

# THE INTERFACE



IEEE



November 2005 • Number 3

THE JOINT NEWSLETTER OF THE IEEE EDUCATION SOCIETY AND THE ASEE ELECTRICAL AND COMPUTER ENGINEERING DIVISION

<http://www.chw.ieee.org/soc/es/>

## Modern-Day Warfare: It's All about STEMs Literacy in a Global Context

Frank G. Splitt  
[fgsplitt@ece.northwestern.edu](mailto:fgsplitt@ece.northwestern.edu)



According to a page-one story, “*Inside Pentagon, A Scholar Shapes Views of China*”, Neil King Jr, [The Wall Street Journal, September 8, 2005], Beijing sees the U.S. as a military foe. But why fight the best customer for your textile and manufactured products? And, why would China ever want to fight a military war against the United States rather than waging a less painful and more profitable economic war against an adversary that is not only losing its edge in R&D, but also is preoccupied with fun and games?

In China, the study of science, technology, engineering, and mathematics (STEMs) is considered to be a patriotic duty – providing a robust pipeline of human resources for R&D. This will be China’s real army – fighting to dominate the technology-driven, global economy that is both expanding and becoming evermore complex. It seems that only in seemingly complacent America can we find a general public that views sports as super cool while STEMs are considered to be nerdy/geeky at best.

Worse yet, greed, fanatic sports fans, an apathetic public and inconsistent government policies allow the commercially driven college sports enterprise to grow unchecked, all but guaranteeing an expanding set of fun-loving consumers for the college sports entertainment business that has hijacked the academic mission of many of our universities. In the future, there will be no room at the table for societies that remain clueless – asleep at the switch or preoccupied with other things. Meanwhile in China, English is becoming big business as the country’s growing middle class pays to learn the language of global commerce [The Wall Street Journal, p A15, September 15, 2005].

America must adapt to this new global reality. So, what do we, as a nation, need to be thinking about if we are going to continue as a dominant player on the world stage in the 21st century? Might I suggest that we need to begin thinking about STEMs and STEMs literacy in a global context for they are the ‘tools’ of modern-day economic warfare? Pentagon strategists need to balance the input from high-cost ‘China scholars’ with a relatively low-cost reading of two best-selling books, Thomas Friedman’s, *The World Is Flat: A Brief History of the Twenty-First Century*, and Jared Diamond’s, *Collapse: How Societies Choose to Fail or Succeed*. Perhaps they will see that what we did to the Soviet Union during the Cold War is now being done to us.

There should not only be concern at the Pentagon, but also at the highest levels of our government – concern that things are moving in a direction where America could very well be a net-loser in a modern-day economic war. The good news is that a democracy has as one of its fundamental strengths the ability to bring great ideas, innovation and individual initiative, into what could otherwise be a failing system. But democracy is only as strong as the people who are willing to keep it vital and ever evolving. We all need to rise to the challenge. What better place to start than with organizations like the IEEE and ASEE – involving engineers as well as engineering educators and their students in keeping America vital and ever evolving by broadening its STEMs literacy in a global context?

Frank G. Splitt  
[fgsplitt@ece.northwestern.edu](mailto:fgsplitt@ece.northwestern.edu)

## November 2005 TABLE OF CONTENTS

Modern-Day Warfare: It's All about STEMs Literacy in a Global Context . . .	1
Why Janie won't go to Engineering School . . . . .	2
Program Criteria . . . . .	5
From the IEEE EAB Committee on Engineering Accreditation Activities... .	5
A Report on Recent ECEDHA Activities .	6
Call for Nominations for ASEE/ECE Awards . . . . .	8
2006 Frontiers in Education Conference . . . . .	10
From your Editor . . . . .	11

*THE INTERFACE* is published three times each year by The Institute of Electrical and Electronics Engineers, Inc., 445 Hoes Lane, Piscataway, NJ 08855.  
The deadlines are August 30 for the November issue, January 31 for the April issue, and May 31 for the August issue.

### Editor:

William Sayle  
Electrical and Computer Engineering  
Georgia Institute of Technology  
Atlanta, GA 30332-0250 USA  
+1.404.659.3671 (voice)  
+1.404.894.3047 (fax)  
bill.sayle@ece.gatech.edu

©2005 IEEE. Permission to copy without fee all or part of any material without a copyright notice is granted provided that the copies are not made or distributed for direct commercial advantage, and the title of the publication and its date appear on each copy. To copy material with a copyright notice requires specific permission. Please direct all inquiries or requests to IEEE Copyrights Manager.

Printed in USA.

## Why Janie won't go to Engineering school? (Hint: Janie is not dumb)

Moshe Kam  
Vice-President, IEEE Education Activities  
m.kam@ieee.org



The campaign to attract women to American law schools had really taken off in the early 1970s. The American Bar Association and State legislatures in the largest ten States took upon themselves to double the percentage of women lawyers in a decade. The slogan for the campaign was “20% by 1980”.

