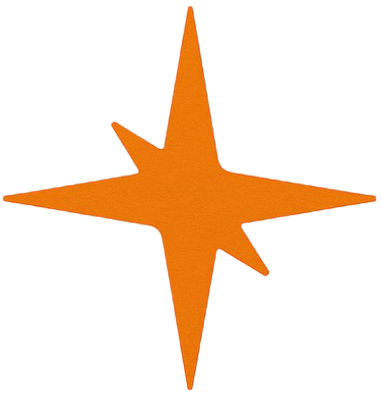

Spark

where ideas come to life

Spark is an idea commitment engine built to outcompete closed innovation ecosystems, unlocking unstoppable collaboration, crypto-powered incentives, and shared upside for every contributor. It helps inventors bring bold ideas to life by connecting them with the people, tools, and capital they need to succeed.

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Preface

This document was authored by **Marco Huberts**, **Ayat Abourashed** and **Shady El Damaty** as part of an ongoing effort to reimagine and expand open innovation in the age of decentralization.

This whitepaper is a derivative work based on the *weDEA* whitepaper by Primavera De Filippi, from which several structural, conceptual, and terminological frameworks were directly adopted or adapted (De Filippi, 2024). It represents a fork, both technically and philosophically, of their original contributions, recontextualized to meet the evolving needs of decentralized collaboration, with particular emphasis on crypto-powered ecosystems, shared incentives, and community-driven development.

Our goal is to empower inventors, creators, and collaborators with the tools and frameworks they need to turn bold ideas into collective reality. We hope this work not only honors the legacy of its predecessors but also inspires further experimentation and innovation.

0 Abstract

The traditional patent system discourages collaboration and limits innovation of inventions by privatizing intellectual property (IP) ownership. Spark, a blockchain-based IP framework, addresses these limitations by enabling open collaboration and efficient commercialization. Spark is a protocol component of Poscidon, a decentralized autonomous organization (DAO) funding personalized medicine research for life-altering diseases like cancer; Spark leverages the DAO's token, SCI. Spark's defensive patent pool, represented as a collection of non-fungible tokens (IP-NFTs, covering everything from raw data and computational workflows to hardware designs, schematics, and other IP assets) with copyleft restrictions, ensures that inventions remain accessible to the public while incentivizing inventors and contributors through Web3-based economic models.

Spark's unique economical model allows anyone to use IP-NFTs in the pool for non-commercial purposes. However, for commercial use, members must lock SCI tokens and pay fees through the Poscidon Protocol, a decentralized application (dApp), to mint non-tradable License-NFTs that allow access to gated resources such as data, compute, models, or other IP owned by the DAO. The revenue generated from offering tokenized licenses is routed to the DAO treasury with the mandate to be reinvested to further innovate and improve ideas, fostering a sustainable funding model for continuous innovation.

Spark's governance model leverages Poscidon's battle-tested governance systems. This inclusive yet secure blockchain-based governance system requires non-disclosure agreements for participation in the early phases of an idea, ensuring transparent management of the Spark IP pool from the inventor's initial concept to the creation and management of the IP-NFT.

Spark is designed to create a collaborative environment that bridges the gap between open innovation and IP commercialization, aiming to maximize advancements in personalized medicine and ultimately improve patient care.

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1 Introduction

Collaboration has always been the foundation of our society, but modern legal and institutional frameworks are limiting these opportunities. Intellectual property (IP), often in the form of patents, granted to individuals or organizations, converts collaborative efforts into privately owned IP, introducing friction in the form of costly patenting, licensing, or litigation (Gold et al., 2010). This system makes it challenging to share ideas, access new discoveries, and foster collaboration to improve inventions, resulting in limited innovation (Heller and Eisenberg, 1998).

The current patent system, though initially intended to support scientific progress, imposes significant limitations and inefficiencies on research and development (Bessen & Meurer, 2008; Lemley, 2001):

- Promotes competition over collaboration
- Generates redundant patent filings
- Introduces high patenting costs
- Encourages litigation rather than innovation
- Biases toward short-term, incremental gains over transformative solutions
- Creates opacity, exclusionary practices, and monopoly pricing that locks out lower-income populations

This results in negative societal impacts, including opacity over transparency, exclusionary practices that stifle competition, and monopoly pricing that limits accessibility for lower-income populations (Sampat and Williams, 2015). Today's IP landscape is so complex that starting from first principles has become all but impossible. Open collaboration is the best way to elevate inventors. The key challenge lies in building the appropriate protections so contributors can safely share ideas in a truly open and collaborative ecosystem.

