

Biometric Identification
& Looking Forward to AUTOTESTCON

From the Editor's Bench

Shlomo Engelberg

Keeping It Personal

I am writing this while flying from Israel to the United States. As usual, I am flying economy class, and college professors' salaries being what they are, this is not likely to change any time soon. Though I enjoy visiting different locales, flying is not something I do for pleasure. From the time I go through the initial security check to the time I cross passport control and customs and pick up my bags, I feel like I have lost whatever makes me an individual and have become one of a great many cogs. I find the experience unpleasant and dehumanizing. Especially in these trying times, it is important to do what we can to keep people from becoming, or feeling that they have become, cogs in a huge, soulless machine.

Knowing how to express yourself "humanizes" you. It is a critically important skill that starts as basic communication and that is developed over a lifetime. (As someone who works for a magazine and who teaches for a living, I may be suspected of having certain biases – but I can only call them as I see them.) I teach electrical engineering courses, and I like to give tests that require students to answer questions like, "What is interesting about the following system?" as well as questions that involve solving equations. Questions of the "what is interesting about..." variety are difficult (and time consuming) to grade, but they help the students learn to express themselves in writing, and that is very important.

In recent years, perhaps because of the ongoing economic crisis, class sizes have been growing. As class sizes grow, everyone is forced to be more "efficient" and to give less personal service. Because of the class sizes, I have to reevaluate my decision to include such long-answer questions and to carefully consider how many questions of this type to include each semester. I do not want to move towards the much more impersonal multiple choice tests, but I do not know how long I will be able to hold out. Especially in these trying times, it is important to do what we can to keep people from becoming, or feeling that they have become, cogs in a huge, soulless machine.

Computers are also being used in ways that depersonalize the way we are treated. At one of our local universities, for example, if a faculty member is late submitting grades, the computer automatically sends him, or her, a nasty letter and has a copy placed in the faculty member's personnel file. The computer program, so they tell me, cannot be told not to send out the letter and have it filed. There is no way to tell the system that a particular late submission was an

“excused lateness.” Faculty members are also treated as no more than cogs in the system. I do not know how to stop this kind of behavior. All I can do is try to follow Tip O’Neill’s dictum: “Think globally. Act locally.” (Tip O’Neill, 1912 – 1994, was Speaker of the U.S. House of Representatives from 1977 – 1987.)

In my department, we still manage to treat students and faculty as individuals. People who help out with this magazine, whether by writing or peer reviewing, will find that each person’s written expression is appreciated. That individuality of expression is what makes the IEEE Instrumentation and Measurement Magazine interesting and valuable to its readers. Our authors and the others who contribute to the magazine are not viewed as a few pieces of a well-greased machine, and the I&M Society’s technical meetings also take care to maintain the personal touch.

In addition to its primary theme, this issue introduces AUTOTESTCON 2011. AUTOTESTCON 2011, sponsored by the IEEE, the IEEE Instrumentation and Measurement Society, and the IEEE Aerospace and Electronic Systems Society, will take place in Baltimore’s Inner Harbor from September 12-15, 2011. By actively participating in the conference, you help it remain a very enjoyable conference. At the conference, you will attend stimulating lectures that deal with automated testing, visit the many exhibit booths, reconnect with old friends, and make new ones. The expression of your work and ideas in the form of papers that are submitted to each AUTOTESTCON may be chosen to be featured in the next year’s Instrumentation and Measurement Magazine August issue. We look forward to presenting selected papers from AUTOTESTCON 2010 in this year’s August issue.

In this month’s issue, we present the fruits of many individuals’ labor. We have a pulse metrology tutorial and articles about open source hardware for instrumentation and measurement, measurement and simulation of our society, biometric recognition, a small-signal, complex distortion and waveform measurement system for multiport microwave devices, and a new instrument to measure the ultrasonic velocity coefficient. As always, we have a fine group of columns, too.

Shlomo

President’s Perspectives

Kim Fowler

Is IEEE Irrelevant?

My last column continued with some thoughts about the challenge and importance of measurement and instrumentation. After preparing that column, the I&M Society officers attended the annual strategy meeting and discussed the future of the society.

During the course of discussion, we grappled with a contrarian proposition put forth by a member of the AdCom. He stated the proposition, in part, with the following:

. . . [H]ere’s my two cents on why we are not relevant. The I&M is organized around current technologies, circa 1950. Very few people self identify as ‘instrumentation and

measurement,' even though pretty much every technical business depends on it. Why would someone working on the smart grid, homeland security, entertainment technology, communications, submarine warfare, biomedical engineering, etc., self-identify with IMS?

So, really, our time is up, as I see it. . . . [T]here was a time when instrumentation was the big thing, but this is not that time any more.

Today IEEE has a matrix of physical location versus outdated technical silos . . . and I don't have to tell you how irrelevant physical location is becoming. Maybe what we need is a matrix of fundamental technologies versus applications. (I think that local organizations still have a place for live presentations and networking, but not at the granularity of technical societies.) Under this concept, instrumentation MIGHT have enough interest as an application and measurement MIGHT have enough interest as a fundamental technology.

Papers would need sponsorship from one technology and one application. Subscribers to either would receive a copy. Delivery by hardcopy doesn't seem like a practical model here. . . . Conferences would probably cover regions of the matrix, or perhaps an entire row or column.

I actually think that IEEE itself will lose its relevance if it does not adapt to the way people are working.

We discussed both sides of this proposition without reaching any definite conclusions. Here were some of the opinions expressed:

- Many views commonly held about instrumentation and measurement are probably the result of a lack of understanding.
- The I&M Society needs to emphasize that we have a common background with most other societies. The commonality is the fundamental technology: measurement. You can save a lot of money if the proper measurements are made. We need to sell our skills. A lot goes into calibration.
- We cannot be pessimistic. But, we do have to continually change to survive. We need to re-package ourselves. We need to pass on the message that “measurement is sexy”.
- The relevance notion is really about the difference between academics and industry. We need to strengthen the link between academia and industry. This can be done with publications. The magazine might be the best tool for this. We need to find a reason for industry people to attend our conferences. Our conferences are stagnant. All the sessions and tracks stay the same.
- Publications are valuable. They are still a good form of communication. Books are not dead; the media format has changed.
- We are always evolving; social networking is the next avenue to explore.
- I&M should be working with other societies, but instead we are silent.
- We have to keep standards in mind. Who is going to continue to develop standards if not a professional society?

We would like to hear from you, the IMS members. What do you think – is IMS irrelevant? Is the IEEE becoming irrelevant? Weigh in at our website forum at [http:// www.ieee-ims.org/main/index.php](http://www.ieee-ims.org/main/index.php) and click on the “Membership” tab and find the discussion forum.

