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# Women in Data Science - A Roundtable Discussion

DS Examiner

23-29 minutes



The <u>demand for science</u>, <u>technology</u>, <u>engineering</u>, <u>and math</u> <u>occupations is expected to grow over the next decade</u>, but even with the growth in opportunities, women remain underrepresented in these fields. The U.S. Bureau of Labor Statistics estimates that <u>only 15.9 percent of the engineering and architecture workforce</u>, <u>and 25.6 percent of employees in computer and mathematical jobs</u>, <u>were held by women in 2018</u>.

We spoke with five women data scientists about the current landscape of opportunities for women in big data. Read on to learn about our participants – Jana Eggers, Claudia Perlich, Lillian Pierson, Jennifer Priestley, and Sarah Aerni – as well as their experiences working in the field and what it takes to be successful.





### Jana Eggers, Nara Logics

Jana Eggers is CEO of the artificial intelligence company Nara Logics. An AI practitioner, Jana focuses on practical applications of AI to business and problem-solving. Her previous experience includes work at Lycos, American Airlines, Los Alamos National Laboratory, Intuit and a number of startups. A speaker and mentor, Jana also sits on the digital advisory board for Fannie Mae. She holds a bachelor's degree in math and computer studies from Hendrix College.



### **Claudia Perlich, Dstillery**

Claudia Perlich serves as an advisor at Dstillery, and designs, develops, analyzes and optimizes the machine learning that drives digital advertising. An active industry speaker and frequent contributor to academic and industry publications, Claudia won the Advertising Research Foundation's Grand Innovation Award, was named Innovator of the Year in the annual Stevie Awards, was selected as a member of the Crain's New York Business annual 40 Under 40 list, made WIRED's Smart List, and was listed among Fast Company's 100 Most Creative People. She has published over 50 scientific articles and holds multiple patents in machine learning. Claudia has a doctorate in Information Systems from NYU and worked in the Predictive Modeling Group at IBM's Watson Research Center, concentrating on data analytics and machine learning for real-world applications. She also teaches in the NYU Stern MBA program.





#### Lillian Pierson, Data-Mania

Lillian Pierson, PE, is a three-time author on the topics of data science, AI and big data. She is CEO of Data-Mania, LLC, a datastrategy consulting boutique that has supported a variety of corporate clients, including Amazon, Intel, and the United Nations. She was elected as a Microsoft Regional Director. Through her partnerships with LinkedIn and Wiley, Lillian has trained about 1 million professionals to develop data skills that generate business values.



### Jennifer Lewis Priestly, Kennesaw State University

Dr. Priestley is associate dean of the Graduate College at Kennesaw State University and executive director of the university's Analytics and Data Science Institute. Datanami recognized Dr. Priestley as one of the top 12 "Data Scientists to Watch in 2016." In 2015, she oversaw the launch of the country's first doctorate program in data science. She served as the 2012 and 2015 co-chair of the National Analytics Conference. And the SAS Institute recognized Dr. Priestley as the 2012 Distinguished Statistics Professor of the Year. She has authored dozens of articles on analytics, classification and data mining, and she has been a featured speaker at a number of corporate events addressing issues related to advanced analytics and the challenges and opportunities of big data. She is a member of the advisory boards for the Southern Data Science Conference and Flock Specialty Finance. Prior to receiving a doctorate in decision sciences from Georgia State, Dr. Priestley worked in the financial services industry for 11 years. She holds a master of business administration from Pennsylvania State University and a bachelor of science from Georgia Tech.



Sarah Aerni, Salesforce

Sarah Aerni is director of data science and analytics at Salesforce. She previously led the San Francisco practice at Pivotal as a principal data scientist and data science manager. Sarah also serves as an Apache Software Foundation committee member. She earned her doctorate from Stanford University in biomedical informatics, performing research at the interface of biomedicine and machine learning. She also co-founded a company offering expert services in informatics to both academia and industry.

# Which women in data science (or tech in general) inspire you?

"There is nothing better than seeing Lauren in action connecting worlds and creating a tapestry of stories using the backdrop of data."

Jana: We're often touted as having a pipeline problem. I look around and I think there are amazing women everywhere. And so of course, Dr. Fei-Fei [Li] at Stanford has been an incredible inspiration. Looking at people like like her academia is exciting. I really love all of the work that's coming out about biases. You have Joy Buolamwini. And stuff that Kate Darling is doing, and what she's facing and going through at the [MIT] Media Lab is definitely inspirational. You have people like Joanna Bryson who's been doing it for a long time.

One of the things that I'm really excited about because of what we're doing is the people that are bringing neuroscience into it. So you have Eve Marder who's one of the early neuroscience professors; we have Rebecca Saxe, who does work in early childhood brain development; one of our advisors is Emily Hueske.

