Transcript: UW Physics Undergraduate Career Panel
March 30, 2022

Marjorie A. Olmstead: Welcome to the annual Career Panel for Undergraduates in Physics.

For those of you who are here in person, I welcome you, and for those of you who are watching this later, I'm glad that you're taking the time to try and learn about what you can do with your physics degree.

I'm Marjorie Olmstead. I'm the Undergraduate Faculty Advisor here in physics and the Associate Chair for Undergraduate Affairs, and I'll be your host today. We also have a panel of five people: one is Dan Poux, who is from the Husky Career Center, and he's going to tell you a little bit about what things resources we have here on campus when you're starting to look for a job. We have Ned [Nestorovic], who is here. He graduated from our department in 1988 and is now President and Chief Scientist at Seattle Photonics, and so he will talk to you a little bit about what it looks like from the hiring point of view. And then we have two people who graduated about 10 years ago, Arielle Leon and Alex Stevens: one is working at the Allen Institute for Brain Science as a systems engineer, and the other as a high school teacher in Issaquah. And then a recent graduate, Chris Moore, who is working at a local optical engineering firm, Lumotive.

What will happen today is, first, I'll give you a little bit of an overview, some statistics from UW and from the national level, just to give you a broad perspective on what kinds of careers you can have. And then, Dan will talk about what the Career Center here at UW can do for you, and then I will turn over to our panel, who will give you their words of wisdom on how to go about this process of getting gainfully employed doing something that you love.

[note: first 3 slides were not shared in the video, but all of Prof. Olmstead's slides are available in the pdf]

SLIDE 1: 00:02:03

So you're here , you've got your BS in physics, or you will soon, and then the question is, "What do you do next?"

SLIDE 2: 00:02:18

Many of you have probably already filled this out or know that, before we will allow you to apply to graduate from the University, physics forces you to fill out our senior exit survey. This is the result of the senior exit survey for people graduating this year and last: we asked, "What's the probability that any of these various choices will be your main activity?"

About half of our students think there's at least a 60% chance that they'll be working full time, and about 40 or 50% think that there's a good chance they'll be in graduate school in some form or other, whether it's physics, a cognate science, engineering or data science, getting a

teacher certification, going to med school or law school. There are a few students who are in ROTC who will be in the military, and others who just plan to take time off.

Notice how few people actually checked 100% on anything. It is perfectly normal to be a year, or even six months, from graduating and really not sure what it is you're going to want to do. Hopefully today will give you a little bit more information that will help you make those decisions.

Slide 3: Don't Panic. 03:30

First of all, don't panic, there is a job out there for you. The unemployment rate among physicists is really low, and almost all of them are doing a job that is exactly - not the ideal, absolute perfect job, but it's something that they find challenging and interesting and that they feel uses their education.

Getting started. First just ask: What can you imagine yourself doing? What are the skills that you enjoy? What are the tasks that you enjoy? Do you love to program or do you hate it? Do you love getting in the lab and making equipment work? On the other hand, do you enjoy writing about what it is you're doing? What are your strengths? What are your weaknesses? What drives you up the wall? And so the first questions to ask are these: What sorts of things do you think you might actually enjoy doing?

The next step is then to find somebody who will pay you to do what you enjoy doing. Check out what those places are. They may not have an opening this week for what it is you're looking for, but if those places exist and they hire people to do what you like to do, check them out and do informational interviews. Talk to people about what they might hire you for eventually.

Another thing to do is to think about what you might want to do 10 years from now, and look at ads for those dream jobs. If they say, "Well, you can do this, but the minimum requirement is three years of experience doing X," then start looking for jobs that will give you three years of experience doing X.

Then you need to market yourself. There are about 200 physics majors a year coming out of the University of Washington. What's going to make you the unique person who's going to have the right fit for what your skills are and for what that job is? Your resume and your cover letter need to be tailored to that job: show that you're interested. Dan will talk a little bit more about that and local resources on that.

You'll want to curate your online presence, make sure that when someone does a Google search for you, they don't immediately find idiot things you did when you were 15, but rather have some things on your LinkedIn page that show what you've accomplished while you're here at the university.

Think about what your elevator pitch is going to be - your two-minute answer to the question of well, “What is it about you that makes you right for this job?” That's usually going to be the first question in an interview, and so you need to think about it before you actually go in.

And finally, get to know people who can recommend you. Get to know people who are aware of what jobs are out there.

Network! It doesn't matter what the connection is - it could be your next-door neighbor's babysitter's uncle - it doesn't really matter who the connection is, but you can learn a lot by talking to people.

Slide 4: Degree-Career Relationships. 06:36

You need to think broadly. This is data from the Census Bureau, where they asked people who got a bachelor's degree, "What was your degree in and, what is your job in?" The green over here on the left is what the Census Bureau calls STEM, but that also includes social sciences so economics and psychology are here - so computers, engineering, & physical sciences is about one in six. Science-related (blue), that tends to be healthcare, and then there's business, education, and everybody else.

