

# Energized

DEVELOPING  
SKILLS FOR THE  
MAINFRAME  
COMMUNITY

IBM



## Large Systems Thinking

Profiles of **28**  
schools from around  
the globe teaching  
mainframe skills

# Energized

DEVELOPING  
SKILLS FOR THE  
MAINFRAME  
COMMUNITY

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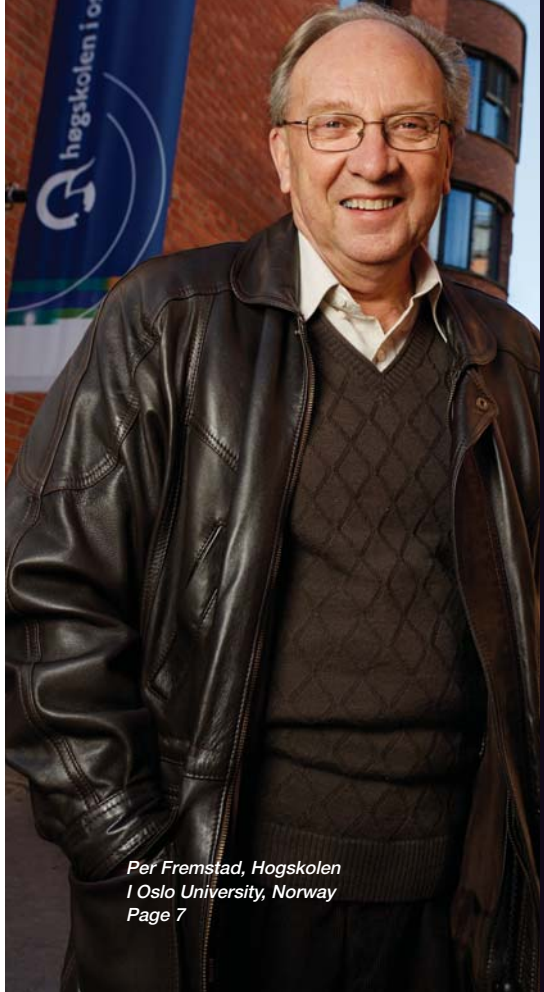


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# IBM Systems

MAGAZINE

220 S. 6th St., Suite 500, Minneapolis, MN 55402  
(612) 339-7571

#### EDITORIAL

##### EXECUTIVE PUBLISHER

Diane Rowell  
(drowell@us.ibm.com)

##### PUBLISHER

Doug Rock  
(drock@msptechmedia.com)

##### EXECUTIVE EDITOR

Evelyn Hoover  
(ehoover@msptechmedia.com)

##### MANAGING EDITOR

Sara Gilbert

##### COPY EDITOR

Caroline Vitse

#### WRITERS

Kristin Lewotsky  
Shirley S. Savage  
Jim Utsler

#### PRODUCTION

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Shari Schumacher

#### PRODUCTION MANAGER

Jonathan Benson

#### PROJECT MANAGER

Kelly Daugherty

#### CIRCULATION

##### CIRCULATION MANAGER

Linda Holm

#### MARKETING

##### ASSOCIATE PUBLISHER

Mari Adamson-Bray  
(mbray@msptechmedia.com)

#### IBM

Kathy Pfeiffer  
IBM Academic Initiative program  
manager, System z

Don Resnick  
IBM external skills leader, System z

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# ENERGIZING MAINFRAME SKILLS

**IT SKILLS** are in demand and the need is growing, especially the need for students who have mainframe or enterprise-systems skills. IBM continues to modernize and simplify the mainframe platform, while partnering with customers, IBM business partners and educators from around the world to build more of the skills that industry demands. This supplement features a sampling of schools from around the globe that are committed to educating students about enterprise systems. They're helping to ensure that there's a thriving pipeline with the skills needed for the mainframe community. →

Submitted photo

IBM Student Mainframe Contest winners.

Numerous complementary and supporting programs are also dedicated to building knowledge and strengthening skills across the mainframe community.

## The IBM Academic Initiative and System z

IT and business-skills requirements are rapidly changing as technology advances. Nowhere is this point more clearly illustrated than in the evolution of the mainframe. The mainframe revolution that began 40 years ago never ended, and neither did the demand for these skills.

An important IBM\* program that schools and the mainframe community can leverage is the IBM Academic Initiative System z\* program. This innovative worldwide program is designed to assist colleges and universities in their education of students in modern mainframe technologies and concepts. Through this initiative, IBM provides:

- Access to mainframes worldwide
- Access to course materials
- A connection with the mainframe community
- Faculty education, awards, contests, etc.

The goal for the Academic Initiative System z program is to build a pipeline of skills for the mainframe community. By working together, members of the mainframe community are helping spread the growth of large systems thinkers. Upon graduation, knowledgeable students will understand the relevance and versatility of the mainframe and possess the necessary in-demand skills for employment by IBM, its customers and IBM business partners worldwide.

There has never been a better time for businesses to partner with academia and leverage the IBM Academic Initiative System z program. You can find more specific information about the IBM Academic Initiative System z program online ([www.ibm.com/university/systemz](http://www.ibm.com/university/systemz)). If you have any questions about the program or would like to become involved, send an email to [zskills@us.ibm.com](mailto:zskills@us.ibm.com). The educators profiled in this supplement have embraced large systems thinking and want to meet the needs of businesses worldwide. Contact them if you have student internship and hiring opportunities.



## IBM Student Mainframe Contest— It Rocks

Since its first run in the United States and Canada in the fall semester of 2005, the Student Mainframe Contest has become a worldwide phenomenon. Students from countries all over

the globe have logged into remote mainframe systems from their dorms, apartments and computer labs to tackle hands-on enterprise computing challenges. All mainframe contests are designed to be accessible to students with no prior large-systems experience. Students start with very simple challenges that allow them to learn their way around. As the contest tasks progress in difficulty, students become eligible to win significant prizes. T-shirts, iPods, laptops, Xbox 360s, Nintendo Wii systems and expenses-paid trips to mainframe labs have all been awarded to deserving college and university students.

For the first time, high-school students were invited to compete in the 2007 U.S. and Canada Master the Mainframe Contest ([www.ibm.com/university/contest](http://www.ibm.com/university/contest)). More than 6,000 students from 700 schools worldwide have competed in mainframe contests sponsored by the Academic Initiative System z program. And several more contests are scheduled to kick off in the coming semesters.



## SHARE and zNextGen— Adding Another Generation to the Mainframe

SHARE, the largest mainframe users' group in the world, is encouraging newcomers to the mainframe platform through its sponsorship of the zNextGen project. As a gateway for newcomers to the mainframe, zNextGen is a growing community of professionals that seeks to expedite its members' professional development in this crucial segment of the IT workforce.

Membership in zNextGen offers these benefits:

- Established IT professionals new to the mainframe can find connections to help them solve mainframe-related technical challenges more efficiently.
- Experienced mainframe specialists gain access to a forum through which they can share their expertise.
- Access to incredible networking opportunities through SHARE, at its twice-annual conferences and through its general membership that includes more than 20,000 enterprise IT professionals representing the world's most sophisticated corporations, institutes of higher learning, government agencies and consultancies.

In partnership with the IBM Academic Initiative, zNextGen has:

- Offered the worldwide IBM System z Entry Level for z/OS\* System Programmer Mastery Test ([www.ibm.com/certify/mastery\\_tests/ovrZ01.shtml](http://www.ibm.com/certify/mastery_tests/ovrZ01.shtml)) at SHARE conferences, giving its members the opportunity to boost their mainframe credentials.
- Held "Head of the Class" sessions at SHARE conference events. In these sessions, attendees get the chance to hear professors from schools around the country discuss their mainframe programs and what IBM, the industry and SHARE are doing to help educate students to meet the needs of industry.

More information and zNextGen membership information can be found online ([www.share.org/Volunteer\\_Center/programs/zNextGen.cfm](http://www.share.org/Volunteer_Center/programs/zNextGen.cfm)).



