



# INSIGHT



## DATA PRODUCT MANAGEMENT FELLOWS PROGRAM

**Insight's Data Product Management Fellowship** is an intensive, professional training program leading to a career building products in machine learning, data infrastructure, and analytics. In seven weeks, product managers, data-focused MBAs, and experienced cross-functional data scientists & engineers gain an industry specialization needed to work in the growing field of data product management at leading companies in Silicon Valley.

## Your Bridge to a Career in Data Product Management

Are you a product manager, data-focused MBA, or professional data scientist/engineer looking to transition to a career building products in machine learning, data infrastructure, or analytics? Do you want a career that leverages your engineering know-how, product savvy, business acumen, and quantitative experience in a fast-growing, in-demand field that is defining how we build and experience the world?

Top data-driven companies are hiring product managers who are skilled in statistics, data infrastructure, machine learning (and increasingly deep learning) to help them leverage cutting-edge research to build world-class products. To deliver user-driven business value, these product managers not only interface with the traditional suite of software engineers and designers, but collaborate with data scientists, data engineers, and machine learning researchers. The pace of research teams has accelerated and there is an ever expanding ecosystem of data infrastructure technologies to train and serve optimized models. In this ecosystem, there is a critical shortage of technical product-minded talent who can orchestrate these efforts to deliver value to users.

The Insight Data PM Fellows Program is a professional training fellowship that bridges the gap between traditional product management and a career building products in machine learning, data infrastructure, and analytics. This seven week, full-time, in-person program enables experienced product managers, data-focused MBAs, and cross-functional data scientists and engineers to apply their existing skills to the challenging problems of organizing, managing, and delivering data-driven products and features. Fellows learn by coordinating with a team of scientists and engineers to build data products in a collaborative and hands-on environment. They receive guidance and resources from industry mentors and leaders of open source projects in Silicon Valley. Additionally, Fellows gain access to a network of more than 1,700 Insight alumni, who are now working at over 700 companies. Immediately following the program, Fellows interview at leading companies in the San Francisco Bay Area and receive continued guidance and support until they accept a full-time offer to join a top product team.

### Insight Data Product Management in a Nutshell:

1. 7 week, full-time, professional Data Product Management training fellowship in San Francisco, CA.
2. Tuition-free program, with need-based scholarships available to help cover living expenses.
3. Self-directed, product development and management under the guidance of industry experts.
4. Lead a group of skilled data professionals who are excited about working on cutting-edge, high-impact problems.
5. Launch a new data product or feature
6. Meet top companies, present your work to teams you're interested in, and interview immediately following the program.














## Why Data Product Management?

Data will continue to be at the cornerstone of modern business and innovation. McKinsey Institute estimates that “the volume of data continues to double every three years as information pours in from digital platforms, wireless sensors, virtual-reality applications, and billions of mobile phones.”<sup>1</sup> The proliferation of cheap data storage and large scale high performance computing has enabled the creation of sophisticated algorithms that are poised to contribute “as much as \$15.7 trillion to the world economy by 2030.”<sup>2</sup> Critical R&D in this area, however, often sits unused in companies and is far removed from product, so companies are hiring Data Product Managers to facilitate the translation from research to product. These Data PMs will be at the forefront of developing the next generation of products and solutions that will ultimately capture this value and impact the lives of millions of people across many domains.

The acceleration of machine learning research and the development of large scale infrastructure for streamlining prototypes into production has created an ecosystem where individuals and companies alike can create life-altering data products from cutting edge breakthroughs. These differ from traditional products, however, because often their behavior can be difficult to explain, their output can be unexpected & unrepeatable, and their performance can dramatically shift based on trends in user behavior. Data-centric product managers who understand these pitfalls and can also assemble and coordinate all members of a data team are the crucial evolutionary next step for data-driven industries. Data teams include researchers who focus on prototyping new algorithms, engineers who robustly scale systems, and data science generalists who also work across these boundaries. The Data Product Manager (PM) integrates all these efforts by seeing the bigger picture, determining how to divide up time and energy, and being relentless in the pursuit to provide a quality experience for users and consequently value to the company.

