1. Open Research Fund application

Reference number	UNS128804
Applicant name	Mr Dragan Okanovic
Title of application	Unfold Research
Total amount requested	£100,000.00

2. Application summary

Application title
Unfold Research

Proposed duration of funding (months, this should be no longer than 2 years)
15

Proposed start date	01/08/2021

Is your application being submitted through a university?	No

Name of administering organisation
Nodebook Inc.

Lead applicant's address at administering organisation	
Department/Division	
Organisation	
Street	
City/Town	
Postcode/Zipcode	
Country	

Research funding area Please select from the drop-down list the funding area that you consider your research falls under
Population and Public Health

3. Lead applicant

Lead applicant details	
Full Name	Mr Dragan Okanovic
Department	
Division	
Organisation	No Organisation
Address Line 1	Pasmanska 12, apt 10
City/Town	Belgrade
Postcode	11000
Country	Serbia and Montenegro
Telephone No.	
Email Address	dragan.okan@gmail.com

ORCID iD	
ORCID iD	0000-0003-3675-9820

Career history (current/most recent first)			
From	**To**	**Position**	**Organisation**
04/2021	05/2021	Tech Lead	Bestow (through Symphony)
09/2020	05/2021	Senior Software Engineer	Bestow (through Symphony)
04/2020	07/2020	Software Engineer (contract)	Nira
11/2019	04/2020	Software Engineer	Deploy Inc.
06/2019	11/2019	Software Engineer	Embroker
01/2018	06/2019	Founder & full-stack developer	Nodebook
10/2016	07/2017	Render Programmer	Ubisoft
07/2016	10/2016	Mobile 3D Graphics Intern	NVIDIA
07/2015	10/2015	Infrastructure Architect Intern	NVIDIA
10/2014	12/2014	Software Developer Intern	Microsoft
02/2014	07/2016	R&D Graphics Programmer	LARGO (School of Electrical Engineering, University of Belgrade)

Education/training				
From	**To**	**Qualification**	**Subject**	**Organisation**
10/2012	06/2022	Bachelor of Science (BSc)	Computer Science	University of Belgrade

Source(s) of personal salary support
Salary by employer (Symphony.is), an outsourcing agency for web developers

Clinical status Are you a healthcare professional?	No

Career breaks Have you taken a break from research or any periods of part-time work? This could include periods of parental or long-term sick leave, or if you had caring responsibilities. You can also include any periods where you were unable to work because of the COVID-19 pandemic.	No

Do you wish to undertake this award part time?	No

Career contributions
What are your most important research-related contributions to date? This may include contributions to health policy or practice, or to technology or product discovery and development.

Founded Nodebook (https://nodebook.io) - a graph-based reference manager. The goal was to let users organize their references and notes in the form of digital graphs, linking different papers together, collaboratively. One could then extract the collective "map of knowledge", enabling unparalleled discovery or research work. The work had many tech and UX challenges since graph-based application never developed the level of interactivity and readability that we were after.

Founded Entropy Manager (not live anymore) - a tool for advanced no-code e-lab notebooks. The idea was to create digital notebooks from different "blocks" that could communicate with each other, a no-code, visual, block-based "Excel on steroids". For example, tabular data block, feeding into visualization block, or project progress tracker that could read from the file system and update data in real-time... The project was scrapped due to a lack of funding to continue work and overly ambitious goals at that point in time. It's planned to be developed later as part of Unfold Research, concretely as part of project management and development pipeline, and Nodebook will be made as part of it, as one of the available visualization blocks.

Research outputs
List up to 5 of your most significant research outputs, ensuring that at least two of these are from the last five years. Provide a statement describing their significance and your contribution (up to 50 words per output).

Research outputs may include (but are not limited to):

- Peer-reviewed publications and preprints
- Datasets, software and research materials
- Inventions, patents and commercial activity

For original research publications please indicate those arising from Wellcome-funded grants in **bold**, and provide the PubMed Central ID (PMCID) reference for each of these. Please refer to guidance notes.

