

PACE IN ACTION

Partners for the Advancement of Collaborative Engineering Education

FIRST/SECOND QUARTER 2003



PACE Breaks Into Europe, Expands in Canada and the U.S.

The PACE Program continues to grow as it has added four schools from around the globe to the strategically selected cadre of PACE Institutions. This brings the number of announced PACE Institutions to 22 with an overall contribution value of more than \$1.8 billion (U.S. currency) to date.

Purdue University (West Lafayette, IN) announced on September 26, 2002, that it received \$116.1 million worth of PACE hardware and software. This was the largest corporate gift in Purdue's history.

"This gift represents Purdue's collaborative relationships with key industry and high-



technology leaders," said University President Martin C. Jischke. "These relationships continue to grow and benefit our students, both in the classroom and in the workplace. We are grateful to our PACE Partners for their commitment to our students' education today and their employment tomorrow."

"The technology that PACE has donated represents the future of engineering and design," said Frank Colvin, former GM Vice President for Fuel Cell Activities and a Purdue grad. "Our industry demands that we move quickly and deliver unsurpassed quality, reliability and durability in every product we produce. By the time they graduate, these students will be among the most experienced and highly skilled graduates to enter the workforce. Companies such as ours will turn to them for innovative ideas and the know-how to deliver excellent products."



Frank Colvin, a Purdue University alumnus and General Motor's former vice president for fuel cell activities, announced an in-kind software gift to Purdue during the PACE news conference at the West Lafayette campus.



Dalhousie University (Halifax, Nova Scotia) announced on October 31, 2002, an educational contribution of \$61 million (Canadian), which is the largest in Dalhousie's history.

"Dalhousie has joined a growing international community of leading institutions participating in the PACE Program,"

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Partnering Globally With:



GM Supplier Discount Available to Employees of U.S. PACE Institutions

If you are an employee of a U.S. PACE Institution, you and the other faculty and staff of your institution are eligible for a "GM Supplier Discount" on GM vehicles. This discount is generally in addition to the other buyer incentives that are in effect at GM dealerships—e.g., "0" % interest financing, money-back incentives, etc.—that offer a great deal! With the GM Supplier Discount, each employee can purchase or lease up to two eligible new and unused GM vehicles per model year.

The process is simple and quick. You simply visit the Program Web site (www.gmsupplierdiscount.com) or call Program Headquarters at 1-800-960-3375. When you call, after a brief discussion with a representative, you will be mailed GM Form 1753 within three to five days. Take the form to your participating GM dealer and enjoy the savings. (You will be asked to mail a photocopy of your current pay stub or employee ID badge to: GM Supplier Discount Program HQ, P.O. Box 33085, Detroit, MI 48233-5085, to verify your employment status.)

The supplier discount is substantial. The amount of the supplier discount is predetermined and is listed on most dealer invoices.

Here is an example of the discount for the 2003 Chevrolet Impala 4-Door Sedan.

MSRP	\$21,290.00
GM Supplier Discount Price	\$19,671.27
Less Current eligible consumer cash incentives	– \$ 3,250*
GM Supplier Discount Program Price	\$16,421.27**

* \$2,000 cash back plus \$1,250 bonus cash offer effective through 1-2-03

** Tax, title, license and optional equipment are extra

The supplier discount applies to passenger cars, sport-utility vehicles (SUVs), minivans and light-duty trucks. Remember, GM has many nameplates that are available through this program:

- ◆ **Chevrolet**
(including Corvette)
- ◆ **Buick**
- ◆ **Cadillac**
- ◆ **GMC**
- ◆ **SAAB**
(has a different discount formula)
- ◆ **Pontiac**
- ◆ **Oldsmobile**
- ◆ **Saturn**



Visit the GM Supplier Discount Web site at www.gmsupplierdiscount.com for complete, up-to-date information on the program. □

PACE

Partners for the Advancement of Collaborative Engineering Education



PACE Gets a New Identity

Effective May 1, 2003, PACE will change the meaning behind the letters P-A-C-E. To reflect the growing importance of collaboration in the design and manufacturing process and the movement to next generation product life cycle management, PACE will now stand for "Partners for the Advancement of Collaborative Engineering Education."

This change will not affect the program in any way, but better reflects the mission of the organization and the work of its members. □

ADAMS Now a Product of MSC.Software



Starting in the year 2000, the ADAMS suite of software was a product supplied to PACE Institutions by Mechanical Dynamics, Inc. (MDI). In March 2002, MSC.Software acquired MDI. As a result, the

ADAMS products are now supplied by MSC.Software and are identified by a new name, MSC.ADAMS.

