January 08, 2007

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Nation's First Robotics Engineering Degree Program

January 1 - 5, 2007 **by Jeff Rowe**
A weekly summary of recently published MCAD product and company news, featured downloads, customer wins, and coming events. Brought to you by MCADCafé.

Each week MCADWeekly Review delivers to its readers news concerning the latest developments in the MCAD industry, along with a selection of other articles that we feel you might find interesting. If we missed a story that you feel deserved to be included, please contact us! Questions? Feedback? Click here, Thank-you!

Worcester Polytechnic Institute (WPI) announced that it plans to offer the nation's first bachelor's degree program in robotics engineering starting in the fall of 2007.

The new major grows out of an increasing demand for robots and robotics systems to meet national needs in such areas as defense and security, elder care, automation of household tasks, customized manufacturing, and interactive entertainment, and also responds to the escalating interest in robots among young people.

"Robotics is one the fastest growing areas of technology and has the potential to change many aspects of our world and greatly improve human life," noted Carol Simpson, WPI's provost and senior vice president. "This major is designed to prepare a new breed of engineer with the skills and imagination to develop machines that go far beyond today's reality. Meeting this challenge requires an approach to engineering education that crosses academic boundaries, since no single discipline can provide the necessary breadth."

In the program, to be offered jointly by the Computer Science, Electrical and Computer Engineering, and Mechanical Engineering departments, students will receive a firm grounding in the fundamentals of these three fields, and learn to apply them to design and build robots and robotic systems for a wide variety of emerging applications. Graduates will be well-prepared for careers in the rapidly expanding robotics industry and for graduate work in the field. The program also includes an entrepreneurship course to ensure that students have the skills they need to turn their robotics ideas into viable businesses.

"Whether in science fiction or real life, robots have the power to fire young people's imaginations and spur their interest in technology," Simpson added. "By building upon our already extensive involvement in robotics competitions and K-12 outreach programs, this program can help WPI respond to a national imperative by attracting more young people -- particularly girls -- into science and engineering. At the same time, we will be helping the United States build the innovative, technically advanced workforce it will need to assure its technical and scientific leadership well into the 21st century."

The robotics engineering program will draw on the expertise of more than 20 associated faculty and staff members and capitalize on the university's involvement in high-profile robotics competitions over the past 15 years. Each year, the university sponsors three major competitions that engage well over 1,200 local and regional elementary-, middle-, and high-school students. In addition, university faculty, staff, and students conduct robotics demonstrations at 70 schools and organizations throughout the region and work with K-12 schools on curriculum development and other robotics outreach programs.

Since 1992, WPI has sponsored a team in the international robotics competition organized by FIRST (For Inspiration and Recognition of Science and Technology), which was created by WPI alumnus Dean Kamen,

founder and president of DEKA Engineering and Development Corp. in Manchester, N.H., and inventor of the Segway Human Transporter.

Development of the robotics engineering program was guided by an advisory board comprising representatives of several leading robotics companies in Massachusetts, which has more than 150 companies, institutions, and research labs in the field employing more than 150,000 people. Members include Helen Greiner, chairman of iRobot Corp. in Burlington, Mass., maker of the popular Roomba floor-cleaning robots; Brian Abraham, president of Bluefin Robotics in Cambridge, Mass., developer of robotic undersea vehicles; and Brian Hart, president of Black-I Robotics in Bedford, Mass., manufacturer of low-cost, expendable robots for military and civilian applications. Dean Kamen is also a member.

The new program, which will receive a final review from the university's Board of Trustees in February, is the third interdisciplinary undergraduate major developed by WPI during the past two years. Interactive Media and Game Development (IMGD), offered jointly by the Computer Science and Humanities and Arts departments, began in 2004. A program in environmental engineering will be offered by Chemical Engineering and Civil and Environmental Engineering starting next fall.

Founded in 1865 in Worcester, Mass., WPI was one of the nation's first engineering and technology universities.

