Interviewer: Turn on the recorder again. So, basically what we're going to do today, we have an hour, but this has usually taken about 30 minutes max, is we will just start off talking about the workshop, since it's been a while, so casting your mind back. And then we'll take another look at the workflow that you drew and see if anything's changed. We'll talk about that and then we'll finish up with this scorecard that we did at the beginning. So that's basically it.

Interviewer: So just staring off with the workshop, so it was back in March so it's been couple months now. So first of all were you able to attend both days of the workshop?

Researcher: Mm-hmm (affirmative).

Interviewer: Yeah? Okay. And what did you think of it?

Researcher: I think it was pretty great, yeah. I was able to learn an intro to everything and it was so long ago. I didn't actually end up incorporating much of it into my work. I feel like what I learned there was great but it stayed there.

Interviewer: Well we'll talk about that more. Did you have a big take away from it or main thing that came out of it for you?

Researcher: Not really. I feel like I got a little bit more out of the R workshop, which I took the year before 'cause we actually used that.

Interviewer: And was there anything we could have done better to make it a better learning experience?

Researcher: I would say maybe in some parts going slower, 'cause it was a little bit fast.

Interviewer: Was there a particular topic that seemed too fast?

Researcher: The Python parts, not the GitHub and the, what was the other one, shell? Yeah those were pretty good but the Python part, there were specific parts towards the end of it where it was a lot of information and it was after a few hours so everyone's really brain dead.

Interviewer: So it seemed like we could have gone slower maybe near the end or just getting peoples' energy up.

Researcher: I think actually in general what would help the most is if there was like a little packet you could just go over at home before you started so you didn't get overwhelmed at once.

Interviewer: So what would be in that packet?

Researcher: Just the very basics so you get oriented into the right frame of mind before you enter.

Interviewer: Okay so kind of like priming the material. All right, yeah that sounds good.

Interviewer: So thinking about your workflow, so we'll just take another look at the one that you drew. So it sounded like this was mostly a single-cell RNA sequencing workflow which was something that many people have talked about and I seem to remember that you were doing most of your work in R because you had worked with R previously. But were starting to work with some collaborators that were using Python and that's why you were interested in using Python. That's correct?

Researcher: Mm-hmm (affirmative).

Interviewer: The first question is really: is there anything you're doing now that is different than what you drew here?

Researcher: Yes.

Interviewer: And what is that?

Researcher: The biggest change- should I just draw it on here?

Interviewer: Yeah you can draw it right on there.

Researcher: Oh I was doing that in the past, that's right.

Interviewer: You were sorting the facts.

Researcher: Wow I was doing a lot of different things. Well now there's so many things you can do but here, the one I've settled on for my project is [platform], which is basically does the same thing as 10x genomics but it's cheaper.

Interviewer: Okay so this is-

Researcher: So this is also going to here.

Interviewer: And so that's a tool or a-?

Researcher: It's a platform but instead of having a core do it, like before in 10x genomics we gave it to a different core to process, we do this ourselves.

Interviewer: Oh nice.

Researcher: So it adds months of work. So what happened is we're just finishing this now because it added months in the middle.

Interviewer: And why did you decide to switch to that?

Researcher: I think it's mostly just a cost decision because so many people in my lab wanted to do single cell that we just- I think my PI just decided it would be cheaper if we found a different technique.

Interviewer: So instead of outsourcing that, bringing it in-house and learning how to do it. And does that involve any programming at all?

Researcher: No, it's all bench work.

Interviewer: So you're not doing the 10x genomics anymore?

Researcher: Yeah.

Interviewer: You can even cross that off if you want. What else, any other?

Researcher: I'm not doing this anymore either, I was in the past.

Interviewer: Any other changes?

Researcher: Actually, there's another whole box here now. Let's see, how do I...

Researcher: Okay I'm gonna add another thing here.

Interviewer: Yeah, feel free to draw whatever you want.

Researcher: Oh I have it here, I have it down here. Do you want me to re-draw this?

Interviewer: Whatever you wanna.

Researcher: Well I'll just x this out because this is one and this is two coming from the same thing and I did this already, though. So we have a new thing now where we can do both these things from the same mouse and previously we would do this separately. So we're basically able to join this arrow. While this is taking a long time I was able to go ahead with this.

Interviewer: So getting the [body part] cells from the mouse?

