

**Episode 9 – Dresser-Rand DC1213
Podcast Transcript**

- Susannah Howe: Welcome to the Design Clinic Download. In this podcast, we dig into the experiences of Design Clinic teams and classmates through the years. I'm your host, Susannah Howe from the Picker Engineering Program at Smith College. This episode features three alums from the class of 2013, Zin Min Aye, Phoebe DeGroot, and Celeste To. Their Design Clinic project with Dresser-Rand was on the design of an impeller labyrinth seal for centrifugal compressors.
- So I'm delighted that you're all here to join me today. This is great. And I'd like to get started by just having you each share briefly who you are and what you're doing right now. What are you doing for a job or grad school right now?
- Zin Min, why don't you start us off?
- Zin Min Aye: Sure. I'm currently located in Portland, Oregon and working as a supplier launch readiness manager for Daimler Truck North America. I actually worked as an engineer for a little bit and then ended up switching careers and then now work in operations.
- Susannah Howe: Great. Thanks. And Celeste?
- Celeste To: My name is Celeste To, I'm currently a design assurance engineer for transcatheter cardiovascular devices here in Irvine, California.
- Susannah Howe: Thanks. And Phoebe?
- Phoebe DeGroot: I'm Phoebe DeGroot. I just enrolled in September at Carnegie Mellon in the Masters of Computational Design where my focus is robotics and digital fabrication.
- Susannah Howe: Excellent. Great. All right, so let's jump back to when you guys were all together in Design Clinic more than nine years ago. And I'm hoping that one or all of you together can describe what your Design Clinic project was. Who was your sponsor and what was the description of what the project was?
- Phoebe DeGroot: I was just thinking about how it took a while for us to figure out what that was. So our project was designing a self-centering labyrinth seal. Our sponsor was Dresser-Rand, which is a manufacturer primarily of compressor technology for compressing gases, primarily. The self-centering labyrinth seal was a type of passive mechanical seal that prevents leakage of gases around the turbine. And there was an issue with the sort of eccentricity of the seal with the turbine, which is a problem in creating more leakage than you were aware and at that time required a manual alignment or re-centering of the part with the rotating gas compressor assembly.

- Susannah Howe: And as I recall, Dresser Rand has a patent on that project. And you are all named as inventors on that.
- Phoebe DeGroot: Yep, it is true.
- Susannah Howe: All right. So let's take it back to Design Clinic itself, and what were your expectations coming into the class and how did those expectations match the reality of your experience?
- Zin Min Aye: My only expectations were just to get, I guess, a real world experience of doing a engineering design project. I think by my senior year, I had already done two summer research projects and one internship. They honestly didn't provide a lot of great insight into what my career would be like, and so I was just really hoping that I would get to understand what the design process is like, what it's like to work in a team as an engineer. The way we worked within our team even felt a bit more professional than any other school projects that we've done in the past. And I particularly really remember how we were also treated throughout the project that we were consultants. We weren't just students there to learn and figure things out along the way. We actually were contributing something important to the project.
- Phoebe DeGroot: Well, I expected this to be a real-world design project or have some basis in an actual problem that we could then work on. I didn't really think about some of the soft skills that we ended up really developing over the courses of Design Clinics. So, project management, taking things like meeting minutes and, what Zin Min was saying, professionalism or working collaboratively as a team was something that I had done in group projects. But thinking about it in more of the context of how you might experience that in a workplace setting. And that was something that was really, I'd say formative for me coming out of school. I think that that was really an important experience.
- Celeste To: I didn't really go in with expectations. I was like, "Okay, this is a part of it. I have to do it." But I think in hindsight, really looking at how beneficial having Design Clinic was for the real world. Most of work is open-ended projects and you're still learning even up to this point. So for me, I think it was really good to experience what such a long-term project and something that has some limitations, but you really have to create your own solution for it. And a lot of that is still going to apply going forward. So I think it was really an amazing experience to leave students graduating like, "Okay, you're graduating now and I hope you take this and build off on it."
- Susannah Howe: So in the more than nine years since you graduated, talk a little bit about what your path has been to where you are now, because I know that you did not all end up immediately where you are now, and you've had quite interesting journeys on the way there. So Phoebe, why don't you start us off about your path from graduating until now.