## IBM DESTINATION z— Online Community

IBM Destination z ([www.ibm.com/systems/destinationz](http://www.ibm.com/systems/destinationz)) is a fast-growing and vibrant community that helps you make the most of your mainframe. This strategic program aims to help businesses adopt, manage and migrate to the mainframe. Destination z provides an online meeting place for customers, systems integrators, IBM Business Partners, software vendors and academic institutions to connect with each other and with mainframe experts to gain access quickly to industry information and solutions.

This online community also offers access to development tools and the latest mainframe solutions, as well as links to platform economics (such as total cost of ownership tools) and case histories that reveal financial and business benefits to running on the mainframe.

Kathy Pfeiffer  
IBM Academic Initiative program manager, System z

**“We’re trying to popularize the knowledge about mainframes.”**

— Elena Galiamova, assistant professor and director, Center of Excellence, Bauman Moscow State Technical University



Submitted photo

Elena Galiamova (center), assistant professor, organizes mainframe seminars for Bauman University students.

**THE MAINFRAME MESSAGE** is reaching students across Russia, thanks to the IBM\* Mainframe Center of Excellence at Bauman Moscow State Technical University in Moscow. A participant in the IBM Academic Initiative Program since 2005, Bauman University officially opened its Center of Excellence on Sept. 11, 2007.

The rising interest in mainframe is demonstrated by the programs offered at Bauman University. “At the beginning, it was just an enrolled course for our department,” says Elena Galiamova, assistant professor and director of the Center. Besides the two mainframe courses taught at Bauman University, Galiamova has organized seminars that have drawn Bauman University students as well as those from five other Moscow universities. Her department is reaching out to 80 other universities, bringing mainframe education to the widest possible audience. “We’re trying to popularize the knowledge about mainframes,” she says.

Her efforts are successful, judging from her students’ enthusiasm. While visiting IBM in Moscow, the students learned about z/OS\*, Parallel Sysplex\*, LPAR “and so many progressive things like WebSphere\*, Rational\*, DB2\* and so on,” Galiamova says. “They asked IBMers many questions. After every answer, a little discussion started. It was really a great experience for students and for IBMers as well.”

Aside from her own enthusiasm, what makes the mainframe curriculum work at Bauman University? “I have a good team—good students and good support from the dean and colleagues,” Galiamova says.

—SHIRLEY S. SAVAGE

#### TO LEARN MORE:

Bauman Moscow State Technical University  
Elena Galiamova  
galiam@bmstu.ru  
<http://mainframe.bmstu.ru/>

**Q&A with Mikhail Egorov, Bauman Moscow State Technical University student.**

**Q:** Was there anything that surprised you when learning about mainframes? Is there anything you’d like to share with other students who may be interested in learning about mainframes?

**A:** I was surprised when I discovered Enterprise General Language (EGL) and Rational Business Developer tooling. It really simplifies developing Web-service apps, Java\* apps and COBOL apps. I was excited adopting and creating learning materials for Russian students.

**Q:** Have you participated in any student mainframe contests or internships? Tell us about your experiences.

**A:** I was in International Technical Support Organization (ITSO), Poughkeepsie, N.Y., as an intern. I was a project leader assistant. It was exciting to take part in a real project and to deliver it to real customers. During my residency, I improved my technical skills and had the opportunity to work closely with some of IBM’s subject matter experts.

# ESTACAO BUSINESS SCHOOL/GROUP AMERICAS, BRAZIL

**“The beauty of the curriculum is that we’re providing students with not only a technical education, but also practical training.”**

— Carlos Oliveira, course coordinator, Estacao Business School/Group Americas

Photo by Jonathan Campos

*Group Americas is providing much-needed mainframe training.*

**IN SHANGRI LA**, as Carlos Oliveira, course coordinator with Group Americas, a non-accredited school in Brazil, calls his hometown of Curitiba, Brazil, there’s a need for mainframe-related skills. This is largely because HSBC Group, a large banking entity with its Latin American headquarters located in Curitiba, has a need for them.

According to Oliveira, HSBC Global Technologies “needs up to 600 people within the next two years who know how to work on the mainframe at different levels.” Adding to that is another business that recently moved to the region and the local government, which is committed to making Curitiba one of the major players in the IT world community.

Because of this massive need for mainframe-ready IT hires, Group Americas has partnered with: HSBC Global Technologies, which will provide mainframe-specific teachers; the IBM\* Academic Initiative, which has structured the courses and offered access to a mainframe in São Paulo, Brazil; and Estação/Ibmec, a large university that’s giving the program accreditation. Already, the program has 104 students enrolled and, with the addition of two new labs in 2008, a total of 990 can be accommodated.

“The beauty of the curriculum is that we’re providing students with not only a technical education, but also practical training, thanks to the rigorous program that includes 200 hours of hands-on classwork. After the first 100 hours, the students who qualify will be hired to work for HSBC Global Technologies,” Oliveira says. “The only reason we don’t have more people enrolled is because we simply don’t have enough room.” —JIM UTSLER

**Q&A with Carlos Oliveira, course coordinator, Group Americas.**

**Q:** Can you share with us what you are doing to help prepare students and build enterprise system (mainframe) skills for the 21st century?

**A:** I’m working at HSBC Bank Brazil in the training department and Americas Group preparing students to work with mainframe tools. My responsibility is to prepare and to teach several courses, including z/OS\*, TSO/ISPF, JCL, COBOL, DB2\* and CICS\*.

**Q:** Do you have any partnerships within the mainframe community that you’d like to share with us? What benefits or opportunities have you or your students experienced as a result of the program or from mainframe community partnerships?

**A:** There is a growing demand for workers and we are preparing our students to help fill that demand.

**Q:** What would you like readers of this magazine to know about your mainframe program and your students?

**A:** I would like readers to know that my students will all be employed by the end of the course.

## TO LEARN MORE:

Estacao Business School  
Carlos Oliveira  
carlos@americas.com.br  
www.estacaoopr.com.br/

## CZECH TECHNICAL UNIVERSITY, CZECH REPUBLIC

Prague

Contact: Martin Bloch, Tomas Oberhuber, Professors  
bloch@fel.cvut.cz; oberhuber@kmlinux.fjfi.cvut.cz  
www.cvut.cz

The Czech Technical University is the first university to provide a mainframe module in the Czech Republic as part of its MSC in Computer Science program. This module covers many aspects of large systems computing including: hardware, OS, database management, system programming, JCL, transaction management, ISPF, DB2\* and WebSphere\* Application Server. Students build z/OS\* and Linux\* on mainframe skills and knowledge through practical application on the mainframe system. Technical experts from the mainframe community work closely with the Czech Technical University in events such as university days to help build awareness in the student and academic community.

## ESTRELLA MOUNTAIN COMMUNITY COLLEGE, UNITED STATES

Avondale, Ariz.

Contact: Jim Nichols, CIS Instructor  
jim.nichols@estrellamountain.edu  
www.estrellamountain.edu

Estrella Mountain Community College offers students and industry professionals the opportunity to build enterprise systems skills through its Introduction to the Mainframe course. This online offering allows students the opportunity and flexibility to study enterprise systems independent of student location and traditional classroom time, while paying low community college tuition rates. Estrella Mountain Community College is planning to expand its enterprise systems in semesters to come.

## FAIRLEIGH DICKINSON UNIVERSITY, UNITED STATES

Teaneck, N.J.

Contact: Dr. Harvey Lowy, Associate Professor of Computer Science and MIS  
lowy@fdu.edu  
www.fdu.edu

Fairleigh Dickinson University provides students with an opportunity to learn about enterprise computing through an online course offering. This course uniquely combines the features of both IBM\* System i\* and IBM System z\* platforms. Students are introduced to the architecture and software of these systems, including the hardware, middleware, system and application software and interfaces to other systems and software products. Students also learn about the security and network communications capabilities of these systems, with a special emphasis placed on the control language, unique file system, application programming languages and data-management services. Fairleigh Dickinson plans to offer a range of courses in IBM System i and IBM System z platforms in both traditional and online formats.

