

Internships

Experience outside of coursework is an important part of a student's education. This experience is most often obtained through assistantships and internships. With respect to assistantships, they can be teaching or research-based, where the research-based can be further divided into statistical research or consulting types. Both teaching and research assistantships provide valuable experiences to students and are conveniently located on campus.

Somewhat similar to research assistantships with a consulting focus, internships provide a way for students to obtain hands-on experience by working with data and individuals from other disciplines. However, internships are in a different environment (e.g., ultimate goal is usually not publication of a paper) so they can provide much more valuable experiences toward future employment in industry. The purpose of this section is to discuss internships in depth by answering the following questions:

- How to obtain an internship?
- How to get the most out of an internship?
- What to do after the internship?

How to obtain an internship?

Announcements

The top resource for internship announcements is the ASA's website and its AMSTAT News publication. Because the vast majority of internships are summer-only, the November or December issue of AMSTAT News provides a long list of internships from companies (along with non-profit organizations and government agencies) for the following summer. This same information is also

For the remainder of this section, I will simply use CVs to mean a general term used to denote both CVs and résumés.

The general rule of thumb for length is

- BS degree: 1 page
- MS degree: 2 pages
- PhD degree: 3 pages

where this rule extends to individuals in the pursuit of one of these particular degrees. Those who are already employed in academia will go beyond 3 pages.

What should you put in a CV? I have included on the course website my own CVs constructed at the beginning of the second semesters of my 2nd and 3rd years of graduate school. These CVs could be improved upon, so I have even constructed a "new" CV from this 2nd year example. Based on these CVs and my reviewing of other student CVs while a faculty member, here is a summary of my own recommendations which are organized by commonly found main sections of a CV:

- Objective: This is a sentence which states what you want to do with your degree. It is debatable whether to include it because your cover letter (discussed shortly) will essentially have stated this as well.
- Education: Degrees, GPAs, and other academic items (e.g., thesis titles, Society of Actuary exams passed, advisor name, graduation honors, ...); some individuals will put courses taken during their current degree program or specific important courses taken throughout their college career
- Work experience: Internships, assistantships, volunteer work, and other substantial jobs (even if not associated with statistics); include brief explanations of what you did at these jobs, where my preference is to make these explanations bulleted

posted on the ASA's website as well.¹ Some companies do not get their internships announcement in on-time for publication, so additional announcements will be posted to this website throughout the spring semester.

The earliest deadline for an application is late December and the latest deadline is late April. These earlier deadlines are sometimes used to enable a company to obtain the first selections among students. However, they may not necessarily reflect the best positions for students to accept.

Other potential resources for internship announcements:

- Faculty and departmental e-mails
- Faculty contacts
- University of Florida and University of Purdue websites (given in Career Paths section)
- Direct inquires - Use the ASA membership database to obtain names and e-mail addresses of individuals who are working at a desired company or location. Contact these individuals directly regarding internship possibilities.
- Company websites (although I would be concerned whether this is a "good" internship if the company does not know to post in AMSTAT News)

CV/Résumé

A curriculum vitae (CV) is essentially a résumé. The main difference is that CVs can be much longer, especially for those in academia because it is rare to remove anything! For example, all of my specific committees that I have been a member of are included on my CV. However, a résumé could simply say "actively involved in service to the department, university, and profession."

¹Current location: <http://www.amstat.org/ASA/Education/Internships-and-Fellowships.aspx?hkey=3b471cc7-263a-4b4e-be26-62260b6d799a>

lists using action words (all in the same tense) at the beginning of each bullet

- Publications: For most students, this is difficult to have any until the end of their PhD program.
- Presentations: Again, this is difficult for students to have until the end of their PhD program, but not as difficult as for publications. Include only presentations in public forums (e.g., Department of Statistics seminars) rather than those in a classroom setting.
- Computer experience: Statistical software, operating systems (if more than just Windows), and other relevant experience
- Honors and activities: Scholarships, leadership examples, statistical society memberships (this shows knowledge and seriousness about the profession), ...

There is not necessarily a particular order for these sections (other than objective should be listed first), but try to put your strengths first. For most students, the education section tends to be the largest strength. For my own CV as a student, I put computer experience on the first page because I thought my experience in this area was much higher than other students at the time.

Cover letters are typically required along with CVs. Again, I have included on the course website my own cover letters constructed during the second semester of my 2nd and 3rd years of graduate school. These cover letters could be improved upon, so I have also constructed a "new" cover letter from this 2nd year example. Overall, the general paragraph-by-paragraph structure to a cover letter is:

- Introduction and description of position applying for. If possible, include some type of attention getter that can differentiate your application from others. There are usually many appli-

cations for a position so being able to stand out can spark the interest of who is reviewing the applications.