Product managers need a new framework for orchestrating teams to tackle modern day product challenges. This is because there are so many additional touch points and a need for knowledge across many domains. In addition to working with software engineers to build out capabilities and designers to make products visually appealing and usable, Data PMs must interface with members of the data landscape. To inform product and market gaps, Data PMs need to work with analytics-focused data scientists to mine user behavior and activity and learn where product improvements can target the biggest business needs. To quickly test data-driven modeling solutions, Data PMs need to leverage machine learning (ML) focused data scientists. To handle these processes at scale, Data PMs need to enable data engineers to build the right infrastructure and deliver robust data pipelines. And finally, to build revolutionary new products, Data PMs need to employ teams of ML researchers and engineers who build, optimize, scale, and integrate new research results. There is a shortage of skilled product managers who can deliver such coordination effectively.

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<sup>1</sup> McKinsey, The age of analytics: Competing in a data-driven world (2016)

<sup>2</sup> Bloomberg, AI Will Add \$15.7 Trillion to the Global Economy (2017)

## From Research to Product

Recent product innovations have been driven not only through breakthroughs in research, but also through solving a series of infrastructure challenges. These include instrumenting with capacity to collect enough data, organizing and structuring data appropriately, as well as standardizing data across organizations so that all Product teams are conceptually aligned.

Due to these changes in the structure and organization of teams and their data, companies have created a variety of products and product advances that have been incredibly successful in recent years, with some examples listed below. These represent advances that many startups and companies wish to leverage themselves, which makes Data PMs ideally situated to deliver them, but also represent jumping off points for new products and services with these as components.

### Improvement to Products

- Performance: [Improving Text to Speech with Deep Learning \(Google\)](#)
- Personalization: [Artwork Personalization \(Netflix\)](#)
- Recommendation: [Predicting User Preferences \(Spotify\)](#)
- Search: [Similarity search \(Flickr\)](#)
- Newsfeed: [Surfacing posts from family and friends \(Facebook\)](#)
- Generation: [RobustFill for learning patterns \(Microsoft\)](#)

### Improvement to Product Usage

- Security: [Malware detection in executables \(NVIDIA\)](#)
- Pricing: [Dynamic Pricing \(Uber\)](#)
- Demand Forecasting: [Dynamic allocation of shoppers \(Instagram\)](#)
- Experimentation: [Generating new customer journeys \(Amazon\)](#)
- Fraud: [Voice Biometrics \(Verint Systems\)](#)
- Knowledge Graphs: [Profile Completeness \(LinkedIn\)](#)

### Improvement to Machine Learning Infrastructure

- Model Building: [Keras \(Google\)](#)
- Model Training: [Horovod \(Uber\)](#)
- Model Optimization: [Hyperparameter Search \(SigOpt\)](#)
- Full System & Deployment: [Michelangelo \(Uber\)](#)

## Data Product Considerations

*“Working with data at the core of a product requires a level of understanding of data modeling, data infrastructure, and statistical and machine learning. If the traditional PM operates at the intersection of business, engineering, and user experience, the data PM must also have domain knowledge of data and data science.”*

- Trey Causey, Rise of the Data Product Manager

Today, consumers expect software systems to know their preferences and preemptively provide information. These systems ingest massive information about our lives and provide new structures and frameworks with which we experience and explore the world. The internal mechanisms of these products typically rely on statistical methods and machine learning, therefore product managers need to know the products' inherent differences. Here are some of the considerations product managers need to consider when building these data and machine learning driven products:

- **Algorithm accuracy vs user acceptance:** Backend algorithms often comprise the core experience for users. Modifying these algorithms can result in complex interactions under the hood which manifest as confusing behavior or unintended results to users. This also makes it difficult to understand how changes drive overall business metrics. This is particularly tricky when researchers and engineers want to keep pushing the boundaries of algorithmic performance and make algorithms more accurate. Increased accuracy does not mean a better user experience, and error cases that don't affect accuracy can still stifle business. Instead, algorithms can be deployed in smaller doses, evaluating the results in AB tests to get a quick read before deploying widely.
- **Adversarial attacks:** Modifying a product in principled ways over time, with additional and better features, grows revenue and impacts the bottom line. For products that rely heavily on algorithms, there is also a trend to continually add additional model features which helps improve performance and consequently the product. Data and user behavior, unfortunately, change over time. Whether the product has users who at times can be adversarial (e.g. fraudulent users) or the incoming data is changing based on new user cohorts or segments, adding features does not automatically improve the product. This continual model grooming to counteract the impact of certain users over time makes it a challenge to predict product adoption and success.
- **Bias in data and training:** The data involved in making algorithmic decisions comes with inherent biases, often because the data is collected hastily or in an ad hoc manner. Consequently, unexplored areas of the data might be crucial for specific segments of users (e.g. most Pinterest users are women, making prediction for men more difficult). Even if all data was collected in a way that respected reality, human behavior itself has biases and so products that need to be relevant to all users and make life-changing decisions need to incorporate data above and beyond what is typical.

- **Non-determinism:** Users don't experience a deterministic outcome based on actions. For example, a specific search query or user action will produce a probabilistically generated answer or event. In some cases, this will make a product operate differently in exactly the same user-facing conditions, which can cause users to react unfavorably. Additionally, because no machine learning system is completely accurate, there will be errors that surface to users. When this experience is a bad one, and users complain, it's hard to reconstruct the exact scenario to understand what actually went wrong or what to change to make it better.
- **Explainability:** With rule-based decision systems, it can be fairly easy to explain how and why a product produced a certain decision. As models become increasingly complex, their internal processes become more opaque and difficult to explain why outcomes come from system inputs. As deep learning technology becomes more pervasive, it is imperative that product managers ensure their research and engineering teams leverage tools that make models explainable to others. This will not only help when speaking with users but also presenting and supporting your products internally to executive, sales, and marketing teams.
- **Graceful failure:** Machine learning algorithms are not 100% perfect, so when they fail, products managers need to ensure that the product still delivers. For example, a mixture of machine learning models along with extra rules-based decisions can address glaring errors. More importantly, the best products fail gracefully in a way such that user interaction with the system is still seamless and natural human actions correspond with what will make the product better. For example, a search algorithm can provide top results, which is of use to customers, but when it doesn't return the best answers, the natural inclination is to search through the list to find a relevant item. These actions provide feedback to refine the algorithm, and hence the product.

## The Demand for Data Product Managers

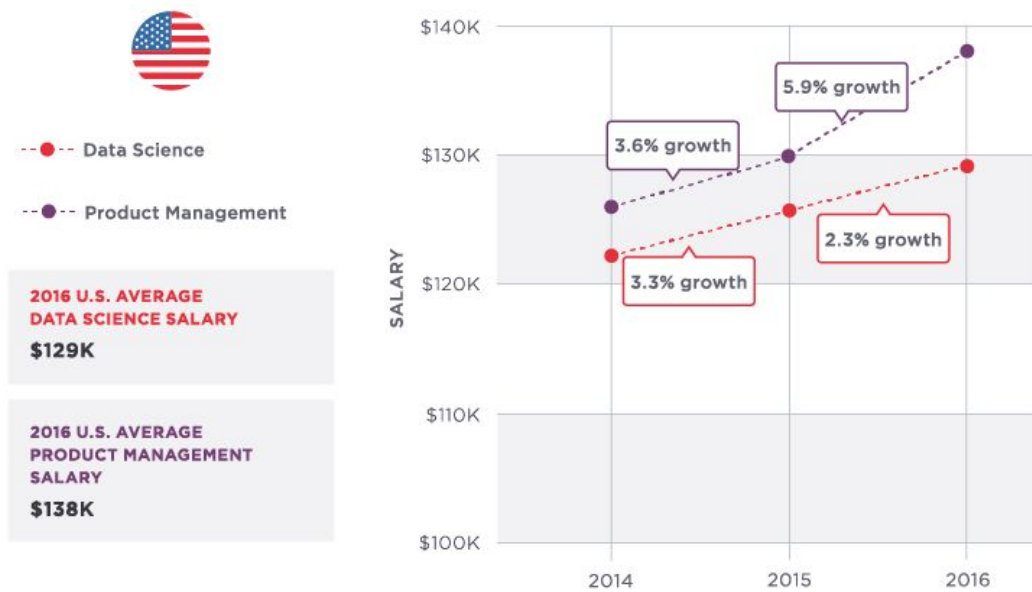
*"In turn, product managers today face a significant addition to their duties—they now need to begin treating data as a feature in the products they're building. In other words, not viewing data as only a byproduct of the apps they're charged with developing, but as a prominent feature. To do this successfully, it's critical to understand who is going to be using the products, what their data needs are, and how a specific data-driven "slice of business functionality" could help users meet those needs."*