And then, you ask, where do they end up? About one in six jobs are what gets classified as STEM, but that doesn't mean you're not doing STEM [outside of this]. If you look more closely at where this physical science spreads out to: The Census Bureau defines physical sciences as physics, chemistry, earth science, atmospheric science, astronomy, and you see that about half of those people end up doing something that you would call in the sciences. Then there's a sizable chunk in engineering or health sciences and social sciences, but, for example, the Census Bureau doesn't call me STEM. I'm a physics professor and they just call me Professor, so I'm over here in the education sector, and here in visual and performing arts,

[interruption where we realize that the screen wasn’t shared]

If you go here from physical sciences, which is this very small piece, and then you divide that up further. So I'm here in Education. Here in visual and performing arts - a physicist who is calculating out how to make realistic computer graphics in a movie would count here in visual and performing arts. So just because the Census Bureau doesn't think you're doing STEM doesn't mean that you're not doing STEM.

SLIDE 5: Physics jobs span the economy. 08: 58

The American Institute of Physics does a survey every year of the graduating classes. We send them your email, and then they send it to you, so please answer that survey that you should get. About half the people who got their degree in physics respond, and in the new data that just came out for the classes of 2019 and 20, about half are employed or looking for a job and the other half are in some sort of school.

Of those who are employed about a quarter or so are somehow in academia - teaching high school or working at a college or university - and another chunk are working in the military or government, but most people are out with jobs in the private sector.

Although that shrank: I did notice that the difference from the two years before to these two, who just both came out in COVID, was that the College/University sector increased at the expense of the private sector. But, the unemployment rate only went from 5% to six, so even during COVID, physicists are finding jobs.

SLIDE 6: Private Sector Job Areas – 1 yr post B.S. 10:07

If you take that private sector, and you open it up, what you find is about 60% of the jobs are what we would say are engineering, computer software, information. Only about 4% of people who come out with a degree in physics or astronomy have a job that they would call physics or astronomy, so it's very rare to be able to do pure physics when you come out right away with your bachelor's. But, on the other hand, it's only about 8% that report that they do not solve technical problems at least monthly. So even if you're in another kind of a job, you're still solving technical problems.

SLIDE 7: Typical Job Titles 1 yr Post B.S. 10:51

Many of the job titles that physicists get say things like engineer in them, and sometimes you've got to work a little bit to get past human resources. But physicists do, and they get these jobs: lab technician, optical engineer, software engineer, and high school science teacher, and so forth: many different jobs that you can do right away.

SLIDE 8: Job Skills Used by Physics B.S. 1 year out 11:17

The skills that people report using: the most common are working on a team and solving technical problems, and the next most common is technical writing. So it's really important, those W credits: learning how to communicate is really important; knowledge of physics or astronomy or advanced math is less common, but important. But notice that these three [highlighted on slide] are the ones that you learn in the classroom, and the rest are ones you learn in advanced lab or by doing research with someone.

Even if you're not planning to go on to graduate school, doing research or getting involved in one of the engineering teams - the reason we have that capstone experience is because that's how you learn many of these skills that are important for the job market.

SLIDE 9: Starting Salaries for Physics B.S. (2019-20) 12:11

Physicists get paid pretty well. The median salary for a private sector STEM job for two years ago was about $65,000 a year, and there were some who reported well over $100k, but that's rare.: And even you know as you get paid to be a teacher or actually the worst here is working here in academia, but it's a nice job, it's a nice place to work. So you can get paid in dreams, you

can get paid in dollars, you can get paid in the smiles of your students, and different things mean different things to different people.

SLIDE 10: Who hires physics bachelor's in Washington State? 12:53

Here in Washington state: You can go to the American Institute of Physics and click on a state, and they will tell you the names of companies that students report working for within a year of when they graduate. We've got representatives here from the Allen institute, Lumotive and Seattle Photonics, but there's lots of other places. Clearly the biggies of Google and Amazon and Boeing, but also smaller companies, Intellectual Ventures, which is a venture capital firm, or working here at the Institute for Health Metrics on campus. There's lots of different places that you can be hired.

SLIDE 11: Society of Physics Students Career Resources 13:36

So I'd like to finish now with directing you to a few resources. The National Society of Physics Students career resources page is really good, and it specializes in students who have a degree in physics: how do you write your resume to make electronics lab look great as a bullet point. You can find that sort of thing in their Careers Toolbox, they have some webinars about the interview, networking, how do I get started, resume and interview advice.

SLIDE 12: What resources are available for my job search? 14:09

The American Physical Society also has a careers page; the Society of Physics Students right, as I've just mentioned; the AAAS, those are the people who publish Science magazine, also have a science careers page. These would be aimed at physicists, and then we're about to hear from Dan at the Career and Internship Center here at UW, and they have a huge number of resources that are aimed at UW graduates. And then of course there's all faculty and alumni, neighbors, people on the bus, and, of course, today's panel.

SLIDE 13: 2022 Career Panel 14:47

So our panel today is Dan Poux from the Career and Internship Center and he'll give you a brief overview of what the Career and Internship Center can do. And then we'll hear from Ned Nestorovic, Arielle Leon, Chris Moore and Alex Stevens, who are all graduates of our program who are now employed in the area. I'll stop and take a couple questions if anyone has some, either in the chat or by raising your hand or speaking up.

In that case, I will turn the floor over to Dan.

Dan Poux: 15:41

Thank you, Marjorie. Thanks for including me and the Career Center in the panel today. I'm really excited to be here. I'm going to keep my remarks very short, because I know that you really want to hear from the folks in physics working in these various career fields in physics.

So I'm just going to tell you a little bit more about the work that I do in the Career Center as a career coach, give a couple of resources that are kind of germane to today's topic, and then

really an invite to you to take advantage of our DIY resources, as well as scheduling an appointment with me or with one of my colleagues on the coaching team, which I'll put the first of four links in the chat right now, and if it's okay Marjorie I'm going to try to share my screen.