Kim

Article Summaries

Biometric Recognition: Sensor Characteristics and Image Quality

Salil Prabhakar, Alexander Ivanisov, and Anil Jain

(Summary)

In this article, the authors present components of fingerprint and iris recognition systems, which account for a substantial majority of deployed biometric systems. Designing biometric scanners is a challenge because humans come in all shapes and sizes, and their physiological factors are different due to hereditary, lifestyle, and environmental factors. Furthermore, the human factors (e.g., ergonomics, hygiene, perception of invasiveness, behavior, etc.) are extremely important in biometrics and bring an element of art into the science of biometric scanner design for specific applications.

This summary includes text from the article.

Engineering Trade-offs in Social Organization: The Beginnings of a Computational Social Science

Manual Cebrian and Alex Pentland

(Summary)

In the last ten years, we have seen the emergence of a multitude of sensors that can capture every individual's activity and, more importantly for this study, how he or she interacts with others. The chief sensor is the cell phone which has become the ultimate tool for social science research. This article discusses one mechanism to study the impact of social structure on individual performance that is a mixture of exploitation of a realistic communication dataset and a simulation of how much each individual's performance depends on how the individual interacts.

This summary includes text from the article.

A Method and Instrument to Measure the Ultrasonic Velocity Coefficient

Zhixiong Huang

(Summary)

The ultrasonic Doppler velocimeter is a multifunctional instrument to measure flow velocity by means of the ultrasonic Doppler effect. The instrument is widely used in scientific research and engineering practice for the study of hydraulic systems. It has the advantages of a simple

structure and wide applicability and is convenient for field use. This paper explains the characteristics and performance of an ultrasonic velocity coefficient-measuring instrument developed by the author that provides an effective method for calibration and can measure flow velocity for different sedimentary concentrations. The program for analyzing the power spectrum of the Doppler frequency shift signal is described.

This summary includes text from the article.

Small-Signal, Complex Distortion and Waveform Measurement System for Multiport Microwave Devices

Walid S. El-Deeb, Mohammad S. Hashmi, Noureddine Boulejfen,
and Fadhel M. Ghannouchi

(Summary)

In this paper, a multiport measurement system along with a generic calibration algorithm which requires few computation steps and therefore expedites the measurement process is reported for the characterization of N-port microwave devices. The developed system is capable of measuring most of the required linear and nonlinear figures of merit for accurately describing the behavior of a multiport microwave device under 50 W or non-50 W impedance environments. In addition, the proposed multiport waveform calibration algorithm is unique since does not rely on the use of a multiharmonic generator in the calibration process

This summary includes text from the article.

Open Source Hardware for Instrumentation and Measurement

Cindy Harnett

(Summary)

The term “open source” originally applied to software projects with publicly available source code for others to modify, improve, and compile. Modified software projects were then often required to release their source code under the terms of the “open source” agreement. Currently, “open source” is also available for hardware projects and includes printed circuit board designs, photomask layouts and mechanical assemblies. This article discusses situations when open source hardware is a good option for engineers, how designs are used, and how participation in this network has benefitted hardware developers and end users.

This summary includes text from the article.

Pulse Metrology, Part 1: Tutorial 32

Nicholas G. Paulter Jr. and Donald R. Larson

(Summary)

This tutorial is the first part of a two-part series on pulse metrology. Part one provides a brief introduction to the field of metrology in general and to pulse metrology, involving the important concepts of traceability to fundamental units, measurement uncertainty, and reproducibility and repeatability of measurement. These aspects are not automatically included in measurements, and this article discusses the challenge to continuously provide the manufacturing and user communities with measurement capability exceeding their present and future requirements.

This summary includes text from the article.

Columns

In Memoriam: David William Braudaway (1932 – 2010)

Bob Rassa and Kim Fowler

Our long-time colleague and member of the IEEE Instrumentation and Measurement Society, Dave Braudaway, passed away peacefully at 2:00am Christmas morning 2010 at the Anna Kaseman Hospice in Albuquerque, NM. A native of Gering, Nebraska, Dave received his B.S.E.E. at the University of Colorado, and advanced degrees at the University of New Mexico in 1962 (M.S.) and 1968 (Ph.D.). He married Caroline Paschal in 1954, and they had three sons, Gary, Rodger and Brian.

Dave was drafted into the U.S. Army in 1954 and taught nuclear physics at Sandia Base. Dave remained at Sandia, renamed Sandia Labs, for 40 years, where he held a variety of senior technical positions in the field of electrical instrumentation and measurement. He served as the U.S. representative to the international Electrotechnical Commission (IEC) for a number of years, beginning in 1971, and served seven years as Chair of the IEC committee that sets international electrical measurement standards.

Dave was a long-time member of the I&M Society and its Administrative Committee (AdCom), where his focus was on our flagship conference, the Instrumentation and Measurement Technology Conference (IMTC, since renamed the International Instrumentation and Measurement Technology Conference) where he served as IMTC Board member and Chair, and also chaired the 2003 IMTC in Vail, Colorado.

Wherever Dave could, he would try to get us all to see parts of America with which we were mostly unfamiliar. He scheduled meetings in Vail, Colorado, and in Jackson Hole, Wyoming, and even got us to reconnoiter on the top of Sandia Mountain, outside of Albuquerque.

Dave was “Mr. Standards,” having worked on standards and “cross-standards” while running the Sandia calibration laboratory. Much of his IEEE activities involved the IEEE standards. He

published many papers and received many awards from the various societies to which he belonged.

Dave is survived by his wife Caroline, two sons, and three granddaughters, as well as his brother Gordon, of Yorktown, NY. We express our sincere condolences to Caroline and the family.

The Great Train Man

Stephen S. Dyer

He was a curious kid from western Nebraska who retained that definitive quality through his full, busy life, traveling the world and always learning. I liked all of that about Dave, especially the part about learning.

Although he was a couple of decades older than I, we had some interests and experiences in common. Having our childhood homes less than 500 miles apart in adjoining midwestern states, enjoying broadly common interests in instrumentation and measurement, and working together within the Administrative Committee (AdCom) of the I&M Society provided a few, but we had other things to talk about as well. Each of us had played in pep band in school. We had both opened radio-repair shops when we were in junior high. We had both constructed sound systems in our early years—and had made a little money selling related services. And, if you had ever visited with Dave for very long, you'd know that he had a fascination in, and a love for, trains. While my infatuation with railroads could have never matched Dave's, it was an interest I could engage in—and with great appreciation: my dad worked for the railroad for 65 years, mostly as Day Wire Chief for the AT&SF; and my list of other close family members whose livelihood the railroad provided is long.

We enjoyed a few differences, too. Dave's mind was an encyclopedia, especially of matters technical. In short, it seemed he could remember everything, a gift I cannot claim. And Dave was as talkative as I am quiet (at least as I perceive it). Which was just fine. I loved to hear all the stories with all the technical details included, whether it was about how to better receive the signal from WWV by using an antenna designed in 1936, or Dave's hand in the setup of the sound system used in the dedication of the NBS (now NIST) Boulder facility by President Eisenhower, or the advantages of using 25-Hz traction power for railways.