Researcher: Mm-hmm (affirmative)-so this was just getting the cells for sequencing but this was actually freezing the tissue, sectioning it, and then staining it. I did that, I did that, yes I did that too, I did that too. I haven't done this yet but I will very soon.

Interviewer: Which one is that?

Researcher: In situ. But these are all just different methods of staining so I started staining and I've also done HNE's. These sped this up because before...more than speed it up I would say it really helped trying to get it from the same mouse because if

you see differences here you can later on also correlate that with the exact same mouse you got the [body part] from before. So it was just a new thing that we realized we could do [operation].

Interviewer: So before you would get it from two places and then try and merge it together and now it's just all one thing?

Researcher: No, before it was just that we would get it from a similar mouse that was treated the same was but it wasn't the same exact mouse. Now it's more of a exact comparison.

Interviewer: Nice.

Researcher: I'm kind of stuck here on this one and I'm stuck here on this one so I haven't reached the part where I really need to use programming 'cause there was a huge delay here.

Interviewer: Right. I'm trying to remember where you were when we last chatted. Were you still at the data acquisition stage?

Researcher: So I had done all this for my pilot study and now I'm on the real study. I have finished this for the pilot study. And for that, we don't use this anymore. We have some more things that have been added here that I will use as soon as this moves along but majority of this I would say is the same. We have probably a few more interesting things that happened here.

Researcher: The biggest update is that we now use Seurat 3 instead of Seurat 2 but that's still just in R, we didn't switch completely to Python, which was a discussion at the time, six months ago. But it turned out that you only really need that for really large data sets and we're able to manage everything else in R so we didn't want to change. Because the whole lab only worked in Suerat and R before, we didn't want to make that big of a change if it wasn't necessary.

Interviewer: Is that something you think you might have to do in the future or does it seem like it's not applicable?

Researcher: I guess it was an option before but it seems like it's not as applicable. It depends, I don't know how long this will even take and then by then things will change again.

Interviewer: And you said that you had collaborators that were using Python, is that still-

Researcher: They're still using Python.

Interviewer: And are you able to continue working with them if you're doing R and their doing Python?

Researcher: I've just not been working on that project, I don't really know.

Interviewer: They're dead to you 'cause they're Python over there.

Researcher: It makes it easier.

Interviewer: Any other changes that you've done?

Researcher: We wanted to get to here but we haven't gotten here yet.

Interviewer: The image analysis.

Researcher: Yeah.

Interviewer: So the second piece of this is are there any changes that you haven't made yet but you're looking at doing or things that you think you'll do differently in the future.

Researcher: In terms of programming or just in-

Interviewer: Yeah or just different tools or using different techniques.

Researcher: Well this is not widely used so I think right now we're just trying to figure out a lab that recently moved near our lab used this in the place where it originated so they're kind of teaching us and we're kind of gonna spread it to the rest of UCSF.

Interviewer: Oh yeah? Cool.

Researcher: So we're going through the initial process of finding a good protocol, make sure it works with everything and there's a lot of troubleshooting in that to set it up and make a pipeline. So that'll probably expand in the future. And I think once I get to here there's gonna be a lot of stuff I learned in the R workshop which I will be able to use to add on to answer specific questions that I have. 'Cause this right now, what we have, is just a very general pipeline.

Interviewer: And you're still planning on doing it in R and using all your R knowledge. Cool. So do you think that Python will come up at any point?

Researcher: It actually has come up at one point but it was so minor that I didn't know it was worth mentioning.

Interviewer: Where?

Researcher: There was one point where we used to use TSNEs in here as a way of plotting and we switched to UMAPs but you have to download that package in Python.

So we just have to go to our terminal, download it, and then convert it using a different command so it works in R.

Interviewer: Oh interesting so there's just one teeny little-

Researcher: There's just one.

Interviewer: I mean, I feel like we can write that in there.

Researcher: Okay it's something.

Researcher: Oh we don't use this anymore either.

Interviewer: Which one was that?

Researcher: Scatter. Yeah a lot of things have changed.

Interviewer: Any other places that Python comes up?

Researcher: I feel like I will reach it soon but I haven't yet.

Interviewer: And what about the other things that we covered in the workshop? So what about using the Unix shell?

Researcher: Oh yeah that is handy when you wanna just download a bunch of data sets or something. I didn't know anything about Terminal before so now I know what that is and how to basically use that. I think that has helped.

Interviewer: Cool, so is that something-

Researcher: And you need it here too.