Civic leaders, entertainers, and politicians took part in the well-financed campaign to inform girls and young women about the virtues of the legal profession. They highlighted the contributions of lawyers, judges and legal scholars to equality, social justice, and welfare. They publicized the professional and economic rewards of becoming a patent lawyer or a judge. Many will remember the long running TV series “*Defender of the Damned*” – on the life and times of the controversial 1920s Los Angeles lawyer **Gladys Towles Root**. It was a runaway hit of the 1974-1978 TV seasons, and gave rise to the equally successful series on the life of the first black lawyer in the United States, **Charlotte E. Ray**. There were numerous lectures in schools, and public events in large and small towns. Lawyers and judges practically descended on schools in their local communities to make presentations to eager female students and to provide the ever-so-needed “human side” of the story. Governors declared “Woman Jurist Day” in State after State. Bus, newspaper, radio, and TV advertisements promoted “legal summer camps” for girls – heavily subsidized by local bar associations and large corpo-

rations. By the time President Reagan introduced **Sandra Day O'Connor** to the nation as the first woman ever to be appointed to the US Supreme Court, the leaders of the campaign could point to great successes everywhere. The percentage of woman lawyers doubled in only three years (from 9.5% in 1971 to 20.1% in 1974). By 1981 it was 35.8%, certainly better than “20% by 1980.” By 1996 it climbed to 44.4%. Strong gains for women were recorded in the leadership of the legal profession – the fraction of women among federal judges, law school full professors, and law firm partners has been rising steadily. While some claims about discrimination and salary gap between men and women in the law still persisted, there was no doubt that the scene has changed dramatically since the beginning of the public crusade.

If, after reading this, you are a bit puzzled about some of my facts, or have somehow missed the re-runs of the ever popular “*Defender of the Damned*,” there is a very good explanation for that. The numbers I quoted on the percentages of woman professionals in the law are correct, and Gladys Root and Charlotte Ray were indeed significant historical figures. However, the rest of the story is fabricated. There was no ABA campaign, no bus ads, no summer camps, and no “Woman Jurist Days”. In the law (and in medicine), the phenomenal rise of women to professional prominence (if not yet equality with men) occurred with very little institutional inducement. It was the result of social changes, the rise of

new political movements, increased political freedom, new legal rights, economic pressures, and changes in technology. Women identified opportunities in these fields and fought to be admitted. No degree of conservatism expressed by the “old boys,” or artificial barriers to admission, proved to be real obstacles. When woman graduates of law schools were refused entry to the bar in the late 19th century, they created their own support groups and arranged political campaigns to fight rejection. There were battles in the legislatures of Massachusetts, Minnesota, and many other states. Societies of “sisters in law” sprung up everywhere and intense action by activists has continued for more than a century. At present the numbers of women in medicine and the law are projected to stabilize in about a decade at close to 50%.

**Which brings us to our profession, engineering.** The participation of women in engineering, in spite of some increases in the last two decades, continues to be anemic. Between 1983 and 2000 the percentage of woman engineers in the workforce in the United States rose from 5.8% to just 10.9%. The percentage of women among Bachelor’s and Master’s degree recipients in engineering has hovered at around 20% for several years (the Ph.D. fraction is about 17%). No matter how we look at these numbers and at related statistics, the conclusion is that we are not moving toward parity; by and large we are not moving at all.

**Not that we are not trying.** The efforts to understand why young women do not choose engineering as a career path and the various programs designed to reverse the course are numerous. In ten years (1993-2003) the NSF awarded 211 grants under the Diversity in Science and Education program. Most of these addressed the disinclination of young women to choose engineering. A summary of the NSF studies is said to include “helpful tips...about how to best encourage girls in pursuing Science and Engineering education and careers.” Yet these tips did not make any fundamental change. On average, 10 new PhD dissertations are devoted to this subject every year. One would expect that with such a growing volume of new work in this area, we would already have discovered some convincing explanations and one or two useful remedies. It has not happened. Quite a few organizations, from WIE to ASEE to the NAE, are devoted in full or in part to attracting girls and young women to engineering, and these organizations maintain a healthy number of on-line web sites and other programs. “Introduce a Girl to Engineering Day” has been in existence since 2001. A major PBS station, WGBH, has joined the

	It helps to be	Are you ready to?
Law	Fascinated by the relationship between law and society.	<ul style="list-style-type: none"> <li>• Engage in intense discussion of thorny legal problems</li> <li>• Study actual court cases</li> <li>• Join your school's legal studies association</li> </ul>
Broadcast Journalism	Quick of mind and sharp of tongue	<ul style="list-style-type: none"> <li>• Learn how to find and interview sources</li> <li>• Write radio and TV scripts</li> <li>• Record and edit sound</li> </ul>
Computer Engineering	A problem solver and a team player who is able to work independently. You'll spend hours solving problems on your own and as part of a team.	<ul style="list-style-type: none"> <li>• Spend lots of time solving tough math problems</li> <li>• Take courses in electricity, circuitry, and electronic materials early on to prepare for engineering courses</li> <li>• Intern off campus</li> </ul>
Electrical Engineering	A fan of science and math who is curious about the way things work.	<ul style="list-style-type: none"> <li>• Juggle projects, lab exercises, and reading assignments</li> <li>• Spend hours building detailed, complicated systems</li> <li>• Design your own gadgets or software</li> <li>• Try, try, and try again when at first a project doesn't succeed</li> </ul>

Table 1: Major and Career Profile – top descriptors from CollegBoard.com

effort and has developed thoughtful public TV documentaries and hands-on campaigns on engineering, targeting girls. All major engineering associations, including ASME, ASCE, and IEEE, have launched or participated in similarly-motivated efforts. If we are still failing, it is not for lack of programs, websites, goodwill, research or budgets. Something else is amiss.

