**2nd Advanced School in Genetic Manipulation of Parasitic Protozoa**

**Summary:** This course will provide students from neglected disease endemic countries and the UK with theoretical and practical training in the latest technologies for exploitation of genomes of parasitic protozoa using genetic manipulation. The parasites covered in the theoretical component of the course will include *Leishmania* spp., *Trypanosoma cruzi*, *Trypanosoma brucei* and *Toxoplasma gondii* and will describe how genetics can be used to validate drug targets and to identify novel molecular mechanisms involved in host-parasite interactions. In the practical element of the course, students will use CRISPR-cas9 to carry out genome editing of their parasite of choice (selected from *Leishmania mexicana* or *Trypanosoma cruzi*) to generate gene deletion mutants and/or in situ gene epitope tags.

**Organisers:** Ana Paula Lima (UFRJ), Jeremy Mottram (York), Santuza Teixeira (UFMG), Eva Gluenz (Oxford)

**Where and when**: Federal University of Rio de Janeiro; 16-20th July 2018

**Funding:** GCRF (UK)

**Numbers:** Maximum number of students for practicals: 18. No limit for lectures on theory

**Format**: Morning lectures and afternoon practicals and/or poster sessions.

Lectures; 2 x 1.5 hrs each day on use of genetic manipulation to exploit parasite genomes, validate drug targets and to investigate essential biological processes of parasitic protozoa. Open to all.

Practical: CRISPR-Cas9 genome editing (epitope tagging and gene knockout) for *Leishmania mexicana* or *Trypanosoma cruzi* running for 1 week in parallel, students to choose species they wish to work with. During the course students will be able to design primers to delete their own gene(s) of interest.

Poster sessions: Students will present their current research to the class and faculty

Group presentation: At the end of the course students will present the work carried out during the practicals.

Lecturers: David Horn, Dundee; Richard McCulloch, Glasgow; Carlos Robello, Montevideo; Esteban Serra, Rosario; Lia Soares Medeiros, Curitiba; Lilach Sheiner, Glasgow

Leads for Practicals: *Leishmania* (Eva Gluenz, Tom Beneke, Oxford; Carol Catta-Preta, York/Rio de Janeiro), *Trypanosoma cruzi* (Santuza Teixeira + Gabriella Burle-Caldas, Belo Horizonte)

**Further information**: ntd.network@durham.ac.uk

**Preliminary Program**

**Sunday 15th July**

Arrival

**Monday 16th July**

09.00 – 10.30 Flash talks (5 minutes each)

10.30 – 11.30 Dr Eva Gluenz “How to edit Leishmania genes with the LeishGEdit toolkit: a practical introduction”

11.30 – 12.00 Coffee

12.00 – 13.00 Dr Santuza Teixeira “Development and application of CRISPR-Cas9 systems to *Trypanosoma cruzi*”

13.00-14.30 Lunch – discussion with students. Poster session

14.30 – 17.30 Practical: Primer design and PCR

**Tuesday 17th July**

09.30 – 10.45 Dr Jeremy Mottram “Using CRISPR for drug target validation in Leishmania”

11.15 – 12.30 Dr Lilach Sheiner “Organelle biogenesis in *Toxoplasma gondii*and the use of genome editing tools to study organelle biology"

12.30-14.00 Lunch – discussion with students

14.00 – 17.30 Practical: PCR gel and transfection

**Wednesday 18th July**

09.30 – 10.45 Dr Lia Soares Medeiros “High-Efficiency genome editing in *Trypanosoma cruzi*using CRISPR-Cas9 Ribonucleoproteins delivery”

11.15 – 12.30 Dr Eva Gluenz “Discovery of Leishmania motility mutants in a CRISPR-Cas9 knockout screen”

12.30-14.00 Lunch – discussion with students

14.00 – 17.30 Practical: Transfection selection, cloning (dilution cloning). Verification of KOs (DNA extraction, PCR)

**Thursday 19th July**

09.30 – 10.45 Dr Carlos Robello “Trypanosoma cruzi-host interaction: genomic and transcriptomic approaches”

11.15 – 12.30 Dr Esteban Serra “CRISPR knock outs, dominant negative mutants and inducible protein over-expression: Complementary tools to study essentiality and function of bromodomains in *T. cruzi*.”

12.30-14.00 Lunch – discussion with students

14.00 – 17.30 Practical: Verification of KOs (run PCR gel). Microscopy;

**Friday 20th July**

09.30 – 10.45 Dr David Horn “Dicing, slicing and editing in *Trypanosoma brucei*”

11.15 – 12.30 Dr Richard McCulloch “DNA recombination in trypanosomatids; relevance to CRISPR editing”

12.30 - 14.00 Lunch – discussion with students

14.00 – 17.30 Practical; Image analysis + group presentations.

18.00 Departure

**Application Form for 2nd Advanced School in Genetic Manipulation of Parasitic Protozoa, Federal University of Rio de Janeiro, 16-20th July 18**

*For attending the Lectures only/no funding*

* The application form must be completed using Arial 11pt font.
* The application form and CV must be returned to [ntd.network@durham.ac.uk](mailto:ntd.network@durham.ac.uk)
* Combine all application documents into one (no zip) word document and add your surname to the document name as follows: surname\_rioapp.doc
* Incomplete applications will not be considered.
* Deadline: Monday 4th June 2018 at 09.00am British Summer Time
* Successful applicants will be notified by 18th June 2018

**Applicant**

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| --- | --- | --- |
| First Name |  | |
| Surname |  | |
| email |  | |
| University / Employer |  | |
| Country |  | |
| Position (MSc Student, PhD student, Postdoc) |  | |
| Signature \* |  | |
| Attach a 2 page CV. | |

**Applicant’s supervisor (or line manager)**

|  |  |
| --- | --- |
| First Name and Surname |  |
| email |  |
| University / Employer |  |
| Country |  |
| Position |  |
| Signature |  |

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| **2. Justification** |
| **Please outline how the advanced school will help to impact both your research and career progression (max 250 words). .** |
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| **2. Poster** | |
|  | Applicants can present a poster at the School. If you wish to present a poster, fill out the details below |
| **Poster title** |  |
| **Presentation Abstract (max 150 words)** | |
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