Phoebe DeGroot: I first had a short job at a neuroinformatics company where I was doing a bunch of weird stuff, but then that was an aside, but ended up doing product design at an optical products company. So mostly doing consumer grade microscopes, telescopes, binoculars, that kind of thing. The larger part after that was going to a machine shop, small job shop in Brooklyn called Rush Design. I was working primarily as a CNC machinist. I would also do the design, CAD, CAM setup, operating the machine, post-processing. So over the course of the five years that I was working there, I became lead machinist. And so I was essentially running the shop in the Brooklyn shop because the shop owner was in another shop. So I was also working with clients and project management. Then I got a job at Pratt Institute, which is an art architecture and design school in Brooklyn.

I worked as the project coordinator at the Consortium for Research and Robotics, which is a lab that does interdisciplinary work in both the small business side as well as art research side with industrial robot arms. I was able to teach during my time at Pratt, so I taught a undergraduate course on using industrial robotics for creative applications. And then in the last year, I decided that I would go back to grad school, and I applied to this program here at CMU, the Masters of Science and Computational Design. And now here I am.

Susannah Howe: So not entirely circuitous, but an interesting journey.

Phoebe DeGroot: Yeah, definitely. There's been a lot of odd jobs along the way. I've been a moped mechanic. I had a stint at a startup that did 3D printed jewelry where I was mostly setting up their 3D printers, and maintaining and monitoring them in a lot of just odd jobs in fabrication at different times. But mostly has been working in the digital fabrication area. And that has been consistent from actually also from when I was at Smith.

Celeste To: Yeah, I wanted to comment first: Phoebe, I think that your journey has been super interesting because I remember in college you were very creative, very artistic. So I feel like you still incorporated a lot of that creativity and your journey, so that's super cool.

For me, I think I mentioned before, I think in college and a little bit, even in grad school, I was very much like, "Okay, I just got to get this done. I just got to get through it." So obviously after college - I haven't mentioned I went to grad school - so I went to grad school. But funnily enough was also Carnegie Mellon. So I went there two years for my master's in mechanical engineering. So I think my one thing that I really wanted for a job was just to be closer to home, which is back here in California. So it was really hard to find a job, but I did land a job in medical devices. So my first job was at Abbott.

So I was really excited because I feel like since high school I knew I wanted to go into medical devices. I just didn't really know how I would fit into that industry. So it was really exciting. I'm like, "Oh, I made it. I'm here." But I guess I didn't realize the different roles that you could have in medical device. So after three

years in process development, I didn't really enjoy it. I think there wasn't a lot of growth in that site specifically. And I think I still yearned for doing something, a new product, but maybe not necessarily R&D. So when I applied to my next job, I applied for a role that was a new product development, but as a quality role. Right now, I'm still at that job. I switched over from Abbott and now I work at Edwards Lifesciences as a design assurance engineer.

So it's really cool. I feel like I still get to touch and be a part of new product development in the industry that I want to be, which is medical devices, but I get to use the skills that I feel like I really shine through, which is quality assurance. Super excited to be where I'm at now. And it's crazy because I think 10 years ago that Celeste in college may not have seen that I could find a function that I would really resonate with, and I think I finally found that. So that's my journey. And still continuing on that journey.

Susannah Howe: That's really exciting to think that you've found something that really is a good fit. That's great. All right. Zin Min, how about you? I know you've had also interesting twists and turns and finding things that fit along the way.

Zin Min Aye: After graduating from Smith, I got a job in San Francisco, luckily through a connection that Professor Howe made for me. It was a Smithie that graduated a couple years prior. She was working in San Francisco in the construction industry. So I reached out and got a job at the same company. And so I moved out there and did mechanical engineering, well for mostly renovations in the commercial construction industry for about three years. And then decided I wanted to move out of San Francisco and I wanted to move to Portland, Oregon. So I moved up here back in 2017, got another job at a mechanical contractor company doing the same thing, mechanical engineering within a commercial industry, the consulting side. Did that for about two years. And by that point I had learned that I really did not enjoy engineering as much as I thought I would.

It came as a shock to me and I was doing a lot of renovations, and so it felt a bit repetitive after six years or so. So I didn't feel like I was learning a lot. It was the same systems that I was doing and working on for a while. And so I decided to go back to school, but I didn't know what I wanted to study for the longest time. And then I found myself after all those years that I was really drawn to process inefficiencies within the way we work. And so I spent a lot of time when I was an engineer, building tools, templates and all that for our team. And so I decided that I wanted to focus more on the operations side and maybe on the project management and business operations. And so I went back to get my MBA.