Interviewer: So is that something that you're using in this pipeline then?

Researcher: Not really but just in general if I'm told to download something it's not as unfamiliar as it was before.

Interviewer: So mostly for kind of downloading data, programmatically. Nice. And what about Git or Github is that something that is part of this?

Researcher: I haven't used that. But I really liked how they explained it. I understood it and I find it really useful.

Interviewer: Nice.

Researcher: I think once I get to this part and have a lot of files I would want to do that.

Interviewer: So maybe that's something you're planning on doing.

Researcher: In terms of version control, yeah, I think that would be really helpful.

Interviewer: Do you want to write that down in green which is a future plan? Pink is things you've already done and green is future.

Researcher: Coming up.

Interviewer: Yeah.

Researcher: I guess this whole section. Version control.

Interviewer: And is that something that you will be just doing for your own stuff or as part of a collaborative workflow?

Researcher: I mean for now I'm the only one working on my project so I might just do it for myself but I think there's definitely going to be other projects where people are actually collaborating too.

Interviewer: Do other people in your lab or on your team use GitHub?

Researcher: Not really.

Interviewer: No, okay, still pretty new. You'll have to be the educator for everyone.

Researcher: When something works then we can spread to the rest of the lab.

Interviewer: Is there any other things that you might do differently in the future or plans for maybe the later data analysis or the writing stage?

Researcher: Yeah this is still kinda dot dot dot because I haven't reached there yet. Yeah everything got very delayed otherwise I would have been there by now.

Interviewer: Yeah well that's kind of the nature of research, isn't it?

Researcher: But this is better because we can do a lot more with a lot more flexibility when you can sequence more. And you get to learn the actual process rather than handing someone a tube.

Interviewer: I just have to remember that [platform] so that when I look at this transcript I don't change it to [platform]

Interviewer: Let's see, so is there anything else about your research workflow that's different that seems worth sharing?

Researcher: I think I've just spent the majority of the time since the last meeting learning [platform] and that's been a great experience because I really understand all the steps in between that we used to skip before.

Interviewer: Yeah so how does that change the work that you do or the work that you can do?

Researcher: I think it gives a lot more ability to experiment and include more samples, more replicas just because it's cheaper. And we have more control over specific things and I think that helps.

Interviewer: So some questions about the overall level of support you received, so basically you were already kind of familiar with R but was there anything that maybe, and it looks like you started using a little bit of Python here and have some plans for version control. So since you took the workshop, which was four months ago, we're kind of trying to figure out what helps people stay motivated to learn and what are some barriers that get in the way. Was there anything that helped you or made it easier for you to try out some of the things you learned?

Researcher: I would say after the workshop was over I really wanted to go back and review everything and try some things out myself but because it seemed like it wouldn't really come in to play as much, I think it got pushed to the side and then too much time passed.

Interviewer: So that sounds like a barrier then too, was not needing it. Was there anybody in your lab that was supportive of you doing this or are you-

Researcher: I think because I was stuck in a wet lab stage there was no room to even experiment, we tried a lot of things and there was just not enough time. If there was more time and just extra time then I would have looked in to it but I think we're just too busy. But it's still on my list of things to eventually learn at some point.

Interviewer: And that's Python specifically or just more-

Researcher: Just more programming in general, to get a better feel and more confidence with it.

Interviewer: And so you think that's something you might do more of in the future?

Researcher: Mm-hmm (affirmative)- yeah, I definitely think it's really helpful and more and more people are using it now so I would like to feel like I can understand it and apply it very fast, not have that be a barrier.

Interviewer: Do you feel like it's a barrier-

Researcher: Right now? Yes. Yeah, even with R I wouldn't say I haven't properly learned it, I've only gone to this workshop and tried fiddling with it but I don't feel like I can directly use it like language. I would say I definitely need more time with it. And yeah it's going to be useful wherever I go.

Interviewer: So then the last piece here is we just have your checklist. So we went through this the first time so we're just going to talk about the pink sections I guess or I guess the green as well. So your workflow as it is currently. So as part of this, do you use any programming languages like R, Python, or Command line?

Researcher: Mm-hmm (affirmative)-

Interviewer: Have you transformed any step-by-step workflows into scripts or functions?

Researcher: I mean we use R notebooks so that is a script.

Interviewer: So are there places where you have, instead of doing like: we do this piece of it, then we do this piece of it, we do this piece-

Researcher: Yeah we have a pipeline notebook, you probably run the whole notebook. And that's just been updated, every months there's new things added to it.