Dr. David W. Braudaway was intensely involved with measurement standards throughout his working years and into his retirement. And he was deeply involved with many conferences and professional organizations, especially the Measurement Science Conference (MSC); the National Conference of Standards Laboratories International (NCSLI); the IEEE, to which he was elected Fellow in 1990; and the IEEE I&M Society, for which he served two terms--in 1988 and 1989--as President.

His service was long and exemplary, and he was recognized for it. In 1985, Dave was awarded the title Distinguished Member of Technical Staff by Sandia National Laboratories, which he served for most of his career. In addition to his elevation to Fellow of the IEEE, Dave received the NCSLI's prestigious William A. Wildhack Award in 1988, the I&M Society's Distinguished

Service Award in 1989, MSC's Woodington Award in 2001, and the I&M Society's Technical Award in 1997. All of these honors recognized, in one way or another, Dave's contributions to the development and improvement of measurement techniques and equipment involved with primary standards.

In October 2006, the I&M Society's AdCom members gathered in Portland, Maine for its Fall AdCom Meeting. During an after-dinner awards ceremony on the night before the meeting, we honored Dave for his many years of active service on the AdCom, giving him AdCom Member Emeritus status. In response to my summary remarks on Dave's career and his service to his profession and to the I&M Society, Ken Medema, who was providing the entertainment for the evening, improvised for Dave "The Great Train Man." Here are the lyrics to that song¹:

If you miss the train he's on,
You will know that he is gone.
In human circles he's learned to run.

He has run so many things.
He's done so many wonderful things.
And he's just started, but he's not done.

He took the train down to New Mexico.
He took the train all the way to Cairo.
He's taken trains here and there and everywhere,
All around the place.

But if you miss the train he's on,
Then you will know that he is gone.
He's off to another adventure somewhere 'round the world.

And you can hear that diesel hummin',
And you can hear him comin',
Takin' that train somewhere 'round the world.

Can we get on the train along with you?
Learn some things that you have learned?
We promise not to pull the ripcord.
We promise not to make the train turn.

Show us the wisdom that you've gained across the years.
Show us some things we ought to know.
We want to learn from someone wise like you,
Just where this train ought to go. (Oh yeah.)

Well if you miss the train he's on,
Then you'll know that he is gone.
And you'll know that you can find him
In some strange, exotic place,
Ridin' that train with a smile on his face!

Although Ken knew Dave for only the four or five minutes prior to creating the song, it would be amply evident to anyone who had known Dave for years that contained in its lyrics is an amazingly accurate summary of an amazing man and the rich life that he lived.

The final lines are hauntingly poignant to me. But, at the same time, they allow me to be joyful. Dave is indeed gone. That I know. But I also picture him in some strange, exotic place. And I'm sure that he is smiling! Farewell, Dave.

Instrumentation Notes

Shlomo Engelberg

Polite Protocols

Amos Cohen, Shlomo Engelberg, and Boaz Kaizer
(Summary)

Many protocols rely on – actually require that – their users be polite. The protocols require that if one instrument would like to transmit, to “talk,” while another is transmitting, the instrument that is not yet transmitting must wait for its turn to transmit. The authors consider two examples of such protocols. First, a piece of the inter-integrated circuit (I2C) protocol is presented, and the authors describe how the I2C protocol implements a “listen constantly” policy. Then, a system that allows multiple polite users to share a limited amount of bandwidth – that implements a very simple “virtual cognitive radio” - is discussed.

This summary contains text from the column.

History of Physical Standards

James F. Schooley, Sr.

Well, What Time Is It?

(Summary)

This historical survey identifies attempts by different civilizations to accurately measure the passing of time, from ancient Egyptians, to Babylonians, to modern era scientists whose intensive research on atomic time and frequency standards was begun in many laboratories. The author explains that as the accuracy of frequency standards improves, so does the accuracy of modern clocks.

This summary contains text from the column.

Departments

New Products

Robert Goldberg

Unique Functionality Increases Test Efficiency, Confidence

Agilent Technologies Inc. has expanded its pulse function arbitrary noise generator family to help R&D and test engineers test higher speed, higher bandwidth analog, digital and mixed-signal devices more efficiently and with greater precision.

Design and test engineers are under pressure to get products to market faster, with shorter design schedules and yet higher quality goals. In addition, they must differentiate their products in the marketplace by offering unique capabilities, which necessitates expanded test functionality during development.

The Agilent 81160A pulse function arbitrary noise generator provides innovative functionality and streamlined setup to help engineers complete a broader test set more quickly.

The Agilent 81160A pulse function arbitrary noise generator eliminates the need for cumbersome multi-instrument setups for stress testing devices. Like the 81150A, the 81160A provides versatile waveforms along with superior signals with an intrinsic jitter of 7 ps rms. This combination of characteristics helps engineers define better performance specifications for their devices. The 81160A is ideal for general-purpose bench tests and advanced serial data stress tests.

Capabilities include: generation of 330-MHz pulses and 500-MHz function/ arbitrary waveforms with a 2.5-GSa/s sample rate and 14-bit vertical resolution; selectable crest factors for white Gaussian noise lets engineers determine how much distortion to apply to a device during stress testing to meet various serial bus standards; glitch-free timing parameter changes allow engineers to change the frequency without drop-outs or glitches and enable continuous operation without rebooting or resetting the device under test; and arbitrary bit patterns show capacitive load of the channels using simple pattern settings. Complex measurement setups are no longer necessary to test designs to their limits.

Additional information is available at www.agilent.com/find/81160.

USB Peak Power Sensor Provides 100 MHz To 20 GHz Peak And Pulse Waveform Measurements

Giga-tronics has announced the release of the new GT8555A 100 MHz to 20 GHz USB Peak Power Sensor which provides fully calibrated peak and average power measurements with high dynamic range, fast measurement speed and easy-to-use PC-based user interface.

The new Giga-tronics GT-8555A USB peak power sensor offers easy-to-use, high-performance RF and microwave power measurement. High dynamic range and peak (pulse) capability make this sensor ideal for testing in wireless communications and defense electronics systems. The GT-8555A features power versus time, time gating and automatic pulse parameter

measurements. It provides high accuracy for R&D laboratory, manufacturing test and field installation and maintenance applications.

The GT-8555A delivers 20 GHz frequency range, 2,000 readings per second typical, wide dynamic range of -40 to +20 dBm, and low VSWR of 1.2:1. The GT-8555A includes Gigatronics MeasurementXpress (MX) software, an easy-to-use interface, and a suite of measurement capabilities. The GT8555A USB Peak Power Sensor includes a trigger input, with software control of the trigger parameters.

For more information, please visit www.gigatronics.com.

