

# AMERICAN ENGINEER<sup>TM</sup>

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## Defense-Industry Conversion: Blaming The Victims?

With drastic cuts in defense spending, there is widespread concern about converting defense industries and their engineers to commercial work. There is unfortunately a widespread misconception that the so-called "corporate culture" of defense industries makes them and their engineers unsuited for this conversion. All government-funded industry—both defense and nondefense—is assumed to have this special "corporate culture," but this article will refer to the defense sector because it is there that the decline has been especially steep; however, this article is intended to apply to engineers of government-funded nondefense programs as well.

This view of defense-industry engineers as virtual unemployables—if not uneducables—outside of defense work really represents a sudden about-face. A few years ago, when defense spending was higher, there was much bellyaching that the defense industry was "depriving" commercial industry of engineers in general and the most capable engineers in particular. However, now that laid-off defense engineers are available in large numbers, they are largely being ignored by commercial industry.

Some of the special features of defense industry's "corporate culture" are as follows: (1) unfamiliarity with—and lack of interest in—commercial products; (2) lack of concern for keeping costs down; (3) drawn-out development schedules; (4) design for small-quantity production; (5) red tape: big bureaucracies, heavy, testing, voluminous documentation; (6) high salaries; (7) skill in marketing to only a single customer, the U.S. government. However, the differences are much smaller than many people realize.

First, there is the complaint that defense engineers are unfamiliar with commercial products. However, the principles of engineering are equally applicable to defense products and commercial products, and engineers are highly adaptable. Engineering schools do not have separate "defense" engineering programs for engineers expecting to work in defense industries. There is a major called "aerospace" engineering (or less commonly called "aeronautical" or "astronautical" engineering), but probably most engineers in the aerospace industry do not have AE degrees, and AE degree programs are mostly just modified mechanical engineering programs, anyway. And transfer of knowledge from one product line to another often works in strange ways; for example, some people might consider airplanes to have more in common with cars than with bicycles, but it was the bicycle-making Wright brothers who succeeded in making the first airplane because airplanes and bicycles have the common feature of lightweight construction. And ironically, while some regard a transition to commercial work as too challenging for defense engineers, some defense engineers regard

commercial work as not challenging enough—though such engineers are probably a small minority. Presumably most laid-off defense engineers would be glad to go into commercial work—given the opportunity.

Then there is the matter of keeping costs down. Certainly, many of the products sold to the government are merely ordinary, everyday items with inflated prices—like \$500 hammers and toilet seats. However, many of the high prices result from the aerospace industry's demanding requirements of high performance and reliability. It is patently unfair, for example, to compare the price of car parts with the price of parts going into a high-performance aircraft. And recent quality control problems have shown that quality control has in some cases not been strict enough; for example, a federal law was recently passed to deal with defective fasteners (ironically, many of these defective fasteners were knowingly supplied by companies from that alleged bastion of quality, Japan). And the need to maintain quality while keeping costs down is rarely mentioned (how many of us have been stranded in our cars on a dark and rainy night because of poor car design or production penny-pinching?). And certainly, the prices of many commercial products—luxury automobiles, for example—show that minimizing costs is often not a very important factor in commercial products (though giving the best value for the money may be an important factor; even here there may be more important factors, like image). The red tape of defense industry—e.g., specifications and extensive testing—is often associated with the need to maintain high quality.

Then there is the matter of drawn-out project schedules. It is true that once a company gets a defense contract, it does not have to worry about beating a competitor to market, and beating a competitor to market can be critical in many fast-moving commercial industries. However, the length of a project schedule could be one of the factors that the government considers in awarding a contract, and contractors are expected to meet their schedules.

Then there is the matter of the sizes of production runs. It is true that the design and tooling of a part may depend on the size of a production run. However, the gap here is certainly not unbridgeable.

It is a myth that defense-industry engineers are especially highly paid.

Let's cut the malarkey and get to the point. Much of the criticism of defense engineers' ability to transfer to commercial work is simply a case of "blame-the-victim." The real reason laid-off defense engineers are having such a hard time is that the U.S. has an overall surplus of engineers. And this surplus has been exacerbated by drastic cutbacks in the defense industry.

