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Spring 2013
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Technology Management Workforce

Faculty and administrators associated with Colleges of Technology around the country have long held the belief that the country needs more smart people who have the knowledge and skills to conceive, build, operate, manage and maintain advanced technological systems. Efficiency (workflow as well as energy and environmental issues) and safety associated with these systems are important metrics as well as the interface of workers to the technical systems and broader socio-economic impacts. Academics are not the only ones with these interests. Insightful business, government and industry leaders share the same concerns because they understand that these issues affect their bottom-line.

In a May 2013 Congressional Research Service Report to Congress (Sargent, J. F, May 2013), data present an intriguing picture of the contemporary and near-term future of the U.S. science and engineering (S&E) workforce. Of primary importance to us is the data about science and engineer management workers who make up about 9% (532,870) of the entire 5.9 million strong S&E workforce. S&E manager category includes computer and information systems managers, architectural managers, engineering managers, and natural science managers. The other occupational areas in the entire field are: computer occupations, engineers, life scientists, physical scientists and mathematical occupations. It is important to note that this report does not segment educational attainment associated with occupational fields. Therefore, like many occupational reports, the data does not segment the impact of graduate degrees on one’s ability to apply high-level problem-solving, research, analysis, and system design knowledge and skills in a workplace. It makes sense to extrapolate the findings about wages and critical need to a higher level than the mean data presented in the report.

According to the report, science and engineering managers make a mean wage near $120,000. This is the highest reported mean wage of other S&E occupations and about one-third higher than most. In fact, architectural and engineering managers rank highest with a mean salary of $129,000. The good news continues when considering the unemployment rates for S&E managers reported to be at 2.3% which is the lowest level of all S&E occupation groups. Architecture and engineering managers seem to have the lowest unemployment rate at 1.6%.

The numbers of those employed in S&E occupations grew in each category with the S&E manager category growing the most at a 2% annual growth rate, however within this occupation group, the growth rate for architectural and engineering managers grew only 0.4%. The employment projections for the S&E managers to 2020 is modest at 6.8%. This will amount to over 100,000 new workers in the field increasing the total projected workforce to be 608,800.

Clearly the field of STEM education has a vital role in preparing a workforce which will enable the U.S. to provide technological leadership in productivity, innovation, energy conservation, and
environmental restoration. Those with advanced degrees will lead the way. A PhD in Technology Management has never been more important.

Source:
RECOGNITIONS

James Smallwood Receives Caleb Mills Distinguished Teaching Award

In 2002, Dr. Smallwood joined the College of Technology faculty. He teaches undergraduate and graduate courses in technology management and manufacturing and is the coordinator of the bachelor's degree in technology management program. In addition, he is a long-time PhD program faculty member. He is a certified manufacturing technologist with the Society of Manufacturing Engineers.

Randy Peters Named Faculty Distinguished Service Award Recipient

Dr. Randy Peters has received the 2013 Faculty Distinguished Service Award in recognition of outstanding contributions outside the classroom.

Dr. Peters has been an Indiana State faculty member for 10 years and has been involved in university service via the Faculty Senate and Foundational Studies Council. His professional involvement includes the Association of Technology Management and Applied Engineering, which he has served as division president. He is a visiting team chair for accreditation and as a peer reviewer for the organization's professional journal.

American Society for Quality Names James Bossert Editor for Six Sigma Forum Magazine

Dr. James Bossert was recently named editor of ASQ's Six Sigma Forum Magazine. Dr. Bossert works as a program manager for Bank of America, and earned his Ph.D. in technology management, specializing in quality systems from Indiana State University.

Dr. Bossert, as ASQ Fellow, has received numerous awards, including the ASQ Distinguished Service Medal; Academician, Center for Quality and Applied Statistics; best of Six Sigma Project, Bank of America; and has been a Malcolm Baldrige National Quality Award Examiner.
OUR GRADUATES


Dr. Sandra Serkownek specialized in Human Resource Development and Industrial Training at her home institution of Bowling Green State University. She successfully defended her dissertation, “Identification of Influential Promotion Decision Determinants for Advancement to First-Level Manufacturing Supervisor” in October 2012 and graduated in Fall 2012.