Spark is a blockchain-based IP framework that operates within Poscidon, a decentralized science organization (DAO) focusing on funding and commercializing personalized medicine research. Spark is governed by the Poscidon Protocol, a decentralized application (dApp) powered by the SCI token (more information about Poscidon can be found here). Spark addresses the challenges of IP commercialization by bridging the gap between open collaboration and commercialization by providing inventors with the necessary resources and support to bring their ideas to life. Specifically, it:

- **Enables transparent, on-chain governance** through Poscidon's SCI-powered voting system (more details here).
- **Offers token-incentivized collaboration**, rewarding contributions (financial, technical, or otherwise) via Proof-of-Contribution NFTs
- **Streamlines research funding** with a built-in funding module that covers provisional patent costs
- **Automates patent filing and defense**, minting IP-NFTs and managing copyleft licensing

- **Simplifies licensing and enforcement**, issuing non-tradable License-NFTs for commercial use and revoking them if terms aren't met

This system helps create a society where everyone can access, benefit from, and enhance innovations with their knowledge, ideas, and talent.

To summarize, Spark consists of three key innovations:

1. **Legal Innovation:** Establishing a defensive pool of intellectual property represented as non-fungible tokens (IP-NFT) with copyleft restrictions.
2. **Technical Innovation**: Leveraging the governance system of Poscidon and its governance token SCI for transparency and accountability.
3. **Economic Innovation:** Incentivizing inventors through Web3-based business models and economic rewards.

This whitepaper will help you understand:

1. Why Spark is critical for fostering innovation in the personalized medicine field.
2. How Spark will leverage the Poscidon Protocol to incentivize collaboration and sharing ideas.
3. How Spark could become the first-ever defensive copyleft IP-NFT pool on the Base network.

1.1 Defensive Copyleft IP Pool

Spark's patent pool builds upon previous copyleft IP frameworks (De Filippi, 2024). IP refers to a broad category of different types of legal protections for inventions, artistic works, designs, names, and images used in commercial settings. To legally protect inventions, patents are created; and owning one patent gives the inventor the exclusive right to make, use, sell, and import their invention. This is often for 20 years after the patent has been filed (Guan, 2014). A patent pool is a consortium or an agreement between multiple patent owners to cross-license their patents to each other and to third parties under specific conditions (Layne-Farrar & Lerner , 2010). Spark's patent pool includes the following three licensing terms:

1.1.1 Defensive Patent License

Spark patents are used, only and exclusively, to prevent others from patenting the invention or any incremental innovation based on such invention. This can be theoretically done by publishing the invention in a public outlet (Bessen & Meurer, 2008). However, in order to destroy its novelty, third parties could patent a similar invention, or patent an incremental innovation. Subsequently, these third parties can sue the original inventor for patent infringement (Galasso and Schankerman, 2015).

1.1.2 Copyleft Clause

Copyleft is a type of licensing that requires any modifications to the licensed material to be released under the same license (Montague, 2021). In the case of patents, this means that anyone can build upon the inventions in the pool as long as they share any improvements back into the patent pool and make them available under the same conditions. This creates a "copyleft

invention", which is an invention that is patented exclusively to guarantee it remains accessible to everyone for non-commercial use without requiring permission.

1.1.3 Non-Commercial Exploitation

The public is free to use the patents in Spark's patent pool provided that they do so without any commercial expectations or for-profit motivations. Access to underlying IP might be gated by SCI tokens, depending on the level of confidentiality. Commercial use of the invention is managed through blockchain-based assets called tokens from a DAO called Poscidon.

1.2 SCI Token-Gated Commercialization & Royalties

To use an IP-NFT for commercial purposes, users must obtain a non-tradable License-NFT. This requires paying a fee in USD Coin (USDC), a stablecoin 1:1 pegged to the U.S. dollar and locking of SCI tokens with the specific IP-NFT through the Poscidon Protocol. For example, an IP-NFT can be created where users must lock 50% of the license fee's value in SCI tokens and pay the remaining 50% in USDC. If the annual license fee is $20,000, users must lock $10,000 worth of SCI tokens for that year and pay the remaining $10,000 in USDC. The revenue generated from these licenses will be distributed to the inventor, financial and non-financial contributors, and the DAO treasury. The exact licensing agreement and revenue distribution will be determined per IP-NFT through an on-chain proposal. After distribution, Poscidon can choose to reinvest the generated revenue into the original idea by providing additional funding and incentives, such as bounties, to motivate researchers to develop new patentable ideas related to the original concept. This approach creates a sustainable funding model for open-source innovation.

