

**Biomakespace Training Proposal**

**Checklist of included documents**

* Final Form
* Risk assessment
* GM risk assessment
* COSHH forms

**Section 1: Summary**

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| Title of training | Hands-on gene editing with CRISPR-Cas9 and MinION sequencing |
| Name of lead instructor | Abigail Wood |
| Email address | abigail@biomake.space |
| Training Summary | A series of theory and practical workshops introducing new users to CRISPR-cas9 gene editing and the Oxford Nanopore MinION, running in March 2020. These workshops will primarily target members of the public with limited biology background.  The curriculum includes: applications of gene editing, ethical implications, experimental methods and design, and computational data analysis. Practically, we will identify target genes in DNA in a yeast (S. cerevisiae) strain expressing blue fluorescent protein (BFP) and then CRISPR gene editing will be used to edit the relevant gene to change the expressed protein to green fluorescent protein (GFP). We’ll then identify the change in the DNA sequence using targeted DNA sequencing (with a CRISPR-cas9 protocol) with the ONT MinION sequencer. In April, we will run a session exploring the data and demonstrating some of the bioinformatics tools used to predict gene and protein product structure and functions. |
| Date of proposal submission | 1 March 2020 |
| Estimated duration and dates of training | 3 days total for lab-based training delivery. >12 lab days spent for testing and delivery.  Training dates:  Wednesday 4th March 2020 (theory + practical demonstration of diagnostics by Charlie)  Wednesday 11th March 2020 (theory + ethical discussion)  Wednesday 25th March 2020 (theory)  Saturday/Sunday 14/15th March 2020 (gene editing workshop, lab-based)  Saturday 28th March 2020 (sequencing workshop, lab-based)  Date TBD in April 2020 for sequencing delivery |
| Does the training use or create Genetically modified organisms? | Yes (gene editing in S. cerevisiae) |

**Section 2: About the Instructors**

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| --- | --- | --- |
| Briefly indicate your background, experience of working in labs, working with microorganisms, genetically modified organisms and any training you have received | | |
| Team members | Qualification/background | Training/experience |
| *[Team member 1]*  Abigail Wood | Wet-lab and bioinformatics experience; has run a Biomakespace workshop before; BSc Natural Sciences (Biochemistry) and Research Assistant experience; MSc Bioinformatics. | Trained in BMS lab procedures. Trained in basic CRISPR-cas9. Has run Cambridge Metagenomics Challenge Workshop in Biomakespace including DNA sequencing. |
| *[Team member 2]*  Anna Kuroshenkova | Biomedical and Forensic Sciences degree; also project manager for CUSBS. | Trained in BMS lab procedures. Assisted with Cambridge Metagenomics Challenge Workshop in Biomakespace including DNA sequencing. |
| *[Team member 3]*  Jennifer Martin | Masters in Genomic Medicine; experienced clinical research study coordinator. | Trained in basic BMS lab procedures. Previous wet lab experience during education. |
| *[Team member 4]*  Dr Charlie Gilbert | Currently a PostDoc, previously completed PhD. | Wet lab background in CRISPR, diagnostics and yeast growth. |
| *[Team member 5]*  Dr Emma Johnson | Mammalian genomics PhD, currently policy analyst (Biomedical Science) for PHG Foundation. | Attended Cambridge Metagenomics Challenge Workshop in Biomakespace including DNA sequencing. Previous lab experience during PhD, ethical and CRISPR-related expertise from day job. |
| *[Team member 6]*  Dr Lalitha Sunderam | Research Associate at Centre for Existential Risk | Experienced research associate, relating to evaluation of risk and DIY-Bio. Will not be participating in Wet Lab work. |
| *[Team member 7]*  Dr Jenny Molloy | Biomakespace Director, experienced PhD, presenter, manager. | Very experienced in open data and open science practices, as well as presenting. Will not be participating in Wet Lab work. |

**Section 3: About the training**

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| Description of the training, including the methods used. | |
| Theory training (by presentation, pipetting practice, demonstration of CRISPR-cas12 diagnostic technology).  Preparatory and intermediate work to set up for the two practical workshops.  CRISPR-cas9 gene editing and high efficiency transformation of yeast.  Targeted DNA sequencing using Oxford Nanopore Technology MinION. | |
| **If the training includes working with organisms or DNA vectors/samples and you do not plan to create or use GM organisms, please fill in section below. If you are using or creating GM organisms please complete BMS\_GM1 form instead, which contains the same sections.** | |
| Organisms used and origin | *\*see GM form\** |
| Vector/DNA used and origin | *\*see GM form\** |
| Containment level | BSL-1 |

**Section 4: What support do you need**

*Please indicate the type of support you need from the Biomakespace committee or others to successfully execute the training*

We need to ensure all instructing members involved have a full safety induction and are trained in the use of all appropriate lab equipment; prompt review and sign-off for all risk assessments, COSHHs, GM and training proposal forms.

**Please now complete:**

* **BMS\_RA1 risk assessment - DONE (x3)**
* **BMS\_GM1 form if using or creating GM organisms - DONE**
* **BMS\_COSHH if you are using chemicals or hazardous substances - DONE (x multiple)**

**Submit all documents to safety@biomake.space for review once completed, please speak to a committee member at any point for information or advice, we are here to help!**

**Section 6: Approval (to be completed after review by safety committee - please leave blank)**

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| --- | --- |
| Declaration | We declare that this work will be conducted in accordance with Biomakespace rules, practices and requirements on safe working and GM procedures, and that if at any stage there is any indication that hazards and/or risks could be significantly higher than originally assessed, then the work will cease until such time the risk assessment has been revised, and approval granted from the Biomakespace Safety Committee as appropriate. |
| Instructor responsibilities | As the instructor, you have a responsibility to ensure that all those involved or participating in the training have an appropriate level of instruction and knowledge to enable safe working. This includes ensuring that :   * every participating instructor and volunteer reads, signs and understands the risk assessment. * a safety induction is provided to all participants as part of the training, covering the applicable control measures in the risk assessment and applicable lab rules. * all procedures, including the control measures, are conducted in strict accordance with those approved. |
| Print Name | Abigail Wood |
| Sign and date |  |
| Declaration | This risk assessment has been assessed and approved by the Biomakespace Safety Committee |
| Role |  |
| Print Name |  |
| Sign and date |  |