For More Information: http://www.wpigroup.com/

Commentary By Jeffrey Rowe, Editor

What a way to start 2007 – an exciting new educational program that should draw interest from both potential students and prospective employers! Things robotic are big and getting bigger as evidenced by this new robotics degree program at WPI (Also see the first item in "The Week's Top 5" below). I'm a "plain vanilla" mechanical engineer, and if I had it to do all over again I would definitely go the robotic route because, one, it encompasses much more than just mechanics and, two, the field has so much potential.

This new robotics education program is part of a bigger trend that I see moving away from traditional mechanical engineering and toward a more comprehensive range of disciplines known as mechatronics. I think one of the things that makes mechatronics so compelling is the sheer number of areas that it takes into consideration, including mechanics, electrical components, electronics, controllers, sensors, and software. That's a pretty long list of areas of knowledge, but all are increasingly necessary as robots evolve and become more sophisticated. This long list will also require special students who have the ability and desire to learn so much across such a wide spectrum of topics.

I say that the future looks good because the use of robotics will continue to expand in areas such as robotic highway safety markers; planetary exploration; precise measurements of large structures, such as train lines; and medical/surgical applications. It is the last item that is especially exciting because it takes things a step even further to include principles of bioengineering. For example, although laparoscopic techniques have allowed surgeons to perform operations through small incisions, the benefits of laparoscopy are still limited to less complex procedures because of losses in imaging and dexterity compared to conventional surgery. Miniature robots could be developed to be placed within the abdominal cavity to assist a surgeon. These remotely controlled in vivo robots could provide a surgeon with an enhanced field of view from arbitrary angles, as well as provide dexterous manipulators not constrained by small incisions in the abdominal wall. Although possibilities like this might sound far-fetched today, they could very well become reality in the not too distant future.

As kind of a side benefit to a wider acknowledgement and importance placed on robotics, I've been following a project at the University of Nebraska that has studied simplified robot programming using an approach to Programming by Demonstration (PbD) called What You See Is What You Get (WYSIWYG) robot programming. Unlike traditional robot programming that can get complicated quickly, here the user "explains" the action to a robot rather than "demonstrating" the action. Using this approach, generalization occurs after every demonstration example and the generalized program is then visually presented to the user. This approach lets the user direct the generalization process, where the user may use this feedback to better convey the intent for the actions of the robot to accomplish specific tasks. The WYSIWYG approach

differs from other PbD systems because it assumes that only the user has a true understanding of his or her intent.

Don't think that the MCAD software vendors haven't noticed the growing interest in robotics either. Notably, both Autodesk and SolidWorks sponsor several types and levels of robotic educational programs and competitions.

Admittedly, there are a number of colleges and universities that offer a lot of the bits and pieces of the proposed WPI program (such as the program at the University of Nebraska), but as far as I know, no other institution offers as focused a robotic curriculum as WPI. About 40 years ago in the movie, "The Graduate," the character Benjamin Braddock (played by Dustin Hoffman), when asked about his plans for the future was told to, "Think plastics." Well, 40 years hence I would heartily recommend to anyone looking for a career with a bright future to, "Think robotics."

The Week's Top 5

At MCADCafé we track many things, including the stories that have attracted the most interest from our subscribers. Below are the five news items that were the most viewed during last week.

SolidWorks' Support Grows For Robot Design Competitions

Aiming to expand the pool of skilled engineers in the U.S., **SolidWorks Corp.** continues to sponsor robot design competitions to give students a taste of real-world engineering projects with free licenses of **SolidWorks** 3D CAD and **COSMOS** design analysis software. Students in middle school through college use the software in these competitions to quickly learn CAD concepts and discover their engineering creativity. Since 2003, SolidWorks has worked with different organizations to sponsor competitions that give students hands-on experience in planning, designing, testing, building, presenting, and operating robots in term- or year-long competitions. Students learn to work in teams, create bills of materials, order parts, work with industry experts, and make deadlines. SolidWorks is donating software licenses to the following competitions:

- Botball - Middle and high school students form teams and design and build autonomous robots that must perform a series of tasks, such as placing colored balls in the right color goals.
- BotsIQ -- Created from the popular TV show BattleBots, the program includes a complete curriculum of STEM education and teacher training that culminates in students designing and fabricating robots competing nationally and locally in four different types of competition: task oriented, fully autonomous, and 15- and 120-pound robots that face head to head challenges.
- MATE ROV - Teams from middle school through college use guidance from industry professionals to design sub-sea ROV's that perform tasks such as salvaging objects from the bottom of a pool to simulate real-life recovery operations at great depths.
- BEST Robotics - Students in grades seven through 12 form teams to design robots for performing tasks such as hang up wet laundry and take down dry laundry or replace batteries on a mini-replica of the Hubble Telescope.

Dassault Systemes PLM Gains Momentum

According to **Dassault Systemes**, its **ENOVIA MatrixOne** PLM products are playing a strategic role in a growing range of industries as companies adapt to fast-moving markets and shrinking windows of profitability. The new market realities are not confined to PLM's traditional stronghold in product data management (PDM) for discrete manufacturing. Consumer product, apparel, high-tech and other industries face the same regulatory environments as their heavy manufacturing counterparts, and even more intense market pressure because of volatile consumer demand. Executives in industries ranging from automotive to food processing, speaking at the recent ENOVIA MatrixOne Global Customer conference, described a common set of strategic challenges that they are addressing with ENOVIA MatrixOne PLM products.

Autodesk And PTC Announce Interoperability Agreement

Autodesk and **PTC** announced a technology exchange agreement to expand interoperability options. This agreement fosters a common goal of facilitating software interoperability for organizations with multi-CAD environments. This interoperability agreement aims to decrease the overall effort and costs that are commonly associated with supporting these environments. Autodesk and PTC plan to provide customers

with out-of-the-box integrations between their solutions that will enable organizations to work more efficiently with the product development strategies currently in place and the flexibility to adopt future strategies. This agreement enables PTC to leverage **Autodesk's RealDWG** software development toolkit and deliver solutions using Autodesk's DWG technology, so that PTC's products will be interoperable with **Autodesk Inventor** and **AutoCAD**. Similarly, Autodesk can utilize **PTC's GRANITE** 3D modeling and interoperability kernel to provide enhanced integration with **Pro/ENGINEER.**

PTC Reaches Legal Settlement With RAND

PTC announced that it has reached agreement with **RAND A Technology Corp.** and **Rand Technologies Limited** to settle all pending litigation between the parties. The parties agreed to settle their disputes to avoid further litigation costs. Neither party admitted liability with respect to any claims made. PTC previously announced that if a settlement were reached before the filing of its 2006 Annual Report on Form 10-K, it would be treated as a subsequent event that would impact earnings results for the fiscal year ended September 30, 2006. As a result of the agreement to settle and consistent with its earlier guidance, PTC has recorded an operating expense charge during the fourth quarter of 2006 that lowers fourth quarter and fiscal year earnings results announced on November 1, 2006 by $0.02 per diluted share. There was no impact on revenue.

EdgeCAM Helps Keep Racing Team On Right Track

In the super-competitive world of motor sport, producing quality car parts on demand can mean the difference between losing or winning a race. Nowhere is this more true than in the cut-and-thrust of the Australian V8 Supercar series where Triple Eight Race Engineering Australia (888) has been the driving force behind this year's historic victory for Ford in the Bathurst 1000 motor race. In 2004, 888 installed **EdgeCAM Solid Machinist** from **Pathtrace** as a key element in the expansion and improvement of its in-house machine shop. The team had previously outsourced its machining jobs and was looking to increase productivity in order to be able to respond faster to requirements for components for its Ford Falcon race cars. Senior machinist, Neil Prior, investigated the market to find the best combination of CAD/CAM software and CNC machine tools for his purposes. Two systems reached his shortlist and EdgeCAM was selected to operate with the HAAS lathes and mills in the machine shop.