Screen shared: https://careers.uw.edu/schedule-an-appointment-with-a-career-coach/

Just to give you a quick little menu of how we support students, so you can see that, in addition to our DIY resources, in addition to workshops and webinars that we have, and career fairs that we put on every quarter, students can meet with coach for half an hour or 60 minutes up until 36 months after they graduate.

That's a really important thing to know, is that we continue to support alumni for three years after they graduate from UW, and then you can see this menu of all the different types of appointments that we can help you out with.

Basically it's from soup to nuts: we can help you look for things that you want to apply for that are a good fit with your skills and interests, we can help you put forward a compelling application in terms of your resume and your cover letter, we can help you with your interview, and we can also help you with networking, which is really, I think what a lot of you are here for today is really a sense of how to tap into that amazing network of UW alumni from this department, as well as other departments, that can help you figure out what your next step is going to be.

First and foremost, if you want to come in and have a conversation with me or a colleague, you can make an appointment, you can also take advantage of any of the cool events on our events calendar and there's a ton of DIY resources on our website.

Screen shared 17:15: https://www.linkedin.com/school/university-of-washington/people/?facetFieldOfStudy=100892

But to that networking point, the second link I'm going to put in the chat is to all of the UW alumni who have a physics degree from UW who have a LinkedIn profile. Would anyone like to guess how many people there are in that group - UW alumni, LinkedIn profile, physics major.

Nobody wants to take a guess? well if you - 200 said Jeanny - it's 5646. So that is, I think, a great illustration of the fact that there are a lot of people out there, doing a lot of really cool things with their physics degree. And you can just take a look at them here briefly in terms of where they live, where they work. Not surprisingly, UW is the one of the largest employers of UW graduates, and that could encompass a lot of different things. Every large employer in the area is here, including places like PNNL, which you wouldn't typically see for non-physics majors, or Los Alamos National Labs. If you want to look more at what they're doing, what kind of role they're in, well, you can see they're all over the place, in terms of engineering, research, education, business development, IT operations, project management, etc.

And then you might also want to focus on what do they say that they're really good at. So when I work with students trying to narrow down this list of alumni that might be good to talk to, I try to get that number down to 30. And the way that I do that is by really aggressively using as many of those filters, as I can, and then being very creative about the kind of keywords I use, to try to get it down to a small number of people who, I think, might really be interesting to talk to, and then I encouraged them to spend a lot of time looking over their profile in a platform like LinkedIn, because they can learn a lot about somebody before they even reach out to them. So, for example, if you're wondering like wow this person seems like they have a really cool job, I wonder what they did before that job to get that job, you oftentimes can learn that just by taking a look at somebody's LinkedIn profile. And so that's a great resource and, of course, you do not have to use just UW alumni in LinkedIn, but it certainly helps, it certainly helps, so I think that's a great place to start.

Shared Screen: 19:40. https://cdn.uconnectlabs.com/wp-content/uploads/sites/25/2020/06/Informational-Interviews-and-Networking-Light-Blue.pdf

If you're one of those people who really struggles with sort of talking to strangers, and you feel kind of uncomfortable with this idea of informational interviewing, use our handout on informational interviews. And we have, as part of this two pager, there's a list of sample questions that you could ask. And there's even a sample email that you could send at the bottom. And you could use this kind of like a worksheet; you can, if you're the kind of person like me who loves worksheets and filling out worksheets, then you could use this as a way to organize and track your networking. Because each time you talk to somebody, ideally one of your goals of that conversation is to get the names of three other people whom you could talk to. And then, when you talk to those three people you want to get the names of three other people and so on.

I know that for many of you, this might feel uncomfortable. It's a little bit outside your comfort zone. All I can do is to promise you that it gets easier. The more you do this, the more comfortable and confident you're going to get with having these kinds of conversations and talking about yourself and what you're interested in and what you're good at.

It's also going to help you tap into that what we call the hidden job market, which is all of the jobs and internships that aren't on places like LinkedIn or aren't on other platforms. Estimates vary as far as how many jobs never even show up on those platforms, but are only getting filled through networking. So this is another - I think a really important resource. It's obviously very germane to today's topic.

Shared Screen: 21: https://careers.uw.edu/channels/physical-life-sciences/

Then one last place I want to encourage you to check out: we maintain a series of what we call interest communities for students that are focused on different industries, different sectors. I

manage one of our interest companies that is focused on the physical and the life sciences. And so I would encourage you to check it out.

We have jobs, we have upcoming events that you might be interested in, so if you're interested in sustainability, we're co-hosting the career panel coming up on April 5 that's all around sustainability in conjunction with the UW alumni association. And then we also have other great resources that might be relevant to this particular field; you can look at job trend data, that kind of stuff that Marjorie was already highlighting in her presentation.

So those are just a couple of ways, I think, that you can access our services and our resources to kind of take your networking to the next level. And this is really important: I think a lot of students spend a lot of time applying for jobs and they get very frustrated with that process, and they feel like they're just kind of turning the crank. And so, one thing that I always encourage them to do is to complement their searching for jobs with their searching for people who might be associated with those jobs or who might lead them to other jobs, and that's why this networking piece is so important.