Acoustic Measurement Products Selection Guide

Meggitt Sensing Systems, a Meggitt group division, has announced the global release of its new “Endevco® Acoustic Measurement Products Selection Guide,” a single comprehensive product specification resource, detailing Meggitt’s complete range of Endevco® acoustic sensors and instrumentation for automotive NVH, cabin noise, vibro-acoustic testing, appliance noise evaluation, environmental noise analysis, building acoustics, appliance noise evaluation, wind tunnel testing, and other critical measurement applications.

Endevco® prepolarized condenser measurement microphones are offered in free-field, pressure, low-cost array, and random incidence types and may be used to meet IEC and ANSI standards. Array microphones offer a lower overall per channel measurement cost and are directly compatible with ISOTRON® (IEPE-type) signal conditioning, facilitating their use as drop-in replacements within existing accelerometer test system set-ups for as-needed precision noise measurements.

Models may be purchased as stand-alone units or in a microphone and low-noise preamplifier combination with TEDS for larger channel count applications. Available for use with Endevco® precision measurement microphones are a full range of low-noise ISOTRON® preamplifiers, handheld calibrators, and accessories.

The “Endevco® Acoustic Measurement Products Selection Guide” is available for download at <http://www.meggittsensing.com>, or may be ordered in printed copy by contacting Jessica Koble, Sales & Marketing Coordinator, at +1 949 493 8181, or by email: jessica.koble@meggitt.com.

New Low-Cost RTD Signal Conditioners with USB Configuration

The initial offering in Acromag’s new ST130 series of low-cost, temperature transmitters is an ASIC-driven RTD (Resistance Temperature Detector) signal conditioner, Model ST131. Units combine the simplicity of a digital USB setup and calibration interface with the inherent performance advantages of analog signal conditioning. With free Windows configuration software, this DIN Form B head-mount instrument will convert the input signal from any 100 ohm Platinum RTD sensor to a highly accurate, loop-powered 4-20 mA output. The ruggedized design features -40 to 80°C operation, electrical noise immunity, and surge protection. CE and UL/cUL Class 1 Division 2 Zone 2 approvals are pending.

Despite their tiny size and economical price tag, ST131 transmitters are full-featured. These transmitters provide sensor excitation and perform advanced signal linearization, lead-wire compensation, and sensor fault detection functions. Units can also support any 100 ohm Pt RTD sensor ($\alpha = 375-393$) or 0-900 ohm input.

Designed for harsh environments, the unit's ASIC exhibits very low drift across wide ambient temperatures and is highly resistant to RFI, EMI, ESD, and EFT effects. Differential sampling and auto-zero techniques yield further accuracy improvements. Another benefit, the output is non-polarized and reverse polarity protected. Factory calibration is also available.

A variety of options add greater flexibility. Programmable over/under range and fault/alarm levels enable identification of a "runaway" process or broken sensor. Selectable up/ downscale failsafe modes ensure a safe, predictable shutdown with a NAMUR-compliant fault response.

For easy installation, Acromag sells a variety of mounting and wiring accessories. A USB-to-USB isolator protects equipment from ground loops, electrical noise, and surges during configuration. For convenience, a kit supplies the software, isolator, and USB interface cables. Numerous connection head enclosures are also available through Acromag. Select from stainless steel, aluminum, and cast iron housings with explosion-proof or general-purpose ratings. A DIN rail adapter adds more mounting options.

Please visit www.acromag.com for more information.

Universal Thermocouple Connector

Omega's new UTC-USB universal thermocouple connector accepts signals from 9 thermocouple types (J, K, T, E, R, S, B, C and N). The UTC-USB displays actual temperature readings on your PC through the USB port. Free software for display, data logging, and chart recording is provided.

The included software lets you select the thermocouple type and units and then use your PC as a meter, chart recorder or data logger. UTC-USB accepts both standard and miniature connectors. It features a Built-In Cold Junction Compensation and Linearization. Applications include PC-based temperature monitoring and data logging for laboratory work, industrial ovens, hydraulic pumps, fluids and motors, extreme temperature monitoring, and HVAC.

For more information, please visit www.omega.com.

Enhanced Throughput and Accuracy of Parametric Test Systems

Keithley Instruments, Inc. has introduced several enhancements to its line of S530 Parametric Test Systems to the semiconductor industry. These enhancements include the addition of Keithley's new high throughput switch mainframe for high integrity signal switching, full Kelvin measurements at the probe card for greater low-ohms accuracy, new hardware protection modules that safeguard sensitive system instruments from high voltages, and a complete range of "probes up" system specifications and diagnostic tools.

Two different S530 systems are available: a low current version developed for measuring characteristics such as sub-threshold leakage, gate leakage, etc., and a high voltage version for the difficult breakdown and leakage tests that GaN, SiC, and Si LDMOS power devices demand.

S530 parametric test systems are designed to speed and simplify wafer and test plan setup by providing immediate feedback to the engineer throughout test project development. For example, the Automated Characterization Suite (ACS) software that controls S530 systems streamlines test project development by allowing new test scripts to be tested interactively without compromising throughput in full automatic mode.

All S530 systems provide up to 20 W of source or sink capability on both the 200 V and 20 V ranges. The S530 High Voltage System is the only available parametric tester that offers 1 kV to any probe card pin on up to 32 pins. This permits high voltage and low current sensitive measurements in a single pass, enabling the accurate characterization of high power devices.

Each S530 test system employs a high performance switch matrix and high fidelity signal pathways to direct signals between instruments and test pins. The performance of these pathways directly influences the performance of the test system as a whole by setting upper current and voltage ranges and limiting low-level measurements due to current offsets.

All source-measure units (SMUs) built into S530 Parametric Test Systems are based on Keithley's production-qualified instrument technology to ensure high measurement accuracy and repeatability and extended hardware life. The SMUs are four-quadrant sources, so they can source or sink current or voltage. Each SMU also measures both voltage and current while sourcing, which ensures that parameter calculations reflect actual conditions rather than simply the programmed conditions.

To learn more, view Keithley's online product tour at <http://keithley.acrobat.com/p20663354/>.

Fast Linear Actuator for Automation Based on Ultrasonic Motor Technology

PI (Physik Instrumente) introduces the new M-272 linear actuator for automation applications based on a maintenance-free PILine® ultrasonic ceramic motor.

PILine piezo ceramic ultrasonic drives offer an affordable alternative to electromagnetic linear motors and motor-lead screw combinations when small dimensions and/or high speed are important. With velocities of up to 200 mm/s, these drives are fast, compact, and are readily integrated. In addition, PILine motors are self-locking at rest with zero heat generation, eliminating the need for an additional motor brake.

The novel M-272 closed-loop linear drive combines motor, actuator, linear encoder, guiding system and brake functionality in a very compact package. Due to the integrated guiding system a payload can be easily attached to the drive rod of the M-272 drive and positioned precisely.

Features and Advantages: Maintenance free ceramic linear motor; Travel range 50 mm; 5 µm resolution with integrated linear encoder; Fast: 200 mm/sec (8in/sec); High speed and dynamics for fast settling; Self-locking at rest, no need for external brakes, no energy consumption; OEM driver electronics for ultrasonic motors available.

