



INSIGHT



DECENTRALIZED CONSENSUS FELLOWS PROGRAM



The Insight Decentralized Consensus Fellows Program is an intensive, professional training fellowship for experienced software engineers and academic researchers seeking to transition into a full-time career creating blockchain technology and decentralized consensus solutions for leading companies in Silicon Valley and top open-source projects. In seven weeks, Fellows gain experience with the tools, skills, and best practices necessary to lead innovation and collaboration in this new domain.

Your Bridge to a Career in Consensus Engineering

Are you a blockchain-savvy professional software engineer, postdoctoral researcher, or late-night open-source contributor, looking to transition to a full-time career developing decentralized consensus technologies, engineering smart contracts, and building the next generation of decentralized apps and platforms? Do you want a career that leverages your engineering know-how, familiarity with decentralized systems, business acumen, and coding experience in a fast-growing, in-demand field that is rapidly disrupting a wide range of sectors?

Cutting-edge consensus space projects and top companies are seeking talented engineers with the knowledge and skills to lead blockchain innovation and evolution, to help them leverage brand new tools and build world-class products. To create new and valuable technologies in these spaces, consensus engineers not only work with traditional industry teams, but additionally need to collaborate with cryptographers, cybersecurity experts, and infrastructure engineers. The large number of companies moving into this space are competing for a very small talent pool of well-rounded individuals with strong coding skills and consensus/blockchain domain knowledge.

The Insight Decentralized Consensus Fellows Program is a professional training fellowship that bridges the gap between your current informal involvement with this space and a full-time career building distributed consensus infrastructure, applications, and analyses. This seven week, full-time, in-person program enables researchers, engineers, and open-source contributors to apply their existing skills to the challenging problems of designing, developing, and delivering blockchain products and applications. Fellows learn by pushing the technological envelope in a collaborative and hands-on environment. They receive guidance and resources from industry mentors, leaders of open-source projects, and advisors through the Insight Decentralized Consensus Lab. Additionally, Fellows gain lifelong access to a network of more than 1,600 Insight alumni, who are now working at over 400 companies. Immediately following the program, Fellows interview for full-time jobs with global decentralized projects and leading companies in Silicon Valley. Fellows receive continued guidance and support until they accept a full-time offer to join a top team.

Insight Decentralized Consensus Fellowship in a Nutshell:

1. Full-time, seven-week professional engineering fellowship in San Francisco.
2. Need-based scholarships available to help cover living expenses.
3. Self-directed and collaborative project design and development, under the guidance and mentorship of top experts in the field.
4. Rapidly gain knowledge and practical experience with a diverse cohort of talented Fellows, working together on cutting-edge solutions to high-impact problems.
5. Meet top companies and projects, present your work to teams that you're interested in, then interview immediately following the program.

Why Decentralized Consensus?

To understand the significance of *blockchain technology*, it is necessary to first consider the implications of humanity's fundamentally new ability to create decentralized networks with strong universal consensus. The term "*decentralized consensus*" refers to a set of principles and techniques that allows participants on a distributed network to arrive at perfect agreement on a shared document or database. Systems built upon decentralized consensus methods are inherently tamper-proof, censorship-resistant, and permissionless.

Centralized consensus has always been easy! It is trivial to share a document among participants who trust each other (e.g. co-workers sharing information on an office whiteboard) or if participants choose to trust some central third party (e.g. a cloud storage provider or banking system).

The paradigm-shattering result of **decentralized consensus** is that we now have methods for soundly establishing the veracity of a shared document even when the participants do not know or trust each other. Remarkably, even in systems where individual participants would benefit from fraudulently modifying the database (e.g. a financial ledger) the cryptographic and game theoretic principles underlying decentralized consensus unlock trust as an emergent property.

Any effective decentralized consensus system must solve a fundamental challenge: how can a system arrive at universal agreement under adversarial conditions where messages may be unknowingly lost and participants may behave dishonestly for their own gain. The problem was concisely expressed as the [Byzantine Generals' Problem](#) in 1982:

Imagine a group of generals of the Byzantine army camped with troops around an enemy city. Communicating only by messenger, the generals must agree upon a common battle plan - whether to attack or retreat. Either way, they must arrive at agreement and act in unison, since an attack with only a portion of the troops would be disastrous. However, one or more of the generals may be traitors who will try and confuse the others. The problem is to find an algorithm to ensure that the loyal generals will reach agreement.

