1. **What tips could you provide to students to help them find an internship/employment in your company or agency?**

Terry Briggs (Newmont Mining Corporation): Do not wait until the end of your degree, Newmont Mining Corporation North American and Corporate offices begin searching for next year's summer interns in September of the previous year with offers going out starting in October. Most interns will work May through August. Newmont also offers a separate program for new graduates. The best starting place for applications is on-line, but I strongly encourage students to meet with company geoscientists at industry forums such as GSA / GSN meetings. Newmont's careers page is where we direct all applicants https://jobs.newmont.com.

Bret Dixon (Anadarko Petroleum Corporation): You need to start thinking about an internship as early as your junior or senior year during your undergraduate education. Local, national and international geoscience and industry professional organizations are open to student/younger members and are a great source of information and networking opportunities. Join student chapters of AAPG, SEPM, SEG, SPE, IAS and GSA. Present at and/or attend geoscience and industry conventions, conferences, meetings and expos. Research potential companies online, understand their business and where they operate, and call or email the HR or other departments to find out about recruiting times and venues. Make sure to select a graduate school that conducts industry related research or has industry supported consortia, has professors that have industry connections, invites industry companies to come recruit, has a solid track record of placing their graduates in the industry, and whose graduates have succeeded professionally within the industry. Find a thesis topic you are passionate about, an advisor who will help feed your passion, and find a way to make that research relevant and accessible to industry companies. Network, network, network!

J.P. Dube (Chesapeake Energy): Start by making sure you are following a path in your education that excites you. Your enthusiasm as a geoscientist will be important to stand out over individuals who are just looking for a job. Get involved in geoscience organizations nationally and at your school and be proactive looking for opportunities to attend conferences and expos. Networking is always a great way to find internships and jobs so make it out to events, present your work and meet people from the industry whenever you can.

Leslie Hsu (U.S. Geological Survey): Keep an eye on the USGS Student and Recent Graduates opportunities, the Pathways Program and the Internship Program. These are good ways to start working at the USGS. Talk with USGS staff wherever you see them, for instance at the booth at GSA, or any other meetings you attend, and ask about opportunities. One of my colleagues started off by asking to volunteer to help with field work at a local USGS Science Center, and this later transformed into a permanent USGS position!

Alicia Kahn (Chevron Energy Corporation): It is difficult on the website so if you can get a face to face interview you are far more likely to be considered. Be direct but not pushy. Go to conferences and student expos if your school does not get recruiters on campus.

Jason Kenworthy (National Park Service): It is very rare for folks to apply to, and be selected for, a permanent federal position right out of school. Many people use internships, student opportunities, volunteering, seasonal or temporary positions to build experience with an agency. There are relatively few geoscientists in public land management agencies (for example, there are

more than 20,000 federal employees in the NPS, but only ~250 are physical scientists) so the nearly 200 geoscience internship positions offered every year are very helpful to build experience and start networking.

In the National Park Service, there are 2 primary NPS internship programs for geoscientists: the Geoscientists-In-the-Parks (GIP) program (http://go.nps.gov/gip) and Mosaics in Science (for under-represented youth; http://go.nps.gov/mosaics). GSA GeoCorps is another excellent program for internships with other public land management agencies: https://www.geosociety.org/geocorps/. Summer positions are typically advertised starting in December the year before so now is the time to think about next summer. There are many other internship opportunities to work with land management agencies if you aren't looking for a geoscience-specific program: https://www.nps.gov/subjects/youthprograms/index.htm. If you have a park you are interested in working with, I recommend contacting the natural resource manager (or the park volunteer program coordinator) and explaining your interests and career goals, and offering to volunteer with them if they have work available. Volunteering isn't an option for everyone but this is another way to get know the agency and what type of work we do, and to develop a relationship with a park

The agency also hires students through the Pathways Program—the federal government can direct place current students with parks or central offices, and those positions may be converted over to permanent, full-time positions. For recent graduates of graduate programs, The Presidential Management Fellows (PMF) Program (https://www.pmf.gov/) is a highly competitive flagship leadership development program at the entry-level for advanced degree candidates

All federal jobs (seasonal, temporary, or permanent) are advertised on https://www.usajobs.gov/. A quick note about federal job terminology. Science positions in the federal government are almost all "General Schedule" or "GS" positions. Federal jobs are described by the schedule ("GS") and then a 4-digit series number (jobs staring with 1300 are physical science; "1350" is geologist) and then a 2-digit grade which indicates the position's pay rate (higher numbers equal higher salary). So an early career geologist position could be a GS-1350-07 and a hydrologist program lead may be a GS-1315-12.

Ken Ridgway (Purdue University): From a university perspective, participating in undergraduate research is an opportunity to learn more about possible career pathways and scientific interests. Talk to your professors about research opportunities to work in their labs, with their graduate students, and/or to serve as a field assistant. It might not be a perfect fit for your current career vision but one door opens to another door, and you will be surprised where the journey takes you.