*Disillusioned Engineer*

# Editor's Column

## ILLUSORY JOB ADS

Past issues of AE carried examples of what I called "illusory job ads." They were ads that purported to offer jobs to the most qualified applicant but were so detailed that they were really biographies of the applicant the firm intended to hire in the first place. Their most striking feature was the number of words lavished on the job description. Also they offered such low salaries for such extensive qualifications that no one other than the intended applicant (and an unemployed engineer) would even bother to apply. Here's another such ad. Notice the requirement for up to 50% travel outside the U.S., including *Antarctica*, for a salary that amounts to about \$38K/yr. Note the ad lists only a state employment service, and the employer remains unidentified, so that his reputation is not affected. Please consider complaining to: Secy. of Labor, U.S. Labor Dept., 200 Constitution Ave., Washington, DC 20210. His name is Robert Reich, and I believe his heart is in the right place, but the Labor Department is too burdened to monitor such ads. Tell him what you think of this ad. Alternatively, you can write the Texas Employment Commission.

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## INSERT IN THE APRIL ISSUE OF "AMERICAN ENGINEER" (AE)

I assume all of our readers received our April issue of AE. If you didn't, write our Texas address. I take care of editing; they take care of circulation. Besides a full eight pages, the April issue had a 1-page, 2-sided insert containing a questionnaire from BJ Wootan. You will remember that our February Editor's Column contained a piece entitled "Outside Enterprises," which mentioned the BJ Wootan organization. Wootan runs a computerized bulletin board (BBS), listing consultants and job shoppers. The BBS enables companies who need engineering services to contact the listed consultants and job shoppers directly, which could result in EMPLOYMENT or BUSINESS. The insert in the April issue opens the Wootan BBS to new applicants who fit the requirements and return the insert (filled out) to BJ Wootan. Tell me what you think of this. AEA seeks to serve U.S. working engineers. Who else does?

## UNEMPLOYMENT FIGURES VIS A VIS PROFESSIONAL STRENGTH

The 4/17/95 issue of *EE Times* contained an article by Bob Bellinger, entitled "EEs' jobless rate is below 3 percent." It mentioned Robert Rivers' statistics: that the all-time peak EE unemployment rate was 6% in the 2nd quarter of '94, and the overall engineering unemployment rate at that time was 4.1%. The EE unemployment rate during the 1st quarter of '95 (according to Rivers) is 2.9%, and the overall engineering unemployment figure is 2.7%

Mr. Rivers' article in the April '95 issue of AE showed fluctuations in engineering salaries, for several experience levels, over the period of 1965 to 1991. The plots looked like profiles of the Rocky Mountains. They also contained ordinates to display engineering unemployment. The lowest salaries occurred when unemployment was high. Other Rivers' articles told how unemployment is not random, but is controlled by identifiable factors, like the discount rate. Why did I publish old data? Because it demonstrates how insecure an engineering career can be. The future is likely to look like the past, only more so.

Back to the *EE Times* story. I suppose a drop in unemployment is cause for rejoicing, although some of those reemployed could be flipping burgers. Since 2.7% of about 1.9M engineers comprises 51,300 souls, I don't think I'll rejoice just yet. Nor will AEA relent in its efforts to enhance the U.S. engineer's career climate. I don't believe those engineers who turn to self-employment will come near to offsetting the unemployment from continuing cutbacks in corporate staffing. So engineers still need a voice that is heard throughout Congress and the administration. 'In unity there is strength; in disunity weakness.' Engineers resist unionization. Dissident engineering organizations like AEA need to exist.

## SOURCES OF MATERIAL FOR "AMERICAN ENGINEER"

Readers can tell that my background is in electrical engineering. That's why I excerpt from EE periodicals. I would welcome letters from technical professionals in other disciplines. I would find articles written by readers in other disciplines to be even more welcome. I already have such readers, and I could use more.

