



Dr. Irving Engelson,
President, IEEE EMS

President's Corner

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Reengineering the Engineer

It is often said that when an engineer gets promoted to management, the company loses a good engineer and gains a poor manager. Somehow engineering management is treated as an oxymoron. If we believe that where there is smoke there is fire, we should not ignore such comments. I recently reflected on some of the reasons for these perceptions, and also if there is some truth to them. The circumstantial evidence supports these perceptions.

As an engineer, and previously as an engineering professor and university administrator, I worked with many engineers and engineering students. I concluded that engineers as a group have a low threshold for ambiguity. Engineering students have no problem solving three linear simultaneous equations in three unknowns. But, if they are given three simultaneous equations with four unknowns, the usual reaction is that the problem cannot be solved with the given data. They need one more equation to complete the assignment. While it is true that the problem does not have a unique solution, it may have a set of possible solutions. If the unknown quantities have a physical meaning, such as mass, or distance they should be able to eliminate parts of the set of solutions, because they may be in violation of the laws of physics. Likewise, any solution that suggests a negative mass needs to be removed from consideration. In management we seldom have unique solutions to problems and must arrive at decisions based on limited knowledge and conflicting information. People with a low

threshold for ambiguity have difficulty functioning in such an environment.

Engineers tend to live and think in a Newtonian deterministic world, whereas managers have to function in a probabilistic environment. Only after I took courses in the theory of relativity, quantum mechanics, and probability and statistics did I start thinking outside of my engineering deterministic box. Heisenberg's uncertainty principle was an excellent introduction to the fact that some things in the physical universe cannot be defined with exactness, and this knowledge was transferable and helpful in the field of management. My work in statistical signal analysis and statistical communications theory, cybernetics and information theory helped me bridge my pragmatic engineering approach to the uncertainties of management.

A basic management course should be required of all engineering students at an early stage of their education. Every engineering graduate will likely either do some management and/or be managed. We should reengineer the engineering curriculum to include basic management and organizational behavior courses. This would broaden the way engineers think.

Membership in our IEEE Engineering Management Society (EMS) and in the IEEE as a whole can help. We should promote the notion that EMS membership is not just for managers. It is for all engineers who want to gain some management skills that are an indispensable part for survival in a competitive environment. Only then will engineering management stop being considered as an oxymoron, and we will no longer hear that a promotion of an engineer to management creates a poor manager.

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Expanding Our Focus

by Gerard H. (Gus) Gaynor, EMS Vice-President - Publications

I recently had an opportunity to attend a management of technology (MOT) workshop at MIT sponsored by the Technology Management Education Association (TMEDA). TMEDA is a forum for academia, industry, and government to exchange ideas on managing technology. Its focus is on developing a unified approach to MOT education and disseminating the best educational practices relevant for the whole technology management domain.

MOT activity took on new meaning after publication of the report by the National Research Council's Task Force on Management of Technology in 1987. The Academy of Management (AOM) subsequently organized the Technology and Innovation Management Division (TIM), and the University of Florida began delivering conferences on MOT.

The academic community pursued research on the multi-disciplinary approach to managing technology and developing it into a recognized discipline. At EMS we also focused our publications and conferences not only on managing engineering but the broader scope of managing technology. But while research in MOT continued to expand in the academic community, industry never really bought into the idea of managing technology from a systems perspective.

TMEDA's Objectives:

- Develop a professional profile for the MOT graduate
- Develop a template for graduate studies in MOT
- Define the structure
- Develop some priorities for research
- Promote technological literacy
- Identify a community of peers
- Develop TMEDA as an organization of related associations with a common interest

Some major points emerging from the conference:

- The frontiers of engineering are focusing on biotechnology, nanotechnology, information related to sensor input, macro systems, and new ways to look at management.
- Concerns were raised that MOT programs may not be meeting needs of industry. Issues raised included: managing knowledge workers, dealing with risk averse managers, making choices, reconfiguring organizational assets, and learning to communicate with the required depth.
- Discussion focused on trends in MOT education and associated problems. Faculties are currently committed to a process and change is difficult to implement in an academic setting. Information technology as known today is becoming a commodity.
- The government, industry, and workers view outsourcing differently. It's not that there's a shortage of jobs but a lack of people capable to fulfill the needs.
- Professions become commodities just like products.
- We can be optimistic about the future but this will depend on activity, productivity, and behavior.
- MIT is currently restructuring its MOT program. The emphasis is on the integration of business perspective/acumen, technology execution, and leadership.
- TMEDA will launch a new Technology Management Educational Journal. This will be a peer-reviewed journal and will be published quarterly beginning in 2005.

- Denis Simon, Dean, Lally School of Management of Technology, RPI presented the new approach to MOT at RPI. The new program is based on developing the following streams of knowledge:
 1. Building, maintaining, and growing a business
 2. Understanding the implications of old, new, and emerging technologies
 3. Using information technology effectively
 4. Thinking strategically about the business
 5. Driving design and marketing of new products and services
 6. Leading cross-functional teams
 7. Managing risk and uncertainty
 8. Managing on the edge for sustainability
- Five MOT graduates gave their perspectives. All were very positive about their academic experiences but since a MOT degree is not recognizable as a discipline had some difficulties making a case in search of positions that led to employment as MOT managers.
- Rias van Wyck, Professor; University of Minnesota presented a unified approach to MOT. The approach includes:
 1. A range of management specialties such as marketing, operations, MIS, finance, strategy, mapping the future,
 2. Knowledge of technology and technology management procedures: a core theory of technology, technology foresight and forecasting, emerging technologies, innovation management, project management, science and technology policy, and many others.
 3. Include a contextual setting of MOT: It stresses a more holistic view and addresses such topics as ethics, environment, evolution, macroeconomics, politics, etc.

What does this mean for us as engineers and as engineering and technology managers?

We should take heed to a comment made by Dr. Joseph Bordogna while

Acting Director of the National Science Foundation and President of IEEE:

"The future belongs to those who can make sense of the complex, to those who

can take an idea from conception through the functional integration of many complex technologies and disciplines to product realization, to those who can put complex products out the door."

Three Interesting Conference Venues

by Joseph H. Bellefeulli, Vice President - Conferences

The IEEE Engineering Management Society is pleased to bring you three more informative conferences. Read on to learn about the upcoming IEMC 2004 in Singapore and two more conferences in 2005, in Limerick, Ireland and St. John's, Newfoundland, Canada.

