CACT conducts process improvement training at Energy Absorption Systems, Inc.

In January and February 2007, the Sierra College Center for Applied Competitive Technologies (CACT) conducted customized process improvement training for 10 managers and supervisors at Energy Absorption Systems, Inc. (EAS) in Roseville, California. The company develops crash cushion impact protection for highway, work zones and railroad intersections.

It says a lot when an organization delivers what they promised.

—LeAnn Filbrun, ABR Industries

The 20-hour training focused on developing a system process map of current functional areas, a relationship process map showing 'who does what,' and a 'future state' map to institutionalize strategies for improving processes and outcomes. EAS has fully engaged the process improvement training tools and techniques, and has requested additional consultation by the CACT to help sustain their efforts.

## Workforce Development & Continuing Education Division conducts Ski Lift Technician Training

In partnership with the California Ski Industry Association and the Sierra College Business & Technology Division, three 40-hour courses for 59 lift operators, mechanics and operation managers was held June 18-29, 2007 at Sugar Bowl Ski Resort. This is the second year that Sierra College has conducted ski lift technician training for resort employers. Building on principles and practices of Sierra College's Mechatronics degree and certificate program, the Ropeway Mechatronics training program is the only training program of its kind in California.

## Sierra College Robotics Club hosts South Placer Robotics Club

On April 25, 2007, Sierra College's Robotics Club hosted high school students from the South Placer Robotics Club to share information and talk

about how the two groups can support each other. The South Placer team brought their 2007 FIRST robot entry to meeting, and the Sierra College team shared a design prototype of a robot that will be used in a June 2007 competition. The Computer Integrated Electronics and Computer Information Systems Departments are sponsoring the Sierra College Robotics Club, with Tony Osladil and Mike Dobeck as faculty advisors. The Sierra College Center for Applied Competitive Technologies (CACT) is supporting the South Placer Robotics Club. Granite Bay High School instructor Stephen Miller is the club's faculty advisor.



# Electricians Learning to Maintain

Responding to requests from manufacturing employers throughout the central San Joaquin Valley, Fresno City College's Center for Applied Competitive Technologies (CACT-Fresno) designed a 198-hour course to train prospective workers in the electrical, plumbing and other skills needed by entry-level technicians in the manufacturing industry. Initially piloted in Dinuba, California, the program enrolled 84 students and met with resounding success, which resulted in the immediate hiring of 59 program graduates.

Comments from class graduates indicated that the CACT-Fresno's Maintenance Technician training program gave them the chance to develop the skills that are important to employers. The pilot training in Dinuba provided training program graduates with the opportunity to earn a beginning wage of \$9.00 to \$12.00 per hour, with room for growth. The real reason for the

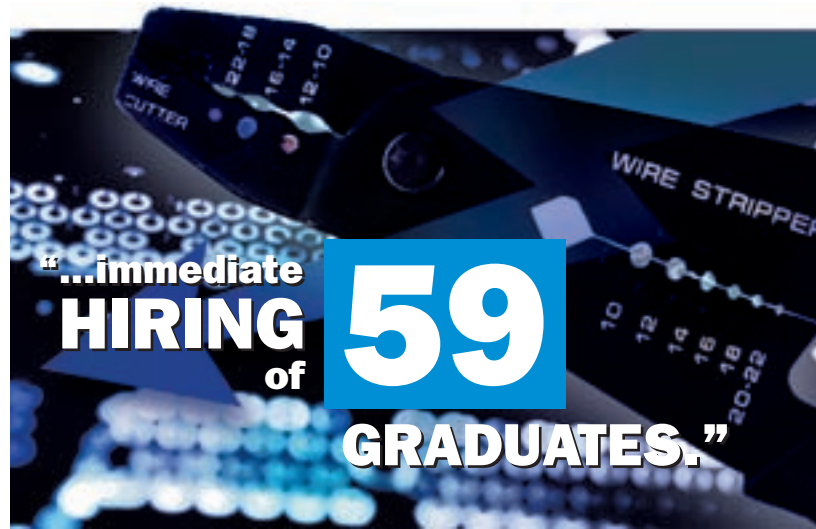
success of the CACT-Fresno's original pilot training program, however, came from its partnership between employer, training agent and local government. It is what Fresno City College's Center for Applied Competitive Technologies refers to as its training triangle of workforce success.

Expanding out from its initial experience in Dinuba, the CACT-Fresno has gone on to help initiate and replicate the Maintenance Technician Training Program throughout the San Joaquin Valley at Porterville College, West Hills Community College District, Taft College, the North College Center in Madera, Modesto College – other locations will follow. To date, more than 150 trainees have graduated from the community colleges operating the Maintenance Technician training program.

The replication of this program has also drawn the attention of the U.S.

Department of Labor's Employment and Job Training Administration as it approved a \$1.9 million grant with West Hills Community College District for a similar training project. Future

plans are being developed by the CACT-Fresno to replicate the training program with unique and specialized target populations and alternative sources of funding.



