

LEADER PROFILE

Jennifer Clark, Director of Manufacturing Operations Global Foundries | WITH HAROLD KING

EMBRACING NEW IDEAS

"BY ALWAYS
LOOKING TO
DO THINGS
BETTER, YOU
CREATE A
CULTURE THAT
EMBRACES
NEW IDEAS
AND REMAINS
FOCUSED."



Jennifer Clark at Global Foundries holding a silicon wafer.

JENNIFER CLARK really liked math and science in high school and found herself to be good at both but never thought about what that meant in terms of a career. HV Mfg sits down with Jennifer to discuss her rising career path after a degree in Chemical Engineering and about her role as Director of Manufacturing Operations for Global Foundries.

HV MFG: Thank you for agreeing to talk with us this morning. How did you come to work in the manufacturing sector?

JC: When I was 17 years old, in high school in Northeast Ohio—the Canton area—I really liked math and science. I was also pretty good at both but never really thought about what that meant in terms of a career. One day in my junior year some people from The Timken Company visited the school to talk about careers in the steel industry, specifically engineering careers. I learned a lot from that visit because, really, I had no idea what manufacturing was at all. It all sounded great. There was a special co-op program at our school and I actually got a co-op/internship with Timken. I spent Thursday afternoons during my junior year in High School working for Timken in their quality department. I ended up working there that summer too. It was because of that experience that I decided to pursue Chemical engineering.

HV MFG: Is that what your degree is in, Chemical Engineering? Where did you go to school?

JC: I went to Case Western Reserve in Cleveland Ohio and yes, Chemical Engineering.

HV MFG: Case has an excellent reputation—did you enjoy your experience there?

JC: Yes, I did—it was great. I especially liked, and got a lot out of, their co-op requirement, and the study abroad option that were part of the program. Engineering students have the option take 2 semesters off from school to work in the industry. The first co-op I did with Timken was in the fall. The following year I spent the spring semester on co-op with IBM in Burlington. Then I spent 6 weeks that summer taking classes in London before returning to Cleveland for my senior year.

The co-ops were great. At Timken I worked at their bearing plant and got to focus on plant safety. For co-op the second half of the year Timken was a little slow confirming that I could work there again. While I was waiting for them IBM called and offered me the co-op at their semiconductor plant in Burlington. I hesitated because it was not what I was used to and it seemed so far away. But the manager called me and laid out all the reasons why I should accept it. He was very convincing and I said yes and went to Burlington. That was great experience. I liked it and did well enough that they offered me a full time job there after graduation.

HV MFG: That's how you came to work for IBM. How did you get from Burlington to East Fishkill?

JC: So that was in 2001 when I started working full time and I was working in Lithography in Burlington.

HV MFG: Let me interrupt you for a minute, can you explain what “lithography” is in the semiconductor process?

JC: Sure, in the manufacture of semiconductors we take the silicon wafers and we use a light-sensitive photoresist process to write patterns on them. This is a huge simplification, but the patterns are then etched and eventually filled in with metals or other materials.

It was about this time—actually around 2003 that IBM was planning to invest in 300mm wafers. This was a huge step forward and would mean much greater throughput and efficiency. Burlington had a pretty stable, older workforce—especially in Lithography so my chances to advance there were pretty limited. IBM was building the 300mm plant here in East Fishkill. New plant, new technology—it seemed like good timing and a good opportunity for me to move.

An operator responding to a Lithography tool.



HV MFG: That IBM 300mm plant is the building we are in now?

JC: Yes, with a few additions and modifications through the years. IBM sold to GLOBALFOUNDRIES in 2015. We are now GLOBALFOUNDRIES Fab 10, though that will eventually change with the transition to ON Semiconductor's ownership—they already have another plant with a Fab 10 designation.

HV MFG: That's something we definitely want to hear about but first, how did you get from Lithography Engineer to Director of Manufacturing Operations?

JC: My first move was from Lithography to Integration sometime around 2006. I liked lithography but integration was a little more interesting. Basically you got to work with all the different



A recent "Take Our Children to Work Day" event allowed guests an up close look at tool components.

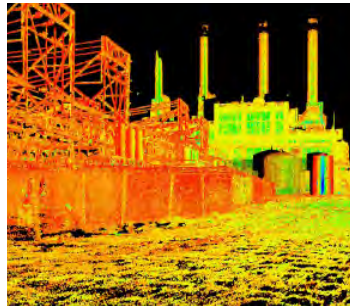
manufacturing processes and technologies within the process. I remember one time when I developed a litho process improvement. The idea was sent to integration and they were able to implement it. The integration team got a lot of the credit for the improvement and I thought to myself it might be better for my career, and more interesting to work in that field. From there, in 2010, I took my first management role in the CFM team (Contamination Free Manufacturing). I was in charge of about 15 people.

HV MFG: IBM is well known for its leadership training, did you receive any at this point?

JC: Yes, I attended a 3 day session in Armonk. IBM calls it "Basic Blue." It was very valuable and gave me some insights and skills

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I use all the time. In 2012, I was promoted into operations and worked on an important project for our production Control Center. I had FOUP responsibility.

HV MFG: “FOUP” Responsibility?

JC: Right, FOUP stands for Front Opening Unified Pod. They are basically plastic crates on an automated conveyor system. Semiconductors are made in a highly controlled, clean environment. FOUPs are the way we move the wafers from one operation, or process, to the next without contaminating them. It's all highly automated. Programming the movements of the FOUPs is a vital part of the efficiency of the entire operation.