**Let me propose an hypothesis:** our basic assumptions on the intelligence and perception of girls and young women are wrong. With very few exceptions, the enthusiastic planners of campaigns to attract women to engineering (and the literature) all assume that what we really need is to make these uninformed females “see the light.” In other words, like missionaries who know that only one religion (theirs) is right, we reach out to the pagans to save them at once from their collective folly. If we could only show these women how important/humane/ economically-rewarding/ intellectually-satisfying it is to be an engineer, they will understand that their future is in bridge design and microwave amplifiers. If we could only persuade young ladies who now enroll happily in law schools and medical schools, in programs in accountancy and pharmacy and dentistry, to enter the much more valuable occupations of civil and electrical engineering, then our sacred mission would be accomplished...

It is not difficult to discover what is wrong with this picture. As wage differentials erode and discrimination recedes, women enjoy a much wider range of opportunities. If these women have the intellectual ability and persistence required in engineering school, they are also welcome in other challenging programs. Unlike the engineering class-

room, that has preserved many of its 1950s qualities, the alternative programs often offer a friendly and inviting atmosphere, modern teaching methods, and much more immediate connection to real world applications. Reform attempts notwithstanding, engineering school continues to be a dreary and stressful affair. Typical curricula still struggle to include “all that is important,” and as a result they are overstuffed and unattractive. More study subjects are likely to be crammed into the heavy course list; fewer obsolete old favorites are likely to be retired. The post-college workplace is not much better. Compared to the fields of education or healthcare, the ethos of the engineering workplace – long hours, high stress, high competitiveness, “one size fits all” – is quite uninviting. This is especially true for women, who still carry child-rearing duties in our society much more heavily than men.

The effect of the lackluster engineering education experience and the often unaccommodating (and increasingly unstable) engineering workplace, have affected men as well as women. Over the last 20 years, enrollment in U.S. engineering programs has lagged significantly behind the overall growth in college and university enrollment. There were demographic changes as well – engineering students in the U.S. are increasingly recruited from communities that struggle to lift themselves into the middle class (most notably, first generation college attendees and first- and second-generation immigrants). The news about offshoring of engineering jobs, whether accurate or not, has not helped. Clearly, some of the appeal of engineering as a key to upward mobility has vanished, and it is not surprising that young successful women, even those who have taken the right classes and are prepared for engineering schools, are not that impressed with the opportunity. When we also tell them (as we do) that in order to be an engineer one must be “a fan of science and math” and “juggle projects, lab exercises, and reading assignments” they take one last look at us and flee. In Table 1, I show how one popular website (CollegeBoard.com) describes several college study majors. The lawyer-to-be will “engage in intense discussion of thorny legal problems.” The computer engineer? She will “spend lots of time solving tough math problems.” Take your pick.

**Young women are not dumb.** The problem is not that they need to change. The problem is that we need to change. In the view of many young people, women especially, engineering represents a collection of majors that promise hard work during college, often in a tense and demanding atmos-

phere, with the prospect of ultimately gaining a stressful job of questionable permanence. What will help us most is not to say that this ain’t so, but to make it such that it ain’t so... We have put enough money and effort into ads and websites. We have a full cabinet of trend studies that made very little difference, and lists upon lists of unhelpful tips from carefully written dissertations and long observational treatises. It is time to change direction.

**Here are two ideas to start the process.** Whether we like it or not, the current engineering curriculum has demonstrated itself to be strongly oriented toward males. As unfashionable and unseemly as it may sound, the time may have come to try consciously to develop an engineering curriculum aimed deliberately at young women. This may sound heretic. However, when everything else fails (and I would argue that everything else has indeed failed), it may be appropriate to address the curriculum problem directly rather than ignore it and try to hide it in glitzy propaganda campaigns (which women do not fall for anyway). One likely outcome may be that this new re-engineered curriculum would also appeal to many talented men who are repelled by the same deficiencies of the current curriculum that have driven most women away.

Second, we need to work with industry and experts in occupation, labor, economy, psychology and popular culture to develop new engineering workplace models. These models would be designed to be in better harmony with the tastes, sensitivities, lifestyle, and family obligations of the modern educated middle class woman. Again, I realize this too may sound a bit out of style, we are all supposed to enjoy full equality now and exhibit unquestionable sameness. However, the reality is that with 10% woman engineers, the engineering workplace is anything but equal. In other professions and occupations the workplace evolution has occurred naturally, shaped by market forces and social pressures. In engineering we may have to give it a little push.

If we (professional organizations, federal funding agencies, research institutions, colleges and universities, the engineering industry) insist on trying again and again the same formulas, studies and campaigns that have disappointed us for thirty years, we are certain to get exactly the same unsatisfactory results. In that case it will be much more practical to admit that engineering is for men only, and move on to the next problem.

*Moshe Kam  
m.kam@ieee.org*

## *From the IEEE Educational Activities Board Committee on Technology Accreditation Activities*



### **Program Criteria**

*John J. Sammarco, Ph.D., P.E.  
Chair, Committee on Technology Accreditation Activities (CTAA)  
zia4@CDC.GOV or j.sammarco@ieee.org*

The objectives of this article are twofold. The first is to provide information concerning CTAA's involvement with Engineering Technology program criteria so that readers could gain a better understanding of our responsibilities and processes. The second is to describe our on-going efforts to continuously improve program criteria. This article is one such effort – it solicits input for improving Engineering Technology program criteria for which the CTAA has primary responsibility.

