

# PACE IN ACTION

Partners for the Advancement of Collaborative Engineering Education

First Quarter 2007



## Sungkyunkwan University (SKKU) in South Korea Joins PACE



*Steve L. Clarke, GM Daewoo Technical Center Vice President makes PACE presentation to SKKU leadership. (left to right) Mr. Kyung-Ryul Kwon, President, UGS Korea, Mr. Steven L. Clarke, VP, GM Daewoo Technical Center, Mr. Myong-Chul Shin, Vice President, SKKU, Mr. Jai-Ik Kim, Account Operations Manager, EDS Korea*

On November 9, 2006 GM Daewoo, EDS, Sun Microsystems, and UGS participated in the launch of an engineering partnership with Sungkyunkwan University (SKKU) in South Korea. They also joined in the inauguration of SKKU's PACE Center.

Sungkyunkwan University is welcomed as the 38th global PACE institution with their goal to provide students in mechanical design, engineering, analysis, and manufacturing with the practical skills they will need in their professional careers.

Sungkyunkwan University continues its partnership with GM Daewoo by integrating programs provided by PACE in engineering courses. This allows students to obtain practical experience with an engineering application utilized by leading global companies.

Sungkyunkwan University is participating in the PACE Global Vehicle Collaboration Project, which involves the development of a next-generation concept vehicle by 20 global PACE institutions.

*Continued on page 2*

## Rensselaer Polytechnic Institute (RPI) – New PACE Institution



*Larry Burns VP Research & Development-General Motors Corp, presents PACE plaque to Shirley Ann Jackson, President-RPI.*

September 8, 2006 – Troy, New York (USA) Larry Burns, Vice President for GM Research & Development and Strategic Planning, welcomed Rensselaer Polytechnic Institute (RPI) as a new PACE Institution.

Rensselaer has been a pioneer in the use of computer-aided design, with programs that employ CAD/CAM across the spectrum of academic activities, from science and engineering to game design and cognitive research. The comprehensive modeling and simulation tools from PACE will allow Rensselaer students to work with the latest software used by major corporations, enhancing their ability to design projects ranging from more efficient factories and hybrid vehicles to the flow of blood through artificial heart valves.

"As educators, we must prepare students for the global economy. This visionary partnership combines the innovative curriculum at Rensselaer with the tools and talents of the PACE partners to create an even more technology-rich, multidisciplinary learning environment for our students," said Rensselaer President Shirley Ann Jackson. "The PACE partnership reflects our mutual goal to prepare the next generation of innovators."

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Partnering Globally With:



## Sungkyunkwan University (SKKU) in South Korea Joins PACE (continued)



*Elaine Chapman-Moore, Manager, PACE Global Partnerships and Steve Clarke, GM Daewoo Technical Center Vice President observe student demonstration in new PACE center.*

Students and professors from participating universities, including Hongik University and Korea University, will cooperate in the design and engineering of a racing car of the future that will be unveiled July 2007 at the PACE Global Annual Forum in Darmstadt, Germany. This collaborative project gives students networking opportunities with industry experts around the globe and evaluates their abilities.

“Our investment in PACE and the opening of the PACE Center at Sungkyunkwan University represent an investment in the future of GM Daewoo and the Korean automotive industry,” said Steve L. Clarke, GM Daewoo Technical Center Vice President. “Over the years, Sungkyunkwan University has developed many outstanding engineering professionals. We look forward to continued close cooperation.”

“The PACE program represents a new model for global partnership in research and education between the academic community and industry. Through PACE, our vehicle engineering curriculum, research capabilities and accomplishments have been recognized globally,” said Sungkyunkwan University President Jung-Don Seo. “We have been developing a cooperative relationship with GM Daewoo in various fields including internship programs, plant tours, human resource exchanges, joint projects, and seminars since being selected as a PACE partner.”