- Describe why your background is ideal for the internship. The strongest items from your CV can be included here.
- Re-iterate your strong interest in the internship and emphasize how you can be contacted.

Additional thoughts about CVs and cover letter:

- Grammar and spelling should be perfect.
- Submit PDF rather than Word documents. Also, make sure there is no meta data hidden in the document. For example, my wife (attorney at the U. of Nebraska Foundation) interviews potential law interns every year for her organization, and she commonly finds errors associated with meta data and Word documents submitted. These errors include:
 - Tracked changes remaining in a document, including those changes by an applicant basing a cover letter on another applicants cover letter
 - Author information different from the applicant
- Have someone else critique them. We learn from other individual's criticisms. If you disagree with the criticisms, you do not need to make the corresponding change.
- Read the cover letter aloud to make sure it sounds correct.
- Stick with a consistent style in a CV. For example, if you use a bulleted list with each position listed in the work experience section, use a consistent format such as starting each bullet with an action word with one complete phrase. Do not mix this with paragraphs describing what you did at a position.
- Be mindful of what is available through social media regarding you. When I do interviewing, I ALWAYS check Facebook and

- What would you like to do with your degree?
- Describe a conflict or disagreement that you had with a co-worker in the past and how you resolved it.
- What are your weaknesses?

Of course, a web search for "interview questions" will produce a plethora of examples. The basic idea is to prepare some simple examples that in the end cast yourself in a good light. Very often, questions are meant to be easy so that the interviewer can focus on evaluating an individual's communication skills.

Overall, when I have been interviewed and when I have been part of the interviewing for others, I have found a much larger emphasis on evaluation of the non-statistical qualities. The reason is because employers will know due to degree program and a student's grades whether a student understands the technical material—this is why someone gets an interview in the first place. A degree program and grades do not necessarily evaluate as well the non-statistical qualities needed for employment. Those who are interviewing an individual are often evaluating then whether or not a person will fit in at a company and whether this would be someone they personally would like to work with.

Additional comments:

- Interviews typically take place over the phone or Skype rather than in person because these are for internships. Because these interviews are not in person, it may be helpful to practice an interview with a colleague to get used to the format.
- There will often be multiple interviewers at the same time.
- Do not ask questions regarding salary level. Expect a pay level at least comparable to the highest degree that you currently have. Thus, if you are a PhD student with a MS in Statistics, expect to be paid at least at the MS-level. The only time it is appropriate to talk about pay is when you are offered a job

other social media resources to see what I can find out about an individual.

- Orient cover letters (and sometimes CVs) to a specific internship that you are applying for.
- See Chapter 8 of Hahn and Doganaksoy (2011) for additional prospectives.

Interview

There are typically two purposes of these interviews:

- Assess statistical knowledge
- Evaluate non-statistical qualities

Very often, an interview will only focus on one of these items.

When assessing an individual's statistical knowledge, questions may be general like:

- Do you have experience with generalized linear mixed models?
- What software packages have you used in your courses?

or they can be much more specific like:

- How can one use `proc glimmix` to test the significance of a difference between means?
- What is the difference between S3 and S4 in R?

The general questions are much more common. However, it can be beneficial to look over your notes for a course prior to an interview if you think a specific course may be helpful for an internship. At the very least, be prepared with answers to "Have you covered <insert statistical method> in your courses?"

When assessing an individual's non-statistical qualities, standard interview questions may be asked like

- Why do you want to work for us?

(although there is little if any flexibility with an internship). It is rare for there to be unpaid internships in Statistics.

- Always be prepared to ask your own questions! These can be specific about the job itself or the company. Thus, you need to do research before the interview to have questions ready to go. Of course, other questions may occur to you during the interview.
- Always e-mail your primary contact at a company AFTER the interview to thank them and re-express your interest in working there.
- Demonstrate how you have "gone beyond" basic requirements in a course or other job in the past. For example:
 - Describe what you have done in a course to better understand a topic.
 - Describe how you have produced extra plots or alternative analyses on a consulting problem to provide better insight for a client.
- Learn about the people that you are interviewing with before the interview. This can help you prepare for small-talk or specific questions.

How to get the most out of an internship?

Prior

Finding a place to live is the most important thing to do before the internship! This is complicated by the need to find housing for only three months when it is a summer internship. Fortunately, many companies will provide some assistance in the form of

- Company-owned or contracted housing

- A Human Resources department that can provide leads

Other options:

- Of course, there are numerous websites available that offer apartment listings
- University housing - Universities will often rent out rooms in their residence halls during the summer
- Friends

Expect housing to be more expensive than you generally are used to due to the short duration and the likely need for the housing to be furnished. For example, an apartment complex may charge you a higher monthly rate or not refund a security deposit. Also, remember that you may actually still need to pay for housing in two locations – location of the internship AND in Lincoln – while you are there.