## LACC Engineering & Manufacturing

The Engineering Academy is for students in the 11th and 12th grade. The program allows students to explore engineering and manufacturing programs while in high school and encourages them to select engineering as a career choice. Students that complete the course will earn college credit that can be used as electives towards their engineering degree. After successfully completing the SolidWorks course, students are immediately enrolled in the Engineering Academy. The Engineering Academy runs for five consecutive Saturdays.

The Engineering Academy allows students to experience life as an engineer. Students will have the opportunity to conceptualize and design a project and compete against other teams. Projects will be manufactured on a state-of-the-art rapid prototyping machine. Members from industry will critique and judge the final project on the last day of class.

Students that finish the Engineering Academy are now considering engineering as a career choice. Establishing early career awareness is a vital link, since the engineering profession is experiencing a downward trend of enrollment in engineering schools.

**SolidWorks**

**EXPLORE**  
engineering &  
manufacturing

**EARN**  
college credit

**EXPERIENCE**  
**LIFE**  
as an engineer

**CONCEPTUALIZE**  
& **DESIGN**

**COMPETE**  
against other teams

## Riverside CACT Success Stories

### Riverside Community College District (RCCD) CACT Partners with Goodrich Aerostructures

Goodrich Aerostructures of Riverside competes in a highly specialized, rapidly advancing, and technologically innovative marketplace. A new investment in state-of-the-art equipment for their composite fabrication contracts uses digital controllers to direct multi-axis machines in the manufacture of structural elements for commercial and military contracts.

Many of Goodrich's veteran industrial maintenance personnel did not have knowledge or experience in the area of digital controllers, but past CNC machining training with RCCD's CACT encouraged a new partnership.

Goodrich's and CACT technical staffs teamed to develop and deliver a twenty-week program that covered topics such as digital electronics, electrical safety, hydraulics, pneumatics, mechanical systems and troubleshooting.

While the program prepared Goodrich's industrial maintenance technicians to maintain the newly arrived multi-million-dollar equipment, exposure to state-of-the-art equipment helps RCCD upgrade its technical curriculum to reflect current industry standards.

### RCCD's CACT and Contract Education Units Cover the Area's Training Needs

When one hears the term CACT, one immediately assumes high-tech training and consulting. The RCCD CACT does a great deal of that sort of assistance especially in areas such as CNC, Rapid Prototyping and Industrial Maintenance. However, the RCCD CACT and Contract Education units often find that the problems manufacturing firms face are much more human in nature.

Recent training programs which the CACT and Contract Education units collaborated on include Business Writing training to the Customer Service personnel of a high-performance automotive filter manufacturer; Basic Supervision training for production supervisors at a local window manufacturer in Spanish; and, training for a firm that was pursuing ISO-9000 registration.

The RCCD Contract Education unit involved the CACT because the clients needed instructors with strong manufacturing background who are familiar with the challenges of delivering a quality product on-time at minimal cost. Although the RCCD CACT is a technically advanced center, it retains credibility with local manufacturers as a source of practical training for the everyday problems that manufacturers face.

# Irvine: NSF Designates CACT Center of Excellence

The National Science Foundation has designated the Center for Applied Competitive Technologies (CACT) in Irvine as one of twelve chosen for the National Center for Optics and Photonics Education (OP-TEC), a National Science Foundation Center of Excellence. The center is partnered with the Advanced Technology & Education Park (ATEP), an emerging campus of the South Orange County Community College District.

The prestigious designation was awarded to twelve centers across the U.S. that have committed to increasing the pool of well-trained technicians in optics and photonics by creating a secondary-to-postsecondary "pipeline" of highly qualified and strongly motivated



Twelve centers will receive funding for four years from the National Science Foundation. Pictured with center representatives is Dr. Larry DeShazer, Irvine CACT Program Director (fifth from right).

students. The twelve centers will receive grant funding for four years from the National Science Foundation to create one and two-year postsecondary programs devoted specifically to lasers, optics, and photonics technology as well as high demand technologies that are enabled by optics

and photonics, such as biomedicine, manufacturing, information technology, and engineering.

Dr. Larry DeShazer, CACT's program director, has been working with the National Science Foundation for several years to earn the distinction. "It is an honor to be designated as

a National Photonics Center by the National Science Foundation. To be named a Center of Excellence confirms the advances we have made in the optics technician training program at the Center for Applied Competitive Technologies (CACT) in Irvine, California."

CACT operates under a grant from the Economic & Workforce Development Division of the California Community Colleges office in partnership with the Advanced Technology & Education Park (ATEP) and receives leading edge equipment and support from many industry leaders such as Newport Corporation, Northrop Grumman, Zygo Corporation, Schott Glass, OptoSigma and IBM San Jose.

## Centers for Applied Competitive Technologies

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### College of the Canyons

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