MSC.ADAMS is a virtual prototyping and motion simulation software that allows the user to model a mechanical system and mathematically simulate and visualize its 3-D motion and force behavior under real-world operating conditions.

For more information on MSC.ADAMS, check out www.mscsoftware.com or contact John Janevic at john.janevic@mscsoftware.com. □

ITESM-Toluca Students Help People Get Around

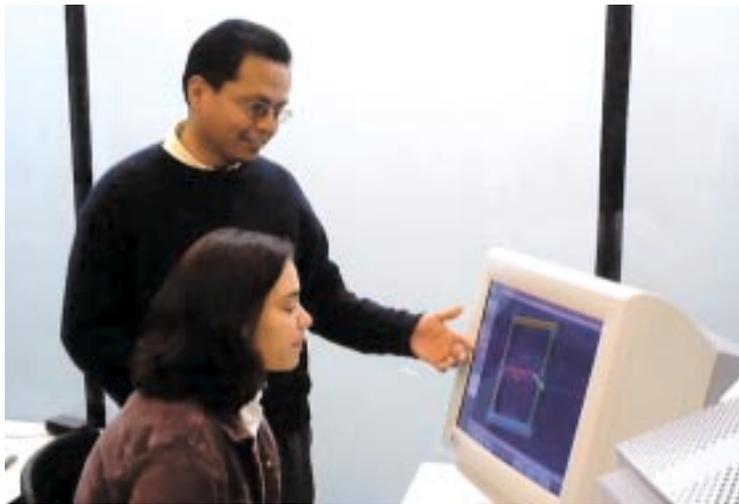
The Mechanical Engineering Department at ITESM-Toluca (Mexico) is facing a challenge. Students are working on a project to design an inexpensive car for use by people with physical disabilities in their lower extremities that prohibit them from using common vehicle controls.

“The idea is to provide a low-cost solution to the transportation problem of disabled people,” says Professor Gerardo Alducin, project coordinator. “Very few people here in Mexico can afford a fully equipped van that may cost more than \$30,000 (U.S. currency).”

The Opel Corsa, a very popular and economical car sold in Mexico under the Chevrolet brand name, was chosen as the project platform. The project involves the design and implementation of all the systems that may need modification.



Professor Alducin and team members (from left to right: Fernando de la Rosa, Manuel Castillo, Karem Cedillo, Abril Silva and María Elena López) working with the Chevy. The chassis was donated by General Motors de Mexico through the PACE Program.



Professor Gerardo Alducin with student Abril Silva working with MSC.ADAMS in the simulation of the team's design.

In the first stage, students in the CAD course are using Unigraphics to help model the parts of the chassis that will be needed for the design. Also, students in the course *Analysis and Design of Mechanisms* are working on the addition of a lift system for a wheelchair. Since there is no space inside the car to store the wheelchair, their solution is to secure it to the outside of the car. The mechanism should allow the driver to accomplish this with minimum effort, while positioned in the driver's seat.

To date, the students have identified various approaches and have begun initial development on several “best possibilities”—some with more success than others. “I think we all agree that it has been an interesting and valuable experience,” says Manuel Castillo. “Without Unigraphics and MSC.ADAMS, the development of the ideas would have been much more difficult,” asserts Abril Silva. Both Castillo and Silva are team members working on the project. □

2003 SIG List

PACE Special Interest Groups (SIGs) provide a forum for faculty information exchange and program research and development. Below is a list of the current SIGs and their respective leader. If you would like to join a SIG, contact the specified leader. Several SIGs are awaiting leader identification. If you are interested in becoming a leader for one of those SIGs, contact Elaine Chapman-Moore at elaine.chapman-moore@gm.com.

◆ 24/7 COLLABORATIVE ENGINEERING

Leader: Jan Helge Bøhn, Virginia Tech
E-mail bohn@vt.edu

◆ COURSEWARE

Leader: Steve Lambert, Waterloo
E-mail steve@uwaterloo.ca

◆ MANUFACTURING

Leader: TBD

◆ MECHANICAL SYSTEMS SOLUTIONS

Leader: TBD

◆ PRODUCT LIFE CYCLE MANAGEMENT

Leader: TBD

◆ SOFTWARE STANDARDS AND RELIABILITY

Leader: David Wallace, MIT
E-mail drwallac@mit.edu

(PACE Expansion—continued from page 1)

said Everett Anstey, Chairman of the Board at Sun Microsystems of Canada, Inc. "In today's global competitive marketplace, it is essential that students have access to industry-leading resources. The implementation of this computing infrastructure in Dalhousie's classrooms is the foundation of future innovation."

