Questions posed to panelists. The following responses are from:

Mark Carter, USGS

Jason Early, Cardno

Carroll Ellis, III, EEE Consulting

Matt Heller, DMME

Marcie Occhi, DMME

1. What is the most important thing that you learned in college that has benefitted your career?

MC: Geologic map interpretation, geologic map construction, field geologic mapping techniques, and scientific writing.

JE: As a practicing Professional Geologist, the most important things I learned in college were how to interpret and visualize problems in three dimensions and break down problems into manageable parts. These critical analytical skills have been a tremendous benefit to my career.

CE: If you fail, it is just setting you up to learn and get back up. But, if you feel like you’re having difficulty, it is ok to ask for help.

MH: To think independently and critically.

MO: I would have to say that the most important thing I gained in college which has benefitted my career was a combination of independence and resourcefulness. This was mainly a byproduct of participating in a yearlong research project as a senior which necessitated a written and oral proposal and thesis defense.

1. What specific skills from your educational experiences do you apply at work?   Can you estimate what percentage of skills that you apply daily were obtained through on-the-job training (both formal and informal)?

MC: Same as above, and also structural geology, stratigraphy, and geomorphology. 50-60% of my daily geologic mapping and research routine is based on experience (i.e,, training) gained post-graduation.

JE: I apply many skills obtained during my undergraduate and graduate education on a daily basis at work, including: groundwater modeling, aquifer/pump test interpretation, aqueous geochemistry, organic chemistry, joint and fracture network orientations (strike and dip), contouring of data, GIS mapping, and logging of borings in soils, unconsolidated sediments, and bedrock. It is difficult to estimate a percentage of these skills that were obtained through on-the-job training as I learned these skills during my education but refined them in my professional practice.

CE: Technical writing skills, background info (geologic history, ecology, etc.), computer/GIS skills, presentation skills, etc. Around 50%

MH: Writing, field methods, petrology, mineralogy, stratigraphy. I still use trigonometry on a regular basis to calculate bedding thickness. Probably 50/50.

MO: I get to use a lot of specific skills from my educational experiences in my work:

* 1. Critical thinking skills
	2. Literature review/researching skills
	3. Skills associated with geologic mapping (Brunton, ArcGIS, Adobe software, topographic maps, GPS enabled Apps to log data, field notebook)
	4. Decision making skills
1. Briefly describe your educational and career path.

MC: Old Dominion University undergraduate (BS Geology, ‘90); University of Tennessee, Knoxville graduate school (MS ’94); North Carolina Geological Survey (‘96-‘04); Virginia Division of Geology and Mineral Resources (‘04-‘09); U.S. Geological Survey (‘09-present).

JE: I graduated from the College of William & Mary in 1997 with a B.S. in Geology. Although my main academic interest was in paleontology, the career prospects in this field are limited. As a result, I decided to try working in the engineering geology (e.g., environmental and geotechnical) field for a while before pursuing an advanced degree. After college, I began working for an environmental consulting firm and quickly fell in love with groundwater hydrology and remediation. My mechanical skills obtained from working in my father’s plumbing and heating business coupled with my geology training paid off, and I was able to advance quickly and gain a great deal of experience within three years. Most of my experience during this time involved contaminated site characterization, soil and groundwater sampling, logging and construction of groundwater monitoring wells, and some groundwater modeling.

In 2000, I began the Master’s Program in Geology at West Virginia University. By this time, I had decided to focus my career on hydrogeology and wanted to obtain the training and credentials in the sub-discipline to be considered an expert. My coursework at WVU included quantitative hydrogeology, groundwater modeling, aqueous geochemistry, soil chemistry, and GIS. For my Master’s Thesis, I developed a regional groundwater flow model of the northern Shenandoah Valley of West Virginia and Virginia. The model was used to delineate source water protection areas for community water systems in Berkeley and Jefferson Counties, West Virginia as part of the national Safe Drinking Water Act requirements.

After leaving WVU in 2000, I returned to Virginia to continue my career in environmental/water consulting and engineering. Between 2000 and 2007, much of my work involved contaminated site investigations, project management, groundwater remediation, aquifer testing, and groundwater modeling of contaminated sites. Around 2007, I began to develop some business in the water supply arena and began to focus my efforts in this area. From approximately 2013 on, my main area of practice has been in groundwater supply consulting, including water withdrawal permitting, siting and permitting of water wells, aquifer/pump testing, and groundwater modeling.

CE: I began my college studies as a Geology major at VA Tech and completed 3 semesters while there. I later transferred to VCU and transitioned into an Environmental Studies major. Upon completing my Bachelor’s and Master’s of Science degrees in Environmental Studies in 2008 and 2009, respectively, I found employment at an environmental consulting firm called Dominion Due Diligence Group focused mainly on Phase I Environmental Site Assessments (ESAs) and hazardous materials assessments (asbestos, lead-based paint, mold, and radon). Over the last 2 years, I have been working with 3e Consulting, Inc. which provides full spectrum environmental services, including Phase I, II, III ESAs, hazardous materials assessments and abatement monitoring, UST removal monitoring, stormwater management, erosion and sediment control, threatened and endangered species assessments, natural resource assessments, wetland delineations and permitting, etc.