## Rensselaer Polytechnic Institute (RPI) – New PACE Institution (continued)



*Left: Larry Burns, General Motors Corp, Ed Arlin, UGS, and John Nielsen, EDS observe RPI students' demo at the PACE - RPI announcement event.*

“Computers and math are critical to every aspect of business so it is essential for engineering students to be proficient at using the latest computer-aided engineering programs and systems,” said Larry Burns, Vice President, Research & Development and Strategic Planning for General Motors. “Our common goal is to help train engineers to succeed in the rapidly evolving engineering environment of the future.” In addition, Dr. Burns explains, “GM believes the PACE contribution will help RPI nurture a new generation of the best and brightest designers, engineers, and researchers. And we look forward to working with them in the future and helping them turn their ideas into reality.”

## SKKU Professor Sang Do Noh Authors Book

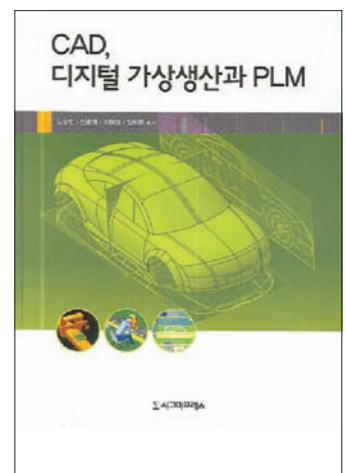
Professor Sang Do Noh from Sungkyunkwan University in Kyunggi-do South Korea is offering PACE Institutions the opportunity to view his recent publication **CAD, Digital Virtual Manufacturing and PLM**.

The instructional resource consists of many theories, explanations and exercises on UGNX including:

- Product development and production process of manufacturing industries
- Information technologies in manufacturing areas such as CAD/CAE/CAPP/CAM/PDM, Concurrent and Collaborative Engineering, Digital and Virtual Manufacturing, and PLM
- Examples and case studies of these new technologies in automotive, heavy and ship building industries
- Step-by-step training materials for 3-D CAD and virtual manufacturing simulation.

Dr. Sang Do Noh, PACE Integrator for SKKU, is a distinguished professor of PLM and manufacturing technologies, and has many experiences with industry experts.

***UGS is featuring Professor Noh's publication on PLM Knowledge 21website. For more information log on to [http://www.ugs.com/partners/goplmm/plm\\_knowledge.shtml](http://www.ugs.com/partners/goplmm/plm_knowledge.shtml)***



## PACE IN THE NEWS...

- PACE Cumulative In-Kind Contributions total \$6 Billion
- NX 3 & Machine Design Tutorial on PACE Website
- New Parts File Repository on PACE Website
- New Textbook Repository on PACE Website
- **Alessandra Ortiz**, GM do Brasil, receives distinguished **PACE 2006 Global Administrator Award**
- **Professor Greg Jensen**, Brigham Young University, receives distinguished **PACE 2006 Global Integrator Award**
- 2007 Global PACE Forum July 23-28 in Darmstadt, Germany

## New Contributors Join PACE



PACE and **Gamma Technologies, Inc. (GTI)** now offer PACE

Institutions, around the globe, a software that is specifically targeted for powertrain design.

GT-Power can be integrated with FLUENT and other PACE sponsored software. It is specifically designed for both steady state and transient simulations. In addition, it can be used for analysis of engine/powertrain control. According to Ron Herrin with GM's Powertrain Engine Development and Validation group "...GM uses these simulation tools to sort alternative injector spray patterns and piston designs prior to building and testing hardware, and as a standard part of GM's combustion system development process."

PACE Institutions may request GT Power by submitting a completed request form, found on the PACE web site, to PACE (deborah.a.peak@gm.com). More information about GT-Power can be found at [www.gtisoft.com](http://www.gtisoft.com).



*PACE Executive Sponsor Council welcomes new PACE Contributors*



**3Dconnexion, Inc.**, has joined as a PACE contributor, providing critical navigation input devices for product design, animation, modeling, and digital content creation. 3Dconnexion provides navigation devices to PACE Institutions globally.

