

Applying for Nonacademic Positions

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Introduction

So you want a job in industry. . .

This short article is intended to help students interested in obtaining such positions, and faculty wishing to assist their students as they enter the job market. The author brings the experience of a 30-year career in the aerospace industry.

Preparation Counts!

Academia and industry (note: for purposes of this essay, industry means industry + business + laboratories, i.e., everything outside academia) differ in a great many ways. Accordingly, it is not surprising that, when seeking industrial employment, a different approach from that which is taken when applying for an academic position is required. Since most students have been trained to think in academic terms, this entails some serious additional “prep time” to adjust resumes, goals, and cover letters to make certain that they are appropriate for the purposes intended. So don’t start at the last minute and don’t expect that a single set of written material will “work” for every position for which you apply. Targeting the job that you seek will be a helpful discriminator, if you wish to improve your chances of becoming a savvy—and successful—applicant.

Industry Represents an Important Source of Jobs

Most graduate students in mathematics work to solve or advance the understanding of a relatively narrow field of study. Preparation is typically in an academic setting, for academic purposes, directed by academicians. Graduates, for the most part, aspire to faculty positions. Because the supply of newly minted Ph.D.’s outstrips faculty replacement needs, industrial employment offers alternative opportunities for these “surplus” graduates. Unfortunately, some graduate students regard nonacademic employment

as occupations of last resort. Their job prospects will not be improved by this attitude.

Once relegated to second-class status in mathematical circles, industry professionals now enjoy somewhat greater respect. There are important and challenging mathematical problems in industry; it is the nature of the work—as well as the environment and the rewards—that is different from that in academia. It is up to the individual to decide whether this difference, as well as the job situation in academia, makes industrial employment preferable.

The Resume: Making a Good First Impression

People in industry work with deadlines, many of which are challenging and unforgiving. They do not have a lot of time to search for information in your resume, which is your introduction to them. So it is definitely to your advantage to make it as easy as possible for them to find the narrative of your qualifications and experience and to simplify the presentation of this information so that they can absorb it as rapidly as possible. Whatever is hard to find, or poorly written, will probably not be read.

Your resume should be tailored, as much as possible, to the industry and company to which you are applying. In the academic world, qualifications are described in terms of papers written, courses taken, courses taught, and thesis adviser. In contrast, a prospective nonacademic employer is mainly interested in understanding what an applicant can *do*.

Examples abound. If you have experience or expertise in software related to that employer, it should be highlighted on your resume. If you have worked in an organization that uses technology related to that of your prospective employer, this experience should be prominently featured. If you have worked on a project that is potentially of interest to the employer, that information should be spotlighted.

One size does not fit all. It is highly unlikely that the same resume will be appropriate for application to distinctly different positions, especially when they require dramatically different capabilities. Be prepared to rework your resume, to target the particular position at hand. Keeping several somewhat different versions of your resume will enable you to focus more narrowly on the particular opportunity you have identified.

Finally, use SpellCheck (or a similar diagnostic tool) to identify and correct errors in spelling and syntax. You can hardly expect to impress an employer if the quality of your paperwork reflects a poor command of the language. If you mail your application, use good quality paper. These and similar style pointers should be obvious to an applicant, but my personal experience as a supervisor reviewing job applications suggests that they are hardly the rule. Good form and careful presentation enhances an applicant's job prospects.

Emphasize Capabilities Aligned with the Opportunity; Deep-Six the Rest

Academic vitae emphasize courses taught, departmental service, teaching philosophy, and course portfolio. None of these is of particular interest to industrial organizations. Academic departments are interested in what you can teach; industrial organizations are interested in what you can *do*.

Few employers are interested in applying an applicant's particular thesis work to job-related problems. While an academic thesis can be an interesting extension of mathematics in a specialized area, an industrial career most often involves a wider range of problems and techniques. Your resume will be strengthened by providing an indication of both the breadth and depth of your mathematical capability.

A simple statement that an applicant has expertise in PDE's will probably not send an employer's heart racing. But experience with birth-death-growth processes, and the solution of related problems, may be of considerable interest to an industry in which the understanding of these kinds of problems is critical for success. An applicant with experience in industrial problems, or a project with an applications focus, needs to highlight that information. If results were obtained that were useful in an industrial application, a couple of lines summarizing this information are definitely needed. For maximum effect in any context, a bit of study of the target employer, the

sorts of problems that are of interest to that industry, and some effort to connect this information to the applicant's skill set, will be extremely useful in differentiating one applicant's resume from the competition.

A Few General Guidelines

Make your resume brief and put as much of the important information on the first page as you can. *Remember: Your goal is to get your resume read.* So it is imperative that the information most relevant to the particular employer be presented as quickly and concisely as possible.

Put the contact information (name, address, telephone numbers, e-mail address, home address) right at the beginning. Follow this with a brief (i.e., one or two line) statement of your job objective. This can be generic, e.g., "Employment in financial modeling," or more specific, e.g., "Optimizing manufacturing operations". Follow this with college and graduate degrees, with institutions. Next comes a list of positions held, with dates, in reverse chronological order, with brief descriptions of each, and perhaps slightly greater detail for any related to the job for which the resume is targeted. Only professional experience should be listed; industrial employers have no interest in your high school tennis team proficiency.

Cite publications early, if they are related to areas of interest to the employer. Extensive coursework in relevant mathematical areas should be mentioned. Academic awards and publications should be at the end, except for those cited above. Teaching awards and academic departmental service are better left off, unless the resume is embarrassingly brief.

Accuracy is critical. Mistakes in timelines, or inaccuracies in experience, will immediately end consideration of an application.

Pack as much information as you can into the first page; there is no guarantee that anything on the second page will be read.

Do not shrink the font size! Use 12-point type and respectable margins. If something is hard to read, it probably *won't* be read.

Networking Is Important

Networking is a valuable resource in the job search process, both inside and outside academia. Personal relationships between people in your network and their industrial contacts can provide

you with useful “leads” to possible positions. Letters of recommendation from faculty members are, of course, essential. Their value is greatest when the person evaluating an application knows the letter writer or is aware of his/her work.

Many universities have placement offices or similar organizations that facilitate contacts with industry. Some have lists of alumni who can provide you with points of contact with specific companies. Some offer helpful hints on resume writing and interview preparation. Investigate and make use of these resources. Few jobs result from “cold” contacts.

Broaden Your Job Search

Most mathematicians expect that the word “mathematics” will appear somewhere in the job title of any position in which they might be interested. Nothing could be further from the truth.

Most of the jobs held by industrial mathematicians have other names: engineer, analyst, etc. That is because industry thinks in terms of how their personnel support their product, and professional mathematicians have not always been associated with practical applications. Engineering companies employ engineers, even if mathematicians are filling those positions. Optimization of manufacturing processes is far more likely to be done by someone with the title, “manufacturing engineer,” than “mathematician”. So the mathematician-applicant needs to be expansive in his/her view of industrial positions to which he/she can contribute. Read the job description before deciding not to apply.

Best of luck in your job search!

Other resources

Additional information on opportunities in mathematics can be found on the AMS website at <http://www.ams.org/employment/job-articles.html> and the SIAM website at <http://www.siam.org/careers/>.

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