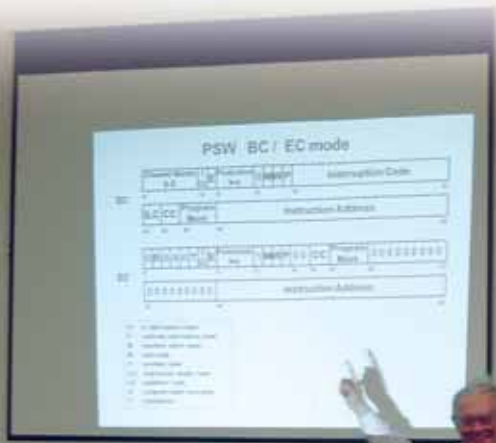
## GEORGIAN COLLEGE, CANADA

Barrie, Ontario

Contact: Tim Pointon, Professor  
tpointon@georgianc.on.ca  
www.georgianc.on.ca/academics/courses/mainframe

Georgian College in Ontario offers students the opportunity to learn about mainframe computing through its z/OS\* Basics course. Due to the success of this offering, Georgian College has expanded its program to include the Enterprise Computing I and II courses. Through lab exercises, students will experience the benefits of the mainframe firsthand. Georgian College has partnered with IBM, local businesses and government mainframe employers to help build student mainframe skills for the 21st century.

Submitted photo



Students tackle the mainframe at Czech Technical University, Prague, Czech Republic.

**“After [students] take the mainframe courses, they [have more knowledge] of the real world, and, yes, many job opportunities, because mainframes are very important in our life.”**

— Fen Wang, professor, Huazhong University of Science and Technology

Submitted photo



Members of the System z power group (pictured) at Huazhong University of Science and Technology can choose from a full curriculum of mainframe courses.

**THE HUAZHONG UNIVERSITY** of Science and Technology (HUST) features a full curriculum of mainframe courses designed to graduate skilled professionals for industry and commerce. “The markets need more and more mainframe persons to take into this industry,” says Professor Fen Wang of HUST. “For students, this is a good opportunity for them to master mainframe technology and have more opportunities to get jobs.”

IBM has been collaborating with the university since 1996, donating a mainframe and software and helping train professors. The program graduates nearly 100 students each year. Students from the program have won international mainframe competitions and the center has collaborated with large banks.

“After taking the mainframe courses, students know many things, such as how the banking systems work,” says Wang. “In the banking system, there can be security, there can be scalability, there can be reliability. After [students] take the mainframe courses, they [have more knowledge] of the real world, and, yes, many job opportunities, because mainframes are very important in our life.”

—KRISTIN LEWOTSKY

#### TO LEARN MORE:

Huazhong University of  
Science and Technology  
Fen Wang  
wangfen@hust.edu.cn  
www.hust.edu.cn/

#### Q&A with Fen Wang, professor, Huazhong University of Science and Technology.

**Q:** Can you share with us what you are doing to help prepare students and build enterprise system (mainframe) skills for the 21st century?

**A:** We do all this work in four ways. First, we take a mainframe course as an elective course in our university, such as Mainframe OS, COBOL, Mainframe Assembler, CICS\*, DB2\*, etc. Then we organize students to attend mainframe contests and direct them. We also cooperate with enterprises to create Mainframe Practice Base and to develop new courses. And finally, we write books and e-learning resources about the mainframe, such as z/OS Fundamentals, ABC of z/OS System Administration, CICS Transaction System, PLI Programming Design, COBOL Program Language and others.

**Q:** Do you have any partnerships within the mainframe community that you'd like to share with us? What benefits or opportunities have you or your students experienced as a result of the program or from mainframe community partnerships?

**A:** We have good collaborations with some business partners, such as IBM and some software outsourcing enterprises. Also, the mainframe courses were set up under the Mainframe University Program, which was collaborated with IBM. We cooperate with a large bank in China to create the Mainframe Practice Base and offer some job opportunities to our mainframe students. Besides, we create new courses with some software outsourcing enterprises.

**Q:** What would you like readers of this magazine to know about your mainframe program and your students?

**A:** I'm glad that more and more people can know about us and our students and would like to cooperate in more widespread aspects with people in the world.



**“One of my goals is to create a familiarity with the mainframe in the university setting, to get students interested in, excited about and familiar with the System z (platform).”**

— Per Fremstad, senior IT specialist, IBM

Photo by Pal Rodiani

*Per Fremstad, senior IT specialist, IBM, teaches an annual mainframe course.*

**IBM\* SENIOR IT SPECIALIST PER FREMSTAD** with the IBM Systems and Technology Group can see the future, especially as it pertains to the mainframe. “My hair’s beginning to get a bit thin, and it won’t be too many years before I and many of my colleagues retire,” he says. “So one of my goals is to create a familiarity with the mainframe in the university setting, to get students interested in, excited about and familiar with the System z\* (platform).”

To that end, he helped establish—and now teaches—an annual one-semester mainframe class. He has also been able to support students doing their master’s theses on the mainframe in concert with the university and IBM customers. He now oversees this program at the Oslo University College in Oslo, Norway.

“I and a couple of other people from IBM approached the school about five years ago with the idea,” he recalls. “They didn’t have a mainframe background there, but a professor we contacted was very enthusiastic about it. So now we have a program that is split into four sections: an introduction to the hardware and hands-on instruction for the operating system, z/OS\*, and z/VM\* and Linux\* on System z. We also have a thesis program that involves real-world internships.”

— JIM UTSLER

#### TO LEARN MORE:

Høgskolen I Oslo University  
Per Fremstad  
[per\\_fremstad@no.ibm.com](mailto:per_fremstad@no.ibm.com)  
[www.hio.no/welcome\\_to\\_ouc](http://www.hio.no/welcome_to_ouc)

**Q&A with Per Fremstad, senior IT specialist, IBM Systems and Technology Group.**

**Q:** Can you share with us what you are doing to help prepare students and build enterprise system (mainframe) skills for the 21st century?

**A:** I started it all and completed this year the fourth year of teaching. Malcolm Beattie from IBM U.K., Claes-Gøran Cedströmer from IBM Sweden and Kristoffer Stav have all been helping me teach. I teach the mainframe basics for a total of 14 full days over 14 weeks in the semester. We also cover Linux and z/VM over these 14 weeks. I have also had two students doing their master theses on the mainframe for their master’s degrees. The two theses covered a comparison of clustering and a comparison of server virtualization.

**Q:** Do you have any partnerships within the mainframe community that you’d like to share with us? What benefits or opportunities have you or your students experienced as a result of the program or from mainframe community partnerships?

**A:** For the master’s thesis it is always three partners involved: the University, IBM and an IBM customer. The master’s student does his thesis onsite at the IBM customer.

**Q:** What would you like readers of this magazine to know about your mainframe program and your students?

**A:** That we do run it in Oslo, and we have been doing so for several years. And that we do have students doing their master’s theses on the mainframe and that some of them have gotten jobs in the mainframe environment.

**“The opportunities are there and we are ready.”**

— Getachew Haile, chair, Computer Science Technology Department,  
Houston Community College



Submitted photo

Professor Steve Linkin (third from right) teaches a COBOL/CICS class at Houston Community College.

**Q&A with Getachew Haile, chair of the Computer Science Technology Department, Houston Community College.**

**Q:** Can you share with us what you are doing to help prepare students and build enterprise system (mainframe) skills for the 21st century?

**A:** With the help of Marc Smith, IBM University Ambassador from IBM Austin, Texas, more than 12 businesses that use IBM mainframes asked us to create a certificate program for our students. The courses for the program include z/OS\*, JCL, Linux\* on System z\* machines, COBOL/CICS\* and Assembly Language. We started offering classes during the spring 2007 semester and the students are expected to complete the program in May 2008. Five students completed internships during summer 2007 and will be hired full time by their co-op sponsors when they graduate.

**Q:** Do you have any partnerships within the mainframe community that you'd like to share with us? What benefits or opportunities have you or your students experienced as a result of the program or from mainframe community partnerships?

**A:** We have Fortune 500 companies using IBM System z machines in Houston, Dallas and the Cleveland area that offered internship opportunities to our students. The students appreciated the training, challenges and hands-on work they completed during their summer 2007 internships. At the end of May 2008, they will go back to work for the companies full time with full-time pay.