So we're happy to help you with that, wherever you find yourself. I'll put my email address in the chat, danpoux@uw.edu and you can reach out to me directly, I also sent all four of those links I just posted to Marjorie in an email, along with the link to make an appointment on our website. You are welcome to do so with me or any of my colleagues in the coaching team. So thank you again, Marjorie, for having me here. I'm going to stop talking and let's get to the physicists.

i'm going to hang around the chat just for a little bit until my next appointment, if you have other questions for me, you're welcome to reach out to me directly in the chat.

Marjorie A. Olmstead 22:41 - Thank you. Anybody have a quick question for Dan? Okay you're all lurking in Zoom. Okay, so in that case, it is time to turn over to our panel and Ned needs to leave in about 20 minutes so well.

Why don't we take maybe one minute for you each to introduce yourselves and then we'll let Ned give his advice, and then he has to leave, and then the rest of you can continue to give your advice to students who are currently looking for jobs.

Ned Nestorovic 23:17: Sure, I'll start. I 'm Ned Nestorovic. I'm the President of Seattle Photonics Associates – we're actually not in Seattle, we're in Woodinville - but, that being said, we are an optical engineering consulting and prototyping house.

Oddly enough, I fell in love with optics while getting my physics degree there and actually my next-door neighbor was a former physicist there at UW, who has since passed, but he taught the optics lab and that's really where I kind of found my love for that topic and went on to graduate school for that stuff. So I'll let the other guys introduce themselves after that.

Marjorie: Chris?

Chris Moore 23:54: Everyone, I'm Chris Moore. Like Marjorie said, I just graduated a couple of years ago. After graduating I went and found a job at Lumotive, which I'll talk a bit about the future, but before I did my undergrad, I was also in the Navy for nine years as a SEAL.

Marjorie A. Olmstead 24:21: Arielle?

Arielle LEON 24:24: My name is Arielle Leon. I graduated in 2012 and I'm currently working at the Allen Institute for Brain Science as, actually, a software engineer, but I didn't start there, I actually worked at the University of Washington working in the Bioengineering building before landing a job at the Allen Institute.

Marjorie A. Olmstead: 24:46: Alex?
Alex Stevens: Hey! I'm Alex Stevens I graduated in 2011 and I went and taught for a year East Side Catholic with just my physics degree and kind of fell in love with teaching. I went back and got my master's degree and now I'm in my eighth year, I think, at Issaquah High School.

Marjorie A. Olmstead: Okay, great Thank you. And so, let's see, Ned, do you want to give some advice to our students who are currently looking for jobs?

Ned Nestorovic 25:16: Sure. I think what Marjorie and Dan talked about is all very relevant and all their points, even though I know they have somewhat of an academic perspective on things, even us out here in the world of engineering and working for these larger companies or even smaller companies, all those points that they brought up are completely valid.

I can't express enough how much networking and even the social media platforms in terms of just connecting to people - people, maybe that you went to school with even a few years back and finding out what they're doing and what they're up to. And kind of flowing out from there. It's really, really critical and certainly, in terms of people that we've worked with in the past - we've had interns and people who have moved on to other companies after they've worked for us. I've always expressed a need for them to reconnect with the Community as a whole and try to help those people up. Our company has helped them, and I think we found that there's a pretty gracious community of physicists, certainly locally and domestically throughout the United States. It's a good group of folks.

That being said, just a couple points about what we look for as employers. I can't stress enough your writing; as Marjorie pointed out, that is critical. You could be the smartest person in the room, but if you can't communicate your ideas it doesn't come out, and so really being able to communicate, not to be too nervous about speaking in front of people, because invariably you have to either show your designs or your ideas in front of a group of your peers and potentially bosses. Being able to speak about it comfortably and confidently is really critical and then actually being able to write things.

I have a handful of peers as well that are really bright, bright folks that can't even put a PowerPoint together, let alone right a coherent sentence or use spell checker. And I certainly found that people poke at them for things like that and it distracts from some of the ideas they try and bring across, so that aspect of your education, I can't emphasize enough and really, you know, drilling down on that and being able to be comfortable and adept at it is really it's really, really important.

I think, just one other topic about physicists as a whole, which is what I like to brag about to some extent, but certainly appreciate it, this kind of this wide breadth of base that we all have. So I can throw, for example, interns that design a quick circuit, a little op-amp circuit to drive something simple or design something in solid works, a little mechanical part that do this or that, and certainly we have an optics emphasis here, but just use some very fundamental first order equations to solve simple problems and grow from those points. And what's great is I'm always comfortable about throwing physicists at these different problems and maybe they don't have exact experience in it, but they're going to be able to figure it out. And really I think all of you should have the confidence that you've got this really great base and to and not to be nervous about something maybe that you haven't drilled way down into; that you have that capability already in you to kind of educate yourself and spin up on it and be able to do the job. Certainly with coding and doing math and all that stuff, it's really nice to have that big base underneath you.

And that's about it, I mean if you have any other questions in here for about another 15 minutes. We can certainly have the other people speak and give their opinions on that as well.

Marjorie Olmstead. 28:50: One thing I remember from a previous career panel is someone commenting that when you're looking for a job, it's not so much what you know when you walk in the door, it's what you'll be able to do after six weeks of training. And that's something that physicists, who think that pushing a kid on a swing and tuning your radio is the same thing, can learn very quickly a lot of different things, and how to apply what they already know to something new. And that's something that you can definitely sell yourself with as you're looking for a job.

Okay, are there other questions? I don't see anything in the chat, or you students who are lurking there on zoom?