(Lamport, Shostak, and Pease; 1982)

An individual Byzantine general may selfishly communicate an attack, then retreat themselves - ensuring their own safety at the expense of the overall campaign. Likewise, individual participants in other decentralized systems (e.g. a shared inventory list or financial ledger) may selfishly try to selectively communicate dishonest information to advance their own position, at the expense of network integrity.

For decades, the world's greatest minds have been working on creating tools to enable self-securing decentralized systems. The entire landscape changed when the pseudonymous

Satoshi Nakamoto brilliantly completed the decentralized consensus puzzle and publicly shared a game-changing solution in the short and elegant [Bitcoin white paper](#).

Nakamoto consensus combined the architecture of a peer-to-peer network with the concepts of a cryptographically-secured ledger that requires a “proof of work” to modify. The *peer-to-peer* architecture allows anybody in the world to participate, which creates an incredibly robust global network that has no central points for failure or censorship. The Bitcoin ledger timestamps new information into a particular tamper-proof database structure, retroactively named a *blockchain*. The biggest contribution from Bitcoin was the combination of this data structure with a difficult “mining” task that attaches a high cost (*proof of work*) to database modifications. This approach strongly penalizes malicious actors, since only honest miners whose blocks are accepted receive rewards to reimburse them for the energy costs of creating the block.

Decentralized consensus technology has changed dramatically in the intervening years. The proof of work methods currently employed by many decentralized consensus networks have benefits such as a field-tested security record, and downsides such as high energy use and financial barriers for mining. However, various mechanisms such as ASIC-resistant proof of work, proof of stake, proof of spacetime, and even non-proof systems are currently in development and operation.

The global community has improved the performance and expanded the functions of initial blockchain implementations through innovations such as second-layer scaling solutions, sharding, and integration with computational resources. Furthermore, decentralized consensus tools are being developed using alternatives to blockchains, such as directed acyclic graphs.

It is not surprising that the foundational tools of modern decentralized consensus methods were introduced in the context of a currency use case. Global economic turmoil exacerbated pain points related to general lack of financial sovereignty, and maintaining a digital ledger is an intuitive application of the new ability create consensus on a shared document.

In the last decade, decentralized consensus technology has been advanced to enable a range of uses beyond storage and transfer of value. The shared document can be public or private (encrypted) and the networks can be permissionless or permissioned. The ability to create smart contracts that interweave value with code enables decentralized application platforms (DApps) that have the potential to replace many of our third-party legacy institutions with decentralized peer-to-peer networks.

Decentralized consensus systems are being used to [revolutionize supply chain management](#), run [global computations](#), create [digital assets](#), [share resources](#), create [digital IDs](#), enable [data sovereignty](#), build financial infrastructure for the [Internet of Things](#), manage [property titles](#), [vote](#) securely, and interchange assets through a [decentralized](#) exchanges and [atomic swaps](#). Insight Fellows create new and useful solutions employing blockchain data structures and other cutting-edge innovations in decentralized consensus engineering.

Crossing horizons that were out of sight 10 years ago

Financial sovereignty - For millenia, storing and sending money was generally facilitated by third-party banks and payment processors, largely due to necessity. In 2008 it would have been absurd to imagine how an individual could safely self-store millions of dollars, and transfer \$5 or \$500000 overseas instantly with no bureaucracy or overhead. These feats became trivial after first cryptocurrency [launched](#), providing a paradigm-shifting alternative, that enabled globally-distributed strangers to share a decentralized ledger, by using cryptographic tools and “proof of work” to form a network where trust arises as an emergent property. With cryptocurrencies, value can be stored and transferred across a peer-to-peer network without entering custody of any third party.