Publications should be in chronological order with the most recent first. Please give citation in full, including title of paper and all authors. Citations to preprints should state "Preprint", the repository name and the articles persistent identifier (e.g DOI).*

*(*All authors, unless more than 10, in which case please use 'et al', ensuring that your position as*

author remains clear.)
Published work: * Development of an application with 3D interaction: KinectCity; Dario Mirovic, Dragan Okanovic, Jovan Radivojša, Nemanja Lucic, Đorde Đurdevic, InfoM (ISSN 1451-4397), v.53 n.2, p.14-25, May 2015 As a computer graphics researcher, I've worked on novel techniques (unpublished work) such as: * PGAA (Perfect Geometry Anti-Aliasing) - mathematically correct anti-aliasing, implemented in real-time with geometry shaders. (later discovered NSAA, i.e. Non-Sampled Anti-Aliasing paper) * FTC (Fourier texture compression) - processing a texture through the auto-encoder whose output coefficients are used to reconstruct lossy compressed version, instead of sampling the full, regular in-memory texture data * walit (Wave LIght Transport) - quantum light transport algorithm via wave equation. The most similar approach is Monte Carlo Geometry Processing by Sawhney&Keenan)

Principles of open research Briefly outline how you have embraced and adopted the principles of open research during your career to date
Through my experience with academia while doing computer graphics, and later with artificial intelligence, I've felt the need to improve tools in that industry first-hand. Like many researchers, I was hitting paywalls, unable to access or even find useful materials and have been constantly bothered by outdated apps and services and experiences with a lot of friction and frustration. As a software engineer, I had the opportunity to directly improve that, by actually building better alternatives, and that has taken me on a path of founding startups and starting different projects, interviewing hundreds of people to better understands their needs and pain points, exchanging learnings with other people building for academia, and iterating endlessly with a hope that I'd eventually create something that would allow people to take discovery and sharing of research to a higher level, and that would generally push the industry towards better practical application of Open Science principles. The goal is to make everything we do as transparent as possible, make software open-source, and share our data and learning with the community of people that we're building products for, and make that possible for others as well.

4. Team members and collaborators

Will you require any team members or key collaborators for this proposal?	Yes

Please list your team members or key collaborators (name and organisation) and provide a very brief outline of their role in the proposed research.
Malisa Pusonja (https://rs.linkedin.com/in/malisapusonja) (member of 3327.io - a web3.0 incubator, that is a part of MVP Workshop blockchain company (there as CTO)) informal contributor and consultant for a web3.0 solution for the Unfold Research's blockchain-based academic research fund

I confirm that the team members or key collaborators named above have agreed to be involved, as described, in the proposed research and are willing for their details to be included as part of this application.
Confirmed

5. Transparent decision making

Are you happy for us to share your full name on the Wellcome website?	Yes

Are you happy for us to share the title of your application on the Wellcome website?	Yes

Are you happy for us to share the "Details of proposal" section of your application on the Wellcome website?	Yes

6. Proposal summary

Provide an outline of what your successfully completed Open Research Fund activity will look like and what you will have achieved.
A community-driven web platform for researchers that enables easy discovery and sharing of related materials, with an alternative way for researchers to make a living and fund their research. The core of the functionality is the ability to link publications and their supplementary materials, open review system and integrated points-based voting mechanics that works by allowing all content to be voted on - upvotes earn their authors reputation points; and downvotes decrease them. The voting mechanics helps filter and curate linked content and successfully builds a crowdsourced knowledge repository that can grow over time. This reputation points metric is what is intended to be used to completely replace and deprecate metrics such as h-index, as it provides much better incentives, reflects the totality and diversity of academic contributions better, and is less prone to exploitation and abuse. With new metrics in place, a collective research fund will be built that consists of public donations, part of users' subscriptions and is supported by institutional investors and funders, and its resources would get distributed to researchers on a recurring basis, proportional to their individual recorded activity and metrics during that period. This will help researchers unlock an easily attainable, sustainable and secure economic income stream. By redefining incentives and metrics, and streamlining the funding, we have the ability to completely disrupt the academic business model and rebalance it in favor of researchers and principles of Open Science.

7. Details of proposal

Provide details of your Open Research Fund proposal, including: (i) the vision for your proposal, including aims, target audiences, activities; (ii) how your proposal will influence open research practices in your field or more broadly;
The vision is to create a web platform and related tools that incentivize sharing of high-quality,

verifiable, relevant information, make discovery and curation of such content easy and quick, promote collaboration by accounting for the totality of contributions and overall activities within the community, and directly supports such efforts financially, based on those metrics.

Since the writing of the initial concept note for this grant, the plan has changed in a way that instead of building a web platform first, we pivoted towards first developing a browser extension that will have the full spectrum of the functionalities that the website was supposed to have, and its (closed) launch is expected to happen by mid-June (already in development for 2 months, teasers can be seen at https://twitter.com/UnfoldResearch, and some potential users already tried early versions of it).

We chose to build a browser extension first, due to how common those are in scholars' workflows, their ease of use and unobtrusiveness.