## SKUNK WORKS

"Tales from a Skunk Works" is one of the articles in this issue. Just exactly what's a 'skunk works'? My understanding is that it's an organization replete with high talent, that attempts to market products which push the state of the art. Readers please verify this definition. At any rate, a quote from this article really hit home with me. "A company surrenders today's business when it gets smaller faster than it gets better. A company surrenders tomorrow's business when it gets better without getting different." I perceive the feverish downsizing in present-day U.S. industry as an attempt to maximize short-term profits, so as to raise the value of the stock and increase the annual bonuses of the Directors. This short-range strategy contrasts with the business plan displayed by industrial nations in Europe or the Pacific rim, which is to maximize market share and let the financial success follow. This is long-term planning, and it's something that corporate America needs to copy, for the good of the nation, which incidentally benefits technical professionals. I quote Edith Holleman, author of two AE articles, who recently joined the AEA Board of Advisors. "The policymakers need to hear that from you." Who are the policymakers? They are our elected representatives in the executive and legislative branches of the government. Who is the 'you'? The 'you' is the citizens, taxpayers and voters of the U.S., especially those who hold a better economic status for the nation as a higher value than a good deal for executives of transnational corporations. The latter hold benefits to shareholders (themselves) higher than any obligation to the nation.

## CHINA'S COMPLAINT

The March 24, '95 issue of *The Chronicle of Higher Education* contained a short article which told that China has accused the U.S. and Canada of, '... policies that discourage its students from returning home' (after graduation from North American universities). The article went on to say that only about one third of all Chinese students who studied abroad since 1979 have returned to China afterward. Education Minister Zhu Kaixuan is quoted as saying "We are concerned about immigration policies of some Western countries designed to attract the best talents of the Chinese." When asked which countries had such policies, he named the United States and Canada, both of which attract large numbers of Chinese. He further stated "I hope the countries will change their policies and encourage our students to return home." So does this editor.  
*Robert Bruce, AE Editor*

## Book Review Review

The word repetition in the title is not a misprint; this is a review of a book review. One of the problems with engineering is that keeping fully informed of the many ills plaguing the profession can be a career in itself. Book reviews, provided that they are written by knowledgeable, unbiased individuals, are great time-savers for those who do not have time to read the many books concerning the ills of the engineering profession. Furthermore, book reviews are often more informative than the books themselves.

This is a review of a book review of a book titled, "The Ghost of the Executed Engineer: Technology and the Fall of the Soviet Union," by Loren R. Graham (published by the *Harvard University Press*, 1993, 128 pages, \$22.95). This book review, which appeared in the September '94 issue of the *IEEE Spectrum* (page 8), was written by Alexander V. Kalinin, formerly a high-ranking Soviet academic who is now professor of science and technology management at the Monterey Institute for Technology Studies in California. The book and the book review help explain how a country can fail technologically and economically despite—and perhaps because of—a surplus of technical professionals and heavy representation of technical professionals in positions of political power.

The shortage-shouters used to blame our trade losses to Japan on the fact that Japan graduated more engineers in proportion to population than the U.S.; to a lesser extent, the shortage-shouters also bellyached that the U.S. was far behind the former Soviet Union, too, in cranking out engineering graduates. The Soviet Union was graduating about 300,000 engineers per year, about twice the combined total of the U.S. and Japan. The book review points out, "by the 1960's, the Soviet Union had developed the largest corps of engineers and applied scientists the world had yet seen ... " Of course, the result was predictable; the book review continues, "Overproduction of engineers, little professional freedom, and low salaries led to massive dissatisfaction. Beginning in the 1970's, engineers working as bus drivers, plumbers, or accountants scarcely raised an eyebrow (*editor's note: Sound familiar?*). Almost any career could start with an engineering diploma. In the Soviet Union, many engineers pursued politics ....."

Speaking of politics, the book review shows that merely getting more engineers into positions of political power is by itself no guarantee of wise technological policies in government. There are frequent lamentations about the scarcity of engineers in U.S. politics; for example, there are very few engineers in Congress and few U.S. presidents have had real engineering backgrounds. (The best examples are Herbert Hoover and Jimmy Carter. Contrary to the propaganda of the old-line engineering societies, George

Washington's brief stint as a surveyor does not qualify him to be considered our first engineering president). In contrast, the book review notes of the Soviet leadership, "Leonid Brezhnev and Nicolai Kosygin, a prime minister in the 1970s, were products of the engineering education system, as was Kosygin's successor, Vladimir Tikhonov. A solid majority of the Politburo, too, had engineering backgrounds." The book review adds, "As Graham points out, the Soviet regime became a government of engineers, but what he overlooks is that most were failed engineers. After all, they were willing to abandon engineering in their twenties or thirties to become party functionaries .... advancement was based on loyalty to and membership in the communist party .... the recruitment of members of the ruling elite degenerated, basically, into choosing managers from the waste heap of the engineering community." However, maybe it is unfair to conclude that most of these Soviet leaders left engineering because they were bad engineers or bad engineering managers; perhaps they left engineering because they felt, like many American engineers, that that was the only way to get ahead.