Singapore

In the last Newsletter, I invited you to join your colleagues for the 2004 International Engineering Management Conference (IEMC) during October 18 to 21. It is getting late; however, there is still time to register by clicking on www.iemc2004.org. This promises to be a great, world-class conference in the unsurpassed city of Singapore.

The Organizing Committee has engaged an outstanding group of keynote speakers and has an awesomely interesting array of to be delivered papers. Tuesday night's banquet at the Fullerton Hotel will be augmented by guests' tours of Singapore, the "Garden City," as well as other choices. We look forward to seeing you so now is the time to book your reservations. You will not want to miss this exciting opportunity.

In this age of networked and knowledge driven economies, corporations and countries compete both in innovating their products and services as well as excelling at operations. However, to stand out at both is not an easy feat to achieve for the two often require different and sometimes opposite mindsets, organization, and strategies. The common axis in both innovation and operation is engineer-

ing and engineering management. Hence it is appropriate to address the challenge to be ambidextrous in innovation and operation through the people whose profession it is to envision and orchestrate innovation, implement effective changes, and ensure reliable operation. The theme "Innovation and Entrepreneurship for Sustainable Development" aptly highlights the era we live in and the focus of this conference.

Given the importance and depth that this theme suggests, the IEEE Engineering Management Society and its local Singapore chapter have invited the IEEE Management Professional Network to join in sponsoring this event. Many IEEE and IEE members hold senior management and academic positions. Singapore's strategic location makes it one of the busiest crossroads of the world, and it is here that you can count on being at the "crossroads of intellectual exchange" during IEMC 2004.

This VIP list features among others, Raymond Lim, Minister in charge of Entrepreneurship of Singapore; Arthur Winston, President of IEEE; and Professor John O'Reilly, President of IEE. They will all be on hand to help open the conference as well as to speak.

The organizing committee is pleased and honored to announce an extraordinary roster of keynote speakers with both global origins and impact. They include:

- Professor George F. Farris of Rutgers Business School, USA, Editor

of *IEEE Transactions on Engineering Management*. His paper is titled: The Effective Engineer

- Professor Hiroyuki Mizuno, IEEE Honorary Member / Director, Research Institute of Kochi University of Technology Kochi University of Technology, Japan. His paper is titled: Sustainability Development
- Professor Sir Kumar Bhattacharyya, Director, Warwick Manufacturing Group University of Warwick, UK. His paper is titled: The Opening up of the Two Asian Giants: China, India and the new Agenda for Manufacturing Globalization
- Professor Joe McGeehan, Director of the Centre for Communications Research Toshiba Telecommunications Research Laboratory, UK. His paper title is forthcoming.

The program includes interactive tutorials, interesting paper presentations, and poster displays. Several editors of journals of innovation, technology and engineering management (including *IEEE Transactions on Engineering Management*) have expressed interest in inviting authors to contribute extended papers for possible publications in special issues of their journals.

The committee has also lined up a series of interactive tutorials, schedule to be held on October 18, 2004. The list of tutorials is as follows:

- **Tutorial A1: Six Sigma for Engineering Managers**, offered

by T.N. Goh, *National University of Singapore*

- **Tutorial A2: An Intensive Workshop on the Buzan Mind Mapping® Technique – A Swiss Knife for the Innovative and Creative-Minded Person**, offered by Choon Boon Lim, *Ngee Ann Polytechnic*
- **Tutorial A3: Publishing in IEEE Transactions on Engineering Management and Other Top Journals**, offered by G. Farris, *IEEE*
- **Tutorial B1: Effective Leadership in R&D and Technology-Based Team Environments**, offered by Hans J. Thamhain, *Bentley College*
- **Tutorial B2: Planning Global Projects**, offered by Saamyendu Ghosh, *Oracle Corporation*
- **Tutorial B3: Managing Yourself – A strategy for enjoying self-employment**, offered by Anthony F Bainbridge, *CEng FIEE MIEEE*
- **Tutorial C1: Knowledge Management to Power Your Organization**, offered by H.T. Loh, *Design Technology Institute Ltd*

Outlines of the tutorials and their speakers are posted on the conference website at www.iemc2004.org.

Hopefully you will see something that interests you enough to inspire registration and travel booking to join us in Singapore in October.

Singapore, situated at one of the most important crossroads of the world, is a vibrant and cosmopolitan country where tradition and modernity meet in comfortable companionship and intermingle harmoniously. Singapore provides you with unforgettable insights into her “old world” charms combined with exciting “new world” visions. Its climate is warm and welcoming all year round with tempera-

tures ranging from a low of 24°C to a high of around 31°C. Rainfall usually takes the form of sudden showers and storms. Innumerable trees and flowering shrubs line the expressways and colorful plants hang from balconies and overhead bridges.

In Singapore’s multi-racial melting pot, all the various Asian cuisine’s compete in the battle of the taste buds: Malay, Chinese, Indonesian, Peranakan, Indian, Thai, Japanese and Korean. There is a vast array of hawkers’ stalls and restaurants, ranging from global franchises to gourmet deli to fancy six-star settings. Singapore’s unique arts scene is richly flavored by influences drawn from indigenous Malaysian culture, the cultures of Chinese and Indian migrants, as well as the city’s international outlook. Traditional forms have been preserved and new contemporary forms are constantly evolving. The recently opened performing arts complex in Singapore is the Esplanade – Theatres on the Bay. It has a 1600 seat concert hall and 2000-seat theatre with world class acoustics. International productions such as Singin’ In The Rain have played there.

For more information, be sure to visit the conference and related websites:

- Conference website www.iemc2004.org
- Singapore’s world-famous must-experience Night Safari <http://www.zoo.com.sg/safari/>
- For more information on Singapore, the city of light and life and the cosmopolitan nation, please visit <http://www.visitsingapore.com>

We hope you will join us in Singapore for an adventure of a lifetime that is sure to enlighten your professional mind and refresh your soul.

Limerick, Ireland

From Asia to Europe, plan now to join us for a wonderful conference in Limerick, Ireland, July 10 – 13, 2005. The venue is the University of Limerick, which is near the Shannon Airport. An authentic medieval banquet is

to be held at nearby Bunratty Castle. Participants will be delighted with the venue and with the program.

The Professional Communication Society of IEEE serves full-time technical communicators, business managers, and engineers who need real expertise in communication. The program committee will structure the conference offerings to accommodate a wide audience. This Conference will include a thread coordinated by the IEEE Engineering Management Society (EMS).