Primary features that will be present on launch (and were already developed at the time of writing this are):
- user registration, login, and the onboarding
- the ability to link different types of supplementary materials to a specific web URL and browse through them by simply acessing the browser extension
- voting system with the ability for users to upvote and downvote linked content
- bookmarking feature enabling users to save some of the linked content to their personal library
- tagging system
- reporting system, for the sake of monitoring health and detecting and stopping any bad behavior as early as possible
- tracking - anonymous records of different kinds of activities on the platform that enable us to monitor its health and bottlenecks

This set of features constitutes a good minimum viable product (MVP) for Unfold Research's main value proposition by providing core functionalities that will enable us to learn what users are focusing on and what their main, still unsatisfied, needs are. It also provides a sufficient set of functionalities to start deriving conclusions about the behavior of users and the type and quality of content that we could expect to be shared on the platform.

Initial iterations of the product will be done on a niche-by-niche basis in the form of "private betas" (so far planning to include selected individuals from computer graphics, neuroscience, and physics areas (all very different in their size, dynamics and needs)), which will provide us an opportunity to catch potential problems and fix them before fully releasing the product to the general public, and also to get some learning about what to expect and how valuable the product is to users.

Approximate timeline (at the current pace) and roadmap:
- closed launch by mid-June
- private beta phase for at least 1-2 months
- building out explainer landing pages on the website
- (grant funding would kick in here somewhere)
- public launch
- continuous iterations and improvements to the design, features, and implementation (app and back-end server) + building out premium features for paid users (no less than 4 months, likely 6)
- building out the research fund - implementing income streams and recurring payments based on the metrics - 2-3 months
- the rest: optimizing the experience and adding more features, finding product-market fit (and reaching break-even point), and picking an initial group of people that will be able to demonstrate that research fund can work in practice as a way for them to fund their research and be financially stable
- (improvements to the research fund (adding extra incomes streams) and possibly integrating blockchain-based micropayments)

This timeline is within the scope of the runway that this grant would provide us, and would likely be

speeded up significantly after additional hires (see "Costs requested") and the mere fact that we'd be doing this full-time instead of part-time.

By building out the platform that enforces good practices (those well aligned with Open Science principles) directly by supporting them financially, and takes a myriad of different contributions into account (and not just original publications and citations), we aim to create an environment where researchers can achieve economic and mental stability and certainty, where they can take their time to produce high-quality output, help their peers and review stuff thoroughly and also be compensated for it.

This will help build trust in the results and people, and enable them to avoid bad practices such as p-hacking and the "publish or perish" mentality. We can help redistributed focus on things like peer review, negative studies, replication studies by putting more resources and emphasis on those metrics. By having the platform open to everyone, we create opportunities for citizen science and early-career researchers, and in that process relieve pressure off of more experienced researchers.

We see our approach as a way to potentially address every single problem in academia, through the right incentives and practical, financial means, independent of the research field.

How you will monitor and evaluate the success of your proposed activities in making health research more open, including approximate targets.

We will use various tracking and statistical data such as the number of votes, the number of submissions and reports, visits to the platform,... to understand what design choices work the best, what features are used and sought out the most, and give us insight into what kind of differences there are between different research fields as well and how to address them. All improvements could be run as variations of software A/B testing.

Our goals are:
- high retention (high user satisfaction and low churn) - a stable percentage of daily active users even long after registration
- positive sentiments (a friendly and collaborative community with low reports for abuse) and adherence and enforcement of the Open Science principles
- high-quality content (high value for users with low amounts of spam) and a lot of it
- good growth (5-7% a week)
- conversion rate (free users turned premium users)

These are some of the more important metrics that we'll be optimizing for (by adding new features and balancing existing mechanics), but equally important is that we will try to introduce payments as soon as possible (we need a critical mass for the economic dynamics to become sustainable and a certain ratio between high-impact contributors and more average consumers) - with a big milestone of having a small group of people, probably within the same research field, that can make their living from producing scientific content and interacting with the community. That would be a huge achievement, not just for Unfold, but also for an entire academic community, and would present direct proof that such a model can work in practice. Future improvements to the fund would be expanding the number of ways how to grow it and tunning how resources get distributed to best suit the community's needs.

Additional information
Figures and additional information cannot exceed 2 A4 pages.

