PI profile

## Greger Larson

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|  | **Professor Greger Larson****Titles**: Professor of Evolutionary Genomics**Location**: Peter Medawar Building for Pathogen Research**Department**: Archaeology**Group**: Palaeogenomics and Bio-Archaeology Research Network**Webpage**: [www.palaeobarn.com](http://www.palaeobarn.com)**Email**: greger.larson@arch.ox.ac.uk |

### GMS themes:

[Please retain any that describe your research, deleting others:]

* Genome biology (genomes and genetic variation)
* Genomic analysis (bioinformatics and statistical genetics)

### Research Overview

Our modus operandi involves combining the resolution afforded by DNA sequences and fine-scale morphological variation with the time depth of archaeology and palaeontology. Doing so allows us to establish the patterns of DNA and morphological variance through time and space. We then take advantage of a range of bioinformatic approaches to answer long-standing questions related to how, when, and where evolutionary processes (including domestication) took place that have led to the creation of the modern world.

**Approaches**: Molecular biology, phylogenetics, bioinformatics, modern and ancient DNA

**Project areas:** I am happy to discuss potential projects in any area that fit within our group. We already have two potential projects both co-supervised by Adrian Smith (Zoology) that relate immunity and infectious disease to past human and animal populations.

**Specific project proposals**:

* ‘Molecular archaeoparasitology approaches to interrogate past populations’ (Supervisors: Adrian Smith, Greger Larson and Patrik Flammer, page 60.
* ‘Using ancient DNA to understand the impact of humans on the immune system of domesticated animals’ (Supervisors: Greger Larson, Adrian Smith and Laurent Frantz), page 60.

Please contact directly for further information.

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Project proposal

# **Title**: Using ancient DNA to understand the impact of humans on the immune system of domesticated animals.

# Supervisors: Professor Greger Larson, Professor Adrian Smith and Dr Laurent Frantz

Wet/dry lab mix (approx): mixed

### Description:

Domestication of animals was a key process in the emergence of modern societies and it is clear that various traits were deliberately selected by early populations including temperament, resilience and production traits. However, by changing the character and environment of animals we also altered the pathogen profiles that affected these animals (and sometimes spilled over to us). Whilst the genetics of some traits has received considerable attention (e.g. behavior and production) others have been neglected, in particular the influence of domestication (and more recently intensification) on the immune system of these animals.

This project will employ ancient DNA based approaches to identify the effects of humans on the immunogenetic profiles of domesticated animals. Understanding these historical selective events can be used to improve the welfare and resilience of modern domesticated animals and may help to reduce the impact of infectious diseases including those where domesticated animals represent a primary source of zoonotic disease in humans.

### Training Opportunities:

The DPhil will support training in a wide range of molecular biology (aDNA and standard methods) and bioinformatics techniques and these may also extend to testing the function of selected variants of immune genes in relevant cellular assays.

### Background reading / references:

* Flammer PG, Dellicour S, Preston SG, Rieger D, Warren S, Tan CKW, Nicholson R, Přichystalová R, Bleicher N, Wahl J, Faria NR, Pybus OG, Pollard M and Smith AL. (2018) Molecular archaeoparasitology identifies cultural changes in the Medieval Hanseatic trading centre of Lübeck. Proc. R. Soc. B.285:20180991. <http://doi.org/10.1098/rspb.2018.0991>
* Flammer PG, Ryan H, Preston SG, Warren S, Přichystalová R, Rainer Weiss, Valerie Palmowski, Sonja Boschert, Katarina Fellgiebel, Isabelle Jasch-Boley, Madita-Sophie Kairies, Ernst Rümmele, Dirk Rieger, Beate Schmid, Ben Reeves, Rebecca Nicholson, Louise Loe, Christopher Guy, Tony Waldron, Jiří Macháček, Joachim Wahl, Mark Pollard, Greger Larson and Adrian L. Smith (2020) Epidemiological insights from a large-scale investigation of intestinal helminths in Medieval Europe. PLOS Neglected Tropical Diseases 14(8): e0008600. <https://doi.org/10.1371/journal.pntd.0008600>

Insert any additional project description(s) on subsequent pages if applicable. Please use the same template and use separate pages for each project.