First, program criteria are one of the CTAA's important responsibilities. The CTAA does not have the responsibility of approving program criteria. Rather, the CTAA is chartered to:

*“Propose, review, critique, and facilitate the development of TAC of ABET Criteria for Accrediting Programs in Engineering Technology, including program-specific criteria ...”*

The Engineering Technology program-specific criteria for which the CTAA has primary responsibilities are determined by those programs for which the IEEE is the lead society. Specifically, program criteria are written for:

- Computer Engineering Technology and similarly named programs;
- Electrical/Electronic(s) Engineering Technology and similarly named programs;
- Electro-Mechanical Engineering Technology and similarly named programs;
- Information Engineering Technology and similarly named programs;
- Telecommunications Engineering Technology and similarly named programs.

Limited responsibilities extend to programs for which the

IEEE is a cooperating society. At this time, we are a cooperating society for only the Bioengineering Technology and similarly named programs.

Within the CTAA, a Criteria Sub-Committee exists for reviewing criteria, identifying new program areas and program criteria, and developing policies and procedures with respect to criteria. These policies and procedures help us to maintain completeness and consistency. They are part of the CTAA Operations Manual and are available at [http://www.ieee.org/organizations/eab/apc/ctaa/operations/op\\_man.htm](http://www.ieee.org/organizations/eab/apc/ctaa/operations/op_man.htm)

Second, we have a continuous improvement plan for program criteria. The sources for potential improvements include feedback from academia, industry, and related societies. We have identified another source during our June CTAA meeting. It is from the CTAA mentoring process. At first, the relationship between mentoring program evaluators (PEVs) and improving criteria might not be clear; however, mentoring provides an opportunity to obtain feedback from the perspective of a PEV. Thus, the PEV has an opportunity to identify criteria that might be vague or weak. Mentors are also in contact with PEVs after an accreditation visit. This provides an opportunity to identify needed improvements based upon the PEV's interactions with the institution. Lastly, this article of the IEEE *Interface* provides an opportunity for your feedback; so, I invite your comments and suggestions concerning Engineering Technology program criteria. E-mail me at [j.sammarco@ieee.org](mailto:j.sammarco@ieee.org)

*John J. Sammarco, Ph.D., P.E.*

## *From the IEEE Educational Activities Board Committee on Engineering Accreditation Activities*



*John Orr  
Chair, IEEE EAB Committee on Engineering Accreditation Activities  
orr@wpi.edu*

### **Looking Forward...**

As this is being written, a new round of accreditation visits is just beginning. This will be a very busy year, with 125 programs to be reviewed. Most of the visits are to electrical engineering or computer engineering programs, but in addition we are visiting programs with the titles: electrical and

computer engineering, computer science and engineering, computer and telecommunications engineering, wireless engineering, telecommunications engineering, systems engineering, engineering - mechatronics concentration, engineering science, engineering physics, and engineering.

The breadth of program titles reflects the growing breadth of the

profession, and may also reflect the growing depth of knowledge which is believed to be required in specialty areas. An interesting question is, "Under which program criteria will these programs be reviewed?" If the title contains the words "electrical" and/or "computer", then the familiar criteria for "electrical, computer, and similarly named engineering programs" will be used. If "computer science" is in the title, then the computer science criteria (not under our jurisdiction) also come into play. If there are no Program Criteria, such as for "systems engineering" and "engineering" programs, then only the General Criteria apply, and ABET headquarters identifies an appropriate society (such as IEEE) to conduct the visit.

Currently we have about 180 Program Evaluators available for assignment. The matching of visitors to programs is a big job, handled expertly by **Bill Sayle**, with help from **Ed Jones** and **David Soldan**. Everything from date conflicts, to conflicts of interest, to visitor experience and program size come into the picture. Bill watches details such as whether the previous program visitor was from academia or industry, alternating between the two on successive ABET visits. He also assigns mentors to the visitors. These mentors are members of the IEEE Committee on Engineering Accreditation Activities, and are experienced visitors themselves. They are available by phone or email before and during the visit, to provide consultation and advice. Particular attention to mentoring is paid on the first visit of a new Program Evaluator.

This attention to visitor selection and mentoring pays off. The performance of each program evaluator is itself evaluated by the team chair and by the head or chair of the visited program. Most of these evaluations are quite positive. Of course, we have not quite arrived at perfection, and differences in professional judgment do occasionally result in disagreements between the program evaluator and either the team chair or the program chair. Mentors can provide immediate advice to evaluators to assist in resolving disagreements. Program evaluators must be ready both to exercise individual judgment and to understand the possibly differing judgments of the other team members, which may ultimately require compromise to arrive at a team consensus. The primary goal of the ABET Participation Project which was described in the previous issue of *The Interface* is to improve the already high level of program evaluator performance, and in particular to reduce to near

zero the instances of serious problems during the visits.

## Looking back...

The 2004-05 cycle of evaluations was completed in July, with good results for electrical engineering and computer engineering programs. I sat in on the Engineering Accreditation Commission's deliberations on the visit reports. The EAC's attention to accuracy, fairness to all programs, and consistency among programs was most impressive. My unofficial scorecard recorded 59 visits to electrical engineering programs with 40 of those receiving full-period accreditation actions (either six years or a shorter period if the action was the result of an interim visit or report), 13 requiring interim reports, only six requiring interim visits, and none receiving show cause actions. Thirty-eight computer engineering programs were visited, with 24 receiving full-period accreditation actions, 13 requiring interim reports, only one requiring an interim visit, and none receiving show cause actions. Two electrical and computer engineering programs were visited, with both receiving full period accreditation actions. In summary, 67 percent of the visits resulted in the best possible outcome for the programs. It is important to note that EAC's willingness (even eagerness) to work with programs to resolve any shortcomings during the period between the visit and the EAC final action results in many initial recommendations for interim reports or visits being upgraded to recommendations for full-period accreditation actions.