Self-executing contracts - For the first time, value can be intrinsically woven into computer code, and crafted into digital contracts that have the ability to act autonomously and to execute various functions and transfer funds. Traditionally, money and contracts have been two distinct concepts, with the latter arbitrated and enforced by some third party like a court system, which may or may not operate efficiently and fairly. Smart contracts are a revolutionary innovation for transparent and trustless agreements that are executed by global computation platforms with no central point for failure. The payment is bound to the program itself, delivered upon the satisfaction of the contract conditions. For example, smart contracts can manage [crowdfunding](#), [private secure voting](#), and the [sharing economy](#).

Digital goods - Prior to this decade, scarcity and uniqueness of digital goods was either nonexistent or artificially imposed. However, the economic and cryptographic underpinnings of contemporary systems integrate these real-world properties into decentralized digital assets. Eric Schmidt (Executive Chairman of Google) noted, “the ability to create something which is not duplicable in the digital world has enormous value.” Collectables and [CryptoKitties](#) are only the first few digital manifestations in an era with true electronic commodities.

Identity verification - Decentralized consensus technology provides new avenues for distributing, [verifying](#), and [contributing annotations](#) to digital identities. This is largely enabled by application of cryptographic signatures, which allow somebody holding a (secret) private key to sign messages and data with mathematically-verifiable proof that cannot be forged or duplicated, and do not reveal the secret (in contrast to social security numbers, which requires exposing a single secret to scores of counterparties).

Distributed infrastructure - The concurrent expansion of the sharing economy, cloud services, and our decentralized consensus horizons has created the perfect conditions for an infrastructure revolution. This enables anybody in the world to share [computing power](#), [storage space](#), and of resources [among IoT devices](#).

Decentralized autonomous organizations - Smart contracts and DApps provide the framework for truly autonomous digital organizations whose [governance](#), policies, and actions can be transparently [managed by code and humans in tandem](#).

Shared immutable databases - Decentralized consensus boils down to various parties synchronizing and agreeing precisely on a shared document. This ability represents both an underlying technology and a fundamentally-new capability enabling an incredible number of new possibilities in domains ranging from [supply chain management](#) to tamper-proof [document control](#).

Fellows gather broad domain knowledge

Decentralized consensus engineers interface not only with the traditional suite of software developers and designers, but additionally collaborate with cryptographers, cybersecurity experts, and infrastructure engineers. Insight Fellows are equipped with well-rounded domain knowledge, and interact effectively across layers of the ecosystem. Emphasized facets include:

Decentralized consensus protocols - Fellows gain knowledge about a wide range of architectures for decentralized consensus networks, including directed acyclic graphs and the newest blockchain technologies, such as sharding and second-layer scaling solutions. Fellows explore alternatives to proof of work, and the benefits and difficulties that come with each system.

Smart contract engineering & decentralized apps (DApps) - Smart contracts and decentralized applications enable autonomous programs to run on a global computation engine. Value can be intrinsically coded into smart contracts, which function as self-executing digital agreements with awareness of the blockchain and outside systems. Decentralized platforms and autonomous organizations built on these frameworks enable new business models and access to untapped markets experiencing ongoing pain points that have been internalized as the norm.

Cryptographic primitives and cybersecurity basics - Modern decentralized consensus technology relies heavily on clever use of cryptographic primitive such as hash functions, asymmetric encryption, and digital signatures. Fellows follow best practices for anticipating and proactively mitigating a variety of attack vectors including Sybil attacks, eclipse attacks, denial of service, and malformed requests.

Economic incentivization - Decentralized consensus systems frequently contain multiple roles whose actors are theoretically motivated to behave usefully by economic incentivization under varying conditions. New incentive systems must be effective during normal operation, and robust against attacks and oligarchical coups. Traditional financial game theory was not developed in this landscape, and new microeconomic systems are being field-tested daily. Fellows learn how to assess and design strong incentive systems.