Todd Thompson (Indiana Geological and Water Survey): We do not have formal internships, and our temporary employment is primarily on an hourly basis associated with specific projects. On the job training if you will. Timing is everything when you are available and when the project starts and ends. Although we are on a university campus, our projects rarely follow the academic year. We accept unsolicited resumes' all year long, and advertise using the university's employment system. It never hurts to contact individual scientists to see what they may have going or in the works.

2. What coursework, degree requirements and/or experience would you suggest students have to help them get an internship/employment with your company or agency?

Terry Briggs: I cannot emphasis strongly enough, that field experience is a crucial aspect of being a geoscientist. This is a highly regarded aspect that within the geological community as it brings together a lot of the knowledge from petrology, sedimentology, structure and other disciplines into field, even if you don't end up doing field work, you will be better able to interpret the work of others. Secondly, familiarity with key software, especially GIS packages (i.e. ArcGIS), even better, 3D modelling software, many companies offer discounts or trial packages for students. Thirdly, non-geoscience subjects help round-out your skillset, be this mathematics, business or environmental to help round out your education. Outside of subject choices, active participation in geoscience societies, community engagement or run a workshop or other event to demonstrate organization and leadership skills.

Bret Dixon: Good fundamentals of geology or geophysics, an understanding of tectonics and structure, stratigraphy and sedimentology, petroleum systems and basin evolution, undergraduate research during bachelors, attend industry sponsored events or trips, previous part-time or full time work with an industry service company (e.g. mudlogging, wireline, operations geology, well steering, seismic acquisition or processing, core handling and sampling, geochemical sampling and analysis, etc.), previous geoscience industry internships, and a wide variety of personal growth and discovery related life experiences.

J.P. Dube: Get the best foundation in geoscience you possibly can. Mineralogy, petrology, structure, sed/strat, geophysics, hydrogeology and tectonics are a great place to start. You can always add on to your education, but it will be assumed that you have a great foundation. Field experience, research, petrophysics, petroleum systems are all nice additions to a resume. Also, make sure you are filling your time with experience, you don't want to appear idle.

Leslie Hsu: The USGS employs a very diverse range of scientists. Each ad generally asks for a degree in one of the physical or biological sciences, so beyond the normal degree requirements, I would just recommend to take the course topics that inspire you. A large part of what we do is deliver our scientific results to various stakeholders in other agencies or organizations, so having experience in scientific and plain-language communication is always a plus.

Alicia Kahn: MS or PhD required for earth scientists. BS for engineers. The more internship experiences the better, lab work, field work...basically anything that is a geologically related workflow. ArcGIS and seismic software are good tools to know. If you can't get in with a major, go smaller, or go to service companies. They will give invaluable and interesting hands on experience and often more leadership opportunities should you then decide to transition elsewhere.

Jason Kenworthy: Every position will list the specific coursework and experience requirements—make sure to pay attention to those and ensure that your resume makes it clear that you meet those requirements. In general, NPS geoscientists are multidisciplinary so a variety of geoscience and physical science is helpful. Most positions have practical resource-management component (i.e., what information will help a superintendent make a decision about managing a resource) rather than a purely research or academic focus. Park-based positions may also benefit from land management or outdoor recreation coursework, particularly if there will be an interpretation (public outreach) component to the position. Having GIS experience is really helpful because nearly all

resource management information in the NPS is geospatial (or will be). The requirements and qualifications for physical science positions (1300 series) with the federal government are available on the OPM website. Note that there are relatively few people with the title "Geologist" (GS-1350) in the NPS. People working on geoscience projects may also be classified as Physical Scientists (GS-1301) or Hydrologists (GS-1315) for example. Positions at the lower GS (general schedule) levels can be hired with a bachelor's degree positions at the GS-09 level and above often require master's degrees.

Because positions in parks can involve a lot of field work, having professional or personal experience hiking, camping, or with other outdoor activities is often a bonus. Similarly having first aid, CPR, wildland fire fighting ("Red Card") certification, or experience with ATV or boat operation, horseback riding, public speaking, and foreign language fluency, can all make a difference when picking among otherwise equally qualified people. While moving to a different geographic location may not be something you can do, it is much easier to get hired if you are willing to move to a different area for a position. Likewise, if you are looking for to start a career, look at some of the smaller NPS areas for opportunities, they typically have fewer applicants than Yellowstone or Yosemite, and once you are "in the door" it is easier to move to other positions and other parks.

Ken Ridgway: Curiosity and dedication are key factors for success in research.