Dr. Barbara Boroughf specialized in Human Resource Development and Industrial Training at her home institution of Bowling Green State University. She successfully defended her dissertation, “An Examination of the Relationship between Transformational Leadership Tendencies and Safety Outcomes in Selected Manufacturing Settings” in October 2012 and graduated in Fall 2012.


Dr. Dean Bartles specialized in Manufacturing Systems at his home institution of University of Central Missouri. He successfully defended his dissertation, “An Experiment to Assess the Utilization of Adaptive Control Technology on a CNC Lathe to Reduce Energy Consumption During Machining: A Step Towards Environmentally Conscious Manufacturing” in March 2013 and graduated in Spring 2013.

Dr. John Patton specialized in Construction Management Systems at his home institution of Indiana State University. He successfully defended his dissertation, “Task Diminishment: Construction Value Loss due to Sub-Optimal Task Execution” in March 2012 and graduated in Spring 2013.
Construction Management

Project alliancing and building construction partnerships are becoming more attractive to construction contractors and professionals as an alternative tool of construction project management; and to deliver efficiencies in terms of cost, time and quality values. Alliancing are generally represented as strategic or project-based, depending on the length of relationship. Strategic alliancing are long-term maneuvers used to promote the strategic interests of parties and may not be limited to specific projects. Project-based alliancing are formed for specific projects and specific outcomes, with a defined termination point.

Though alliancing and partnering are loosely interchanged in the construction industry, partnering is viewed as more of a management approach where partners may remain independent and may benefit or not from the relationship. Alliancing is however a contractual building block used to deliver a project and creates a ‘win-win’ or ‘lose-lose’ outcome. The client served by a construction project may also be a participant in alliancing, though in a non-dominating role, as the scope of participation is well defined for all parties.

Alliancing has been known to deliver innovations in processes and value, thus advancing practices in the construction industry. An alliancing agreement (AA) is different from a traditional contract and may include the following elements: alliance governance and management; good faith obligations; termination clause; a structure for conflict resolution; a commercial framework; and a force majeure clause.

Digital Communication

Radio frequency (RF) field is a part of a highly specialized field and are an integral part of wireless solutions. The explosive growth in RF and wireless technologies continues to play a significant role in today's vast communications networks. The RF helps in the design of filters, amplifiers, RF switches, and oscillators for 2G and 3G technologies. It also helps in migrating from 2G to 3G and other latest technologies.

RF field incorporates theory and practices to illustrate the role of RF in almost everything that transmits or receives a radio wave which includes the following: cellular networks such as global system for mobile communications (GSM), differential phase shift keying (DPSK), minimum-shift keying (MSK), long term evolution (LTE), LTE-advanced, Wi-Fi, bluetooth, Zigbee, worldwide interoperability for microwave access (WiMAX), satellite communications, very small aperture terminal (VSAT), two-way radio, digital demodulation, digital modulation, and public safety solutions.

It will continue to play a significant role and shape the usage of wireless communication into the future.
**Human Resource Development & Industrial Training**

Successful business leaders know that people are the driving force behind organizational business successes. Recent research shows that companies that exercise effective and highly skilled HR practices experience up to 3.5 times the revenue growth and nearly 2.1 times the profit margins compared to companies with less capable HR practices (Report produced by: Boston Consulting Group and the World Federation of People Management Association).

The report further contends findings that show the greatest correlation between positive economic performance and skilled HR practices in the following areas:

- Leadership development
- Employee retention
- Employee branding
- Employee performance management and rewards
- Recruitment
- And Talent Management

High performing companies differentiate themselves by focusing on and offering more variety of effective Leadership Development, Talent Retention and Performance and Reward Management. The results of such studies have led many executives to add the value of their staff to their balance sheets.

