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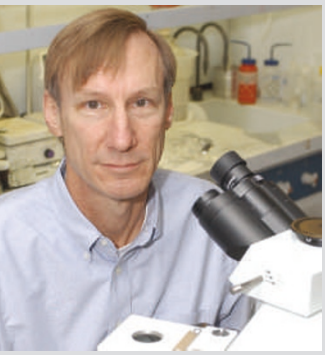
MOVERS

Stephen Forrest, vice-president for research and William Gould Dow professor in electrical engineering, University of Michigan, Ann Arbor



1992–2006 James S. McDonnell professor of electrical engineering, Princeton University, Princeton, New Jersey
1997–2001 Chairman, Department of Electrical Engineering, Princeton
1992–1997 Director, Center for Photonic and Optoelectronic Materials, Princeton

As an undergraduate, Stephen Forrest threw a dart at a map to determine the site of his doctorate. It guided the then University of California, Berkeley, physics undergraduate to the University of Michigan to get his PhD studying magnetism. But it was his next major career decision — to accept a position at Bell Labs in Murray Hill, New Jersey, on the development end of the R&D spectrum — that steered him towards the intersection of academia and industry.

Working in development gave Forrest practical training in systems design and economics: "I was becoming an engineer without my knowing it," he says. At Bell Labs he developed the first practical indium gallium arsenide detector, still used in fibre-optic systems today. After six years, however, he started to get restless for academia and found a natural fit at the electrophysics department at the University of Southern California. There, he became director of the National Center for Integrated Photonic Technology, a research consortium between five universities including the Massachusetts Institute of Technology and Princeton, funded by the Defense Advanced Research Projects Agency.

But the pull of industry would return. Forrest met Greg Olson, then a friendly competitor at RCA labs. Olson — now best known for being the third space tourist — approached Forrest to start a company called Epitaxx. Uninterested in business management, Forrest agreed, instead, to consult. "I've had opportunities to become CEOs and presidents of companies, but never considered giving up the freedom of thought in academia," he says.

Olson wanted Forrest closer to his New Jersey-based operations and so he took it upon himself to submit Forrest's resumé for the directorship of Princeton University's Center for Photonics and Optoelectronic Materials (POEM). Building on POEM's charter to work with industry, Forrest crafted the first agreements allowing company engineers to work at POEM facilities.

Now he's returning to Michigan in a new capacity — vice-president for research. He is already working on significant initiatives, most notably in energy, aiming to foster more academic-industry collaborations there.

Forrest credits the calibre of his collaborations, notably with Olson and chemist Mark Thompson, as the secret to his success. "You have to bring together skills in today's world," he says. "Take the time to teach each other." ■

Virginia Gewin

RECRUITERS & ACADEMIA

What makes a good PhD student?

Doing a PhD should be fun and rewarding, because you can spend all your working time discovering things and pursuing ideas — and getting paid for it, without any administrative responsibilities. Those who stick with a career in science do so because, despite the relatively poor pay, long hours and lack of security, it is all we want to do.

Unfortunately most new PhD students are ill-prepared, and as a consequence very few will fulfil their aspirations to be independent scientists. The main reasons for this are the 'grade creep' inherent at most universities, making it difficult to identify the really talented first-class graduates from the rest, and the pressure on universities to graduate as many PhD students as possible. The consequence is that we enrol far too many of them without telling them clearly what doing a doctorate should entail. We therefore set ourselves, and the students, on a path of frustration and disappointment.

So what should we be telling prospective PhD students?

- Choose a supervisor whose work you admire and who is well supported by grants and departmental infrastructure.
- Take responsibility for your project.
- Work hard — long days all week and part of most weekends. If research is your passion this should be easy, and if it isn't, you are probably in the wrong field. Note who goes home with a full briefcase to work on at the end of the day. This is a cause of success, not a consequence.
- Take some weekends off, and decent holidays, so you don't burn out.
- Read the literature in your immediate area, both current and past, and around it. You can't possibly make an original contribution to the literature unless you know what is already there.
- Plan your days and weeks carefully to dovetail experiments so that you have a minimum amount of downtime.
- Keep a good lab book and write it up every day.
- Be creative. Think about what you are doing and why, and look for better ways to go. Don't see your PhD as just a road map laid out by your supervisor.
- Develop good writing skills: they will make your scientific career immeasurably easier.
- To be successful you must be at least four of the following: smart, motivated, creative, hard-working, skilful and lucky. You can't depend on luck, so you had better focus on the others! ■

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www.qimr.edu.au/research/labs/georgiat/Guideforphds.doc

GRADUATE JOURNAL

Valuable diversions

Passion for science can make it hard to stop thinking about work outside office hours. One solution is to engage in hobbies that force you to switch off from thoughts of work, such as sports, crafts or, in my case, music. At choir rehearsals, I effortlessly shift my focus off small black ants onto the small black notes on the sheet music.

Choirs, teams or dance groups can offer a welcome break from the scientific world, where social gatherings inevitably lead to talking shop. In the choir, I meet people in different professions and life situations. While I may tell the occasional ant story, pub discussions are as likely to revolve around life as a casino dealer, teacher or full-time mother.

But perhaps most importantly, performing in a concert or learning a new piece of music gives me a feeling of instant gratification that research sometimes lacks. The average biological project can take years from planning to writing up, and when your inbox finally delivers that longed-for letter of acceptance, you're already deep into the next project. Short-term successes outside science — learning a new language, competing in a race or performing in a play — can boost your morale, giving you strength to continue in the marathon run towards graduation. ■

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