- O'Reilly, "Data as a feature" is coming. Are product managers ready?

Product managers in tech companies are highly sought after individuals, and with the growth of roles in data teams, there are fewer and fewer individuals who can organize teams effectively. In addition to the growth in salaries (as seen in the Figure below, from Hired.com<sup>3</sup>), which signal a shortage, one of the top six requested skills of current product managers is data management.

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<sup>3</sup> Hired.com, 2017 State of Global Tech Salaries (2017)



Not only are companies starting to hire data product managers, but organizations are creating whole product divisions that are centered around building products that leverage machine learning and deep learning as a core component. These groups are led by individuals with titles like Director of Product, Data Science and Director of Product, Machine Learning. People who move into these roles will become important figures for structuring the process of moving products from ideation to final launch, and hence will be at the forefront of shaping industry.

The demand for product managers who understand data exceeds the current supply. One reason for this gap is that these roles simultaneously require understanding current research advances, engineering system design possibilities, and user engagement. Another crucial issue is that it is rare to already be situated at a company that is working on cutting edge research, which excludes people from gaining the prerequisite experience of integrating it into products. Many companies are hesitant to hire candidates without direct experience building data products.

This is where the Insight Data PM Fellows Program comes in, and why top organizations are helping Insight develop the next generation of leading Data Product Managers.

# Insight Data Product Management Fellowship

In 2012, Insight developed a new model for education: we bring together very smart, hard-working, and enthusiastic scientists, engineers, and product managers who have the fundamental skills, and enable them to make a transition into a specialized and technical field by gaining hands-on experience with the tools and practices of industry and engaging with an extensive network of industry mentors.

## Learning by Leading

*“An effective PM is an entrepreneur, strategist, technical visionary, cross-functional team leader, project manager, and customer advocate all rolled into one.”*

- Jeffrey Busgang, Entering StartUpLand

Since our Fellows enter the program with existing product management expertise and basic data fundamentals, there are no classes or lectures on these foundations. Instead, the main focus of the program is to learn by building a team of data engineers, data scientists, and AI researchers and launching a new product or feature using the same tools and best practices as leaders in the Data PM community. The aim is to understand and optimize the customer journey with a sophisticated data product.

In addition to learning from seasoned PMs, the Fellows will also receive technical advice from industry experts to get a high level perspective on how technical teams tackle industry-grade problems and distill those insights into their products. Finally, while PMs are always interfacing with their users to learn from their behavior and experiences, Fellows' projects also provide first hand experience on the challenges PMs face when building with large scale data and sophisticated algorithms.