In that case, why don't we turn to Chris, who is the one who went through this whole job search thing most recently, and maybe you can talk about the process that you went through in deciding, “Was it Grad school or a job?" and then what kind of a job you wanted, and so forth.

Chris Moore 29:49: Yeah, so I was convinced I was going to Grad school, and I would say my advice there is kind of broaden your expectations. Don't put all of your eggs in one basket that you're going to go to grad school immediately. And so out of that I didn't really have a contingency plan, so always a good thing to have. But I kind of came to this company by, my first thought was I kind of need to stay busy with research and doing something actively physics

related, so that the next year, when I apply to Grad school again, I can have that on my resume that I'm still like this is my passion and that's what I'm working towards.

The way I found Lumotive was the postdoc in my research lab, after she finished with her postdoc, went and worked a little bit of - did some work for them for about a year and then she has moved on (she's at Microsoft now), but then I just remembered talking with her and hearing about the company and it was really interesting - a kind of solid state fabrication, which is similar to some of the research that I was doing and then also just a lot of tabletop optics. And then, also the silicon side is a lot of optical, like simulations and things as well, so I figured that's perfect. I'll see if they'll take me as an intern. So, I went through the postdoc Emma, and she talked with them and, basically, they said, well, we haven't taken an intern before, but you can apply, you know, for a job. I was like, okay, yeah that makes sense, and followed through with that and it ended up working.

Sorry, I don't have more, I guess, broad job search experience than that, but I think it's a clear example of how networking, not just knowing the right people to reach out to to find a job, but also having someone who can kind of speak to what you've done, I think helps a lot in that process as well.

Let's see so, in terms of actually like finding that job that's kind of how I got to it. I've been here for about a year and a half now, and I feel like it's actually got a faster pace than the research that I was doing at the university and feels well-funded and I'm surrounded by people that are very knowledgeable about what they're doing and passionate. And it's kind of pushed me to learn different aspects that I wouldn't have necessarily done if I stayed strictly in physics. But I think, overall, I would just say that, if your passion is doing research in general, there's more places to do it than just grad school, which is kind of what I felt like. I was a bit, you know, tunnel focused on doing grad school for kind of the fundamental aspects of it, but still, yeah I think that's most of kind of the beginning, there, process for me.

Marjorie A. Olmstead 33:16: Thank you! um, I guess, Arielle.

Arielle LEON 33:23: yeah so I actually came prepared with a little presentation about what I do and how it relates to physics, is it okay if I go through that?

Marjorie A. Olmstead: Okay sure that'd be great.

Arielle LEON: I will try to rush through it though we're not saying that we have a time limit here. So let me share my screen with you. All right, can you guys see this?

Marjorie A. Olmstead: Yes.
Arielle LEON: All right, let me go to the beginning.

Alright, so, my background. I am a software engineer at the Allen Institute for Brain Science. I was non-traditional in the sense that I started some years after high school, but I went to

Shoreline Community College and then came to UW in 2010 and graduated with a double major in astronomy and physics. One of the things that really helped me when I was applying for jobs is contributing to research projects and, like Marjorie was saying earlier, being able to - or maybe it was Dan who was talking about how to spin those projects into a career - like really, really talking about those on your resume, and that's actually what helped me get into the Allen Institute.

And the other thing is, is that my interest was not just limited to the physical sciences, I took a lot of introductory courses in both chemistry and biology. And so again that helps working at a neuroscience facility. And so, you know, I came here because looking microscopically at cells is very analogous to peering into the night sky and I also wanted to have a more direct impact on the Community. I think that astrophysics and physics does have a direct impact, but it just takes a while to happen, so that's what I really loved about the Allen Institute.

Mostly what I love is being able to contribute to science openly and that's one of the things that the Allen Institute pledges to do - making available data available on a global, to the global community. So my department is manufacturing and process engineering, and I'm not going to go through the remit too much, but we mostly support the entire Institute to give them - to build systems that reliably provide data. We provide core engineering service to develop tools that they might need and also provide customer service that's, you know, honest, timely, and effective.

This is how my department is structured. I am not doing justice to our hardware department, I am not a hardware engineer - sorry, pardon me guys -- they do a lot of wonderful work. I started off in systems engineering and that's where my physics really helped me, in fact.

It really is about networking and who you know, because I started off as a as a contractor, and I got hooked up with Cliff Slaughterbeck, who is also a UW physics graduate, and he recognizes physics folks when he sees them, so he hired me on right away.

But, the systems group: they help execute instrument builds, they monitor performance, maintain instruments on a regular schedule or as part of performance feedback, maintain configurations for rigs, manage incoming issues. So that's what I was doing, and then I switched over to software, because I found myself writing a lot of analysis scripts and monitoring systems, writing software for little hardware bits and whatnot, so I switched over to that team, and I'll be talking a little bit about that.

I designed a lot of the data acquisition coordination software that the scientists or the pipeline's use. I also write custom API's that communicate with third party Apps and in-house software and hardware and then I also create standardized ways to inform on system requirements.

My group does a lot of work with architects in the system, monitoring and then we have a dev-ops guy that does all the in-house deploys. I do know how to do a little bit about of that, but

not much. And, so this is kind of how the things that our software team contribute to our remit: to provide repeatability, core engineering service, and system reliability.