Designed to be used in tandem with a traditional mouse, a

navigation input device conveniently streamlines all on-screen navigation. It completely eliminates the tedious shuffle between mouse and keyboard required to position models or objects on the screen in 3D software applications. Navigation becomes second nature, freeing the designer to focus on the creative task at hand.

PACE Institutions in North and South America may contact Tanya Jordan ([tanya.jordan@gm.com](mailto:tanya.jordan@gm.com)) or Elaine Chapman-Moore ([elaine.chapman-moore@gm.com](mailto:elaine.chapman-moore@gm.com)) for more information on this opportunity.

### PACE SOFTWARE - CURRENT VERSIONS

Below are the current versions of the software that PACE Institutions should be utilizing as of December 2006. This maintains consistency between institutions and GM.

SOFTWARE	VERSION
Altair HyperGraph	v7.0sp1
Altair HyperMesh	v7.0sp1
Altair HyperView	v7.0sp1
Altair MotionView	v7.0sp1
Altair OptiStruct	v7.0sp1
Autodesk-Direct Connect	v1.0
Autodesk-AutoStudio	v13.0.2
Autodesk-Maya	v7
Autodesk-PortfolioWall	v2.2.5
Autodesk-SketchBook Pro	v2
Engenious iSIGHT	v9.0
FLUENT	v6.3.26
Fluent-FlowLab	v1.2.10
Fluent-GAMBIT	v2.2.30
Fluent-TGrid	v4.0.16
GT Power	v6.2.3
LS-DYNA (updated 3/1/07)	v971-p1
MD Nastran	v.2005.5.0 (r3)
MSC Adams	v.2005 (r2)
MSC Sofy	v.2006 (r2)
UGS-JT Open	v1
UGS-NX 3 or NX 4	
UGS-Teamcenter Community	v5.1.1.a
UGS-Teamcenter Engineering	v9.1.3.6a u1
UGS-Techomatix	v7.6.0.1b p1



PACE and **Wacom Technology Corp.** are pleased to offer PACE Institutions in North and South America, an opportunity to obtain designer tablets for use with computers in the digital ideation and design process.

Wacom has agreed to provide a grant each year for a specified number of free new Cintiq designer tablets. Wacom also works with GM Design, GM Information Systems and Services, and EDS to provide used Cintiq designer tablets to PACE Institutions. By using a pen directly on the screen, the designer will work much more quickly and naturally. For even more productivity, the Cintiq 21UX features ExpressKeys™ and Touch Strips, allowing convenient keyboard shortcuts, scrolling, zooming, brush size control, and more. This is a very exciting opportunity for PACE Institutions specializing in Design.

**PACE welcomes Gamma Technologies, 3Dconnexion, and Wacom to the PACE Contributor family. With contributions such as these, the program is better able to support PACE Institutions in the Product Lifecycle Management mission.**

# STUDENTS' SKILLS 'WOW' ATTENDEES AT THE 2006 ANNUAL PACE GLOBAL FORUM

"Vroom, vroom" translated into Korean, Mandarin, Portuguese, Spanish and Swedish on July 26, 2006 when a team representing more than 140 design and engineering students from 13 PACE institutions around the globe gave their final presentations and design models to a packed house at Brigham Young University Conference Center. The crowd was amazed at the display of skill, execution, and presentation by the students. "I was prepared to be impressed with what the students had accomplished, as I had a chance to see several interim reports along the way. But when I saw the totality of what they had accomplished, I was truly awed," said Elaine Chapman-Moore, the Manager of the Global PACE Partnerships.