Depending on their interests and company preferences, each Fellow works with a subset of Fellows from our Data Science, Data Engineering, and Artificial Intelligence programs and builds a project that highlights your ability to do one or more of the following:

- **Launch a new product that leverages ML**
  - *Example:* work with a Data Engineer and Data Scientist to build a real-time streaming pipeline for text processing and analysis that allows online media publications the capacity to uncover breaking stories
  - *Example:* work with an ML engineer to develop a web service for middle schoolers to consume advanced reading materials at a reduced complexity



- **Push a feature into an existing product**
  - *Example:* work with ML researchers and engineers to improve an AutoML platform that can deliver better models to internal teams
  - *Example:* work with Data Scientists and ML researchers to improve for designers a service that auto-generates code from website mockups
- **Optimize a current process or pipeline**
  - *Example:* work with Data Engineers to develop a set of large scale data pipelines that can be consumed by Data Scientists and AI professionals
  - *Example:* work with an AI researcher and a Data Engineer to scale up deep learning training and deploy a robust API

## Who are the best Data Product Managers?

*“Modern product managers are increasingly filling the new CEO pipeline for tech companies. Before becoming the CEOs of Google, Microsoft, and Yahoo, Sundar Pichai, Satya Nadella, and Marissa Mayer were product managers, and they learned how to influence and lead teams by shepherding products from planning to development to launch and beyond.”<sup>4</sup>*

- McKinsey & Company

The goal of Insight is to prepare the next generation of leading Data Product Managers. To do this, we have created a program that is explicitly designed to guide Fellows into fulfilling careers at companies at the intersection of product and data. These companies have a very high bar for talent so likewise we are setting a very high standard for candidates. This is why we are setting a very high standard for acceptance into the program and expect entry to be quite competitive.

The best Data PMs are driven to uncover and solve high impact business and customer problems. They have a passion for providing direction and guidance to teams through synthesizing unstructured feedback and ideas from multiple sources. While this top-tier quantitative ability and product management experience is necessary, it is not sufficient to be an Insight Fellow. In addition to experience, we’re looking for Fellows who are extremely curious, highly motivated, love learning across a wide range of fields, enjoy collaborating with other skilled, driven colleagues and are excited about the opportunity to make a positive impact in the world.

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<sup>4</sup> McKinsey, Product managers for the digital world (2017)

We expect Insight Data PM Fellows to come from roughly three different categories of backgrounds, although we're excited to consider an application from anyone, regardless of their background:

**Product Managers:** You have experience organizing and building products in companies ranging from medium to large size and now want to pursue data product management as a specialization. While your current teams may not be leveraging data and machine learning as the backbone of the product, you may have been building dashboards and interacting with software engineers who are starting to explore methods in machine learning. You have a strong quantitative inclination with the ability to code simple programs and can read and interpret technical white papers for recent cutting-edge products. While PMs find their way to the role through various backgrounds, you likely had a background in traditional software engineering before leading a product team.

**Data-focused MBAs:** You are almost finished with your MBA program and have been taking courses on technical topics including statistics and machine learning. Your program may even have a group focused on tackling data-driven case study competitions. You acknowledge that most CEOs in top-tier companies come from a product management background, and since most products are leveraging data, it's advantageous to launch your career by pursuing a technical data product manager role.

**Cross-functional data scientists and engineers:** You are a senior data scientist or engineer, and given your purview of the processes at your company, you have taken a lead on a larger functional project that has many touch points across the company. You understand your users because they are often the very data scientists or engineers on your team. You have a passion for solving their problems and providing them with solutions, and hence want to pursue new opportunities as a data-focused PM.