International students with a F-1 visa need to apply for Curricular Practical Training (CPT) at UNL to correspond to their internship. This requires a student to take a course for the internship. In the past, our students have registered for

- STAT 997: Practicum in Statistical Consulting
- STAT 892 or 992: Topics in Statistics and Probability, where the name of the course is changed to “Internship”

These courses can be registered for as Pass or No Pass grade and can be administered by your advisor. For a student of mine obtaining CPT in the past, I simply made giving a Department of Statistics seminar on the internship (when they got back) as the sole requirement for the course. More information regarding CPT can be found at <https://careers.unl.edu/intlemp-restrictions>.

If you have some ideas regarding what statistical methods you will be using on your internship, it can be helpful to review your course notes or learn more about the methods elsewhere.

myself every detail about the product (SAS used to have many very thick user manuals). Before this time, no instructor had really taught me in detail how to use graphics procedures in SAS despite three prior years of graduate school.

- Explore the area where you are living outside of work.

The educational benefits from an internship can be so much more if you make opportunities for yourself.

Take full advantage of the non-educational benefits that may be provided. For example, some companies may allow you sign up for their 401K retirement program AND include the typical employer funding match with it. While it may seem strange to start saving for retirement while you are still a student, this money can be used for non-retirement purposes if absolutely needed, perhaps subject to a tax penalty (one still will come out ahead even with a penalty).

Make sure to show how *useful* you are and how well you *get along* with everyone. This may lead to the company inviting you back for another internship or pursuing you for a full-time employment after graduation. At the very least during an exit interview, discuss the possibility of future internships there with your supervisor if this is where you would want to work.

What to do after the internship?

Keep in contact

Make sure to periodically stay in contact with your supervisor and/or others at the company. Even if you do not want to work at the company, it is good to stay in contact for the purpose of obtaining a reference from him/her. Also, you will likely come in contact again with the individuals you worked with, so the internship presents important networking opportunities.

During

From an employers prospective, there are two main reasons to offer internships:

- Provide a learning experience (a service to the community)
- Get work done that there is not normally time available to complete

While both are beneficial to an intern, the first one provides the most benefits. For example, my pharmaceutical company internship was of this first type. In fact, during my exit interview, my supervisor said the purpose was to provide a learning experience and any work done was just an added benefit to them. This was the first time anyone told me this while I was there!

For both scenarios, take full advantage of where you are to learn! Below are some examples:

- Talk to your co-workers! To help facilitate this process during my last month on an internship, I would formally set up 30-minute discussions with each statistician in my department that I did not interact with on a regular basis. The purpose of these discussions was so that these individuals could tell me more specifically about they do and provide tips toward success. I set up these types of discussions as well with a select number of non-statisticians from other departments.
- Avoid sitting in your cubical for 8 hours per day. Get up and explore your surroundings.
- Take tours of company facilities to learn more about the non-statistical aspects of the company.
- Learn new statistical methods or programming tools in or outside of the office. For example, during my Department of Energy lab internship, I took my supervisor’s SAS Graph book back to my apartment and read the ENTIRE book to teach

Seminar

Give a Department of Statistics seminar on your internship shortly after you return! Here are some reasons why:

- Provide advice to other students about how to obtain an internship
- Looks good to faculty because this shows an example of *going beyond* normal expectations
- Practice for giving future presentations that perhaps matter more (e.g., presentation for the PhD Comprehensive Exam)

Frequently, interns are expected to give a seminar at the company prior to leaving, so much of the preparation for a Department of Statistics seminar will already be complete.

Scholarly benefits

- Obtain course credit for the internship even if not on CPT. This can allow you to take fewer courses during the academic year so that you can put more focus on those courses you do formally take.
- Apply knowledge received from internships to your coursework. In fact, research topics can be motivated by internship experiences.
- Some scholarship/fellowship applications can benefit greatly from internship experiences.

Final comments

- Once you start your dissertation, it is questionable whether you should pursue an internship. Simply, the three months for a summer internship could delay your graduation by *at*

least three months. It is best to discuss internships with your advisor before pursuing them at this point in a PhD program.

- The ASA's STATtr@k website at <http://stattrak.amstat.org> contains a lot of useful information for graduate students. I recommend doing a search for "internship" there to locate a number of postings on the subject. For example, tips on having a successful internship are available at <https://stattrak.amstat.org/2015/12/01/top-10-tips-for-getting-successful-statistical-internships>.
- Some internships are regarded as "fellowships" with a stipend. For example, my Department of Energy lab internship was actually a fellowship. This led to some tax considerations that do not normally occur for a regular job.