Beginning in September 2005 right up to days prior to the Forum, these talented students worked collaboratively to design, model and analyze major subsystems and components for a set of sporty car exteriors that assemble to a parametric platform. Five industrial design teams worked with 13 engineering teams to accomplish this PACE Global Vehicle Development Project. The project involved over 140 students, speaking 6 different languages and residing on 5 different continents. During this presentation, each of the participating schools discussed their approach and contribution to the project, and students from BYU discussed the overall collaboration and integration that occurred to bring all of the parts and subsystems together into a set of virtual sports cars. The schools participating in this project included: Brigham Young University (U.S.A.), Hongik University (S. Korea), ITESM-Monterrey (Mexico), ITESM-Toluca (Mexico), Monash University (Australia), Shanghai Jiao Tong University (China), Universidad Iberoamericana (Mexico), University of British Columbia (Canada), University of Sao Paulo (Brazil), University of Toronto (Canada), University of Waterloo (Canada), University West (Sweden) and Virginia Polytechnic Institute (U.S.A.).

"The design folks in Australia may end up designing part of a car that gets manufactured in China, Mexico or Detroit," said Dr. Greg Jensen, BYU Project Lead. "Our students are going through some of this same process as a learning experience. An international collaboration like this is exactly what PACE was set up to do," said Jensen.

UGS' Teamcenter Community (TcC) played a vital role in the success of this project, providing the students the opportunity to collaborate with each other in both real-time and delayed formats. UGS' Teamcenter Engineering (TcE) software provided a repository for all models and lessons learned throughout the project, and into future such projects. Other PACE software tools utilized and featured in the students' presentations included MSC's MD Nastran and Adams products, Engineous' iSIGHT, Altair Engineering's HyperWorks Suite, FLUENT, and LS-Dyna.

Industry support for design was provided by Clay Dean, Ken Parkinson, and Jess Bailie from GM Design Center. The engineering teams worked with Jim Welton and Jim Johnson from GM's CAE area, as well as others from GM Powertrain and GM Product Development.

As this globally collaborative project is reformulated and offered each year, we all look forward to seeing what the design and engineering students will present at the next PACE Forum in Darmstadt Germany!



# GLOBAL VEHICLE PROJECT



ABOVE: Alan Rhodes, GM Design, Ed Arlin, UGS, John Nielsen, EDS, and Jan Helge Bohn, Virginia Tech admire Monash University design [Australia]

ABOVE: Students' Models on display at GM Technical Center-Engineering Center in Warren MI

## OTHER PACE GLOBAL PROJECTS . . .

There are several global virtual collaborative projects that are sponsored by the PACE Program. In addition to the vehicle development project described above and lead by Professor Greg Jensen at Brigham Young University, an annual globally collaborative team project was initiated by Professor Jan Helge Bøhn from Virginia Tech and Professor Reiner Anderl from Technische Universitaet Darmstadt (Germany). That project focuses on solving a specific GM-related engineering problem (rotates between global GM units) each year. This project centers on the use of the PACE engineering and collaborative tools, and adds the use of videoconferencing for joint international classroom teaching.

Timothy Hinds and John Lloyd from Michigan State University (MSU) also provide a PACE-sponsored virtually collaborative product development course, currently between MSU and 3 other global PACE Institutions. MSU will partner with the other global institutions utilizing PACE tools in an "east meets west," multi-point sharing of data in a 24/7 engineering process with multidisciplinary student teams collaborating to develop *The City Truck*—A Next Generation Vehicle. The expected completion target is set for January 2008.

# 2006 PACE Student Competitions in South Korea

In December 2006, all three PACE Institutions in South Korea participated in Course Competitions.

**Hongik University** hosted their first PACE Competition with great success. The students focused on showing good modeling skills with the engineering solutions.

The competition featured:

- Presentation on Mini-Baja structure design
- 3D Math using UG NX and analysis using Altair HyperWorks
- 33 teams totaling 99 students presented 10-minute PowerPoint presentations
- Judges participated from UGS, GM Daewoo, and Hongik University
- PACE awarded winning prizes to: *Jaehoon Choi, Changkyu Choi, Taemin Kim*

**Sungkyunkwan University (SKKU)** participated in their second PACE Course Competition and the momentum is growing. The students focused on creative thinking to design the best battery loader equipment.