This is something that I helped write. This is a data acquisition software. And again, I came into this job, not knowing - I knew how to write like small Python scripts, Matlab scripts - but by no means did I know how to do this. This took a while. I've been at the Allen Institute for six years, so this was kind of cool to be a part of and learn and grow in my career to be able to do these kinds of things. These Apps, they control the flow of all data acquisition, so basically when a user walks up to rig, instead of, you know, they need to run five pieces of software to start a data acquisition, and so this tool allows them to just open it up, and it will run all hardware and software for them. And so this allows them to be able to take data in the same way, every single time. It's called our workflow sequencing engine. It controls instrumentation, it builds and maintains data containers relevant to that experiment and queries our database called LIMS, to ensure that the data that's entered in by the user is correct, so that nobody accidentally, you know, puts in the wrong mouse ID or something like that, and then it hands, works on all the data left off from the system.

So it really does ensure that data collection is repeatable, this is one of the systems that is in use right now, and there's not one of these, there's eight of these, so this is like a very scaled up version. You know, we do a lot of scaled up science, we do big science is what they call it, and this is one of my colleagues (sorry the Your images are in the way), but I hope you all can read his quote. I thought it was beautiful, but this is how they use these to be able to understand the diversity of neurons in the brain by probing specific cells with different like voltages or currents.

This is something that I wrote, I actually worked on, contributed - so this is one of the custom API's that I helped build. This is a little track wheel that a mouse can run on. He needs to know like where it is in space at all times. This was – Again, I didn't come in with a background of electronics, but I sure was able to dive into this project learn a lot about it and help build it and it's now running on probably 50 of our systems. I helped debug a lot of the PCB board work, wrote the software that that controls the quadrature encoder that's on this on this track wheel, so that we can get understand where the mouse is at any given time, I do a lot of Python scripting to pull the serial information from that Arduino and then store it in some data structure and in one of our other software libraries.

And we do a lot of pipeline monitoring, too, so all the Apps that are created in-house are logged to our local server. This allows us to track like maybe that encoder is broken, we can find out when it's broken, because it'll report all of its errors. We track instruments based off of their computer ids that we've assigned to them to make systems easier to look at so we're not looking at some funky computer names. And then we send a lot of informational messages just for like system diagnostics, you can imagine, when you're running these scaled pipeline system it's really important to know what's going on with all of your systems and of course errors, and we have weekly meetings to discuss these errors These are actually some of my favorite meetings, because we find some interesting things.

And this is my boss' favorite power bi. I'm not a big fan of power bi, but we can pull in this information to be able to log these to see - We can pull the information that's in those logs into a power bi to be able to give - we can tailor reports for specific users, so that they can look at metrics that they care about.

So I want to go through this kind of fast.

I think this is the most important thing, so how did physics help? I hope that you can see I'm a generalist. I don't specialize in one thing. I can dive into multiple projects, listen, ask good questions, and understand complex systems. And I think that that's something that physics really helped me out with. I'm sure we've all had that experience, whether it's with classical mechanics or something like that, where you were just blown away that, that this is how the world works. And I think that that was something that was important for me: to work very hard at not making assumptions, to not make assumptions about systems and to really approach them in a more curious way. I think that it teaches you also how to explain the complexity of systems very effectively when you're in a job you're not just talking to people who are technical you're talking to people of all different backgrounds cultures levels of understanding.

This is so important, working in software, this has probably been one of the hardest things - is pulling requirements from users at a very high resolution. You cannot build a system if you don't if you don't know what the requirements are so learning how to do that, and I think that physics at least helps you appreciate that complexity.

It also helps you understand the importance of collaboration. I remember being in study groups when I was in college and knowing that it's okay, not to know things, it's okay to ask questions, because that is how we all learn. I think that my physics also teaches me to keep an open mind, like it's okay to hold your beliefs until you have new facts to help you adjust the beliefs that you have.

And then I was going to say that when I when I first got my job at the Allen Institute, they actually told me that the reason why I was hired was because I was very honest that I didn't know certain things. When they asked me about specific hardware, or something like this, and I said, you know I actually I don't know what that is. And that was something that that they found very valuable and also, knowing that I had the capability to learn, and so I really worked here at the Allen institute from the ground up and it's been very proud of my work over the past six years.

And that's all.

Marjorie A. Olmstead. 44:15: Thank you.
Questions for Arielle? A couple of people have had to leave to go to four o'clock classes. But in that case, Alex, do you want to tell us about teaching?

Alex Stevens 44:27: Yeah. I'll start off with the getting a job. Teaching is a little bit different of a process and a lot of other things in the first thing is that, in order to teach in a public school here in Washington, you need some sort of teaching certification so.

[PA announcement in background]. Sorry.

When you're in Washington, you need a teaching certification to teach. So for the people who are in undergrad or either pursuing that currently or there's masters programs in the state that you can go through to get your teaching certification.

The public schools in Washington all run their own job boards, so the application process of teaching jobs are not things you're going to find on like LinkedIn or Indeed.

[I'm sorry my lights, I have not moved into my classroom and the lights switched off.]

The school districts all maintain their own job boards. I took some notes here: there's a couple things that I wanted to touch on. One thing that I kind of didn't expect coming out of college that I needed to have in my applications for teaching jobs was letters of recommendation. I thought that that was kind of like behind me after I graduated from high school and got into college, knowing that I wasn't going to probably go into grad school, but every school district that I applied to wanted either two or three letters of recommendation. So along the way, if you feel that you put your best foot forward in a class that can be a good thing to ask for. It's a lot tougher to scramble for those at the last minute in order to apply for a position, whereas, if you have them in your back pocket, it's a nice thing.