Dr. Tom Traves, President of Dalhousie University, exclaimed, "This is an historic day for Dalhousie. Not only is this the largest in-kind contribution that we have ever received, it is also one of the most significant in terms of its potential impact on our future."



(l-r) Tom Traves, President of Dalhousie University; Everett Anstey, Chairman of the Board, Sun Microsystems of Canada Inc.; Michael Grimaldi, President of General Motors of Canada; Fraser Nicholson, Vice President Atlantic, EDS Canada; Phil Taylor, President, EDS PLM Solutions Canada and Premier John Hamm activate the PACE "mighty mouse" during the media event at Dalhousie.



Brigham Young University (Provo, UT), the 21st PACE Institution to be announced, received an educational contribution with a commercial value of \$313.8 million. BYU was the first university to be accepted by PACE based upon the strength of its collaboration between industrial design and engineering.

Wayne Cherry, GM's Vice President of Design, announced this new partnership with BYU and the associated initial in-kind educational contribution, at the event on the Provo campus on December 4, 2003. Before a crowd of 4,000 students, faculty and government dignitaries, Cherry quipped that he had "never said a number this big," as he referred to the value of the educational donation—\$313,888,754! "And 53 cents!" Ed Arlin, President of the Global GM Account for EDS PLM Solutions, chimed in with a grin.

"It's an historic day for the university because of the partnership and the quality of the companies that we will be associated with," said University President Merrill J. Bateman. "And the size of the gift is enormous. It will really be a great blessing to our students."



BYU mechanical engineering students (l-r) Katie Timothy, Mark Andersen, Jason Elliott and Adrienne Blackburn are mentored by Professor Greg Jensen in the use of computer-aided design, manufacturing and engineering software.



Technische Universität Darmstadt (TUD) in Germany was the first PACE Institution to be deployed in Europe. Announced on February 11, 2003, the hardware and software package supplied by PACE will help TUD continue its consistent modernization process in research and curriculum development.

Professor Johann-Dietrich Wörner, President of TUD, regards the PACE membership as recognition as well as an incentive. "After being nominated the 'Best Practice University 2001' in Germany, we are proud to now receive international recognition as one of the leading universities in the fields of engineering and science through our membership in PACE," said Wörner.

On the occasion of the official announcement of the PACE partnership, the Minister, Ms. Ruth Wagner, proposed additional funds from the State of Hesse of 4 million Euros.



RAK2 the legendary Opel rocket car of 1928, reconstructed as a computer model by TUD-students utilizing the PACE donation.

"Without the very latest computer technology, the development and production of a modern automobile would be unthinkable. This makes it important for young engineers, during their academic training, to have the opportunity of working with the most advanced computers and software," said Carl-Peter Forster, Chairman and Managing Director of Adam Opel AG.

PACE has selected an additional four institutions in Canada, Sweden and the U.S. for deployment by the end of 2003. Watch for details in the next issue! □

DeBrabant, Sears and Sheikh Join PACE



Ron DeBrabant, Director of PACE Projects for General Motors, has joined the PACE Program as PACE Project Lead-U.S. In this position, Ron will oversee PACE student projects assigned to U.S. institutions.

"Seldom does an opportunity like this present itself, utilizing one's career, experience and knowledge," said Ron. "To support this very important PACE initiative,

the projects will provide science- and creative-based results capable of being integrated into our main stream Design, Engineering and Manufacturing process."

Ron can be contacted at ron.debrabant@gm.com.

John Sears, Field Marketing Manager-Automotive for Sun Microsystems, has joined the PACE Core Team.

"I am excited to join the PACE Core Team," Sears commented. "Technology continues to drive dramatic change in the automotive industry, and I believe that this collaboration with the educational community is key to furthering the industry's competitive edge."

John can be contacted at john.sears@sun.com.



Noveen Sheikh, Technical Analyst of PACE Projects for General Motors, joins PACE as the Technical Lead person for PACE projects in the U.S., assisting Ron DeBrabant.

"I am delighted to be part of this wonderful opportunity and look forward to working with all PACE partners," said Noveen. "I see a great potential for developing dynamic individuals who will be an asset for General Motors and our suppliers through the utilization of our real business projects and modern technology."

Noveen can be contacted at noveen.m.sheikh@gm.com.



*Welcome to PACE
Ron, John and Noveen!*



Altair Engineering Becomes PACE Contributor

The PACE Program is pleased to introduce Altair Engineering, Inc., based in Troy, MI, as its newest "PACE Contributor," providing critical CAE software to PACE Institutions. Altair Engineering has agreed to make its Altair® HyperWorks® software suite available to PACE Institutions at a nominal cost.