PILine piezo motors are based on a new, patented, ultrasonic drive principle developed by PI. The core piece of the system is a piezoceramic plate excited with high-frequency eigenmode oscillations. A friction tip attached to the plate moves along an inclined linear path at the eigenmode frequency. Through its contact with the ceramic friction bar (runner), the moving part of the mechanical system is pushed along. With each oscillatory cycle, the mechanical system executes a minute step of only a few nanometers; the macroscopic result is smooth motion with a virtually unlimited travel range. The piezo ceramic plate is preloaded against the runner and thus generates the holding force when the drive is at rest.

The linear actuator can be driven with the C-867.OE OEM controller card. Its highly specialized DSP handles all of the motion properties typical for ultrasonic piezomotors, such as dynamic control parameter adaption. Optimized settling behavior of the mechanics within tens of milliseconds is achieved by automatically switching between gainsets for dynamic and static operation.

Additional information on ultrasonic motors is available at http://www.ultrasonic-motor.com/Ultrasonic_Motors_Catalog.pdf.

Electro-Mechanical Actuators Support Modbus TCP/IP Protocol Enhancing Communications Versatility

Exlar announces the newest Ethernet-based communications protocol supported by the company's Tritex II™ linear and rotary actuators' Modbus TCP/IP. To maintain standard connectivity, the Ethernet connection is offered through an M12 connector.

The Modbus TCP protocol pairs the robust Modbus RTU protocol already supported by the Tritex product line with the convenience of Ethernet connectivity. In addition to Modbus TCP support, Exlar Expert™ software now includes enhanced functionality for customers using Modbus commands through an HMI or PLC.

Rather than searching through manuals for individual parameter addresses while programming the PLC, a Modbus Mapping table allows users to map all parameters they wish to use in a contiguous register bank composed of up to 100 registers. This will allow a PLC program to perform a single read operation and a single write operation to all selected registers, rather than reading and writing one register at a time or being forced to read in blocks of data that may not all be used.

Tritex II actuators operate from 100-240VAC, allowing direct connection to factory power sources. Enhanced software features include 16 programmable indexes, linked moves and firmware flash upgrade capability via the actuator's Modbus port. This port—through the RS/485 protocol—allows complete control, programming and monitoring of all aspects of the Tritex II actuator as it performs an application. Other communications options include the following: Ethernet IP, HART, CAN Open and CAN J1939 protocols.

With eight digital inputs, four digital outputs, plus one analog input and output, the Tritex II actuator has ample I/O capability. Feedback choices include the analog Hall effect (standard) and an incremental encoder for high positioning resolution.

Tritex II linear actuators provide the same form factor as hydraulic and pneumatic actuators and allow simple and clean all-electric retrofits for former fluid power applications. They are available with many different mountings (metric or imperial), such as front flange, rear clevis mount, side mount, trunnion mount, extended tie rod, and rear flange.

For more information, please visit www.exlar.com.

New Instrument Drivers For Linux and LabVIEW Real-Time Software Environments

Geotest has announced the release of a new software driver package, GtLinux v1.0, which allows Geotest's PXI instruments to operate under the Linux operating system. The initial release includes support for Geotest's DC source instruments (GX1642/8), the GTX2200 counter/timer family, the GX3500 Flex DIO FPGA card, and static digital I/O cards (GX5731/2/3 and X5641/2). In addition, a new update to Geotest's instrument driver libraries now supports Geotest's PXI instruments under the National Instruments LabVIEW RT software environment.

Geotest's GtLinux driver package supports both 32 and 64 bit Linux operating systems and is compatible with the Linux kernel 2.6 or higher. Support for LabVIEW RT is now included with Geotest's standard driver libraries.

GtLinux can be downloaded from the Geotest web at <http://www.geotestinc.com/Downloads.aspx?prodId=35&search=package>.

Other information can be found at www.geotestinc.com.

Industrial Timer Provides Six Timing Ranges in a Single Unit

The ATC Diversified Electronics division of Marsh Bellofram Corporation has announced the introduction of the 405A series, an economical, industrial timer family with on-delay instantaneous relay function, designed for daily-use OEM and control package timing applications.

The Marsh Bellofram 405A series features six individual timing ranges within a single unit, packaged within a highly compact 48mm² standard DIN housing. The housing is watertight when panel mounted with an 8-pin round (octal) socket. A selectable on-delay/interval timing mode version is also available.

The timer operates from industry standard 24-240 VAC or 24 VDC power, and features a large and easy-to-read display dial with decimal points. Output contacts are rated 10A 120/240 VAC and 30 VDC. Mode and range select switches are located on the side of the unit, so that when panel mounted, they are not operator accessible, a tamper-proof feature that prevents unauthorized or hazardous changes to the timing mode and range. A special LED indicator provides a unique and effective method of cycle progress indication.

Units are CE marked and UL-pending, as well as CSA and FM approved, facilitating their use across a variety of industrial environments. For more information about the model 405A series industrial timer or other products, please visit www.marshbellofram.com.

Portable Flow Meter Tester

The rugged PFM (Portable Flow Meter) Tester Series by Flotech now features an internal safety pressure relief disc or “burst disc”. The PFM series has long been relied upon to measure flow, pressure, temperature and horsepower on mobile hydraulic equipment. Effective immediately, all PFM Testers will include an internal burst disc component. The new design ensures that in the event of an over pressurization, the fluid is safely allowed to bypass the load valve and remain within the hydraulic system. No fluids will escape outside of the tester. Maintenance costs are thereby reduced, and potential harm to the environment from spills is eliminated with the internal design. As before, the internal burst disc is field-replaceable should an over pressurization occur.

The PFM Tester utilizes a turbine rotor and a magnetic pick-up to measure flow rates by measuring the frequency pulse output from the rotor. Volumetric flow rate is displayed on an LCD or sent via digital output to a PC. The PFM Series provides reliable readings with an accuracy of 1% of full scale and a repeatability of 0.2%. Temperature is measured via an internal sensor, and pressure is measured via an analog gauge or a high-sensitivity digital sensor. For ease of use and safety, all testers have loading valves with fingertip control and pressure surge protection.

More information can be found at www.racinefed.com/flow.

Ultra-Stable Pigtailed OEM Diode Laser

The iBeam smart PT is a compact, permanently fiber coupled (“pigtailed”) diode laser from TOPTICA. This high-performance, ultra-reliable diode laser is designed for straight-forward OEM integration. It includes TOPTICA’s patent pending COOLDC technology, which guarantees ultimate long-term power stability and thus ensures true drop-shipment capability.

These features make the iBeam smart PT the ideal choice for fiber-based applications in biophotonics such as microscopy or cytometry.

The standard wavelengths are 405 nm (60 mW), 445 nm (50 mW), 488 nm (50 mW), 515 nm (20 mW), 640 nm (80 mW), 660 nm (75 mW) and 785 nm (70 mW) – all powers are given after the single-mode polarization maintaining fiber delivery. Other wavelengths are available on request.