The EMS thread focuses on relevant information for engineers, industry and business professionals as well as for technical communicators outside of the United States. EMS plans at this time include a track with 4 – 6 invited papers to be followed by a panel discussion. Mr. Gus Gaynor will be presenting a paper on management practices in Italy. Lucent plans to discuss engineering management practices in Ireland. Other speakers are being sought.

The program committee will have more details in a timely manner. For a neat description of the Limerick venue, see the related article by Marj Davis in this newsletter. Potential presenters on the Technical program are invited to contact the Program Chair, Dr. Helen Grady, at grady_h@mercer.edu, or the EMS Coordinator, Dr. Dennis Bodson d.bodson@ieee.org. For additional information please visit the conference website: <http://ieeepcs.org/conference/limerick>.

St. John’s, Newfoundland, Canada

IEMC is your global international conference. In 2005, you are invited to discover the hospitality and charm of the oldest city in North America; St. John’s, Newfoundland, Canada is a city unlike any other. The IEEE Newfoundland and Labrador Section are extremely pleased to host IEMC 2005 in St. John’s, Newfoundland, Canada from September 11 – 13. The conference is off to a promising start with a

dedicated, enthusiastic and experienced planning committee from industry, academia, and government. The local planning committee is working closely with both EMS and the IEE to ensure the success of the conference.

The main convention venue for IEMC 2005 for both accommodation and meeting space is the Fairmont Newfoundland - a renowned four-star hotel in the heart of downtown St. John's. The hotel has a total of 301 rooms (282 guestrooms and 19 suites) and features two restaurants, two lounges, a business centre, and recreational facilities that include a swimming pool, whirlpool, sauna, and exercise area. Pre-conference tutorials, either half or full day sessions, will be held on Sunday September 11th at the Fairmont Hotel. A "meet and greet" reception for all delegates and their registered guests will be scheduled for Sunday night at the Fairmont. Monday evening a reception will be held at an off site location. The Conference sessions themselves, on Monday and Tuesday, will be conduct-

ed in the conference facilities at the Fairmont. In addition, an active and enticing social program will be offered to all attendees, partners, and guests.

The City of St. John's has become one of the most desirable sites in Canada to host meetings and conventions. Rising spectacularly from the water's edge, St. John's promises you a sophisticated city experience with small town warmth and safety. Visitors will experience our world famous hospitality and friendly service within the oldest city in North America. We are proud to boast of modern accommodations, traditional and international cuisine to tantalize the most sophisticated taste buds along with specialty boutiques and craft shops with unique works by our local craftspeople. Keep in mind that one does not have to venture far to experience the rich history, local culture and breathtaking scenery of St. John's!

The planning committee is seeking interested volunteers to help out with organizing efforts. In addition, we

would welcome any suggestions for potential workshops or activities. If you would like to become involved or would like further information, please do not hesitate to contact either Charles Randell, Conference Co-Chair, at Charles.Randell@c-core.ca or Kathleen Chafe, Planning Committee Member, at Chafek@ieee.org.

We look forward to seeing you in St. John's next year!

Many thanks to Dennis Bodson and Kathleen Chafe for their contributions to this article.

Joe Bellefeuille, EMS Vice-President of conferences, j.h.Bellefeuille@ieee.org would like to hear from you with comments about this article and EMS conferences in general.

Editors Note: *Joe Bellefeuille recently received his Ph.D. from Boston University. His dissertation is entitled "Discovering How Firms Align Executive Development with Business Strategy". The summary is included in this newsletter. Congratulations on your achievement.*

EMS Special Interest Groups

The Governors of the IEEE Engineering Management Society is inviting you to participate in the formation of Special Interest Groups (SIG's). SIG's provide a new platform with a sharper focus for discussion on topics of interest to members through the exchange of ideas and experiences.

Virtual communities will be established on the EMS Web-site, and moderated

by an EMS Governor. It is expected that each SIG will comprise up to 12 members. As a pilot program, the Board of Governors is seeking nominations, including self-nominations, from members to join one of the following SIG's:

- Entrepreneurial Management
- Project and Process Management
- Product Development
- Career Development in Engineering Management

Please address your nominations to the following, including your name, address and e-mail, SIG of interest, along with a brief paragraph on the nominee's areas of interest and relevant background. Self-nominations are also encouraged. Should you have suggestions for other SIG's please let us know. Please send your nominations to: Tariq S. Durrani e-mail: t.durrani@ieee.org



International Engineering Management Conference 2004

Tutorial Registration Form



Pan Pacific Hotel, Singapore
www.iemc2004.org

Conference Secretariat
Integrated Meeting Specialist Pte Ltd
1122A Serangoon Road Singapore 328206
Tel: 65 6295 5731 Fax: 65 6295 5792
Email: iemc2004@inmeet.com.sg

Please fax the completed form to (65) 6295 5792

Title	Prof / Dr/ Mr / Mrs / Ms		
Family Name		Given Name	
Organization			
Designation		IEEE / IEE Membership No. (if applicable)	
Address			
Country / State		Postal Code	
Telephone No.		Fax No.	
Email			

Selection of Tutorial

Morning Tutorials: 18 October 2004 (09:00 - 12:30 hrs)	Afternoon Tutorials: 18 October 2004 (14:00 - 17:30 hrs)
A1: Six Sigma for Engineering Managers	B1: Effective Leadership in R&D and Technology-Based Team Environments
A2: An Intensive Workshop on the Buzan Mind Mapping® Technique	B2: Planning Global Projects
A3: Publishing in IEEE Transactions on Engineering Management & Top Journals	B3: Managing Yourself - A strategy for enjoying self-employment

C1 [FULL-DAY Tutorial (09:00 – 17:30 hrs)]: Knowledge Management to Power Your Organization

Conference Participant *			Non-Conference Participant		
Type	Fee (SGD)	Please <input checked="" type="checkbox"/>	Type	Fee (SGD)	Please <input checked="" type="checkbox"/>
Half-day (includes tea break only)	\$ 150.00		Half-day (includes tea break only)	\$ 180.00	
Full-day (includes lunch & tea breaks)	\$ 300.00		Full-day (includes lunch & tea breaks)	\$ 360.00	
Total Amount Payable			Total Amount Payable		
* Conference Registration ID:					

Payment

By Credit Card: Visa MasterCard American Express

Cardholder's Name:	
Card Number:	Expiry Date (MM/YY):

Cardholder's Signature

Please note that the merchant name reflected on your credit card bill will be "Lotus Travel Pte Ltd".