Writing and assessing white papers - In this space, new projects and technologies are often announced by technical white papers, which are rarely peer-reviewed and are sometimes released pseudonymously. Fellows hone their ability to ascertain the quality and value of other proposals, and learn how to how to effectively communicate their ideas in this manner

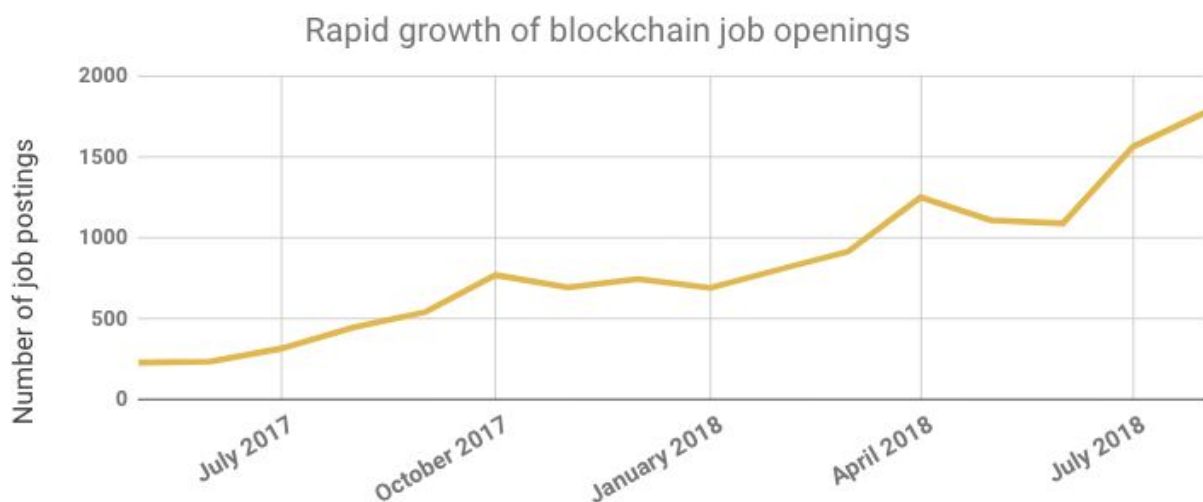
Data science analyses - Fellows generate actionable insights by extracting data from on-chain and off-chain sources, enhancing signals through feature engineering, statistical analyses, and AI methods. Insight is already developing [public open-source libraries](#) for consensus engineering and blockchain analysis, which enables a quick ramp-up time for Fellows' machine learning and data product projects, and provides experience with tools that they can use throughout their career.

Innovative integration - There are products and systems that do *not* benefit from “putting it on the blockchain” or launching a new token. Fellows evaluate hundreds of use-case and product proposals, and learn how to identify which processes and pain points are actually improved by implementing decentralized consensus solutions.

Regulatory landscape - It is both challenging and crucial to know the basics of the rapidly-changing regulatory landscape, in order to recognize when SEC filings and legal counsel are necessary. Fellows practice identifying assets that are classified as securities, and learn how to access the proper resources for regulatory guidance.

High demand for decentralized consensus experts

Due to the expansive and disruptive power of the decentralized consensus paradigm, the number of projects and companies in this new and developing space is increasing exponentially. Silicon Valley is a hotbed for blockchain innovation, and organizations are competing for access to a small pool of highly-talented individuals with sharp business acumen and strong technical expertise.