**Manufacturing systems**

If it is true that imitation is the best form of flattery, manufacturing professionals, as well as vendors of Product Life-Cycle Management (PLM) systems, should be proud that PLM could be a recurrent theme of water cooler talks on major fashion runways in Paris and New York. Indeed, PLM has made a grand entry into fashion week. PLMs provide the input to the creative process that allows fashion designers and retailers to match style and substance.

It is all about efficiency. ‘Fashionistas’ now use PLM systems to organize and track clothing data all over the world, right from where each material is sourced to the retail shop. Every little detail about a product is now available at the tip of the fingers. The retail and apparel industry use PLM software to manage the supply chain by tracking development processes that churn out fast moving seasonal products and locating the millions of stock keeping units (SKUs) and their variations within the industry.

Many retailers use PLM for product standardization and a similar market is growing for customized PLMs. PLM systems has found use in high-end watchmaking, embroidery design and crowdsourcing for fashion trends, internal collaboration, and information processing. A PLM system handles all these with the added advantage of a built-in controlled access data-tier for database integrity.
Quality System Specialization

The amount of data available in internal and external social media (Wikis, Blogs, Facebook, LinkedIn, Yammer, YouTube, Google+, and Twitter) is exploding rapidly and this trend is expected to continue at a faster rate. Employees, customers, and community members use social media to express opinions and feelings. Customers take feedback from peers to make purchasing decisions, recommend products and services to friends. The latest innovations in IT have led to advanced data mining tools from leading Information Technology (IT) companies such as IBM, SAS, and Microsoft to mine real-time social media information and integrate with existing data (Survey feedback comments from stakeholders, emails, and web log files) to make meaningful use of this data. Organizations can supplement traditional statistical tools with advanced data mining tools to gain new insights, identify new patterns and trends, optimize business performance, and make smart decisions to improve stakeholder satisfaction.

Organizations use Lean Six Sigma methodologies for improving productivity, reducing costs, and improving stakeholder satisfaction. These organizations typically use traditional statistical tools such as Control charts, Design of experiments (DOE), Linear regression, Analysis of variance (ANOVA), and Response surface methodology (RSM). These organizations can gain competitive advantage by leveraging Lean Six Sigma culture and DMAIC (Define, Measure, Analyze, Improve, and Control) to supplement traditional statistical tools with advanced data mining tools. Advanced data mining tools are a great addition to Lean Six Sigma Toolkit.
Bowling Green State University

Bowling Green State University's longstanding reputation in the area of Industrial and Organizational Psychology has garnered it the number three position in U.S. News and World Report's 2014 listing of best graduate programs in the discipline, up a notch from last year.

U.S. News lists Ph.D. programs ranked best by department chairs and senior faculty. BGSU’s program shares the honors with programs at Michigan State University, the University of Minnesota – Twin Cities, and the University of South Florida. “Industrial and organizational psychologists strive to make workplaces more efficient, pleasant, and productive through research and application,” according to the publication.

The goal of Bowling Green’s graduate program is to prepare students for careers as active contributors to the psychology of work.”I have been excited to be a part of the Bowling Green IO psychology program for 16 years,” said Dr. Michael Zickar, a professor and chair of the Department of Psychology. “The program has a long history starting with Pat Smith and Bob Guion in the 1960s and we have worked hard to maintain and grow the reputation over the years.”

WBGU-FM goes 'Beyond Green'

Dr. Wil Roudebush, a professor of construction management at BGSU hosts a new radio program called "Beyond Green Show," on WBGU-FM 88.1 from noon to 1 p.m., simulcast on WFAL (on the Internet at http://www.falconradio.org/), and WBGUFM.com ((select the Listen Live! button), and iTunes Radio (Genre: College/University). The program was premiered at noon on September 24, 2012. It is an hour-long talk show which focuses on topics related to the environment and sustainability.