By Cheque:

Cheque Number	Bank / Branch
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All cheques should be made payable to "IEEE-IEMC 2004" and mailed to the conference secretariat.

Kindly indicate your name, contact number and "IEMC 2004" at the back of the cheque.

IMPORTANT NOTICE:

- The organiser reserves the final rights to cancel or change the tutorial(s) due to unforeseen circumstances, or if the number of participants registering for a particular tutorial is too small.
- In the event of any cancellation(s), all participants would be informed and the registration fee refunded

Registration Details

- Registration payment can be made via credit card (Visa, Master), or cheque/bank draft.
- All cheques / bank draft should be made payable to "IEEE-IEMC 2004" and mail to the secretariat. Kindly indicate your name, contact number and name of the conference (IEMC 2004) at the back of the cheque/bank draft.
- Only cheques drawn from a Singapore bank is acceptable. Personal checks, money order and wire transfers are not accepted.
- Registration will only be confirmed upon receipt of payment.

Cancellation Policy

- A 50% refund will only be made for cancellations made in writing and received by the secretariat on or before 31 Aug 2004.
- Refunds will only be made after the conference
- Any other refunds will be made at the sole discretion of the organiser.

IPCC 2005 in Limerick

by Marj Davis, General Chair IPCC 2005

IEEE EMS and IEEE Professional Communication Society are collaborating on a stimulating, timely conference to be held in Ireland 10-13 July 2005. I recently had the delightful duty of visiting the University of Limerick, site of our International Professional Communication Conference (www.ul.ie). What a great venue for our conference, whose theme is cean-gail — making connections.

Only a short drive from Shannon airport, the university campus is set within a beautiful 650-acre National Technology Park that serves as a primary center for e-Learning-related applied research. Several research units focus on many aspects of e-learning:

- Educational Media Research Centre
- Interaction Design Centre
- College of Informatics and Electronics
- Localization Research Centre

- Software Quality Research Laboratory

It's easy to see how technical communication fits into each of these areas of applied research; but also significant are the engineering management implications. I was delighted to talk with Eamonn McQuade, professor of computer engineering; Reinhard Schäler, department of computer science and information systems; and Gerry Slattery, business development manager for Shannon Development, County Clare, Ireland.

Slattery talked knowledgeably about how the Limerick area is focusing on developing a leading digital content industry within their National Technology Park. He asserts that digital content for business is now worth nearly \$200 billion and is expected to double in two years. Engineering

managers, along with managers of media, software, training, wireless, multimedia, etc., are seeking to make connections to learn and enhance their businesses. Digital business content must flow easily among businesses, within businesses, and with clients around the world. Communication — especially “making connections” — is at the heart of this enterprise.

Join us in Limerick and make your own connections! The call for papers is available at www.ieeeecs.org/limerick. Deadline for abstracts is 15 October 2004. Contact program chair Helen Grady with questions: grady_h@mercer.edu.

If you have conference questions, please contact me. I look forward to seeing you in Limerick! Marj Davis, general chair: davis_mt@mercer.edu.

Congratulations to New Senior Members

The EMS Board of Governors congratulates and sends its best wishes to the Engineering Management Societies' newly appointed Senior Members.

Xinsheng Lou
Tim L. Washington
Kenneth C. Cone, Sr.
Aleksandar Szabo
Christer Karlsson
Lars Taxén
John Urriola

Connecticut
 Coastal South Carolina
 Shreveport
 Croatia
 Sweden
 Sweden
 Panama

If you have ten or more years of experience you can apply for IEEE Senior Member status. The forms are available on the web: www.ieee.org/organizations/rab/md/smforms.htm

Call For Papers

Special Issue of IEEE Transactions on Engineering Management Information Systems Leadership
Deadline for submission September 30, 2004

Papers submitted to the special issue will be reviewed in accordance with the IEEE Transactions on Engineering Management editorial policy. Papers must be submitted to the IEEE electronic submission web site at <http://tem-ieee.manuscriptcentral.com>. Abstracts (proposals) may be submitted well in advance of the deadline to confirm appropriateness to the special issue. Send to one of the co-editors: Richard T. Watson rwatson@terry.uga.edu or Elena Karahanna ekarah@terry.uga.edu For further information please refer to an earlier issue of the EMS Newsletter; [vol. 54(1)].

Call For Papers

Special Issue of IEEE Transactions on Engineering Management Mass Customization Manufacturing Systems
Deadline for submission: October 31, 2004

Papers submitted to this special issue will be reviewed in accordance with the IEEE Transactions on Engineering Management editorial policy. Papers must be submitted via the IEEE electronic submission website (<http://tem-ieee.manuscriptcentral.com>). Papers may also be submitted to one of the co-editors: Dr. Thorsten Blecker blecker@ieee.org or Dr. Gerhard Friedrich gerhard.friedrich@uni-klu.ac.at For further information please refer to an earlier issue of the EMS Newsletter; [vol. 54(1)].

Chapter Reports

Central Texas Chapter

by T. Scott Atkinson

We continue to increase our activities. We have been instrumental in co-sponsoring with the University of Texas an Annual Engineering Management Conference held each August in Austin, Texas. This year's 5th Annual Conference was held August 12-13 at the University of Texas Campus. The program was expanded to include two technical tracks, one for tutorials and one for presented papers which will be published by the IEEE. Dr. Tony Ambler, Chair, Dept of Electrical and Computer Engineering, UT served as Conference General Chair, T. Scott Atkinson, Chapter Chair, served as Conference Vice-Chair and Treasurer, Steve Prough, Chapter Co-Chair, served as Technical Program Chair for the presented paper track, Dr. Gaylen Paulson, Lecturer, Department of Management, McComb School of Business, UT, served as Technical Program Chair for the Tutorials track and Tom Grim served as Conference Advisor. For information on the Conference check out: www.ieeeUTemc.org

The Chapter has 72 members. Our activities are to continue to plan for enhancing the Annual IEEE-UT EM Conference and working diligently to host the Society's IEMC 2007 in Austin. A Chapter Web Page is in development and should be available soon. The Chapter has created a customized chapter Banner. Our chapter leadership consists of T. Scott Atkinson, Chair, Steve Prough, Co-Chair, Tom Grim, Advisor, and Eric Cowan.

