

Social Impact

Scientific research brings together observations, knowledge and data to solve problems, invent solutions and develop new products. Conducting research is valuable for developing and promoting the body of knowledge and information that drives innovation and allows us to live healthier and longer lives. Whilst there is a huge volume of research being undertaken across Europe and worldwide, a vast amount of this research is lost as it never reaches publication.

One of the biggest problems that needs to be solved to accelerate the pace of scientific research, is the scarce exploitation of intermediate and negative results. To date, the publishing bias favours positive results, whereas negative but scientifically significant findings (improperly considered as research "failures") are largely neglected. Negative results have been gradually disappearing from academic literature over the past two decades. In the same way, incomplete or preliminary results that do not make it for final publication are lost as well. As a result, scientific groups frequently duplicate from scratch results that have already been achieved by others and have never been published. This ends up in a waste of time and resources to the detriment of the scientific community and society as a whole.

The aim of the ResearchProof (RP) project is to use cryptographic technology and blockchain to streamline the sharing of single, intermediate, negative and complete results, to speed up the pace of scientific production and promote faster adoption of findings.

A multi-layered approach towards Open Access



RP Registry



RP ELN



RP Repository



RP Journal

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To incentivise scientists to share results, the platform provides different services with increasing levels of openness:

RP Registry allows scientists to generate an unfalsifiable, legally and internationally valid timestamp to prove the authorship of scientific content prior to its dissemination. The results deposited with the Registry service are encrypted and not publicly visible. Together with authorship protection, this service allows scientists to become more confident in sharing their results after having generated a proof of authorship.

RP Electronic Laboratory Notebook allows scientists to keep track of their daily results, generating a proof of authorship with legal validity for each result, and making past, present and future research of a scientific group more organised and easily accessible to make sure that useful results are not lost over time.

RP Repository allows free publication on the platform of non peer-reviewed negative, single, intermediate or complete results. The group that deposited the result can decide whether results are openly visible, or accessible only upon authorisation. RP Repository represents an intermediate solution between total privacy and open access publication.

RP Journal (not yet publicly available) will be an Open Access, peer-reviewed journal where single, intermediate, negative and complete results can be published. All the results sent to the journal are peer-reviewed, and all scientifically accurate results are published. The group pays for publication only if the result is accepted. RP Journal always rewards all peer-reviewers.

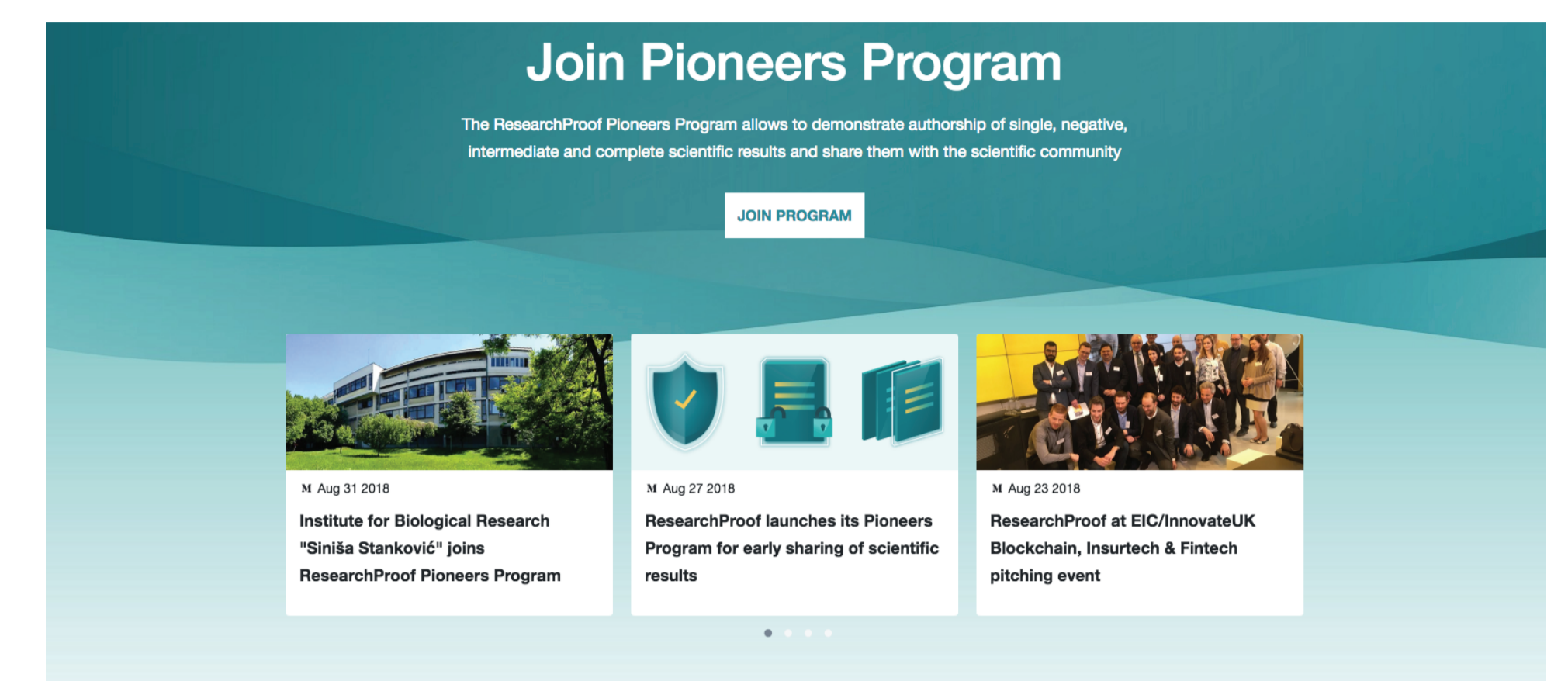
Blockchain and Cryptographic Technologies

