IEEE-USA eBOOKS PRESENTS

Engineers' Guide
to Lifelong Employability

The Transition
from School to Work

By IEEE-USA's Employment and Career Services Committee

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Introduction

There's a rumor going around that new EE graduates don't have career worries. Many of their elders, who have been humbled by layoffs or bypassed by new technologies, enviously assume that today's electrical engineering and computer science graduates walk straight out of school and into lucrative high-tech jobs in sun-drenched locales, garlanded with bonuses and wreathed in stock options.

If you're a college senior or a recent graduate, you know better. Surveys conducted by the IEEE show that new grads are just as anxious about their long-term job security as their elders, no matter how hot or cold the job market may happen to be on the day they pick up their sheepskins.

To be sure, appearances can be deceiving. Demand for new BSEEs may be soaring, but so are employers' standards and expectations. Good grades and technical expertise aren't enough anymore. Campus recruiters increasingly look for "soft skills," like the ability to communicate well, to work in teams and to lead others. Cautious employers say they'd rather hire nobody than the wrong body.

Though today's graduates have the Internet to help them look for jobs, they're discovering that the Internet is a two-edged sword. Job postings on the Web aren't necessarily more fruitful than want ads in the newspaper; there's just more of them. Despite the hype surrounding the Internet, most engineers still get their jobs the old-fashioned way — by networking.

In one respect, new grads are wiser than their predecessors. Even those who have multiple job offers know that the era of guaranteed lifetime employment at IBM or GE are over. They know that they may have to change jobs or retrain themselves every three to five years to remain marketable. Indeed, the "Generation X" engineers do have one advantage over their elders — they know what's waiting for them. And they're getting ready for it.

— Jean M. Eason

What Are Employers Looking for?

Over the past decade, demand for new EE and computer science graduates in the work force has waxed and waned. However, campus recruiters' increasing selectivity has become a constant, as they sort through thousands of graduates to find those with the most potential. Here's what they're looking for:

- Good grades
- Communication skills
- Co-op, work-study, summer job or internship experience
- Leadership potential

Students who can hit all four of these hot buttons can just about write their own ticket. Let's take a closer look:

Grades — Traditionally, recruiters have used grade point average (GPA) to decide which campus candidates to interview. But today, those with the highest grades are sometimes considered overqualified for the nuts-and-bolts activities of an entry-level engineering job at the average company, especially one where the emphasis on R&D is weak. Someone who seems well rounded or shows good business sense could edge out the person with the 3.9 GPA. "Those with the highest grades get the most interviews, but I'm not sure if they get the most offers," said one campus placement officer.

Communication skills — In today's lean, flattened corporate structures, engineers frequently have contact with internal and external customers who don't understand technology. And engineers have to be able to talk to them in plain English. This skill is especially necessary in consulting firms, in small companies where engineers may accompany salesmen in the field, and in places like investment banks and accounting firms, where the information-services director might be the only engineer around. Communication skills include poise, patience and good humor.

Co-op, work-study experience — Students with successful work experience are particularly attractive to recruiters and employers. Not only do part-time positions often lead to full-time work at the same firm, but the candidate with any relevant workplace experience will always inspire more confidence than someone with no track record at all. Employers also love candidates who are "double experts" — engineers with good technical skills who know a lot about their particular industry.

Leadership qualities — In addition to the above skills, graduates with leadership traits are the most sought-after candidates. "The high-tech companies say, 'We're looking for a technically competent person, but if they don't have leadership skills, we don't have a place for them,'" said Tom Tarantelli, director of the Career Development Center at Rensselaer Polytechnic Institute (RPI) in Troy, N.Y.

Recruiters are drawn toward candidates who have been officers in professional societies or other organizations, either on- or off-campus. One utility company engineer who recruits for her company said, "It's a cliché, but being active in a professional society like the IEEE is a definite plus. Employers are looking for people who aren't just school-focused." A combined business/engineering curriculum

— which a few schools offer to undergraduates — is especially potent. "Employers come to the campus looking for people who exhibit leadership behaviors early in their careers," Tarantelli said. "They ask candidates how they deal with adversity, or how they've promoted their ideas, or how they dealt with a team member who wasn't pulling his weight. They call these Critical Behavior Interviews, because they are looking for multidimensional people who can reason and solve problems. They want people who can handle the workplace, because things go wrong in the work place every day. Ultimately, these folks are the ones who will move up and become managers."

Finding a Job the Old-Fashioned Way

The Internet may be the trendiest place to look for an engineering job, but old-fashioned networking is still the most effective job-search method. "Looking for a job is an up-close and personal enterprise," said one college career-placement officer. "At some point you have to step away from the PC and the e-mail and go out and talk to people."

