

Engineering Career Development
and Experiential Learning Center

Graduate Career Handbook

UMass **Amherst**

College of
Engineering

ENGINEERING CAREERS FOR M.S. AND Ph.D. SCHOLARS AT UMASS AMHERST

The College of Engineering at UMass Amherst is ranked as the best public engineering school in New England with a broad range of research interests including scientific computing, cybersecurity, bioengineering, materials science, nanotechnology, sustainable energy, environmental and water resources, structural and geotechnical engineering, transportation, mechanical design and controls, fluid mechanics, manufacturing, and systems engineering.

Our graduate students are well-positioned for successful engineering careers, in either academia or industry, and the Engineering Career Development and Experiential Learning Center helps to prepare students for their transition to the engineering profession.

We provide a broad range of career-related programs and services that include skills development through targeted workshops, individual counseling, and online resources. In addition, we provide students many opportunities to connect with industry leaders through career fairs, corporate information sessions, technical talks and networking events.

We also collaborate with other UMass offices such as the Graduate Office of Professional Development, the International Programs Office, the UMass Alumni Association, and the Writing Center to provide graduate students with the comprehensive resources needed to develop their professional skills and launch their engineering careers.

Career Success: Where Preparation Meets Opportunity



- Resume/CV
- Cover Letters
- Interview Skills
- Networking
- International Student Support
- Social Media
- Job-hunting

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GRADUATE CAREER HANDBOOK

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UMassAmherst
College of Engineering



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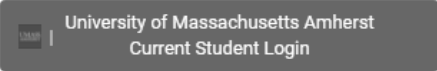
Welcome to UMass Engineering Handshake



Find jobs, internships, co-ops and connect to the UMass Engineering Career Center for recruiting events, fairs, workshops and helpful career resources!

Signing up is easy!

1. Go to **UMass.JoinHandshake.com**


2. **Click**  and login using your **UMass Net ID and Password**

3. Complete your profile. Some information is already pre-loaded, so check it for accuracy. Profiles are automatically set to private, so if you want your profile to be viewable by employers you need to change it to public. A public profile is only viewable by employers connected with UMass. You can have a public profile and keep some information (for example GPA) private. Here's how to change your setting:

Profile Privacy Setting

- a. **Click** your name in the main drop down menu in the top right corner
- b. Select **Settings & Privacy**
- c. Select **Account Information** in the upper left side of the page, then in the privacy section
Select the option that meets your privacy preference

GPA Privacy Setting

- a. **Click** your name in the main drop down menu in the top right corner
- b. Select **My Profile**
- c. **Click** the edit symbol () in the Education section and **Select** options that meet your privacy preference

Resume Privacy

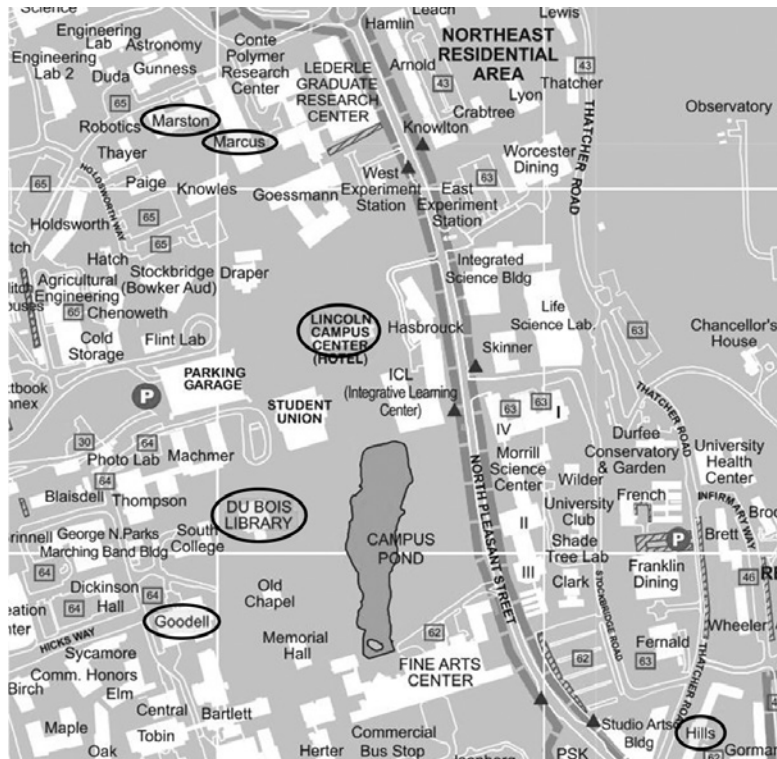
- a. You have the option to make documents "Visible" on your profile, allowing employers to view and download them. For a visible/ public resume, we suggest you do **not** include personal information such as cell phone number, address, or email address. Resumes not set as visible can be attached to specific job applications so only the employer who receives the application will be able to view it.

4. **Start searching for your future career!**

Handshake has a great help center full of Q & As, short videos, tutorials and materials to help you find your way! <https://support.joinhandshake.com/hc/en-us>

Trouble with sign in? Need help? Contact the Engineering Career Center at coecareers@engin.umass.edu or 413-545-4558.

UNIVERSITY RESOURCES



Engineering Career Development and Experiential Learning Center

Workshops, resumes, cover letters, mock interviews
 Walk-in resume/cover letter help
 Marston 112
 Monday – Friday
 8:30am – 5:00pm
 (413) 545-4558
 Website: <http://engineering.umass.edu/careers>
 Email: careers@ecs.umass.edu
 Job Board: UMass.JoinHandshake.com

Graduate Office of Professional Development

Training programs, skill development
 538 Goodell Building
 Monday – Friday
 8:30am – 4:30pm
 (413) 545-0669
 Website: www.umass.edu/gradschool/office-of-professional-development
 Email: opd@grad.umass.edu

UMass International Programs Office

The International Programs Office (IPO) is a comprehensive office that works with incoming international students and scholars, and manages the study abroad and exchange programs and processes for all students, faculty and staff.
 70 Butterfield Terrace
 (413) 545-2710
 Hours: Monday – Friday, 8:30am – 4:30pm
<https://www.umass.edu/ipo>

Writing Center

Provides 45-minute writing-help consultations by appointment.
 W.E.B. DuBois Library, Learning Commons
 Hours vary Sunday – Friday
www.umass.edu/writingcenter

UMass Amherst Alumni Association

Alumni networks based on region (including international) and affinity are listed under “Stay Connected”. Also, an events listing can be found under “Participate.”
 Memorial Hall, 134 Hicks Way, (413)545-2317
 Email: alumni@admin.umass.edu
<http://umassalumni.com>

Murray D. Lincoln Campus Center

Great spot to grab a bite to eat, check out some UMass gear, or find the ATM. A hub of campus life and activities complete with a hotel.
 1 Campus Center Way
www.umassauxiliaryservices.com

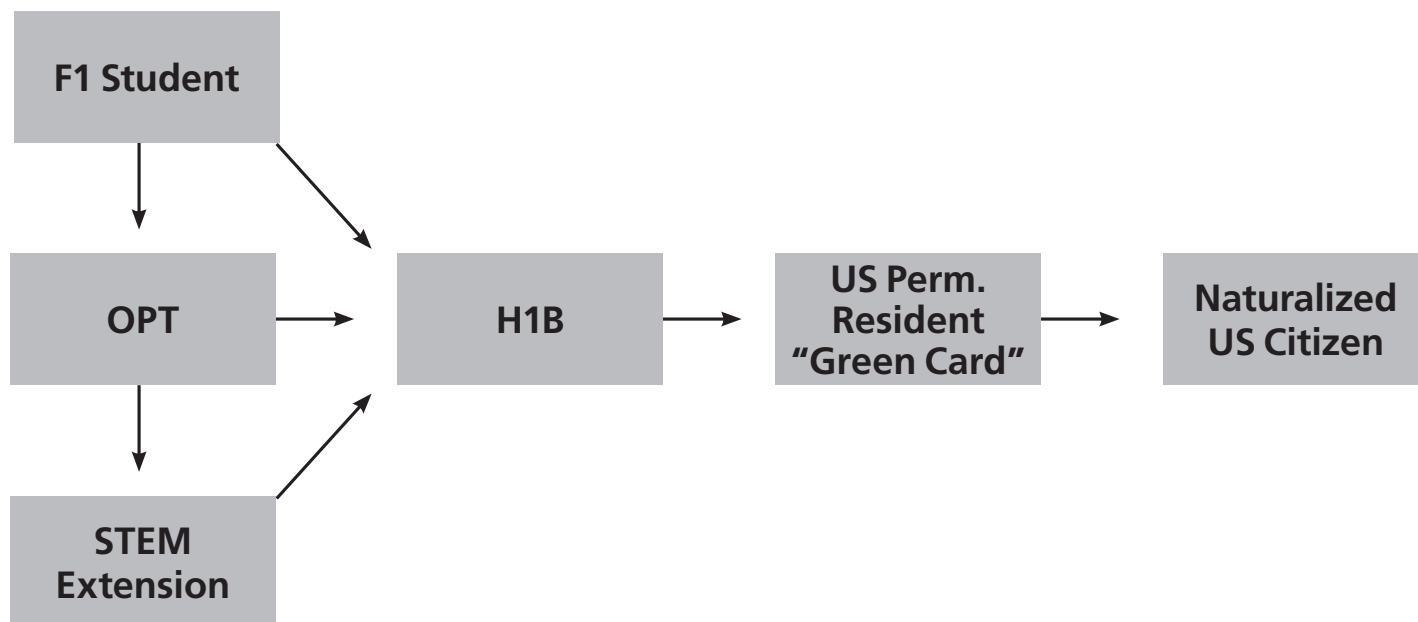
INTERNATIONAL GRADUATE STUDENTS

Working in the USA: Internships and Co-ops

Some graduate students wish to gain real-world experience through internships and co-ops. These students should first speak with their advisor/research professor to ask about their funding and research obligations which may affect outside employment options. Experiential learning for international students requires a different application and authorization process to maintain F-1 visa status. Students going on a summer internship or semester-long co-op must enroll in a one-credit independent study course and apply for **CPT (Curricular Practical Training)** authorization in order to participate. Students going on semester-long co-op must also enroll in an Externship through the UMass Graduate School office. For instructions on how to apply for CPT authorization, please go to: <https://engineering.umass.edu/current-students/career-development/internships-coops-research> and review the International Programs Office webpage at www.umass.edu/ipo on the application process for CPT authorization.

Working in the USA: Post-Graduation

If the international F-1 student's goal is to remain in the USA to gain work experience then employment must be obtained and a timeline established for completion of degree requirements and application for legal work authorization. The best way to begin this process is with a career portfolio prepared and ready. The Engineering Career Development and Experiential Learning Center can assist with resumes, cover letters, CVs, lists of potential employers and interview practice. **OPT (Optional Practical Training)** work authorization is endorsed by the UMass IPO. The most common path is for the F-1 student to apply for OPT 2 to 3 months before completing their degree requirements. OPT work authorization is for a maximum of 12 months with a possible one-time extension of 24 additional months available to certain STEM degree recipients. The flow chart below shows the various optional work visa procurement paths:



The H-1B visa is sponsored by the employer. H-1B is highly regulated according to place of employment, salary, job duties and job title. After an F-1 student is hired, and the employer files a petition for an H1B visa, sponsorship of the F-1 visa shifts from UMass to the employer. H1-B visas can be valid for up to 6 years. Please refer to the College of Engineering website: <http://engineering.umass.edu/careers> for more information and detailed instructions on applying for CPT and OPT work authorization.

On campus visa resources include: The International Programs Office, The Engineering Career Development and Experiential Learning Center, UMass Graduate School Office of Professional Development.

Additional resources include: www.uscis.gov and for general information on visas and travel please refer to the US Department of State website: <https://travel.state.gov/content/travel.html>, www.goinglobal.com is an e-recruiting tool for finding international jobs and internships, www.myvisajobs.com lists employers that sponsor H1-B visas and current job openings.

CAREER CHECKLIST

As you progress through your graduate studies, it is important to take concrete steps to planning your future career by developing your skills and participating in career-related events. The following is a suggested timeline of specific activities and tasks that will help you reach your engineering career goals. Continue to read emails from the engineering career center which provides information concerning jobs, fairs, workshops, and networking events.

All Years MS and PhD Students

- Maintain regular contact with your faculty advisor.
- Attend various workshops resume, career fair prep, interview skills, and job searching and negotiations.
- Attend company information sessions to build relationships with recruiters and learn more about what companies are doing in your field of interest and gain an understanding of the skills and competencies they look for when hiring candidates
- Attend the Engineering Career Fair in the fall and the Campus-Wide Fair in the spring.
- Follow up with companies you meet at information sessions, career fairs, or interviews. Make sure you present yourself in a professional manner—through phone conversations, email, thank-you notes, or in person.
- Attend academic conferences and network with colleagues from other institutions.

MS Students

Year One

- Begin your resume—attend a resume workshop.
- Develop your LinkedIn Profile.
- Join and participate in professional associations, engineering student societies, or other student organizations.
- Plan a related work experience (research position or internship) for the summer if you are not already doing research through your degree program. Go to the Engineering job board, Handshake, at: UMass.JoinHandshake.com.
- Learn master's degree requirements and thesis information by visiting www.umass.edu/gradschool, and clicking on Current Students.

Year Two

- Update and polish your resume.
- Update your LinkedIn Profile.
- Continue to participate in professional or other engineering student societies.
- Start to prepare for life after UMass! Determine what kinds of positions, industries or types of research you are most interested in. Start your search on Handshake, the College of Engineering job board at: UMass.JoinHandshake.com.
- Reach out to alumni from your department that are working in academia or industry. This is a great way to network and also a resource for job search advice.
- Prepare to take the FE exam if your job requires a PE (Professional Engineer) as many companies require this for employment. The FE is a computer-based exam that

is administered year-round by NCEES (National Council of Examiners for Engineering and Surveying). Advanced Registration is required and is available at <http://ncees.org/exams>.

PhD Students

Year One

- Decide whether to pursue a career in industry or academia by attending a workshop held by the Engineering Career Development and Experiential Learning Center.
- Begin your resume or CV by attending a workshop.
- Begin considering what other application materials will be needed for your future career and begin developing these. For example, a career in academia will require a teaching statement, research statement, dissertation abstract, and letters of recommendation among others.
- Develop your LinkedIn Profile.
- Join and participate in professional associations, engineering student societies, or other student organizations.
- Pursue fellowship opportunities.
- Prepare a timeline for degree completion.

Year Two

- Learn your program's policy on dissertation committee members and start forming your committee. Learn doctoral degree requirements and dissertation information by visiting www.umass.edu/gradschool, and clicking on Current Students.
- Update your resume and CV.
- Update your LinkedIn Profile.
- Continue developing any application materials.
- Pursue fellowship opportunities.

Year Three

- Make sure you are clear on dissertation formatting.
- Update your resume and CV.
- Update your LinkedIn Profile.
- Continue developing any application materials.
- Reach out to alumni from your department that are working in academia or industry. This is a great way to network and also a resource for job search advice.
- Consider presenting your research at an academic conference and network with colleagues from other institutions.
- Pursue fellowship opportunities.
- Note any academic or industry deadlines for next year. Many academic deadlines occur in the fall of your final year.

Year Four or Last Year

- Polish your application materials including your resume, CV, and any additional materials.
- Reach out to alumni from your department that are working in academia or industry.
- Consider presenting your research at an academic conference and network with colleagues from other institution
- Make sure you are aware of all dissertation and graduation deadlines.

CAREERS IN ENGINEERING

An advanced degree in engineering opens doors to many career paths, both traditional and non-traditional. The following resources will help you understand and pursue the path that is right for you.

Research

Will you focus on basic research or more applied research? At a university, government lab, research institute or industrial lab? In a tenure-track faculty position, or as adjunct research faculty? As a faculty or staff member who manages a research lab, center or institute?

To find organizations conducting cutting-edge research in a particular area:

- Confer with your thesis advisor and/or committee members
- Look up and contact presenters and others who attend conferences in that field
- Search academic journals, trade magazines and Google Patents by relevant keywords
- Search alumni directories and LinkedIn using relevant keywords

To change your research focus, build your network and knowledge of your intended subject area. In this case, your transferrable competencies, such as the methods, tools and equipment you have used, may be more valuable and relevant assets than your expertise in a narrow specialty.

Product Development

Do you want applied (product-oriented) research, product design or development? Applications engineering to help customize products to customers' specific needs? Manufacturing? At what size company? Who are your customers/clients?

Gather information, advice and make connections through:

- Career Insider/Vault—<http://www.careerinsider.vault.com>
- The Engineering Career Center job board—UMass.JoinHandshake.com
- Participation in recruiting events such as Corporate Information Sessions, Technical Talks, Career Fairs and Professional Conferences
- Connecting with Alumni through the UMass Alumni Association. <http://goo.gl/tasefv>
- Networking with other professionals through LinkedIn or other social media.

Ask yourself (and others!), “Who would benefit from my specific knowledge and/or transferrable skills?” For instance, if you have ideas for improving equipment you’ve used in your research, contact your equipment supplier. If your research project has potential to become a product, consider participating in the UMass Innovation Challenge <http://www.umass.edu/innovation>.

Whether choosing between academia, a national laboratory/research institute, or industry, the following factors can help you to find the right fit for you.

Factors to Consider	Academia (Faculty)	Industry	Hybrid (National lab, Research Institute)
Functionality (day-to-day activities)	Writing (grants, publications, reports), Directing/Over-seeing research, Supervising graduate students, Teaching	Development of new products or processes, trouble-shooting, data analysis, report-writing	Basic Research, Supporting others' research efforts such as instrumentation, data analysis, trouble-shooting, or training. Some grant & report writing
Collaboration vs. individual contribution	Mainly individual contributions, (published research or awards). Some collaborative research grants and shared governance	Collaborative	Collaborative
Pace of work	Slower paced	High paced, deadline-driven	Steady, with some intense periods
Salary	Moderate (based on 9 month appointment)	Somewhat higher for entry level. Possibility of substantially higher over time with stock options	Somewhat higher than academia for entry level. Based on 12 month appointment
Reach	Research is aimed at “moving science forward”. Faculty have strong impact on future engineers through mentoring and teaching.	Work on cutting-edge products and processes.	Strong emphasis on performing high-impact research
Flexibility	Extremely flexible	Least flexible. Very deadline-driven	Somewhere between academia and industry in terms of flexibility
Stability	Extremely stable	Least stable-linked to economic factors	Stable, but linked to federal budgets
Spousal Career	Can be challenging	Usually not a consideration	More responsive to spousal career issues than academia

THE ACADEMIC CAREER

Academic jobs are quite competitive, and most colleges and universities will expect that a new faculty will have done a post-doctorate position before applying. As a new faculty member, you will spend a good portion of your first year starting up your research program. This will involve ordering equipment, supplies, and computers, and getting them set up in the space that has been allocated for your lab and office. Depending on the condition of that space, you may need to supervise some cleaning or renovations. You will need to put a lot of focus on recruiting and training your first batch of graduate students; somewhere between 1 and 3 students is the usual number depending on your startup support agreement. Keep in mind that these are the students that will be carrying out the research work that does (or does not) lead to your tenure, and they are relying on you to set an example and show them the right way to do research. Once you have some things operational, you should focus on getting results that can be used as preliminary data in grant proposals and/or in manuscripts for publication. As you transition into the second year, there will be less hands-on activities and one-on-one supervision, and more writing (proposals and papers) and general supervision. Of course teaching will be a big part of your life from Day 1. But you should have a reasonable teaching load based on the high research expectations. Look for tips (e.g. from workshops, literature, informal talks with colleagues) to be an effective and efficient teacher. Don't try to be a perfect teacher – putting more than 10-15 hours per week into teaching will only make you a marginally better teacher, and it will start to hurt your research program, which is the primary thing that you will be judged on.