The other thing I wanted to touch on was as far as starting salary goes, I always like to put in a plug for public school teachers. I know that, I think that, like everyone would argue that probably teachers should be paid more - I don't hear many arguments that teachers should be paid less - but, the starting salary in my district, at least, which is one of the higher paying districts in the state, but for just with a bachelor's degree we start at just under $66,000 and then with a master's degree it's like $76,000, so it's a lot better than I think some people perceive it to be.

[another PA announcement]

Then, the last thing that I wanted to touch on is that in getting hired for teaching jobs, pretty much every school district, not during COVID, but coming out of COVID, holds job fairs and which are a great way to network with people from the district. And most districts have a process - in our district it’s called a golden ticket, but if you meet with someone and you interview pretty well at the job fair you make a good impression, you can get a golden ticket at these job fairs which guarantees you a job in the district. It's like a nice way to get your foot in the door and guarantee yourself a job and you don't have to, I guess at that point, really compete for a job anymore. You are - when you're interviewing for a position, it's kind of like you're assured that you're going to get it.

Marjorie A. Olmstead 47:50: Okay, thank you. So are there questions that the students have, now we've heard from our speakers? Or are there things that the speakers now, you guys, can comment on now that you've heard other people speak about? Things that you realize you'd forgotten to say.

Chris Moore 48:18: Yeah. I was gonna say a couple more things, I wasn't sure to break these out. I guess I didn't really touch on transferable skills as much as I was hoping to. I guess one thing that's really interesting in this kind of startup culture, like, I was the 20th employee and that's grown really quickly, I think, we are 35 or 40 now over the course of a year and a half. But, one thing that's very obvious to me is everyone here has a really, really strong foundation in coding, which I didn't actually have that strong foundation in coding before I got here, but everyone's you know, been very like open and helpful. Kind of like what Arielle was saying of basically just being honest with - I don't know how this thing works or I don't know how to you know code this specific thing. It's really nice, because I've seen the same experiment redone by two different people with completely different kind of code bases, and I get to see how you can kind of rework the same problem, solve it in different ways, and get a very, very different, more optimized outcome. So coding, in general, just get some experience. Astronomy classes were about the only experience I had there going into it.

Let's see, and I guess that actually learning coding on the job has been really satisfying because you actually get - you have an application to learn, and you basically learn by completing some tasks, and then you get to actually see your code run on something that you're actually going to use for the foreseeable future.

Let's see, organization and note taking is huge. That kind of again goes to the same things we've been saying, but when I first started here, there was, I think, eight or nine new softwares to learn, whether it's Gantt chart organization, things like Tableau for a new kind of plotting, and things like that.

It can be overwhelming at first, but I think all of us in physics tend to tend to be pretty good at picking things up quickly, especially anything tech related so yeah be ready for that.

For the job search process, it's not something I was actively - not something I was like aware of while I was doing it, but I think my research kind of took me on this path of starting at the smallest kind of like, not that I did particle research, but you can imagine kind of going from particle to atomic and kind of basically growing in the size of your problem that you're looking at, so, you know, stepping from particles to atomic to biology, and I think that's kind of the path that my research took over the four years that I was doing research; and I think it helped to give a lot of context and direction of where it was going to go next, and then to the silicon fabrication world.

I think that helps a lot because there's a lot of rules that are just strict and there's so many people kind of just follow them without thinking. And so having the physics background to bring to silicon fabrication. You can try to push on those rules and boundaries, a little bit more so.

Marjorie A. Olmstead 52:19: What do you like best about your job?

Chris Moore: I like that it's still really research intensive and the problems are, like, completely different day to day. We get so - let's see, I mean it starts with having meetings with different people - like I can't be too specific, but, but just having meetings with different companies that are in different countries all over the world, so the downside is meetings at 11:30 at night and then eight in the morning the next day, and things like that, but it's really cool to collaborate with those people and see the devices that you're fabricating and sending through all those kind of packaging steps come back and then be able to test them and it's like, I don't know, opening a deck of cards or something: like you have no idea what you're going to get, and once you get it, you kind of hit the ground running from there, and try to figure out why the, you know, why the waveform looks the way it does, and, yeah, it just feels like a nice reset.

And actually, one other thing, I guess, when I first started, I think, within the first week that I was there, we realized, basically, one of the films - one of the companies was laser cutting this film, which you would think is the best way to do it, but it was actually shorting a bunch of the connections at the end, and so we just took one and cut it with scissors and tested it again and it had no more shorts. We were, like, Okay let's just chop them instead of cutting them off with a laser and it brought our yield up like basically from 10% to like 90 plus percent. So, it was really cool to see that something that simple could have that profound an effect, and yeah, it's just like a very open problem-solving space.

Marjorie A. Olmstead 54:20: Alex, what do you like best about your job?

Alex Stevens: Well, part of my job, so I teach five classes of physics; I also teach a guided studies class, which is for students that struggle in a traditional academic setting and it helps them to access credit recovery as well, and then I serve as the school's senior class council advisor. I think that the most rewarding part of my job is that I get to work with a lot of students who don't come into my class on track to graduate from high school and then reading their name at graduation is super rewarding. I feel that most days or, at least at the end of each week, I feel like I go home having made a tangible difference in people's lives, which is very fulfilling.