Blockchain is a decentralized digital notary which allows at the same time to proof authorship of content registered into it, and to preserve privacy of content if needed. In the scientific publication ecosystem, blockchain has the potential to streamline transfer of value among stakeholders, increasing both pace and quality of scientific production.

ResearchProof plans to develop a permissioned blockchain and a related cryptocurrency to incentivise sharing and peer-reviewing of results. Academic institutions and research centres will become nodes of the blockchain, guaranteeing decentralization and distribution of the network. Scientific findings will be stored on the blockchain, ensuring timestamping, encryption, and trustlessness (i.e. the lack of the need to trust a central authority).

Blockchain technology not only makes for the resilience of the underlying infrastructure, but also helps establish a reward system that facilitates and incentivises all those functions that produce value within this network. A remunerative cryptocurrency will be issued to users engaging in activities such as the sharing or peer reviewing of negative, intermediate or complete results.

Join the Pioneers Program



Scientific groups, single scientists or academic institutions can now participate in the ResearchProof Pioneers Program, consisting in the selection and publication of intermediate, negative and single results as well as of any other scientific content, implementing a novel reputation and rewarding system for authors and peer-reviewers.

Candidate results are first protected using blockchain and cryptographic technology to allow authors to demonstrate authorship of the work. Results are then prepared for publication on the platform by the ResearchProof Team, with the collaboration of the authors. When the result is ready, authors are asked for authorization before making the result visible on the platform.

All the participants in the program are also granted free access to the ResearchProof Registry service throughout the duration of the program. The Registry service generates an unfalsifiable, legally and internationally valid timestamp to prove the authorship of scientific content prior to its dissemination (e.g. drafts or pre-prints of papers, code, presentations, preliminary or negative results, etc).

To receive more information on how to participate in the ResearchProof Pioneers Program, please write an e-mail to info@researchproof.com

Awards and Conferences

The ResearchProof project was recently awarded with the **European Commission H2020 Sme Instrument Phase 1 grant**, and **Phase 1 and Phase 2 EU H2020 Seal of Excellence**. ResearchProof is also partner of **Genigma**, a Citizen Science project selected and funded by the European **Orion Open Science** project. In 2018, ResearchProof was among the 10 tech projects selected for a 4-month pre-acceleration program for intensive technological entrepreneurial projects organised by **Barcelonactiva**, the economic development agency for enterprises of the municipality of Barcelona.

ResearchProof was also invited to speak at international conferences or hackfests, such as the **Fintech-/Blockchain Conference** organised by the European Innovation Council, the European Commission and Innovate UK (London, 2018), the **Microsoft Blockchain Hackfest** (Zurich, 2018), the **EIC Innovator's Summit** by the European Commission (Berlin, 2018), **CRG Symposium** (Barcelona, 2018) and **Cosmocaixa OpenScience Bdebate** (Barcelona, 2018).

References

- Vosshall, L.B., 2012. The glacial pace of scientific publishing: why it hurts everyone and what we can do to fix it.
- MacLeod, M.R., Michie, S., Roberts, I., Dirnagl, U., Chalmers, I., Ioannidis, J.P., Salan, R.A.S., Chan, A.W. and Glasziou, P., 2014. Biomedical research: increasing value, reducing waste. *The Lancet*, 383(9912), pp.101-104
- Glasziou, P., Altman, D.G., Bossuyt, P., Boutron, I., Clarke, M., Julius, S., Michie, S., Moher, D. and Wager, E., 2014. Reducing waste from incomplete or unusable reports of biomedical research. *The Lancet*, 383(9913), pp.267-276
- Freedman, L.P., Cockburn, I.M. and Simcoe, T.S., 2015. The economics of reproducibility in preclinical research. *PLoS biology*, 13(6), p.e1002165
- Baker, M., 2016. 1,500 scientists lift the lid on reproducibility. *Nature News*, 533(7604), p.452
- Fanelli, D., 2012. Negative results are disappearing from most disciplines and countries. *Scientometrics*, 90(3), pp.891-904