Dr. Roudebush said, "the number of ideas for the show keeps growing, but basically I want to provide students, faculty, staff, and city, county and state officials who are interested in topics related to the environment and sustainability the opportunity to disseminate information and knowledge." He continued that "the main mission is to help guide our community toward sustainability."

It is great that listeners can hear the show live over the Internet and use the chat feature to make their contributions to the program and also communicate with Dr. Roudebush. Dr. Roudebush is a long-time PhD program faculty member.

East Carolina University

The College of Technology and Computer Science at ECU has named Dr. Tijjani (TJ) Mohammed as the chair for the Department of Technology Systems (formerly the Department of Industrial Technology). Dr. Mohammed has been employed as a faculty member of East Carolina University for 16 years. He most recently served as the interim chair of the department for two and a half years.

He has a strong history of collaboration on a variety of externally funded projects and on a number of publications in information and computer technology and related areas. He has also served in various other capacities, including as graduate advisor for several master’s and PhD students. “I was surprised and humbled that I was one of the faculty’s top picks for the chair position,” Mohammed said. “It is very exciting to work in a department that has houses accessible technology programs in high-demand fields that directly impact regional and statewide economic development.”

Mohammed received his B.S. in Technical Education from the University of Central Missouri, an M.S. in Electronics and Computer Technology from Indiana State University, and holds a Ph.D. in Industrial Education from Texas A&M.
**Indiana State University**

**Technology professors receive NSF grant to create educational device**

A team of Indiana State University (ISU) professors received a National Science Foundation (NSF) grant of more than $190,000 to create an innovative device they hope will transform automotive engineering technology education.

The funding was received for their project, "CULMINATE: CUstomized Laboratory using MIcrocontroller for New Automotive Technology Education." The ISU researchers propose to create a microcontroller board, a device that looks like a computer motherboard featuring different components, that would help teach automotive engineering technology students how microcontrollers function in vehicles. The devices are becoming more prominent in automobiles, underscoring the need for students to learn about them, said Yuetong Lin, associate professor in the department of electronics and computer engineering technology. He is the lead researcher on the project. "The idea of the microcontroller board is that it has the core of any commercial products out there, but it's also going to integrate some key components for some automotive sensing and controls," Lin said. "With the commercial board, everything is fixed on."

The team first received the idea after Xiaolong Li, assistant professor of electronics and computer engineering technology, attended an NSF conference and saw that a friend had created a different kind of customized microcontroller board. "They are mainly used for computer engineering or electrical engineering programs," Li said. "We wanted to develop a different board which is specifically for an automotive engineering program."

The customized board would allow for the different components used in microcontrollers in vehicles to be included in the educational board so that students could learn about them. A customized board also will allow for components to be interchanged; the commercial boards available for purchase have components that are soldered onto the board, Lin said, so they can't be taken off.

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**North Carolina A&T State University**

NCAT has launched NCATConnect, a free mobile app that will help NCAT State University students, alumni and friends connect to the university using an Apple or Android mobile device. A university committee has been working with Blackboard Inc., a global leader in enterprise technology and innovative solutions that improve the experience of millions of students, to create the app since last August. The app provides information about university news, athletics, events and courses in addition to access to a university directory, map, the Bluford Library and Blackboard. It also has a link to access Alumni Affairs and campus emergency assistance. There are free downloads available from iTunes and Google Play.

NCAT State University has been ranked in the top tier of national universities in several categories in the 2013 U.S. News and World Report college rankings. NCAT has earned top 25 honors amongst the nation’s top online programs in the area of information technology. In the graduate category, A&T was ranked No. 144 in engineering schools with the concentration of industrial/manufacturing engineering ranking No. 56.

**University of Central Missouri**

The University of Central Missouri Foundation (UCMF) is sponsoring a new grant program to benefit the university’s learning environment. These grants fund the University of Central Missouri’s faculty and staff projects. The total amount of $25,000 will be set aside to sponsor grants ranging from $100 to $5,000. The deadline for the first year’s proposals is March 29 2013.