Then also, like, I love my work-life balance. I don't take a lot of work home, and I get the summers off. After my first four years I did professional development, but then once I'd, like kind of, maxed myself out on that, I get the summers off to travel and spend time with my family, which is very important to me and I wouldn't trade it for anything.

If I may, I'd like to like kind of piggyback on something Chris was talking about on the job learning. One thing that is said about physics degrees is it's like a problem-solving degree, and

no job really out there is static, and you're not really in any position doing one thing for your entire career. And as you're applying for jobs where you're competing with like people, maybe you're competing for an engineering job with someone that has an engineering degree, you have to find a way to make yourself stand out and be marketable. I think that excitement about problem solving and being able to say, like you know, I might not know how to do this, but I know that I can learn how to do it, is huge, for an employer. Because you're not - you know if they were hiring someone to do the same thing over and over again there'd be a computer to do it - so excitement about learning and communication skills, can help to differentiate you as you apply for a job and you're competing against people that might seem like on paper, a better fit, um so that's a great way as a physics major to sell yourself.

Arielle LEON: Thank you. I'm gonna second that. That is a great, great statement.

Marjorie A. Olmstead 57:12: So, Arielle, what do you like best about your job?

Arielle LEON: Oh, that's a really good question. I am, I mean, of course I love the different problems that I solve, we have again, where there are so many different things that we're doing, so there's lots of exciting things to jump into. But I think one of the things that I love the most are the people that I work with. I work with a lot of really great customers doing lots of different types of science. And so, to hear about the things that they're doing and the ways in which my team can be useful is - it's um, I take a lot of pride in that.

Marjorie A. Olmstead: Thank you. Do any of our students have questions you want to either speak up now or type into the chat? In that case, our hour is up, and I would like to thank our panelists. You did a great job and while there weren't as many students as we might have hoped here in person, I do know that I've gotten a number of emails from students saying, please, please, are you going to record it?

[STUDENT], we've got a question.

[Student] 58:22: yeah. First, I just want to say thank you to everyone for presenting. This has been super helpful as someone who's, you know, trying to get positions that are actually physics based. So I, my question was, I know you guys's emails are in the email sign up for this event. Is that the best way to contact you? And if so, just moving forward to maybe find positions that could fit what we want to do so, we just sent an email your way with a resume? How should we go about that?

Arielle LEON: yeah I'm - go ahead and send an email and reach out that would be the best way for sure, for me.

Chris Moore: Oh yes, I'm here.

Alex Stevens: I probably am not going to get like an email with a resume, because I'm not in the hiring process, but if anyone either here in the meeting or watching this is ever interested in

coming to see what a day is like, anyone is more than welcome to come out to my school - we're like a 15-20 minute bus ride away from UW - and shadow for a day. So shoot me an email if you're interested in that.

Marjorie A. Olmstead: And also, do follow up with Dan at the Career Center and that whole idea that he talked about: You know, all those 5000 people on LinkedIn who are physics grads from UW. Right, that would be at all levels, I think, because I think the alumni association only has addresses for about 3000, because when Margot retired, I got the emails of all the ones that the alumni association had, and that was a little over 3000 in the last 35 years. But it's perfectly okay to just reach out to them either via LinkedIn or some other way, and just tell them, "I'm about to graduate with my physics degree and I'd be interested in scheduling an informational interview, just to learn how you got where you are because you have a job that I think I might like some day."

That's - it's hard, very hard, the first time, but as you get good at it, it's a very informative way of moving on and that may not be the person who's going to hire you now, it might be the person that you will come back to five years later, but that network is important.

Arielle LEON: Yeah, and I actually want to echo something about that too, because networking and trying to meet up with people is probably one of the best ways to go. I know somebody who has been out of physics for six years and through one of his first three applications, one of them was through a friend who worked at Boeing, he was able to land the engineering position at Boeing and which is kind of amazing, given how long that they'd even been out of the field, so getting those direct connections is very useful.

Marjorie A. Olmstead: And also, at Boeing, if you don't have engineering on your resume and it's an engineering job, you need someone else to direct it around and make sure that the computer at human resources even recognizes that you're there.

Arielle LEON: that's exactly what happened – exactly, yeah.

Marjorie A. Olmstead: But my former PhD student who went who did that, oh - when did he graduate? About the time my kids were born and my kids are now both in Grad school, so a long time ago - but he's still there.

And, but his response when he got there, he said, "Look, you know whether it's radar scattering off of an enemy plane or it's an electron scattering off an atom, once you Fourier transform it, it's all the same.

Arielle LEON: it's all the same, exactly.

Marjorie A. Olmstead: And he's - I don't know if he's still doing that, but that was sort of what got him the job.

Alright, so, then I thank you all very much. This was very helpful, and I will send you the link once we get this processed and up on the website and hopefully we'll chat again soon, thank you very, very much.

Arielle LEON: thanks for having us.

Chris Moore: yeah thanks.

[**STUDENT]:** Thank you so much.

Links in the chat:
00:31:27 Dan Poux: https://careers.uw.edu/schedule-an-appointment-with-a-career-coach/
00:33:01 Dan Poux: https://www.linkedin.com/school/university-of-washington/people/?facetFieldOfStudy=100892
00:35:06 Dan Poux: https://cdn.uconnectlabs.com/wp-content/uploads/sites/25/2020/06/Informational-Interviews-and-Networking-Light-Blue.pdf
00:36:27 Dan Poux: https://careers.uw.edu/channels/physical-life-sciences/
00:37:41 Dan Poux: danpoux@uw.edu