Todd Thompson: Colleges and universities typically test on what you know, but we hire on what you know how to do. It is important to get a wide variety of field and laboratory experience. Go on every fieldtrip that fits your schedule regardless of the class or geological subject – always sit beside the fieldtrip leader so you can ask questions. Volunteer to help a classmate in the field or lab, and just don't go through the motions. Learn why you are doing what you are doing, other ways it can be accomplished, and question everything. Familiarity with a number of geological specialties is very important and a focus on getting a job done.

3. **Students are interested in the amount of time you spend in the field, lab, office and traveling. What does your work involve?**

Terry Briggs: This is highly variable and can depend upon the role, where the industry is in the commodity cycle, the size of the company, the stage of a project (discovery-development-operation). As a graduate, it is not unlikely to only be able to go to one workshop or conference a year (as a tip – a speaking place is the best way to get to a conference), travel in early years is often limited to the project site. Field work can be anything from a big aspect of the work such as our greenfield geologists to minimal such as our database geoscientists. As you progress through your career you may get the opportunity to be exposed to more travel to other projects, operations, conferences and events. Technology has enabled more to be done remotely, and an increased expectation of analysis and interpretation in the office. I have had the opportunity to work through all aspects of the project cycle from discovery to closure, and one of the benefits of the geosciences, is that it is global, it offers career development opportunities that can have you in the field or the office as your wants and needs require.

Bret Dixon: Depends on assignment. Some individuals in some companies may spend a lot of time in the field, on a plane, in the lab, or at the work station. Throughout my career I have done all of them. I started my career in a more operational role where I spent a lot of time on rigs and in the oilfield as well as in the office. There have been parts of my career where I was primarily conducting

field and lab based geologic research and teaching. I have spent years interpreting wells logs and seismic data sets in support of both domestic and international exploration and development drilling efforts. A large part of my career has been spent in international new ventures and business development, where I often travelled the world looking for new places for my company to explore. My current role is as an advisor focused on the mentoring and training of early career geoscientists. I am also heavily involved in recruiting, and serve in a senior technical expert and advisory role across the corporation.

J.P. Dube: Unfortunately, the answer is it depends on your company and your role. Some basins and assignments present great opportunities to visit field outcrops, some don't. Some roles include active operations including drilling, coring and seismic acquisition, some don't. Some companies have amazing labs like Chesapeake, most don't. Some companies offer great training, some don't. Some companies work all over the world, some don't. The reality is that most oil and gas geoscientists spend most of their time in the office at a workstation but the best jobs out there provide ample opportunities to get away from the desk to be hands on.

Leslie Hsu: These days I spend most of my time in the office, and travel about a week every month or two. Teleworking is fairly common, because most computer work can be done in any location, but I prefer to stay in the office. As a coordinator, it is my duty to get the appropriate information to the right people at the right time. This translates to a lot of communication, whether in the form of emails, social media, blog posts, and presentations. It also entails participating in the activities of other organizations and bringing relevant information back. With the rise of web-conferencing software, days can be full of online meetings. I always feel really happy when someone indicates that they found out about the right opportunity or publication because of our communication activities.

Alicia Kahn: Now in the downturn, travel has been severely curtailed. Whereas I used to travel globally, even a trip to a lab is rare now. Field trip frequency is much reduced as well. I spend most of my time on the computer or microscope. I anticipate that the travel will never return to what it once was, especially because many offices worldwide have been closed or reduced in size. That being said, once the economy improves for the oil and gas industry there will likely be more flexibility in meeting locations and field work/school possibilities.

Jason Kenworthy: NPS geoscience positions vary from nearly all field work to nearly all office work. In addition to the 418 parks across the country, there are 7 regional offices, and many national programs that support parks across the country—most of the national natural resource offices are in Denver or Fort Collins, Colorado. People that work in the regional or national offices provide technical support to parks and may travel to them to provide direct support or be in more of a management, advisory, or liaison role with minimal travel. I am a program lead and work in the national office near Denver so I typically travel once a year and that's to GSA. However, the technical specialists in our office can travel to parks much more often and during field season may be gone half or more of the time. If you are stationed at a park, many of your duties will involve field work. All job and internship announcements list travel and field requirements for the position so you can make sure the position fits your expectations for field, office, and travel time.

Ken Ridgway: Most field-based research careers requires about six weeks of a year of intensive field work. Much of the remaining part of the year is dedicated to preparing and analyzing samples collected in the field and writing up the results.

Todd Thompson: Before obtaining my current position, I could spend a third to half of the year in the field. A typical survey employee spends about a third of their time in the field, a third, and the lab, and a third authoring publications and answering service requests. Of course, this changes depending on the project need and how much managing is being done.

