

Decentralized Science (DeSci): A New Era for Scientific Publishing and Review

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Abstract

Decentralized Science (DeSci) proposes a revolutionary approach to scientific publishing, addressing significant issues in the current system. By giving scientists ownership of their work and enabling direct monetization, DeSci aims to democratize the peer-review process, making science open, accessible, and equitable. Through blockchain-based mechanisms and community incentives, DeSci offers a fair and transparent publishing environment.

1 Introduction

The current scientific publishing and reviewing landscape is dominated by a few large publishers, which imposes significant financial barriers on both access to and participation in research. Scientists often lose ownership of their work and are unable to profit directly from their findings. Meanwhile, the scientific community lacks an effective system to incentivize fair and constructive peer-review practices.

1.1 Problems in Current Publishing and Review Processes

- **Financial Barriers to Access:** Major publishers charge high fees for accessing scientific literature, limiting the reach of research to institutions and individuals with significant financial resources. For example, Elsevier, one of the largest scientific publishers, reported revenues of approximately \$4.6 billion in 2020.¹
- **Loss of Ownership and Profit:** Scientists currently transfer copyright of their work to publishers, relinquishing control and limiting their potential for profit. This system reduces authors to unpaid contributors, while publishers profit substantially from their work.
- **Lack of Transparency and Accountability in Peer Review:** Traditional peer-review processes are often closed and lack transparency, with reviewers uncredited and feedback unrewarded. This system fails to incentivize quality and constructive peer review, resulting in biased or incomplete evaluations.
- **Exclusion of Negative Results:** Current journals seldom publish negative results, leading to a "publication bias" and hampering scientific progress, as failed experiments are a valuable part of scientific discovery.

¹Source: Elsevier Financial Reports

2 DeSci: Decentralized Science Solution

DeSci seeks to address these issues through a decentralized, blockchain-based approach that redistributes power and profits to the scientific community itself. Key elements of DeSci include the following:

2.1 Returning Ownership to Scientists

In the DeSci model, scientists retain ownership of their work by publishing on decentralized platforms. With each publication stored on a blockchain, scientists maintain the copyright and control of their research output, allowing them to share or monetize their work freely.

2.2 Monetizing Research via Direct Earnings

Scientists can earn directly from their contributions through a tipping mechanism. Peers, institutions, or the public can financially support scientists' work, rewarding impactful research without middlemen.

2.3 Gamifying the Reviewing Process

Leveraging blockchain's consensus technology, DeSci proposes a gamified peer-review process, where community members stake tokens to participate in quality control:

- **Staking Protocol for Validity:** Reviewers stake tokens when reviewing, incentivizing thorough evaluations. Reviews deemed fair and insightful by the community are rewarded, while poor or biased reviews lose staked tokens.
- **DAO-like Voting System:** A decentralized autonomous organization (DAO) governs the review process. Each review receives votes from the community, and high-quality feedback is rewarded. This democratic approach ensures accountability, transparency, and fairness.

2.4 Incentivizing Community Curation

Through an incentive-based system, scientists are motivated to contribute actively to the platform. Rewards may come in the form of tokens or reputation points, encouraging scientists to engage as reviewers, curators, or validators. This fosters a collaborative community, where all members contribute to the integrity and quality of the science.

2.5 Tipping for Impact

In addition to publishing, DeSci allows tipping for various scientific contributions, such as:

- Individual scientists
- Research groups
- Foundations or research initiatives
- Specific papers or impactful results

This tipping model fosters a meritocratic environment where impactful work is recognized and financially rewarded.

3 Conclusion

DeSci presents a transformative model for scientific publishing that places power back in the hands of researchers, democratizes access, and fosters a collaborative scientific community. By utilizing blockchain technology and decentralized governance, DeSci creates an equitable and transparent publishing system, empowering scientists to earn from their work and actively participate in peer review.