Ottawa Chapter

Ottawa Smart Energy Fair – 2004
by Aidan Foss

On April 17, 2004, IEE Ottawa, in conjunction with IEEE Ottawa launched the Ottawa Smart Energy Fair - 2004 at the Canadian Museum of Science and Technology. The purpose of the fair was to provide practi-

cal information to homeowners on energy efficiency and renewable energy. 400 attendees experienced a combination of presentations, booths and workshops. The first presentation, an overview on Energy Efficiency and Renewable Energy, was given by Bill Kemp, author of *The Renewable Energy Handbook for Homeowners*. This was followed by Jeff Knapp of Natural Resources Canada, who ably introduced solar-heating domestic water systems. A more in-depth workshop on solar-heating systems was coordinated by several speakers from Eco Energy Choices Ottawa.

Thirteen booths covered basic energy efficiency, advanced energy efficiency, non-electrical renewable energy systems, electrical renewable energy systems and information on the growing energy challenge and its potential impact on the environment. New products were exhibited including software for optimizing domestic energy usage and an 8-foot long solar reflector and collector.

Ottawa EMS Chapter Seminars

In the Second Quarter 2004 issue of the EMS Newsletter we described the IEEE EMS EPIC initiatives which led to the first two Seminars covering "Project Management" and "What it Takes to be an Innovator" in Ottawa. We recently provided three more, full-day seminars and we describe them briefly below. For more detailed coverage of the presentations please go to www.ottawa.ieee.ca/ems

- *Hi-Tech Finance: 22 April 2004 (42 participants)*

Dr. Jean Paul Paquin from University of Quebec Outaouais (UQO) provided a pragmatic approach to project financial evaluation and decision making. Errors to avoid when measuring operating cash flows provided lively discussions. Economic factors impacting project profitability and how to deal with taxation, inflation, and exchange

rates were discussed. Participants learned approaches for dealing with risk (normative, probabilistic, and prescriptive). This was followed by Dr. Michael McIntyre from Sprott School of Business who provided a primer for managers on the internal financial management of an enterprise with an emphasis on liquidity management. Forecasting liquidity was presented as were issues relating to managing banking relationships, and key considerations in structuring a banking relationship. Essentials that should go into a business plan to enhance understanding by the business community was presented by Dr. Denzil Doyle, Chair of Capital Alliance Venture. Other presenters from legal and accounting firms (PriceWaterhouseCoopers) covered the critical success factors of early stage companies, focusing on the many accounting, tax, and finance related issues and other factors that are important to success.

- *Hi-Tech Marketing: 21 May 2004 (53 participants)*

This seminar covered the essentials of Hi-Tech marketing needed by technology entrepreneurs and executives to ensure long-term success. Practical issues were presented by practitioners from both universities and leading private sector experts on how to market products/services. Facilitators included: Dr. David Large from the University of Ottawa, Dr. Tony Bailetti from Carleton University, Mr. Don Hewson of Hewson, Bridge & Smith, Mr. Tyler Burns of IceFyre Semiconductor Corporation, Ms. Alyson Gaffney of Alcatel, Mr. David Curley of QNX Software Inc and Mr. Peter Fillmore from Westpark Technology.

- *Hi-Tech Strategic Management: 4 June 2004 (23 participants)*

Dr. Tamas Kopolyay (UQO) reviewed the evolution of market dynamics in fast moving environments and

developed a framework to explain and predict various firm behaviors. The concept of the lifecycle was used to provide an organizing model and the relationships among product, firm and market lifecycles. These were explored as were the challenges faced by senior managers in developing and adjusting strategies to market changes. Elements of strategy such as marketing, product development, production and finance were analyzed. A brief overview of strategy implementation was provided especially the key implementation variables of organization structure, decision modes, and staffing compensation regimes. Dr. Tony Baletti Carleton University discussed four commercialization strategies available to technology start-ups – contracting with established firms; product for niche market with investment in complementary asset investment; open new market with substantial investment in technical platforms and complementary assets; and selling ideas and intellectual property. Other presenters provided real life examples of Strategic Management and this provided some contrasting approaches.

- *You to can participate:*
A special one-day seminar is planned for 19 November 2004 to cover Intellectual Property: What Every Engineer Should Know. We plan to offer this seminar to our other 59 EMS Chapters around the world over the World Wide Web. If you are interested in participating please send an e-mail to Grefford@ieee.org indicating your interest in joining and the full particular of the URL will be provided. If there are no Chapters in your area and you would like to form one, please contact Dr. Charles Rubenstein at c.rubenstein@ieee.org for details on how you can put a Chapter together.

South Africa Chapter

by Tinus Pretorius, and Mariette Stirk

It is a pleasure to report that Mr Christoph Köpke, Chairman of the

Management Board of Daimler-Chrysler of South Africa (Pty) Ltd, was our guest speaker at our Chapter Meeting on June 9, 2004. The topic of his presentation was: "Does the SA Automotive Industry Need Engineers?" Christoph Köpke is the Chairman of the Management Board of Daimler-Chrysler of South Africa (Pty) Ltd. He has more than 20 years experience in the automobile industry. Leaving Mercedes-Benz after about twelve years to join LSM Distributions (Pty) Ltd, he rejoined Mercedes-Benz as Chairman of the Management Board in March 1989. His current associations include: head of the Daimler-Benz Organization in South Africa; Deputy Chairman of the South African Excellence Foundation and serving on the Millennium Labour Council.

Winnipeg Chapter

by Anne Parer

"MANCOM" (an amalgam of management, education and professional communication) is a small but active chapter of the IEEE Winnipeg Section. Our chapter, because it combines a variety of interests, tries to accommodate all these different perspectives by offering one or two guest speakers each year. Last April (2003), for example, Ron Blicq (an IEEE Distinguished Lecturer and a member of MANCOM) gave a lunchtime talk on the beginnings of technical communication. This June, Fred Doern (an instructor in Technology Management at Red River College) gave a talk on how we can adapt new technology to both common use and competitive advantage. MANCOM also has strong ties to the technical communication students at Red River College. To encourage them to join IEEE, in 2003 we offered two student memberships as prizes for a writing assignment they had to do. These students also helped us to publish a newsletter.

Our plans for this coming year promise to be exciting. We will continue to offer IEEE student memberships. We will host a tour of the new

telecommunications complex in downtown Winnipeg. We have also discussed the possibility of sponsoring a panel to look at the role of technical communication and management within the Engineering profession. While we are a relatively small chapter, we have nonetheless been very active in promoting topics of interest to a wider audience while, at the same time, promoting IEEE.