8. Outputs management and sharing

Provide an outputs management plan All Wellcome-funded researchers are expected to manage their research outputs in a way that will achieve the greatest health benefit, maximising the availability of research data, software and materials with as few restrictions as possible. Our guidance on developing an outputs management plan, which includes a link to some good examples, is available here. If an outputs management plan is not required, please briefly explain why below.
The services that will be a part of Unfold Research suite will generate data such as: user data and their path through the funnel (registration, onboarding,...), publication metadata and files, linked supplementary materials (notes, annotations, questions, comments,...), number of page views, reports sent, saves to libraries, upvotes and downvotes,... segmented by data type, research field (tags), users, and time. This data would allow us to extract statistics about the most active research areas, the most popular papers over time, the most prolific contributors,... As our platform works by linking pieces of information together, we'd be able to generate interesting and insightful visualization ("maps of knowledge") to show how things are interconnected and what the community deems important. We also plan to make a lot of our data available by sharing reports and our findings with the community on a recurring basis. Speaking long-term, the goal is to simply expose an API that will allow everyone to read our data as it becomes available within our system and use it however they want. This would have the biggest benefit for everyone and would mean maximal flexibility in how that data is used - for visualization purposes, metadata extraction or big data processing, or anything else. However, this kind of data sharing will not be done immediately, in part due to technical complexity (it takes time to implement all of that and make it accessible) and in part due to our need to have a slight competitive edge as a for-profit entity, at least for some amount of time. However, it is certain that a large chunk of data will be made available at some point in time, and the same goes for the software itself and making it open-sourced and reusable by other people on their own projects. Tracking data will be anonymous (unable to be linked to a particular user) and simply used for statistics and platform monitoring (tracking overall activities and interests, and health of the platform). Data regarding payments and donations will be protected and not shared, and if a particular subset of that data is selected to be shared (for example, an insight into how large the collective research fund is) it would be anonymized and aggregated in such a way that privacy is ensured.

Which approach do you intend to use to maximise the impact of your significant research outputs to improve health and benefit the wider research community? If an outputs management plan is not required, select ‘Not applicable’.
Make research outputs available for access and re-use

9. Costs requested

Currency requested Select the currency in which you wish to apply.
GBP - Pound Sterling

Salaries Are you requesting salaries?	Yes

Salaries

Description	Total (£)
Founder salary	31,000
Software Engineer #1 salary	31,000
Software Engineer #2 salary	31,000

Materials and consumables Are you requesting materials and consumables?	No

Equipment Are you requesting equipment?	Yes

Equipment

Description	Total (£)
3x personal laptops	4,500
Cloud infrastructure costs	1,500

Miscellaneous costs Are you requesting miscellaneous costs?	Yes

Miscellaneous costs

Description	Total (£)
legal, paperwork, tax	1,000

Justification for costs requested
Provide a high-level budget breakdown and justification for costs requested.

Assuming a relatively modest software engineer salary (in Serbia; for a medior or lower-level senior web developer) of 2000eur (after taxes), that comes to around ~2550gbp/mth/engineer (taxes included) and assuming that there are three (3) engineers earning equally, the funding would give us ~12 months of runway. Since hiring extra engineers wouldn't happen immediately, i.e. it would be offset by a time required to find good hires, the burn rate would be smaller at the beginning, thus making the runway longer for probably 1-2 months.

Expected roles for engineers would be:
- founder working as a full-stack engineer (x1)
- front-end engineer (x1)
- back-end engineer (x1)

Since we're a for-profit, our costs would be amortized by our monthly earnings, with the hope of reaching a break-even point by month #10 or #11 at the latest. Thus a 12-month runway should be sufficient to cover our needs until we become self-sustainable, and generally represents a good amount of time to conclude the overall feasibility of the project.

Other operating expenditures - cloud infrastructure and legal paperwork would be pretty small in comparison.

Capital expenditures, i.e. personal computers could be redeemed later for part of their initial costs, but are necessary as it's highly unusual to expect software engineers to provide their own private computers to be used instead.

(All costs expressed here are estimates and not guarantees, but still represent a good approximation about the expectation for the distribution of the costs.)

Summary of financial support requested	
	Total (£)
Salaries	93,000
Materials and consumables	0
Equipment	6,000
Miscellaneous - other	1,000
Total	**100,000**

10. Carbon offset for travel

Are you requesting costs to offset the carbon emissions involved in your travel?	No

Are you requesting costs for alternatives to travel, so you can travel less?	No

11. Wellcome Trust supported facilities

Will the project be based in one of the following Wellcome Trust supported facilities: • the Wellcome Trust Sanger Institute • a Wellcome Trust Centre • an Africa and Asia Programme • the Francis Crick Institute?	No