

ONLINE TRAINING CALL (2020/21)

GUIDANCE

The Alan Turing Institute is committed to training new generations of data science and AI leaders with the necessary breadth and depth of technical and ethical skills to match the UK's growing industrial and societal needs. As part of this commitment, and in response to the exceptional global circumstances driven by the pandemic, we are opening this call to invite interested members of its academic community to develop and deliver online learning initiatives, aimed at both the Turing's students and researchers and the broader UK research community.

Learning tracks

There are two tracks in this call:

Dynamic Learning with a focus on **activities** that bring doctoral students together online to learn with others. These **activities** can be single occurrences or part of a series.

Activities will also generate **resources** that will be made available for a minimum of 6 months as part of the Self-Paced Learning track (see below).

Self-paced Learning with a focus on providing engaging learning **resources** developed for flexible, self-guided study.

These **resources** should include asynchronous activities or exercises to promote active learning and help the learner meet the intended learning outcomes.

Scope

As data science and artificial intelligence are such broad fields, we are expecting natural diversity in the proposals. Within the broader scope of this proposal we suggest there will be three themes to the courses being produced:

- 1) **Introductory courses** – these courses will allow the learners to begin to explore a data science topic outside the "home discipline". Therefore, it is expected for learners to have no or little knowledge of the topic.
- 2) **Interdisciplinary courses** – these innovative learning initiatives will bridge between knowledge and/ or application domains and will be taught by instructors from multiple disciplines. For example, they could allow the learners to develop practical understanding of multidisciplinary applications of a data science method.
- 3) **Speciality courses** – these learning activities will be dedicated to furthering existing knowledge and will primarily focus on themes where expertise or teaching is not widely available. The speciality courses will require prerequisites prior to taking the learning activity.

Intended Audience

As a guiding principle, the training should be designed for use by researchers at a doctoral level. However, as already explained the scope of the call includes introductory courses for those approaching data science topics outside of their home domain.

While the Turing would like its cohorts of doctoral students and early career researchers from varied academic backgrounds to engage with the course, we hope that many of the proposals will also be of interest to those at earlier stages of higher education, as well as potentially to practitioners from outside academia.

Dynamic Learning activities will be advertised to our research community – that includes university partners, subscribers to the Turing mailing lists and collaborators.

Self-paced Learning resources should be designed with accessibility and inclusivity in mind. This includes detailed information of any freely accessible prerequisites that will be needed to engage with the resources (with links where possible).

For both learning tracks, we advise the time required to go through the prerequisite materials not to exceed the duration of the synchronous activities or asynchronous resources.

Priority areas

The Turing Institute welcomes training proposals on any topic that has a focus on mathematics, data science, artificial intelligence (AI), quantitative science and/or statistics. While proposals will be mainly assessed based on the quality of applications, there are a few topics that the Turing particularly encourages applicants to submit in response to feedback from our research community. The current priority areas are:

Bayesian statistics –

courses can span Bayesian inference, Bayesian learning, applied Bayesian statistics and other related subtopics that offer the learners the mathematical intuition to apply and interpret Bayesian analysis.

Big data –

these should focus on computational methods that are required to enable processing, mining, and analysis of large datasets from diverse application areas.

Ethics in AI –

these can range from fundamental methodology underlying ethical AI to responsible AI approaches applied in public policy.

Machine Learning –

these courses should focus on introductory concepts for those students outside their “home” discipline, such as students who come from humanities backgrounds.

Please note, we will fund proposals on any topic that is relevant to the Turing research agenda, and we encourage training proposals that will broaden the current research remit of the Turing. The priority areas are only meant to illustrate some of the current training interests within the Turing community.

Available funding

The Turing will provide a grant of **up to £10,000 per initiative** to support the development of

activities and resources. Full eligible costs are listed in the appendix but can include buy out of teaching time and limited software, equipment, or university services required for the activities or resources. The Turing welcomes training initiatives from any UK-based researcher or academic, and the funding will be proportional to the scope and development time required for the activity to be successful and suited for this call.

While there is flexibility and the allocated budgets will be assessed on a case-by-case basis, the proposals will be commensurate to the extent of teaching (and development) time required to successfully enable the learning activity. Applicants are expected to justify the costs in the proposal, which may vary depending on the current state of development and the scale of the work. The review panel will work to maximise the range and impact of outputs. For illustrative purposes, funding might cover:

1. (Low cost) Endorsement – the teaching materials are already developed, and the proposal is seeking funds to help adapt the material for sharing online with the Turing community or supporting an activity.
2. (Low – medium cost) Adaptation – there are existing teaching materials that can be adapted for this training call. This will require some development work either to adapt material for delivery as an online activity or to add in interactive learning components into online resources for use as online learning.
3. (Medium – high cost) Development – the proposal is seeking to create new material or constructing a course with significant focus on interdisciplinarity that has not been delivered previously. These proposals will likely involve multiple individuals involved in the planning, development, and delivery stages.

The Turing will provide organisational and promotional support and will work alongside the trainers to ensure the learning activity will be successful and suited for the purpose. We do not expect funded initiatives designed to generate profit.