Delhi Chapter

by Prakash V. Eklande

Delhi Chapter is pleased to provide this report on our one-day Seminar on "Project Management – Latest Trends" – held on March 19, 2004 and organized by the Delhi EMS Chapter. The following salient points emerged from the presentations, deliberations, and panel discussions:

- Project Management was considered to be a very important requirement for today's business environment particularly for managing long-term capital-intensive projects. It was reported that many infrastructure projects have had cost over-runs of about 24% and in some cases in the order of 78%.
- Cost and time over-runs result in an increasing cost for consumers/customers. Improvement on some of the infrastructure projects has shown excellent results, particularly in Central Utility NTPC-power projects, and Metro Railway.
- The critical factors noted was an effective decision-making process and utilization of a computerized information system that enables better and faster implementation of projects.
- Utilization of IT enabled knowledge based sharing resulted in an increased team spirit in the project implementation. To be effective each and every individual has to participate. Creating a project mind-set and a knowledge base are seen as

new emerging techniques of project management. A balanced approach in national and international markets is needed for successful implementation and benchmarking.

- Issues to be resolved include systems such as LAN, and WAN which demand a very high level of performance. There is a need to satisfy the requirements of innovative thinking, researching new methods, and aligning goals for results.
- Seven habits of effective project management were also presented; be productive, forecast completion,

prioritize the critical path, collaborate, communicate well and often, be accountable, and practice continuous improvement

- In the discussion on implementation of ERP – computer software, the following experiences/views were expressed.
 - There should not be parallel system in adopting ERP package.
 - When it is to be implemented proper study, planning and full training to each and every individual is necessary.
 - When ERP adopted in a newly

formed organization it is easier and faster to implement ERP.

- In old established organization where systems are stabilized ERP should be implemented carefully and in a phased manner.
- Excellent results are seen when proper setting of pre-qualification for tendering, no external interference is permitted, and a sound team spirit and work culture is encouraged. It was also recommended by a large number of participants and speakers that an incentive scheme needs to be included in the contracts.

Recent Theses

A Framework for the Coordination of Complex Systems' Development

Lars Taxén, EMS Senior Member

Lars Taxén has worked for over 30 years within different development projects with the Ericsson Company and is one of the founders of the Swedish Chapter of the IEEE EMS. During the last five years he has analyzed what separates successful projects from the less successful ones in the Ericsson practice. One particular focus is how to reconcile the different opinions about the coordination of activities in large, globally distributed projects such as those developing the 3rd generation of mobile systems.

At Ericsson, Lars Taxén has developed and introduced a framework for the coordination of the development of such systems. The framework consists of, among other things, an information model, a process model, a content separation model, and an information system, which supports the coordination. The framework has been used in more than 140 main - and subprojects during the years 1999 to 2002. One main conclusion in the dissertation is that the most complex nodes in the

mobile network would not have been possible to develop without the framework.

The projects developing these systems are very large, have tough requirements on deliveries and are exposed to never ending changes in the environment. This implies that the planning and monitoring of the projects must be continuously modified. In addition, the projects are staffed with many people, often several thousand, located all over the world. The development is structured into several hundred development steps or increments. These increments, which can be regarded as mini-projects, are all dependent on each other. Circumstances like these put high requirements on the coordination of the different development steps in the project. The coordination is made even more difficult as there exists different interpretations among actors of how coordination should be achieved.

A basic position take in the dissertation is that coordination should be regarded

as the outcome of a particular activity, the purpose of which is to deliver coordination to the development projects. This means that social aspects, like how shared meaning of coordination emerges and is maintained, are important parts of the framework. The strategy suggested in the framework is that the actors working with coordination, gradually construct a shared meaning of what constitutes coordination. This is done by a continuous alteration between constructing the coordination and trying the result out in the development projects. A consequence of this way of working is that the information system is changed in concert with the evolution of the shared meaning. This in turn implies that this system must be extraordinary easy to modify. At Ericsson the Product Data Management (PDM) system eMatrix from Matrix-One was used.

The major conclusion in the dissertation is that the framework has had a major impact on how development projects are coordinated at Ericsson. Furthermore, the framework should

be applicable in other, similar industrial settings like the telecommunications, automobile and airplane industries. The most striking knowledge contribution is that actors participating in the development of complex systems must evolve a shared meaning of basic concepts and way of thinking in a social process. This means that the coordination of development projects of this nature cannot be captured in predefined, formalized requirements or instructions concerning how coordination shall be done.

The dissertation is available at www.ep.liu.se/diss/science_technology/08/00/index.html. Lars Taxén can be reached at - lars.taxen@telia.com

Discovering How Firms Align Executive Development with Business Strategy: A Grounded Theory Study

Joseph H. Bellefeuille, EMS Governor

Boston University, School of Education, 2004

Major Professor: Alan K. Gaynor, Associate Professor of Education

More and more frequently firms are finding it necessary to terminate chief

executive officers (CEOs) due to poor organizational performance. This is happening despite the fact that executive development spending is increasing significantly during the same era. These simultaneous situations would suggest that there is a need for a theory to bring clarity and direction to the process of executive development while aligning it with firms' business strategies. A comprehensive review of the literature reveals that there are no well-understood theories that relate executive development strategy to business strategy. The lack of a theoretical foundation makes it necessary to derive the linkage between business strategy and executive development strategy empirically.

This study was designed to determine how and to what extent the participating firms achieve alignment between executive development and business strategies. It is founded upon the premise that for a firm's success to be sustainable, its environment, its business strategies, its executive development strategies, and its executive development activities should all be aligned. This study provides both a theoretical and a practical analysis of the alignment between business strat-

egy and executive development strategy. The theoretical analysis is grounded in a review of the twentieth-century history of organizational theory as well as the theories pertaining to business strategy and executive development strategy. The practical analysis was drawn from the experiences of senior-level managers employed by twenty-one commercial firms to design and guide executive development.

This research utilized interviews of executive development specialists as the primary means of collecting data from the subject firms. The analysis revealed four key concepts: aligning executive development and business strategies, linking executive development to the business environment, integration of executive development with other corporate systems, and the utility of top-level executive support for executive development programs. The study resulted in a conceptual model of the focus firms' approaches to achieving alignment between executive development and business strategies. These findings imply opportunities for policy makers and practitioners as well as future researchers.

In the News

- *IEEE Job Site Adds Thousands of New Job Listings*

Last month, the IEEE Job Site added job listings from more than 100 participating media and newspaper sites on the CareerCast National Network, greatly increasing the number of postings previously available. Registered users may set up automated search agents to search for open positions in their field, and view the results online or by email. Visit the IEEE Job Site at <http://careers.ieee.org/>.

