



## Search results: Careers in high tech

High technology permeates every corner of every enterprise, from global computing corporations, to social media and search establishments, to retail giants. Not surprisingly, these industries offer attractive playgrounds for Ph.D.-level scientists and engineers. **By Alaina G. Levine**

**A**lmost every moment of our day is somehow touched by high technology. Whether you are searching for an old friend or buying coffee on the Internet, billions of lines of code, petabytes of data, and a potentially infinite amount of brain power make it possible. And behind every invention are scientists and engineers. As more industries are influenced by big data and computer-based systems, the need for talented Ph.D.-level science, technology, engineering, and mathematics (STEM) professionals to contribute to these arenas has grown considerably.

High tech jobs are exciting and diverse: The problems they address are interesting and intense, involve multifunctional (and in many cases, multinational) teams, and offer the chance to make a difference that is felt by customers the world over. As **Nicholas Clinton**, a developer advocate at Google with a Ph.D. in environmental science, policy, and management, says: “It’s great to feel like I’m part of something impactful, with real power to effect global-scale change.”

As a member of the developer relations team for Google Earth Engine, a platform for Earth science analysis, Clinton strives to ensure that external developers are able to utilize the instrument effectively. He collaborates with the Earth Engine engineering team to help them identify user needs and to improve the platform. “I conduct a lot of trainings, give a lot of lectures, and create documentation to enable users to do incredible things,” he says. “I ensure that

researchers can use Earth Engine to perform high-impact, data-driven science.”

**Sun Mi Chung**, a Ph.D. astrophysicist and principal data scientist at AOL, also appreciates how rapidly her work affects the public. In her job, she applies machine learning techniques to optimize real-time bidding for advertisements on the AOL platform. “We have to think deeply about what makes sense in terms of the algorithms we use and whether we can put it into production quickly,” she says. **Chandra Narayanan’s** doctorate is in oceanography, and as director of data science for Facebook, he has engaged with almost every product in the company. With a background in creating numerical models for Earth systems, he was working for the National Weather Service when he heard that a new group was forming at PayPal that was eventually to become one of the first data science groups in industry. Narayanan came on board at PayPal in 2007, where his responsibilities included risk analytics and fraud identification.

His entry into Facebook in 2010 was facilitated by a former colleague. He initially joined the social network in its risk management practice, but every few months, “I took on a new portfolio,” says Narayanan. His accomplishments include building from scratch the teams that focus on Instagram, games, risk, payments, and advertisements. But he is most proud of his ability “to be able to charter a new course for what data science means in industry,” he says. “Many companies are using Facebook as their model to form data science teams.”

### Investigating the diversity of destinations

Not surprisingly, data science careers are particularly prominent in the high tech space. **David Evans** is a computational linguist with a Ph.D. in computer science from Columbia University. He is also passionate about Japanese language and culture and had studied it since he was an undergraduate. An internship at IBM Japan while in grad school solidified his interest to work in that country and combine his two loves. While pursuing a postdoc at the National Institute of Informatics in Tokyo, Japan, an Amazon recruiter contacted him about an opening related to information retrieval and searching. The company **cont.>**



Sun Mi Chung

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**“I address grand challenges in Africa and develop solutions that affect people’s lives.”**

— **Temitope A. Ogunyoku**



needed someone who had both data analytic skills and a prowess in Japanese linguistics. “Because Japanese and English are so different, there are very different ways of searching for information in those languages,” says Evans. Given his research in information retrieval and the fact that he was bilingual, “it made sense for me to go to Amazon,” he says, and today he is a senior search engineer working for A9, a wholly owned subsidiary of Amazon Japan.

With data being utilized in increasingly new and creative ways, the diversity of career paths in high tech companies has increased, especially in multinational firms like IBM. **Kristen Beck** and **Temitope A. Ogunyoku** are both IBM employees and scientists who hold a Ph.D.—Beck’s doctorate is in biochemistry, molecular, cellular, and developmental biology, and Ogunyoku’s is in civil and environmental engineering. Their jobs and career paths are very different and are on opposite ends of the planet. And neither of them do what one might expect at Big Blue.

Beck, who is based at IBM Almaden Research Center in Silicon Valley, works on bioinformatics problems in association with the University of California, Davis and Mars, Incorporated. She is examining ways in which analytics can be applied to food safety on various fronts, including pathogen detection, antibiotic resistance, and food fraud or mislabeling. She leverages her biology background to implement solutions based on life science tools, such as next-generation sequencing.

Ogunyoku is a research scientist with IBM Research–Africa in Nairobi, Kenya, one of only 12 global research labs in IBM’s portfolio, where “I address grand challenges in Africa and develop solutions that affect people’s lives,” she says. Her focus is on creatively utilizing analytics to scrutinize complex interconnected datasets and deploy solutions in fields such as public safety and waste management. For example, her team monitored social media in Kenya for data about crime, because people use it as a platform to report public safety concerns. “We used algorithms and natural language processing systems to detect and determine the credibility of these incidences,” she explains, adding that the goal of this research was to develop a product that can be used by security companies to alert their clients of criminal activity.

**Searching for an “in”**

At Facebook, there are multiple entry points for Ph.D.-level scientists and engineers interested in joining the company. Your doctorate gives you access to jobs in product management, engineering, design, analytics, user experience

research and even marketing and sales, says Narayanan. The key to employment? “Love the mission, be quantitative, be interested in solving hard problems and building awesome products,” he stresses. As the head of recruitment for analytics, he looks for candidates who display a “ton of curiosity, drive and leadership, have a highly analytic nature, enjoy a fast-paced environment,” and of course have superior coding skills. Interestingly, new employees in Facebook’s analytics department come in through a central pool, and after a five-week boot camp and orientation, can pick which group they want to work with.

