



Women in Steel:

Progress & Perspectives



Chenn Zhou

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Where did your education and career start?

I spent 10 years at Nanjing University of Aerospace and Aeronautics to study (B.S. and M.S. degrees) and to teach in the areas of combustion, computational fluid dynamics (CFD), and thermal science and engineering. In 1987, I went to Carnegie Mellon University to study for my Ph.D. in mechanical engineering and started my career in the U.S. in 1991 at an air pollution control company, NOXSO, in Pittsburgh, Pa., USA. Since 1994, I have been a faculty member at Purdue

University Northwest (PNW) in Hammond, Ind., USA.

Why did you choose the steel industry?

I have steel in my blood. My grandfather on my mother's side and several other family members across three generations worked in the steel industry their whole career. I've also only lived in two places in the U.S., which are famous for steel production, Pittsburgh for seven years and Northwest Indiana for 30 years. When I joined PNW in 1994, I started to apply CFD to industry. In 1998, Pinakin Chaubal (currently the chief technology officer of ArcelorMittal) approached me about using CFD to solve blast furnace hearth erosion issues. It was during my close collaboration with Pinakin and Wendell Carter (currently the executive vice president, technology at Cleveland-Cliffs) on our first blast furnace project 25 years ago that I felt like I found a new home. The industry has proven itself committed to applying new technologies, and I found my collaborators in steel to be exceedingly innovative and open-minded, and also very friendly! I have also found AIST to be an incredible resource for opportunities to enhance my network. It is one of the best professional societies for these opportunities, and also for the incredible support it provides for collaboration within the industry.

With these strong partnerships, we built a nationwide Steel Manufacturing Simulation and Visualization Consortium (SMSVC) in 2016. Together, we have developed and implemented state-of-the-art digital technologies including CFD, augmented reality (AR)/virtual reality (VR) visualization, high-performance computing, and artificial intelligence (AI) to address critical issues such as energy efficiency, decarbonization, digital transformation, workforce development and safety. These collaborative applications have generated very positive economic

and educational impacts for the steel industry and PNW students alike.

Tell us how you have advanced in your career.

After joining PNW in 1994, I focused on both teaching and research for the first 10 years. This provided a strong foundation for my career development. At that time, our campus was very different and had a heavy teaching load and limited resources available to support research. As said by George Bernard Shaw, “Don’t wait for the right opportunity: create it.” So, I focused on my background in computational modeling, in spite of my strong experimental background, and built my research by collaborating with Argonne National Lab and industry during the summers, applying CFD to solve real-world problems, which was relatively new in the field. During the academic years, I then integrated my research with teaching by showcasing research results in classrooms and involving students in projects, which helped me grow quickly in both teaching and research. I received both Outstanding Teaching and Research awards in 1999, and was promoted to associate and then full professor in six years.

From 2005 to 2015, I served in various administrative positions including head of the Department of Mechanical and Civil Engineering, the interim head of the Department of Electrical and Computer Engineering, and the Interim Associate Vice Chancellor for Research and Graduate Studies. In the meantime, I kept my passion and dedication to teaching and research and established the Center for Innovation Through Visualization and Simulation (CIVS) in 2009 and the SMSVC in 2016. Along the way, my engagements in professional societies, such as AIST and the American Society of Mechanical Engineering (ASME), greatly benefited my career advancement. I became ASME Fellow in 2003, AIST Distinguished Member and Fellow in 2022, and NIPSCO Distinguished Professor of Engineering Simulation at Purdue in 2020.

Can you talk about support you’ve received to advance your career?

I have been extremely fortunate to have had so many mentors and supporters throughout my life, including my teachers, professors, thesis advisors, supervisors, colleagues, collaborators, funding agencies, friends and of course my family members. I have learned and benefited so much from them not only technically, but also in my growth as a person. Without their mentorship and support, I wouldn’t be where I am today.

What are you most proud of in your career?

In my career, I am most proud of (1) my students, staff and collaborators, and (2) our collaborative work to solve real-world problems. It always makes my day when I hear



that students have found jobs or have been accepted into graduate programs because of their research experiences at CIVS, or the results of our projects have been used for real applications. I am extremely proud of our CIVS staff who are dedicated to and passionate about making positive impacts for industry and society, currently including Armin Silaen, Kellie Butler, Kyle Toth, Jack Moreland, Nick Walla, Orlando Ugarte, Tyamo Okosun and Wei Guo. Many of them started as undergraduate students and have grown as outstanding professionals and leaders in engineering simulation and visualization. Together, we built a multidisciplinary, self-supported, and sustainable applied research center (CIVS) and a nationwide steel consortium (SMSVC). With great support from PNW, government funding agencies, and more than 180 organizations including industry, national labs, other universities and colleges, AIST and others, CIVS and SMSVC have conducted and continue to conduct tens of millions of dollars in research projects at the forefront of decarbonization, digital transformation and workforce development.

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

A diverse and inclusive workplace is a win-win situation. It can increase companies’ productivity as well as employee engagement and happiness through widening perspectives, enhancing innovation, creativity, problem-solving, employee satisfaction and improving decision-making. It can also increase the depth of the available talent pool of new potential employees, critically needed for steel and other industries.

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

The 7 Habits of Highly Effective People by Stephen R. Covey. ♦