- *May Membership Highlights*

IEEE membership totaled 327,911 in May. This represents an increase of 1% from May 2003. For the complete

membership development report, visit <http://www.ieee.org/organizations/rab/md/mdprogpr.html>.

- *IEEE-USA Testifies for Balance in Copyright Policy*

WASHINGTON (22 July 2004) - Copyright owners should not be permitted to restrict the development of technology having non-copyright-infringing uses, unless the developer actively and independently induces a copyright infringement, Andrew C. Greenberg testified before the Senate Judiciary Committee today. Greenberg, vice-chair of the IEEE-USA Intellectual Property Committee (IPC) and an attorney with Carlton

Fields, P.A. of Tampa, Fla., testified on the Inducing Infringement of Copyrights Act of 2004 (S.2560). IEEE-USA believes that neither the bill nor the status quo adequately balances the interests of those who create digital copyrighted content and those who create the technology to deliver, or otherwise make use of that content.

"We are mindful that new technologies may be misused to infringe a copyrighted work, and some will promote that to their own benefit," Greenberg testified. "At the same time, we are concerned that the Copyright Act must not be changed in ways that would inhibit research and development of novel tech-

nologies before their social value can be demonstrated.”

IEEE-USA believes that it should not be an indirect infringement of a copyright to manufacture, distribute, or provide a hardware or software product or process capable of substantial non-infringing use, unless the manufacturer, distributor or maker actively induces the infringement of a

copyrighted work by another.

“The challenge facing the Senate is to find a solution that allows the true copyright infringers to be dealt with in the legal system, while not restricting leading-edge technologies that might be used in making copies, both infringing and non-infringing,” said Glenn Tenney, chair of IEEE-USA's IPC. “At the same time, non-infringing copying must be allowed to continue.”

IEEE-USA, in the appendix of its written testimony, proposes substitute language for S.2560 to achieve these goals. For more information, go to: <http://www.ieeeusa.org/forum/policy/2004/072204.html>.

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EMS Board of Governors Meeting

by Celia Desmond and Joe Bellefeuille

The EMS Board of Governors caucus and meeting took place in Philadelphia on July 29-August 1. The first day consisted of the caucus and on the second day the formal meeting occurred. The Board spent the first morning in working sessions addressing strategic planning and membership. The yield from these sessions will be useful in preparing for the Societies five-year review, which is scheduled for 2005. Wade Shaw distributed the results of the Board Survey on what the Society is and what it should be. He used this information as background to facilitate a workshop.

The group discussed the question "who the audience is for EMS products and services". As there are many potential targets, it is difficult to get consensus on which are the most critical. Some believe that the audience is strictly engineers, while others look more broadly. Since the main bulk of Society members and engineers in general are global practitioners, practitioners were thought to be the primary customer, with researchers following closely. Practitioners include active engineering managers and aspiring managers.

The **business** of the Society is publications, conferences, education and career development, meetings and networking, recognition and awards, and liaison.

The **purpose** of the Society is to provide information, provide services, promote engineering management as

a profession, and career development and facilitation.

The **values** of the Society are ethics, being a leader in the professionalization of Engineering Management, meeting our commitments, being open and inclusive, being volunteer driven, providing service to members, quality and excellence, diverse constituencies and leadership.

The Board discussed the Societies Field-of-Interest in depth. A modification was proposed to the current statement, but since this statement is critical to the scope of Society involvement the Board decided to give the issue further thought. The Vice-Presidents each presented the mission, vision and activities in their areas of responsibility.

John Grefford facilitated a Board discussion on re-energizing chapters. Breaking into workgroups to brainstorm possibilities the Board centered its discussion on issues of support for Chapters. EMS supports chapters, upon request, with \$25 per meeting held, in exchange for information about the Chapter activities. Each group proposed a set of projects, which could be valuable to Chapters. These will be evaluated and some prime projects will be selected for implementation.

In the afternoon your BOG enjoyed a presentation by Dick Doyle, Division VI Director, followed by comments by Moshe Kam, Region 2 Director. Divi-

sion VI is the IEEE Division for Engineering Management Society. The BOG meeting was held in Region 2.

The meetings for 2005 will be held January 28-30 and July 29-31. EMS members are welcome to attend. Locations were discussed, and final selections will be announced shortly and published on the EMS website.

The Board also discussed in depth the concept of starting a certification program. Further investigation is required to obtain more information, and to develop a more precise proposal, before a final decision can be made on whether or not to pursue this idea.

The formal EMS BOG Meeting was held on August 1, 2004. The initial action of the board was to hold an executive session to discuss some legal actions, and to hold officer elections. The officers elected were:

President: Irv Engelson
Executive Vice President: Tariq Durrani
VP – Publications: Gus Gaynor
VP – Education: Mark Werwath
VP – Conferences: Joe Bellefeuille
VP – Awards, Recognition and External Relations: Joel Snyder
VP – Member Relations: Celia Desmond

Mark Werwath was appointed VP – Education for the rest of 2004, replacing the VP who resigned. Secretary Peter Eckstein, Co-treasurers

Lou Luceri and Vivian Carr, were all re-appointed. Dennis Bodson as chair; and John Grefford, Lou Luceri, Wade Shaw, and Beth Zimet were re-appointed to the nominations committee.

The Board moved that the nominations committee would report its nominations for Governors to the BOG prior to the BOG meeting at which such nominations are consid-

ered. The committee nominations for officers must be shared with the BOG at least three weeks prior to the election as per bylaw 205.1.

The proposed 2005 budget is balanced. The Board of Governors approved it. The Board decided to change the Field of Interest of the Society. The proposed change must be presented to TAB for their approval. Please check the website for updates

on this development.

At its meeting, the Executive Committee heard a presentation on the IEE organization and operations from Anthony Bainbridge and appointed an ad-hoc committee to look at ways to work with IEE. It addressed some legal issues, reviewed the 2005 budget, addressed input to the Society Review process, and reviewed upcoming conference plans.

Introducing Our New EMS Governor

A vacancy due to resignation recently occurred in the EMS BOG and in accordance with the EMS Constitution and Bylaws the balance of this within-term vacancy was filled with the appointment of Howard Wolfman by the President with the consent of the Board of Governors.