I'm really inspired by a lot of the new people that are coming in, the younger people. One woman, Cassie DeWitt, started doing work in Detroit in the public service sector. I think she actually worked for the Detroit Fire Department. And she moved from there and started working for the city of New York, and she's been doing some amazing work in data science for the city of New York. So there's a lot of people I'd say that are taking the amazing research work and really applying it to some very important problems.

Claudia: Brenda Dietrich was one of my earlier mentors. She led the math department in the TJ Watson IBM research lab when I joined the predictive modeling group there in 2004, and since then she has held various IBM SVP positions. To me, she embodies the success of a deeply skilled technical expert (in optimization and data) in a corporate research environment, where she took on a leadership position not so much (as she confessed to me) because she desired to manage, but rather because the alternatives would have been much worse (my words) for her and all the people who ended up working for her. She is extremely well regarded by both the people working under her and IBM leadership, and she has high external visibility. (Fast Company's 100 Most Creative People list is one of the recognitions we have in common.) During her very successful career she has also been one of my role models - she has raised four children and was one of the first to congratulate me on the birth of my son months before I even joined IBM research.

I met Kate Crawford two years ago during a two-week stay at the Rockefeller Bellagio center. Kate is inspiring in her brilliance, eloquence and passion for addressing some of the less sexy sides of data science, such as privacy concerns or threats to equality caused by algorithms invading our everyday life. Her career is astonishing in terms of both academic and political influence. She has full-time roles at both MIT and Microsoft Research. I cannot hope to do justice to Kate's complete curriculum vitae here (<u>Wikipedia</u> might), but on a very personal level, I love Kate for simultaneously challenging me to think a bit harder about how what I do may change the world for the better while being willing to be open and listen to my arguments. She is raising a beautiful baby boy amidst all of her professional travel and is another example of a woman with an unbridled "can-do" attitude.

Lauren Moores is a good friend and colleague at Dstillery who has taken a different path in her career — she entered the world of data after completing a PhD in economics after having taken some time to raise a family. She calls herself a "digital data geek and strategist" who loves "creating stories from dirty and disparate signals and mentoring others to 'speak' and think data." There is nothing better than seeing Lauren in action connecting worlds and creating a tapestry of stories using the backdrop of data. At this point, we share a passion for speaking externally on the facets of emerging data science and for being involved in the creation of the next generation of "geeks" teaching courses at NYU.

Lillian: I am deeply inspired by Sara-Jayne Terp, Heather Leson, and Justine Mackinnon. They inspire me because they've devoted their lives and careers to using data science and/or technology to help people that are in crisis situations in under-privileged nations.

Sarah: My manager, Hulya Emir Farinas, is easily one of the most talented and inspiring people in data science (male or female). She is incredibly brilliant, both technically and with her business acumen. She has both inspired and greatly educated me. Beyond that, what I find wonderful is that almost any list of top data scientists will contain several women. I feel this cannot be said for many technical fields, so it does not feel like a boys club!

# How are the opportunities for women in data science? What do you think the future holds?

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for what I bring to the table and not waste even one thought on the fact that I am female. Most successful women I know in the field seem to have this attitude and are very comfortable with themselves and their roles."

Jana: I feel like we're just getting started because I think we're just now realizing that most companies have enough data to make a difference using data science. Before most companies felt like their data was limited and they couldn't use some of the more advanced tools, but they're now realizing, wait a second, this isn't just about the Googles and the Facebooks and the Amazons, who clearly have large amounts of data. It's really about the "mere mortal" companies actually now have a lot of data that they can use to improve their business, come up with new offerings.

I'm sitting here in my office just staring out into our office space and I see a fire extinguisher. There're companies that just service fire extinguishers. Sensors are now being put on those and now they can actually use that data and sell that to insurance companies, right? That's a whole new business model, and now they need a data scientist to watch, monitor and understand that data.

I think there's going to be so many more jobs that come up that allow us to do more with the data. So I believe we're just getting started on our whole data transformation, which means that we're going to need more and more data scientists and even, you know, data wranglers and data whispers. It's not just about the science behind it. It's about how do you handle it and how do you encourage other people to think about it.

Claudia: I see what I would consider a healthy participation of women in the field. They often bring a different intuition to the table and are rising easily into leadership positions. At Dstillery, half of our core data science team are female PhDs from very diverse backgrounds. Similarly, I consistently see nearly half female students taking my MBA course on data mining for business intelligence at NYU. Ultimately, data science is another technical field where women remain statistically a minority, but I do not believe that we need to force the issue and "fight" for a higher female quota. I want to come to work and do what I love and be recognized for what I bring to the table and not waste even one thought on the fact that I am female. Most successful women I know in the field seem to have this attitude and are very comfortable with themselves and their roles.