Suggestions submitted in this call will be evaluated by members of the Training Steering Group (TSG), with the support of the Training team. The TSG is responsible for the development and quality of the Turing's training and development strategy and activities.

For details of eligible costs for this training call, please see [Appendix 1](#).

Format

All teaching materials will reside on the Turing learning portal. The Dynamic Learning activities will be complemented by live teaching through Zoom and other platforms to enable the learners to maximise their training experience.

For the Dynamic Learning track, an activity should take no less than half a day and no more than a full week of teacher-led study. To illustrate some of the options, proposals that will be eligible may fit with one of the following formats:

- **Seminar:** 2 hours teaching, followed by 2 hours of facilitated practical exercises. These can be presented as a series of seminars where appropriate.
- **Workshop:** 1 to 3 days, involving a mix of learning approaches (lectures, discussions, group work, presentations)
- **Summer school:** intensive 4-5 training days where the learners have an opportunity to

gain thorough understanding of a topic (breadth and/ or depth)

- **Course:** weekly activities shorter than one day and spanning 4-10 weeks, aimed at developing complex skills or thinking

The Self-pace Learning track will consist of well-prepared lessons that will be readily available for asynchronous learning – similar to an online **tutorial**. These should include a mix of teaching materials: presentations, videos, case studies and examples and/ or programming exercises with solutions provided.

These resources will be accessible through the Turing learning portal but should be delivered on a platform that allows any learner to access the training and it should therefore not require high computing power, prior knowledge (unless stated) or live support.

For examples of applications eligible for this training call, please see Appendix 2.

Timeline

The activities and resources will be delivered between November 2020 and November 2021. Once an application has been approved, the Training team will work closely with the applicant(s) to support the logistical planning of the activity or resource. Please see the timeline below to understand what is expected of this call.

- 15 September 2020: Applications open
- 20 October 2020 11:59 am: Applications close
- 15 November 2020: Applicants are informed if successful
- 1 – 15 December 2020: One-to-one meeting with a Turing representative
- 1 January 2021 – 1 January 2022
 - Learning activities take place: to be carried out completely within this timeframe
 - Interactive resources are launched: to be posted on the Turing VLE within this timeframe and to be freely accessible for 12 months minimum from the launch date

General Guidelines

The following points have been common themes of feedback from our learners and from discussions with academics about the landscape of training, including the Scientific Advisory Board. Relevant points should be considered during the development of any proposed activity:

- Training needs to be pitched at the right level for a diverse set of learners. They are willing to work hard on new topics but need guidance to prepare so they can make the most of the face-to-face learning opportunities.
- Training needs to impact on research. The best feedback from students has generated outcomes such as “changing the way I do research” and “providing a new line of enquiry”, and has been driven by experiential learning of skills through example.

- Training needs to meet more than the technical needs of the student. The role of training in both cohort building and development of character and maturity needs to be acknowledged, even if training is not designed to explicitly develop these skills.
- Training needs to add value to the current learning initiatives at the Turing and serve democratically the Turing community – from undergraduate students to industry experts who might want to learn about a topic outside their home domain.

Before completing the application form

Please ensure you have considered the following:

Who can apply	<p>The call is currently open to researchers employed by/ affiliated with a UK university, including those in the Turing community (Turing Fellows, Turing Research Fellows, Turing employees or researchers at a Turing partner university).</p> <p>We encourage researchers from the industry and without a university affiliation to apply for this call if you have a minimum of 3 years of experience in a research role.</p>
Significance	<p>Why this is a significant topic for data science researchers, and its relationship to the Institute's aims and research challenges?</p> <p>How can this initiative bring added value to the Turing research community?</p>
Audience	<p>Who is the desired audience? What preparation steps might potential participants from outside your field be able to take to also benefit from the event?</p>
Learning outcomes	<p>What do you hope for the participants to achieve by attending the activity, and how you will facilitate these outcomes?</p>
Title and description	<p>Can you explain just using the title and description of the initiative what your workshop will be about, in terms that will make sense to researchers from all disciplines?</p>
Prerequisites	<p>Each activity (Dynamic Learning) or resource (Self-paced Learning) should indicate clear guidelines on what the expected knowledge requirements are for the learners (if applicable).</p>
Intellectual Property	<p>All training initiatives will be licensed with a CC-BY licence which allows the Turing to make the learning activities open source while crediting the instructors who develop the lessons. Please familiarise yourself with what the licence entails.</p>
Letter of approval	<p>You will be asked to upload a signed letter of approval from your Head of Department/ Unit, or line manager (as applicable). We will provide the template and the letter only requires sign-off.</p>

Training platform	All workshops will be hosted online on the Virtual Learning Environment (VLE) portal hosted by the Turing Institute. The free-access resources can be hosted on the portal directly or linked to external platforms such as GitHub, Google Colab, AWS.
Training duration	The learning materials on the Self-paced track will reside on the Turing VLE for a minimum of one year, with further extension agreed mutually. The Turing encourages the materials for the Dynamic learning track to be adapted for Self-paced learning as well, where possible. These could involve uploading slides and/or recordings from the live event, available to access later in a cohesive format that does not require in-person guidance.
Dates for delivery or submission	You will be asked when you can deliver the activities (Dynamic learning) or submit the teaching materials (Self-paced learning) if you are successful. Please think realistically about these dates as the successful proposals will be part of the national training plan provided by the Turing in 2020/21.
Equality, diversity, and inclusion	Please think of concrete example of how equality, diversity and inclusion can be considered within the activity or resources. For instance, video caption could be added to the recorded materials. You can draw more ideas from the Web Content Accessibility Guide .