As in the recent past, the majority of shortcomings result from problems in one of three areas: Criterion 2 (Educational Objectives), Criterion 3 (Program Outcomes), or Criterion 4 (in particular the Major Design Experience). It appears that the number and severity of the problems with respect to Criteria 2 and 3 are slowly falling as programs gain experience with them.

The CEAA and all of the IEEE Program Evaluators look forward to a successful set of visits this fall. Please let me know ([j.orr@ieee.org](mailto:j.orr@ieee.org)) if you have any suggestions to improve the accreditation process.

**John Orr**  
[j.orr@ieee.org](mailto:j.orr@ieee.org)

## *From the Electrical and Computer Engineering Department Heads Association (ECEDHA)*

### A Report on Recent ECEDHA Activities

*Ken Connor, ECEDHA President*  
[connor@rpi.edu](mailto:connor@rpi.edu)

*Ken Jenkins, ECEDHA Past President*  
[jenkins@enr.psu.edu](mailto:jenkins@enr.psu.edu)

*Stephen Goodnick, ECEDHA Past President*  
[stephen.goodnick@asu.edu](mailto:stephen.goodnick@asu.edu)



Ken Connor



Ken Jenkins



Stephen Goodnick

This is a particularly busy year for ECEDHA. In addition to our 2006 annual meeting to be held in Hawaii, March 10 through the 14, we will also be holding a workshop in November. The themes of both meetings relate to globalization, its impact on ECE programs and the opportunities it presents us for new directions in education.

In response to significant interests in globalization, public policy, and engineering out-sourcing that emerged during the 2004 ECEDHA Annual Meeting (cf. the August, 2004 *Interface*), and which continued throughout the 2005 ECEDHA Annual Meeting (cf. the August, 2005 *Interface*), ECEDHA and The International Engineering Consortium (IEC) have obtained support from the National Science Foundation for a fall 2005 workshop that focuses on “**The Impact of Globalization on Electrical and Computer Engineering Curricula of the Future.**” The workshop will be held at the Constitution Avenue location of the National Academy of Engineering, Washington DC, on **November 14 and 15, 2005**. The ECEDHA Board of Directors is grateful to Dr. **William Wulf**, President of the National Academy of Engineering (NAE), for making the NAE facilities available. The Semiconductor Research Corporation (SRC) will play a crucial role in representing the U.S. semiconductor industry’s views on engineering education. Also, since ECEDHA has recently developed a new working relationship with the Computing Research Association (CRA), CRA will also participate in the workshop to represent their views on educational policy. The workshop will explore changes that are needed in engineering education and ECE curriculum to properly prepare graduates from United States institutions for careers in an economy where globalization and out-sourcing are predominant characteristics. Funds obtained from NSF provide partial travel support for invited workshop attendees and cover basic administrative expenses for the fall 2005 workshop.

The long range plan is for ECEDHA and NSF to sponsor a series of three workshops in consecutive years from 2005 through 2007. The first (2005) workshop will focus on the discovery phase, with its goal being to analyze the effects of globalization on the Electrical and Computer Engineering profession, to propose ECE curriculum revisions designed to prepare students for further changes in the future, and to deal with issues involving the recruiting and retention of undergraduate students, graduate students, and young faculty in ECE. The role of ABET will be re-examined, and the workshop will seek to define changes needed in the ABET process to facilitate the creation of curricula that prepare students to effectively deal with the globalization of their profession. The second workshop (2006) will explore the implementation phase, in particular how ECE educators can bring about much needed curricular change in light of traditional program structures and increasing pressures to introduce emerging technologies into already crowded ECE curricula. The third workshop (2007) will focus on assessment and continual improvement of curricular revisions that were identified and implemented in the two previous years. ECEDHA believes a three-year time window is the minimal period over which substantial changes can be made in ECE curricula in response to the globalization

and outsourcing pressures that are already appear to be dominant forces in the profession. It is hoped that one of the outcomes of this three-year workshop series will be an increase in proposals submitted by ECE departments that will lead to major curricular revisions and eventually to overall department level reform across the nation.

This workshop this fall will follow a format similar to that used for the NSF/ECEDHA/IEC **NanoEngineering Education Workshop** held in January of 2003 (cf. the November, 2003 *Interface*), with one significant change. Prior to the workshop, both ECEDHA members and representatives of selected companies chosen from the advisory boards of member departments will be surveyed on issues pertaining to globalization. On Monday, November 14, industry and university leaders will provide the framework for addressing the impact of globalization on the engineering profession. Experiences and plans will be presented from a wide variety of companies that employ large numbers of electrical and computer engineers. Ideas on how ECE programs should be responding to these issues will be offered from a broad spectrum of universities, large and small, public and private. Results of the surveys will also be shared with the meeting participants. This part of the meeting will not be restricted to ECEDHA members. On Tuesday, November 15, there will be an Academic Workshop for ECEDHA members and representatives, with the purpose of addressing the challenges of globalization, particularly within the context of electrical and computer engineering. Breakout groups will discuss and prepare a report on specific issues such as curricular changes, recruitment and retention of students, life-long learning, foreign partnerships, etc.