**Q:** What would you like readers of this magazine to know about your mainframe program and your students?

**A:** We will train our students with the necessary skills for entry level positions to help fulfill the demand in the mainframe community. IBM's Summer Faculty Seminar in Poughkeepsie, N.Y., is an excellent offering for educators. Educators should take advantage of this opportunity.

**RESPONDING TO DEMAND** from Texas-area businesses, Houston Community College (HCC) launched its IBM\* certification program in the fall 2006 semester to much success. In just a few months, the Academic Initiative has provided benefits in the form of “on-the-job training for our students, resources and faculty training,” says Getachew Haile, chair of the Computer Science Technology Department. Further, being featured on the IBM Web site as an educational partner gives HCC exposure to the wider community of mainframe users.

The initial HCC program is certifying 10 students. Some of those students already have received job offers once they graduate. Others have been redeployed to mainframe jobs at their current employers. That leaves only a few students looking for jobs, and prospects are good they will find employment. At an IBM expo in San Antonio, several people gave Haile business cards so he could contact them when his students were certified.

Haile is also getting the word out to potential students. At the end of September, the college and IBM held a Career Day attended by 275 students from HCC and local high schools, featuring live demos on the System z9\* platform. Haile says about 60 students signed up to explore the certification program.

Thanks to the support from IBM, Haile is “encouraged to carry the banner and show it to students” wherever he goes. “The opportunities are there and we are ready,” he says.

—SHIRLEY S. SAVAGE

**TO LEARN MORE:**

Houston Community College  
Getachew Haile  
getachew.haile@hccs.edu  
<http://csci.hccs.edu/>

### ITESM-CEM, MEXICO

Atizapan de Zaragoza, Edo. de Mexico  
Contact: Roberto Gómez Cárdenas, Professor  
rogomez@itesm.mx  
<http://homepage.cem.itesm.mx/rogomez/zOS.html>

Tecnológico de Monterrey is recognized worldwide for its academic excellence and offers courses of study in foundational mainframe principles. Students gain knowledge in JCL, batch processing, COBOL, networking concepts and z/OS\* security. They also benefit from the knowledge of visiting mainframe professionals as guest lecturers who share their real-world, practical experiences.

### KING MONGKUT'S UNIVERSITY OF TECHNOLOGY THONBURI, THAILAND

Bangkok  
Contact: Dr. Prasert Kantamanont, Assistant Professor, School of IT  
prasert@it.kmutt.ac.th  
[www.kmutt.ac.th](http://www.kmutt.ac.th)

King Mongkut's University of Technology Thonburi (KMUTT) plays a critical role in developing IBM\* System z\* skills in Thailand. The university provides consulting services to many of the country's businesses, helping them understand how to apply large systems architecture to solution business requirements. KMUTT is building a curriculum around Linux\*, z/OS\*, DB2\* and COBOL. The university is integrating System z concepts, solutions and scenarios into its undergraduate and graduate computer science curricula.

Submitted photo

### MARIST COLLEGE, UNITED STATES

Poughkeepsie, N.Y.  
Contact: Angelo F. Corridori, Director of Large Systems Education  
angelo.corridori@marist.edu  
[www.idcp.org/learnzos](http://www.idcp.org/learnzos)  
[www.marist.edu](http://www.marist.edu)

Marist College is a recognized leader in technology education. The college's IBM\* System z\* Certificate Program is a three-year professional development program designed to develop the skills that a participant will need to work as a professional who manages mission-critical System z installations. The online Certificate Program is available worldwide and has enjoyed considerable growth since its inception. The first module prepares participants to take the IBM z/OS\* System Programmer Mastery Exam. This year's program includes more than 165 working professionals and college students.

### NORTH CAROLINA CENTRAL UNIVERSITY, UNITED STATES

Durham, N.C.  
Contact: Cameron Seay, Lead Professor,  
Computer Information Systems  
cseay@ncu.edu  
[www.ncu.edu](http://www.ncu.edu)

Capitalizing on the unique opportunities provided by its location in the Research Triangle Park area, North Carolina Central University (NCCU) provides dynamic, global management education to a diverse student population. Students at NCCU learn about foundational enterprise systems principles in the Introduction to the new Mainframe z/OS\* Basics course. This course explores the z/OS operating system, user interfaces, batch and online workload processing, system security and a mainframe-hardware overview. Lab exercises provide the students with hands-on experience. The program at NCCU has provided students with many opportunities, including internships and jobs at major financial institutions.

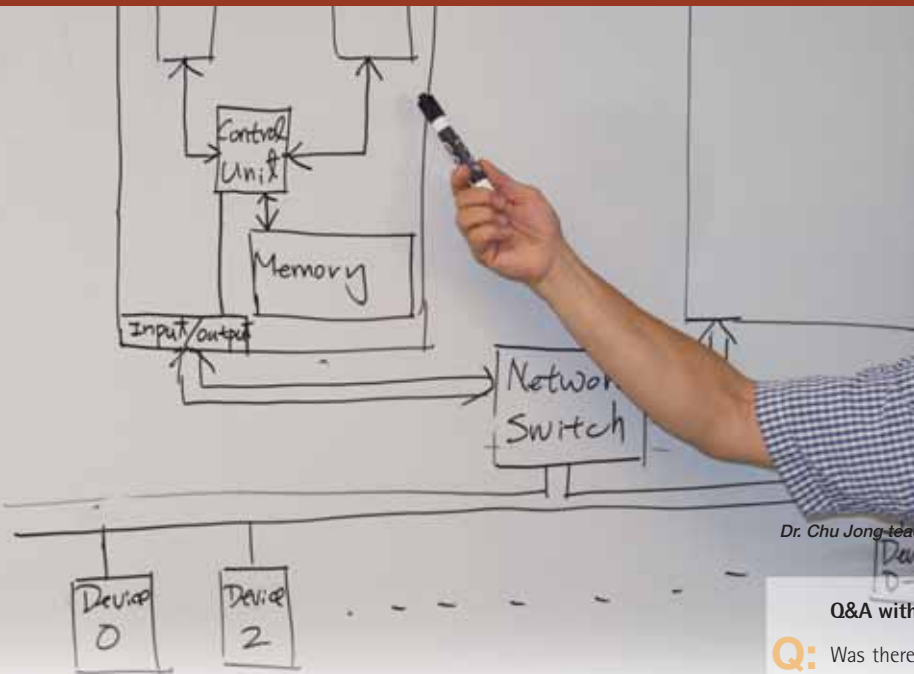
King Mongkut's University of Technology Thonburi, Bangkok, Thailand, plays a critical role in developing System z skills in the country.



**“We can now graduate students who can help build the next generation of integrated enterprise computing systems — and help remedy the retirement requirement.”**

— Dr. Chu Jong, assistant professor and Enterprise Computing Systems program coordinator, School of Information Technology, Illinois State University

Submitted photo



Dr. Chu Jong teaches a mainframe course at Illinois State University.

## Q&A with Yan Cui, Illinois State University student.

**Q:** Was there anything that surprised you when learning about mainframes? Is there anything you'd like to share with other students who may be interested in learning about mainframes?

**A:** IBM mainframe's capabilities are amazing. It handles many things that a PC or server can't. You can write different programming languages, such as C, C++, Java\*, etc., and implement them in mainframe. Also, mainframe has the capability to contain various database systems, provide high security, zero down-time, fast networking and more. I believe that you will find lots of fun working on IBM mainframe.

**Q:** Have you participated in any student mainframe contests or internships?

**A:** I participated in the 2006 IBM Mainframe Contest and 2007 Citigroup summer internship. After completing the contest and internship program, I gained great and advanced mainframe knowledge, including TSO, ISPF, CICS\*, JCL, REXX, CLIST, IOF, SPME, WebSphere\*, UNIX\*, etc. These practical experiences help me understand more about IBM mainframe technology. However, because the mainframe field is so broad, I will keep learning more and also enjoying the challenges.