In 2015, GF (GLOBALFOUNDRIES) bought the 300mm site from IBM. Basically we all just became GF employees overnight on July 1st 2015. I became the Etch Module Manager with 90 people reporting to me. Around that time, we were growing our internal maintenance skills and my team grew quickly. In 2018, I was made Director of Manufacturing Operations with 185 people reporting to me.

HV MFG: You obviously are getting things accomplished to move into these leadership roles so quickly. What are some of the things you think make a good leader? What advice do you give young people looking to get into leadership roles?

JC: Ask questions—lots of questions and help people clarify their answers. Focus on facts, not opinions or guesses. Problems are solved—whether they're technical, or personal—when we focus on the facts and deal with their root causes, not the symptoms. Also “Go and See.” Be on the floor. See what is going on and be available to everyone. Identify and implement best practices.

FOUPs travelling automatically for product delivery along a conveyor system.



By always looking to do things better, you create a culture that embraces new ideas and remains focused.

HV MFG: Do you have any favorite leaders from industry, or history? Anyone you try to emulate?

JC: I can't think of any historical leaders, not off the top of my head, but I have been inspired by Sally Helgesen. She is an author, speaker and coach and I have read a few of her books including “How Women Rise.” That book talks about the habits that hold women back as they seek to advance to leadership positions in their organizations. It is interesting because the very traits and habits that work for women early in their careers might actually be sabotaging their future success. One thing, for example, is being good at details. That helps you tremendously in your few jobs, but in order to rise to a leadership role you will need to delegate the details and focus on the bigger picture. It makes a lot of sense to me.

HV MFG: That's a nice segue to the next question. What is it like being a woman in this field? What were the challenges to getting to where you are now?

JC: There were challenges and there are challenges. Until that visit to my High School from Timken Steel I thought I would get into psychology. Even though I was one of the best math and science students in my class nobody was encouraging me to pursue engineering. As a 17 year old I didn't know what all the opportunities were for me. When I did decide to go into engineering I chose Chemical Engineering, in part because that is the field that had the most women in it. Even today all of my peers are men so there is bit of isolation, and also a pressure to do well. I feel a responsibility to set a good example and encourage girls to pursue these STEM careers.

In 2016, I was selected to attend a women's professional development conference at Smith College in Northampton Massachusetts. It was a program for senior leaders in science, technology, and engineering organizations and it was a fantastic experience. I learned so much and met so many great women who have become part of a great support network for me. It was there that I learned about how common “Imposter Syndrome” is with women, where we doubt our accomplishments and fear being exposed as a “fraud” even though the accomplishments are real and the recognition sincere. I also learned to find my own brand and to “own” my career and to be honest about what I am after. It was truly a transformative experience and I believe I am more comfortable and confident as a woman who is a leader in tech.

So I try to be a good example—as a leader, as a wife (my husband also works here for GF), and as a mother to my 8 year old daughter as well. I work hard, and pretty long hours, but when I'm home I'm home and don't have the email up all the time. Of course emergencies happen and you have to handle them. Being responsible is also a good example. Striking that balance is an important example to everyone on our team.

HV MFG: You mentioned ON Semiconductor's purchase of this facility. Is that a good or bad thing? What is that timeline?

JC: I think it will be a very good thing for us—and the community. We will be ON's only 300mm fab. They own dozens of fabs and we will be a key resource for them. ON provides technologies for things like energy efficiency, power management, sensors, logic, connectivity, 5G and so much more. They help their customer solve unique design challenges in automotive, communications, computing, consumer, industrial, medical, aerospace and defense applications. East Fishkill will become a part of those solutions.

We are transitioning from GF to ON and those transitions should be completed at the end of 2022.

HV MFG: What's next for the semiconductor industry? Is Moore's Law still driving what you do?

Making chips that are half the size and twice as fast every 2 years, is not what is driving the sector anymore. Now its differentiation and customization.



Co-workers Olivia Smith-Walters (L) and Kelliann Holtz (R) along with Jennifer Clark are part of the GLOBALWOMEN network in Fab 10.

JC: Moore' Law—making chips that are half the size and twice as fast every 2 years, is not what is driving the sector anymore. Now its differentiation and customization. Chips need to be designed for things like the internet of things, 5G, power management, mobility, automation and autonomous cars that is where the future lies.

HV MFG: What do you think are your biggest challenges in the next few years?

JC: Well, the one that looms large is workforce. As I just mentioned the future of the industry lies in design and customization. That requires talented people to design chips and talented people to manufacture them. We have talented people here now but we need more. Bringing talented, skilled people on board is going to be the biggest challenge.

HV MFG: GLOBALFOUNDRIES has been a Council of Industry member since 2015 and you joined our Board of Directors in 2017. What have you found to be the most valuable part of your membership with the Council of Industry?

JC: I really like being a part of the Board and that networking opportunity. I also really like the tours of member facilities. The tour we did a few months ago of Bell (Flavors and Fragrances) was great and it is so interesting to see how other organizations do things like quality and Lean.

I also like the work the Council is doing on workforce. The apprentice program is great and your help connecting manufacturing companies with schools is tremendously important. Remember, it was a visit by a manufacturer to my high school that started me on this journey!

HV MFG: Thank you so much for your time—this was very interesting.

JC: Thank you—it was fun!



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