The iBeam smart PT features the COOLDC technology – which ensures a Dura Calibrated Constant Optical Output Level. TOPTICA’s novel concept for high power single-mode permanently fiber-coupled lasers does not use any micro-mechanical adjustable parts. These are normally the first to shift due to varying ambient conditions, for example temperature changes or vibrations. All major optical components are solidly mounted; thus, optical alignment is immune to mechanical and thermal distortions or translations. The incorporated microprocessor control and optional features such as high speed digital modulation and feedback-induced noise suppression by FINE technology make the iBeam smart PT a good choice for flexible OEM integration.

Please visit www.toptica.com for more information.

Society News

Society Honors the 2011 IEEE Fellows in the Instrumentation & Measurement Society

The IEEE Fellows Program was established to recognize and honor outstanding members for their significant accomplishments in the advancement or application of engineering, science, and technology and for their contributions to the mission of the IEEE: to advance global prosperity by fostering technological innovation, enabling members' careers and promoting community worldwide.

The IEEE Fellows are an elite group from around the globe. The IEEE looks to the Fellows for guidance and leadership as the world of electrical and electronic technology continues to evolve. The Instrumentation and Measurement Society (IMS) Fellows Identification and Evaluation Committees identify candidates, gather references from their peers, and submit detailed applications to the IEEE Fellow Committee in a confidential process typically extending over several years. After a further rigorous evaluation and selection process by the IEEE Fellow Committee, each year a slate of candidates for elevation to Fellow is proposed to the IEEE Board of Directors for approval. Per IEEE rules, the number of successful candidates, in any year, must not exceed one-tenth percent of the IEEE voting membership on record as of 31 December of the preceding year. IEEE Fellows receive a certificate and pin. The Instrumentation and Measurement Society members elevated to Fellow in 2011 are:

Voicu Zamfir Groza

University of Ottawa

Ottawa, Canada

For contributions to floating-point analog-to-digital conversion

Sergey N. Kharkovsky

Missouri University of Science & Technology

Rolla, MO, USA

For contributions to microwave techniques for the evaluation of materials and structures

Subhas Chandra Mukhopadhyay

Massey University

Palmerston North, New Zealand

For development of low-cost smart sensors and sensing systems

Yong Yan

University of Kent

Farningham, United Kingdom

For contributions to pulverized fuel flow metering and combustion flame imaging

Dr. Voicu Groza received the Dipl. Eng. in Computer Engineering from the Polytechnic Institute of Timisoara, Romania in 1972. He received the Dr. Eng. Degree in Electrical Engineering from the same institution in 1985. His faculty career began in 1979 at the Polytechnic Institute of Timisoara where he became Professor in the Department of Computer

Engineering and Dean of the Faculty of Automation and Computers. After brief assignments as visiting and part-time faculty at Eidgenössische Technische Hochschule, Zürich, Switzerland, and Sheridan College, Toronto, Canada.

Dr. Groza joined the faculty of the University of Ottawa where he is presently Associate Professor and Coordinator of the Computer Engineering Program in the School of Information Technology and Engineering. He is author or co-author of more than 200 refereed articles in journals and conference proceedings, author of two books, and holds two patents. His publications reflect his two dominant research interests, which are high-speed data acquisition and dynamically reconfigurable embedded systems.

Dr. Groza is active in the IEEE in a number of different capacities and societies. Within in the IEEE Instrumentation and Measurement Society, he has been General Chair and Technical Program Co-Chair of several workshops and symposia. He is a member of the I&M Society's AdCom and Chair of the AdCom's Conferences Finance Committee and is a member of the I&M Magazine's editorial board. He is also a member of the IEEE's Computational Intelligence Society, the IEEE Standards Association, and the Association of Professional Engineers of Ontario.

Dr. Sergiy Kharkivskiy (professional name Sergey Kharkovsky) received the Diploma in Electronics Engineering from Kharkov National University of Radioelectronics, Ukraine, in 1975, and his Ph.D. and D.Sc. degrees in radiophysics from the Kharkov National University, Ukraine Society Honors and from the Institute of Radio-Physics and Electronics (IRE) of National Academy of Sciences of Ukraine, Kharkov, in 1985 and 1994, respectively.

Prior to joining Missouri S&T he was a Member of the Research Staff at IRE from 1975 to 1998 and a Professor in the Electrical and Electronics Engineering Department at the Cukurova University, Adana, Turkey, from 1998 to 2003. He joined Missouri S&T in 2003. Currently, he is a Research Associate Professor in the Applied Microwave Nondestructive Laboratory (AMNTL), the Electrical and Computer Engineering Department at Missouri University of Science and Technology (Missouri S&T).

He has authored and co-authored more than 120 publications in microwave and millimeter wave physics and engineering, material characterization, and nondestructive evaluation. He holds 11 USSR patents and 3 US patents. He is an Associate Editor for the IEEE Transactions on Instrumentation and Measurement where he is also a member of Best Paper Award Committee.

He is a member of the American Society for Nondestructive Testing (ASNT) and a member of the ASNT University Programs Award Committee. He served as the Guest Editor for the ICONIC09 special issue of the IEEE Transactions on Instrumentation and Measurement, 2010. He is also a member of Steering Committee of the IEEE International Symposium on Medical Measurements and Applications (MeMeA 2011), Bari, Italy and a co-technical chair for the IEEE International Instrumentation and Measurement Technology Conference (I2MTC 2013) "Innovation in Measurement for Medical and Industrial Technology," which will be held in Minneapolis, MN, USA.

His research interests are microwave and millimeter sensor technologies, nondestructive evaluation and imaging of composite structures, material characterization, and instrumentation and measurement.

Dr. Subhas Chandra Mukhopadhyay graduated from Jadavpur University, Calcutta, India with a Gold medal and received the Master of Electrical Engineering from the Indian Institute of Science, Bangalore, India. He holds a PhD (Eng.) degree from Jadavpur University, India and a Doctor of Engineering degree from Kanazawa University, Japan. Currently he is working as an Associate professor in the School of Engineering and Advanced Technology, Massey University, Palmerston North, New Zealand.

He has made outstanding contributions to research in the field of sensor and sensing technology. He has authored or co-authored over 240 papers in different international journals, conferences and book chapters. He also received various awards and honors.

He is a Fellow of IET (UK) and an Associate editor of IEEE Journals. He is the co-Editor-in-chief of the International Journal on Smart Sensing and Intelligent Systems and the General chair/co-chair of many international conferences.

Dr. Yong Yan is a Professor of Electronic Instrumentation, the Head of Instrumentation, Control and Embedded Systems Research Group, and the Director of Research at the School of Engineering and Digital Arts, at the University of Kent, Canterbury, U.K. He received the B.Eng. and M.Sc. degrees in instrumentation and control engineering from Tsinghua University, Beijing, China in 1985 and 1988, respectively, and his Ph.D. degree in gas-solids flow measurement from the University of Teesside, Middlesbrough, UK in 1992.