HyperWorks is an integrated suite of CAE tools for product design, featuring technologies in modeling and visualization, analysis and optimization, design process automation and manufacturing process simulation. From this software suite, GM uses the following software technologies in its product development process:

- ◆ Altair HyperMesh®
- ◆ Altair MotionView®
- ◆ Altair HyperView®
- ◆ Altair OptiStruct®
- ◆ Altair HyperGraph®

"Academia research and university technology programs have been a strategic focus and key enabler for innovation and growth at Altair," said Robert B. Little, Chief Operating Officer, Altair Engineering. "The PACE Program not only provides tremendous value to its participants, but deploys a product engineering environment that is used widely throughout the industry which better prepares students for the automotive workforce."

This offer is available to all PACE Institutions globally. For more complete information on the software, visit the Altair Engineering Web site at www.altair.com. Technical questions can be addressed to Michael J. Kidder via E-mail at mkidder@altair.com or by telephone at 248-614-2400, ext. 269.

PACE Institutions interested in receiving Altair HyperWorks can obtain offer information and a request form by contacting elaine.chapman-moore@gm.com.

This is an exciting addition to the products and services made available through PACE. □

PACE...What's Coming

Now that a critical mass of the PACE Institutions have been deployed, the PACE Partners are preparing for the future of the program. The PACE Executive Sponsor Council met recently to set the strategic direction for the alliance for 2003-2004. The following initiatives have been identified:

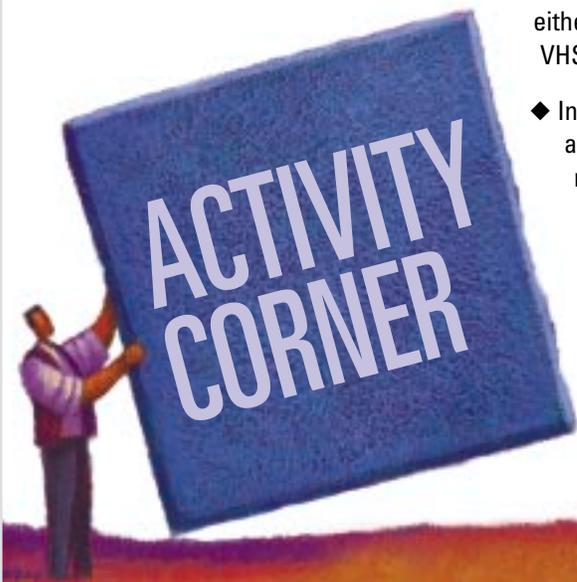
- ◆ A menu-driven offering of hardware will be made available—including Unix-based desktops, Intel-based desktops, plotters and servers. Both new and refurbished hardware will be offered. At least one new PACE Contributor will be identified to support the Intel-based platform of PACE. A study on the feasibility of offering virtual power-walls will also be conducted.
- ◆ The partners will increase the offering of industry-related projects to design classes and other appropriate classes in PACE Institutions. A survey will be conducted with the institutions to determine time limitations for project proposals, associated costs, possibilities for funding, etc.

- ◆ Software offerings will be expanded. Special emphasis will be placed on additional CAE tools to encourage the use of virtual validation and testing in the curricula. New "PACE Contributors" will be identified—joining MSC.Software and Altair Engineering, Inc. in the support of the PACE partnership.

- ◆ Global expansion of the program will continue, based upon the global strategic direction of the PACE Partners.

The PACE Partners and PACE Contributors look forward to working with the PACE Institutions to make these and other initiatives a reality.

- ◆ Reminder: **PACE Annual Meeting** will be held on Thursday, July 31, 2003, at the GM Technical Center in Warren, MI. Watch for more information in the mail.
- ◆ We have created a new **PACE Overview video and brochure!** If you would like a copy of either, contact Tanya Jordan (tanya.jordan@gm.com). Please specify format for video—VHS, PAL or DVD.
- ◆ In June 2003, **GM and PACE will be moving to Version 19 of Unigraphics** (also known as UG NX). The GM Knowledge Center has created a CD to provide the training and math model updates to support instruction of the software. Contact Tanya Jordan (tanya.jordan@gm.com) if you would like a copy. Additionally, PACE Institution faculty and teaching assistants can attend free courses in Unigraphics-related areas provided by EDS-PLM Solutions and General Motors. Contact Elaine Chapman-Moore at elaine.chapman-moore@gm.com for more information.
- ◆ Mark your calendars—the **annual PLM World 2003 Conference** will be held April 28 to May 2 at the Anaheim Convention Center in Anaheim, CA. Check out <http://event.plmworld.org/> for more information.