As a tenured faculty working in a research-intensive institution, I spend a huge fraction (as much as 75%) of my time writing. I write proposals to get research grants, manuscripts to be published as papers in archival journals, research reports to grant agencies, reviews of manuscripts for journal editors, reviews of proposals for program officers at grant agencies, abstracts for conference talks/seminars, reference letters for students and peers, and emails to just about everyone. I also spend a lot of time interacting with students in one way or another. I meet weekly (or more frequently) with each of my graduate students to advise them on research, and I have at least 5 hours of direct contact time per week with students whom I teach or advise (including class time). When not writing or meeting with students, I am generally doing some type of reading/planning/preparation work associated with research or teaching. I very rarely “do research” myself anymore. I rely on my graduate students as the “hands” that get things done, e.g. writing and running codes, building and conducting experiments. I am more like the coach or boss who guides and supervises. This is different from the beginning of my career, when I did more hands-on things.

Individual Contributions

Academia really values **individual contributions**. As a faculty member you pursue a self-directed research

program and become known in your global “research community” for having certain expertise and making certain contributions to knowledge, usually reported in peer-reviewed archival journals and/or conference talks. You also develop a local reputation with students based on your teaching ability or other contributions to student life. In fact, success in academia is largely measured by the impact of your individual contributions in research and teaching. While academia is an arena where you can choose to focus almost exclusively on individual contributions, it is becoming less easy to do so. An increasingly large fraction of research grant funds at certain agencies is targeted for “grand challenge” or team-based projects, where you need to partner with scholars that have complementary expertise. The departmental, college, and university structures also require that faculty work together collaboratively to a certain extent (team-teaching, committee work, faculty governance, etc.).

Pace of Work

Although academics work hard, the **pace of work** in academia is generally considered to be quite slow. This may have its roots in the “apprenticeship” model where graduate students do research under the guidance of a faculty member. The point is not just to get the research done, but also to have the student learn by doing it. In addition, academic research by nature focuses on creating something new or novel; this often requires a period of struggle by the student (or faculty member!) to make a creative breakthrough.

Salary, Stability, and Flexibility

A successful academic career will generally make you financially comfortable but not amazingly wealthy. The typical model is that the university provides a **salary** based on 9 months, which you can supplement with up to 3 months worth of “summer salary” from your external research grants. The median 9-month salaries for full professors in 2011 ranged from \$130-147K based on field (ASEE data). A rare “superstar” who brings in millions of dollars of research money every year, or a higher-level administrator (Dean or above), might make \$300-500K per year. But you can't beat the **stability** of a tenured faculty position; the firing of a tenured faculty member is rare (only 2% per year across the nation, according to the NEA) and would typically involve gross misconduct or incompetence. Faculty positions probably provide the most **flexibility** of any job. You are judged much more on the outcomes of your research and teaching than on the time put in. Other than classes or office hours, there are really no times when I am required to be in any specific location. Working from home, or at odd hours, is quite common. The flip side is that you have to maintain a strong sense of discipline and self-direction. An average of 50-55 hours of good, focused work is typically cited as the weekly load for a faculty member. Considerations of a **spousal career** can be a huge factor. Universities are often in somewhat

remote locations, far from industry or other universities. It is especially difficult when your spouse is looking for an a faculty position as well; this is certain to reduce your options, perhaps drastically, even if you are both highly competitive candidates in your own right. The good news is that universities are becoming more sensitive to this issue, and most now have a formal process for facilitating spousal hires.

Reach

In terms of **reach** or impact, a faculty position is unique. You directly influence the research careers of dozens of graduate students. Less directly, you impact the careers of hundreds or thousands of other students who you teach in class or advise. So you will have the chance to change lives for the better, and have your life changed for the better.

You will remember some of these students and their stories all of your life, and vice-versa, which can be tremendously rewarding. You also get the satisfaction of seeing your work appreciated in your global “research community” through citations of your papers and invitations to give talks at conferences or seminars at other universities. If you are highly motivated by seeing your work used on a grander scale, a faculty position is not your best bet because it is still somewhat rare to see an academic research discovery turn directly into a commercially successful product or process. Being familiar with a range of analytical techniques and a having breadth of knowledge is key for the engineering consultant.

Thanks to Professor David Ford, Associate Dean of the College of Engineering, for his contribution to this section.

INDUSTRIAL CAREER PATH

There is a distinct difference between M.S. and Ph.D. level jobs in industry. I will give some brief comments about M.S.-level engineers. However, the focus of this section will be on Ph.D.-level engineering jobs.

M.S.-Level Engineering Jobs

While some industry positions require an M.S. degree, most B.S.-level positions will consider a M.S.-level engineer. Generally, the job description will say, “B.S. degree required, M.S. preferred”. The preference is due to the increased specialized knowledge gained through the additional courses along with any research or hands-on experience. M.S. degree candidates generally earn an additional 10K over those of their B.S. degree counterparts. They may also have a larger degree of responsibility or less supervision. However, the functionality will be very similar to the B.S. degree engineers.

Ph.D.-Level Engineering Jobs

Industry jobs for Ph.D. engineers generally fall along two basic areas: Research & Development or Consulting. Within the R&D arena, Ph.D. engineers are hired based on their expertise in a specific area, project management, problem-solving, and analytical skills, as well as their ability to do independent, higher-level work such as developing new processes or products. In addition to in-depth knowledge of a specific field, Ph.D. engineers are hired for their skills and competencies and are expected to work on complex, ambiguous problems. Therefore, both depth and breadth of knowledge is desired and expected at the Ph.D. level. **Functionally**, a day in the life of a Ph.D. engineer at an R & D facility may look very similar to Ph.D. in academia—consisting of research, writing papers, and attending conferences. One of the main differences, however, is the type of research being done. In industry, research is tied to products or processes that the company is producing. The idea is to develop new products or processes that can add value to the company and affect the “bottom line”.

Ph.D. students looking to enter industry should consider the practical applications of their research and seek to communicate to recruiters how their research could bring value to the company.

The consulting industry provides services to find solutions and supply expert advice in a specific field to paying clients. Therefore, consultants have the opportunity to tackle a diverse set of problems as they arise. For example: The ASME website describes a typical problem encountered by a Ph.D. consultant that was hired by an athletic shoe company based on his “expertise and familiarity with the failure modes of polymers and how they handle stress under impact conditions”. The role of the consultant was to “investigate why some fluid-filled, shock-absorbing shoe components were failing”. The research resulted in a novel, patentable shoe that was brought to market. Much of the work done at this level requires the ability to evaluate different approaches or solutions to problems, and to draw on one’s expertise so that the work is done quickly and effectively.

Collaboration

Whether in a consultant or R&D role, Ph.D. engineers must be able to **collaborate** with a broad range of people from diverse backgrounds, cultures, and languages. They must be able to effectively communicate their ideas both orally and in writing. This includes technical presentations and reports, memos, brainstorming sessions, etc. In industry, the Ph.D. engineer will often need to convince colleagues or clients of the value of their solution or idea. The audience may include other engineers or scientists, or someone who does not have a technical background at all. One constraint mentioned by practicing engineers is the high degree of collaboration needed around scheduling meetings. In the current world-economy, a conference call may include participants from four different time zones. Consulting engineers must stay in contact with their client, making sure that all expectations are being addressed

and adapting quickly to changing needs and priorities. Generally, the Ph.D. engineer is the Project Manager with a team of junior engineers working together through brainstorming sessions, collaborative design solutions and technical report development.

Pace of Work

The **pace** in industry is generally much faster than in either academia or at a national lab. Products go to market quickly and are usurped by other products with improved features. Engineers at the Ph.D. level, especially in R & D, will encounter pressure to come up with the “next new idea” that will keep corporate profits increasing. Consulting is driven by billable hours, so engineers are heavily accountable for their time. In addition, trouble-shooting problems could be tied to law suits or IPOs that have strict deadlines.

Salary

Salaries for Ph.D. engineers working in industry tends to be higher than those in academia over the long-run. While entry-level salaries for Ph.D. engineers in industry average around \$128,000, they vary greatly by major, area of the country, and industry type. In addition to basic salary, compensation can also include benefits such as 401k, vacation and sick time, and oftentimes, ownership share in the company (stock). Compensation can also vary greatly over time as some Ph.D. engineers choose to stay in a more technical role, while other move into more of a management or business track. Consultants usually make the most money overall, however, the income is tied to the number and level of contracts they are getting.

Stability

Industry offers the **least stable** option for Ph.D. engineers. Factors such as the economy, company workload, outsourcing, supply chain issues, and government regulations can all affect the ability to hire and retain Ph.D.-level engineers.

Flexibility

There is generally **less flexibility** in industry than in academia or at a research laboratory. Within industry, time is money and employees are expected to add value by being results-driven. This mindset translates into an expectation that employees at all levels will work efficiently and effectively.

Spousal Career

Spousal career is generally not considered in the industrial job search. Unlike many academic positions that are located in remote areas, industry jobs at the Ph.D. level tend to be in more developed areas where job opportunities are more readily available.

Reach

In terms of **reach**, Ph.D. engineers working in industry have the opportunity to work on cutting-edge products and process that have may have a global impact. Many engineers at this level are tackling some of the most pressing problems, with national and international implications.

Thanks to Polina Razina, Ph.D. polymer scientists at 3M, and Cheryl Brooks, Director of the UMass Engineering Career Center for their contributions to this section.

NATIONAL OR RESEARCH LAB

Functionality

The **functionality** and day-to-day activities at a national laboratory depend in part on what type of role you have. As a graduate student, you may have been exposed to instrument scientists, scientists who run large facilities for outside users. While there are a number of instrument scientists at national laboratories, there are also scientists who focus almost exclusively on research. If you are an instrument scientist or in another role that involves a user facility, you may spend 25%-50% of your time supporting users. This can mean helping users with training, planning experiments, conducting experiments, analyzing data, and just hosting users in general. You may also be involved in trouble-shooting instruments while users are visiting the lab, which may be 10% of your time but may be very stressful, since you may need to come in after-hours or on the weekends. Much of the remainder of your time, or nearly all of your time if you are not an instrument scientist, will be spent on research and writing. While there is not as much grant-writing as there is in an academic position, there is still a significant amount of grant-writing and report-writing involved in a national laboratory position. Writing research publications is also quite important, and

there is an emphasis on high-impact, collaborative work. As compared to being in a faculty position, I find that scientists in national laboratories do more of the research themselves, as opposed to directing a research group as you would in academia. There is also a larger emphasis on collaboration, so there are many more informal and formal meetings among colleagues to discuss research. Finally, I would say that the record-keeping, safety training, and meetings with higher-level management take up more time in a national laboratory position as compared to an academic position, perhaps taking up as much as 10%-15% of your time.

Collaboration

Many groups in national laboratories emphasize **collaboration** far more than academic environments. There is a much greater focus on making sure that research is both high-impact and in line with the mission of the laboratory. Your contribution to the reputation of the laboratory as a whole, and how well your work is integrated into the mission of the lab, is quite important. In general, I have found that this leads to a more collegial environment than academia. However, some scientists I know have expressed concern that this type of environment may limit their own

professional development and opportunities to advance, and that it is difficult to develop the kind of individual external reputation that you would as a scientist in academia. As compared to academia, you may have fewer opportunities for travel to conferences to promote your own work and network with colleagues in your field.

Pace of Work

The **pace of work** at a national laboratory tends to be quite steady, with some periods of very intense work. As compared to academia, research tends to get done more quickly, because there is less of an emphasis on training new researchers. Again, if you are an instrument scientist or in a position where you are supporting users, you may have an instrument problem arise that needs to be dealt with immediately. There are also periods of time when new, complex facilities are being designed and built, and these times can be very intense with significant time pressure.

Salary

In terms of **salary**, compensation at national laboratories tends to be very good. It can be as good as industry, and is typically better than academic salaries. However, it is important to keep in mind that academic salaries are typically on a 9-month basis, while industry and national laboratories are on a 12-month basis. Additional benefits at national laboratories also tend to be quite good.

Stability

Stability also tends to be quite good in national laboratories. The mission of the lab will typically remain similar over periods of 5 years or longer, so you do not have to worry about the focus suddenly changing, as you may have to in industry. While there are always concerns about the federal budget for national laboratories shrinking, there is typically some time given for the lab to adjust to new budgets.

Flexibility

Flexibility of national laboratory positions are probably intermediate between academia and industry. Because you will likely be a government employee or government contractor, you will be more accountable for your time than you would be in a typical faculty position, and you will usually have to complete some sort of formal record of your time. However, there is a great deal of flexibility in how

you spend your time. There is a general understanding that research is not something that can be easily “tracked,” and that you will need to spend a great deal of unscheduled time reading, writing, meeting with colleagues, and discussing research ideas. As noted above, if you are in a position where you support users, there will be times when you have very little flexibility in your schedule—particularly when the users are having problems, you will need to be present or “on-call”. Many laboratories also have formal policies that allow “flex-time” when needed.

Spousal Career

National laboratories seem to be much more responsive to **spousal career** issues than academia. I know of a number of scientists at national laboratories whose spouses have also been offered positions at the labs. While some laboratories are in remote locations where there are few opportunities outside of the lab, there seems to be a general recognition that in order to attract the best talent, the labs must deal with dual career couples appropriately. This just seems to be more a part of the culture at national laboratories than in academia. Some of this may stem from the more collaborative nature of the lab environment. There is also the fact that the management at labs have input into hiring decisions, while upper administration in academic settings have limited influence over individual hires.

Reach

In terms of **reach** or impact, there is a strong emphasis on performing high-impact research. Thus, you may have the chance to see your research featured in a high-impact publication, or to know that you are working to design a new facility that is truly unique and world-class. Because there is less of an emphasis on training researchers than in academia, you will not have as much direct influence over guiding students and young researchers as you would in academia. As compared to industry, you may also not have the chance to see your research directly impact a product or process. Thus, in terms of appreciating the reach of your work, you have to take a long view and realize that your collaborative research contributions are helping to move the field forward.

Thanks to Professor Surita Bhatia, who holds a joint position at SUNY Stonybrook and Brookhaven National Lab, for her contributions to this section.

CRAFTING YOUR CV

WHAT IS THE DIFFERENCE BETWEEN A CV AND A RESUME?

The curriculum vitae (also referred to as CV or vita) is a comprehensive record of your scholarly credentials, research and teaching experiences, and has no limitations in length. It is used in academic or research settings to apply for jobs, tenure, grants or fellowships.

A resume, on the other hand, is a concise (1-2 pages) and selected summary of your most relevant skills and experiences as they relate to a particular employer's needs. The language, value system, and format of a resume differ from an academic CV and align more closely with the position and company to which you are applying.

For an academic position, your CV's job is to convey—in a clear and readable format—your educational background, your research and teaching experience, your publications and presentations, and your honors and awards. There may also be additional sections, depending on your field and professional experience.

In addition to presenting factual information about your educational and professional accomplishments, your CV has the potential to convey much more. For example, it can indicate that your focus is research, or that you are teaching-focused. In this way, you can also communicate that your focus and the focus of the institution to which you are applying are the same. How? First, the order of the sections is key. If you place the teaching section before the research section, or vice versa, that will communicate to the hiring committee that you share their priorities in respect to teaching and research. If you apply to a variety of institutions—i.e., both liberal arts colleges and research universities—it is strategic to develop multiple versions of your CV.

How do you want to describe your teaching experience? This is another way that you can communicate that you share an institution's priorities and that you understand the role. One Ph.D. student who was applying for adjunct positions found that department chairs were more responsive when she rewrote her teaching section to include detailed descriptions of what she did in the various teaching roles she had held. Someone applying for a position that emphasizes research, however, might find greater advantage in keeping their teaching section very straightforward.

If you have unique accomplishments, skills, credentials, or experiences that are absolutely required for the academic position to which you are applying, they *must* go on the first page. For example, if the job description emphasizes that candidates must have a proven record of securing grants and you have already experienced successes in this area, it is essential that you convey your own funding record on the first page. Again, the key is to emphasize those aspects of your experience that align with the requirements for the position in question.

When it comes to CV design, typically hiring committees prefer a simple, classic, clean look. Unusual fonts and formatting are generally not well received. However, a clear and easy-to-read format will enhance any CV. Take the time to look at several CV formats. Draw inspiration from the ones you like best.

CV Headings

There is not a single set of headings that would be right for every Ph.D. student or postdoc. Rather, base your decisions about which headings to include on conversations with faculty and colleagues in your field; perusal of colleagues' CVs and CVs of faculty in your field; job descriptions for the positions to which you are applying; and your own experience and strengths. The suggested headings that follow are general ideas, organized loosely by category, to get you thinking about which headings would enable you to most effectively convey the value you would bring to a college or university:

- Education, Education and Training
- Certifications, Licensure
- Dissertation, Dissertation Research, Thesis
- Research Experience, Grant-Funded Research, Related Research
- Teaching Experience, Teaching and Mentoring, Teaching and Advising, Instructional Experience
- Honors, Awards, Fellowships, Research Funding
- Industry Experience, Related Professional Experience, Work Experience
- Publications, Presentations, Conference Presentations, Invited Talks, Book Chapters, Published Abstracts
- University Service, Academic Service, Professional Activities, Committee Work, Referee Services
- Media Coverage
- Volunteer Experience, Leadership Activities, Community Engagement, Scholarship in Action
- Professional Development, Continuing Education, Training, Institutes
- Related Experience, Additional Experience, Languages
- Professional Affiliations, Memberships
- References

A word about document length: More pages are fine. In particular, do not truncate relevant experience or publications in order to “save space.” It can be helpful to have a header or footer with your last name and the number of pages (i.e., Name, page 3 of 5).

Adapted with permission from Stanford University's Stanford Ph.D. & Postdoc Career Guide.

SAMPLE Ph.D. CV - PAGE 1 OF 3

Ali Turani

Department of Civil Engineering
University of Massachusetts, Amherst
140 Main Street, Amherst, MA 01002
(413) 545-4400 aturani@umass.edu

EDUCATION:

- | | |
|---|-----------------------------|
| <p>University of Massachusetts, Amherst, MA
PhD in Structural Engineering and Mechanics
Cumulative GPA: 3.97/4.0
Advisor: Professor Sanjay R. Arwade</p> | <p>Expected Summer 2019</p> |
| <p>Sharif University of Technology, Tehran, Iran
MSc in Hydraulic Structures Engineering
Cumulative GPA: 3.41/4.0
Advisor: Professor Mohsen Ghaemian</p> | <p>June 2008</p> |
| <p>Iran University of Science and Technology, Tehran, Iran
BSc in Civil Engineering
Cumulative GPA: 3.27/4.0</p> | <p>June 2006</p> |

RESEARCH EXPERIENCE:

Graduate Research Assistant, University of Massachusetts, Amherst 2011 - Present

Structural Application of Metal Foams Considering Geometrical and Material Uncertainty

The performance of metal foams in structural applications was investigated through analytical and experimental methods. Material variations were included through probabilistic analysis to evaluate their influence on member behavior. The research addressed multiple buckling modes of thin walled shapes and channels made from steel foam, restraint of steel tube buckling through steel foam filler and the performance of hybrid steel/steel foam braces as a hysteretic damper for seismic energy dissipation.