A progressive initiative and collaboration among UCMO (The University of Central Missouri), local educational institutions, local community
organizations and local businesses partners lead to the creation of The Missouri Innovation Campus. This is expected to revolutionize the way students learn, earn, and work, while bridging the gap between graduates and workforce demands. Key highlights of this initiative include providing student employment, tuition forgiveness, reduced time to graduate, shared tuition and low-interest loan programs leading to key outcomes - reduction in overall cost and debt students will have upon graduation.

SPECIAL FEATURE

Michael A. Hayden, PhD
Quality Systems and Manufacturing Specializations

Dr. Michael A. Hayden earned his PhD in Industrial Education and Technology at Iowa State University. He is a tenured full professor in Department of Applied Engineering & Technology Management at Indiana State University (ISU). Dr. Hayden joined ISU in August 1996. He has served as department chair. Currently he is the coordinator of the MS in Technology Management and several programs in quality. Currently he is Chair of the local chapter of the American Society for Quality (ASQ) and secretary of the local chapter of the Society of Manufacturing Engineers (SME). Dr. Hayden was involved in the creation of the PhD in Technology Management program and the quality systems specialization. He usually teaches the COT 703 Advanced Statistics course, several courses in quality, and other research courses.

Dr. Hayden has several certifications including, Quality Engineer, Quality Manager, and Manufacturing Engineer. He is an Epsilon Pi Tau Laureate. Dr. Hayden has over 30 referred publications and presentations. Dr. Hayden’s research agenda focuses on quality, workplace law, technology management, and program and administration issues. Dr. Hayden is a long-time PhD program faculty member.

FEATURED UNIVERSITY: Indiana State University

Indiana State University (ISU) offers programs that involve the study of technology and management with full-time faculty in more than 30 specialized state-of-the-art instructional laboratories. Many programs offer online degree options for bachelors, masters, and even the Ph.D. study as well as campus. ISU’s College of Technology faculty members are seasoned with vast industry experience in their respective areas of study.

ISU’s human resource development program has formed a new international agreement with Al Akhawayn University in Morocco, for further development, collaboration and partnership purposes. The agreement between the two universities calls for collaboration in the form of: exchanging of professors, students, technical specialists, and assistance in organizing joint research opportunities and conferences, which are of interest to both institutions.

Dr. Bassou El Mansour, PhD program faculty member from ISU represented ISU for the agreement development and has stated that students are aware of the fact that after graduation they may find employment at organizations, which are not limited to United States. He has further contended that the work environment is much more global now than before; therefore, getting a global perspective will allow the students to better prepare for their future global careers.
The consortium program is offered in cooperation with Bowling Green State University, East Carolina University, Indiana State University, North Carolina A&T State University, and the University of Central Missouri. The doctoral program meets the needs of today’s technical professionals. An academically rigorous program of study, the Doctor of Philosophy Program in Technology Management offers research and scholarship experiences and in-depth study in a specialization selected from the areas of:

- Construction Management
- Digital Communication System
- Human Resource Development and Industrial Training
- Manufacturing Systems
- Quality Systems

For Additional information about the PhD in Technology Management, visit our website at http://technology.indstate.edu/consortphd/ You may also contact Dr. Maughan at (812) 237-3368
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**Profiles**

*Dr. Maughan* is Director of the PhD Program Consortium.

*Eli Aba* was admitted to the PhD program in Fall 2010. He specializes in Quality Systems.

*Arezou Harraf* was admitted to the PhD program in Summer 2011. She specializes in Human Resource Development & Industrial Training.

*Kishore Erukulapati* was admitted to the PhD program in Spring 2011. He specializes in Quality Systems.

*Olufemi Awolusi* was admitted to the PhD program in Summer 2010. He specializes in Human Resource Development & Industrial Training.