After the meeting, we will develop and conduct a follow-up survey instrument to poll the ECEDHA membership on its views, efforts, and suggestions on approaches to dealing with the impact of globalization on engineering education. In addition, the ECEDHA organization will hold a session at its annual meetings as a follow-up to this and future workshops. Outcomes of the workshop will be presented at the 2006 meeting and discussions will engage the entire ECEDHA membership. Annual comprehensive reports will be prepared presenting the outcomes of workshop discussion, surveys, and relevant discussions from the ECEDHA annual meetings. These reports will be posted on the ECEDHA website and summaries of the major conclusions of the reports will be shared with the members of the IEEE Education Society in future *Interface* articles.

To effectively deal with engineering aspects of globalization and out-sourcing, existing engineering curricula must be modified and new programs put into place immediately. The Electrical and Computer Engineering community, working through ECEDHA and other organizations, will play key roles in leading the way in this evolution. It is hoped that these workshops will stimulate a debate on changes that are needed in engineering education to properly prepare graduates from United States institutions for careers in an economy where globalization and out-sourcing are predominant characteristics. The sequence of three workshops over the years 2005 - 2007, together with the subsequent reports and surveys they

produce, will go a long way toward helping the ECE profession prepare for the global changes that have already started, and which are surely to accelerate in the foreseeable future. Information on the meeting can be found on the ECEDHA website <http://www.ecedha.org>. We look forward to seeing many of you in Washington.

The theme of our 2006 annual ECEDHA meeting is **Globalization Opportunities for ECE**. This meeting plays a critical role in our plan to address globalization since we will be able to engage the majority of ECEDHA members in the dialog during sessions specifically dedicated to this issue, including the keynote address and two plenary panels. In one panel, the work at the November workshop will be presented and discussed while a second panel will address industrial and liberal arts perspectives on ECE and globalization. In addition, there will be a breakout panel on using GradNet to focus on globalization as a contemporary issue under ABET criterion 3. There will also be many excellent sessions on topics of continuing interest to ECE department heads, all of which will impact how we respond to globalization. These include:

- Nanotechnology Education

- Public Policy
- Recent ABET Visitation Experiences
- Educational Research
- Major Challenges for Department Chairs
- Best Practices for Bio Education in ECE

In addition to panel sessions and plenary talks, the annual meeting will, as usual, provide an open forum for members, a business meeting including the results of the ECEDHA annual survey, regional meetings, and of course the best part of this or maybe any other meeting – time for sharing stories with old and new friends. This year's meeting will also include, as in the past, the New Chairs workshop and the EC2000 workshop for programs slated for accreditation visits in 2007. Details of this year's meeting may be found on the ECEDHA website, <http://www.ecedha.org>.

*Ken Connor, ECEDHA President*  
*connor@rpi.edu*

*Ken Jenkins, ECEDHA Past President*  
*jenkins@enr.psu.edu*

*Stephen Goodnick, ECEDHA Past President*  
*stephen.goodnick@asu.edu*

## *From the ASEE Electrical and Computer Engineering Division*

### Call for Nominations for ASEE/ECE Awards

Consider nominating someone for one of the following awards.

#### **ASEE/ECE Distinguished Educator Award**

*The ECE Distinguished Educator Award is conferred by the Electrical and Computer Engineering (ECE) Division for significant contributions not only to ASEE, but also to the ECE education profession.*

The award, which is given annually to an educator who has shown evidence of vision and contribution to ECE Education, consists of a commemorative plaque to be presented at the ECE Division's business meeting at the ASEE Annual Conference.

Nominees will be evaluated based upon two equally-weighted criteria:

1. **Outstanding Teaching Effectiveness.** Nominees must demonstrate evidence of excellence in the education of undergraduate and/or graduate students in the classroom or through supervision of independent study projects. This can be demonstrated by such evidence as standardized student evaluations along with letters from students or former students (not more than four).
2. **Educational Scholarship.** The award recipient should have made significant contributions to ECE education that go beyond his/her own institution. Examples of such evidence include development of instructional methods of materials (textbooks, instructional software, assessment

instruments), along with the associated publications in refereed scholarly journals and conference proceedings. This evidence may be supported by the applicant's teaching dossier, reprints of papers and up to four supporting letters, three of which should be from outside the candidate's institution.

Pertinent nomination information should be submitted by the nominator, including a curriculum vita describing the nominee's professional achievements. Nominators must accompany the submission with a short citation. Resubmissions are the responsibility of the nominator. Candidates for this award must be a member in good standing of the ASEE ECE Division and cannot be a previous recipient of this award. Members of the award selection committee are ineligible for this award.

For more information and processes, please consult:

[http://www.asee.org/members/awards/otherDivision.cfm#Electrical\\_and\\_Computer\\_Engineering\\_Division](http://www.asee.org/members/awards/otherDivision.cfm#Electrical_and_Computer_Engineering_Division) and forms, process, etc., @ <http://www.asee.org/members/awards/generalNomination.cfm>

#### **ASEE/ECE Meritorious Service Award**

*The ECE Meritorious Service Award is conferred by the Electrical and Computer Engineering Division (ECE) to recognize significant and meritorious service to the ASEE-ECE Division over an extended period of time.*

The award consists of a commemorative plaque to be pre-



mented at the ECE Division's business meeting at the ASEE Annual Conference.