Lillian: The fields of data science and analytics are absolutely exploding with opportunity. So, for men and women alike, there are plenty of opportunities. The issue for women in this field is getting them trained in STEM areas. We need more women in STEM, period.

Jennifer: I think the current landscape is rich with opportunity regardless of gender. The trend that excites me the most is that this is really the first career path that is truly interdisciplinary. Courses in applied statistics and applied computer science are filling up with students, again coming from disciplines where we have not previously seen many students, such as psychology, marketing, finance, economics and sociology. This makes for a particularly rich learning environment where students have to solve problems and work in groups with people who think very differently from them. When an engineering student, a chemistry student and a marketing student all have to solve the same analytics problem, they are learning important latent skills related to teaming, communication and project management.

Sarah: I would say that luckily the opportunities for women in data science are the same as those for men. This field benefits from diversity in thinking. There is rarely only one way to approach a problem, and new ideas and input can only lead to more variety in approaches and potentially better outcomes. Not just that, but the consumers of data science exist in every industry, and therefore require us to interact with a wide variety of businesses and individuals. Beyond that, it is a field that values a variety of skills, deep technical abilities, hacking, storytelling, visualization and constant learning. This is something I value, and I think it encourages diverse backgrounds as well.

#### What can be done to encourage more women to

#### pursue data science?

### "In fact, many senior data scientists in my network recently agreed that coding tests are not necessarily a requirement for data science interviews."

Jana: I don't think it's a pipeline problem. I don't mean that there's not an industry problem. I think it's a little bit more of people staying in the industry. So I think there's a lot of women that are interested, they still come in, and data science is still too, in my opinion, akin to tech industry. We have some sexism and bias problems. And so the people are not used to someone thinking differently and challenging the way they're thinking. And so I think to encourage more people to be a more inclusive place, you need to think about that. So how do you make your office more accessible to women? And everything from flexible time has been talked about. So how do you make sure that people have time to do what they do? And recognizing people coming from different backgrounds.

I was just working with a woman who is rejoining the workforce after being out of it for six years as she raised kids and did some nonprofit work. And she was really struggling because people weren't recognizing the fact that she had 12 years of amazing experience in technology and some in data science. And she's very interested in AI, and people weren't recognizing that. So I think, you know, look non-traditionally, and consider people non-traditionally. And understanding how different people apply for different jobs. Women are known to not apply for a job that they're not overqualified for. So how many people are you weeding out because of the way you wrote your job description?

Claudia: Many of the women I meet just lack a bit of confidence and need a little nudge to believe in their abilities. Meeting them in lowkey social events, such as meetups or specific career advice sessions, has been very rewarding. Coming from other fields, many junior women doubt whether their coding and stats skills are at par to "qualify" for a data science position. But data science roles come in many flavors, and not all require master's level CS knowledge. In fact, many senior data scientists in my network recently agreed that coding tests are not necessarily a requirement for data science interviews.

At Dstillery, we have female PhDs in data-related positions coming from very diverse fields: information systems, physics, neuroscience, economics and genetics. So on one side, I would encourage junior women to get their feet wet and just start working on projects either related to their work or school or just on their own. On the other side, I would like to encourage companies to be more risk-taking in their hiring decisions and embrace diverse backgrounds. Additionally, many of the established women happily take on mentorships or speak at events, such as Grace Hopper reaching out and encouraging the next generation.

Sarah: I think many of the existing programs and meetups out there that focus on bringing women together can help encourage more women to pursue data science. I think the best source of encouragement is from women coming together to support and encourage each other. Having positive role models helps, but certainly knowing that we can elevate each other is also important.

# What types of challenges do women (but not men) in data science face?

"...there is a perception that if you are a female with a manicure and wear jewelry, then you must not know how to program or understand advanced analytics. But a wellgroomed guy carrying a cappuccino cup gets immediate respect. I don't get it. I think that stereotype is slowly dissipating."

Jana: I'll give you some that are me-specific, and I don't think I'm singular in this, but things like, I like to think through things a little bit more. So we're in a meeting and I listen to stuff, and it's not that I won't contribute, but I also like to sit and process. So that's one of those things that how do we as women make sure that we even call out and say, "Hey guys, I get it. We don't need to make a decision right now. Let's make sure that we're thinking through some of these things." So for women, it's all of us making sure — me

making sure I'm speaking up, and then the team making sure that they're like, "Hey, should we wait a little while on this one to give everybody a chance to think about it, realizing that we all have different patterns?" And women's patterns will tend more one way and men have others. And that doesn't mean that there's not crossover, right? So there's probably some men that feel that way too. So this isn't about that. It's about being a more inclusive environment for everyone. But for women in particular, knowing those types of tendencies and making sure that you're actively solving.