Howard Wolfman received his BSEE from the University of Illinois, an MBA from Northwestern University, and is a Registered Professional Engineer in the State of Illinois. Mr. Wolfman is the Senior Manager of Regulatory Affairs for the Electronic Control Systems Division of OSRAM SYLVANIA. He has had management experience with AT&T, Motorola, Northern Telecom, and other companies where he

has focused on international and domestic issues

He is past Chicago Section Chairman, past IEEE Treasurer, past member of the IEEE Board of Directors, and has served a member of the following IEEE Boards and Societies: Regional Activities Board, IEEE-USA Board, Standards Board, IEEE Electromagnetic Compatibility Society BOG and IEEE Industry Applications Society BOG. He is currently serving as a member of the Ethics Hearing Pool and Chairman of the Employee Benefits Committee.

Mr. Wolfman holds management and leadership positions in the National Electrical Manufacturer's Association (NEMA), the American National Standards Institute (ANSI), US National

Committee of IEC TC34, and the Illuminating Engineering Society of North America (IESNA). Howard serves on two Underwriters Laboratory (UL) Standards Technical Panels (STP) as well as on a Canadian Standards Association (CSA) advisory Committee.

He is an adjunct full professor in the Masters of Engineering Program at the University of Illinois, Chicago teaching a course in the Engineering Management Track. In addition, he has been a guest lecturer at universities in China, Hong Kong, Thailand, the Philippines, Canada, Mexico, and the United States. Mr. Wolfman has made numerous presentations and has authored many papers. He is a recipient of the IEEE Centennial Medal (1984) and the IEEE Third Millennium Medal (2000).

EMS Awards

by Joel Snyder, Vice-President for Awards

Peer recognition is the greatest "pats on the back" that anyone can receive. Well now is the time to look around and consider who among your friends and colleagues should be recognized for their professional accomplishments. The Engineering Management Society sponsors three major awards for practicing members. Below are short descriptions of these awards. Look

them over and decide who is eligible and worthy of recognition.

Engineering Manager of the Year Award

\$1,000.00 plus Certificate or Plaque.

Eligibility - Senior Member or IEEE Fellow, Member of EMS for at least 3 years, and an Engineering Manager for at least 10 years.

Basis for Judging - Outstanding Executive or Managerial contributions to the field of Electrical and Electronics Engineering.

Engineering Management Educator of the Year Award

\$1,000.00 plus Plaque and a one-year EMS Membership.

Eligibility - Active or Retired Educa-

tor or Education Administrator in the Field of Engineering Management or a closely related discipline.

Basis for Judging - Outstanding Education or Education Administration contributions to the field of Engineering Management or a closely related discipline.

Engineering Management Innovation Award

\$1,000.00 plus Plaque and a one-year EMS Membership. If the awardee is not a member of IEEE, that individual shall be supported as a one-year EMS affiliate. In the case of a multiple per-

son team, the \$1,000 award shall be split evenly among the team members and a single EMS membership or affiliate status shall be awarded to whomever the team designates. Each individual shall receive a plaque.

Eligibility - No restrictions. The award may be given to one individual or a small, focused, team of individuals in the engineering management community whose work meets the "basis for judging" below.

Basis for Judging - For outstanding management of an engineering project, or series of related projects,

where the success of the project(s) is tied clearly to the use of innovative engineering management techniques. The work for which the nomination is being made shall have been completed within the last 10 years.

Recognition is sweet! It brings almost as much joy to the nominator as to the award recipient. Send me your ideas and nominations. I will help.

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The Ten-Minute Drill

by Robert (Bob) B. Bishop, Jr.

The concept is so simple! Spend ten minutes a day sharpening your skills – even ten minutes a week! Training, staying fresh, being prepared, is entirely up to you. As Stephen Covey likes to say, "It's time to sharpen the saw!" Peter Drucker tells organizations, "You'd better keep training your people, or they'll soon be gone!"

The concept of the ten-minute drill has been around for a very long time. Reader's Digest has had "It Pays to Increase Your Word Power" for years. If you can't find ten minutes to sharpen your skills, you may have a much larger problem – poor time management.

Get Your Act Together

What Size Is Your Landing Pad? In 1973, IEEE contracted with Richard N. Bolles (author of *What Color Is Your Parachute?*) and John Crystal (major source of career ideas). Together they put together a seminar to help people think ahead, to recognize the brick wall, and to effectively plan for when they hit the brick wall.

Wearing the right parachute is a critical first step as is sizing and hitting your Landing Pad. That's why IEEE offered a home study course and seminars across the US, using *Scratch Pad Workbook* authored by Bishop, to get people into writing things down quickly, and finding creative ways to get that job! The professional issues of *Lifework Planning* involve actual written planning versus armchair planning and day-dreaming.

Bolles and Crystal co-authored *Where Do I Go From Here With the Rest of My Life?* This describes a 16-week process for creativity in finding the right job for you. Many people recognize that resumes are NOT the only answer. Exercises in a group setting can lead to considerable creativity in finding ways for people actually get hired.

One popular powerful exercise is the Free-Write Process, described in Peter Elbow's book *Writing Without Teachers*. The Free-Write Process works for everyone, and it's fast!

By organizing issues into a series of 2-minute drills, you can get a lot on paper in ten minutes. Only then can you back, looking for major themes and ideas that stand out in your mind. It has worked very well in seminars for some years. Everyone reports surprises, and unexpected results.

Further reading: Go to www.job-huntersbible.com "Freewrite" each issue that applies to you. *What Color Is Your Parachute?* Richard Nelson Bolles, @2003 Ten Speed Press. Go to www.tenspeedpress.com for a list of 41 career-related books.

Computer Commands

Everyone writes down his or her favorite computer commands. Someone starts the group activity, by showing his or her most favorite command at the keyboard. Keep going until everyone has shared one command. Do it again and have fun with it. Make mistakes, have fun, and help each other. Don't just memorize a bunch of lists. Really have fun. Laugh out loud. People having fun tend to remember what they've learned.

Financial

Twins at age 14 get US \$2000 each, from Grandma for cutting the grass every summer. So one twin starts an IRA, and puts the whole US \$2000 into it every summer for eight years. The other twin spends it all. At age

22, the first twin never puts another dime into the IRA. The second twin starts an IRA at age 22, and puts US \$2000 a year into it, all the way to age 65. It takes the second twin a whole working lifetime to catch up to the first. The power of com-

pounding is starting at an early age.

These are but a small sample, but you get the idea. What ten-minute drills have worked for you? Your ideas and suggestions are most welcome. r.bishop@ieee.org

Explore

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Board of Governors

Your Board serves the interests of the Society and promotes Excellence in Engineering Management. The EMS Board needs your input to help determine if the Society meets your needs. Please contact any Board member for additional information, for expressing opinions, or raising issues that need to be addressed by the Society.

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