4. **Do you have any interviewing tips or strategies to help students get hired?**

Terry Briggs: Our Human Resources department presented these tips with graduates recently. When preparing for an interview, research the company you will be interviewing with (despite how easy this is, you would be surprised how few still do this), prepare for commonly asked questions (about yourself, strengths & weaknesses, why do you want to work here…). During the interview pay attention to body language, use discretion, avoid discriminatory subjects, ask questions, actively listen and walk away knowing the next steps in the process. Ask questions such as what do the interviewers most enjoy about the company, what is expected to be accomplished, type of training on offer, etc. After the Interview, send a thank you email, follow-up with the company keeping in mind the timeline they've shared and keep them informed of changes in relation to your job search. Don't be afraid to ask your point of contact what the dress code is, I was once on a remote mine site where two recent graduates arrived for an on-site interview, one in a suit and tie, the other in jeans and a t-shirt (both were hired!).

Bret Dixon: Be friendly, be open about what motivates you, be inquisitive, share what makes you unique, be team oriented, good communication skills. You need to be passionate about geoscience and have a desire to learn and build upon the foundation you have created via your academic education.

J.P. Dube: Make sure you have other people look at your resume. You don't have to act on everyone's feedback, but you should solicit as much as possible. It's amazing what blind spots we have about ourselves. Then make sure you research the company you are interviewing with. You don't have to be an expert, but you'd be amazed how many candidates I see that don't know where we are located. And finally, bring energy to the process. You probably got into geoscience because something about it excited you, don't be afraid to share that passion during an interview.

Leslie Hsu: When I applied, I was reminded many times to follow the instructions and requirements in the ad very carefully so as not to get filtered out on the initial pass. It helps to repeat the keywords from the ad in your CV and cover letter. I recommend to try to talk to someone on the phone about the position even before submitting an application, this can give you more insight into what exactly the hiring team is looking for, and if it's a good fit. Be collegial and friendly at workshop and meeting socials. As scientists, we are among a lot of introverts, but if you find a common topic, you'll have a great connection and add to your network. You might even find out about unadvertised job opportunities - that has happened to me in the past.

Alicia Kahn: Practice interviewing. Go to your career center and solicit help and mock questions. Most interviews have situational questions so try to think of specific scenarios that will help describe your personality, communication skills, scientific prowess, team suitability, leadership. The more you interview the more polished you become. Be sure to tailor your answers so they are appropriate/relevant to that which you know (do your research) about the company/organization/department to which you are applying.

Jason Kenworthy: One of the keys to landing an interview is to spend the time making sure your resume is tailored to each job you are applying for. It takes more time upfront but makes it much easier for the Human Resources folks and the Hiring Official to navigate. Federal resumes are very different than industry or academic resumes in that there is no preferred length or format. For example, mine is 15 pages long, and covers nearly 18 years of experience in more than a dozen positions (volunteer, intern, contractor, seasonal, student, term, and permanent employee). You should make sure that everything that is listed in the announcement is reflected in some way in your resume and use the same terminology as the announcement. Make it clear that you are qualified for the position you are applying for and do not assume that the hiring official will "know what you meant". If you have any relevant experience with an agency, even if volunteer, make sure to include that in your resume. You should not overstate your qualifications and experience but do not sell yourself short either. Consider organizing your resume by job knowledge, skills, and abilities rather than just chronological to ensure that it is clear that you meet the requirements.

The interview itself is your opportunity to turn your on-paper accomplishments and experience into a real human so be honest and genuine—the interviewer is seeing if you will be a good fit for their team. Let your passion for the position and the park come through but keep your answers concise and make sure you do actually answer the question. If you can practice with friends or colleagues that have experience interviewing, do so. Ask them for questions they like to ask or that may be challenging to answer. And remember to come with some of your own questions about the park and position. Re-read the position description and do some research about the park or office you are interviewing with. You also want to make sure the position is a good fit for you! Be patient with the process even though it is frustrating. There is usually a relatively quick turnaround time (few days-few weeks) for internship positions. However federal positions through USAJobs may take many weeks or months from when you apply to the interview to the notification of whether you were selected for the position. If you were under consideration/interviewed but not selected for a position, after the interview process reach out via email or phone to the hiring official to thank them for the opportunity and inquire about ways to improve. The land management agency world is relatively small. Networking and relationships are very important, so make sure to learn as much as you can from your interview experiences, and be persistent and vocal about your career goals.

Ken Ridgway: I recommend approaching an interview as starting a relationship with a company. Find out what they want in the relationship and be clear about what you are seeking in the relationship. These kinds of honest approaches during interviews lead to good matches and fulfilling careers.

Todd Thompson: The more you learn about the organization and staff the better. I am always impressed by the candidates that have researched us and what we do. With the internet, today, that is not that difficult. I always comes down to the fit of the individual with the needs of the position. Survey's do not have liberty to conduct extensive on the job training. We need someone to hire-up and hit the ground running. Focus on your accomplishments and your ability to complete tasks. Be curious and ask lots of questions.