1.2.1 Distribution of Revenue

IP-NFTs can generate revenue when interested third parties acquire License-NFTs. The distribution of this revenue will depend on several factors, including the inventor's contributions beyond the initial idea and the extent of financial and non-financial contributions from the community and core DAO members. Due to the numerous variables involved in the IP-NFT generation process, as detailed in Section 2, ""Idea to IP-NFT Life Cycle," a standardized outline of revenue distribution cannot be provided in this whitepaper. However, all interests and contributions from inventors and the community will be carefully considered. Revenue distribution decisions will be determined through on-chain voting, open to participants who have their SCI tokens locked and are willing to sign non-disclosure agreements (NDAs).

1.3 Spark's IP Scope

Poscidon focuses on funding life sciences and specifically personalized medicine research for life-altering diseases including, but not limited to, solid cancers, Alzheimer's disease, diabetes, and multiple sclerosis by leveraging blockchain technology, as described in Poscidon's whitepaper. Using this transformative technology to decentralize the process of scientific research funding will enable open, transparent, and collaborative scientific endeavors. Spark, as part of the decentralized science (DeSci) movement, is positioned to disrupt traditional barriers in the

scientific community, fostering a more inclusive and innovative environment for groundbreaking research. Given the expertise of Poscidon's community in personalized medicine, the initial cohort of approved ideas for Spark will likely be related to this field. Over time, Spark is expected to expand its research scope beyond personalized medicine and life sciences, and in the short term, it is open to accepting groundbreaking ideas from other fields as well.

2 Idea to IP-NFT Life Cycle

The process for an idea to be converted into an IP-NFT in the Spark Copyleft IP pool involves several steps and is adapted from the weDEA process architecture, adjusted to integrate blockchain primitives and token-based governance (De Filippi, 2024). This structured approach ensures that ideas are thoroughly vetted, funded, developed, and protected through a series of phases. An overview of this process has been depicted in Figure X.

2.1 Ideation Phase

An inventor submits their idea to Poscidon's Review Committee (legal and technical experts), which handles NDAs and assesses merit. Submitted ideas are reviewed by an expert committee for preliminary approval and are then subject to peer-review for final approval. If the proposed idea involves research on human subjects or human-derived data, the inventor must also obtain approval from an Institutional Review Board before proceeding. Inventors must ensure that their idea is novel. The submission should also be sufficiently detailed and of high quality to qualify as a viable provisional patent application. The review process is done under an NDA, preventing reviewers from patenting the ideas they review. After approval by the peer reviewers, a proposal detailing the patentable idea will be submitted on-chain, and any DAO member who has signed the NDA can cast their vote for or against it.

2.2 Bootstrapping Phase

In order for the ideas to become eligible IP-NFTs, a minimum funding threshold must be reached. These funds will be used to cover the (provisional) patent application, compensate the DAO operators, the expenses for obtaining and maintaining the patent in all relevant jurisdictions, and an additional fee for potential litigation costs if someone were to violate the terms of the IP pool. This is likely to amount to USD $100k. Any DAO member that has signed the NDA can evaluate the project and contribute to providing the initial funding for the idea. Both verification of the signed NDA and the financial contribution will be done on-chain through Poscidon's Protocol.

2.3 Acceleration Phase & Proof of Impact Rewards

After funding has been completed, a provisional patent application is submitted to establish an early priority date for the invention, providing a 12-month grace period for further development. The idea can then be further developed and improved by both the inventor and Poscidon's distributed community of contributors, who can provide financial, non-financial, or in-kind contributions. Poscidon incentivizes these contributions through its SCI token, using a "proof of impact" system that rewards participants based on the impact they have on the project.

Non-financial and in-kind contributions are rewarded based on on-chain proposals specifying the type and value of contributions, where only DAO members that signed an NDA can vote on their approval, upfront payments, and milestone achievements. These contributions can be tracked using platforms like Coordinape. Financial contributions can be made through a SCI token offering, where funds are committed in exchange for SCI tokens at a discounted rate. Any contribution will be rewarded with a non-tradable proof of impact NFT. This NFT might potentially evolve according to the degree or types of contributions provided by each actor, thereby adding a new gamification element to incentivize more (or more diverse) contributions.