The book review notes that Soviet engineers and scientists "managed to create the world's largest (though military-oriented) economy, developed key modern technologies, and demonstrated world-class accomplishments in fundamental sciences—all in an essentially poor country tortured by wars and terror." Nonetheless, because of "decades of misuse and waste of technological talent," the USSR failed—in the words of the book—"to become a modern industrialized country." This description of the Soviet economy bears certain disturbing similarities to the U.S. economy. The book review concludes, "the story of the greatest challenge to the United States at its zenith of political and economic power by a fundamentally flawed system that was, nonetheless, far from a paper tiger, deserves more attention than it is generally paid today. Graham's compelling and well-researched book contributes greatly to this cause."

*The Dissident Engineer*

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# TRUTH

Some years ago, a fantasy TV show examined what might happen if a "truth gas" made folks totally honest. What if IMMIGRATION SUPPORTERS were exposed to this gas? What would they say?...



I REALLY LIKE IMMIGRATION! IT MAKES ME MONEY AND GIVES ME MORE FOLKS TO BUY MY THINGS!

Give me your tired, your poor, your huddled masses willing to work cheap.

YEAH... IT'LL DESTROY OUR COUNTRY ... BUT WHAT DO I CARE? I'LL BE DEAD AND GONE BY THE TIME THE U.S. A. COLLAPSES!

UNCEASING IMMIGRATION IS NEAT...

THE MORE POOR PEOPLE, THE RICHER AND MORE IMPORTANT I BECOME!

WELFARE BUREAUCRAT OFFICE.



BRINGING IN LIMITLESS REFUGEES WITH TAXPAYER'S MONEY IS MUCH BETTER THAN OLD-FASHIONED CHRISTIAN CHARITY... AND BESIDES, EVERYONE PAYS FOR WHAT WE WANT!

LA RAZA GAINS POWER THRU BIG-TIME IMMIGRATION!



I'VE ALWAYS HATED AMERIKA!! THOSE FOOLS HAVE NEVER RECOGNIZED MY GENIUS! THIS IS A GREAT WAY TO DESTROY THE SECADENT U.S.!



I'M FOR ENDLESS IMMIGRATION BECAUSE IT GIVES ME WARM, FUZZY FEELINGS...

... AND SHOWS HOW MORALLY SUPERIOR I AM TO THE RIGHT-WING CONSERVATIVE BIGOTS !!



I LOVE OUT-OF-CONTROL IMMIGRATION! A WOUNDED, BLOODY SOCIETY IS GOOD FOR ME!



WOW! THAT'S HOW THEY REALLY FEEL? HOW DID THAT HAPPEN?



did not

(Reprinted with permission from the April 1994 issue of "Border Watch", a publication of the American Immigration Control Foundation (AICF).

# How The Wall Street Journal Shot Itself In The Foot

"Dwindling Supply of Engineers Brings a Sense of Desperation to Auto Makers." That's the headline that appeared on page B-1 of the *Wall Street Journal* last June 7. The accompanying story began with the assertion that "Just as the U.S. car industry is suddenly out trying to hire thousands of engineers, America's supply is shrinking."

Two charts of data, citing the Engineering Workforce Commission as a source, accompanied the *Journal's* piece. We are always happy to help out journalists and do so with some frequency, but the spin of this article had us stumped. Engineering unemployment rates have been at record levels, but Detroit can't find anybody willing to work? That sounded strange. The story got stranger yet: "General Motors Corp.," it said, "seeking to hire 2,000 new engineers this year, recently threw a daylong job fair but landed just over 200 recruits." Only 200 new hires, ten percent of the target for a whole year, in one day? The *Journal's* stake is that this is supposed to signal problems. We called up a friend who works in technical recruitment for GM. "Hey," we said, "There's a piece in *WSJ* that says you people can't find job candidates, that you held a job fair and got only 200 takers." This struck our pal as hysterically funny. "We were swamped," we were told. "We couldn't handle all the applicants."