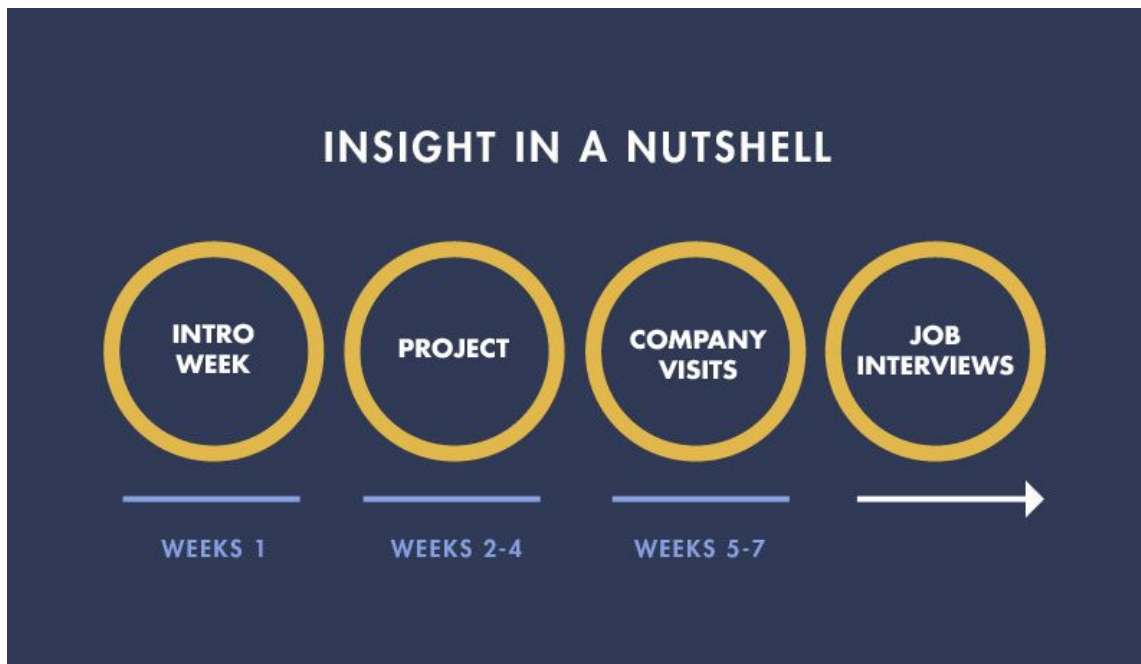


(Data from [Glassdoor](#))

The Insight Fellowship model

In 2012, Insight developed a new model for education: we bring together very smart, hard-working, and enthusiastic engineers and scientists who have strong 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.

Timeline



Gain experience through hands-on projects

During the course of the program, each Fellow completes a substantial project that must contribute meaningful new features, applications, or technologies for the decentralized consensus ecosystem. Fellows pursue projects that ignite their passion in a self-directed setting, supported by the infrastructure, mentoring, and technical expertise provided by Insight. Some projects may be self-inspired, while others are key contributions to external codebases or the libraries developed by the Insight Decentralized Consensus Lab.

The projects vary widely in scope, interacting with different facets and roles in the decentralized consensus ecosystem. During projects, Fellows will:

Develop consensus protocols - Work with core teams to add valuable features and new functionality to exciting projects leading the cryptocurrency space such as [Bitcoin](#), [Ethereum](#), [Monero](#), [Lightning network](#), etc.

Build free, open-source libraries - Contribute to the free open-source software (FOSS) libraries produced through the [Insight Decentralized Consensus Lab](#). You'll create the new industry-standard tools for building decentralized consensus tools, applications, and analyses. The Lab has already published free tools for [abstracting blockchain data](#) for analysis, and techniques for [machine learning-based fraud detection](#) in peer-to-peer networks.

Engineer smart contracts - Create new tools that autonomously and transparently execute functions that have required centralized third parties for thousands of years. Learn how to craft smart contracts that are private, scaleable, and ready for production. These smart contracts can have use cases ranging from [exchanges](#) to [name services](#) to [file storage](#).

Launch decentralized applications - Build robust platforms that provide services in a trustless manner, on a global computing engine with no central point of failure. Design the next paradigm-shifting DApp that uses new capabilities to lead the market business models we haven't even conceptualized yet. Live DApps include [IDEX](#), the [Ethereum Name Service](#), and [Storj](#), providing handy platforms for interacting with the smart contracts linked in the previous paragraph.

Leverage data science - Develop tools to extract actionable insights from the wealth of data produced by decentralized consensus systems: [on-chain data](#), [network metadata](#), and [auxiliary data sources](#). Leverage data-enhanced perspectives for cybersecurity, DevOps, and FinTech applications.

Integrate decentralized consensus systems - Improve extant products and service models by integrating decentralized methods for data distribution and verification. Revolutionize supply chain tracking, financial interconnectivity, digital identification, and more.