MH: B.S. Geology from JMU, 2 years in mineral exploration, M.S. Geology from NC State, 7 years as state regulator in hydrogeology/environmental, 14 years with geological survey. 11 years part time teaching intro labs/classes

MO: Graduated highschool early and enrolled at community college (2003) 🡪 graduated with associate and transferred to a state university (MD) (2006) 🡪 majored in geology at UMD, College Park, graduating with a BS after 3 years (2009) 🡪 stayed at UMD for an MS in geology, 1.5 years (2010) 🡪 Began work on a PhD degree, completed coursework, qualifying exam and numerous field campaigns, left ABD after 3 years (2013) 🡪 Began work with DGMR as a contract/hourly employee (3 months) (June 2013) 🡪 began mapping as a grant supported geologist funded through the STATEMAP grant in December 2013 🡪 Promoted as Richmond area project lead, and transferred to state funding in April of 2017!

1. What did you do at work yesterday? What type of projects did you work on last week?

MC: Yesterday – continued to write a paper on paleoliquefaction exploration and research in eastern North Carolina; Last week – worked on several geologic map geodatabases, and Project administrative responsibilities.

JE: Yesterday, I worked on two projects. The first is a proposed subdivision in the Virginia Piedmont, where the County requires Hydrogeologic Testing to demonstrate that the subdivision’s wells will not adversely affect existing groundwater users. Having completed analysis of the 72-hour aquifer test last month, I am currently finishing up the report of findings. The second project I worked on last week was a water usage audit of 24 community water systems in the Virginia Coastal Plain. All of the systems have a Groundwater Withdrawal Permit, and are required to complete an audit this fall.

CE: Yesterday, I worked as an Asbestos Project Monitor during the abatement of asbestos flooring materials within a containment at an active construction site. Last week, I sampled soil along a creek near a gun range to check for lead levels; I went on a boat to complete a Phase I ESA on an approximate 1,000-acre property comprised of wetlands; and I hiked a manmade wetland property (for wetland credits) to get readings from wells indicating whether the soils were hydric and to assess the vegetation as a part of an annual inspection.

MH: Approved timesheets, updated budget for my projects, negotiated contract with a Virginia University, responded to emails. Provided feedback to employee on project, provided technical assistance with GIS to employee. In the last week, I attended meeting with Virginia Dept. Emergency management, used GIS and Adobe Illustrator to get a geologic map of the Timberville quadrangle into review, and helped walk-in customer looking for rock ID.

MO: I completed geologic mapping on the Beach 7.5-minute quadrangle, just west of Chester, VA. This is a relatively new area for us, so we spent time slowly driving roads, looking for exposures, talking to landowners and asking their permission to access their properties and look at rocks on their land, measuring structural observations and taking detailed lithologic notes with both GPS, topographic map and field notebook.

1. What advice would you give for someone who is just starting out in the geosciences?  What do you know now that you wish you knew when you started to look for internships/employment?

MC: Graduate school is a must; ArcGIS knowledge and skill is important, but not the end-all. There is a significant need in the coming years for quality geologic mappers both at the State and Federal levels. Try not to focus on one particular aspect of geology (i.e., geochemistry, or geochronology) – this is a difficult task, because your graduate advisor will likely convince you to focus on his/her research interest, for funding opportunities, but try to remain open-minded and willing to self-learn new scientific methods (rely on your thesis/dissertation committee members to allow you to open new doors).

JE: My best advice for someone just starting out is to be an active learner. Do not be afraid to put in extra time at the office to learn. Borrow books from your coworkers. Read reports. Understand the science and the business. Additionally, I would recommend getting as much experience speaking in front of groups as possible. This is a valuable skill in any field, and as a scientist, the ability to talk to groups of people of different backgrounds does not always come naturally. However, with practice, these skills will improve.

When I started to look for employment, I wished I had known more about how the geologic principles I learned in my undergraduate study are applied. A better understanding of career fields and what to expect working in consulting would have been helpful.

CE: Because the geosciences are so broad, bounce around a little bit. Unless you already know you have a passion for some specific area, move around to get a variety of skills early on and then settle down somewhere doing what you actually want to do.

MH: Go back and get a M.S. Degree within 5 years if you are able. Follow your research interests for grad school, but keep your future employment goals in mind. I wish I would have pursued internships in college instead of working jobs to make ends meet.

MO: Be open to different geologic experiences – for example, I had no idea that I would be making geologic maps when I graduated from graduate school, and it is not what I had expected to do. Go on field trips, find interesting internships in labs, gain experience! Also, my supervisor once told me, after I complained to him that I didn’t feel qualified for a job that he had recently chosen me for, “Marcie, you can teach anyone geology, but you can’t teach them how to be a good person”.

1. You are at a conference/meeting.  How do you start a conversation with someone you don’t know?

MC: First and foremost, go to their presentation or poster; try to connect with their research through your own educational experiences; listen first, speak second – everyone has something to contribute to the conversation; don’t give up trying to start a conversation – it may be that they were just busy the first time you tried.

JE: Walk up to the person and introduce yourself (first name and last) and tell them something about you (e.g., where you work or your academic institution). Ask their name and memorize it immediately (this is key). Ask them where they work or study. Listen to what they have to say, and ask a follow-up question or questions about their field or study. This will make them feel comfortable with you, and many people like to talk about their work. Then, they are more likely to talk with you and ask you more questions as well. If there’s enough common ground, they might even ask for your resume’ and an interview! Lastly, as you end the conversation, thank them for talking with you and say their name. Remembering their name tells them that you are interested.

CE: Talk about the free food! Whether it’s the cookies, coffee, or lunch, food is universal. Then segue into questions about their background and what brought them to the conference.

MH: I ask them about themselves or their work, try to find a connection such as someone we know in common, similar type of work we have done, schools in common, a town or area that we both know about.

MO: If they have a nametag which identifies what state they are from, that is normally a good place to start! Or I start by asking people if it is their first year attending said meeting/conference.