Jeffrey Rowe is the editor of MCADCafé and MCAD Weekly Review. He can be reached at Email Contact or 408.850.9230.

This Week

Lead Story

- Worcester Polytechnic Institute To Offer Nation's First Major In Robotics Engineering

Product and Company News

- Icona Solutions Announces New Software For Visualizing Manufacturing Variation And Associated Product Assembly Effects
- MSC.Software Expands Partnership With nCode
- SolidWorks Donates Software
- Rocketplane Kistler's Aerospace Vehicle Takes Off With UGS PLM Technology
- Autodesk And ThomasNet Team Up
- Delcam CADCAM Give Competitive Advantage
- Pattern Works Switches To GiveMePower Developer Platform
- Open Design Alliance Releases New DWGdirect Libraries
- Autodesk Receives Additional Nasdaq Notice For Filing Delay
- EdgeCAM 11.5 To Be Showcased
- Stratasys Installs Metal RP&M System At Medical Company

- Dedicated Agile Project Management Tools Continue Rise Over Traditional Tools
- Arena Solutions Launches Innovative Partner Program For Contract Manufacturers
- Schott Systeme Showcases CAD/CAM Solution
- Delcam PowerINSPECT's AIMS Compatibility
- Surfware's TrueMill Technology Earns Awards
- Spansion Selects Agile PLM To Streamline Supply Chain Collaboration
- Agile Receives Additional Nasdaq Notice
- Autodesk AliasStudio Available Through INCAT
- Delcam Promotes Expansion At RP Company
- Autodesk Announces Inventor Of The Month For December 2006
- Delcam Appoints Bulgarian FeatureCAM Reseller

Related MCAD News

- Boeing Delivers 600th 777
- Ford Announces Corporate Realignment
- IFS Applications 7 Wins ERP Award For Discrete Manufacturing
- Tenneco Optimizes Engineering Processes With MEDUSA And mySAP PLM
- Apriso Releases New Version Of FlexNet
- Cambridge Who's Who Selects Professional Of The Year In Aerospace Electronics
- Lear Introduces SoyFoam Technology For Automotive Seating
- Omnify Software Continues Strong Growth In 2006
- Multi-Disciplinary Simulation with ESI Group's Visual Environment
- Boeing Begins Assembling First Next-Generation 737-700ER
- Freightliner Constructing New Truck Manufacturing Plant In Mexico
- INCAT Helps Community Network Services
- Zuken Invests In Rio Design Automation
- Timken Sells Automotive Steering Business
- First Flextop Supercomputer, the NextDimenison, Now Features a Fixed Massive Storage Option, Nextcomputing's Nextpak
- Autodesk's 3D Software Shapes Interactive Games
- Delphi Integrates Controls, Displays, And Security Systems
- PerkinElmer Acquires Thermal Analysis Product Line

Corporate Moves

- Robert L. Taylor Joins Dassault Systèmes As Corporate Fellow
- Visteon Names New Board Directors
- Cyon Research Welcomes New Analyst
- Innova Robotics & Automation Announces Executive Appointments
- Avatech Solutions Appoints Executive Vice Chairman
- Toyota Announces New North American Manufacturing And R&D Executives

Industry Events

- SolidWorks World 2007 Agenda Announced
- UGS Connection Americas 2007 User Conference
- DELMIA Users Share Experiences With Dassault Systemes' PLM Tools
- Autodesk Invites Manufacturing Community To Select 2006 Inventor Of The Year
- 3DQuickPress International Users Conference Announced

- Moldflow Executives to Speak At Conference

You can find the full MCADCafe event calendar here.

To read more news, click here.

-- Jeff Rowe, MCADCafe.com Managing Editor.

Rating: ★★★★☆

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