2.4 Commercialization Phase

For this phase, anyone can participate in the governance system, and signing an NDA is not required anymore as the patent has successfully been granted. This post-patenting phase consists of several steps:

1. The granted patent will be minted as an IP-NFT, an ERC721 token, on the Base network.
2. The minted IP-NFT is then sent to the copyleft IP pool. The IP-NFT is now free for anyone to use or build upon, as long as it is for non-commercial purposes.
3. Users or third parties interested in commercializing the IP have to cover a yearly license fee by locking SCI tokens and covering the fee as described in Section 1.2 "SCI Token-Gated Commercialization".
4. Upon fulfilling the locking and payment requirements, the user will be able to mint a License-NFT, granting them the right to use the IP for commercial purposes.
5. After the licensing period has passed, the user can renew the license by maintaining the locked amount of SCI through the platform and by paying the flat fee. If the requirements are not met, the DAO will hold the right to revoke the License-NFT.
6. Finally, any unauthorized commercial use can be detected through AI-powered infringement monitoring, community infringement reports, and on-chain analytics such as usage oracles. Confirmed breaches trigger an automated dispute workflow and, if unresolved, escalation to Poscidon's enforcement team for license revocation or legal recourse.

3 Governance Overview

Spark will leverage Poscidon's governance infrastructure. Currently, Poscidon has two separate smart contracts to govern DAO Operations and Research Funding. For Spark, a third governance system will be created. This system is relatively less permissive compared to the other two governance systems as the initial phases of patenting ideas require NDAs. However, any DAO member can participate in the governance system as long as they have signed the NDA and have locked their tokens through the platform. Although a large part of the process from idea to IP-NFT is done under NDA, anything regarding the management of the IP pool and its IP-NFTs will be governed by this new governance system. The governance model will

comply with international IP laws and regulations, addressing potential legal issues that could arise from cross-jurisdictional patents and collaborations.

3.1 Proposal Examples

There are several proposals that can be submitted on-chain that are related to managing Spark:

1. Election or impeachment of Spark core team members.
2. Compensation packages for Spark core team members.
3. Approval of ideas selected by the expert committee in the pre-approval phase.
4. Considering contributions to ideas in the pre-patenting phase.
5. Distribution of revenue from License-NFTs between the inventor, contributors and DAO treasury.
6. Revoking of License-NFTs from licensees that do not follow the license agreement.

3.2 Voting

For a user to become a Poscidon member and to be eligible to vote on proposals regarding the Spark framework, the following steps need to be taken:

1. SCI tokens can be obtained through Uniswap V3 after launch.
2. Visit https://protocol.poscidondao.com/
3. You can log in by connecting an account that can hold digital assets, also known as a wallet, or by creating a new account using your email address.
4. Lock your SCI tokens by visiting https://protocol.poscidondao.com/lock
5. Navigate to the Spark governance page (work in progress).
6. Select a proposal that interests you.
7. Sign an NDA if required.
8. Thoroughly review the proposal details.
9. Cast your vote for or against the proposal.

A more comprehensive overview of Poscidon's governance system can be found here.

3.3 Transparency and Documentation

To further ensure transparency of the patenting process, regular reports will be shared with the DAO members describing progress, financials, and future plans. A conflict resolution mechanism will be established to resolve disputes among members, especially concerning IP ownership, licensing terms, and governance decisions. Robust security measures will be implemented to protect sensitive information during the patenting process, including secure handling of NDAs, IP data, and smart contract vulnerabilities. The governance system is designed to scale and adapt to accommodate growth in membership, diversity of IP-NFTs, and the complexity of projects. Regular audits of the governance process, financial transactions, and IP management will maintain integrity and accountability within the system. Protocols for collaborating with external

research institutions, patent offices, and other stakeholders will be defined to streamline the patenting process and integration of new ideas.

4 Market Analysis

Spark's approach to open and distributed innovation mirrors the success of many open-source projects on the world wide web (such as Linux, Wikipedia, and Bitcoin), demonstrating significant societal benefits. By harnessing collective intelligence and funding from Poscidon's global community, Spark aims to solve global problems more effectively and ensure accessible outcomes. Unlike traditional models where private companies impose high licensing fees and establish exclusive agreements with large R&D labs, Spark promotes inclusivity and equitable opportunities for innovation. Smaller competitors, who often lack access to patents due to financial constraints, benefit from Spark's system, which eliminates the need for costly licenses and bureaucratic hurdles.

Spark's economic model significantly improves upon existing systems by fostering a competitive market where anyone can turn original insights into practical applications without needing patent holder permission. Current frameworks, such as Molecule's, primarily focus on connecting researchers with funding by tokenizing IP assets (Clepp, 2021), without the same emphasis on defensive patenting and public accessibility of patent contents that characterizes Spark. Spark's integration with Poscidon's funding model, its use of token-gated commercialization, and its governance by SCI token holders set it apart. This approach creates a sustainable and transparent economic model that allows the DAO to reinvest in innovation while enabling the SCI token to capture all the value from the patent pool. This open approach encourages equitable wealth distribution generated through the commercial exploitation of patented inventions. Additionally, it supports funding for open-source research, promoting the proliferation of copyleft patents and ensuring a sustainable, transparent research ecosystem. By reducing barriers and enhancing accessibility, Spark creates a more inclusive innovation landscape, driving forward advancements that benefit society as a whole.