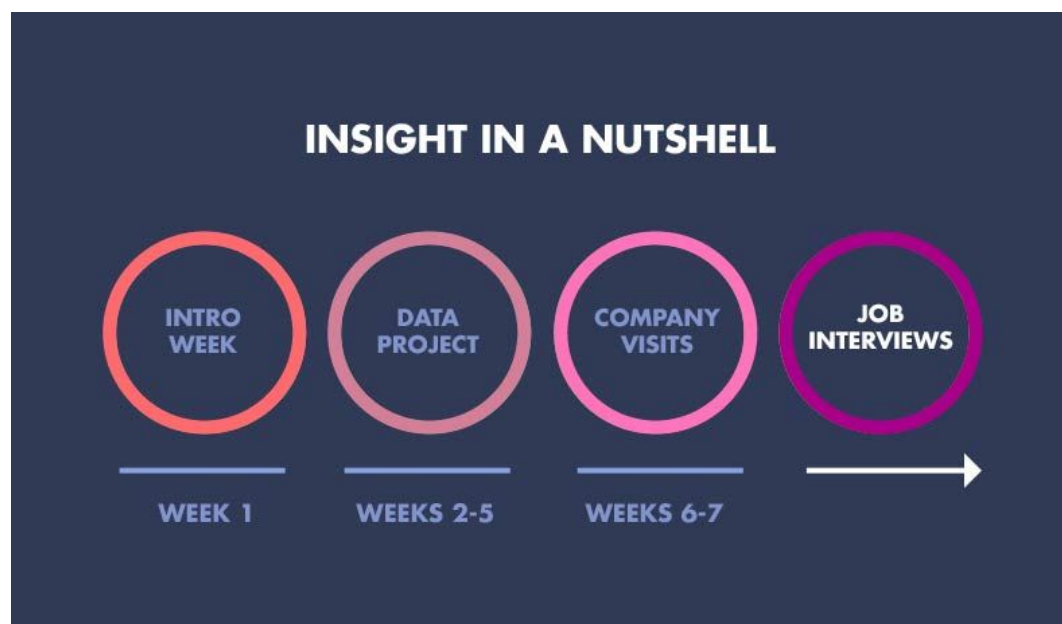
Data teams are employing a model where they are pairing research, engineering, and product teams to maximize for speed of experimentation, productionisation, and user testing and feedback. The Insight Data PM Fellows Program will be no different. By having Data PMs lead teams comprised of both researchers and engineers, while also meeting with users, we will be able to collaboratively solve more sophisticated problems, making for an exciting learning environment for Data PM Fellows from all backgrounds.

To be successful, Fellows need the ability to evaluate market share for an idea, set clear metrics that are aligned with the bottom line of the company (and understand how solutions move those metrics), break ambitious projects into smaller pieces to understand critical pivot points, identify and fix data quality issues, iterate on product features in a data driven way, communicate their product vision to key stakeholders and to a wider audience, and enable all members of data teams to do the critical work of building the product. They also need to be able to understand probability, do their own investigations into data, perform analyses, write reports, and understand the machine learning model landscape and how to measure the success of these methods. That said, you do not need to

be strong in all the areas to apply. As part of the program ,you will learn quickly and fill in any knowledge gaps while leveraging the strength of your previous experience.

## Timeline

Insight is intended for product managers, MBAs, and senior data scientists and engineers who are motivated to quickly build on their fundamental product management and team leadership experience. Fellows gain meaningful experience coordinating a team of top data scientists, data engineers, and ML engineers to build a product in just a few weeks. This high rate of learning mirrors the iterative nature of development in the tech industry.



## Weekly Breakdown of the Program

- **Week 1: Build a Team** - Learn the data ecosystem, crystallize a product vision, build a product roadmap, and organize your team.
- **Week 2: User and Market research** - Speak with your end-users, deepen your understanding of the market landscape, and address user pain points.
- **Week 3: MVP** - Build a Minimal Viable Project with core functionality.
- **Week 4: System Integration and Testing** - Ensure alignment among core components of your system and gather user experience feedback.
- **Week 5: Perfect and Practice** - Finish your project & practice a product pitch.
- **Week 6-7: Present and Prepare** - Present your PM project to the companies you are interested in, and begin preparing for the interviews that will follow.
- **Week 8+: Interview** - Interview at the companies that call you back from your presentations and sign an offer to join a top product team in Silicon Valley.