Insight Decentralized Consensus Lab

Long-term initiatives and external collaborations are facilitated by the Insight Decentralized Consensus Lab, which interfaces leading teams (e.g. Bitcoin, Monero, etc) and drives the development of new tools for consensus engineering and blockchain analysis. The Lab pursues both internal initiatives and external collaborations with research and development teams in the decentralized consensus and blockchain space. Most Lab projects are released as free software libraries, or integrated into public repositories for open-source organizations

Weekly Breakdown of the Program

- **Week 1: Plan the vision** - Learn the consensus landscape, and draft the white paper or roadmap to guide your Insight project.
- **Week 2: MVP** - Build a minimum viable product to prototype your project.
- **Week 3: Enhancement** - Develop the MVP into a functional feature or system, taking into account scaling, security, and deployment considerations.
- **Week 4: Finishing touches** - Complete documentation and your final code review. Sensitive projects will undergo external security audits by top Silicon Valley partners.
- **Week 5: Presentation development** - Polish your slides & practice your pitch, while learning how to optimize your projects and integration with new teams.
- **Week 6-7: Interview preparation** - Present your project to the organizations that you wish to work with, and begin preparing for the interviews that will follow.
- **Week 8+: Interview** - Interview with leading projects, and sign an offer to join a top team in Silicon Valley or take a remote position with decentralized team.

Who are the best Fellows?

The best and most effective decentralized consensus engineers are personally driven to uncover and solve high impact business and customer problems. They have a passion for building new systems by synthesizing ideas and tools from multiple sources. Although relevant knowledge and nimble technical skills are a general prerequisite for the program, we are specifically 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.

There are many paths to Insight, and we're excited to consider any innovative and knowledgeable applicant, regardless of their background. Successful Fellows may relate to profiles such as:

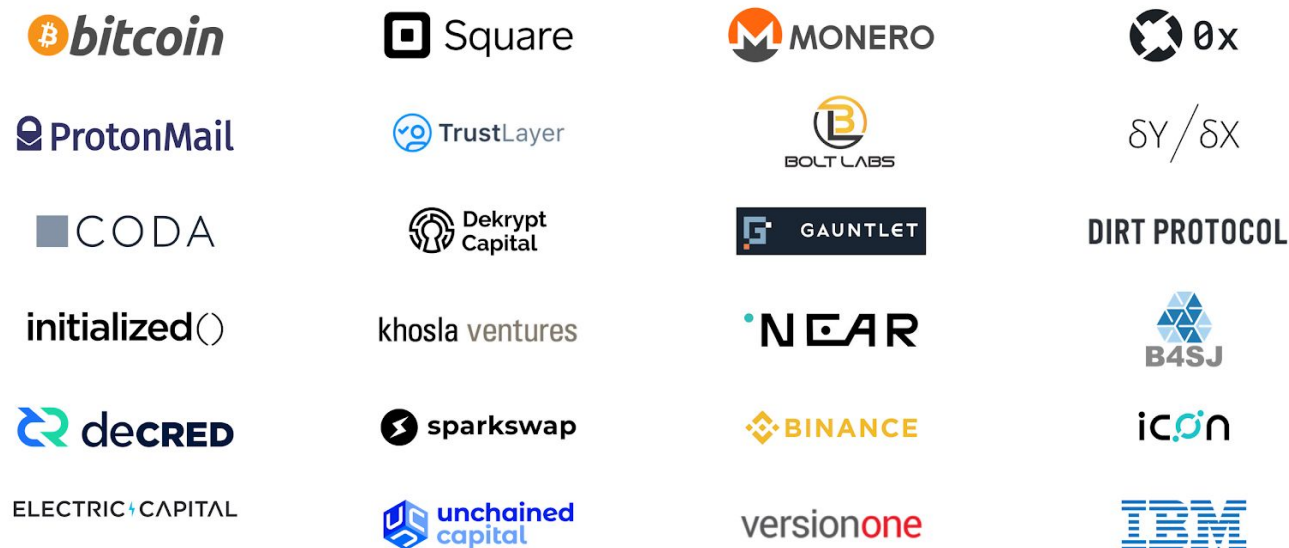
Professional software engineer - You are an experienced software engineer looking to apply your skills toward building the next generation of tools that will enhance human interconnectivity and expand the boundaries of possibility. You understand the principles and implications of decentralized consensus systems, and are excited to gain more experience with the tools and teams in this space.