The Mechanical Engineers from GM Daewoo provided actual examples of problem solving, on the spot, to the students.

The competition featured:

- Presentations on *Equipment Design of a Battery Loader*
- 3D Math using UG NX and motion clips using Vis-Mockup
- 5 Judges from GM Daewoo, UGS, and SKKU Faculty scored 4 teams, totaling 24 students
- PACE awarded winning prizes to: *Song Kyo Hyun, Ahn Jung On, Park Hong Il, Jo Yeong Gi, Suk Jin Woo, Kim Yoon Ah* (3rd & 4th year Systems Management Engineering students)

**Korea University (KU)** was formally announced as a PACE Institution in May 2006 and quickly revved up for their first competition in December 2006.

This sophomore class focused on improving NX modeling, so they invited a UG NX trainer from GM Daewoo to provide additional knowledge and tips to the students.

The competition featured:

- 3D Math using UG NX
- Judges from GM Daewoo, UGS, and Korea University reviewed 13 team presentations
- UG Trainer with GM Daewoo helps sophomores' improve UG modeling skills
- PACE awarded winning prizes to 1st, 2nd, and 3rd place teams

"All three Institutions (Hongik, Korea U, SKKU) did a great job, and we've got a great impression of the enthusiasm by faculty and students." said HyunJoong Jeong, Engineering Process Team, GM Daewoo Technical Center in Korea.



# 2006 PACE Global Annual Forum Highlights July 2006 – Provo, Utah

## FACULTY TRAINING . . .

- Autodesk Sketchbook Pro, AutoStudio, Portfolio Wall, ImageStudio, and Showcase
- UGS Teamcenter Engineering Installation for Windows, Teamcenter Engineering and Teamcenter Community User Training, and Tecnomatix
- MSC Adams
- MD Nastran
- PACE Tools Integration

## KEYNOTE SPEAKERS

- Ed Arlin, Executive VP-UGS
- Frank Barkman, Director Global Product Development - General Motors
- Steve Bashada, VP Teamcenter - UGS
- Linda Channell, Director Vehicle Development Process Systems - General Motors
- Michael Grieves, Director, Industry Research, University of Arizona
- Tim Herrick, Assistant Vehicle Chief Engineer - General Motors
- Jeff Kitson, Process Lead Global Collaboration - General Motors
- Terry Kline, Process Information Officer - General Motors
- Dr. Will Loeffler, President - The New Loeffler Group
- Alan Rhodes, Senior Manager Global Design - General Motors
- Michael Simcoe, Executive Director Global Design - General Motors

## FACULTY, STUDENT, AND INDUSTRY PRESENTATIONS INCLUDED:

- The Role of Group/Team Projects in Education: Bane or Boost to the Student?
- Manufacturing in a Global PLM Environment
- Bridging the Language Gap Between Design and Engineering
- Forming Virtual Teams: How to Create Virtual Relationships and Make Team Decisions
- The Global Workflow from Design to Manufacturing - A GM Perspective
- Planning, Setup and Administration of a Global Collaboration Environment in the Academic Setting
- Virtual Engineering Design Collaboration - A Journey into Uncharted Territory
- Vendor and Poster Sessions
- Global Vehicle Development Project

**PACE**

Partners for the Advancement of Collaborative Engineering Education



**2007 PACE GLOBAL ANNUAL FORUM**

**JULY 23-28, 2007**

**Technische Universität Darmstadt  
Darmstadt, Germany**

To register visit: [www.pacepartners.org/events.html](http://www.pacepartners.org/events.html)

**Networking and Exploring the Cultural Diversity of PACE**

# PACE Executive Champion – Gary Cowger, Group Vice President, General Motors Corporation

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Purdue University  
Rensselaer Polytechnic Institute  
Tuskegee University  
University of Michigan-Ann Arbor  
University of Missouri-Rolla  
University of Texas at El Paso  
Virginia Tech

\* New PACE Institutions formally announced as of December 2006

### PACE CORE TEAM

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