**Q:** How do you think enterprise system (mainframe) courses help prepare you for a job in the IT field?

**A:** The enterprise system courses are helping us develop IBM mainframe knowledge and technical skills. I learned important concepts, principles, terminologies, architecture and more from the classes at Illinois State University. These courses also provide hands-on experiments. All learning materials are advanced and tightly related to the outside world. I believe its purpose is to help us prepare mainframe-related jobs.

**ILLINOIS STATE UNIVERSITY'S** School of Information Technology has long had an established relationship with local businesses. In fact, one business gave the school a grant to build a lab and others provide funds for internships and developments. So it was of little surprise that they came back to the school to ask for help with what Dr. Chu Jong, assistant professor and Enterprise Computing Systems (ECS) program coordinator with the School of Information Technology, calls their “retirement requirements—or their need for future mainframe experts.”

Because of industry demands, the school began to consider developing courses. At the same time, Illinois State's Administration Information Systems department, which runs many of the university's back-office operations, had just upgraded to a new IBM® System z® platform. When IBM became involved in the new course development, it decided to, as Jong explains, “provide extra hardware in the form of a partition on that new machine and the software we needed to help in that development.”

The result was the new ECS program, which is scheduled to be part of the School of Information Technology's sequences in both Computer Science and Information Systems degree programs. Thanks to that development, the school's existing COBOL and JCL courses have been augmented with a number of others that are mainframe system, architecture and infrastructure specific. “We can now graduate students who can help build the next generation of integrated enterprise computing systems—and help remedy the retirement requirement,” he says.

— JIM UTSLER

### TO LEARN MORE:

Illinois State University  
Dr. Chu Jong  
cjong@ilstu.edu  
www.itk.ilstu.edu/ECS

**“At the university level, mainframe education must become an integrated part of the curriculum.”**

— Dr. Wilhelm G. Spruth, professor,  
Leipzig University

Photo by Jan Mielke

*Dr. Wilhelm G. Spruth, professor, Leipzig University, teaches courses on the System z platform in the z/OS Competence Center at the Department of Computer Science.*

**PROFESSOR DR. WILHELM G. SPRUTH** is determined that the IBM® System z® platform advanced characteristics will no longer be “a well-kept secret.” From his post in the z/OS® Competence Center at the Department of Computer Science at Leipzig University in Germany, Spruth is spreading the word that the “System z (platform) is the most modern and advanced software and hardware architecture around.”

Students can see for themselves—in Spruth’s classes and in the center—that the System z platform has technologies that aren’t available on any other platform, such as virtualization and the coupling facility. An advocate extraordinaire for the System z platform, Spruth believes, “At the university level, mainframe education must become an integrated part of the curriculum.”

Since the center has its own z900 computer and Enterprise Storage Server® dedicated exclusively to academic education and research. Students can learn about z/OS®.

In addition to authoring a textbook on z/OS, Spruth and his team support students at 12 schools and have developed 20 tutorials, including CTG, WDz and WebSphere® for z/OS. Their efforts are making a difference. “It’s very slow going, but we are turning the situation in Germany around,” Spruth says, adding, “I can’t save the universe, but maybe I can do something with a couple of German schools.”

—SHIRLEY S. SAVAGE

#### TO LEARN MORE:

Leipzig University  
Dr. Wilhelm G. Spruth  
spruth@informatik.uni-leipzig.de  
www.uni-leipzig.de/

#### Q&A with Dr. Wilhelm G. Spruth, professor, Leipzig University.

**Q:** Can you share with us what you are doing to help prepare students and build enterprise system (mainframe) skills for the 21st century?

**A:** We’re teaching z/OS classes at several German schools. I’ve authored a textbook “Introduction to z/OS.” And we are maintaining our own z900 system at Leipzig University with z/OS 1.8, z/VM® and Linux® on System z. We’ve also developed 20 tutorials for student lab exercises, including WebSphere for z/OS, CTG, and use of WDz, and we are assisting 12 German schools running student exercises on our system using our tutorials. We have had presentations at several conferences and 12 papers published in technical journals ([www-ti.informatik.uni-tuebingen.de/~spruth/publish.html](http://www-ti.informatik.uni-tuebingen.de/~spruth/publish.html)).

**Q:** Do you have any partnerships within the mainframe community that you’d like to share with us? What benefits or opportunities have you or your students experienced as a result of the program or from mainframe community partnerships?

**A:** Close cooperation with IBM Germany, especially the IBM lab at Boeblingen, Germany. We’re also in cooperation with several IBM business partners.

**Q:** Have you participated in any conferences or events relating to or written any papers about your mainframe program and experiences?

**A:** We’ve had presentations in several technical conferences, including Guide/SHARE Germany, as well as 12 papers published in technical journals ([www-ti.informatik.uni-tuebingen.de/~spruth/publish](http://www-ti.informatik.uni-tuebingen.de/~spruth/publish)).

**“Thanks to this approach, we can produce students with strong bullet points on their résumés.”**

— Yannis Viniotis, professor of Electrical and Computing Engineering, North Carolina State

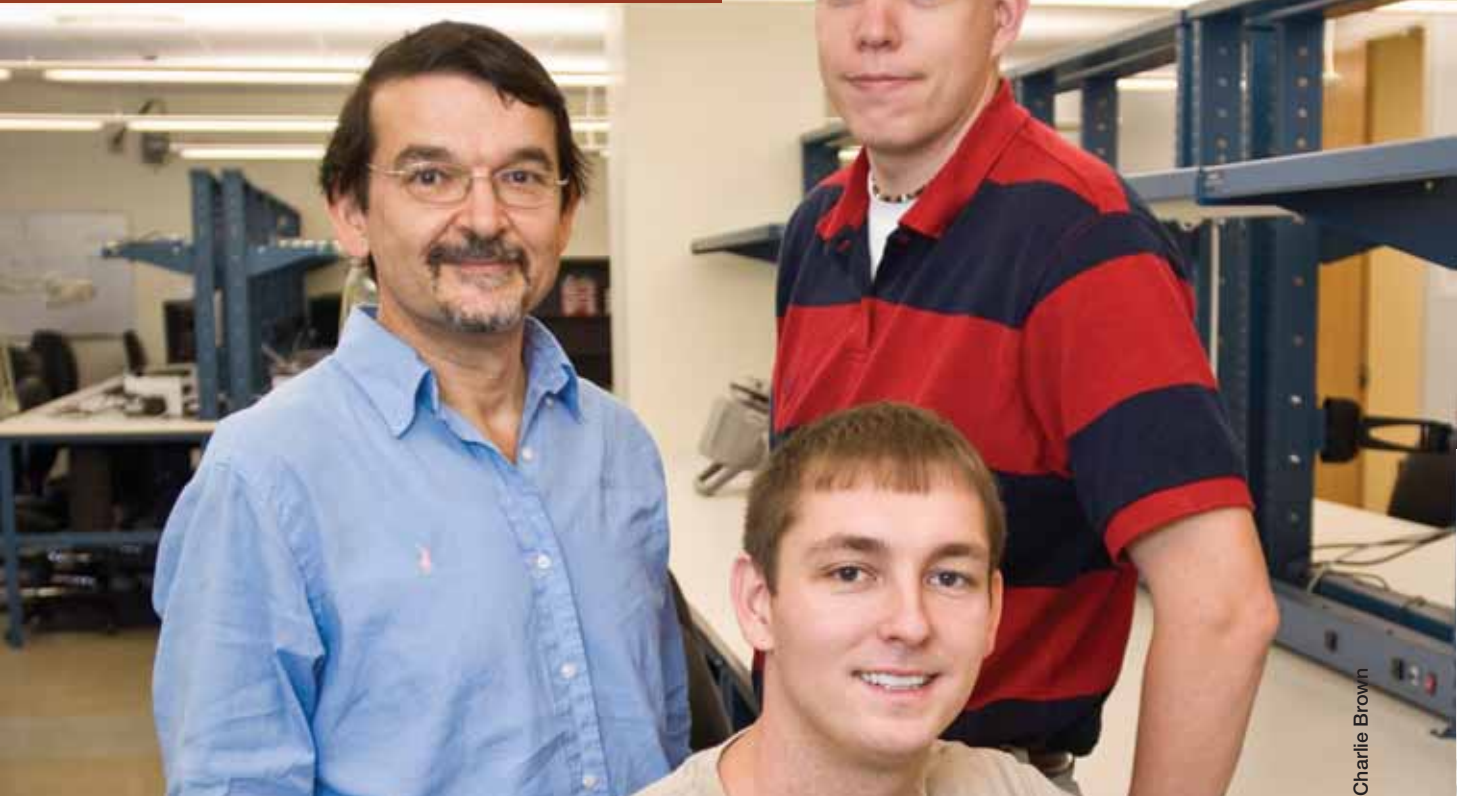


Photo by Charlie Brown

**WHEN IBM ACADEMIC INITIATIVE** System z program manager Kathy Pfeiffer and System z external skills leader Don Resnik approached Yannis Viniotis, professor of Electrical and Computer Engineering with North Carolina State University and associate department head, about the possibility of establishing a mainframe program at the school, he was initially a bit reluctant. “In the typical academic environment, it can be difficult to find professors who can teach everything they wanted to include in the course, including System z architecture, operating systems, applications and networking,” he says.