Dr. Yan started his academic career in 1988 as an Assistant Lecturer at Tsinghua University. In 1989 he joined the University of Teesside as a Research Assistant. After a short period of postdoctoral research, he worked as a lecturer at Teesside during the period 1993-1996 and then as a senior lecturer, reader and professor with the University of Greenwich, U.K. during the period 1996-2004. He joined the University of Kent in 2004.

His research interests include sensors, instrumentation, measurement, condition monitoring, and digital signal and image processing. Dr. Yan has published more than 260 research papers in refereed journals and conference proceedings in addition to 12 research monographs and book chapters. He serves as a member of the editorial boards for Flow Measurement and Instrumentation, Measurement Science and Instrumentation, and Chinese Journal of Scientific Instruments. He has been a member of the Innovation R&D Metrology Working Group and the Engineering and Flow Working Group of the UK Government since 2006.

Dr. Yan is a Fellow of the Institution of Engineering Technology (formerly IEE), the Institute of Physics, and the Institute of Measurement and Control, U.K. He has held the positions of Kuang-Piu Guest Professor at Zhejiang University since 2004 and Yangtze Scholar Professor at Tianjin University since 2005. In recognition of his contributions in pulverized fuel flow metering and combustion flame imaging, Dr. Yan was awarded the Achievement Medal by the IEE in 2003, the Engineering Innovation Prize by the IET in 2006, and the Rushlight Commendation Award in 2009. Dr. Yan has been teaching electronic instrumentation and related modules at both undergraduate and postgraduate levels for 20 years. His contribution in engineering education was recognized by a national award from the Royal Academy of Engineering in 2007.

2010 IEEE Instrumentation and Measurement Society Awards

Each year the IEEE Instrumentation and Measurement Society accepts nominations for its Awards. The Administrative Committee (AdCom) Awards Committee manages the nominations process, reviews the candidates, and recommends a slate. The slate of candidates is then submitted to the Society AdCom for approval, and the awards are presented at our annual Awards Banquet held as part of the International Instrumentation and Measurement Conference (I2MTC). The Awards Committee is pleased to announce the 2010 winners

IEEE Instrumentation and Measurement Society Andy Chi Best Paper Award

The I&M Society Andy Chi Best Paper Award is awarded to recognize an author or authors of a paper published in the IEEE Transactions on Instrumentation and Measurement. The 2010 Andy Chi Best Paper Award recipient is: **Jenny Wirandi**, the Manager of System Engineering, Electrical and I&C Engineering, Sweden, for the paper “An Adaptive Quality Assessment System – Aspect of Human Factor and Measurement Uncertainty.” The secondary authors were Wlodek Kulesza and Jiandan Chen.

Dr. Jenny Wirandi received the B.Sc. degree in electrical engineering from the University of Kalmar, Kalmar, Sweden, in 1997 and the Ph.D. degree in electrical measurement from the Lund University, Lund, Sweden, in 2007. In 2007, she joined the Blekinge Institute of Technology, Karlskrona, Sweden as a post-doc. In 2008 she joined Oskarshamn Nuclear Power Plant, Oskarshamn, Sweden, as a System Engineer in the Electrical and Instrumentation Section, and since 2011 she has been the head of that section. Her research interests are modern measurement concepts and their applications to industry, including traceable calibration, measurement uncertainty, and the role of the operator in the measurement system.

The IEEE Instrumentation and Measurement Society Outstanding Young Engineer Award

The I&M Outstanding Young Engineer Award recognizes an outstanding young I&M member who has distinguished him or herself through achievements, which are technical, of exemplary service to the I&M Society, or a combination of both, early in their career. The nominee must not have reached their 39th birthday and must be an I&M member at the time of nomination. The 2010 Outstanding Young Engineer Award recipient is: **Yan Zhai**, who is with the Micron Technology Corporation, USA, for advancement in stochastic signal processing for real-time data acquisition and surveillance measurements.

Dr. Yan Zhai received the B.S. in Electromechanical Engineering from Tsinghua University, Beijing, China, the M.S. in Mechanical Engineering from Oklahoma State University, Stillwater, Oklahoma USA, and the Ph.D. in Electrical and Computer Engineering from the University of Oklahoma, Norman, Oklahoma USA. He joined Schlumberger Technology Corporation after graduation and is now employed by Micron Technology Corporation, where he is an algorithm development specialist.

His work at Schlumberger involved signal processing and control algorithms for energy industry applications. His work at Micron Technology involves development of advanced signal and image processing algorithms for CMOS imaging sensors and micro-display panels. His present research activity involves image processing, image analysis, and computer vision algorithms to

promote interactive human interface and intelligent sensing. Dr. Zhai is an active reviewer for a number of *IEEE Transactions*, co-author of multiple journal articles and conference papers, and co-author of a book on non-linear filtering.

The IEEE Instrumentation and Measurement Society Technical Award

The I&M Technical Award is given to an individual or group of individuals for outstanding contribution or leadership in advancing instrumentation design or measurement technique. The 2010 Technical Award recipient is: **Abdulmotaleb El Saddik**, University of Ottawa, Canada, for outstanding contributions to multimedia computing. Dr. El Saddik is a Professor and University Research Chair at the School of Information Technology and Engineering (SITE) at the University of Ottawa, Canada. He has made outstanding contributions to multimedia computing, in particular, in the field of ambient intelligence and haptic audio visual environments, which will significantly change the human-to-human and human-computer interaction technologies and their applications.

Dr. El Saddik has authored several books and book chapters, filed 2 patents, and has authored over 250 refereed papers. He is the recipient of numerous awards and grants. He has been selected as an IEEE I&M Distinguished Lecturer and he has been invited as a keynote speaker for more than 15 major events. Recently, he was elected Fellow of renowned national and international Societies and Institutions. He also received prestigious national and international awards and honors.

The IEEE Instrumentation and Measurement Society Distinguished Service Award

The I&M Society Distinguished Service Award is presented each year to an individual who has given outstanding service to the Society and to the profession. The 2010 Distinguished Service Award recipient is: **Robert C. Rassa**, Raytheon, USA, for many years of invaluable dedication to the Instrumentation and Measurement Society.

