**REQUEST FOR QUOTE (RFQ) REF 616 – THE BRIEF**

**PROVISION OF SERVICES FOR: SYNTHETIC DATA: THE CURRENT USE, DEVELOPMENT AND LIMITS OF SIMULATED DATA IN DATA ANALYSIS**

1. **Introduction to the Royal Society**

[The Royal Society](https://royalsociety.org) is the national academy for science in the UK. It is a self-governing Fellowship of many of the world’s most distinguished scientists who are elected based on their scientific work. The Society is over 350 years old, and its Fellowship includes names such as Newton, Darwin and Hawking as well as current names such as Dame Uta Frith, Dame Julia Higgins, Sir Venki Ramakrishnan and current Royal Society President, Sir Adrian Smith. The Fellowship embraces the work of discovery scientists and applied scientists and covers the full range of scientific disciplines.

The Society’s fundamental purpose, reflected in its founding Charters of the 1660s, is to recognise, promote, and support excellence in science and to encourage the development and use of science for the benefit of humanity. The Society has played a part in some of the most fundamental, significant, and life-changing discoveries in scientific history and Royal Society scientists continue to make outstanding contributions to science in many research areas.

Our priorities are promoting excellence in science; supporting international collaboration; and demonstrating the importance of science to everyone.

1. **Background to the Project**

The Royal Society’s [Data Programme](https://royalsociety.org/topics-policy/open-science-and-data/) is developing policy and promoting debate that helps the UK safely and rapidly realise the growing benefits of data and digital technologies. In 2019, the Royal Society launched the report[*Protecting privacy in practice: The current use, development and limits of Privacy Enhancing Technologies in data analysis*](https://royalsociety.org/-/media/policy/projects/privacy-enhancing-technologies/privacy-enhancing-technologies-report.pdf). One of our activities following from this report is an exploration of the status and role of Privacy Enhancing Technologies (PETs): technologies or conceptual approaches that allow the derivation of useful insights from data without requiring full data access. Some examples include homomorphic encryption, zero knowledge proofs, differential privacy, and secure multi-party computation.

The Society has now launched a refresher project to update the 2019 report, which shall be published in Q1 2022. This report seeks to include an updated review of PETs applications, legal and regulatory issues relating to their use, and an illustrative set of use cases. This RFQ is to engage a supplier for the development of a commissioned review and shall be a foundational piece of our evidence gathering for this project; it will inform our understanding of the regulatory landscape, and possible futures with regard to PETs.

1. **Overview of the Services required**

The Royal society seeks to engage a supplier to draft an explainer document reviewing the state of play, and possibilities for, synthetic data as a technology. This document shall include its development, potential uses and limitations, and current and emerging applications across various sectors. The review shall be accessible to a non-specialist audience, in the style of a briefing document.[[1]](#footnote-2)

3.1 Audience

The successful supplier shall engage a wide audience of potential synthetic data users and policy makers, including those without expertise in digital technology or data science. The document shall be written in clear, plain language, avoiding over-technical explanations and jargon. The content shall be robustly researched and well-cited using credible sources, as The Royal Society’s policy team and the Privacy Enhancing Technologies working group will also refer to the output to inform the production of a report. The working group is made of expert academic researchers and practitioners working in digital technology and privacy.

3.2 Objectives and research questions

Synthetic data is said to hold a great deal of promise for enabling learning across data sets where data is scarce, incomplete or where the privacy of data subjects needs to be preserved. Used in Trusted Research Environments; synthetic data helps researchers refine their queries and build provisional models, therefore enabling experimentation while keeping safe any sensitive data, e.g., patient data. Dummy data can be used in hackathon-style events and help innovative solutions emerge such as:

1. Could synthetic data also be used to address gaps or biases in datasets, or other limitations of real-world data?
2. What are the possibilities for synthetic data in training machine learning models?
3. What is the state of play, and
4. What is on the horizon, for synthetic data and its role in mitigating bias, small area estimation and imputation?

The Supplier shall research on the above topics, to be summarised in an explainer document. This Supplier shall include in the document a review of the current use, development, technologies and limits of synthetic data, and should help any potentially interested users to understand what might be possible or not, and to choose an appropriate approach for their own work.

The explainer document shall answer the following questions:

1. What is synthetic data and how is it generated?
2. How do the properties of synthetic data relate to the properties of real-world data? How can privacy and utility be controlled? What frameworks exist (if any) for evaluating privacy / utility trade-offs?
3. What are the possible and emerging use cases for synthetic data relevant to enabling data use while protecting sensitive information? How might synthetic data interface with other privacy enhancing technologies, such as differential privacy, or in secure research environments?
4. In which contexts is synthetic data currently successfully implemented, and where are its applications less mature? What are the ‘alternatives’ to synthetic data (are there other tools and technologies that offer similar utility)?
5. What barriers to adoption, as well as opportunities, are identified in existing research? Where is further research needed to understand barriers and opportunities?, and
6. What are the limitations of synthetic data? What limitations are intrinsic to synthetic data? What limitations could be overcome with further research?
7. **Outputs**
8. The successful Supplier shall be responsible for the delivery of the following output, being a document explaining the use, development, technologies and limits of synthetic data, addressing the research questions above (8,500-10,000 words). It should be written in an accessible style for a public / non-technical audience.
9. Raw data that is gathered and used in the development of the document.