Rather than be deterred, however, Viniotis, Resnik and Pfeiffer convened a roundtable of 14 schools in the region. Together they created a Senior Design Project course that would take the teaching onus off the universities and allow IBM and several of its customers to take over that duty.

In the case of North Carolina State, mainframe experts from Tivoli\* teach what Viniotis calls a “basic training course,” which includes an in-depth introduction to the System z platform that’s followed by internships with IBM customers running mainframes and subsequent independent mainframe project work. As Viniotis succinctly describes the program, “Once the students have gone through the basic training, they then spend a co-op with a company and then take the Senior Design Project with a project the company has specified. Thanks to this approach, we can produce students with strong bullet points on their résumés.” —JIM UTSLER

*Students like Justin Jaynes and Joshua Liley (pictured) are introduced to the System z platform in Professor Yannis Viniotis’ (left) basic training course.*

**Q&A with Yannis Viniotis, professor of electrical and computer engineering, North Carolina State University.**

**Q:** Can you share with us what you are doing to help prepare students and build enterprise system (mainframe) skills for the 21st century?

**A:** I am introducing a Senior Design Project course; in this course, students work on projects that are System z platform-related.

**TO LEARN MORE:**

North Carolina State University  
Yannis Viniotis  
candice@ncsu.edu  
www.ncsu.edu/

### NORTHERN ILLINOIS UNIVERSITY (NIU), UNITED STATES

DeKalb, Ill.

Contact: Dr. Robert P. Rannie, Professor Emeritus of Computer Science  
rrannie@cs.niu.edu

[www.cs.niu.edu/](http://www.cs.niu.edu/) (Select Graduate Programs >Areas of Emphasis>Enterprise Area)

The graduate and undergraduate programs at Northern Illinois University (NIU) emphasize many mainframe topics, including IBM\* Assembly Language, JCL, utilities and systems programming. NIU specializes in enterprise computing concepts, which leverage mainframe strengths while addressing the mainframe's integration with other operating systems, languages and hardware. Jason Arnold, a student from NIU, finished third (out of 750 students) in the 2005 IBM Master the Mainframe student contest.

### REPUBLIC POLYTECHNIC, SINGAPORE

Contact: Tay Kheng Tiong, Director, Centre for Professional Development  
tay\_kheng\_tiong@rp.sg  
[www.rp.sg](http://www.rp.sg)

In November 2006, the Republic Polytechnic (RP) announced the RP Enterprise Computing Learning Centre. The Centre, which includes the IBM\* System z\* platform, is used to educate traditional students and continuing education industry practitioners. Programs of study at the Centre include mainframe computing, z/OS\* basics, JCL, DB2\* programming and administration, CICS\* and WebSphere\*.

### SCHOOL OF SOFTWARE ENGINEERING, TONGJI UNIVERSITY, CHINA

Shanghai

Contact: Huang Jie, Director, IBM Center of Tongji University  
huangjie@mail.tongji.edu.cn  
<http://sse.tongji.edu.cn>

One of the leading universities in China, Tongji University is an important participant in building a mainframe educational program. The School of Software Engineering is dedicated to providing training and research programs and to enhancing academic/industrial cooperation. Students are educated in both theoretical and practical mainframe skills, and graduates are highly sought after by major Fortune 500 companies. Core course offerings include mainframe principles and operating systems foundations.

### STEVENS INSTITUTE OF TECHNOLOGY, UNITED STATES

Hoboken, N.J.

Contact: Paul Rohmeyer  
paul.rohmeyer@stevens.edu  
<http://howe.stevens.edu/academics/graduate-programs/enterprise-systems/>

The IS Enterprise Systems Master's Degree and Certificate Programs offer exposure to enterprise systems, providing IT professionals with a broad overview of the large systems technical environment while emphasizing IS-management issues. The program is available as a concentration in both the MSIS and MBA degrees as well as a four-course graduate certificate.

**The Mainframe Program Opening Ceremony marked the beginning of mainframe studies for students at Tongji University, China.**

Submitted photo



**“I think the dependability of the mainframe and its processing power are two things students are truly impressed with.”**

— François Des Jarlais, professor, Ryerson University

*Computer Science Professor Joshua Panar is developing a mainframe course for senior undergraduates at Ryerson University.*

**TORONTO'S RYERSON UNIVERSITY** is taking a two-pronged approach to mainframe education—undergraduate education and continuing education for those already in the industry.

Continuing Education Academic z/OS\* Coordinator and main instructor François Des Jarlais spearheads the school's continuing education certificate program in this area. “We're really addressing an industry need,” he says. “Private sector partners have expressed concern about the generational change they see taking place in their IT departments. [They see] the older mainframe people leaving over the next five years and they don't see anybody coming behind them. We're training people who will be able to fit into development teams upon completing the certificate.”

Meanwhile, Computer Science Professor Joshua Panar, with the help of an IBM\* mentor, is developing a mainframe course for senior undergraduates that will cover everything from machine layout to Assembly Language. “The fact that there are good job opportunities is getting serious attention from students,” Panar says. “In the end, the effort benefits the university, it benefits IBM, and it benefits the clients out there who need personnel.”

Through IBM, the university also has access to texts and materials as well as time on an offsite mainframe that students access using a terminal-emulation program. “I think the dependability of the mainframe and its processing power are two things students are truly impressed with,” says Des Jarlais.

—KRISTIN LEWOTSKY

**TO LEARN MORE:**

Ryerson University  
Joshua Panar, François Des Jarlais  
francoisdesjarlais@yahoo.ca  
www.ryerson.ca/ce/mainframe

**Q&A with Joshua Panar, computer science professor, Ryerson University.**

**Q:** Can you share with us what you are doing to help prepare students and build enterprise system (mainframe) skills for the 21st century?

**A:** I am writing a new Introduction to z/OS\* Mainframe Systems, a semester-length course for our senior computer science undergraduate students to start in January 2008. As opposed to the specific courses in the usual IBM\* mainframe curriculum, it is intended to be a relatively comprehensive course and is being generated with the greatly appreciated assistance of mainframe specialists from IBM in Toronto. In addition to the usual z/OS overview course material, a particular emphasis on the physical characteristics of mainframe systems is being stressed.

**Q:** Do you have any partnerships within the mainframe community that you'd like to share with us? What benefits or opportunities have you or your students experienced as a result of the program or from mainframe community partnerships?

**A:** Through the IBM mainframe technical support personnel in Toronto, we have had excellent discussions with a major government mainframe center here in Toronto and expect this will provide excellent employment opportunities for our students; in addition, major banks located in Toronto have similarly expressed a strong interest and support for the course. IBM itself has been most supportive. I was able to arrange to have a week-long seminar session led by IBM mainframe personnel at Ryerson, which was attended by faculty and technical support staff with a view to the implementation of the new z/OS courses at Ryerson (in computer science and through continuing education).