It was a hybrid program at University of Washington. And so I was able to work and then study part-time for about two years. And then through that program was able to switch and pivot my career into more operations. So that's when I got into Daimler Truck North America through their leadership program here. And then I graduated from that program last year and then now work in the

supplier launch readiness team, which specifically focuses on bringing new products into production. I'm not doing the engineering work anymore, but I get to be a partner with engineers in ensuring that they have all the design specifications correct and the suppliers that we work with and understand the quality and the volume that we need for our products.

- Susannah Howe: Thank you so much. You've all had really interesting careers, and I'm noticing that you started with a mechanical engineering based project in Design Clinic, and you all then continued into mechanical engineering aspects of your careers and then took them in various directions. So I'm curious, what skills did you learn in Design Clinic that you have used since graduating and what has transferred to your life after Smith?
- Phoebe DeGroot: I clearly tried to focus on that prototyping when we were in Design Clinic, focus on the CAD and the simulation. And that ended up being a huge part of what I did after Smith and continue to do now. It's all about digital fabrication and CAD and really rethinking ways of digital fabrication.
- Zin Min Aye: I went into construction and so I didn't feel like I knew anything when I went in. And it wasn't quite the design project that we worked on, so it was pretty different. And so there weren't a lot of the technical background that I wish I had going in. But what I really took away from Design Clinic, and I think my whole Smith experience really was just the approach of problem solving and how do you approach a problem, how do you break it apart? What are the assumptions that you make? And then how do you really agree on the scope of the project? All those soft skills that Phoebe mentioned in the beginning, those are the, I guess, real important skills that I still use today.
- Celeste To: A lot of the soft skills really transfer well into, I don't even think just assurance, I think in any role you go into. Honestly it's going to apply and it doesn't end there. It's not like, "oh, I'm aware of this thing I have to work on and I'm done." No, you keep learning and you keep growing. So I think, yeah, Design Clinic is definitely the start and then you just keep going from there.
- Phoebe DeGroot: I remember very distinctly having absolutely no clue what our project was when we started our Design Clinic project. We had a vague idea, but I think that all three of us had a lot of trouble reading some of the project brief and even knowing what we were looking at. And I think that that ability to try to synthesize, pull out the knowledge that we needed really has served me well since then.
- Zin Min Aye: Another thing that I learned from the Design Clinic is also project management and working in teams. How do you communicate? How do you work with each other? How do you use each other's strengths? How do you fill in those gaps that you have? And I think that really applies to, I guess, anywhere in the professional world - everything's done in groups.

- Susannah Howe: What would you say was your most memorable or impactful Design Clinic experience?
- Phoebe DeGroot: I remember driving all the way out to Buffalo, which is funnily one of the closest metropolitan areas to me now.
- Celeste To: That is true.
- Susannah Howe: That's right. You went out to visit Dresser Rand in Olean.
- Phoebe DeGroot: I have pictures. We went to Olean. They have squirrel statues. Am I right about that? I can't remember if they were squirrels, but I think that they were, I'm not sure, there was something about the squirrels. That's all I remember.
- Zin Min Aye: I just remember that was such a long road trip and we took turns driving and it was still very long.
- Phoebe DeGroot: It was quite long.
- Zin Min Aye: One thing that stood out for me when I think back on it was that small feedback session that we did between the team. I think it was right after the fall semester or maybe the beginning of winter where we all sat down and give each other feedback on how we worked and how we can improve for the remainder of the year. I remember the feedback I got even during that session. I still think about it every now and then. And I think that was really helpful for me going into the professional environment and understanding where my pitfalls might be and what I need to continue to work on to be a more effective team player. And so I remember doing that and I think that was such a great experience that I still do with my teams now, where you give and receive feedback. I think that was really good for me.
- Susannah Howe: So with the benefit of hindsight, how do you see Design Clinic fitting into your overall engineering experience at Smith?
- Phoebe DeGroot: It did really fulfill that idea of a capstone, of a culmination of some of the things that we had been interested in through our undergraduate experience as an exploration or an exercise in applying those skills to a problem. I think that being able to think about working as a team or negotiating, working with others, being able to do conflict management and being able to intentionally project manage as a way of really helping everybody do their best, being able to work to the best of their ability was something that was super important. And I'm very glad that was something that we were able to get exposed to through Design Clinic, through the lecture as well as the project.
- Zin Min Aye: Yeah, just to build on what Phoebe said, I remember specifically learning about compound interest and present value, future value. And I hadn't taken any economics class until that point. So it was super helpful. I still think about it

when I sign my mortgage and take out loans and whatnot, but those were super helpful. And I think one of the other things that we also learned was how do you do an informational interview? What are the etiquettes of that? Writing thank you notes afterwards. And I still judge people on how well they respond or how they reach out to me when I get these types of requests. So yeah, those were really, really helpful.