Bob Rassa received the B.S. in Electrical Engineering from the University of California, Berkeley. Bob's technical activity has emphasized system engineering, automatic test, process improvement, and interactive cooperation with technical groups in defense and commercial enterprises throughout the United States and around the world. His technical efforts were recognized by his election as IEEE Fellow in 2004. As noteworthy and numerous as his technical activities are, Bob is honored today for his exceptional service to the IEEE I&M Society and to the IEEE as a whole. It is difficult to find a position Bob has not held in the I&M Society. He has chaired numerous administrative, coordinating, and technical committees – including the Committees on Technical and Standards Activities, Awards and Membership Recognition, Meetings, Nominations and Appointments, and Finance. Bob served multiple terms on the Society's AdCom and was Society President during 2004-2005. He spent seven years on the I2MTC Board of Directors as member and chair, and was the 2008 I2MTC chair. His leadership at AUTOTESTCON spans more than 20 years, and he has been the I&M Society's voice on a number of IEEE committees – including the Standards, Conferences, and Critical Infrastructure Protection Committees. Bob's service to IEEE and the Instrumentation and Measurement Society has been unselfish, long-standing, and exemplary in scope. His citation for the 2010 Distinguished Service Award reads, in part, "for many years of invaluable dedication" – an accolade that is, if anything, barely sufficient to describe his service to the Society.

The IEEE Instrumentation and Measurement Society Career Excellence Award

The I&M Society Career Excellence Award is awarded to recognize a lifetime career of meritorious achievement and outstanding technical contribution by an individual in the field of instrumentation and measurement. The 2010 Career Excellence Award recipient is: **Asad M. Madni**, BEI Technologies, Inc., USA, for an extraordinary career of enlightened leadership in and pioneering contributions to the development and commercialization of intelligent sensors, systems and instrumentation. Dr. Asad M. Madni served as President, Chief Operating Officer and CTO of BEI Technologies Inc. headquartered in Sylmar, California, from 1992 until his retirement in 2006. He led the development and commercialization of intelligent micro-sensors and systems for aerospace, military, commercial and transportation industries, including the Extremely Slow Motion Servo Control System for Hubble Space Telescope's Star Selector System.

Prior to joining BEI he was with Systron Donner Corporation (a Thorn/EMI Company) for eighteen years in senior technical & executive positions, eventually as Chairman, President & CEO. Here he made seminal and pioneering contributions in the development of RF & Microwave Systems and Instrumentation. He is credited with over 150 refereed publications in archival journals, conference proceedings and book chapters; over 100 keynote addresses, invited lectures, chairs and panels; and 67 issued or pending patents. Dr. Madni is also the recipient of numerous national and international awards and honors. In 2011 Dr. Madni was elected to the US National Academy of Engineering "for contributions to development and commercialization of sensors and systems for aerospace and automotive safety." He is also a chartered Engineer and a Fellow of numerous technical Institutions and Societies.

The IEEE Instrumentation and Measurement Society 2010 Outstanding Chapter Award

The I&M Society Outstanding Chapter Award is awarded to recognize the most outstanding Chapter of the I&M Society. The 2010 Outstanding Chapter Award goes to the Taipei Section Chapter, chaired by Prof. Din Ping Tsai, for their outstanding commitment to their membership and the I&M Society. In 2010, the Taipei Section Chapter saw a 66% increase in membership and sponsored 25 activities including symposiums, technical workshops, training courses, and international conferences.

The IEEE Instrumentation and Measurement Society 2010 TIM Outstanding Associate Editor

The IEEE I&M Society Transactions on Instrumentation and Measurement (TIM) Outstanding Associate Editor is awarded to recognize Associate Editors for important contributions in overseeing the review process for the IEEE TIM. The 2010 TIM Outstanding Associate Editors are:

Salvatore Baglio - University of Catania, Italy

Alessandro Ferrero – Politecnico di Milano, Italy

Sergey Kharkovsky – Missouri University of Science & Technology, USA

Subhas Mukhopadhyay – Massey University,
New Zealand Dario Petri – University of Trento, Italy
Emil Petriu – University of Ottawa, Canada
Rik Pintelon – Vrije Universiteit
Brussels, Belgium Wendy Van Moer – Vrije Universiteit Brussels, Belgium

2010 Senior Member Elevations

The I&M Society members elevated to IEEE Senior Member in 2010 were:

Alessandra Flammini
Frank R. J. Spitzer
Jeffrey C. Andle
Masahiro Aoyagi
Sergio Rapuano
Venkata Chandrasekhar SarmaTummalapalli
Mark Vivino
Mark Weatherspoon
Ashley Morris Balckstock Hulme
Thomas E. Linnenbrink
Joyanta Kumar Roy
Gaozhi George Xiao
Dusan Agrez
Rajan Batra
Sung-Lin Chen
Ning Hsing Lu
Don T. Macune
James L. Mclean
Claudio M. Montiel
Michael Alan Forman
Dennis E. Destefan
John D. Ramboz
Gerald Steiner
David Rodney White
Fouad M. Al-Sunni
Vedran Bilas
David Ingram
Mohamed A. AbouKhoua
Christian Kargel
Ricardo D. Monleone
Grzegorz Pankanin
Marco P. Schoen

For additional information on IEEE Senior Member grade and to apply for grade elevation,
please visit:

http://www.ieee.org/membership_services/membership/senior/new_senior_members.html.

2011 IEEE Joseph F. Keithley Award in Instrumentation and Measurement

The IEEE Joseph F. Keithley Award in Instrumentation & Measurement was established in 2001. It replaced the IEEE Morris E. Leeds Award. Recipient selection is administered by the Technical Field Awards Council of the IEEE Awards Board.

- Sponsor: Keithley Instruments, Inc.
- Presented to: An individual or a team of not more than three.
- Scope: For outstanding contributions in electrical measurements.
- Prize: The award consists of a bronze medal, certificate and cash honorarium.
- Basis for judging: In the evaluation process, the following criteria are considered: innovation or development, social value, uniqueness of concept, other technical accomplishment, and the quality of the nomination.
- Nomination deadline: 31 January of each year.

For additional information on IEEE Technical Field Awards and Medals, to view complete lists of past recipients, or to nominate a colleague or associate for IEEE Technical Field Awards and Medals, please visit <http://www.ieee.org/> awards.

The 2011 IEEE Joseph F. Keithley Award in Instrumentation and Measurement recipient is **Reza Zoughi**, Missouri University of Science & Technology, USA for contributions to microwave and millimeter wave measurement techniques for nondestructive testing and Evaluation. Dr. Reza Zoughi's work during the past two decades in expanding the utility of microwave and millimeter wave inspection techniques has brought significant recognition to the field of Nondestructive Testing and Evaluation (NDT&E). Dr. Zoughi's research team has developed millimeter wave imaging systems and methods for inspecting the spray-on foam insulation (SOFI) of the space shuttle's external fuel tank, in addition to a realtime, high-resolution and portable microwave camera that is expected to find widespread utility. He has played a leading role in developing near-field microwave and millimeter wave techniques and developed near-field measurement systems using open-ended waveguides and other more sophisticated probes for evaluating a host of defects in thin and thick and layered composite structures. An IEEE Fellow and a Fellow of the American Society for Nondestructive Testing (ASNT), Dr. Zoughi is currently the Schlumberger Distinguished Professor of Electrical and Computer Engineering at Missouri University of Science and Technology (Missouri S&T), Rolla, Missouri, USA.