Networking means talking to people about what you hope to do, introducing yourself to people who work in your field, and building a chain of personal referrals until you meet someone in a position to offer you a job. Eventually, your network will include all of the people you've worked with, gone to school with, and befriended over the years. You should keep their names, addresses and phone numbers in a computer file or a traditional address book and never lose it. Whenever you are in a career transition, at any point in your life, your first step will be to call your network.

University undergraduates are in a good position to network with people in the following groups:

- Professors, especially those who consult for industry
- Alumni who work in industry or consulting firms
- Representatives from companies that sponsor on-campus research
- Campus recruiters
- Guest lecturers sponsored by your department
- Fellow student members of professional societies like the IEEE
- Employers you meet through work-study programs and summer jobs
- Classmates whose parents or parents' friends are EEs or computer scientists

If your school has a strong career placement program, you will have many opportunities to network. At Rensselaer, for instance, students collaborate on projects with private companies, they have access to alumni mentors, and their professors often host visits from corporate executives.

"I encourage people to be joiners," said RPI's Tarantelli. "They should join professional societies and alumni groups. They should get their nose out of their books and start talking to people. They should ask themselves: 'Am I meeting people?' A recipe for failure is to send out a thousand resumes and not follow up on them."

Networking

Networking is the only way to manage your job search with any semblance of personal control. Most of the traditional job-search tools — resumes, want ads, interviews, letters of reference — are designed to maximize an employer's range of choices. The job-seeker always has the worst odds, pitted against hundreds of other applicants. By networking, you decide who to call. You choose situations where the odds are more favorable for you, where people know you (or know of you), where you have allies, and where you're not just a face in the crowd. Even if you haven't begun a formal job search, your networking contacts can help you decide what kind of career path is best for you.

Favoritism doesn't drive the networking process. Determination does. Here's how one engineering student networked her way into a job at NASA: At a technical conference, she met an alumnus who worked for NASA in Houston. She was just one of several undergraduates who approached him after her lecture, but her passion about the space program made the biggest impression on him. She suggested an on-site visit during spring break, and he agreed. She arrived to find that he had set up a no-pressure chat with the co-op manager, who offered her a work-study position on the spot. Upon graduation, she ambled into her current job as a project engineer for electrical subsystems in space-shuttle training equipment.

The Campus Interview

Campus interviews offer prime networking opportunities. By talking to a recruiter, you learn something about a company and you tell the company something about yourself. Your goal is not to angle for a job offer — that never happens in campus interviews — but to inspire the interviewer to recommend you for an on-site visit with company managers and engineers.

To convince recruiters that you're part of the cream and not the skim, give them a glimpse of your most extraordinary accomplishments. The recruiter is looking for people who can lead a team, who can generate new ideas, and who will put in those extra hours in the lab. If you've been the president of a student organization, or played a lead role in a co-op project, or had an unusual summer job that required a lot of initiative, now is the time to talk about it.

If you don't have a stellar GPA, bombard the recruiter with so many other positive things about you that the GPA shrinks in importance. You can get by with less than a 3.0 average by pointing to other pluses, such as the fact that you attend a demanding school, have worked on impressive projects, have strong co-op experience, or have shown leadership skills. Vivacity in interviews also helps.

Let the recruiter lead the interview, but don't be a potted plant. Prepare some pertinent questions about the company and about the position. If you don't ask questions, you'll seem uninterested in the job. In most cases, the recruiter will close the interview by asking you if you have any further comments or questions. If you have concerns that haven't been covered, bring them up.

Do not, however, ask questions about compensation. That would be as gauche as raising the topic of wedding rings on a first date.

At some campuses, students get a chance to interview the interviewers. At the University of Michigan, recruiters are invited to lunchtime meetings called Employer Grills. Here, the students "pepper recruiters with a wide range of questions without the formality or pressure of an interview," according to Gary Boley, director of Career Services for Engineers at the University of Michigan's Ann Arbor campus, where engineering students are exposed to hundreds of recruiters.

Indeed, the best students at the best schools can afford to be picky. "The student has become a very viable consumer in the job market," said Tarantelli. "Students are demanding more information. They're asking, 'If I commit to the company, what is the company's commitment to me? What kind of career path do you offer? How long might I be working there?' We have students who shop around, who look at all the options."

Making Up Your Mind

However, impressing recruiters isn't as important as deciding what kind of career you really want in the first place. And it's not enough to know that you love to process digital signals. You have to consider questions like these:

- Do I want to work in industry, consulting, academia, or government?
- Should I go to the highest bidder, or should I go where I feel the most rapport?
- Do I want to work in a large corporation or a small company?
- What part of the country do I want to work in?
- Do I want to work with other technical people, or would I prefer working with people very different from myself?
- Do I want to stay on a technical track, or do I want to shift into management?