Research included the following:

- Variance decomposition and Monte Carlo simulations were implemented to address global sensitivity and uncertainty analysis. Parametric studies included the effect of input distributions and various sampling methods.
- Optimization analysis was completed of sectional shapes to resist buckling failure modes.
- Compression and bending capacities of members were evaluated through eigenvalue and plastic collapse analysis using finite element programs. Results were compared to Finite Strip Method (CUFSM) when appropriate.
- Dynamic time history analysis of structural frames including hybrid metal foam braces as hysteretic dampers within the lateral load resistance system were completed.
- A combination of ADINA and MATLAB was used for all simulations. MATLAB code for simulations and batching of ADINA files was developed.
- Experimental materials testing was performed to evaluate tension, compression and bending characteristics of steel foam materials to determine applicability of existing ASTM test methods to steel foams. Results were used to address the variability of material properties in simulation modeling.

Through this research it was determined that steel foam, when applied correctly, can significantly improve the strength and ductility of thin-walled sections, channel sections and steel tubes. Dynamic response of a structure can be effectively controlled by hybrid steel/steel foam bracing if the strain demand of metal foam can be satisfied.

Results of the research have been reported in four journal publications (2 published, 1 accepted, 1 submitted) and four conferences (1 published proceeding, 2 published abstracts, 1 accepted)

Graduate Research Assistant, Sharif University of Technology 2007-2009

Foundation Effect on Seismic Response of Concrete Arch Dams Including Dam-Reservoir Interaction

Analysis of concrete arch dams was completed to investigate the effects of wave propagation in the foundation on the overall dynamic response of the dam. The Amirkabir dam, one of the largest arch dams in Iran, was used as the case study.

Research included the following:

- Direct time domain procedure was utilized to complete the dynamic linear analysis of the three-dimensional reservoir/dam/foundation system.
- A finite element program was developed using Visual Fortran to model the system with appropriate lumped dash-pots boundary condition.

Through this research it was found that the effect of a massed foundation with radiation damping reduces the seismic response of a concrete arch dam.

Results of the research have been reported in one journal publication and one conference proceeding.

SAMPLE Ph.D. CV - PAGE 2 OF 3

Turani

TEACHING EXPERIENCE:

- Graduate Teaching Assistant, University of Massachusetts, Amherst** 2013-Present
Instructor: Prof. Thomas J. Lardner
- Teaching Laboratory Sessions for CEE241-Strength of Material: Responsibilities included lecture instruction related to the laboratory material, preparation and setup for laboratory sessions, supervision of laboratory, holding regular office hours and grading of laboratory reports.
- Guest Lecturer, University of Massachusetts, Amherst** 2013
Instructor: Prof. Sanjay R. Arwade
- Teaching of 4 sessions of CEE630-Advanced Solid Mechanics
- Graduate Teaching Assistant, University of Massachusetts, Amherst** 2012
Instructor: Prof. Ching S. Chang
- Teaching of ADINA for CEE/MIE605 - Finite Element Methods through lecture and help sessions.
- Lecturer, Ardakan Azad University, Yazd, Iran** 2009-2011
- Teaching of Structural Analysis: Responsibility included lectures, assignments, office hours and grading.
- Graduate Teaching Assistant, Sharif University of Technology, Tehran, Iran** 2009-2011
Instructor: Prof. Mohsen Ghaemian
- Teaching Assistant for Finite Element Methods: Responsibilities included grading of assignments, office hours and help sessions related to the courses.

WORK EXPERIENCE

- Consultant Engineer, Opal Co., Tehran, Iran** 2008-2011
- Responsible for analysis, design and development of contract documents for projects including the following:
 - 40,000 square foot barn including steel moment frame lateral resisting system. FEMA specifications were referenced for gravity, snow, wind and earthquake load. Used SAP2000 for modeling and designing the moment frames, MATHEMATICA to design different connections, and AUTOCAD to draw the details.
 - Hydraulic structures of 400 ft tall gravity dam with reservoir capacity of 160,000 acre-ft. Investigated possibility of changing dam structure from conventional gravity dam to RCC dam. Visited dam site to identify potential dam construction problems.
 - Designed spillway and culvert of the Shafarud Gravity dam based on ICOLD recommendation. Used CADAM and ANSYS and determined RCC design was more economical and practical than conventional gravity dam.
 - Designed, analyzed, and detailed the hydraulic structures of two embankment dams.
 - Calculated the permeability of Silve and Korzan embankment dams using PLAXIS and Z-SOIL. Designed the hydraulic structures including side channel spillways and culverts based on ICOLD recommendation.
 - Projects included supervisory role of up to 30 engineers and draftsmen.
- Research Engineer, Earthquake Engineering Research Center Sharif University of Technology, Tehran, Iran** 2009-2011
- Designed instrumentation and evaluated recorded data in dynamic vibration test of structural models and building components on a 4m x 4m shaking table. Worked with company supervisor and researcher to determine parameters of design.
 - Carried out shaking table tests at large-scale structural testing laboratory using the two-directional shaking table. Investigated dynamic behavior of a scaled one story masonry building, one and four story sandwich panel building, electronic panels, earthquake alarms, and a scaled gravity dam monolith. Conducted sine-sweep system identification test, scaled real earthquake load and free vibration test on the models. Measured displacement and acceleration of the desired location in the model recorded by different gauges. Used MATLAB, SeismoSignal, NONLIN to evaluate the measured data.
 - Evaluated the dynamic performance of different structures or components like cracking location, story drift, modal properties, etc. and verified the experimental result using numerical modeling.
 - Submitted technical reports including all the evaluated data and figures to the company or researcher working on the projects. Primary responsibility for writing (in English) research reports for submission to the supervising company or researcher. Reports resulted in many journal and conference publications prepared by the lead researcher. Revised the laboratory manual used by civil engineers.
- Engineering Intern, Tarh Haftom Co., Tehran, Iran** 2005
- Analyzed and evaluated data collected from traffic surveys of the 100 km Tehran-Karaj subway using Fortran 90 and Excel.
 - Determined the subway line with both highest and lowest demand.
 - Completed the evaluation as part of a larger study to determine need for extending the Tehran subway system.

SAMPLE Ph.D. CV - PAGE 3 OF 3

Turani

PUBLICATIONS

- Turani, A. and Arwade, S.R. "Using metal foams in the structural braces as a hysteretic damper". Submitted to *Engineering Structures*.
- Turani A and Arwade, S. R. "Improving Buckling Response of the Square Steel Tube by Using Steel Foam" *Structural Engineering and Mechanics* 51:1017-1036 (2018) Accepted
- Turani, A., Arwade, S. R and Schafer, B. W. "Computational evaluation of limit states of thin-walled channels made from steel foam" *Thin-Walled Structures*, vol 62, 2017 (206-214).
- Arwade, S.R., Turani, A. and Louhghalam A."Variance decomposition and global sensitivity for structural systems". *Engineering Structures*, 32(1), 2014 (1-10).
- Ghaemian, M., Noorzad, A. and Turani, A. "Foundation effect on seismic response of concrete arch dams including dam-reservoir interaction". **Journal of the European Association for Earthquake Engineering**, n-3, 2009 (49-57).

CONFERENCE PROCEEDINGS AND PRESENTATIONS

- Turani, A. and Arwade, S.R. "Limit States of Thin-Walled Channel Made of Steel Foam" Engineering Mechanics Institute, 2016. (Submitted)
- Turani, A. and Arwade, S.R. "Uncertainty of the Strength of Composite Steel Foam-Steel Tubes" Engineering Mechanics Institute, Los Angeles, CA, Aug, 8-11, 2014. (Abstract)
- Arwade, S.R. and Turani, A. "The use of variance decomposition in dimension reduction for stochastic structural systems". In Proceedings of the 10th International Conference on Structural Safety and Reliability, September, 2013, Osaka, Japan. (Full Proceedings)
- Arwade, S.R. and Turani, A. and "Analysis of uncertainly in structural systems using the Sobol decomposition". First International Conference of the Engineering Mechanics Institute of ASCE. Minneapolis, MN, May, 18-21, 2012. (Abstract)
- Turani, A., Noorzad A., and Ghaemian, M., "Effect of Foundation Mass and Shape In 3-D Time Domain Dynamic Analysis of Concrete Arch Dams", First European Conference on Earthquake Engineering and Seismology September 3-8, 2010- Geneva, Switzerland. (Full Proceedings)

PROFESSIONAL AFFILIATIONS

- American Society of Civil Engineers (ASCE)
- American Institute of Steel Construction (AISC)
- American Concrete Institute (ACI)
- Earthquake Engineering Research Institute (EERI)
- Precast Concrete Institute (PCI)
- Iranian National Committee on Large Dams (IRCOLD)

COMPUTER SKILLS:

- *Simulation Software:* MATLAB, C++, Visual Fortran, Pascal Programming
- *Civil Engineering Software:* ADINA, ABAQUS, ANSYS, PLAXIS, Z-Soil, SAP2000, ETABS2000, SAFE2000, AutoCAD
- *General Software:* Microsoft Office (Word, Excel, PowerPoint, FrontPage, Access)
- *Earthquake Engineering Software:* SHAKE, EERA, NONLIN, NERA, PITSA, SeismoSignal

LANGUAGES:

- Fluent in English, Farsi and Arabic

ACTIVITIES & INTERESTS

- Ice-Skating (Certified by US figure skating for Basic Skills)
- Snowboarding
- Piano
- Travel

ADDITIONAL APPLICATION MATERIALS FOR ACADEMIC POSITIONS

Depending on the position for which you are applying, you may be asked to include one or more of the following documents as part of your application.

Research Statements

Research statements may vary quite a bit from one discipline to another. Your advisor and other faculty members in your department are wonderful resources in this area. Length of a research statement may vary from one job application to another and across fields; typically, they will range from one to five pages.

However, what most research statements do have in common is that they address four primary areas: the context

and significance of your work, the educational and research foundation you bring to your work, your current and/or dissertation research, and your research plans for the future.

Striking the right balance in your research statement can provide a special challenge. Keep in mind that a hiring committee will almost certainly include faculty members who are not specialists in your precise subfield. Help them quickly grasp what you study and why it matters.

When you are writing about your research plans for the future, you may describe both your short-term research goals as well as broader ideas for long-term goals. These descriptions might include plans for funding or for future collaborations. Ensure that your research plans are in line

Focusing Your Research Statement: Questions to Consider

When writing research statements for postdoctoral and faculty job applications, it is important that you pay close attention to your audience and the context of the “conversation” in which your statement is engaging with its readers. Research statements are more than a description of your research: in reading your statements, your readers will consider whether your research topic, your qualifications, and the significance of the work match the mission and interests of the institution and fulfill the expectations of the position. Use the following questions to help write in context of the institution and job. In many cases, you’ll need to adjust and frame your research for each application.

1. Identify the context of research in the institution: Circle all references to “teaching” and “students.” Then underline references to “research” or “publication.” Usually the number of repetitions of these key words (or similar terms) in the job description signals the priorities of the institution. What type of university or college is it? Are you applying to a liberal arts institution that emphasizes teaching and desires some scholarly research activity? Or a research institution that encourages a strong publication record or research commitments? Alternatively, is there an interest in a balanced commitment to teaching and scholarship?
2. Have you shaped the narrative in your research statement based on the priority of the institution? Although research is encouraged, liberal arts colleges and universities usually look for faculty who seek to be teachers: A research narrative for this position might tie future scholarship and significance of the research to its ultimate effects on teaching.
3. Communicate the need for your current (or last few) projects as clearly and as early as possible: Why is there a need for your research? Why should they care about the research? Think of concrete examples that highlight the need or problem in the field.
4. Communicate your research objectives and methodology as clearly as possible: What is your research about? How will you conduct your research? If relevant, how does your research fit the interests of the department or the program?
5. Communicate your qualifications as clearly as possible: How does your research support your continuing intellectual development as a scholar or researcher? What related publications have you written and what related research have you conducted? If relevant, how are you prepared to conduct and successfully complete the research?
6. How will your research contribute new knowledge to the discipline or more broadly to the field? Think of examples that might explain the potential impact of your work or the important questions it raises for future researchers.
7. Review the language you are using in your statement so that it is understandable to non-specialist audiences. Are you minimizing the use of jargon? Describe your research without jargon if you can.
8. Did you provide a clear “story” of your research or scholarly interest that connects the past and present to future research goals?

Adapted from Stanford University's Hume Writing Center's workshop writing kit: "Writing Research Statements for Graduate Student Fellowship and Grant Proposals."

with what the institution to which you are applying can offer in terms of support (space, technology, funds, and so on) and that institution's mission and priorities. If you are applying, for example, to both large research institutions and small liberal arts colleges, you would likely have two different versions of your research statement to send. If involving undergraduates in faculty research is a priority for a certain institution, you can explain how you would involve undergraduates in your research.

Always take some time to step back and look at your research statement in the context of the other materials you are sending. You want these materials to work together to provide a rich and coherent understanding of who you are and how you are a fit for a particular institution, department, and position.

**Whenever you teach or TA a course,
save your student evaluations!
They will come in handy later to jog
your memory, remind you of your
strengths, and provide feedback
for how you can grow and
develop as a teacher.**

Teaching Statements

Sometimes called a Statement of Teaching Philosophy, this document—typically one to two pages—is where you bring your teaching to life for the search committee. Getting started is often the hardest part of writing a teaching statement.

The best teaching statements convey your passion for teaching and include specific examples. Sometimes applicants think that “teaching philosophy” means they are supposed to only describe their theories about teaching. On the contrary, your statement should convey your values about teaching and students through evidence, anecdotes, and examples. Paradoxically, the more invested you are in teaching, the harder it can be to develop your teaching statement. Start early, write multiple drafts, and do not hesitate to seek another perspective from your faculty advisor.

Dissertation Abstract and/or Writing Sample

Generally, this is an area where support from your advisor and department is very helpful. Naturally, the conventions of your particular field, along with your understanding of the position and the department's priorities, will provide the foundation for your decisions regarding these materials.

Evidence of Teaching Excellence and/or Sample Syllabus

In many cases, your teaching statement, CV, and cover letter will be the primary vehicles for conveying your teaching experience, accomplishments, and approach. Occasionally, you may be asked to supply what is sometimes called “evidence of teaching excellence,” and in some cases, a sample syllabus. Application materials vary by field; investigate what is typical in your field by speaking to faculty and Ph.D. alumni from your department.

Whenever you teach or TA a course, save your student evaluations! They will come in handy later to jog your memory, remind you of your strengths, and provide feedback for how you can grow and develop as a teacher. In some cases, you may want to explore the possibility of also saving student work (consult with your department to find out what is acceptable). Even if you never actually show your teaching portfolio to a committee, having a record in one centralized place can be helpful both in preparing for interviews and in your own professional development as someone who plans to continue teaching.

If you find your “dream job” at an institution that places special value on teaching and your own teaching experience is not quite as substantial as you might like, you may want to consider developing a sample syllabus for a course you would like to teach. Of course, developing a syllabus is a tremendous amount of work, but it can also be a dramatic way of demonstrating how interested you are in a specific job and how willing you are to go above and beyond to demonstrate that interest. And you would always want to be certain that the class you are proposing would be a good fit at the particular institution on which you are focusing. Developing a syllabus in advance will also allow you to have a head start in preparing to teach your first course when and if you get the job!

Applying to Community Colleges

There are many compelling reasons to teach at a community college, particularly for candidates who have a strong focus on teaching and an interest in working with a diverse community of students from a broader range of ages and life experiences than might typically be found at a four-year institution.

Community college hiring committees tend to be most interested in those candidates who demonstrate a genuine and substantiated interest in teaching, as well as an interest in the mission of community colleges and the students they serve. If you would like to apply to one or more community colleges, devote time and energy to understanding their culture and priorities. For an excellent introduction, visit the Chronicle of Higher Education's website (chronicle.com) and search for Rob Jenkins' excellent articles on this topic. He is also the author of *Building a Career in America's Community Colleges*, published by the American Association of Community Colleges.

Getting Started on Your Teaching Statement: Questions to Consider

When you are setting out to write a teaching statement, it can be challenging to figure out how to start. Use the questions that follow to start thinking about your experience as a TA, an instructor, or in other teaching roles. Get some thoughts down on paper, take a break, then come back and write some more. When you are finally ready to look at paring down your ideas and memories, you may decide to include all of your answers, some, or just a few. You may rearrange the order or take a creative approach to your statement. In any case, you will have a treasure trove of material with which to work.

1. Start with your passion for teaching the subject in which you are an expert! What attracted you to your field or to what you study? What do you hope to pass on to your students?
2. What does your teaching contribute to your students' education? How does what you teach help your students grow as learners, scholars, and/or citizens?
3. How does your research inform your teaching—or vice versa?
4. Finish this sentence: "I feel best as an instructor when..."
5. Think of *examples* or *concrete moments* of your teaching. What examples come to mind that worked and highlight the very best of your teaching? Why were these examples so successful?
6. Think of a challenging moment in the classroom that turned out just fine. How did you handle the challenge? What did you learn from it?
7. What are your learning objectives? For example, think of a specific course. What will your students take home from this course? What should they be able to do at the end of your course? Why would these goals be important?
8. How do you know that your students learn what they are supposed to learn? How do you assess their learning?
9. How do you engage your students in the classroom? How do you motivate them? Can you think of examples?
10. How do you take into account the diverse racial, ethnic, cultural, social background, and/or learning styles of your students?
11. Go over your teaching evaluations: What are the highlights? Can you detect patterns in the comments? What are the areas students want you to improve?
12. What new courses would you like to develop, or redesign?
13. How do you grow as a teacher? How do you invigorate your teaching? What do you hope to learn about teaching in the future? What are your professional development plans?

Adapted from Stanford University's Center for Teaching and Learning

Letters of Recommendation

When it comes to letters of recommendation, choosing whom to ask is generally the most pressing question. Letters of recommendation may come from your advisor, PI, dissertation committee members, and research collaborators, among others. You may find yourself considering the value of requesting a recommendation from a faculty member who is well known in your field versus a faculty member who knows you well. There is no single right answer, although it can be extremely helpful to consult with your advisor, faculty in your department, and/or faculty in your field. Remember, too, that you will generally be asked for at least three letters of recommendation, and each letter may serve a different purpose. Think about how those letters will work together to paint a portrait of you as a job candidate.

Particularly if you are planning to apply to institutions that value teaching, consider how one or more of your recommenders could speak to what you are like as a teacher. If you TA a course, you may wish to ask the professor for a letter of recommendation at the conclusion of the course,

when their recollections of your work are still fresh. Your recommenders can speak to your teaching in more depth when they have seen you teach—so invite them to observe your teaching!

Think about how you can best prepare your recommenders to write compelling letters that speak to your strengths. Are there materials with which you can provide them? Make sure they are aware of the audience and the types of institutions to which you are applying. It is not unheard of for faculty members to ask Ph.D. students to jot down some notes or even draft a sample letter for them to edit and revise. If you put together such a draft, it is imperative that you do not privilege modesty above making a strong case. This is not the time to be worried about bragging. Write persuasively and generously about your accomplishments and provide evidence for your assertions. If you still feel reluctant to "sell" yourself, ask a trusted friend, colleague, or classmate for help.

Adapted with permission from Stanford University's Stanford Ph.D. & Postdoc Career Guide.

INDUSTRY RESUME

When applying for jobs outside of academia, you will typically need to submit a resume instead of a CV. A resume is not just a CV minus the publications. The language and value system of academia often no longer apply. The process of converting your CV into a resume requires you to see and present yourself in a new way and can be both exciting as well as a little painful. It can be difficult to edit hard-earned academic credentials, publications, and experiences from your CV. Although it will be tempting to leave as much as possible and let the employers figure out what might be useful, keep in mind that your readers will not have the time or motivation to do so.