The recipient of the ECE Meritorious Service Award will be selected by the Awards Selection Committee as specified in the bylaws of the ECE Division. Pertinent nomination information should be submitted by the nominator, including a curriculum vitae describing the nominee's professional achievements and a specific itemization of the nominee's contributions to the ASEE-ECE Division. The nomination may be supported by up to four supporting letters, three of which should be from outside the candidate's institution. Nominators must accompany the submission with a short citation. Resubmissions are the responsibility of the nominator. Candidates for this award must be a member in good standing of the ASEE-ECE Division and cannot be a previous recipient of this award. Members of the Awards Selection Committee are ineligible for this award.

For more information and processes, please consult:

[http://www.asee.org/members/awards/division.cfm#Electrical\\_and\\_Computer\\_](http://www.asee.org/members/awards/division.cfm#Electrical_and_Computer_) (for the award criteria) and <http://www.asee.org/members/awards/generalNomination.cfm> (for forms, procedures, deadlines, etc)

## Frederick Emmons Terman Award

### ASEE Electrical and Computer Engineering Division

*The Frederick Emmons Terman Award of the Electrical and Computer Engineering Division was established in 1969. Although Frederick Emmons Terman served Stanford University in many capacities, including head of the electrical engineering department, dean of the school of engineering, provost, vice president, and acting president, it was while he was an instructor and professor that he guided engineering students William Hewlett and David Packard, eventually urging them to set up their successful partnership. In 1942, as a result of directing the Harvard University Radio Research Laboratory, which was responsible for developing countermeasures against enemy radar, Dr. Terman received an honorary doctor's degree from Harvard, was decorated by the British government and was awarded the Presidential Medal for Merit, the highest award for civilians in the United States.*

The **Terman Award** is bestowed annually upon an outstanding young electrical engineering educator in recognition

of the educator's contributions to the profession.

**The Award:** The award is sponsored by the Hewlett-Packard Company and consists of a \$4,000 honorarium, a gold-plated medal, a bronze replica, a presentation scroll and reimbursement of travel expenses for the awardee to attend the ASEE/IEEE *Frontiers in Education Conference*, where the award is presented.

**Qualifications:** In light of the successes of Dr. Terman and those of his students, the recipients of this award must meet the following requirements:

1. Be the principal author of an electrical engineering textbook published prior to June 1 of the year in which the author becomes 40 years of age and judged by peers to be outstanding by virtue of its original contribution to the field.
2. Have outstanding achievements in teaching, research, guidance of students and related activities.
3. Be an electrical engineering educator under 45 years of age on June 1 of the year in which the award selection is made.
4. Be a full-time member of a college faculty and actively engaged in teaching in the United States or Canada at the time that the award winner is selected.

For more information please consult:

<http://www.asee.org/members/awards/division.cfm>  
(electronic version of the above note)

<http://www.asee.org/members/awards/generalNomination.cfm> (for forms, procedures, deadlines, etc)

## Nominations for Fellows of the ASEE and the IEEE

Consider nominating someone for fellow of the ASEE or the IEEE. The deadline for ASEE is January 30, for IEEE, March 1st. For further information, please check out the appropriate websites:

**ASEE Fellow:** <http://www.asee.org/members/awards/fellowNomination.cfm>

**IEEE Fellow:** [http://www.ieee.org/portal/site/mainsite/menu-item.818c0c39e85ef176fb2275875bac26c8/index.jsp?&pName=corp\\_level1&path=about/awards/fellows&file=fellows.xml&xsl=generic.xsl](http://www.ieee.org/portal/site/mainsite/menu-item.818c0c39e85ef176fb2275875bac26c8/index.jsp?&pName=corp_level1&path=about/awards/fellows&file=fellows.xml&xsl=generic.xsl) OR, better yet, go to [www.ieee.org](http://www.ieee.org) and click on *membership*, then *grade elevation overview* and go from there.

# 2006 Frontiers in Education Conference

Saturday through Wednesday 28–31 October 2006  
Sheraton San Diego Hotel and Marina  
San Diego, California USA

## Call for Papers

### Abstract Deadline: January 16, 2006

The 2006 Frontiers in Education Conference (FIE 2006) continues a long tradition of promoting the widespread dissemination of innovations that improve computer science, engineering, and technology (CSET) education. FIE is a major annual international conference devoted to improvements in CSET education. It is an ideal forum for sharing your ideas, learning about new developments in CSET education, and interacting with your colleagues.

CSET education faces significant challenges in crossing international, social, and cultural borders in order to expand the pool of those entering CSET education and prepare our graduates to be successful in the global economy with diverse groups of people. Successfully addressing these issues will require innovative solutions including use of new pedagogies and approaches that improve student learning; partnerships among academia, industry, government, and K-12 educators; and curriculum reform. In 2006, in the border city of San Diego, the FIE conference planners are especially interested in contributions that address issues related to how CSET education can identify and surmount international, social, and cultural borders.

## What May You Submit?

We welcome abstracts for peer-reviewed full papers and for works-in-progress (WIPs). We also invite proposals for panels, special sessions, and workshops. These formats are described in detail in this call for papers and at <http://www.fie-conference.org/fie06/call.shtml>.