Four Career Paths

To answer these questions, you might start by examining the four major career paths open to you:

Industry — The majority of EEs work in the computer hardware and software industries or in telecommunications, but just about any industry that uses large, complex information-processing systems — such as banking or insurance — also needs EEs and computer scientists.

Once you enter industry, you must eventually choose either the technical or the business track. The technical track will take you deeper into research and development, production, or technical services, possibly leading to a career in technical management. The business track will send you into areas like marketing, sales, accounting, finance, or administration.

Only you can decide what area intrigues you more — technical challenges or the hurly-burly of the marketplace. But to advance into management along the business track, you may eventually need an MBA.

Consulting — As industries have downsized and outsourced, some engineers have joined consulting firms or hung out shingles of their own. Consulting firms are now one of the fastest growing sources of employment for engineers, according to the Engineering Workforce Commission.

Since half of a consultant's work consists of acquiring customers and serving their needs, consulting engineers need advanced interpersonal skills, along with top-flight technical and analytical skills. Consulting is highly competitive. It requires self-motivated individuals who can work equally well on their own or in teams. If they operate a one-man or one-woman shop, they usually prepare and negotiate their own contracts.

Academia — For those who love pure science, a career in academia may seem the most attractive. However, opportunities in academia have been growing fewer as a result of cutbacks in federal and state funding for higher education. Competition for the shrinking number of teaching posts is intense, with postdoctoral studies a frequent prerequisite. A young professor may have to relocate several times before finding an opportunity to win tenure. Academic salaries lag behind those in industry, but professors often make up for it by working as consultants.

Government — Cutbacks in federal spending, particularly in the Defense, Energy and Transportation departments, and at NASA, have reduced demand for electrical engineers in the federal government. State budgets have shrunk as well. But many engineers in government say that they enjoy the regular hours, excellent benefits (including generous early retirement) and the relative absence of business pressures that come with working for Uncle Sam.

Aside from the four major career paths, you may also want to consider working at a small company, or a company where you might be the only engineer.

Business — Big or Small?

If you like a variety of challenges, if you can tolerate a high degree of career risk, if you crave the freedom to express yourself as an individual, and if you want a clearer shot at top management, then you might like working in a small company. Of course, small companies are more likely to fail than large companies, but a small company may go public and make millionaires of their employees.

A Non-Technology Company?

Another option would be to play a technical role in a nontechnical company. Increasingly, recruiters from investment-banking firms and large insurance companies are interviewing EE and computer-science majors, hoping to hire in-house, information systems managers. "We went to the financial district in Boston to talk to banks and accounting firms about our liberal arts graduates," said a Lehigh University career counselor. "But they just wanted to talk about computer-science majors and EEs. They need help running their networks." If you like working with nontechnical people, and don't mind being the only engineer at the water cooler, you might enjoy life at a service company.

Conclusion

Campus recruiters and human-resources personnel look for graduates who have the skills necessary for success at their companies. That usually means well-rounded graduates who have strong "people" skills coupled with strong technical skills. Recruiters are especially keen on students who show leadership qualities, such as officers in student groups or undergraduate professional societies.

But don't let your eagerness to impress recruiters distract you from the fact that "networking, networking and networking" are the three best ways to find a job. If you simply "get in line" and wait until someone notices you, you could wait a long time. Better to take the initiative and start calling people until you find someone who can "refer you to someone who can refer you to someone who will offer you a job." Networking is a bit like buying life insurance — the younger you are when you start, the better.

Of course, random or haphazard networking doesn't work. Only when you decide what career path to pursue, what sort of income you'll need, and what kind of co-workers or work environment you want, will you be able to focus your networking efforts. Self-analysis is the alpha and omega of the job-search process. You must do it before you begin looking, and you must do it again when the time comes to accept or reject an offer.

The 1990s brought dramatic change to the electrical and electronics engineering profession. New

technologies created exciting new career opportunities in computers and telecommunications. At the same time, corporate restructuring destroyed the promise of lifetime job security that engineers once took for granted. New graduates are not immune to the stresses brought on by these changes, but at least they know what's waiting for them out there in the real world.

"The new generation of EE grads is different," said Joey Duvall, a volunteer who works with recent graduates through the IEEE's Graduates of the Last Decade outreach program. "They know that engineers are becoming proprietors of their skills, like doctors or lawyers. They're more suited to being on their own than the Baby Boomers. They know that having a career means building your network, and using it to find the job that best suits them."

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