So we wrote a letter to the editor of the *Journal*, just to clarify things a bit, but they never ran it. It said: "It is good to see that there are scattered signs of a little resurgence in employment markets for engineers, but we are compelled to provide some cautionary remarks in response to your report on the automotive industry..."

"Car manufacturers may be looking for people but the employment outlook for engineers is still very weak, compared to the conditions which applied for most of the past 20 years. Unemployment rates for engineers jumped sharply in the first quarter of 1992 and remained at unprecedented levels in the first quarter of 1994. The results of weak technical employment markets include the first decline in the purchasing power of starting salaries for engineers since we began tracking compensation for the profession in 1953. Before shedding tears for those firms in the automotive business who say that they can't find people, we'd like to know if they are willing to offer financial incentives, and not just rely on the poor condition of the more general engineering job market to bring candidates flocking to their doorsteps.

"A couple of points in your report may mislead some readers ... Your time series graphs, which were based on our data, do not support the contention that a dwindling supply of new engineers is causing problems for the automotive industry, and we certainly did not make such a claim in our discussions with your reporters. To be sure, between 1984 and 1990 there was rising engineering employment and falling enrollment. However, that era, which was not distinguished by rising engineering employment in the automotive industry, is well behind us. Since 1990, your own graphics show that enrollment has held up quite well in a period when there have been precipitous declines in employment. Where then is the dwindling supply? Perhaps there may be shortages of more experienced people; certainly Detroit let lots of them go in earlier years.

"There has been a great deal of hype in recent years about engineering labor shortages, as if America's industrial problems can be laid at the feet of its youth .... We would advise your readers in the

automotive industry that their recruitment problems may stem more from variations in the effectiveness of local hiring and retention practices than from any real lack of able candidates. If their firms need to know where appropriate graduates can be found, by the way, we are prepared to help them do just that."

Well, as we noted, the *Journal* did not choose to publish this reaction, so we have published it ourselves. We would like to note that there are no disputes here as to the facts; there are only disputes about what is to be made of the facts.

Next, we expect a piece from *WSJ* on the defense industry, asserting that the nation faces imminent risk of military defeat because youngsters refuse to seek careers in that business.

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We need the cooperation of our readers to improve our ability to enhance the profession. This improvement will result from our heightened visibility to Congress, the media, and the profession.

Reach Out to your Congress, senate, other representatives and the news media. Your "American Engineer" is our way of reaching you with facts, articles and information concerning engineering issues. You can copy these articles and send them to your representatives and the news media to support your concerns

Reach Out to an associate and encourage them to join and support the AEA. If you're the bashful type, just place your "American Engineer" or a copy in their mail to be read at their convenience. You can also Reach Out to an associate in another department, company, division or state by mailing them your copy of AE. We encourage you to copy AE for a friend or associate in the hope that they will also support our efforts.

Reach Out to the active volunteers that are making this publication possible. Tell them what you like or what you dislike. Provide them with questions, answers and information or just a hand written note of appreciation. Believe me when I tell you that it is important to let your volunteers know that you care.

Reach Out to the following:

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P.O. Box 820473, Fort Worth, TX 76182-0473

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### Dr. David C. Lewis, Immigration

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Names should be sent to: AEA, P.O. Box 820473, Fort Worth, TX 76182-0473.

## Tales From A Skunk Works

It is hard to build high-performance teams like skunk works. Why bother if there are other ways to cope?

You can take one of two roads in business. The low road is well-known. You simply stick with machine-age paradigms, increase control, and run faster. Just have a few layoffs, and the rest will tuck their heads down and obey. You can get them to work nights and weekends for free. You can use a popular management fad (e.g. reengineering, TQM, etc.) to improve efficiency.

CEOs who take this route are seen as "tough," and their businesses as "lean and mean" by Wall Street. Lewis Gershner may have become CEO of IBM not from any demonstrated prowess in the computer industry, but because he fired some 3000 workers at R.J Reynolds.

If your company takes that road, the CEO may wind up on a "best managers" list, and there will be a sequence of bump-ups in the company's stock price.

