**All longer answers have a 150-word limit. No images or additional documents can be added to the proposal**

**Basic Information**

1. What is the full, registered name of your organization?

University of Oxford

2. If your organization has a website, please provide the URL.

<http://www.ox.ac.uk/>

a. Provide only one. You can **share additional resources at the end of the application**

3. I certify that the organization for which I am submitting this application is eligible to apply for the Challenge.

This means my organization meets the eligibility guidelines outlined in the FAQs.  
a. FAQs are available here.  
4. Which of the following best characterizes your organization?  
a. Not-for-profit organization (non-academic)  
**b. Not-for-profit academic or research institution**  
c. For-profit business with social mission  
d. Other (explain)

5. What is the official, registered address of your organization?

University of Oxford  
University Offices  
Wellington Square  
Oxford  
OX1 2JD  
United Kingdom

6. When was your organization founded?

01/1096

7. How many full-time employees does your organization have?

**Academic staff: 1791**

**Non-academic staff:** Ask Simon.

a. Do not include volunteers in this question -- only full-time, paid staff of your organization.

8. The name of the person completing this application is:

Bradley Gram-Hansen (**Should I put YW here?**)

9. What is your job title?

DPhil Student in Machine Learning and Probabilistic Programming at the University of Oxford (**Should I put YW here?**)  
10. What is your email address?

[bradley@robots.ox.ac.uk](mailto:bradley@robots.ox.ac.uk) ( **Should I put YW here?**)

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11. What is your contact telephone number?  
a. Include country and area codes.

+44 7525507354

For questions below, please include fiscal year data for 2015, 2016 and 2017 in US Dollars (USD). Estimates  
are fine; please do not include potential funding from the Challenge. If an answer is not applicable to your  
organization (e.g., if your organization has been around for less than 3 years), enter ‘0’. We may ask for additional  
financial information from your organization during our evaluation process.  
12. Annual operating expenses (USD):

**Leave for SImon to answer**  
a. 2017  
b. 2016  
c. 2015  
13. Annual revenues (USD):  
a. 2017  
b. 2016  
c. 2015

14. Organization-wide, who are your major partners or funders from the last 3 years?

**Leave for SImon to answer**

**The Problem**

**All answers must be 150 words or under.**We’d like to understand the societal problem your project would address.

15. Tell us more about the social or environmental problem that the project in this application proposes to address. Why did you choose to take it on? Use metrics where possible: e.g., approximately how many people are affected, and how does the problem impact their lives?]

The 2015-16 UN Habitat survey suggests that by 2025 1.8 billion people will live in some form of informal settlement; settlements created via the effects of climate change and conflict. The natural structures of these settlements creates large social, environmental and economic inequalities, affecting the lives of millions, leading to the spread of diseases; such as Malaria and unequal opportunities for large proportions of the global population.

In order for non-government organisations (NGOs) and local governments, where they exist, to help, they require information about the geographic locations and populations of both rural and urban informal settlements and in the case of diseases such as Malaria, they need an understanding of optimal policies to implement. However, governments and NGOs are under enormous financial pressure inhibiting their ability to provide effective large-scale solutions. I believe that AI and ML can provide low-cost, if not free solutions, to such problems.

16. To which category does this project primarily align?

a. [Multiple choice: Arts, Culture and Humanities; **Crisis** **Response**; Economic Empowerment; Education;  
Environment, Conservation, and Energy; Equality and Inclusion; Health; Infrastructure; Public and Social  
Sector management; Other]

**Google AI Impact Challenge Application Guide 5**  
**The Solution 150 words for each**

We would like to understand how you propose to address the problem above.  
17. Tell us about your solution

Our solution combines several prominent AI and ML techniques; in particular, probabilistic programming, which will be at the heart of much of the solution that we present. Our recent work on combining probabilistic programing with physics simulators (<https://arxiv.org/abs/1807.07706>) demonstrated for the first time how to construct fully interpretable ML predictions providing those in the scientific domains with exactly the kind of deterministic interpretability that they require. Due to the way this system has been created it is possible to link this with other simulators, such as climate, epidemiology and many others. In particular we are interested in linking our system with the OpenMalaria simulator (<https://github.com/SwissTPH/openmalaria>), which is a stochastic forward-simulator for both the spreading and prevention of Malaria in a town. Second, taking our recent work on mapping informal settlements using ML techniques and freely available satellite data (provide-cite) . We aim to merge the two approaches, once OpenMalaria is interfaced with our system, with the end goal being the creation of a mobile app and text based messaging service, that provides aid agencies with real time information regarding optimal actions to take and how many people will need to be helped.

18. Contextualize your idea: what other approaches have been tried in the past? What is the insight or innovation  
that differentiates your project, and how is it better than what already exists?  
 To our knowledge the combination of these approaches is very novel and innovative. It not only serves as a better predictor, due to the combination of information shared between models, but it would also come with an interpretability element, which enables NGOs and local governments to criticise any decisions with rigor, before implementing should policies.

19. What will be different in five years in the field or the world if this project has succeeded?  
 The ability to adequately prepare NGOs and local governments with the tools that they need to make life changing decisions, that will hopefully lead to a reduction to those being infected by malaria and improved infrastructure planning, due to the population estimates provided.

20. In what stage is your project presently? What have you accomplished to date? (Please note that we are willing  
to consider projects in the idea stage).

21. What geographic area(s) does your project impact?  
 We would like to make the system global, as this is not a problem that is constrained to just one country. For testing purposes, much of what we do will be constrained to central African region, which is still an incredibly diverse region that would serve as a useful test bed before the project would be deployed on a global level.