GM de Mexico—Considered One of The Best Companies to Work For

GM de Mexico is considered one of the top three companies to work for in Mexico, according to a survey completed by 1,000 college students from public and private institutions in Mexico. The top choices of the students are Bimbo (a popular bread manufacturer in Mexico) with 16%, Cemex (a Mexican cement company) with 15%, and General Motors de Mexico (GMM) with 9%.

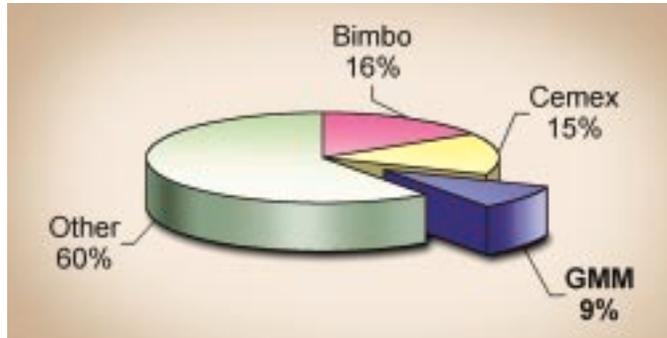
The survey, conducted by *EXP Magazine*, suggested college students choose a company to work for based on such factors as the company's good name, the local or international presence and economic stability.

According to the survey, in exchange for their work and effort, these future employees expect to receive personal development opportunities, continuing education or training and a flexible schedule. For these young people, the most important aspects for establishing a long-term relationship with a company are the company's philosophy, supervisor-employee relationship and the workplace environment.

This is the first time that GMM has landed one of the top three spots on the list. Bill Beaumont, the Chief Engineer for GMM at the time of the survey and a leading champion of the PACE Program, attributes GMM's position in the survey in a significant way to PACE.



Bill Beaumont, GMM Chief Engineer, commends PACE for its contributions to GMM's popularity with Mexican college students.



Through PACE, GMM has made many efforts to enhance its relationships with the Mexican Institutions.

"PACE is part of our bench strength activities in the company. We see our PACE relationships with key Mexican institutions as critical to preparing our future employees to be successful in GMM. We are growing design and engineering capabilities in the company here, and we need new recruits that excel in integrated parametrics-based product development systems," Beaumont stated. He added, "The software provided by PACE allows the PACE Institution students to work with GMM content experts on real-life projects." These projects promote interface between students and GMM employees, provide the students with a good understanding of the engineering and manufacturing processes and challenges in the company, and give the students a set of realistic expectations of what jobs in the company would be like.

GMM has also increased its personal development, continuing education and training opportunities for its employees. For example, the GM Technical Education Program (a distance learning program),

provides GMM employees with an opportunity to complete technical master's level degrees from some of the most prestigious universities in the world while working on-the-job—at virtually no cost to the employee.

GMM and PACE will continue their efforts in Mexico. And who knows, maybe in the next survey, GMM will hit the number-one spot! □



Christian Müller, an ITESM-Toluca student, completed the first PACE project in Mexico, identifying a new material for the clutch pedal of the "S" car.

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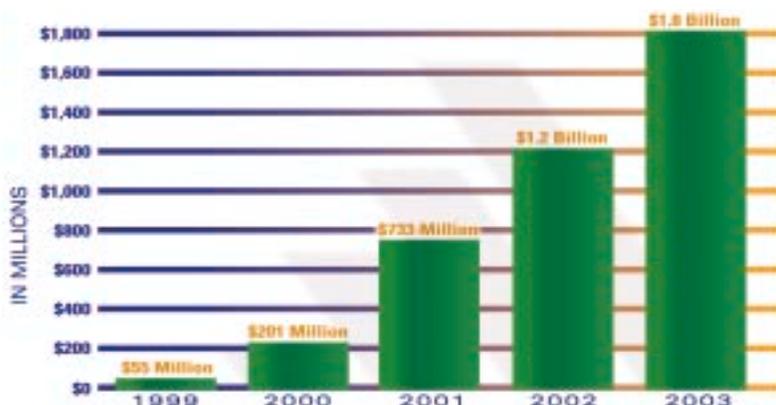
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PACE

We welcome your comments. Please send questions, comments and article suggestions to Tanya Jordan, PACE Marketing Coordinator and Editor, *PACE in Action*, GM Knowledge Center, MC 480-303-110, 6442 E. 12 Mile Road, Warren, MI 48090-9000; E-mail: tanya.jordan@gm.com; phone (586) 947-2386; fax (586) 947-2715.

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