Employers often say they initially spend less than 30 seconds reviewing a resume. Unless you quickly and clearly demonstrate how your graduate training and other experiences allow you to bring value to their line of work, they would rather move on to the next resume. You will need to translate your skills from academic jargon into the language of the field for which you are applying.

The resume is a marketing tool and in order for you to write an effective one, you need to 1) know what you have to offer (skills, knowledge, experience, achievements), 2) know the market or employer's needs, and 3) demonstrate fit in an attractive and clear format. It needs to be written to let the reader know why you can do a particular job well.

Resume Sections

Name and Contact Information

- Your Name.
- Address (personal mailing address, not your institutional office address; can leave it out for privacy and security reasons if circulating the document widely).
- Phone Number (list the number that you'll answer; make sure your voicemail greeting is appropriate).
- Email Address (avoid using your "fun" address name; list your simple, professional one).
- Website or LinkedIn address (if pertinent).

Objective

- Optional; needs to be clear, concise and meaningful.
- Can include the specific position you are seeking, skills you wish to use on the job, field or organization type in which you are interested, or a combination of all of the above (e.g. Seeking a position in museum administration requiring strong research and writing skills and a background in art history).

Education

- Listed in reverse chronological order, with the expected or most recent degree first.
- Include institution, location (especially if overseas), degree, field of study, graduation date or expected date of completion.
- Can also include research focus (keep the description broad unless the employer would be interested in your exact area of specialization), relevant courses, study abroad experience, selected honors.

Experience

- Listed in reverse chronological order, with the most recent experience first.
- Include name of organization, location (optional; be consistent in usage with other sections), position title, dates (include month if appropriate).
- Describe your accomplishments, starting with action verbs rather than using passive language such as "duties included" or "responsible for" (see sample action verbs on the pages that follow or Google "resume verbs" for additional suggestions).
- Use either past or present tense as applicable and keep your format consistent.
- Leave out personal pronouns such as "I," "me," "my."
- Quantify and highlight results and accomplishments whenever possible (e.g., Received fellowship awarded to 5% of applicants, Increased efficiency by 40%).
- Include paid jobs and any non-paid experience (internships, volunteer community service, relevant academic/extracurricular projects, and professional/student activities) that relates to the job you are pursuing.
- Divide experience into two or more sections, when relevant. Possible section headers include Relevant Experience, Additional Experience, Research & Project Management Experience, or Leadership & Communication Experience.

Other Sections

You can choose to include other optional sections if they are relevant and can provide helpful information to prospective employers. Sample headings may include: Summary of Skills, Computer/Technical Skills, Languages, Activities, Honors/Awards, Professional Affiliations, Professional Development, Interests, and Additional Information.

Resume Format

There is no single way to format your resume. Choose a resume format that will best present your strengths.

Chronological Format

- An arrangement of your qualifications in reverse chronological order, starting with your most recent.
- Most familiar to employers and often preferred.
- Best for someone with a clear history of directly relevant experience.

Combination Format

- Highlights specific skills and experiences, which are listed in reverse chronological order and categorized under relevant skill or experience headings (e.g., Research and Writing, Public Service, Leadership); offers flexibility and strength of both the functional and chronological formats.
- Familiar to employers and easy to follow.
- Helpful for candidates who lack a linear history of related work experience but have experience that can be grouped under relevant headings.

Functional/Skills Format

- Highlights your skills by function rather than work experience and conveys skills and abilities possessed even if they were not used in related work settings.
- Not as familiar to employers and less frequently preferred.
- Useful for career changers, candidates with very limited or no experience.

Resume Tips

- Make sure the way you prioritize information reflects the priorities of the organization to which you are applying; consider placement on page, order of bullet points, and number of lines.
- Use limited amounts of bold, italics, CAPITALS, and underlining strategically to bring attention to the most relevant information.
- Balanced use of blank spaces and margins is important. Don't make your margins and font size too small. Keep margins to around .7 to 1 inch and

font size to 10 or 11 point (adjust as needed for various font styles).

- Don't include personal information such as marital status, photo, or physical characteristics unless you are applying to jobs outside of US and Canada and this is the norm for that country.
- When sending emails electronically, attach as a PDF file to preserve formatting and name your file clearly to allow employers to easily identify your resume (e.g., Your name_Resume).
- References do not need to be listed unless they have been requested. Instead of using space to include the line: "References available upon request," have a separate list ready for submission, typically during the final stages of your interviews (see Sample Reference List later in this Guide).
- Have your resume critiqued by several people for content and grammar. Bring your resume to the Engineering Career Development and Experiential Learning Center to have it reviewed by a career counselor.

SAMPLE ACTION VERBS LISTED BY FUNCTIONAL SKILL AREA

Communication	Generated	Appraised	Coached	Chaired	Surveyed
Aided	Illustrated	Audited	Coordinated	Convinced	Tested
Advised	Imagined	Budgeted	Counseled	Directed	
Arbitrated	Improvvised	Calculated	Delivered	Examined	Technical
Clarified	Integrated	Computed	Demonstrated	Executed	Assembled
Co-authored	Innovated	Developed	Explained	Expanded	Built
Collaborated	Painted	Evaluated	Furnished	Facilitated	Calculated
Consulted	Performed	Figured	Generated	Improved	Computed
Coordinated	Planned	Maintained	Inspected	Initiated	Designed
Counseled	Problem-solved	Managed	Issued	Managed	Engineered
Defined	Shaped	Performed	Mentored	Oversaw	Fabricated
Enlisted	Synthesized	Planned	Provided	Produced	Maintained
Formulated	Visualized	Projected	Purchased	Recommended	Operated
Influenced	Wrote		Referred	Reviewed	Programmed
Informed		Manual Skills	Submitted	Supervised	Remodeled
Inspired	Detail-Oriented	Arranged			Repaired
Interpreted	Analyzed	Assembled	Organizing	Research/ Investigation	Solved
Interviewed	Approved	Bound	Achieved	Calculated	Tested
Mediated	Arranged	Built	Assigned	Cataloged	
Merged	Classified	Checked	Consulted	Collected	Teaching Skills
Negotiated	Collated	Classified	Contracted	Computed	Adapted
Promoted	Compared	Constructed	Controlled	Conducted	Advised
Publicized	Compiled	Controlled	Coordinated	Correlated	Clarified
Recommended	Documented	Cut	Decided	Critiqued	Coached
Represented	Enforced	Designed	Delegated	Diagnosed	Developed
Resolved	Followed through	Drove	Developed	Discovered	Encouraged
Suggested	Met deadlines	Handled	Established	Evaluated	Evaluated
	Prepared	Installed	Evaluated	Examined	Informed
Creative	Processed	Invented	Negotiated	Experimented	Inspired
Acted	Recorded	Maintained	Organized	Extrapolated	Motivated
Adapted	Retrieved	Monitored	Planned	Gathered	Participated
Composed	Set priorities	Prepared	Prepared	Identified	Provided
Conceptualized	Systemized	Operated	Prioritized	Inspected	Represented
Created	Tabulated	Repaired	Produced	Investigated	Supported
Designed			Recommended	Monitored	Taught
Developed	Financial	Providing Service	Reported	Proved	Trained
Directed	Administered	Advised		Reviewed	Verified
Drew	Allocated	Attended	Leadership		
Fashioned	Analyzed	Cared	Administered		

Adapted with permission from Stanford University's Stanford Ph.D. & Postdoc Career Guide.

SAMPLE M.S. DEGREE RESUME

Stephen M. Williams

200 Main Street • Amherst, MA • 01003 • (413) 545-8745 • smwilliams@umass.edu

SUMMARY STATEMENT

Mechanical engineering graduate student with a strong background and hands-on experience in design, who can work in diverse teams to achieve superior results.

EDUCATION

University of Massachusetts College of Engineering, Amherst, MA September 2018
Master of Science in Mechanical Design Cumulative GPA: 3.5

University of Massachusetts College of Engineering, Amherst, MA December 2016
Bachelor of Science in Mechanical Engineering Cumulative GPA: 3.1

RELEVANT COURSES

Engineering Design Optimization, Advanced Thermodynamics, Heat Transfer, Design of Mechanical Assemblies, Design of Mechanical Components, Senior Design Project, Manufacturing Processes, Production Planning and Control

RELEVANT EXPERIENCE

Graduate Researcher, *University of Massachusetts Amherst* January 2017-Present

- Member of NSF Center for e-Design, a multi-university research center developed to serve industry
- Working closely with engineers from Raytheon IDS in Sudbury, MA to develop a user-friendly front end to semantic database containing legacy documents

Undergraduate Researcher, *University of Massachusetts Amherst* June 2015-December 2016

- Worked on feature-based CAD interoperability between PTC Pro/Engineer and DS SolidWorks with funding from the National Science Foundation
- Successfully reproduced Pro-Engineer part files from generic XML representations

Senior Design Project, *University of Massachusetts Amherst* Fall 2016

- Member of a four person team which designed innovative self-dumping wheelbarrow for the elderly
- Used PTC Pro/Engineer to create a detailed model of the design, then imported into ANSYS for thorough failure analysis
- Worked under \$200 budget by 44% to build working prototype which was awarded 2nd Place in Senior Design Competition
- Completed prototype ahead of schedule in order to submit it to extensive reliability and user testing to ensure customer satisfaction
- Prepared a robust report documenting the design process from start to finish

Intern, *H.H. Arnold Co., Inc.*, Rockland, MA Spring 2013

- Worked alongside seasoned machinists, seeing several parts through the machining process to final assembly before leaving the shop
- Worked under 1/1000 inch tolerances while using CNC lathe to machine transmission shafts
- Saw ink nozzle through milling, minor assembly, and major assembly into wire printing machine
- Presented information learned to teachers and company owner upon completion of the internship

COMPUTER SKILLS

- Proficient with PTC Creo, Pro/Engineer, SolidWorks, ANSYS, MATLAB
- Programming in MATLAB, Java, XML, SPARQL, HTML, C++, Visual Basic

PUBLICATIONS

- Williams, S., et al. (2016). Integrating Biological and Engineering Ontologies. In DETC2014-13527, IDETC/CIE.
- Altidor, J., Wileden, J., Williams, S., et al. (2014). A programming language approach to parametric CAD data exchange. In DETC2012-48530, IDETC/CIE.

OTHER INTERESTS

- Cars, vintage dirt bikes, *Arduino* microcontrollers, RC helicopters

SAMPLE Ph.D. RESUME - PAGE 1 OF 2

Aryan H. Chada

Department of Chemical Engineering
University of Massachusetts Amherst
600 Main Street, Amherst, MA 01003

(413) 545-7390
achada@umass.edu

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- Summary** Four years of collaborative work experience with industry involving on-site work at research laboratories. Four years of experience in designing and building setup for vacuum drying of pharmaceutical products. Experimental expertise in tray and filter drying, and using online mass spectrometry to predict drying performance. Computation expertise in nonlinear system modeling, optimization, transport phenomena, and data analysis.
- Education** **Ph.D. in Chemical Engineering** Fall 2014 - June 2019 (anticipated)
University of Massachusetts Amherst, Amherst, MA **GPA: 3.96/4.00**
- B.Tech. in Chemical Engineering (Minor: Chemistry)** Fall 2010 - Spring 2014
Indian Institute of Technology Madras, Chennai, India
Among the top 1% to receive the National Talent Search Examination scholarship 2009
- Research Experience** **Graduate Research Assistant**, Department of Chemical Engineering Fall 2014 - present
University of Massachusetts Amherst, Sunovion Pharmaceutical Inc.
Supervisors: Prof. Michael A. Henson, Dr. Kostas Saranteas
Used an integrated experimental and computational approach to research, analyze, and resolve issues in vacuum tray drying. Extending the methodology to agitated Nutsche filter drying.
- Designed and built system to study vacuum tray drying using on-line mass spectrometry
 - Established methodology and parameters to use mass spectrometry as a PAT tool based on Quality by Design (QbD) principles to predict the end point of drying
 - Tested and validated methodology successfully at laboratory and pilot scales. **Methodology reduced drying process time up to 70%**
 - Extending the methodology to agitated Nutsche filter dryers
 - Developing a multiphase transport model for drying to optimize vacuum drying process used during manufacturing of pharmaceutical products
 - Creating software to analyze data in real time from instruments used in the drying process to predict drying end point and solvent content in material
- Research Assistant**, Department of Chemical Engineering Fall 2013 – Spring 2014
Indian Institute of Technology Madras, Combustion and effects of radiation in glass manufacturing
Supervisors: Prof. Niket Kaisare, Prof. Shankar Narasimhan
- Developed a mathematical model that qualitatively captures dynamics of the glass melting process targeting control on glass quality, fuel consumption and NOx emissions
 - Incorporated a simplified module to capture effects of radiation to reduce computational time significantly (order of 106)
- Industrial Experience** **Chemical Engineering Intern** Summer 2013
Research & Development, ABB, Bangalore, India
- Oxygen delignification and bleaching models for pulp production
 - Constructed individual modules for pulp production using the tool Modelica for Dymola
 - Solved connected modules to understand the effect of variation in inputs on outputs
 - Developed a complete fiber line setup to be used for control and optimization
- Chemical Engineering Intern** Summer 2012
Study & Optimization for Horlicks TM Manufacturing, Punjab, India
- Redesigned and constructed 3D model of the mashing section. Eliminated bends in the flow path by 30% and valves by 15% leading to reduction in viscous losses
 - Studied steam consumption and pump load in multiple sections and proposed appropriate improvements to increase efficiency

SAMPLE Ph.D. RESUME - PAGE 2 OF 2

- Experimentally studied moisture content in food product and concluded optimal cooling time to maximize product throughput
- Modifications implemented save USD 90000 per annum

Independent Projects

In-vitro study of dynein driven motility, Department of Biology Spring 2017 - Summer 2017
University of Pennsylvania, Collaborator: Swathi Ayloo

- Developed GrAND algorithm to capture trajectory reversals during the motility of dynein
- Created interactive analysis tools used to analyze and quantify parameters depicting the state of motion of dynein
- Simulated synthetic trajectories with different ratios of Brownian and processive motion that were used to validate experiment data of dynein driven motility

Quad rotor based on the principle of coanda effect May 2011 - October 2011
Indian Institute of Technology Madras, Spirit of Engineering Project

- Designed and hand crafted a working model of quad rotor using specialized materials like depron and balsa wood to maximize performance to weight ratio
- Functioning prototype was displayed at Shastra (technical festival IIT Madras)

Teaching Assistant

- TA for Process Dynamics and Control (ChE 446) and Mathematical Modeling (ChE 361)
- Created interactive code to tutor students in MATLAB & Simulink

Computer Skills

Programming Languages: Matlab, C++, Visual Basic, Fortran, Scilab, Python, Dymola
Scripting Tools: LATEX, HTML, Modelica
Application Software: Microsoft Office, Aspen, Photoshop, Illustrator, InDesign

Publications

- **Aryan H. Chada**, Kostas Saranteas & Michael A. Henson, “*Using Online Mass Spectrometry to Predict the End Point during Drying of Pharmaceutical Products*”, **Organic Process Research & Development**, DOI: 10.1021/op400272t (2018)
- **Aryan H. Chada**, Kostas Saranteas & Michael A. Henson, “*Multiphase Transport Modeling for Vacuum Drying of Pharmaceutical Products*” (*In prep*)
- Swathi Ayloo, Jacob E. Lazarus, **Aryan H. Chada**, Mariko Tokito, E Michael Ostap & Erika L. F. Holzbour, “*Dynactin functions as both a dynamic tether and brake during dynein-driven motility*”, **Nature Communications**, DOI: 10.1038/ncomms5807 (2018)

Selected Conference Presentations

- **Aryan H. Chada**, Kostas Saranteas & Michael Henson “*Transport Modeling of Vacuum Drying Dynamics*”, Process Systems Engineering Consortium, Amherst, MA, USA, 2018
- **Aryan H. Chada**, Kostas Saranteas & Michael Henson “*Using On-Line Mass Spectrometry to Predict the End Point During Drying of Pharmaceutical Products*”, AIChE, San Francisco, CA, USA, 2017
- **Aryan H. Chada**, Kostas Saranteas & Michael Henson “*A Vacuum Contact Drying System for Dynamic Model Development*”, Process Systems Engineering Consortium, Santa Barbara, CA, USA, 2016
- **Aryan H. Chada**, Kostas Saranteas & Michael Henson “*Prediction and Optimization of Filtration in Pharmaceutical Industry*”, Process Systems Engineering Consortium, Amherst, MA, USA, 2015

Extracurricular Activities

- General Secretary (2015-16), Art adviser and Web administrator (2016-17) for Indian Student Association at UMass Amherst
- Designed logo and shirt for the Chemical Engineering Graduate Society at UMass Amherst and for Chemical Engineering Society at IIT
- Member of Athletics team for shot put, discus throw and javelin throw at IIT (2011-12)

WRITING COVER LETTERS FOR ACADEMIC POSITIONS

Like effective CVs, compelling cover letters for academic positions reflect the priorities of the institutions and positions to which you are applying. An academic cover letter, which can be one to two pages, is an opportunity to make a persuasive case for how and why you are an excellent fit for that particular position.

Be selective and strategic about your tone and on what you choose to focus. For example, if you are applying to an institution that values involving undergraduates in research,

you may choose to emphasize how, in your own work, you have involved and mentored undergraduates. Again, you will likely not have a single cover letter that you send out to a wide variety of institutions, but several different, personalized letters.

In a typical academic cover letter, it is likely that you will introduce yourself, describe your research and teaching experience, and write about how and why you find the position appealing.

Academic Cover Letter Format

Name of Your Current Department
University of Massachusetts
Address
Amherst, MA 01003

Date

Name of Recipient
Recipient's Title
Name of Department
Name of University
Address
City, State 12345

Dear Dr. Recipient (or Dear Hiring/Search Committee, or Dear Professor Recipient):

In the first paragraph, you will want to formally apply for and express interest in the position, and introduce yourself. You may share that you are in the process of completing your Ph.D./postdoctoral fellowship in your particular discipline at UMass. You can also introduce your specialty or area of focus. Ideally, you will also use this first paragraph as an opportunity to begin personalizing your letter to this department and institution.

In the next paragraph, you can choose whether you would like to focus on your research or your teaching. In either case, be clear and descriptive. An academic cover letter can be one or two pages, so you are not limited in terms of space. When describing your dissertation and/or your research, provide sufficient context to help the reader understand why your work is interesting, new, and compelling. Your description will likely be two to three times as long as this paragraph. If a research statement has also been requested, try to maintain consistency between the two descriptions without sounding repetitive. In addition to your past research, your future research is also likely to be of interest to the hiring committee.

When you write about your teaching experience, consider whether or not a teaching statement has also been requested. If it has, you will want to reinforce your message without actually repeating it word for word. This paragraph is not only about your teaching experience, but can also address the courses you would like to teach, particularly at the institution to which you are applying. This will require a certain degree of familiarity with their department and curriculum.

You also have the opportunity to address accomplishments, interests, or experiences that are relevant to the position including, but not limited to, service to your university or your field. If the culture of the department or institution is particularly unique or appealing to you, consider addressing that here as well.

In your concluding paragraph, it is appropriate to reiterate your interest in the position and to offer thanks for the committee's consideration. You may also make reference to the other materials you have submitted, and let them know that you look forward to hearing from them. It can be helpful to include your email and phone number in the final paragraph for their convenience.