Susannah Howe: So what advice do you have for future Design Clinic students to make the most of their experience?

Phoebe DeGroot: This was a project that was a little scary. I remember being really unclear on what exactly the project was. And there were a couple of other projects that I was interested in that had the mechanical or product design, had a little bit of that creative bent, but I thought that this one would be a really good experience in getting myself out of that comfort zone and really trying something that I wasn't sure about and learning a lot. And I think that it definitely did that. So not being afraid to do a project that you're a little afraid of is maybe some advice.

Zin Min Aye: I remember feeling the same way, not knowing much about this project. And I think I actually rated this one on the bottom of my list. And I wanted some other projects. And I remember talking to you, Susannah, that you were trying to convince me to consider this project. And yeah, and I'm glad that I did because I felt like I learned the most I could have outside of hearing after having gone through it and hearing about what other people did that really lined up with what my interests ended up being.

Celeste To: Maybe if I would even give my former self advice, not to put yourself down too much. A lot of people are in the same boat of not knowing or understanding the problem, but you're all in it together. So just give yourself more space to learn and grow. And the other thing is just communicate as much as you can because that soft skill of communication is huge and it's probably more important than anything. Because everyone is trying to learn something new and trying to understand the problem. But if you can at least all come together and work it out, then it just makes it a lot easier.

Susannah Howe: Is there anything else that you want to share? Anything that you haven't had a chance to bring up today that you wanted to make sure we covered?

Celeste To: Everyone has their own path. And it doesn't have to be what society is telling you to do.

Zin Min Aye: Yeah. I remember when I was in San Francisco, or I guess when I was an engineer, and I remember thinking, gosh, I wish I had more of the fundamentals learned in school and whatnot. But I think looking back now, maybe with the benefit of not being in engineering anymore as well, I felt like what I took away from Smith was more valuable than just knowing the fundamentals of engineering and exactly how you would solve the problem within one particular

field. It was a lot of the soft skills that we talked about at Smith that we learned. And I think it was also outside of classes too.

Susannah Howe: Oh, though I'd like to think that you learned at least some fundamentals of engineering at Smith!

Zin Min Aye: Oh yeah, it's all gone out of my head now.

Celeste To: I know what you're talking about though, Zin Min. Because that's why I went to grad school for mechanical engineering because I thought, oh, do I need to have this super deep technical, whatever? But then you're right. The other thing too, now retrospectively, they're both good experiences, but Smith's really taught me how to learn and that's invaluable. You can take that anywhere.

Zin Min Aye: Yeah. Can I also just make a quick point? I remember going into the engineering field, and even now because I'm still in the automotive industry, I still see a male dominated environment, especially when I was in construction too. I remember being questioned about every design decision that I made by other males. And I just always look back on my Smith experience and feel really grateful for it because we never had that, being at Smith, it was just all female. We all had a voice. We all were able to go for the leadership positions. We were all able to learn without feeling like we were the minority within the field. And so, I don't know, I felt a bit more empowered going into the engineering field compared to if I had gone to a regular university where it was a co-ed.

Phoebe DeGroot: And it's also weird for me, because I'm non-binary, and that's something that has always been also an interesting thing with being a machine shop and being usually the only person who's not a dude in the machine shop. Definitely have been ignored several times by clients. And I noticed that I overcompensate for it now so that people in the hardware store won't ignore me. And I think that Smith was very good and I never really learned that I shouldn't be speaking up more than maybe other male peers.

Susannah Howe: Well, it's been so much fun to catch up with you and hear about what you've been doing and hear about your experiences. And I just want to thank you so much for sharing your time and sharing your advice with me and with this podcast.

Zin Min Aye: Thanks for putting this together.

Phoebe DeGroot: Yeah, thank you.

Susannah Howe: It's been really fun.