



Women in Steel:

Progress & Perspectives



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Where did your education and career start?

My education started at Carnegie Mellon University, where I learned all of the fundamentals of steelmaking from my professors in class, and from the deep history of steelmaking that surrounds you in Pittsburgh. I remember in my Introduction to Materials Science and Engineering class having a specific revelation that inspired my love for metallurgy. In metals, you can have a fundamental understanding of what's happening at the atomic level, which will inform what you can see with your eye. For example, the way metallic atoms move around each other in a solid, creating defects and dislocations, lead to the failure behavior when a metal beam snaps! To me, a student who always wanted to know why, why, why — understanding phenomena across length scales in this way satisfied some deeply held curiosities, and I was hooked.

Please share why you chose the steel industry and the inspiration or motivations behind your decision to start your own clean steel company, Limelight Steel.

Throughout my career, I've had incredible opportunities to work on fascinating cutting-edge technologies. From micro heat exchangers for supercritical CO₂, to metals exposed to shockwaves and explosions, to new 3D printing lasers for increased metal printability, many aspects of my work sound more like science fiction than practical realities. When I was getting ready to finish my Ph.D., I had a nagging thought that whatever I did next, I wanted to do something that really mattered.

I remember talking to a friend about the lasers I had been working with in graduate school, saying something along the lines of “these lasers are really powerful and versatile, I think there have to be better applications for them.” When my friend responded with a simple “why don't we use lasers to make steel?” I was called back to my education that was deeply rooted in steelmaking at Carnegie Mellon, and I imagined what we could do with a new heating technology in the steel industry. The idea had exactly what I was hoping for: creating something new — using lasers to electrify industrial systems, and working on a scale that matters — steel being a fundamental part of the daily lives of billions of people around the world. That friend, by the way, is Andy Zhao, my co-founder at Limelight Steel.

Can you talk about support you've received to advance your career? (i.e., mentors, etc.)

I am incredibly grateful for the mentors I have had in my life. Each step of my career is characterized by mentors who were willing to take me under their wing and teach me everything they knew and give me access to their coolest projects. At Carnegie Mellon, Tony Rollett accepted me into his lab where I learned the basics of research-driven metallurgy and got my first exposure to cutting-edge tech like metal additive manufacturing. Tony also helped me to find my voice — to have confidence in myself and

my knowledge, even when I'm in a room of other smart engineers. After undergrad, Tony inspired me to apply to work at the Los Alamos National Laboratory, where I worked for my next great mentors, Rusty Gray and Veronica Livescu. We worked on metals exposed to shock waves and more, and I deepened my understanding of metal synthesis, characterization, and performance in the real world. From my time with Rusty and Veronica I learned that I, too, could rise to the level of knowledge that the scientists around me exuded. These mentors formed the bridge to my next mentor, my Ph.D. advisor Ken Vecchio. Ken's gifts to me were independence, opportunities, and saying yes when I asked for more — joining more projects, mentoring more students, presenting my work in front of more people. These opportunities in part helped me to expand my view of what was possible for me in my next role.

Why do you feel diversity and inclusivity are important in the workplace, and the steel industry as a whole?

There's a concept I learned about through Buddhism called "the beginner's mind." The beginner's mind is when an intern walks into the room, asks something like "why do we do it this way?", and stumps an entire technical team. The beginner's mind is the ability to bring an outsider's perspective — and in my experience, that's how real change is made — by questioning your assumptions and revisiting the fundamentals. It's the antidote to expertise's attitude of "this is how we've always done things, so that's what we're going to do." The beginner's mind, on its own, however, risks lots of practical pitfalls that can't be foreseen from the fundamentals. That's where the experts come in. My favorite teams that I've worked on have been people of different backgrounds with deep expertise in different areas — all sharing their knowledge, yet acting as a "beginner" on the aspects they aren't experienced with. This applies to technical expertise, interpersonal styles, and life experience — all giving each member of a group something truly special to contribute and teach each other. Those teams create the best mutual learning, and the most groundbreaking results.

What has been the best thing about being a woman in this industry?

Honestly, I was nervous when I started Limelight Steel; lots of well-meaning colleagues and friends warned me the industry was "conservative." Both as a woman and as a startup founder launching a new metal production technology, I didn't expect the steel industry to feel welcoming to me. To my surprise, I have found that people in the industry overall have been excited to talk to me and learn more about what my company does, answer my questions with incredible patience and detail, and provide ideas and feedback on how to make our technology even better and more applicable when it gets deployed at large scales. This excitement for change extends to the personal, too. I have witnessed an incredible increase in the celebration of women in steel over the past few years. This celebration combined with the feeling of camaraderie and community among the women in this industry has made me feel both welcomed and proud, and I genuinely look forward to continuing to celebrate and uplift the women who come after me.

Do you have any professional development book recommendations that you'd like to share?

Two books that I think about often since I've read them, more on practical skill-building, are *Nonviolent Communication* — for skillful, practical techniques for something we do every day, communicate! And *Never Split the Difference* — a book on negotiations with a lot of humanity paired with unorthodox methods. In general, I've been more of a learn-by-doing person throughout my life, and have learned a lot of professional lessons by jumping in to the deep end. ♦