But in the long term, you will have problems. Studies conducted by the American Management Association concluded that layoffs don't help business performance. In 57% of the companies surveyed, profits do not increase. In 69% of the cases, productivity does not increase, and 63% of the time, there will be another layoff in the next year. Finally, in 77% of the cases, morale suffers. Three years after "restructuring," average stock prices lag further behind index growth rates than before the cuts. (Sources: American Management Association Surveys; *Wall Street Journal*, December 10, 1991, page C1.) To put it simply, I often use a quotation from Dr. Oren Harari in my presentations, "Global competition will compress profits on anything that is uniform, routine, and standard."

Habits are hard to break. It is scary to leave the known, well-lit highway of machine-age process and control. Managers fear that if they relax their control, the system may collapse. Denial is common. People in desperate situations often have clever phrases to deflect blame and raise hope. "It's the economy, stupid. It's the Japanese. It's the unfair playing field."

It is smart strategy to throw crumbs to the losers when you conquer a market. It encourages denial and delays, and can prevent possible retaliation. "Sure we lost, but that is good. We now build subassemblies for the winner." The U.S. has many assembly plants building foreign products. Many well-known Western brands now depend on deals and partners for their products. Many firms will never adapt, but they'll have a place in the new economy. They will provide cheap clones and do contract work for the innovative companies.

There is another road that is less well marked, but those who pursue it tend to have happier stories and greater success. In the information age, there is no single vision, competitive model, product set, standard organization, or process that works every time.

There are numerous examples where leadership and innovation have re-energized companies. Opportunity is everywhere, and there are many ways to make money today. The key to information-age success is to be different from your competition in ways that matter most to your customers.

In *Competing For The Future*, Gary Hamel and C.K. Prahalad make this point: "A company surrenders today's businesses when it gets smaller faster than it gets better. A company surrenders tomorrow's businesses when it gets better without getting different." Success means being different in valuable ways, so firms need to innovate better and faster. Machine-age control and functional organizations help repetition, but hinder innovation. They are not the answer.

Skunk works have a long history of successful breakthrough innovation. Why not try high-performance teams and tapping outside talent to "break out of the box" and to increase your prosperity?

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HAVE YOU EVER SEEN SUCH A DISGUSTING RACIST?!!

# MAKING SENSE OF DATA: COMPUTER-AIDED PATTERN DISCOVERY

RICE UNIVERSITY, THURSDAY AND FRIDAY, JULY 20-21, 1995



This intensive short course will survey new methods of computer-aided data analysis that can enable researchers and analysts in many different professions to classify data and make useful estimates and forecasts. These techniques, drawn from the fields of **statistics, machine learning, data mining, and inductive modeling**, have been applied successfully to many real-world problems, ranging from medical diagnosis and adaptive flight control, to machine fault identification and selection of stocks and bonds.

The course will focus on the leading methods used in industry and academia. Instructors will describe the key inner workings of various algorithms, compare their merits, and demonstrate their effectiveness on practical applications. They will first review classical statistical techniques, both linear and nonparametric, then outline the ways in which these basic tools are modified and combined into more modern methods. The instructors will pay particular attention to four powerful approaches: **kernels, neural networks, polynomial networks, and decision trees**, and will use sample scientific, medical, and financial applications to demonstrate general techniques (such as scientific visualization) and "tricks of the trade" employed by experienced analysts.

## *Data Workshop*

At a "Data Workshop" and demonstration on the first evening of the course, participants may try some of these methods using their own data.

## *Course Outline*

- **Pattern Discovery: An Overview.** Inducing Models from Data: Benefits and Dangers. Related Fields: Statistics, Machine Learning, Data Mining, and Artificial Intelligence.
- **Data Issues.** Case Diagnostics, Feature Creation and Selection.
- **Classical Statistical Techniques.** Linear: Regression and Discriminant Analysis. Nonparametric: Scatterplot Smoothers, Nearest Neighbors, Kernels. Other Key Tools: Optimization, Clustering.
- **Modern Methods.** ASH\* (Average Shifted Histograms). Neural Networks\*. Polynomial Networks\* (ASPN, AIM). Decision Trees\* (CART).
- **Brief Survey of Other Methods.** Projection Pursuit. MARS (Multivariate Adaptive Regression Splines). UPM\* (Universal Process Modeling). Radial Basis Functions.
- **Examples of Applications.** Diagnosing Breast Cancer. Estimating Air Quality. Classifying Bat Species. Investing in the Bond Market.