**Q:** What would you like readers of this magazine to know about your mainframe program and your students?

**A:** The computer science students completing this course will be ideally suited to progress in many areas of mainframe computing at present and especially into the future. The natural expectation is that these computer science students would follow systems programming career paths, but their strong Linux\*, networking and database backgrounds should serve them well in a variety of mainframe career choices.

Photo by Anita Zvonar



**“We thought this was a way for them to see bigger problems in action, and bigger solutions against those problems.”**

— David Dischiavé, director, Information Management Graduate Program, Syracuse University

*David and Susan Dischiavé offer an enterprise technologies course.*

Submitted photo

## AT THE SYRACUSE UNIVERSITY

School of Information Studies, Information Management Graduate Program Director David Dischiavé and Instructor Susan Dischiavé realized that students weaned on PCs and PDAs have a significant gap in their knowledge base.

“They think that to solve any kind of problem, they just take a PC and voilà, it’s solved,” David Dischiavé says. “Not all problems are that simple. There are lots like the Visa problem, where you have to process 60 billion credit-card transactions. To solve these kinds of problems, the technology they’re familiar with won’t work.”

To bring students up to speed, the pair launched an enterprise technologies course. “This is a great way to introduce our students to much larger, more complex systems like the System z\* computing platforms,” DiSchiavé says. “We thought this was a way for them to see bigger problems in action, and bigger solutions against those problems.”

The professors have access to a virtual machine on a System z server housed at the IBM\* Innovation Center in Dallas. VM technology provides a secure computing environment. “We’re separate from anybody else who’s using that machine, so we can’t clobber them and they can’t clobber us,” says Susan DiSchiavé. “Anything we do does not affect anyone else and that’s kind of neat.”

—KRISTIN LEWOTSKY

### TO LEARN MORE:

Syracuse University  
David Dischiavé, [ddischia@syr.edu](mailto:ddischia@syr.edu)  
Susan Dischiavé, [sadischi@syr.edu](mailto:sadischi@syr.edu)  
[www.ischool.syr.edu/](http://www.ischool.syr.edu/)

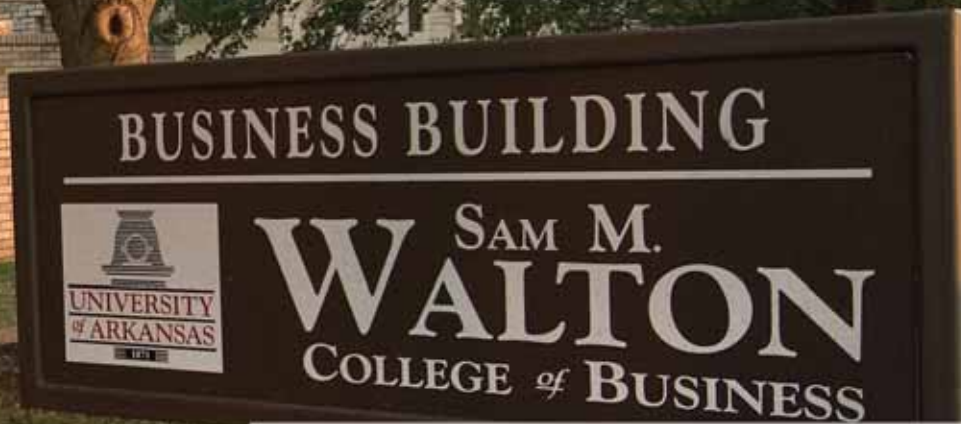
### Q&A with David Dischiavé, School of Information Studies, Information Management Graduate Program director, and Susan Dischiavé, instructor, Syracuse University.

- Q:** Can you share with us what you’re doing to help prepare students and build enterprise system (mainframe) skills for the 21st century?
- A:** We’ve developed a new course that addresses management and technical architecture that comprise enterprise computing environments. The course will focus on identifying and solving large complex problems; creating application-development policies, standards and guidelines; software procurement versus custom development; operating-system selection: z/OS\*, Linux\*, Windows\*; various integrated development environments; software reuse design, software maintenance; change control and configuration management; technical training; and managing technical people. This course will have hands-on exercises using z/VM\*, z/OS, WDz, ISPF, MQ Series\*. We have also integrated DB2\* into our database-management systems courses.
- Q:** Do you have any partnerships within the mainframe community that you’d like to share? What benefits or opportunities have you or your students experienced as a result of the program or from mainframe community partnerships?
- A:** We are working with JP Morgan Chase on enterprise system curriculum development and are reaching out to a number of large organizations.
- Q:** What would you like readers of this magazine to know about your mainframe program and your students?
- A:** Our program is interdisciplinary and is designed for the IT professional who aspires to be mid- to senior-level management. We’re integrating both management principles for managing large complex enterprise-computing environments and introducing the students to large complex computing systems through hands-on lab exercises. Our students will have a blend of organizational management and large complex systems technology experiences.

**“Students recognize that it’s a viable platform to learn about, that it’s a good career choice, and that it’s going to be around.”**

— David E. Douglas, professor, University of Arkansas

Submitted photo



*The University of Arkansas received its first mainframe in 2000.*

**PROMOTING MAINFRAME KNOWLEDGE** within the University of Arkansas (UA) as well as outside the campus is the main objective of Professor David E. Douglas of the Information Systems Department at the Sam M. Walton College of Business. The department received its first mainframe system, an S/390\*, in 2000 and is currently installing a z900. According to Douglas, besides being a tool for UA students, the new mainframe gives the school "a powerful enough platform to allow other universities to teach and use the system."

The University of Arkansas has many unique assets that will benefit students no matter where they are. "We have large transaction datasets. We're an SAP Alliance University and run SAP Business Warehouse under Linux\* and a z900 using DB2\* as the database," Douglas says. Sharing those capabilities with his students as well as other students and faculty is key. "What's important is the collaboration and synergy of working with faculty members worldwide that will result in us having better ideas and better course modules to teach," he says.

It also allows the university to promote mainframe education, ensuring that "the students recognize that it's a viable platform to learn about, that it's a good career choice, and that it's going to be around," Douglas says. — SHIRLEY S. SAVAGE

Q&A with David E. Douglas, professor, Sam M. Walton College of Business, University of Arkansas.

**Q:** Can you share with us what you are doing to help prepare students and build enterprise system (mainframe) skills for the 21st century?

**A:** I teach two courses specifically targeted for students to acquire mainframe knowledge and skills. The first is an introduction to enterprise servers and the second is an introduction to enterprise transaction systems. The first course includes Linux. We also provide access to learning SAP BW running on a mainframe. We serve as an IBM\* hub so external academic uses can access the UA mainframe.

**Q:** Do you have any partnerships within the mainframe community that you'd like to share with us? What benefits or opportunities have you or your students experienced as a result of the program or from mainframe community partnerships?

**A:** We are an SAP Alliance University, and we run SAP in Linux on the mainframe using DB2 as the database engine. Our students have increased internship opportunities as well as jobs upon graduation if they have mainframe knowledge and skills.

**Q:** Have you participated in any conferences or events or written any papers relating to your mainframe program and experiences?

**A:** I've been promoting our mainframe programs at many conferences. These include the Americans Conference on

Information Systems, the Decision Sciences Institute as well as the Hawaiian International Conference for Systems Science.

**TO LEARN MORE:**

University of Arkansas  
David E. Douglas  
ddouglas@walton.uark.edu  
<http://enterprise.waltoncollege.uark.edu/systems.asp?show=IAI>

#### UNIVERSIDAD ABIERTA INTERAMERICA, ARGENTINA

Ciudad autónoma de Buenos Aires  
Contact: Jorge Colombo, Ingeniero en Sistemas  
jorge.colombo@vaneduc.edu.ar  
www.uai.edu.ar

This year the university began to develop the introduction program to mainframe with the support of IBM\* Argentina. More than 40 students signed up for the course. For the practices, the university had virtual access through IBM to a mainframe in Brazil. Thus, for the first time many students were able to access a mainframe in which they could develop various practices. The university will be repeating the experience this semester. IBM is correctly promoting the knowledge and education of mainframe and allowing future graduate students a wider technical panorama.