## Who's involved?

The Insight Data PM Fellows Program is a professional training fellowship that bridges the gap between traditional product management and a career building products in machine learning, data infrastructure, and analytics. With participation from leading technology companies, we are connecting top product managers, data-centric MBAs, and cross-functional data team members with some of the most innovative companies in the world. Mentors for the Insight Data PM Fellows Program are Data Product Managers at:

## Collaboration and Mentorship

Though each Fellow will manage their own product based upon their individual interests and abilities, the strength of Insight is rooted in a collaborative environment. Fellows accelerate their learning by working together to solve common problems and leveraging the diverse backgrounds of one another and the Insight network. Mentorship comes from the following sources:

- **Company Mentors** - Product teams at leading companies of various sectors and sizes that will share the problems they are currently solving. This helps you better understand the current challenges in the industry and decide which teams you want to join.
- **Industry and Open Source Leaders** - Pioneers at the forefront of Data Product Management that help you learn the best practices and newest trends in the industry.
- **Your fellow Fellows** - Ambitious Product Managers, data-focused MBAs, and cross-functional data scientists and engineers with common goals and a diverse set of skills that complement yours. Some have years of experience shipping products, while others have worked on cross-functional data teams. They will help you learn the way you do in industry, by collaborating and working through challenges with your peers.
- **Insight Alumni** - Previous Fellows from our Data Science, Data Engineering, and AI programs have transitioned into Data Product Manager roles at top companies. They provide individualized guidance and practice with interviews.
- **Insight Team** - Insight staff that offer continued guidance throughout the entire process. They point you to the right resources to help troubleshoot tough issues.

## Responsibilities

As an Insight Fellow you're given the opportunity to learn from the best Data Product Managers for seven weeks. The program is designed to remove as many obstacles as possible that stand between where you are now and becoming a successful Data Product Manager. With these benefits, however, come a few responsibilities.

- Actively and thoughtfully contribute to group activities and sessions during program hours Mon-Fri 10am-6pm.
- Take a leave of absence, if applicable, from your current responsibilities (e.g. current employment or studies) in order to participate at Insight. Both the 7-week portion and the subsequent interview process require a full-time focus.
- Self-direct your learning and tackle a challenging data product launch during the program, while giving and receiving constructive feedback.
- Interview for full-time Product Manager positions with Insight mentor companies in your program's location upon completion of the program.
- Plan to keep coming into the office during the interview weeks (when not interviewing) to participate in interview prep sessions with other Fellows.
- Support future Fellows by providing mentorship and guidance once you become a Data Product Manager in industry.

The guiding principle of Insight is: *Fellows first*. We strive to create an environment where you can learn and develop your career in data product management. In return, we ask that you be fully engaged in the process and help pass on your learning to future Fellows through alumni mentoring, helping to make the Insight community stronger as a result.

## Benefits

The Insight program is designed to provide all the training, resources and connections you'll need to effectively transition to a career in data product management. Here are some of benefits of becoming an Insight Fellow:

- Guidance and mentorship from industry professionals at every stage of the program and as you prepare for interviews.
- Mentorship from Insight alumni whose experience, at Insight and in their current data and product roles, make them a vital resource for guidance and feedback.
- Personalized company matching. We help you figure out which companies are the best fit for you based on our experience and in-depth conversations with the hiring managers. We then help you arrange interviews during the final week of the program.
- Help navigating the negotiation of final employment terms once companies have made their employment offers to you.
- Full tuition scholarship paid for by the hiring companies, so Fellows pay nothing to participate in the program. Need-based scholarships are also available to help cover

living and travel expenses -- our goal is to make sure everyone with the right skills can participate in Insight, regardless of their financial situation.

- Desk space at the Insight office in Silicon Valley during the program, with full-time access to a library of relevant resources.
- Dedicated computing resources for your team to build and maintain your product for the duration of the program.
- Advice from our staff to help with your living arrangements for the duration of the program.
- Perhaps most importantly: an unparalleled professional network of product managers, artificial intelligence professionals, data scientists, health data scientists, data engineers, friends, and acquaintances. Through the program you will meet and get to know several dozen top Product Managers who are Insight mentors and alumni, all of whom will be your industry peers. These professional contacts will be an invaluable source of knowledge, advice, career opportunities, and friendship in the years to come.

## Applications

Applications are currently open on [our website](#) for the next start dates of Insight Data PM Fellows Program. We expect high demand, so we encourage you to apply early.

If you have any questions please email us at [info@insightdatapm.com](mailto:info@insightdatapm.com)

Or to apply, please visit: <http://insightdatapm.com/apply>