## Topics of Interest

- Accreditation and assessment
- Active learning
- Capstone and senior design experiences
- Computer and Web-based software
- Creative design experiences
- CSET educational research
- Distance learning: Methods, technologies, and assessment
- Diversity: Valuing it, achieving it, and teaching it
- Entrepreneurship programs
- Ethics: Creative ways to teach and assess it
- Faculty development
- First-year courses and programs
- Globalization: Preparing faculty and students
- Innovative degree programs and curricula
- Innovative pedagogies
- Innovative uses of technology in the classroom

- K-12 initiatives and partnerships
- Laboratory experiences: On-site and at a distance
- Learning models
- Lifelong learning
- Nontraditional students
- Partnerships (industry, government, university, international)
- Service learning
- Software engineering
- Student retention and persistence
- Teaming
- Undergraduate research experiences
- Undergraduate Study Abroad Programs
- Women in CSET education
- Other (You may submit abstracts and proposals on other topics that address issues at the frontiers in CSET education.)

## A Full Paper

- Initially you must submit electronically an abstract of 300 words or fewer, via the FIE 2006 Web page
- Your abstract must contain: author's name, abstract title, author's affiliation, phone number, fax number, and e-mail address.
- One author from each paper is expected to register for and participate in the full conference.
- Abstracts should clearly present the relevance of the paper for engineering education and how the work is innovative.

## A Work-in-Progress (WIP)

- A WIP describes preliminary developments of an ongoing project that involves state-of-the-art implementation, creative pilot programs, or nontraditional concepts.
- A two-page (maximum) paper will be submitted for a WIP.
- WIP papers are expected to include importance to the community, current project status, expected outcomes, projected status by the conference date, preliminary results, and an evaluation plan.
- WIP abstracts will be judged in the same way as full papers.
- Authors must submit electronically an abstract of 300 words or fewer via the FIE 2006 Web page.
- The title of a WIP abstract must indicate that it is a WIP (for example, "WIP: A Study of Capstone Design"). The abstract must contain: author's name, abstract title, author's affiliation, phone number, fax number, and e-mail address.
- One author from each paper is expected to register for and participate in the full conference.

## 2006 FIE Panels & Special Sessions

- Panels and special sessions are scheduled as part of the technical program in parallel with traditional paper presentations.
- Panel sessions normally consist of short presentations by several speakers followed by a discussion period with the audience.
- Special sessions allow a variety of nontraditional formats and emphasize the involvement of all audience members in active learning.
- Special sessions are nontraditional in the sense that they are not like preconference workshops. They give session leaders an opportunity to take risks and try something that may be unproven in content and/or format. Thus they provide experiences that are “at the frontiers.”
- Sessions are 90 or 120 minutes in length.
- To submit a proposal, complete the appropriate form.
- All organizers and presenters on panels and in special sessions are expected to register for and participate in the full conference.

## Faculty Fellows

FIE 2006 will offer a maximum of ten \$1,000 travel grants to support the involvement of new faculty. Eligible

applicants should follow the timeline above. Eligible applicants are:

- Assistant professors of engineering or computer science with no more than two years of employment as a faculty member or an instructor.
- Doctoral candidates defending dissertations during the 2005-2006 academic year.

For more information contact:

### General Co-Chairs

Susan M. Lord  
University of San Diego  
slord@sandiego.edu

David T. Hayhurst  
San Diego State University  
hayhurst@engineering.sdsu.edu

### Assistant to the General Co-Chairs

Mary Heberling  
University of Kansas Continuing Education  
mheberling@ku.edu

<http://www.fie-conference.org/fie06/call.shtml>

## From your Editor

Bill Sayle  
sayle@ece.gatech.edu



What an “autumn” we have had here in North and Central America. I’m sure by now most have heard or read about this year’s series of devastating storms. From Hurricane Stan in Central America (Mexico, Guatemala, Honduras, and other countries to Hurricanes Katrina and Rita in the Caribbean Sea and Gulf of Mexico coastal

regions of the USA, this too has not been an ordinary weather season. From last December’s Tsunami to floods, droughts, fires, earthquakes, cyclones, tornados and hurricanes, we have certainly experienced a year of weather extremes in most parts of the world.

It’s of course dangerous to write about “off-topic” events such as the above. For example, I probably left out many other devastating events in parts of the world. And, since I am writing this column in early October and you won’t be seeing it until early November, who knows what might happen in the intervening weeks.

This issue of *The Interface* has several very interesting articles. The first two, from **Frank Splitt** and **Moshe Kam**, are closely related to one another in many ways. Frank looks at the need to attract students into science, technology, engineering, and mathematics (STEM) while Moshe presents a very

interesting, readable article about what we must do to attract more women into our professions. Both authors are used to generating responses to their writings and I urge you to contact them directly at their email addresses with your comments. (Moshe reports that his August article in *The Interface* generated a considerable number of responses, not all in agreement with his analysis of the professional engineering licensure/registration situation.) And, the ECEDHA article continues the discussion with respect to globalization.

In the “accreditation arena” I am pleased we have articles from both the IEEE Committee on Engineering Accreditation Activities (CEAA) and the Committee on Technology Accreditation Activities (CTAA). We would have had articles from both the CEAA and the CTAA in the August issue of *The Interface*, but for some reason I did not receive **John Sammarco’s** CTAA article. My apologies to John, the CTAA, and our TAC program evaluators and department chairs. This month’s article is the “missing one”.

Thanks to all of our authors, regular and irregular contributors, for interesting thought-provoking ideas and thanks to you, our readers and members, for your feedback. Please let me hear from you.

Bill Sayle  
sayle@ece.gatech.edu

---

**Institute of Electrical and Electronics Engineers, Inc.**  
445 Hoes Lane • Piscataway, NJ 08855-1331, USA

Non-Profit Org.  
U.S. Postage  
**Paid**  
Easton, PA  
Permit No. 7