This output shall be reviewed by the Privacy Enhancing Technologies working group.

Revisions / edits will be expected according to a timeline to be agreed with the Supplier.

References should be inserted in the text and footnoted using Royal Society style (to be provided).

1. **Deliverables**

The successful Supplier shall deliver the following:

1. The explainer document, (8,500-10,000 words), with appendices in MS Word, references using Royal Society style and any images usage rights secured and
2. Raw data and sources upon request

5.1 Methodology

These services are expected to primarily involve desk research and interviews with expert developers and users. Please use your proposal to outline your methodology, including your approach to identifying experts, surveying available literature / accessing required information and analysis. The successful Supplier shall be expected to work with Royal Society staff to identify an appropriate sample of respondents; the Society will share relevant contacts for recruitment as able / appropriate. This research may also require access to external media archives or academic databases.

5.2 How will the deliverables be used by the Royal Society?

The Royal Society shall use these findings to inform our project work and final update report on PETs, as well as in a briefing on synthetic data and relevant policy implications.

The final report text and figures shall be designed and published by the Royal Society, with the Royal Society branding.

The deliverables will be the property of the Royal Society and will be reusable in print by the author after the first publication by the Royal Society.

All contributors will be acknowledged in the final report.

5.3 Project management

Inception meeting and midpoint check-in meetings shall be held with Royal Society staff virtually; additional informal updates or clarification may be communicated via regular emails or brief ad hoc meetings via phone / virtual setting.

1. **Timelines**

The successful Supplier shall be required to complete the Services by 22 November 2021.

|  |  |
| --- | --- |
| Kick off meeting | w/c 20 September 2021 |
| Midterm check-in | w/c 18 October 2021 |
| Draft report | 8 November 2021 |
| Final report | 22 November 2021 |

1. **Budget**

The Royal Society is a UK registered charity with limited funds, some of which are provided via Central Government grants, and therefore we must report on our expenditure. Suppliers are requested to be mindful of this when proposing their costs and we ask that you are as transparent as possible in your breakdowns.

Any costs for the delivery of the Services stated in this brief that are not identified by Suppliers as part of their pricing will be expected to absorbed by Suppliers.

The maximum amount for the Services is up to£12,000 (inclusive of VAT).

Please include a detailed breakdown of costs in your proposal using the provided pricing template.

1. **Evaluating proposals**

As part of your proposal, Suppliers are requested to provide statements to the below criteria questions :

| **Criteria No.** | **Criteria Question** | **Weighting** |
| --- | --- | --- |
| 1 | **Experience**:  Please provide a statement to your experience of delivering similar Services within the last 3 years. | 10% |
| 2 | **Understanding the requirements**:  Demonstrate your understanding of the brief requirements and objectives | 10% |
| 3 | **Methodology**:  Detail how you will achieve the delivery of the Services including a detailed timeline and methodology in consideration of the audience and subject matter in line with this Brief. | 30% |
| 4 | **Proposed Team**:  Detail your proposed project team and their experience of delivering similar projects and how you will ensure business continuity for the term of the Services Agreement. Please provide the proposed team members’ CVs. | 20% |
| 5 | **Terms and Conditions**:  Please provide a statement as to any possible amendments you may seek to the Society’s standard Terms and Conditions.  Please also state any position you have on publishing and acknowledgement of your Services for consideration by the Society. | 0% |
| 6 | **Project Costs**:  Pricing and demonstrating value for money by completing the template titled Services Charges providing your proposed costs and rate card charges**.** | 30% |
| **Total** | | **100%** |

Please note that the proposed team (criteria no. 4) will be expected to complete the commissioned work if successful. Any personnel changes shall be subject to pre written approval by the Society.

1. **How to respond to this brief**

Please respond by emailing your proposal by 5pm BST on 6 September 2021 including the following to June.Brawner@royalsociety.org :

1. Cover note stating your legal name, organisation name, address, phone number, email and UK Company House registration number.
2. Your written proposal addressing all of the Criteria at item 8,
3. Your completed Services Charges template and
4. Your completed Supplier Declaration Form

In the case that any of the above requirements are not completed by the closing date and time, your proposal shall not be eligible for consideration.

Suppliers who can’t not meet the provided timelines are to contact the Society using the below details as soon a possible to discuss.

Attachments included in this Request for Quote:

* Attachment 1 – The Brief
* Attachment 2 – Service Charges template
* Attachment 3 – Terms and Conditions
* Attachment 4 – RFQ Supplier Declaration Form

Please note that where personal data will be involved, a Data Sharing Agreement may be put in place. This will be discussed with the successful Supplier as part of the Award process.

In your proposal, please declare any professional or personal connections, financial or otherwise, with any current Royal Society Staff, [Officers](https://royalsociety.org/about-us/committees/council-37/) or members of the [Privacy Enhancing Technologies working group](https://royalsociety.org/topics-policy/projects/privacy-enhancing-technologies/).

We request any clarification questions be submitted no later than 12pm BST on 2 September 2021. All responses to clarification questions shall be shared with all Suppliers.

Please contact June Brawner (June.Brawner@royalsociety.org) with proposal submissions and questions.

1. See for example: <https://royalsociety.org/-/media/policy/projects/explainable-ai/AI-and-interpretability-policy-briefing.pdf> [↑](#footnote-ref-2)