As more users contribute ideas, data, compute, designs, and licensing activity, the value and breadth of the Spark pool compound, and so do the incentives to join. Each additional IP-NFT attracts more collaborators, which in turn attracts yet more IP and resources, creating a self-reinforcing cycle that closed systems simply cannot match.

5 Conclusion

The described copyleft IP framework will be an integral part of Poscidon and by extension the broader DeSci ecosystem. Spark serves as a platform where inventors, scientists, and researchers can collaborate to transform ideas into patentable inventions represented as IP-NFTs. Similar to how Wikipedia revolutionized open content and Arduino transformed open hardware, Spark aims to pioneer open scientific and technological innovation. As anyone can participate in its governance system, although under NDA, Spark democratizes access to meaningful and impactful research and development opportunities, breaking down traditional barriers between citizens, patients, academia, and industry. By facilitating effortless collaboration among innovators from diverse backgrounds and geographical locations, Spark creates new opportunities for bringing innovative ideas to life quickly and efficiently. Spark also ensures responsible management of research resources, preventing unethical practices driven by monopolies or politically motivated interest groups. Spark helps make science and technology accessible to all by encouraging decentralized collaboration and innovation. This approach ensures that scientific knowledge and novel technologies are shared widely, resulting in a fairer and more innovative society.

6 Glossary

1. **Decentralized Autonomous Organization (DAO):** An organization run through rules encoded as computer programs (smart contracts) on a blockchain. It operates autonomously without centralized control, with decisions made collectively by its members. Learn more about DAOs here.

2. **Smart Contracts**: Programs stored on a blockchain that run when predetermined conditions are met. They automate the execution of agreements, ensuring that all participants know the outcome without an intermediary.

3. **Personalized Medicine:** A medical approach focusing on individual patient characteristics, especially genetic makeup, to develop targeted treatments. It aims to ensure the right patient group receives the most effective treatment.

4. **Base Network**: A blockchain platform that enhances the scalability and efficiency of Ethereum. It's a layer 2 network that processes transactions faster and with lower fees, while leveraging Ethereum's security.

5. **Decentralized Application (dApp)**: An application that operates on a blockchain network, enabling decentralized processes and transactions.

6. **SCI Token**: A digital token used within the Poscidon ecosystem for transactions and governance. It can be earned or traded and is central to the DAO's ecosystem.

7. **IP-NFT**: Non-fungible tokens representing intellectual property, with copyleft restrictions to ensure public accessibility. These tokens are part of Spark's defensive patent pool.

8. **License-NFT**: A non-tradable non-fungible token granting commercial usage rights for an IP-NFT. It is obtained by paying a fee and locking SCI tokens through the Poscidon Protocol.

9. **Copyleft**: A licensing scheme that allows anyone to freely use, modify, and distribute a work as long as they apply the same license to their modifications.

10. **Pre-approval phase**: The initial stage where an idea is submitted and reviewed for patent potential within Poscidon's framework.

11. **Pre-funding phase**: The stage where an idea must secure funding to cover patent-related costs before becoming an IP-NFT.

12. **Pre-patenting phase**: The development stage where a provisional patent is filed, and the idea is further refined with contributions from the community.

13. **Post-patenting phase**: The final stage where the patent is granted, the IP-NFT is minted, and made available for use or commercial licensing.

14. **Defensive patent license**: A patent license used to prevent others from patenting or suing for the patented invention.

15. **Non-commercial exploitation**: The use of patents for non-commercial purposes without any for-profit motivations.

16. **Locking**: The process of holding cryptocurrency in a wallet to support the operations of a blockchain network. In Poscidon, locking SCI tokens gives governance rights and potential rewards.

17. **Governance**: The process through which decisions are made in a DAO, typically involving on-chain proposals and voting by token holders.

18. **Transparency and documentation**: Measures to ensure that the patenting process is open and well-documented, with regular reports shared with DAO members and a conflict resolution mechanism in place.

19. **Patent pool**: A collection of patents managed collectively on-chain to prevent litigation and ensure open access to inventions.

20. **Non-disclosure agreement (NDA)**: A legal contract ensuring that parties do not disclose information covered by the agreement. It is used in the initial phases of Spark's patenting process to protect ideas.

21. **Proof of impact NFT**: A non-tradable non-fungible token rewarded to contributors based on their contributions to a project, which may evolve according to the degree or types of contributions provided.

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