Sincerely,

Your Name

INDUSTRY COVER LETTERS

Cover letters provide you with the opportunity to:

- initiate contact and introduce yourself
- respond to job postings or inquire about openings
- personalize your resume and show enthusiasm and interest in the job
- highlight information that addresses the needs and interests of the employer

Bear in mind that the letters you write not only convey your interest and qualifications, but also give the employer

an opportunity to observe how you communicate and present yourself. What you choose to include in the letter and how you choose to say it reveal much about you, from your attentiveness to detail (including spelling and grammar) and professionalism to the overall quality of your writing skills.

The following tips and guidelines are provided to help you craft an effective cover letter. Please remember that sample cover letters should not be used as scripts to copy but as examples to help you compose your own letter.

Industry Cover Letter Format

Your Street Address
City, State, Zip

Date

Employer's Name
Title
Company/Organization/Institution Name
Street Address
City, State, Zip

Dear Mr./Ms./Dr. Last Name or Hiring Committee:

Who are you and what do you want? Your opening paragraph should briefly introduce you and your interest in the organization or position. If you are aware of a specific position or opening, refer to it now and how you learned about it. This paragraph could also mention the name of an individual who recommended that you contact the employer, or cite other research that prompted you to write. It is important to indicate why you are interested in their organization.

Why are you a good candidate? The middle paragraph(s) should consist of a selection of highlights from your background that would be of greatest interest to the organization and consequently create the notion of “fit.” Focus on your top 2-3 skills and experience and include supporting evidence for any claim of skills or accomplishments. Again, try to display knowledge of the field and organization. Use action verbs to describe relevant skills and expertise and mention specific knowledge you may have (i.e., lab techniques, computer applications, etc.) that would be needed in the work. You can also touch on a particular topic that seems important in the job description that the employer developed. Whet the employer's appetite and entice them to read your resume in detail and schedule an interview.

What will you do next? Your closing paragraph should outline next steps. Express your willingness to provide additional information and desire to further discuss the position in an interview. Include your phone number and email address. If you will be in the area, let them know. Thank the reader(s) for their time and interest.

Sincerely,

(Your signature; may omit extra spaces if sent electronically)

Your Typed Name

Cover Letter Tips

1. Focus on the employer's needs rather than your own. Ask yourself: "What are they asking for, why do I want this position, and in what ways do I meet their qualifications and needs?" "What value can I add to this company?" Address these questions in your letter.
2. Tailor your letter for each employer. Generic letters do not make good impressions and are usually ignored. For practical purposes and limitations in time, plan to at least prepare a tailored letter for each different type of job (e.g. one for consulting, one for industry research) and customize 1-2 sentences for each employer.
3. Keep it concise, typically only one page, and in business letter format.
4. Demonstrate your knowledge of the organization. What attracts you to this company?
5. Highlight your skills and abilities and go beyond or expand on your resume content. Be clear about your objective and communicate your top 2-3 skills or experiences as they relate to the position.
6. Ideally, address the letter to the hiring manager, including a specific individual's name, title, and organization (all correctly spelled). Use "Dear Hiring Manager" as an alternative or when preferred by the employer.
7. Address specific skills and interests without copying them verbatim from the job announcement.
8. Have several people proofread your letters to avoid errors. An effective cover letter requires careful research, strategic thinking, and multiple revisions. Bring your draft letter to the Engineering Career Center to have it reviewed by a Career Counselor and to discuss your specific situation and appropriate strategies.

Industry Cover Letter Sample

1483 Plymouth
Framingham, MA 01701

December 14, 20xx

Ms. Patricia Morisette
Manager, Corporate Administration
Corvie Systems
2604 Calderon Ave.
Mountain View, CA 94040

Dear Ms. Morisette:

In response to your advertisement on the UMass Job Board for a Systems Analyst, I have enclosed my resume for your consideration.

As a Computer Systems Engineering graduate student at University of Massachusetts, Amherst, I have developed extensive programming experience through assignments using C++, JAVA, and other programming languages in both Mac and PC environments. Through these projects, I honed my programming skills and learned a great deal from my peers in a project team setting. The collaborative potential of the Systems Analyst position, combined with Corvie Systems' significant advances within the tech industry, is what most attracts me to this position.

Through my internships at both Klavin, Inc. and Interbold, I acquired the necessary capabilities to successfully handle the responsibilities of a Systems Analyst. Through these opportunities, I have gained considerable experience with telecommunications applications, database management, spreadsheets, and graphics software.

I have a high degree of initiative and am able to learn new concepts quickly, which proved invaluable to the fast-paced environments in which my internships and education were completed. Further, I believe that my analytical skills and enthusiasm for the work that I do would positively contribute to the systems strategy department of Corvie Systems.

Please find attached my resume for your review. I would welcome the opportunity to discuss my qualifications in person and to learn more about the opportunities at Corvie Systems. I can be reached at (413) 123-4567 or name@umass.edu. Thank you for your consideration and I look forward to hearing from you.

Sincerely,

Mazalia Kuanni

ACADEMIC INTERVIEWS

An academic interview is something to look forward to! Consider it an unparalleled opportunity to share how you are a fit and to connect with colleagues at other institutions. Interviewing is a skill in which tremendous improvement can be had in a short period of time when candidates are motivated, have access to good strategy and helpful feedback, and put in the necessary time and effort. Even if you find yourself anxious about an upcoming interview, know that it is likely that you can improve your performance considerably by preparing in advance.

When it comes to preparation, in a nutshell: know yourself, know your research and teaching, know the college or university where you are interviewing, know the department, and know the position. The emphasis of the questions may vary dramatically if you are considering both research-focused and teaching-focused institutions.

Don't underestimate the value of understanding what a department is looking for or its priorities. Talking with your advisor, colleagues at other institutions, and friends of friends who work in that department or know people who do can all be helpful as you try to understand their priorities. These interactions can help you build a proactive strategy that will address what is important to the department.

In general, it is helpful to undertake some substantial self-reflection in advance of the interviews. Candidates often find that when they invest time and energy in their teaching and research statements, they are better prepared to approach questions about those areas.

For teaching, be ready with stories and examples. Don't just say that you use technology in the classroom; tell the story of the dynamic multimedia presentation you rigged up for your students last quarter, and the unexpected ways in which it engaged the quiet student in the back.

The sections that follow address four specific types of interviews: phone, Skype, conference, and campus. We also look at key questions to prepare, as well as how to strategically approach thank-you notes and interview follow-up.

First-Round Interviews: Phone

You may be invited to take part in a first-round phone interview. It is likely that at the other end of the line, there will be a search committee who has you on speakerphone. Naturally, this can be a stressful situation! However there are a few tips that can help. The standard advice with phone interviews: dress up and stand up. Thinking of yourself as a valued future colleague and faculty member feels much easier when you're dressed the way you would be to teach a class or deliver a talk at a conference. Standing up allows your voice to be more resonant, gives you more room to breathe fully, and lets you pace quietly about the room if needed. Understand that when you're talking to a group you can't see on speakerphone, there are bound to be interruptions. Expect these and handle them with

humor and good cheer. That said, it is helpful to minimize distractions and noises on your end, selecting a place to talk that is likely to be silent and, if possible, using a landline instead of a cell phone.

During a telephone interview, it is especially important to ensure that the conversation feels like a dialogue. Resist any temptation to lecture or hold forth at great length on any topic. Committee members may zone out, write notes to each other, and check their email if you are speaking at great length when not necessary. As in any interview, strive to build rapport right from the start; this will go a long way to cover minor missteps later.

It is very useful to have your materials handy, but don't let them capture your attention. Remember: the answers to their questions are not in your notes, your CV, or printouts from their department webpage. These materials function largely as a security blanket—it can be reassuring to have them close by for reference. Similarly, it can also be useful to have a pen and notepad handy during the phone interview, but write only as much as you need to—for many people that will be nothing, or just a few words or phrases to serve as reminders of topics to address later.

Make sure that either during the interview or afterwards, you find out the names of the people with whom you spoke, so that you can send each of them personalized thank-you notes. Use your best judgment to decide whether the thank-you notes should be emailed or handwritten and mailed.

First-Round Interviews: Skype

Interviewing on Skype brings its own benefits and challenges. Be sure that you are comfortable using Skype in advance of the interview. Enlist the help of a friend, family member, or colleague to assess different backgrounds, outfits, lighting options, and camera angles. If your own office and home are not suitable locations, consider finding another location.

Do what you can to minimize distractions—for example, if you are in a setting with a landline phone that never rings, be prepared for it to ring precisely in the middle of your Skype interview! Turn off the ringer in advance.

Eye contact is particularly tricky on Skype. Naturally, there is a great temptation to stare at your own image on the screen. Some people have found success in closing their own image so they are not distracted. Then, there is the paradox: to give the impression of eye contact on Skype, it is necessary to look directly into the camera. However, this prevents you from observing the facial expressions of committee members, which may provide clues that would be valuable to have in regard to how they are responding to your answers. One approach is to aim for about 75% looking into the camera, 20% checking in with the committee's expressions, and 5% taking a quick peek back at your own image to make sure you're still staying in the camera frame. It is wise to practice this in advance to find a balance that works for you.

Finally, it can be helpful to enlist a friend to chat with you on Skype immediately before the interview. That way, you have the experience of speaking online in your natural voice and style and can carry at least some of that over to the interview itself.

First-Round Interviews: Annual Conferences

A number of fields hold interviews on site at an annual conference. Conference interviews can be dizzying; preparation, organization, and planning ahead will improve the experience immensely. If you are interviewing with various types of institutions at the same conference, you may need to switch gears rather abruptly from answering rapid-fire questions about your research in one interview to sharing engaging anecdotes about your teaching in another interview. If possible, find out with whom you will

be meeting, so you can anticipate possible questions and common ground.

One notable feature of conference interviews is that your interviewers are likely encountering many candidates in a short span of time. Your goal is to be memorable for the right reasons. Some experts recommend wearing one distinctive yet appropriate accessory, such as a tie or a pin, to help distinguish yourself visually from other candidates.

In any interview with faculty in your field, you have an opportunity to represent yourself well and forge positive connections with your interviewers. Enjoy this opportunity.

On-Campus Interviews

Typically by the time you are invited for an on-campus interview, you have already interacted with representatives of the department through one or more of the types of

Preparing for an Academic Job Talk

When you're invited to give an academic job talk at an on-campus interview, it's an exciting opportunity to enhance your candidacy and share your work! The right preparation will help you prepare and deliver a successful talk.

Expectations can vary by campus and by department, so it's important to find out what to expect. How long a talk does your host expect? Who and how many will be in the audience? Is this a seminar or a class? Is this on your dissertation...or on anything *but* your dissertation? Should you bring copies of your talk to distribute? If you need audio-visual technology (a projector, the necessary cables, an LCD screen, etc.), will they be supplied? At what time of day will your talk be held (and is there a way you can build a break in before the talk, so you have some time to catch your breath and prepare mentally and emotionally)? Where will you speak, and will there be time afterward to take questions?

Your advisor and other faculty in your discipline can be an extraordinarily valuable resource as well. Talk to them to find out the conventions, norms, and traditions surrounding academic job talks in your field. Solicit their perspectives on how you should dress, whether you should bring copies of your paper and/or use technology, and to what level you should pitch your talk. Strategically speaking, what do your advisor and others know about the department and the people with whom you'll be talking? How can you find out more about them? What questions should you be prepared to answer? Are there any "land mines" for which you should be prepared?

As you compose your talk, ensure that you set a context, showing the importance of your research. Answer the "So what?" question, and demonstrate how your work is related to major issues in the field. Indicate not only what you've done, but what you will be doing in the future. Then try to find or create opportunities to practice your talk for others. Ask them if they think you've found

the right level for the talk (one professor described it as "sophisticated but not specialized"). Do you seem simultaneously prepared and spontaneous? Are you prepared to handle questions seriously and courteously, without getting defensive? And was the talk interesting? If you plan to use slides during your talk, be sure to include them in your practice as well. Talk to the audience, not to the screen!

One terrific strategy is to anticipate questions beyond your presentation and develop slides (in addition to those that you will use in your talk) "in reserve" for topics about which you might be asked, or for details that might be difficult to remember off the top of your head. For instance, if a faculty member asks, "Did you perform any statistical analyses?" you can say, "Yes, I did—in fact, I have a summary of the statistical results right here," and put up your reserve slide. You can put these reserve slides at the end of your presentation, or if you are presenting using a laptop, you can save the slides in another presentation file entirely, so that you don't accidentally initiate them at the end of your presentation. Of course, when planning to include any type of technology in your talk, be sure to set it up in advance—and have a backup plan in place if it doesn't work.

When it comes time to deliver the talk at your interview, consider introducing yourself individually to audience members as they arrive, instead of isolating yourself at the front of the room. It can be helpful to imagine that these are friends and supporters sitting in the audience. In fact, these people might indeed become your friends and colleagues one day soon! Many students have reported a feeling of surprise at presenting to appreciative listeners who respond as they would to a colleague, not to a graduate student. In fact, sharing your research or a topic that interests you can be a very rewarding experience.

Adapted from the Stanford University Oral Communication Program

interviews described above. An on-campus interview for an academic position can be a demanding experience, combining travel, a marathon of conversations, giving a talk in front of a potentially challenging audience—not to mention the pressure to make a good impression. Here are some tips that can help smooth the way:

Travel: A bit of planning for the worst can go a long way. Even putting the phone number of the search chair in your cell phone before you set out can make it easier to reach him or her if you are delayed. On flights, carry on anything (clothing or presentation materials) that is essential to your success at the interview.

Interviews: Whenever you are meeting with a committee, remember not to take things personally. The dynamics of the committee are certain to involve issues that arose long before your visit. This is true for the job talk as well; sometimes listeners will ask questions that seem irrelevant because they are trying to make a point about a departmental issue. The key is to treat all of these situations with good grace and move forward.

One of the biggest and most exciting challenges for those interviewing for academic positions, particularly if it is the first year you are in the academic job market, is the shift in role. No longer are you perceived as a student! Many Ph.D. candidates have returned from on-campus interviews remarking on their surprise at being received as a colleague. The audience at your job talk is not like your dissertation committee. Be prepared for different kinds of questions—more along the lines of questions one colleague would ask another, as opposed to those that a professor would ask a student.

Common sense and courtesy rule the day in how to conduct oneself at an on-campus interview. Avoid or minimize alcohol at meals (positions have been lost after inebriated candidates made statements they would later regret). Treat everyone you encounter—students, staff, faculty, and administrators—with respect, consideration, and interest. Resist the temptation to vent or complain at any point during the day to anybody. If the flight was tedious or you don't care for the campus architecture, save those details for private phone conversations later. For some reason, the temptation to let down one's guard and vent is especially great when walking from one appointment to another with a member of the search committee or a student. Strive to maintain the pleasant and engaging demeanor you had during the interviews.

Interview Questions

Talk to colleagues, faculty, and classmates to get ideas regarding the specific types of questions for which to prepare. Sometimes field-specific lists of questions circulate through departments or among friends—these can be enormously helpful.

Broadly speaking, there are several categories of questions that can be anticipated.

General Questions

- It is helpful to be prepared for generic-sounding questions like “Tell us about yourself.” At this early stage of an interview, you likely have the committee's complete attention. Organize your thoughts in

advance so that you proactively focus on elements in your background, skills, interests, teaching, or research that demonstrate why you are an excellent fit for this particular position.

Research

- *What do you study?* Have a variety of answers ready to address questions about your work. You will want to have a friendly, accessible, short version for describing your research to questioners who are not familiar with your field. At the other end of the spectrum, be ready to describe your work at an advanced level, invoking the jargon and context of your field.
- *Importance and context:* Why does your work matter? Why is it different, interesting, or important? Why do you study this, but not that? Questions like these can sometimes be interpreted by interviewees as attacks, when in fact they may simply be signs of interest, or questions asked by potential allies who want to be prepared when making a case for your candidacy to skeptical colleagues or administrators. Help them walk into those conversations well-armed with compelling arguments.
- *Future research:* What ideas and directions do you have for future research? You want to convey your sense of momentum, so that the interviewer not only believes your interest in the topic but your readiness and capability in completing the work and making a contribution to your field. Your future plans for research should be clear and credible. If you are in a field where securing external funding and/or setting up and managing a lab are an integral part of your work, be ready to talk about your plans and strategy in these areas as well.

Teaching

- *Examples of your teaching:* Go in prepared with specific stories, examples, and anecdotes from your teaching experience. Stories are interesting to listen to and easy for committee members to remember. They also lend credibility to any assertions you may make about your teaching. Identify examples of specific times in your teaching when you encountered a challenge in the classroom and how you handled it, when you found an innovative way to capture your students' interest, and more.
- *Awareness of your field:* What are conventions and trends in teaching your discipline? What are the goals of a major in your current department? How is learning evaluated? Your field may have journals that are devoted to the topic of teaching specifically in that field; you may find it productive to investigate these as you reflect on your teaching.
- *What to teach here:* Much of how you talk about teaching is likely to be informed by your understanding of what you might teach at the institution where you are interviewing. If you have a sense that they are seeking a candidate who would enjoy teaching broad survey classes to non-majors, for example, you might share different examples

and approaches than if the focus were on graduate seminars. You may also be asked outright which classes you would like to teach in this department. Study their offerings in advance and be familiar with their current schedule (as well as what new elements you might be able to add).

- *Theoretical orientation:* What is your approach to teaching? How do you think about what you are doing in the classroom? What are your overarching goals for your students?
- *Blending teaching and research:* In some settings, there may be interest in how your research and teaching complement each other in various ways. If this is likely to be a topic where you are applying, it can be helpful to think through these ideas before the interview.

Why This University

- *Why us:* Put yourself in the shoes of the hiring committee. They want to find a candidate who is not only well qualified, but who understands their institution and their department and is enthusiastic about being a great fit. Conduct background research to understand the institutional priorities, the history of the department, the student population, and other areas. Your goal is not to appear disinterested (“You had an opening in my field”) or awestruck (“You’re the best there is!”) but to come across as a well informed and deeply interested future colleague.
- *Geography:* In some cases, the committee may want to ensure that you are interested in moving to their location. Take the time to learn about the area, including the climate. Find out what this area is known for, and even track down some key features in which you are particularly interested, such as natural resources, good school districts, or cultural institutions. Remember, too, that the committee members have chosen to make their homes in this location. Even if the weather or other factors are different from what you may be accustomed to, all of your comments and questions should convey respect, interest, and optimism (instead of “Wow, I can’t imagine how you stand the snow here,” consider “I’ve always wanted to learn how to ski!”).

Questions for the Department

- *Questions to convey interest:* What is the real purpose of asking questions in a job interview? It might be argued that the goal is to convey interest in the people with whom you are speaking and their institution. For this reason, one category of questions would be ones that you strategically select to illustrate commonalities in your values or interests. To be clear, these questions are not “fake” (it is very easy to see through such questions), but are designed to highlight common ground. For instance, if both

you and the department value interdisciplinary collaboration, you might simultaneously communicate this value while learning more: “Can you tell me more about opportunities for interdisciplinary collaboration?”

- *Questions to get answers:* There may be things about which you are simply curious. Doing due diligence in advance will answer many questions; typically, you would want to avoid asking questions that could be answered by a simple visit to the department website. That said, you may be curious about other things. The one catch is that it is quite likely that by the time you are asked for questions, the committee has already answered all of yours. If you find yourself absolutely stumped, you can always explain that at the moment you don’t have any questions, because although you were wondering about X, Y, and Z, the committee had answered all of your questions. This is much more effective than simply saying, “No, I don’t have any questions.”
- *Questions to wait on:* Negotiation is a delicate process! There are some questions you might want to hold off on asking until late in the interview process or even until you have received an offer. A good rule of thumb is not to ask questions that will make negotiation harder for you later on. Also, consider whom to ask what. There are some queries that are better posed to an individual than to a group, for example.
- *Questions to avoid entirely:* Never be negative! Or, to put it differently, stay positive. Avoid questions like “What do you dislike most about the students?” or “What don’t you like about teaching here?” If you would like to understand the concerns and frustrations of faculty and/or students, stick to asking individuals open-ended questions and follow up with clarifying questions.