#### UNIVERSIDADE METODISTA DE PIRACICABA, BRAZIL

Piracicaba, Sao Paulo  
Contact: Antonio Lacerda, Professor  
alacerda@unimep.br  
www.unimep.br

Universidade Metodista de Piracicaba (UNIMEP) in Brazil offers students the opportunity to complete a qualification program in IBM\* technologies. The mainframe program's topics and application languages include COBOL, z/OS\*, PL1 and DB2\*. More than 100 students have participated in this program.

#### WEST TEXAS A&M UNIVERSITY, UNITED STATES

Canyon, Texas  
Contact: H. Paul Haiduk, Computer Science Program Coordinator  
h.paul.haiduk@cs.wtamu.edu  
www.wtamu.edu for the University and <http://cs.wtamu.edu/cs> for the Computer Science program

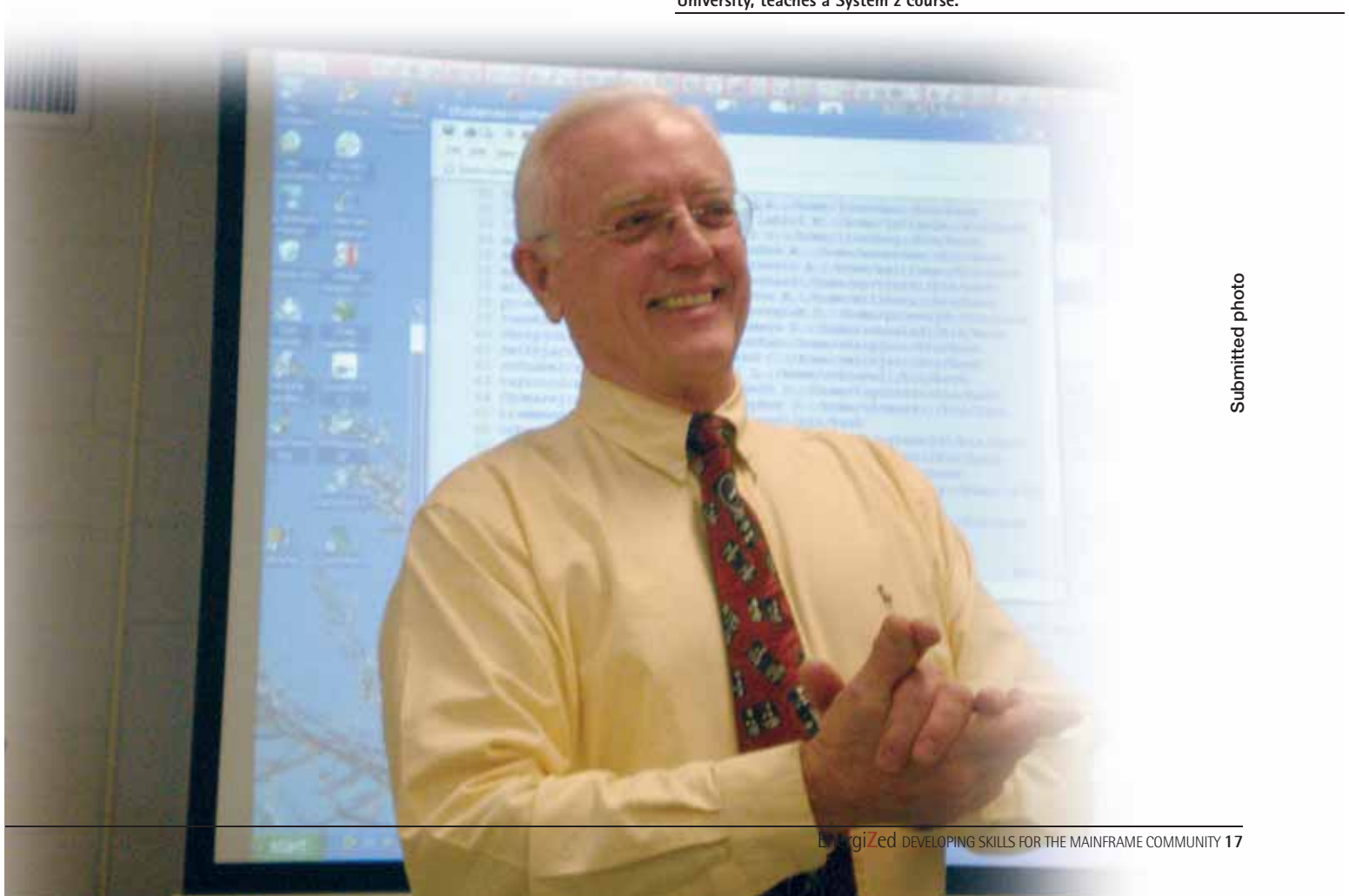
West Texas A&M University has launched, this academic year, its completely redesigned curriculum in computer science with a focus on enterprise computing and mainframes. The program, unique in the southwest, is designed so a student is provided a breadth and depth of knowledge of the classical concepts in computer science and software engineering and can apply these concepts through a focus on enterprise computing using the IBM\* z/Architecture and its operating systems.

#### WIDENER UNIVERSITY, UNITED STATES

Chester, Pa.  
Contact: Dr. Suk-Chung Yoon, Chair, and William R. Bailey, Endowed Professor  
syoon@mail.widener.edu  
www.widener.edu

Wideners Large Systems Computing (LSC) program provides an innovative center of excellence in large systems mainframe computing. This center of excellence features the unique experience, assets and expertise of Widener University, IBM and other Fortune 500 companies. Students gain knowledge and experience through a combination of classroom training, exploration of research problems, hands-on application on the mainframe, and experience through co-op assignments and internships.

**H. Paul Haiduk, computer science program coordinator, West Texas A&M University, teaches a System z course.**



Submitted photo

**“Students get surprised by how much of the functionality is replicated to offer redundancy and reliability. At first they wonder why, but then they realize that redundancy and reliability are essential to mission-critical applications like the ones that run on mainframes.”**

— Filippo Sorbello, professor, University of Palermo

**STUDENTS AT THE UNIVERSITY OF PALERMO** are getting an education in mainframes courtesy of the school's computer architecture class, which includes a short course segment on big iron.

“In recent years, students believe that the PC is all you can have with computer architecture, which clearly is not the case,” says Professor Filippo Sorbello. “At first they are in a sort of disbelief that you can do the same things with a mainframe but in a totally different way, and then it gets through to them that other things that are simply not feasible on a PC can be done on a mainframe.”

The university began developing the course material five years ago, with the assistance of IBM. “There was added value in selecting an instructor coming from industrial experience, and in particular from IBM, because the coursework, the terminology used and the approach to the description of the material is somewhat different from what you would be able to find in the literature,” Sorbello says. “It provides a hands-on experience from the perspective of a person who uses those systems every day.”

In particular, the robustness of the mainframe comes as a revelation. “Students get surprised by how much of the functionality is replicated to offer redundancy and reliability,” says Sorbello. “At first they wonder why, but then they realize that redundancy and reliability are essential to mission-critical applications like the ones that run on mainframes.”

—KRISTIN LEWOTSKY

#### TO LEARN MORE:

University of Palermo  
Filippo Sorbello  
[sorbello@unipa.it](mailto:sorbello@unipa.it)  
[www.unipa.it/](http://www.unipa.it/)



INGEGNERIA

*Students at University of Palermo learn about mainframes in the computer architecture class.*

#### Q&A with Filippo Sorbello, professor, University of Palermo.

**Q:** Can you share with us what you are doing to help prepare students and build enterprise system (mainframe) skills for the 21st century?

**A:** The University at Palermo has had a mainframe curriculum in place for several years. It has been modified to meet student and business needs.

**Q:** What would you like readers of this magazine to know about your mainframe program and your students?

**A:** The mainframe course has been delivered inside the main course of “Architetture avanzate dei calcolatori” (“Advanced architectures of the computers”) at Palermo University in order to provide students with IBM expertise in the mainframe field. Students seem to appreciate this initiative, often participating in long discussions in the course and passing with good ratings on the final test about the IBM course.