Claudia: I honestly do not see specific challenges that would not apply to other fields or to men as well. In fact, I think that most of the challenges of building a successful career in data science are the same for both genders.

One component that is often overlooked but very important is communication skills with non-data science folks. This includes both the ability to explain data science as well as ask the right questions to deeply understand what the true problem is that needs solving. That might mean that you have to question or even contradict senior management in different business units. That requires political acumen as well as a lot of confidence. I think as women we have a leg up to not appear threatening, but at the same time, we might need to fight a bit harder to be taken seriously. So confidence is key!

Lillian: Women constantly face gender discrimination based on how we look and what we wear. It's endemic. Employers are even legally allowed to force women to wear makeup, although men cannot be required to do so. We are operating in a system that promotes the underlying message that at least part of our value is in how we look. But then, if a woman is too pretty, people will want her to do extra things to look less attractive. We face a huge control issue, where society (even including other women) is continually judging and controlling us based on our level of attractiveness. It's pretty lame and irrelevant. This is true for data science as it is for any other field, but in data science there is more pressure because there are less women. Jennifer: Street cred. I don't know why this is, but there is a perception that if you are a female with a manicure and wear jewelry, then you must not know how to program or understand advanced analytics. But a well-groomed guy carrying a cappuccino cup gets immediate respect. I don't get it. I think that stereotype is slowly dissipating.

Sarah: Again, it is tough for me to generalize. I do not want to assume that we are stereotyped, but I have certainly had my awkward moments. That being said, I imagine my male counterparts have also experienced many such moments for a variety of reasons. Personally, I know that I need to avoid the tendency to fixate on why I may have been singled out, or reading into comments too deeply and assume they are because I am a woman. I think it's easy to allow yourself to feel that something has happened because you are a woman. My approach is certainly not to try to dress differently or act a certain way. That wouldn't be successful because once I am revealed as an imposter (not as a woman posing as a man, but rather just not true to myself), I will only feel worse. I think it's important to celebrate your differences, and not become defensive and jump to conclusions. I am happy to say, though, that such occasions are extremely rare.

## How important are mentors for female professionals? Did you have any mentors that had an impact on your success?

"Think of your mentors as more of a mentor melting pot, and it's OK to throw a few radicals in there now and then."

Jana: I feel very lucky that I had an amazing group of mentors. What I see is people are often thinking, "I want one mentor, I need one mentor."

So I'm a CEO, right? I've got lots of hats to wear. So I need a sales mentor, I need a marketing mentor, I need a how-do-I-handle-theboard mentor, I need a how-do-I-be-a-better-leader mentor. Never in my entire career have I had the one person that I'm like, "I want to be like that person." It's not that I didn't respect people that much, it was just that I saw that people were multifaceted, and that while they may have been a great overall person and leader and all of that, they were usually better at one thing than the other. So don't be afraid to kind of pull that out and say, "Hey, this is the person that I really want as my sales mentor." And so I would look at having different people for different things.

Think of your mentors as more of a mentor melting pot, and it's OK to throw a few radicals in there now and then.

Claudia: Mentors are one of the keys to success for anybody. But mentorship does not have to be a formal program and often does not even feel like mentorship. I have had the luck, and maybe good judgment, to work for people who ultimately turned out to be great mentors. I was told that I do not have a huge appreciation for authority. That is not to say that I do not respect authority, but that I perceive my boss primarily as a collaborator and often a friend who has my best interests in mind. I am sure that this is not true in all managing relationships, but it was in mine. As a result, I was encouraged to grow into the best I can be.

Jennifer: Mentors are definitely important. To find someone who will look out for your best interest when you are not in the room, someone who will praise you publicly and then pull you behind closed doors and tell you all the things that you did wrong, and then take you out for coffee ... those people are golden. Indispensable. I did have mentors – all of whom were men. So, I don't think that mentors for young females have to be female — just someone who is willing to provide support and guidance.

Sarah: As with any individual, I think it is critical to find a mentor early on. One of the main challenges is that mentors are most effective when they can see themselves in those they are helping. I actually do not believe that this means women should only be mentored by women. Instead, I think it has to do with the path that you have taken, so mentors can recognize and help with challenges they faced themselves. I have had numerous mentors in my career, both academic and professional. They were not always in my own discipline, and I worked for some and not for others, but they have had such a deep and lasting impact on my life and career. I think they can be found in very unexpected places if you allow yourself to listen to what they have to say.