Academic researcher - You are a postdoctoral researcher with a background in cryptography, economic game theory, or cybersecurity. Or perhaps your doctoral work focused on computer science or a quantitative STEM field such as physics, computational biology, or cognitive psychology. You picked up coding skills to enable your research, and have discovered that your flexible toolkit is valuable for building, applying, and analyzing decentralized consensus systems. You are ready to use your cross-functional perspective to lead R & D in a brand-new industry.

Late-night open-source contributor - You have dedicated your free time toward projects in this space, enjoy hackathons, and are ready to transition from an informal role toward a full-time career doing what you love. Your GitHub portfolio and your code contributions clearly reflect your passion for this domain. You are excited about the project portion of Insight because you have a dozen ideas you've been wanting to test out.

Who's involved?

The Insight Decentralized Consensus Fellows Program is a professional training fellowship that bridges the gap between your current informal involvement with the field and a full-time career building decentralized consensus infrastructure, applications, and analyses. With participation from leading projects and technology companies, we are connecting accomplished Fellows with some of the most innovative companies in the world. Mentors for the Insight Decentralized Consensus Fellows Program are leaders from:



Collaboration and Mentorship

Though each Fellow will manage their own project 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 by leveraging the diverse backgrounds of each other and the Insight network. Mentorship comes from the following sources:

- **Company mentors** - You'll learn about the pain points encountered by teams from leading projects with varying styles, sizes, and sectors. You'll become familiarized with the field's contemporary challenges, and decide which types of teams you want to join.

- **Industry and project leaders** - Pioneers at the forefront of the decentralized consensus industry help you learn the best practices and newest tools in the space.
- **Your fellow Fellows** - Grow as part of a team of ambitious software engineers, postdoctoral researchers, and late-night open-source contributors, who share common goals and a wide diverse set of skills to complement and sharpen yours. They will help you learn by collaborating and working through challenges with your peers, in an environment that reflects industrial workspaces and teams.
- **Insight Alumni** - Previous Fellows from our Data Science, Data Engineering, and AI programs have developed experience in this field, and they provide individualized project guidance and interview practice.
- **Insight Team** - The Insight team offers continuous guidance throughout the entire process. They will help you develop and iterate your ideas, and facilitate your access to the resources and expertise necessary to succeed.

Responsibilities

As an Insight Fellow, you're given the opportunity to learn from the best teams and experts 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 blockchain developer. With these benefits, however, come a few responsibilities.

- Actively and thoughtfully contribute to group activities and sessions during program hours Mon-Fri from 10AM-6PM. Some days, you will need to stay for mentor and company visits ending as late as 8 or 9PM.
- 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 project during the program, while giving and receiving constructive feedback.
- Interview for full-time decentralized consensus engineering positions with Insight partners in Silicon Valley upon completion of the program.
- Plan to continue coming into the office during the interview weeks (even when not interviewing) to participate in interview prep sessions with other Fellows.
- Support future Fellows by providing mentorship and guidance once you become a leader in the field.

The guiding principle of Insight is: *Fellows first*. We strive to create an environment where you can learn and develop your career building decentralized consensus tools. In return, we ask that you are fully engaged in the process, and help pass your learning on to future Fellows through alumni mentoring - continuing 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 developing and integrating decentralized consensus systems. 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 industry roles, makes them a vital resource for guidance and feedback.
- Personalized matching with top projects and leading companies. We help you figure out which organizations will provide a high-quality fit for you, based on our experience and in-depth conversations with the hiring managers.
- Help navigating the negotiation of final employment terms, once companies have made their employment offers to you.
- Additional 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 current financial situation.
- Desk space at the Insight's headquarter office in Silicon Valley during the program, with full-time access to a library of relevant resources.
- Dedicated computing resources for you to build and maintain your product for the duration of the program.
- Advice from our local staff to help you plan your living arrangements for the duration of the program.
- Perhaps most importantly: an unparalleled professional network of decentralized consensus and blockchain experts, product managers, data scientists, data engineers, friends, and acquaintances. Through the program, you will meet and get to know top engineers and developers 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 Decentralized Consensus Fellows Program. We expect high demand, so we encourage you to apply early.

If you have any questions please email us at info@insightdatascience.com

Or to apply, please visit: <https://www.insightdatascience.com/apply>