Interviewer: And is that something that you maintain or?

Researcher: I used to do that, one and a half years ago but now there's a new person who specifically her background is in bioinformatics so she's the bioinformatics person in the lab. So it's her job to update that, maintain that, and educate us on what all the changes are.

Interviewer: Cool. Is that a new position?

Researcher: I think she joined a year ago.

Interviewer: Do you use any version control to manage your code?

Researcher: I think she might be, actually. So most of our lab is wet lab and then she's the only person that's not. So she might be doing a lot of things different from the rest of our lab.

Interviewer: But for you, for your work here.

Researcher: I haven't used it yet but I plan to.

Interviewer: Do you use any open source software?

Researcher: What does that mean exactly?

Interviewer: Software that is available for free with open source code.

Researcher: Oh no.

Interviewer: Well actually in this case I think R is-

Researcher: Oh it counts as one? Okay.

Interviewer: Do you share any of your code publicly?

Researcher: I think I did in my last project.

Interviewer: How did you share it?

Researcher: I think it was on GitHub, yeah.

Interviewer: Nice. And do you share any of your computational workflow or protocols publicly?

Researcher: Not sure if the last question covered that. What's the difference?

Interviewer: Yeah so I think to me, the computational workflow is all of the different pieces, along with protocols being the more wet lab side of things. I think last time we said we weren't sure so we just went with no.

Researcher: I see.

Interviewer: So it really depends on-

Researcher: So everything, not just the code.

Interviewer: So not just how did you analyze the data but how did you gather it.

Researcher: Have we put it publicly somewhere? I don't think so.

Interviewer: So then the last question is just kind of a broader question for you, which is with these workshops, you know we teach the basics of programming but one of the larger goals is we want people to use this to help make their research more reproducible so that somebody else could come in, they could have your same data, your code and they would get the same results. So a question for you is do you think participating in this workshop has helped you make your work more reproducible?

Researcher: I would say the Python one because that really applied it, I can't really speak for that. The R one, I would say just understanding the basics of it helped organize my notebook so it's easier for someone else to read it. So I think that would go under that category.

Interviewer: And the R one, that was an earlier workshop.

Researcher: Yeah, the year before.

Interviewer: Mostly it's just documenting your work or organizing your work has been helpful?

Researcher: Yeah.

Interviewer: Cool. Anything else along those lines?

Researcher: I think the biggest advantage of it was just understanding how I can tweak the code to get what I want. You know what I mean? Answer the questions I want. A lot of that I learned from the R workshop and from the coworker that works specifically in bioinformatics.

Interviewer: Very cool. Anything else- I mean that's our last question, but is there anything else about the workshops or your workflow that seems relevant? Changes you implemented or things you're doing differently?

Researcher: I'm just really glad they had these two both of them workshops. It's just a great resource for anyone who wants to learn it, whether they're going to use it or not it's a jump starter. Before it looks really scary and then once you go through one workshop it's not so scary anymore. So I think that helped me. If I get time now I would make this another step 'cause I've already taken the first step. I think that is a real benefit and great resource to have.

Interviewer: Great, that's good to hear. That's definitely our goal. I think some people can be super intimidated by programming, I mean, it's like learning a new language, like what's going on, but definitely one of our goals is to make people feel like you can do it.

Researcher: I almost feel like if they spread it out and it's not just one weekend, and it's like a class once every week or something it might help more.

Interviewer: Is that something that you would be able to participate in with your schedule?

Researcher: Probably, yeah. I think it makes it too intense to just cram it in to one weekend and then you can't really synthesize everything.

Interviewer: That's good to know, other formats. The last one we did, we did four half days so it was still within one week but we tried to break it up a little bit more a people seemed to appreciate it so we're always trying something new.

Interviewer: Awesome, well that's really great to hear and it's always interesting to see where people are at with their research and what changes they made.

Researcher: Yeah it's really fun to come back and see this.

Interviewer: To just kind of compare and you know sometimes the timeline for making changes, it takes a while depending on where you are in the process.

Researcher: Maybe even in six months when you see me I'm going to be somewhere here and I'll have a lot more to say about this section.

Interviewer: Getting to the data analysis later one.

Interviewer: I know I should have done another follow up but not for this project. Future research.

Researcher: I hope other people have made it further into their coding sections.