## *Instructors*

The instructors and guest lecturer each have more than a decade of experience in applying adaptive, data-driven techniques to practical problems, and have developed some of the leading methods covered in this course.

**Dr. John F. Elder** is Research Scientist in the Department of Computational and Applied Mathematics and the Center for Research on Parallel Computation at Rice University. He is the author of three book chapters and numerous articles on adaptive methods of pattern discovery, and is technical chair of the Adaptive and Learning Systems Group of the IEEE Systems, Man, and Cybernetics Society. He has been a research scientist for an engineering consulting business and director of research for an investment management firm, and has a Ph.D. in systems engineering from the University of Virginia.

**Paul Hess** has been President of Hess Consulting in Herndon, Va. since 1991. He was a research scientist for an engineering consulting firm and co-founder of AbTech Corporation, a leading maker of artificial intelligence software.

**Guest lecturer Dr. David W. Scott** is Professor of Statistics and former Chair of the Statistics Department at Rice University. He is the author of the 1992 book *Multivariate Density Estimation*, as well as numerous articles. Dr. Scott is editor of the journal *Computational Statistics* and is on the editorial board of John Wiley & Sons.

**Fee:** \$395 **Fee for graduate students:** \$245 Fee includes lecture notes, lunches at the Rice Faculty Club, and the Data Workshop.

**For Information on Registration,** call Rice University School of Continuing Studies, (713) 520-6022.

## Reader's Voice

This column in the "American Engineer" is for readers to voice an opinion about issues that affect the professional life of an engineer or other technical professional. Readers are encouraged to write AEA with their professional concerns. Each submission should include the name, address and phone number of the writer. Except for short excerpts, we'll publish the writer's name, city and state (unless the writer requests anonymity). In that case, we'll publish initials, city and state. Let's hear from you.

**From L.F. of L.A.:** - An editorial on page 16 of the 9/19/94 issue of *Electronic Design* said, "In what can best be called an excessively broad characterization, American engineers were labeled as innovative and creative but basically uninterested in mundane subjects like manufacturing, testing and quality assurance. During the latter half of the 1980's, this characterization was offered as one reason for the decline in U.S. market share in semiconductors. Because U.S. engineers were supposedly more interested in 'glamorous' pursuits such as design, the nation's manufacturing base had gone to pot. This is a classic case of finding a scapegoat. Never mind that management and Wall Street were so focused on the bottom line that necessary investments weren't being made. The imbalance-of-trade problem was blamed at least partially on supposedly shared personality of engineers."

There are other examples of where 'an excessively broad characterization' of engineers has been used as a 'scapegoat.' Another example is the notion that a peculiar 'culture' of government-funded industry (lax development schedules, lack of emphasis on cost control, and dealing with bureaucratic government specifications) has made laid-off engineers from that industry unemployable in commercial industry. Still another example is the notion that so-called 'smokestack' industries were being starved of engineering talent because the best engineers were being lured away by more 'glamorous' work in the defense and space industries. (Ironically,

laid-off engineers from the defense and space industries now find themselves shunned by the smokestack industries.) When the shortage shouters fail to show that there is a shortage in the total number of engineers, they start shouting that there is a shortage of 'good' engineers or a shortage of engineers with the right personality type. This scapegoating unfortunately diverts attention from the real cause of our international competitiveness problems.

Robert Bruce, AE Editor  
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## Mexico Protects Its Border

Spokesmen for the government of Mexico charged that passage of Prop. 187 by California voters reflected "racism" and bigotry toward foreigners. The initiative, among other provisions, called for the cutoff of health and educational benefits to illegal aliens. The Mexican government generally complains when the United States takes even the most minimal steps to control its borders.

How does Mexico deal with illegal aliens who come across its borders? A recent study found that Mexico deported 60,000 illegals across its southern border last year. Those caught a second time are subject to a ten-year prison term.

Illegals in Mexico are not entitled to free health and education benefits. Public hospitals are required to ask patients if they are legal residents. If the hospital determines that a patient is not in the country legally, it is required by law to report that person to the immigration authorities. Parents of school children must present the children's birth certificates before they can be enrolled for classes.

Mexico defends its strict immigration control measures. These, say Mexican officials, are necessary for a country to protect its sovereignty.

(Reprinted with permission from the April '95 issue of "Border Watch," a publication of the American Immigration Control Foundation (AICF).)

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