Similarly, at Amazon, Ph.D. scientists are recruited for their technical expertise, and “you get to come in and look for a way to apply your work,” says Evans. “Your career is up to you. Amazon matches capabilities to interests and interests to projects.” For his team, he looks for professionals with a background in machine learning, computational linguistics, and information retrieval. But the key to getting a job, especially in software development and analytics, is to clarify “how what you are doing now can be applied to products [and systems] at the company,” he adds. That’s essentially how Clinton landed a position at Google. “The more you can demonstrate how Google can leverage your research and development work to achieve amazing, broadly applicable results, the better [your chances for getting a job],” adds Clinton.

In smaller organizations and startups, the hiring process tends to focus on immediate needs, as dictated by the business plan. When **Kamal Jain**, CEO and founder of Faira, a technology company for real estate, recruits, he



Kamal Jain

looks for people with skills that match the task to be done. **Radu Rusu**, CEO and cofounder of Fyusion, a startup looking to reinvent the use of 3D imaging for consumer applications, pores over publications to find “research results that match our roadmap,” he says. But he also keeps an eye out for scientists who possess honesty, humility, and flexibility, a marker of their potential to prosper in his organization.

**Navigating a new culture**

As you transition into high tech, it is important to recognize the variances in culture among these types of companies, as compared to other sectors. One of the features of Google’s culture that Clinton immediately noticed is its emphasis on teams, which takes a different approach than what is usually found in universities. “The team environment is a big change from academia, where you work in collaborations, but a lot of time is spent on independent study,” he says. At Google, “you need very tight teamwork, timing, communication, and camaraderie to compete successfully.” At FICO, the financial services company, teams are always interdisciplinary, says **Scott Zoldi**, chief analytics officer, who holds a doctorate in physics. “You have to **cont.>**

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**Featured Participants**

**Amazon**  
www.amazon.com

**AOL**  
corp.aol.com

**Data Incubator**  
www.theincubator.com

**Facebook**  
www.facebook.com

**Faira**  
www.faira.com

**FICO**  
www.fico.com

**Fyusion**  
www.fyusion.com

**Google**  
www.google.com

**IBM**  
www.ibm.com



be a good listener and a good collaborator,” he says. “It’s a rich environment, where different points of view are not just welcome—they’re expected. It’s not going to be one Ph.D. scientist solving the problem, but rather a group of people, from many different fields, working together....[This] yields better results.”

As Narayanan made his way through PayPal and Facebook, he was intrigued by how much his scientific skills easily transferred to the high tech industry. As an oceanographer, he was used to applying models to understand processes associated with natural phenomena. At PayPal and Facebook, he tapped into the same set of abilities. “It was easy to jump in. In fact it was seamless,” he says. “Being able to analyze data, recognize patterns, summarize results, break down problems in the simplest way—these are the kinds of things I learned prior to joining industry.”

Evans notes that the culture of Amazon encourages employees to identify ways to improve the company, whether or not that improvement is related to their job function. “We have the responsibility. We can take a real ownership of a problem,” he says. This translates to an ecosystem where individuals have a large amount of influence and freedom. One of the main projects he’s worked on had little to do with search capabilities. Rather, it was a company-wide effort that he spearheaded on his own, relating to setting the time of product launches according to local time zones as opposed to a central clock working off of the Seattle headquarters. “We had to replumb everything,” he says, referring to programming the systems to make it easier for customers to purchase items. It took years of partnering with teams across the planet, but “it felt surprisingly powerful to make this change worldwide.”

But Evans also clarifies that Amazon’s philosophy is not for everyone. “There is a lot of pressure,” he admits, “and it’s important to know your limits to achieve a work-life balance.” For someone coming straight from academia, adjusting to this fast-paced ecosystem might be challenging.

**Honing skill sets to achieve success**

Although there are ample professional opportunities in the high tech sector, it is critical for candidates to differentiate themselves from the competition, and certain skill sets are particularly advantageous to hone. For software

engineering and data science careers, it is vital to understand databases and algorithms and how to apply them to solve real-world problems, says **Michael Li**, whose Ph.D. is in mathematics. He worked for Intel, Google, Foursquare, and JPMorgan Chase before launching the Data Incubator, which trains STEM Ph.D.’s for data science careers. He emphasizes that technical know-how is what hiring managers crave. “No one needs just an ‘ideas’ person. They need someone who can actually get the job done.”

“The people who are the most successful, marketable, and valuable do their job and also understand the broader picture,” says **John Heinlein**, vice president of marketing for ARM, a global designer of semiconductor intellectual property, whose Ph.D. is in electrical engineering. “They don’t stay in silos. You might never change your role, but you’ll do a better job if you understand what’s happening to the right, left, up, and down in the organization.”

**Advancing your career into new realms**

One aspect of high tech companies that is especially attractive to Ph.D. scientists and engineers is the flexibility to determine your own career path. The competition for top talent is fierce, and firms want to retain the brightest minds. So they offer their employees wiggle room to design their own career advancement strategy. For example, it is not uncommon to find lateral moves encouraged.

At Amazon, “I could move back to the States and still remain with my current team,” says Evans of his career options in the future. Adds Ogunyoku: “At IBM, you are able to reinvent yourself. I can go work for the design team or a global business unit, [among other choices]. Having a Ph.D. doesn’t limit me to only research and development.”

With this level of latitude across the high tech arena, job prospects and career decisions may seem overly complex. But there is a simple way to determine your next course of action in crafting a career there: Articulate your own values. “If you pick opportunities that align with your passion, that will help you be successful,” says Beck. “You’ll feel like you are part of the larger picture, and it allows you to be an ambassador for the cause of your choosing.”

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