Next steps

You are required to complete the application online via [Flexigrant](#). Once you have filled in the application form, please submit this by the advertised deadline.

Once your form has been received by the Training team, they will then add supporting information, based on your application, for the Review Panel to consider. For example, this could be a more detailed breakdown of costs or expected outcomes.

If you have any questions or anything is unclear, please get in touch with us at training@turing.ac.uk

Appendix 1: Eligible costs

Type of cost	Notes
<p>Teaching and development time</p>	<p>Irrespective of the proposal format (Dynamic or Self-paced learning), the training instructors will be reimbursed £35 per hour for teaching and lesson development time, up to 100 hours for each instructor and commensurate to the scope of the proposal (see <i>Available Funding</i>). We can accommodate maximum 3 instructors for each training initiative seeking funding through this call.</p> <p>As a general guideline, we expect the development : teaching time ratio to be:</p> <ul style="list-style-type: none"> • 5 : 1 for new(er) content, and • 3 : 1 for existing content <p>However, we understand this might not always apply.</p>
<p>Software and online materials</p>	<p>If an activity requires specialist software, the Turing can either seek to provide the software licence from the core IT resources or reimburse the organiser(s) for any expenses incurred. The same applies for accessing paid materials.</p> <p><i>Please note the Turing promotes open science and we encourage the use of freely accessible datasets and conventional open source software (e.g. Python, R).</i></p>
<p>Teaching equipment</p>	<p>Teaching materials that will increase the quality of training are eligible for funding through this call. These may include microphones and/or webcams for recording lectures, whiteboards for demonstrating exercises etc.</p> <p><i>Please note we expect these not to be common expense unless there is a demonstrated need that they will enhance the learning experience. We expect these to be maximum £100 per initiative and we will assess teaching equipment requests on a case-by-case basis.</i></p>

Appendix 2

Please see below a few fictional examples of eligible proposals – these are summarised and are only provided here for illustrative purposes.

Dynamic learning

Title: Introduction to Bayesian statistics

This seminar covers general concepts in Bayesian methodology through a two-hour interactive presentation, followed by two exercises in a Jupyter notebook where learners will fill in missing code with the equations provided. The goal is for the learners to apply a Bayesian model in order to forecast the weather based on open-source data.

Funding sought: £560 (16 hours teaching plus development time). This activity is based on existing materials (Endorsement stream) and will require uploading the materials on the VLE and adding interactive elements for the programming tasks.

Title: Applied Bayesian statistics for causal inference modelling

This two-day workshop will start off with an introductory part to understand the mathematical underpinning of Bayes' rule in the context of simple Gaussian distributions. In the second part, we will build on the previous knowledge to explore how the prior produces more complex posterior by implementing a mixture of Gaussian priors. The learners are expected to be able to build their own Bayesian model in Python and interpret the model outputs in the context of the given data. The second day afternoon will be reserved for group discussions and case-studies to illustrate the wide-ranging applications of Bayesian modelling in computational research.

Funding sought: £5600 for two organisers who will each dedicate 16 hours for teaching, plus development time. This activity requires adjustment of an existing course (Adaptation stream) to narrow down to the set learning objectives and adjust to an online learning environment.

Title: Deep dive in Bayesian methods

This one-week school will begin with the basic concepts of Bayesian statistics and generic modelling in computational research. We will bridge these concepts with Bayesian models in the context of generalised linear models. Finally, we will consider various approaches to implement Bayesian models such as probability analysis, causal inference with mixture of priors, Markov Chain Monte-Carlo and finally we will implement costs functions to develop Bayesian Decision Theoretical models. Each consecutive day we will introduce the students to the subtopic of the day, and the afternoon will be reserved for group work where the students will build complex Bayesian models from scratch to better understand heart-disease risk using freely available data.

Funding sought: £8400 for two organisers who will each dedicate 40 hours for teaching, plus materials development time. This activity requires significant lesson development (Development stream) as there are no existing resources that combine: interactive lectures and discussions, together with extensive project work leading to group presentations and peer evaluations of each modelling approach.

The learners are expected to be familiar with statistical methodologies and intermediate programming skills in Python.

Self-paced learning

Below are a couple of examples of self-paced courses that follow our ethos. It is difficult to assess how much time is required for developing these learning materials as this highly depends on how much depth the course organisers aim for within the topic.

Google Colab: [Bayesian statistics tutorial](#) developed by the [Neuromatch Academy](#)

GitHub: [Research Software Engineering course](#) developed by the [Alan Turing Institute](#)
OR [Advanced NLP](#) developed by spaCy