**Dataset and Use of AI**

We want to understand the types of data involved in your work and your ideas to use AI.  
22. How will AI help you solve the problem you articulated? How would you solve it if you didn’t use AI? (Include  
metrics around speed, accuracy, cost, or scalability where relevant.)

23. Please describe any significant datasets you have (or would need) to implement your idea. For example, you  
may share information in the following categoriesa.  
Datatype (e.g., images, text, videos)  
b. Size (e.g., # images or rows)  
c. Attributes (e.g., images, image metadata, image labels)  
d. How frequently data is refreshed  
24. Do you currently have access to this data? If not, how do you plan to collect or access them?  
25. How has your organization used data in the past?  
26. Does your organization currently use AI? (Prior AI experience is not required).  
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27. Tell us about how you would use the data in an AI model. What data would your model consume, and what  
information or decisions would it produce? (For example, the model may predict a future value to act on,  
automate an existing process, etc.)  
28. How will you deploy the results of your model in the real world to address the problem and impact people or  
the environment? Detail any relevant partnerships necessary to reach these outcomes.  
The following optional questions aim to understand your proposed use of AI in greater detail. Please complete  
those you are able to answer.  
29. [Optional] What AI algorithm(s) are you using or do you plan to use? (Select all that apply)  
a. [Multiple choice: Apriori Algorithm, Artificial Neural Networks, Collaborative Filtering, Decision Trees,  
Deep Learning, K Means Clustering Algorithm, Linear Regression, Logistic Regression, Naïve Bayes  
Classifier Algorithm, Nearest Neighbours, Random Forests, Support Vector Machine Algorithm, Other,  
Unsure]  
30. [Optional] If your organization is not currently using AI, what is the greatest deterrent? (Select all that apply)  
a. [Multiple choice: Data availability and quality; Talent availability; Computing resources; Tool accessibility;  
Competing strategic priorities; Other]  
31. [Optional] What AI framework(s) are you using or do you plan to use? (Select all that apply).  
a. [Multiple choice: TensorFlow, Caffe, Torch, Microsoft CNTK, Apache Singa, AML (Amazon ML), Theano,  
Spark, Open C.V, cuDNN, Excel, Other, Unsure]  
32. [Optional] What are your success metrics for the AI system (i.e., how will you know whether the system has  
succeeded or failed)?  
33. [Optional] Is your dataset currently labeled with output examples for training purposes? If not, how do you  
plan to label the data, and how much effort will this take? (e.g., person hours)  
34. [Optional] How do you plan to maintain and refresh the model?  
35. [Optional] All datasets are biased in some way. How is your dataset biased, and what’s your plan to mitigate  
the impact? (For more information on dataset bias, see Google’s resources on ML Fairness and Responsible  
AI Practices)

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Impact and Risks**

We are looking for projects that will drive real-world impact for people or the environment.  
36. How will you measure and evaluate your project’s success?  
37. How will you sustain and grow the impact of this work beyond this grant? How could your project and its  
impact grow beyond what you’ve proposed in this application?  
38. What are the 1-2 most significant risks you anticipate in this project? How does your team plan to address  
them?  
39. On this project specifically, which partnerships are or will be most critical for your success? What is the  
incentive for those organizations to partner with you?  
Team, Partners and Budget  
40. Who on your organization’s staff will lead this project, and what makes them best suited to do this work?  
41. Who will be leading the AI work? Please describe their technical qualifications. (These could be employees of  
your organization, or of a partner. Please note that prior experience with AI is not required.)  
42. [Optional] Applicants may find it valuable to engage a partner organization to advise on or implement the AI  
work. If you will be doing so, please provide more information:  
a. Organization name: [text field]  
b. Organization website: [text field]  
c. Plan for partnership: [text field]  
43. How would your project utilize Google.org funding? What is a budget that would allow you to accomplish  
your goal? Please provide a rough breakdown.  
44. Over what time period would you expect this work to happen? The grant period for funded projects can last  
between 12 and 36 months from the time of award.  
45. If applicable, please explain how you will use any profit that your project earns.  
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Optional Information  
46. [Optional] Please include links to up to 3 articles, publications, videos, or other resources that are relevant to  
your proposal.  
47. [Optional] What else we should know?  
48. [Optional] How did you hear about the Challenge? (Select all that apply)  
a. A colleague, friend, or another applicant  
b. Email from Google  
c. Email from another organization  
d. Press (print, radio, or TV)  
e. Social media  
f. Other

**Certification**

49. Does your organization have any ongoing commercial contracts or negotiations with Google that are directly  
related to the project detailed in your application? (For the sake of clarity, this does not include Google’s  
standard product offerings like G Suite, Google Ads, etc.)  
50. If Yes to the above question, please explain here.  
51. Check here to certify that you have reviewedGoogle’s AI Principles and Responsible AI Practices and  
ensured that the project featured in this application will be aligned with this guidance.  
52. Check here to confirm that you agree: by submitting an application, I certify on behalf of my organization  
that: 1) The organization agrees to be contacted by Google for purposes of carrying out the Challenge, 2)  
All information contained in this application is true and accurate, 3) The organization meets the eligibility  
requirements specified in the Frequently Asked Questions, and 4) None of the information in this application  
is confidential or proprietary.  
a. Note: The information you submit will be used in accordance with Google’s Privacy Policy. If you do not  
wish to submit your application or cannot certify for your organization, do not check the box above. If  
you do not certify, nothing in your application will be saved or sent to Google.