After the Interview: Thank-You Notes and Waiting

It is strongly recommended that you send personalized thank-you notes to everyone on the search committee and to everyone with whom you met individually. In these notes, it is especially effective to refer specifically to topics you discussed, questions they asked, etc.

Drafting thank-you notes can be taxing, but waiting to hear back is even harder. Try to take good care of yourself during this stressful and potentially busy time. Social support from friends, family members, and significant others can help as well. Remind yourself that regardless of the outcome, life will go on. It is natural to be worried during this time but do your best to preserve your health and well-being while you wait for responses.

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INDUSTRY INTERVIEWS

Whether you have just been contacted for an industry interview or are preparing in anticipation of possible interviews, you may have questions about non-academic interviews. What can I expect in terms of interview format or questions? How much do I tell them about my research? How do I convince the interviewer that I can do the job even though I have limited work experience in this area? How do I handle difficult questions? What do I say if they ask why I'm leaving academia? How can I best prepare for the interview?

Interviewing well is a skill that most of us have to practice and develop. It's natural for you to feel nervous or uncertain about the process. However, the following guidelines and tips will help you prepare to do your best.

Before the Interview

Know Yourself

1. Review your resume/CV, past work and accomplishments, academic and extracurricular experiences.
2. Develop a checklist of the most relevant skills and experiences that you have to offer. Also, be prepared to reassure employers about areas of weakness in your resume.
3. Recall concrete examples to demonstrate each of your top skills or qualifications
4. Consider working with the Engineering Career Development and Experiential Learning Center to identify your skills, interests, personality style, and values as they related to your career choice.

Research the Position/Organization/Industry

1. Match your qualifications to the job description. What are their needs and interests? If a job description does not exist, research the career field and review sample job postings.
2. Review the organization's website as a starting place for your company research and search for additional news. Find out key information about their business, company structure, leadership, culture, recent news and issues, and how they are doing. If possible, conduct information interviews with company insiders, current and past employees, for additional information and advice.
3. Research current industry trends and news. Figure out who's who in the industry, including key players and competitors. Learn about the challenges and opportunities facing the industry.

Practice, Practice, and Practice

1. Most of us are not used to talking about our accomplishments. Finding the right vocabulary, wording, and tone does not come easily. Practice articulating your skills and providing clear examples.
2. It's not enough to think about your answers. Practice saying them out loud and if time permits, with someone else.

3. Attend one of the Center's many interview workshops conducted throughout the year. Meet with an Engineering Career Development and Experiential Learning Center career counselor for a mock interview and receive individual feedback. We can also help you strategize your answers and present yourself most favorably in an interview.
4. Videotape yourself. Although it can be painful to watch yourself perform, it'll provide very useful feedback.

Interview Tips

- Employers are seeking two major criteria when interviewing:
 1. Ability: Can you do this job? (skills and qualifications)
 2. Fit: Are you a good fit with the organization? Are you motivated to do this job? Will you remain committed to this company? (personal qualities, motivation/interest, and goals)
- Based on your research of the employer's needs, plan your answers ahead of time. What information needs to be communicated to ensure that the employer will have confidence in your abilities, motivation, and fit?
- The interview is a two-way conversation. Keep in mind that you are interviewing your potential employers as much as they are interviewing you. Observe carefully and ask thoughtful questions to help you to determine whether this is the right job and organization for you.
- Work to create a positive impression and build strong rapport. Interviewers remember their impressions of you, how you answered the questions and conducted yourself, rather than exact content of your answers.
- Ask for clarification if you are confused by a question. This shows poise on your part and allows you to answer questions appropriately.
- Be yourself. Do not exaggerate, give insincere answers, or memorize perfectly scripted answers. Interviewers prefer candidates who are authentic, focused, and engaging.

Preparing for Questions

1. Whenever possible, answer questions using specific examples to support your response. Think of the acronym STAR (situation, task, action, and result):
 - *Situation/Task*: Describe the situation and/or task
 - *Action*: What action did you take? (Even if it was a team scenario, identify YOUR contributions and action steps)
 - *Result*: Discuss the outcome of your action, making sure to mention accomplishments or improvements resulting from your action.

Link this example back to how it relates to the requirements of the job.

2. Emphasize the most relevant and impressive aspects of your background and qualifications (paid work, research experience, projects, extracurricular, volunteer experience, specific skills).
3. Stress and clarify how skills you have developed in the past are transferable to the employer's organization.
4. Speak in positive terms about previous experiences and employers.
5. Talk about your accomplishments and skills (remember what you don't tell an interviewer, she/he won't know). Also, don't assume they have read your resume in depth or remember it in detail. Walk them through your most relevant experiences and explain how they have prepared you to handle the responsibilities of the new job.

Types of Interviews

Screening Interviews

These are usually shorter interviews, approximately 20-30 minutes, used for the purpose of conducting a brief evaluation of a candidate. Employers are usually looking to verify qualifications, check your communication skills, and form a quick impression to help them decide whether to move you forward in the interview process or to screen you out. These types of interviews are often conducted over the phone, Skype, or on campus.

Take screening interviews seriously and be ready to discuss your relevant qualifications for and interest in the position. If you receive an unexpected screening phone call, it is important to remain composed. If the timing of the call is inconvenient, let the employer know and ask if you can return their call. Arrange to take the call at a private and quiet location and if possible, consider using a landline, rather than a cell phone, for a more reliable connection. Make sure your voice projects (sit up or stand up) and conveys your enthusiasm for the job. Even though your interviewer will not be able to see you, consider dressing up for the phone interview to put yourself in the right frame of mind. Arrange to have a copy of your resume, cover letter, and notes in front of you to use for reference.

For Skype interviews, in addition to dressing appropriately, plan out how to optimize your environment (quiet and private location, suitable background and lighting, right camera angle) so that you'll be viewed in the most positive way possible. Work out any technical issues beforehand and practice using Skype with a friend and/or career counselor until you feel comfortable using this medium for the interview.

One-on-One Interviews

These interviews are quite common and involve the candidate being questioned by one person.

Panel/Committee Interviews

This scenario involves a panel of interviewers each with questions to ask. These interviews are common for government, academic, and some corporate positions. It is important to maintain eye contact and build rapport with all members of the committee.

Behavioral Interviews

Behavioral interview questions are based on the premise that past performance is a good predictor of future behavior. You will be asked to talk about specific examples from your past that demonstrate characteristics and skills that are important to the job. Prepare by anticipating employer's needs and thinking of relevant past examples. Use the STAR format (see Preparing for Questions section) to organize your answers.

Case Study Interviews

Some organizations, especially management consulting firms, rely on case study or situational questions to evaluate a candidate's analytical skills.

Second Round or Site Interviews

Often, the interviewing process entails several rounds of interviews. If you are considered a serious candidate, after the first interview you may be contacted for a second on-site interview with other members of the organization. If travel arrangements are involved, usually the company will pay for your expenses and make the necessary travel and lodging arrangements. Site interviews usually consist of a series of interviews with several individuals including your potential supervisor, co-workers, and higher-ranking management staff. These interviews can range from very casual to very technical. You may spend a half or whole day interviewing, which may also involve a luncheon, dinner meeting, or social activity.

Stress Interviews

Although interviews can be nerve-racking in general, some are designed to cause the applicant stress. The interviewer may ask confrontational or particularly difficult questions. It is important to remain calm and think carefully about your answers. Don't be afraid to take time to think through your answers and don't get tricked into losing your cool. The purpose of these types of interviews is to evaluate your behavior and maturity in difficult situations. Stress questions are most commonly used for those positions in which your reaction to stress is critical.

Typical Stages of an Interview

The First Impression

1. Introduction and greeting
2. Small talk (brief, informal conversation on a topic of mutual interest—keep comments short)
3. Employer is looking for appearance and dress appropriate to the organization, a firm handshake, eye contact, ease in social situations, good manners, and poise. Arrive on time, bring extra copies of your resume and don't forget to smile and be yourself.

Discussion of Background and Qualifications

Employer will be asking a variety of questions to better understand and assess your education/training, experience, and skills as they relate to the job requirements. It's important for you to review your resume and be ready to elaborate on any aspects of your background. Plan ahead what information should be shared with your interviewer based on your research of their needs.

Determination of Your Career Goals

Employers will want to know whether this job aligns with your future career goals and whether you will be motivated to do the work. You want to convey a strong understanding of the job/industry and how this work fits with your own goals.

Demonstration of Your Interest in the Organization

Through the ways in which you both ask and answer questions, show your knowledge of, and genuine interest in, the organization. You can ask informed and relevant questions to learn more about the employer at any point in the interview, and especially at the end.

Conclusion

1. Next steps in the interviewing process are discussed—ask for the organization’s time-line in the decision-making process if one is not mentioned
2. Volunteer to provide additional information
3. Thank the interviewer for his/her time
4. Ask for a business card—this will be helpful when sending a thank-you letter or email

Thank-You Notes and Follow-Up

Send thank-you letters to everyone with whom you interviewed. Email them promptly within 24-48 hours. For a special touch, you may also follow up with a handwritten note. If you have interviewed with many individuals in one day and do not have everyone’s contact information, you could address the thank-you to the person who served as your main contact or coordinator and ask him/her to convey your thanks to the others. The letter provides an opportunity to demonstrate your professionalism, build further rapport, and reiterate your qualifications, interest, and fit.

Review how the interview went. You will use interviewing skills again and again during your professional career. Learn from your mistakes and build on your strengths

Sample Interview Questions

- Tell me about yourself.
 - Keep your answer brief and relevant, one or two minutes. Offer highlights of your qualifications, goals, and interests as they relate to the job.
- What are your top 3 strengths?
 - Of your many strengths, choose ones that are important for the job and back up your assertions with clear examples.
- What is your weakness?
 - Identify a weakness that is not too detrimental to the job and discuss what you have been doing to overcome or improve it.
 - If appropriate, present a weakness that can also be a strength.
- What is your expected salary?
 - If possible, defer salary discussions until after a job offer has been made. You may want to state that you are more interested in establishing a good fit between you and the job at this point and would be happy to discuss salary when an offer is presented.

- Be ready to offer a salary range based on market research but defer actual negotiations until job has been offered.
- What did you enjoy most about your most recent job experience?
- Please elaborate on your most relevant work experience.
- What do you see as your major strengths as they apply to this position?
- Why are you interested in this position/industry? In our organization?
- Why did you choose to study _____?
- What motivates you?
- How do you deal with pressure?
- Describe a frustrating or challenging experience you’ve encountered and tell me how you dealt with it.
- Who was the most difficult person you have ever dealt with, and how did you handle the situation?
- Discuss some of your past leadership/teamwork roles and your accomplishments in them.
- Think of a specific situation that reflects your ability to show initiative/handle conflict/work in team. Describe it.
- How have your studies/training prepared you for this position?
- If I asked your friends or colleagues to describe you, what would they say?
- What is your preferred supervision style?
- Give me an example of a time when you had to deal with unreasonable expectations.
- What are your long-term career goals and how are you preparing to achieve them?
- What do you see yourself doing in 3-5 years?
- Of what accomplishment are you most proud?
- Why should our organization hire you? Why are you the best candidate for this position?
- What else would you like us to know about you?

Unusual Questions

These questions seldom have right or wrong answers. Even though the questions may not seem to be job-related, employers may try to determine your confidence, values, and/or creativity through your answers.

- If you could be any tree, which would you choose and why?
- Think about your favorite product. Now think up five better names for it.
- How would your friends describe you?

Some companies are known to ask brainteasers during the interview. They serve two purposes. One, employers want to see how you react to unexpected questions and think on your feet. The other is to gauge your cognitive abilities in solving these questions. Rather than trying to silently come up with a solution, “talk through” these problems so that the interviewer can follow your thought process and offer help. The interviewer is often more interested in how you solve the problem than the answer itself.

Questions to Ask Employers

It is important to have prepared questions to ask of each employer; these questions will indicate your interest

in the position and organization. Additional questions may occur to you during the course of the interview. Conversely, if your questions have already been answered by your research, contacts with the company, or even by the interviewer during the interview, you can also tell this to the employer while summarizing what you have learned and mentioning key points. Otherwise, lack of questions on your part may convey a lack of interest in the company or job.

About the Organization

- How would you describe your organization's culture?
- How would you describe your organization's style of management?
- What are some of the challenges the organization is currently facing?
- What do you see as your organization's strengths and weaknesses?
- How will industry trends affect this organization within the next 3-5 years?
- Where are the areas of future growth for the organization?
- How are goals established for areas of future development?
- What is the method of feedback/evaluation used by this organization?

About the Position

- Can you describe recent projects on which a person in my position has worked?
- What are the common career paths for people entering the organization in this position?
- What skills or qualities are especially important in order to be successful in this position?
- What projects would be given to a successful candidate within the first six months of starting the position?
- How are people trained or brought up to speed with regard to their responsibilities?
- How and when is performance evaluated?

Inappropriate Questions

Do not ask for information that is readily available through the company's website or literature. It will be obvious that you have not bothered to do your homework. You should also initially refrain from asking questions about benefits, perks, and salary. This conversation should wait until it is clear that they want to hire you. Your focus should be on explaining how you can add value to their organization and on gaining a better understanding of the job and organization.

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THE ACADEMIC JOB SEARCH

What Is Important to You?

When you started your doctoral program, you may have had a vision of your professional future. As you progressed through your program, this vision may have sharpened, shifted, or changed completely. In any case, it is important to reflect on who you are now, what you most enjoy doing, and what your priorities are. This will help you identify the types of academic opportunities that are likely to be the best fit.

Do you enjoy research? Do you love to teach? How do you prefer to spend your time? What kind of department are you looking for? What kinds of colleagues do you hope to have? Looking at how you prefer to direct your time and energy can help you figure out if you are most interested in applying to large research universities, private liberal arts colleges, public universities, institutions with religious orientations, community colleges, or others. There is no single right answer for everyone; the goal is to figure out where you will thrive professionally.

Family and partner considerations may also play a substantial role as you look toward the next step in your career. If you have a partner, you may find it productive to discuss your shared hopes and goals. Are there parts of the country where one or both of you would prefer to live? Do you want to live in a city, a suburb, a rural area? What other geographic and lifestyle considerations are important? Consider where each of you might be willing to compromise.

Yes, the academic job market is competitive—in some cases, staggeringly so. But it is always easier and more effective to make a compelling case for an institution that matches your values and priorities. Figuring out what you want may ultimately give you more freedom to be flexible.

Gather Information

It is crucial to know how academic positions are advertised in your discipline. In many fields, a list of academic positions is published annually. First-round interviews then take place at an annual conference. If you have the opportunity to familiarize yourself with postings in your field before you go on the job market, by all means, do so! Take note of which postings interest you the most, and what types of qualifications are emphasized.

Speak with faculty members in your department. At conferences, go out of your way to chat with colleagues from other institutions. Seek out alumni from your department who have already graduated and are now working in academia. You will benefit from their experiences, and you may be surprised how willing some will be to share advice for your academic job search.

Try to build a timeline for yourself in advance. Simply developing a CV and cover letter, along with perhaps a teaching statement, a research statement, a writing sample, a dissertation abstract, sample syllabi, and/or evidence of excellence in teaching, can be a time-consuming process. Some Ph.D. students find it helpful to begin working on these materials well in advance of the deadlines, which often

occur in the fall of their final year. These materials will be addressed in greater depth on page 16 of this handbook in the section “Additional Application Materials”.

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Online Resources for Academic Jobs:

- College of Engineering job board: UMass.JoinHandshake.com
- Academic Careers allows users to search for faculty, postdoc, fellowship, and research positions by field and location: www.academiccareers.com
- Academic Employment Network allows users to browse by job type, salary, and category: <http://academploy.com>
- Each of the links below provide postings for academic STEM positions around the world: <http://computeroxy.com>
<http://www.engineeroxy.com>
<https://polytechnicpositions.com>
- Higher Ed Jobs allows searching by job category, location, and institution type: www.higheredjobs.com
- My Job Helper lets students search by job title and location: www.MyJobHelper.com
- Pathways to Science is an engineering, science, and mathematics specific higher education job search site for postdoc positions, faculty programs, and fellowships: www.pathwaystoscience.org/Postdocs_portal.aspx
- PhDs.org have relevant articles on career development and job postings: www.phds.org
- Science Careers has information concerning science and technology including career profiles, advice, and jobs: <http://sciencecareers.sciencemag.org>
- The American Association of Community Colleges provides general information about community colleges: <https://www.aacc.nche.edu>
- The Chronical of Higher Education provides a list of job postings by keyword and position type: https://chroniclevitae.com/job_search/new
- Times Higher Education allows students to search for academic jobs around the world: www.timeshighereducation.com

THE INDUSTRY JOB SEARCH

Schedule Time for Your Job Search

As a graduate student or postdoc, spare time is hard to come by. Set aside time in your busy schedule to devote to career exploration and the job search. Make concrete, realistic goals (e.g., work on polishing resume and have it critiqued this month, print out business cards to use for networking, conduct 1-2 information interviews per month) and check your progress. Partner with someone you trust and hold each other accountable to work on career issues. You can also check in with your career counselor on a regular basis to assess your progress and to strategize your next steps.

A suggested timeframe is as follows:

- **Fall:** Start researching and networking with organizations
- **Winter/Spring:** Apply to posted jobs/internships/fellowships and follow up with contacts made in the fall as they may now know of available opportunities

Customize Your Resume/CV and Cover Letter

Evaluate the job description, and organize the information on your resume to highlight the knowledge, skills and abilities the employer is seeking. Employers initially spend around 20-30 seconds scanning your resume. Make sure your most relevant and impressive experiences easily catch the attention of the reader. Depending on the career field, you may need to convert your CV into a resume or create a CV/resume hybrid.

Hone Your Interviewing Skills

Learn how to respond to various types of questions and direct the employers to your strengths and relevant experiences. Describe your experiences in succinct and effective ways including the problem you faced, the action you took, and the results you achieved. Be ready to address why you have decided to leave academia and how your skills transfer to this career field.

Tailor Your Job Search

Research your target employers and find out the best ways to secure employment. Many industries and small organizations do not post jobs on the internet and require proactive job search strategies. Other organizations may rely on college recruiting as their primary hiring strategy (consulting, investment banking, etc.) and you will need to familiarize yourself with their recruitment schedules and processes.

Learn How to Effectively Search for Jobs Online

Accessing jobs posted on the Internet is convenient and easy to do. However, big, highly visible job boards make it difficult for job applicants to distinguish themselves. Studies show that only 4% of users find jobs through these sites.

Focus on niche websites or go to the company website when possible.

Target Employers Directly

Whether employers have openings or not, contacting employers directly, though intimidating, can be extremely effective. Job seekers need to research the organization thoroughly before approaching the employer and tailor their resume and their cover letter for maximum impact.

Attend Career Fairs

If you are interested in looking for a job or finding out more about a potential career, this is a convenient way to connect personally with various employers in one location.

- Research who will be present and target employers accordingly. Have a plan of action.
- When getting dressed for the event, keep in mind the industry and type of position you desire.
- Prior to attending a fair prepare a 30-second pitch to engage recruiters. The goal is to connect your background to the organization's need. In less than a minute, you need to introduce yourself, demonstrate your knowledge of the company, express enthusiasm and interest, and relate your background to the organization's need, and end with a relevant question. This is meant to be a dialogue, not a monologue. Keep in mind that this is your opportunity to interact with a company insider, collect valuable information, and make a positive impression.
- Bring copies of your resume (prepare several versions if you are targeting different industries) for employers who wish to collect them to take notes and remember you. It's standard for most employers to ask you to submit your resume online. You may choose to gather pertinent information during the fair to enhance your application.
- Job fairs can be stressful for attendees, who often find they must wait on line to speak to employers. Demonstrate professional behavior and etiquette at all stages of interaction with an employer, even while waiting. Be both assertive and respectful to those around you.
- Keep track of those organizations and representatives with whom you spoke. If appropriate, send thank-you notes to those representatives you wish to pursue. This will set the stage for future correspondence.

Adapted with permission from Stanford University's Stanford Ph.D. & Postdoc Career Guide.

For additional information, please check the following list of industrial job search resources.

Online Resources for Industry Jobs

General:

- UMass Engineering Career Development and Experiential Learning Center: UMass.JoinHandshake.com
- Career Bliss lets students search for positions by keyword and location, and allows students to filter results by company: www.careerbliss.com
- CareerOneStop provides a very detailed search engine to find jobs by industry, occupation, location, and keyword. After choosing an industry type, state, and region, you will be able to view a list of companies in that area: www.careeronestop.org/toolkit/jobs/find-businesses.aspx
- Dice.com is a technical job search site allowing users to search by job title, keywords, and location. Filters are also provided for sorting through search results, including a company list: www.dice.com
- EngineerJobs allows students to search by discipline and location: www.engineerjobs.com
- Engineering.Jobs provides keyword and location search options, and features a company filter tool: www.engineering.jobs
- **Federal Jobs:** Engineering graduate students can search for federally sponsored opportunities including research and non-research based internships, scholarships, fellowships, etc. across many U.S. government organizations: <https://stemgradstudents.science.gov>
- Glassdoor helps students find jobs within a certain industry or location: www.glassdoor.com
- Hoovers is a good site to search a known company and view that company's rankings and top competitors. More detailed information requires a subscription: www.hoovers.com/company-information/company-search.html
- Job-Hunt is a job search site to find positions by keyword and location: www.job-hunt.org
- **Occupational Information Network (O*NET):** The O*NET is the nation's primary source of occupational information, containing information on hundreds of jobs. The database provides the basis for the Career Exploration Tools that describe occupations in terms of the skills and knowledge required, typical work settings, and average salaries. <https://www.onetonline.org>
- US.jobs lets students find jobs by keywords and locations, and has a company filter among others: <http://us.jobs>
- Vault Career Intelligence allows students to search for jobs by research area or industry type. A list of relevant companies, internships, schools, articles, and even blogs can be found to the left of the search results: www.Vault.com

Degree Specific:

Chemical Engineering:

- American Chemical Society Career Center: www.acs.org/content/acs/en/careers.html
- American Institute of Chemical Engineers: www.aiche.org/resources/careers
- Chemical Engineer: www.chemicalengineer.com
- Chemical Industry Search Engine: www.chemindustry.com

Civil & Environmental Engineering:

- American Society of Civil Engineers: www.asce.org
- Associated Builders and Contractors (ABC): www.abc.org
- Civil Engineering Jobs: <http://civilengineeringjobs.com>
- Environmental Jobs & Careers: www.ejobs.org
- Institute of Transportation Engineering: www.ite.org

Electrical & Computer Engineering

- Computer Jobs: www.computerjobs.com
- ComputerWork: www.computerwork.com
- Institute of Electrical and Electronics Engineers (IEEE): <http://careers.ieee.org>
- Nation Job: <http://nationjob.com/computers>

Mechanical & Industrial Engineering:

- American Society of Mechanical Engineers (ASME): www.asme.org/jobs
- Engineering and Manufacturing Job Openings: www.nationjob.com/engineering
- MechanicalEngineers.com: www.mechanicalengineer.com
- The Institute of Industrial Engineers Career Center: www.iienet2.org/Landing.aspx?id=388

Other Resources:

U.S. Government Jobs

- USAjobs.gov

Science Policy/Non-Profit

- AAAS Science and Technology Fellowships
- Presidential Management Fellowship
- American Chemical Society
- United Nations (various offices)
- Idealist.org

TIPS FOR NETWORKING

What is Professional Networking?

Networking is about making connections. It involves the exchange of information between you and another person in your field of interest.

Who do I “network” with?

In addition to obvious people such as recruiters who come to the career fair, think outside the box in terms of networking. There is a wide range of people who can help connect or advise you regarding opportunities in your professional field such as:

- On-campus recruiters (these folks come to career fairs, corporate information sessions, technical talks, formal networking events)
- Alumni come back to campus for a variety of events such as reunions, tech talks, info sessions, award ceremonies and fundraisers. The UMass Alumni Association offers an online connection to alumni at: www.umassalumni.com
- Faculty/Staff
- People you meet at professional conferences
- Co-workers/Collaborators (Other graduate students and faculty that you have collaborated on research projects with will be key connections in your future. Ask yourself: what kind of collaborator am I? Would a colleague recommend me to their employer in a few years? Why or why not?)
- LinkedIn, other social media that is directly related to your field of interest (AICHE, ASME...)
- Family, friends, neighbors, acquaintances from religious institutions, sporting teams, the gym, etc. (Does your uncle work for an engineering company? How about the person in your running group? Keep in touch, think about how your research could align with their needs/interests.)

What kind of results can I expect from networking?

Don’t expect that someone else is going to “get you a job”. You must get yourself the job by presenting your skills, competencies, knowledge and personality well. However, networking CAN help provide:

- Leads on openings at specific companies
- “Inside information” on what a company is looking for when hiring
- The name of a contact within the company such as a hiring manager or HR person
- Career advice on what type of path to choose in order to meet your career goals
- Names of companies who are doing the type of work you are interested in

What do I say when I am “networking”?

Many people feel awkward at networking events, not knowing what to say or how to present themselves without sounding like a salesperson. However, being prepared with some general information will help you feel more confident in talking about your career interests. Possibly the best thing to remember is to “keep it real”. Start as you would any conversation, by introducing yourself, then be prepared to follow up as the conversation progresses. Don’t forget to ask about them as well. Questions like, “What does a typical day on the job look like for you”, “How long have you been in the field” or “What types of problems do you encounter” make the conversation a two-way street. Make sure you have thought about the following things in advance and practice them out loud.

- Name, major (or degree), and school level (M.S., Ph.D.)
- Your career area of interest. (It is important to find the balance between being very specific yet staying open-minded about career fields. For example, if you are interested in working with high-end sound systems and you are at a networking event with BOSE, you should be very specific about your research and interest. However, if you are talking with a neighbor who works at company that manufactures medical devices, you should broaden the conversation to talk about your interest in working in a manufacturing environment.)
- A brief summary about your research and experience and how it aligns with the type of work their company is doing.
- Activities that demonstrate teamwork, technical writing, leadership, or other skills.

Examples: Depending on the nature of the networking event, your level of preparation will vary. If you are going to a formal networking event, career fair, or professional conference, you should definitely spend some time researching who will be in attendance so that you will be able to tailor your conversation to match the needs of the various attendees. For example: Imagine that you are going to the Society of Women in Engineering Conference and you are participating in the DePuy Networking Night. Your “pitch” could sound something like this:

Hi my name is Danielle, and I am a Ph.D. student at UMass, Amherst. For the last couple of years I have been involved with optimizing the fabrication process of an actuated bellows mold that will ultimately become a wireless implantable medical device for the treatment of pediatric cancer. This experience has really sparked my interest in the development of implantable biomedical devices, and I noticed that DePuy has just launched a

new product line of spinal cord implants that utilize microelectronics in a very unique way. I am really interested in using my laboratory experience in an industry setting to help with the testing and re-design process of implantable medical devices. Do you know of any related openings in the company?

Other General Tips for Networking:

- If you will be attending a formal networking event or career fair, ask the event coordinators for a list of attendees so that you can research the type of work they do
- Know the dress code for the event. (business casual vs. suit and tie) Bring breath mints!
- Remember to ask for business cards
- Follow up with contacts after the event. A nice email or LinkedIn note goes a long way!

BUILDING AN EFFECTIVE LINKEDIN PROFILE

As more and more recruiters turn to social media sites for their recruiting efforts (studies suggest that approximately 94% of recruiters use these sites), it is clear that graduate students need to spend time creating an effective online profile. In a “before and after” study, researchers at Business Insider (2013) found that “optimized profiles garnered on average five times as many profile views as before” (p.2). Pull down the “My Network” tab on LinkedIn and click on “Find Alumni” to connect with over 150,000 UMass alumni!

Building an effective LinkedIn Profile includes the following components:

Your Professional Photo

Your LinkedIn Profile picture should be a headshot of you in a professional, straight-forward position. Don’t include props, scenery, etc. Keep it simple and professional, but also remember to smile and look friendly and approachable. Ask a friend or colleague to take the picture (no selfies!) or come by the UMass COE Career Center and ask one of our staff to help.

Your Customized Headline

Use industry-specific terms to highlight your key skills and competencies to market yourself to recruiters. LinkedIn gives you 120 characters to set yourself apart from the competition!

Your Summary Statement

The Summary serves as an “Opening Statement” to recruiters about why they should hire you. This section should summarize what background, skills, achievements and interests you bring to the table. Remember that skills and competencies included in the Summary Statement should be “fleshed out” in the following “Experience” section. You should be able to back-up any claims you make about yourself in the Summary Statement with evidence from your experiences.

Your Experience

This is the largest section of your LinkedIn Profile, and it should show clear and concise examples of professional experiences you have had that demonstrate your technical

and professional skills. It is not necessary that every “experience” be a paid one—class projects and research are excellent examples of places where you may have gained technical proficiencies, trouble-shooting, teamwork and presentation skills. Many large companies use a Key Word search when reviewing resumes. Make sure your Experience Section includes the Key Words for any specific position you are applying to.

Education

As a student, you will be looking for a position while you are still completing your degree. Make sure that you have included your “Anticipated Graduation Date” so that employers know when you expect to graduate and when you would be available for work.

Recommendations

One important component of networking is to begin to build credibility in a professional capacity. Consider asking faculty or colleagues who can comment on your technical competencies, work ethic, teamwork, writing or presenting skills to provide a recommendation for you.

Joining and Following Groups and Companies

Joining discipline-specific groups helps you to connect with other like-minded professionals in your field. Make sure that you are joining groups that you can both benefit from and contribute to. LinkedIn is a community, not just a one-sided search site. In addition, “Follow” companies that you might be interested in applying to. Knowing about upcoming recruiting events or recent projects will give you an edge in the recruiting process.

Fully “Complete” Your Profile

According to LinkedIn, your profile will get significantly more views if you complete the following sections:

- Industry and location
- Current Position (include description)
- Education
- Skills set
- Profile Photo
- Have at least 50 connections

EVALUATING, NEGOTIATING, AND RESPONDING TO JOB OFFERS

Job Search Endgame

As a Ph.D. or postdoc, you've invested considerable time and effort in your education and job search, and now it is about to pay off. It is an exciting time, but potentially confusing and stressful. We offer these brief guidelines to address common concerns related to anticipating, weighing, accepting and/or negotiating job offer(s).

Receiving the Offer

Thank the person extending the offer and express enthusiasm for the position. Reiterate how important this decision is for you and ask for some time to think it over in order to make a good decision. If it is a verbal offer, ask about getting the offer in writing so there are no misunderstandings. Ask when your response is expected.

An offer letter, at minimum, states your job title, salary, expected start date and your department or supervisor's name. It may further enumerate your benefits and/or briefly describe your responsibilities.

Managing Multiple Employers

You have a job offer in hand. Or you may sense an offer is imminent; sometimes an employer will tell you outright, "We plan to make you an offer." This is a great time to reconnect with any other prospective employers that are still considering you as a candidate or finalist. Contact those employers to inquire about the status of your application and their timeframes for making a decision. Reiterate your enthusiasm for the position, alert them that another offer is in hand or seems imminent, and ask about the possibility of them accelerating their hiring process.

EVALUATING THE JOB OFFER

Ask yourself the following questions about the position(s) you are considering. It may be helpful to compile your answers in a spreadsheet or similar document. If these factors are not a good fit, it will be difficult or impossible to rectify them through negotiation. Think carefully whether you want to accept or decline the offer.

1) State Your Values and Preferences

What do you find important and fulfilling about your work? What are your values and priorities? How do you prefer to work? What work environments do you prefer?

And finally: How well aligned is your job offer with your goals, values and preferences?

2) Assess the Organization and Industry

Research the financial stability, growth, and trends of the industry and organization.

What growth or trends are happening in the industry?

How financially stable is the company? Has it had significant layoffs recently?

If a startup, is it well funded? Is it likely to meet milestones to secure future funding?

Will you have appropriate resources and/or budget to support your work?

What are the opportunities and expectations about publishing your work?

Is there a budget for conferences, travel and/or professional development?

If you have questions, address them with the organization contact before accepting the offer.

3) Review Your Role and Responsibilities

Review the responsibilities and daily activities of the position. Consider additional information you gathered while going through the interview process. Does this position seem interesting and engaging? How does it fit with your long-term goals?

4) Salary and Market Value

Salary doesn't necessarily correlate with the value you add or the contribution you make to society. It's what the market will bear to purchase your services, which include your skills, expertise, knowledge, and special talents. Check the *NACE Quarterly Starting Salaries Survey* in the Engineering Career Development and Experiential Learning Center to determine a range for your market value. Often recent graduates don't have the experience or expertise to warrant a higher salary. However, exceptions that may justify a higher salary include:

- Proven expertise in a specific and sought-after area
- Relevant work experience through previous industry experience, internships, or summer jobs
- A written offer for a higher salary from another organization

5) The Overall Compensation Package

Salary is only one part of a total compensation package. Your package might include any of the following:

- base salary
- signing bonus and/or relocation expenses
- medical, dental, and vision insurance

- life insurance, accidental death insurance and disability benefits
- 401(k) or other retirement plans (and perhaps matching contributions from the employer)
- pretax contributions for child or elder care
- bonuses based on performance and/or profit sharing
- stock; discounted stock purchase plans and/or stock options
- paid sick leave, holidays and vacation time and/or sabbaticals
- reimbursement for future education
- laptop computer and/or technical equipment
- flexible work schedule
- extras such as commuting allowance, parking subsidy, health club membership, etc.

Ask your HR representative to explain the benefits package before you make a decision.

Some organizations offer a fixed package that is not negotiable; other organizations may be willing to negotiate

on salary, bonuses, stock options, date of salary review, relocation costs, or extras.

Though many people focus on the base salary, these other items may significantly impact your income and/or quality of life, both now and in the future. One position may offer free meals and a higher salary in San Francisco, an expensive city. Another may offer a lower salary but match contributions to your retirement plan in a different city with a lower cost of living and less expensive housing. You will need to conduct a cost/benefit analysis to determine which is better for you.

6) Evaluate the Offer

Ultimately, you will accept, reject, or try to negotiate changes to the offer. After determining the industry, organization and position are a good “fit,” evaluate the details of your job offer.

NEGOTIATING THE JOB OFFER

Do You Want or Need to Negotiate?

The only reason to negotiate is to get fair market value for your skills, experience and knowledge. You are not obligated to negotiate; do not negotiate for negotiation’s sake. Some job seekers believe they are expected to negotiate, or that salaries should be negotiated as a general principle. Although organizations respect employees who can articulate the value they add, recent grads (or anyone else) can quickly alienate potential employers if they are inappropriate or go overboard in negotiating to “get a fair deal.”

Organizations, large and small, generally establish salary ranges for each position based on standards and general practices for the field. Organizations determine where an employee falls within the salary range based on experience and special expertise or knowledge. Recent graduates, with limited experience in entry-level positions, generally will be paid in the low- to mid-range, reserving higher salaries for more experienced individuals.

It’s in the organization’s best interest to compensate you fairly. Organizations want to hire and retain good employees. Hiring and training new workers is costly. Organizations do not want to make low offers that are rejected and then have to repeat the recruiting process. Nor do they want you to leave to work for other employers—potentially competitors—that offer better compensation.

When Should You Negotiate?

- **After you have received a formal offer, preferably in writing.** Having detailed discussions about compensation before this point could eliminate you prematurely from consideration.
- **You have decided that the overall opportunity is a good fit.**
- **You understand how your skills benefit the organization.** This may be difficult to assess with

limited work experience. In this case, try to identify the needs of each person who interviewed you. How are you a solution to their problems/challenges? Then, when you’re negotiating, you will have specific ideas about how you will add value. You will be able to confidently state that you are worth \$5k more because of your ability to create specific software, design the new manual, or write the necessary grant proposal.

- **The offer does not reflect the fair-market worth of your services in this field.** Research salary ranges for your role and industry. These facts will help you determine if the compensation is reasonable, and support your argument for a higher salary. You’ll be more persuasive if your negotiation is based on verifiable evidence. Familiarize yourself with the entire package before initiating negotiations; employers who can’t offer a higher salary may instead offer “perks” such as extra vacation days or free parking.
- **You are clear about what you want and what you need.** What aspects of the job offer are essential for you, affecting the tipping point of whether or not you accept or decline the offer? What aspects are sweeteners, but won’t change your decision? Where are you willing to compromise? What is your “walk away” point—the barest minimum you need for the offer to be acceptable? Envision your ideal (yet realistic) outcome from the negotiation. At the same time, identify several backup options that are acceptable should your first request be denied.
- **You know your alternatives in case negotiations fail to produce the changes you seek.** If your negotiations produce all the changes you requested, you should be prepared to accept the amended offer. If your negotiations produce some of the changes you requested, you’ll have to decide whether it

adequately satisfies your needs and exceeds your threshold for accepting the position. If negotiations fail to produce changes that will make the position acceptable, you will probably decline the offer—but talk to a career counselor or someone you trust before you do. It is important to clearly assess your alternatives. If negotiations fail, what is your next Best Alternative to a Negotiated Agreement (BATNA)? Do you have other offers? Will you hold out for another employer to make an offer? Can you sustain your current employment (or unemployment) situation?

Negotiating Successfully

Know Your Value

Remember what you bring to the table! If you ask for more money or more resources, it is helpful to remind yourself why the value you bring to the table warrants a higher salary than the one offered. Be prepared to offer substantive evidence for why your unique skills, experience, and qualifications warrant a higher salary or additional resources.

Know the Numbers

It is extremely helpful to have a sense of your peers' salaries. Of course, this is not always possible. State colleges and universities publish salary information, which helps tremendously. A number of online surveys include salary information, but often the information is more general than you need for negotiation purposes. If you have contacts at the school or university, consider diplomatically checking with them to see if they can share any helpful context.

Know Your Priorities

There are various things for which you can negotiate, from salary to office space to time to finish turning your dissertation into a book. (See the list on the next page for more than 30 elements that may be negotiable.) The key is to figure out which ones are most important to you. Think about what you need to thrive in your new role. For some, family interests may play a prominent role in your priorities, with preferences relating to your teaching schedule taking center stage. Negotiating is generally the most effective when you have a clear sense of your priorities.

View It as a Win-Win

It is to the department's great advantage if you can be successful in your position. If you are looking at a tenure-track position, being successful likely means getting tenure. You must seek to have the resources (time, space, equipment, staff) that you will need in order to gain tenure, whether that means a reduced teaching load so you can turn your dissertation into a book, or the resources necessary to write a successful grant in your first or second year that will enable you to conduct essential research.

Get Absolutely Everything in Writing

The importance of this step cannot be overstated. The person who agreed to your terms may leave or forget. Circumstances may shift. It is crucial to have a written record.

One very simple way to accomplish this is to send an email following a phone conversation in which you came to an agreement. The email should describe precisely what you agreed upon, and explain that you just wanted to confirm that these terms were agreeable. Keep your email and the confirmation and/or clarification(s) you receive in return in a safe place, as you may need to draw on them down the road.

Sample Negotiation

Negotiation is a process for reaching an agreement on what an organization will pay for your skills, knowledge and expertise. Your success in negotiating for higher compensation (and the only reason you should be negotiating) depends on evidence suggesting your market value is higher than that reflected in the offer. Contrary to popular belief, this is not an adversarial process. It is in your best interest and the organization's to come to a mutually beneficial agreement. Adopt a Win-Win or No Deal mentality.

You will usually negotiate with your Human Resources representative, but sometimes the negotiation is conducted directly with your manager. If you are unsure, you can ask.

What to Say and Do During a Negotiation

Ask the employer to explain how compensation is determined, and then listen. Ask how your distinguishing and exceptional strengths and expertise were accounted for. State clearly and succinctly the evidence suggesting your compensation should be higher, and then listen.

Here is a sample script for the negotiation process:

Student: "I want to say again how extremely pleased I am to have the opportunity to work with you and this organization. However, I would like to discuss the compensation."

HR Rep: "Sure. What questions do you have?"

Student: "First, I'd like to know how your organization structures salary ranges to understand how this salary was determined. I want this to work for both of us."

Listen to the response.

Student: "What flexibility is there with the starting salary?"

Listen to the response.

Student: "I understand the organization prefers to bring inexperienced graduates in at the lower end of the range for this position. However, I feel this offer does not reflect the experience and perspective I gained from working in this industry prior to starting my Ph.D.." (If you have other hard salary data from your research, diplomatically mention it here.)

If the salary is not negotiable, suggest the next option from your backup plan (such as a higher signing bonus, if applicable, or early performance review,) then move on to any other part of the job offer that you would like to negotiate.

For further help with negotiation, consult with the Engineering Career Development and Experiential Learning Center.

36 Negotiable Items in an Academic Position

1. Appointment title or titles (all special titles are typically renewable after five years in the U.S.)
2. Units (for joint appointment, specify fraction of appointment in each unit)
3. Tenure status
4. Starting date (January 1, September 1, etc.)
5. Starting salary (options: bonuses; additional time off for consulting; additional contributions to retirement account)
6. Living expenses (university housing; housing allowance; closing costs; housing bonus; or mortgage for a year if applying to industry)
7. Contributions to housing relocation expenses (selling/buying costs; realtors' fees)
8. Benefits (healthcare; dental; insurance; parental leave; spousal benefits; time off)
9. Child care (availability of child care resources and referral; also care during time for research data collection or conferences)
10. Tuition benefits for children
11. Spousal job opportunities
12. Reimbursement of moving expenses (may be capped at 10% of salary)
13. Travel budget (including travel for projects and for continuing education)
14. Facilities / Space (amount and nature of the space commitment. For a joint appointment, expect only one office. Check the allocation of space, often public record)
15. Office furniture and computer equipment (on campus and/or at home)
16. Parking fees
17. Staff support (direct and indirect)
18. Nine month or twelve month appointment (or a variation)
19. Immigration and Naturalization contingency
20. Research support or continuing research support (amount, fungibility and source of start-up funds; fungibility = degree to which money can be used for different purposes). Specify length of time during which start-up funds must be used (e.g., first three years)
21. Research equipment
22. Research staff (full-time)
23. Additional hires in a specific research area (for program building)
24. Reduced or free service from campus facilities (machine or wood shops, instrumentation centers, such as NMR, etc.)
25. Support for Postdocs
26. Graduate student fellowships
27. Normal teaching duties in the unit(s) (option of selection of courses)
28. Particular teaching expectations (for joint appointment, clarify distribution of teaching responsibilities among units)
29. Number and source of summer ninths (number paid from general fund)
30. Number of course releases (and any time constraints on this)
31. Center or Institute affiliations (support for)
32. Service expectations (committees—clarify if extra pay is a stipend or part of your base)
33. Sabbatical (any recognition of sabbatical equity accrued elsewhere (can take the form of a Duty Off Campus Leave rather than early sabbatical)
34. Consulting release time (in academe, industry or government based on experience)
35. Date by which candidate should respond
36. Time for candidate to resign from current position

"36 Negotiable Items" used by permission of Jane Tucker of Jane Tucker Associates and Barbara Butterfield of HumanEd Consulting who developed this list for their workshop on Strategic Persuasion: Effective Negotiations, Problem Solving and Conflict Resolution in Higher Education.

RESPONDING TO JOB OFFERS

If you and the company have come to a mutually satisfying agreement, ask for something in writing that reflects your mutual understanding. If negotiation produces changes to the original offer, ask for an amended offer letter so all parties are clear about the revised offer. To accept the offer, sign and return the (amended) offer letter by the agreed-upon deadline. We recommend including a short job acceptance letter as well (see the sample in this section). You will likely phone or email your contact to enthusiastically accept the offer, and inform the employer that the signed document is on the way.

If negotiation failed to produce a mutually satisfactory agreement, you must make your decision based on the employer's final offer. In this case, you would generally phone your contact to express gratitude for the consideration and offer, but to politely decline the offer. Follow up this call with a formal written letter or email that declines the offer in a clear, polite and professional manner (see samples in this section).

Sample Job Offer Communications

Dear Ms. Gonzalez,

Thank you for offering me the position of Research Scientist with XYZ, Inc. However, I regret to inform you that I cannot accept your generous offer at this time. After carefully evaluating all opportunities available to me, I have accepted another position that seems a better fit for me at this point in my career.

I truly enjoyed meeting and speaking with you and other representatives from XYZ.

Thank you again for your consideration. Best wishes for the continued success of XYZ, Inc.

Sincerely,

Nick Gupta

Declining a Job Offer

Dear Madeleine,

I hope this email finds you well.

I am writing to inform you that I will unfortunately not be accepting the generous offer of Assistant Director at ABC. I really appreciate the care and hospitality extended to me during this time. Foremost, I am grateful that ABC granted me an extension so that I could fully consider my options.

At this time, I feel that ABC is not the best fit for me. It was an extremely tough decision for me to make, as evident in my request for an extension. I again want to thank you and everyone else at ABC for this great opportunity and for your help and support through this process.

Sincerely,

Mara Baker

Sample Job Offer Communications

Withdrawing Your Candidacy

Dear Mr. Polanco,

I enjoyed meeting with you and your colleagues last week regarding the position of Project Manager. Thank you for your time and consideration during this process.

While I am not sure where the hiring process stands, I wish to inform you that I must withdraw my application from consideration for this position. I have accepted a similar position at another organization.

Thank you again for your consideration and best of luck in completing your search.

Sincerely,

Anna Udell

Accepting an Offer

Dear Ms. Fuqua,

It is with great excitement that I accept the offer for the position of Senior Analyst. I have included the signed offer letter as you requested.

I have been communicating with the relocation company and am currently in the process of moving to Seattle. I expect to be settled in by the end of the month and ready to start in early August.

I will contact you as my start date approaches. Please feel free to contact me if you have any questions. I look forward to my new position at LMN.

Sincerely,

Sarah Gold

Dear Ajit,

Thank you for your employment offer for the position of Program Coordinator. I would like to reconfirm my acceptance of this position. As I mentioned earlier, I look forward to joining ZZZ and am confident in the contributions I will make to your organization. I am truly excited to apply my passion and skills to this position.

Per our phone conversation, I will start work on Monday, August 22. I will be out of town until mid-July but can be reached by cell phone at (650) 123-4567.

Thank you again for this opportunity.

Sincerely,

John Lee

PROFESSIONAL ETHICS

Candidates and employers have a joint responsibility when accepting or extending a job offer. The Engineering Career Development and Experiential Learning Center expects recruiters will abide by its policies and by the ethical standards of the National Association of Colleges and Employers. These guidelines include the statement that employers “will refrain from any practice that improperly influences and affects job acceptances . . . including undue time pressure for acceptance of employment offers.”

The Engineering Career Development and Experiential Learning Center expects students to observe similar ethical practices, including the following code of conduct:

- Once you accept an offer, you have made a commitment to that employer and it is your ethical responsibility to discontinue interviewing with other employers.
- If you accept an offer, and later a better offer comes along, remember that you have made a significant personal and professional commitment to the first

employer; you should honor that commitment. **Reneging on a job offer is highly unprofessional.** If you are unsure about accepting a job offer, it is always better to negotiate for more time to make your decision than to accept the offer prematurely and later rescind your acceptance.

Consider the reverse situation:

An employer offers you a job and later a stronger candidate comes along. How would you feel if the employer called you to withdraw its original offer to you? Clearly that would be unacceptable. The recruiting and hiring process works best when all parties adhere to ethical behavior.

(In rare cases, a candidate who has already accepted an offer may find him- or herself in an unusual position with extenuating circumstances, such as a family emergency; Engineering Career Development and Experiential Learning Center career counselors are available to meet with you one on one to discuss your situation.)

FREQUENTLY ASKED QUESTIONS

Q: What do I say if I’m asked for my salary requirements before I have received a formal offer?

A: You’ll generally defer discussing your specific requirements until a formal offer has been made. Early in the interview process, you may reply, “If it’s okay with you, I’d like to defer that question for now and focus first on the content of the work. I’m interested in knowing more about the specific duties and responsibilities of the job.” If the hiring manager insists, you might say something like, “I assume a range has been established for this position and wonder what the organization has in mind?” or “A salary competitive for this position and industry.”

Later in the interviewing process, as a finalist, you may need to provide an actual range (not a single number) for your desired salary. You might say, “Based on [objective salary survey], I believe [\$ range] is the fair market range for this position.” Make sure you have done your homework!

Q: What do I do if all my requests are rejected in the negotiation process?

A: You must decide to accept or reject the position based on the terms of the original offer.

Q: How committed am I to a job offer I have accepted, if a better offer comes along?

A: First, if you are unsure about accepting a job offer, it is better to negotiate for more time to make your decision than to accept the offer prematurely and later rescind your acceptance. Second, it is very important to honor your commitment. Backing out of the agreement is highly unprofessional and reflects negatively on you and the University of Massachusetts. It may taint your reputation in your chosen field now and in the future. If you signed a contract that included a signing bonus, check the contract for a clause requiring you to pay back the full signing bonus if you leave the organization before the stated duration. The signing bonus amount that you receive will be the total amount, minus taxes, but the amount you must repay will be the full amount of the bonus.

Q: How do I request an offer in writing?

A: If a verbal offer is made, you can say, “I’m very excited about the opportunity to work with you and this organization. Since this is such a significant decision for both of us, I’d be more comfortable if the offer was in writing and I could look it over.”

Q: What if I don’t understand something in the employment offer letter?

A: Organizations are usually happy to clarify or answer any questions about the job offer.

PROFESSIONAL ETIQUETTE

Your academic knowledge and skills may be spectacular, but do you have the social skills needed to be successful in the workplace? Good professional etiquette indicates to potential employers that you are a mature, responsible adult who can aptly represent their company. Not knowing proper etiquette could damage your image, prevent you from getting a job and jeopardize personal and business relationships.

Meeting and Greeting

Etiquette begins with meeting and greeting. Terry Cobb, Owner, HR-Employment Solutions, emphasizes the importance of making a good first impression—beginning with the handshake. A firm shake, he says, indicates to employers that you're confident and assertive. A limp handshake, on the other hand, sends the message that you're not interested or qualified for the job. Dave Owenby, Human Resources Manager for North and South Carolina at Sherwin Williams, believes, "Good social skills include having a firm handshake, smiling, making eye contact and closing the meeting with a handshake."

The following basic rules will help you get ahead in the workplace:

- Always rise when introducing or being introduced to someone.
- Provide information in making introductions—you are responsible for keeping the conversation going. "Joe, please meet Ms. Crawford, CEO at American Enterprise, Inc., in Cleveland." "Mr. Jones, this is Kate Smith, a senior majoring in computer information systems at Northwestern University."
- Unless given permission, always address someone by his or her title and last name.
- Practice a firm handshake. Make eye contact while shaking hands.

Dining

Shirley Willey, owner of Etiquette & Company, reports that roughly 80% of second interviews involve a business meal. Cobb remembers one candidate who had passed his initial interview with flying colors. Because the second interview was scheduled close to noon, Cobb decided to conduct the interview over lunch. Initially, the candidate was still in the "interview" mode and maintained his professionalism. After a while, however, he became more relaxed—and that's when the candidate's real personality began to show. He had terrible table manners, made several off-color remarks and spoke negatively about previous employers. Needless to say, Cobb was unimpressed, and the candidate did not get the job.

Remember that an interview is always an interview, regardless of how relaxed or informal the setting. Anything that is said or done will be considered by the interviewer, cautions Cobb.

In order to make a good impression during a lunch or dinner interview, make sure you:

- Arrive on time.
- Wait to sit until the host/hostess indicates the seating arrangement.

- Place napkin in lap before eating or drinking anything.
- When ordering, keep in mind that this is a talking business lunch. Order something easy to eat, such as boneless chicken or fish.
- Do not hold the order up because you cannot make a decision. Feel free to ask for suggestions from others at the table.
- Wait to eat until everyone has been served.
- Keep hands in lap unless you are using them to eat.
- Practice proper posture; sit up straight with your arms close to your body.
- Bring food to your mouth—not your head to the plate.
- Try to eat at the same pace as everyone else.
- Take responsibility for keeping up the conversation.
- Place napkin on chair seat if excusing yourself for any reason.
- Place napkin beside plate at the end of the meal.
- Push chair under table when excusing yourself.

Eating

Follow these simple rules for eating and drinking:

- Start eating with the implement that is farthest away from your plate. You may have two spoons and two forks. The spoon farthest away from your plate is a soup spoon. The fork farthest away is a salad fork unless you have three forks, one being much smaller, which would be a seafood fork for an appetizer. The dessert fork/spoon is usually above the plate. Remember to work from the outside in.
- Dip soup away from you; sip from the side of the spoon.
- Season food only after you have tasted it.
- Pass salt and pepper together—even if asked for only one.
- Pass all items to the right. If the item has a handle, such as a pitcher, pass with the handle toward the next person. For bowls with spoons, pass with the spoon ready for the next person. If you are the one to reach to the center of the table for an item, pass it before serving yourself.
- While you are speaking during a meal, utensils should be resting on plate (fork and knife crossed on the plate with tines down).
- Don't chew with your mouth open or blow on your food.

The interviewer will usually take care of the bill and the tip. Be prepared, however, if this doesn't happen and have small bills ready to take care of your part, including the tip. Never make an issue of the check.

Social skills can make or break your career. Employees have to exhibit a certain level of professionalism and etiquette in their regular work day, and particularly in positions where they come in contact with clients. Be one step ahead—practice the social skills necessary to help you make a great first impression and stand out in a competitive job market.

Written by Jennie Hunter, retired professor at Western Carolina University.

POSSIBLE OUTCOMES AND LOOKING AHEAD

No matter how your job search process concludes, in a sense, it is truly a beginning. If you receive and successfully negotiate an offer for an academic job, congratulations! In addition to planning for a move, approach your next professional steps with the same strategy you brought to your job search. If your new academic job is a tenure-track position, start thinking now about laying the groundwork for tenure. Consult with your advisor or faculty in your department or field about how best to do this at the type of institution where you will be working. If your academic position is a fixed-term visiting professorship or an adjunct role, think about how you will manage your time effectively to balance your teaching commitments with other professional activities, potentially including research, that will continue to strengthen your candidacy for future academic positions.

If you do not receive an offer, or do not receive an offer that you choose to accept, multiple paths lie before you as well. After the emotional highs and lows, the travel, and the sheer amount of time devoted to the academic job search—not to mention to your doctoral studies—not getting an academic job can feel devastating. Every year, many, many brilliant candidates on the academic job market do not receive offers. Not getting an academic job in your field of

choice is in no way an indicator of your value as a scholar or as a teacher.

If this happens to you, please keep in mind that there are a variety of resources and options available to you. Your advisor, faculty in your department, colleagues in other departments, and even faculty members you connected with during interviews may all be excellent sources for brainstorming and strategy.

Remember that the Engineering Career Center also offers services and resources that can help you plan your next steps. Whether you plan to keep your focus on academia and go back on the academic job market next year, pursue a postdoctoral fellowship, or explore options beyond academia, you can make an appointment to come in and discuss your situation with a career counselor. We can also work with you to figure out how to connect with alumni of your program or similar programs who pursued a variety of paths. These connections can be refreshing and provide a new and useful perspective. We also invite you to explore the parts of this guide devoted to the non-academic job search as well. Know that there are many ways to express the skills and experience you have gained throughout your education, and that the most rewarding paths may even be ones you haven't yet explored.

THE COST OF LIVING INDEX

The following is a selection of cities where many graduating students accept offers. The cost of living index is based on the composite price of groceries, housing, utilities, transportation, health care, clothing and entertainment in each city listed.

Use the calculation to compare salaries in different cities.

For further information about the data below, please refer to www.bestplaces.net/cost-of-living.

To compare information from other sources, refer to these websites: www.salary.com and www.homefair.com/real-estate/salary-calculator.asp.

Salary Comparison Equation

$$\frac{\text{City \#1}}{\text{City \#2}} \times \text{Salary} = \$ \underline{\hspace{2cm}}$$

What is the New York City equivalent of a \$50,000 salary in Chicago?

$$\frac{\text{New York City } 168}{\text{Chicago } 103} \times \$50,000 = \$81,553$$

Average City, USA	100	Boise, ID	107	Detroit, MI	73	New York City, NY	168	Memphis, TN	73
Montgomery, AL	89	Chicago, IL	103	Lansing, MI	82	Chapel Hill, NC	128	Nashville, TN	99
Anchorage, AK	143	Springfield, IL	87	Minneapolis, MN	108	Charlotte, NC	94	Austin, TX	107
Phoenix, AZ	99	Bloomington, IN	98	St. Paul, MN	102	Fargo, ND	98	Houston, TX	98
Little Rock, AR	88	Indianapolis, IN	89	Kansas City, MO	94	Cleveland, OH	79	San Antonio, TX	92
Fresno, CA	105	Des Moines, IA	82	St. Louis, MO	84	Columbus, OH	82	Salt Lake City, UT	115
San Francisco, CA	243	Iowa City, IA	105	Billings, MT	107	Oklahoma City, OK	89	Burlington, VT	124
Denver, CO	115	Kansas City, KS	85	Omaha, NE	88	Tulsa, OK	85	Richmond, VA	95
New Haven, CT	113	Lexington, KY	95	Las Vegas, NV	99	Portland, OR	126	Virginia Beach, VA	110
Stamford, CT	167	New Orleans, LA	99	Princeton, NJ	162	Philadelphia, PA	96	Seattle, WA	154
Wilmington, DE	98	Portland, ME	118	Newark, NJ	122	Pittsburgh, PA	84	Washington, DC	154
Miami, FL	119	Baltimore, MD	88	Albuquerque, NM	101	Charleston, SC	109	Charleston, WV	91
Atlanta, GA	97	Boston, MA	161	Santa Fe, NM	120	Columbia, SC	99	Madison, WI	116
Honolulu, HI	199	Ann Arbor, MI	111	Albany, NY	102	Sioux Falls, SD	95	Milwaukee, WI	85
				Buffalo, NY	74	Chattanooga, TN	88	Cheyenne, WY	103