

Daniel Jeffares Curriculum Vitae

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Contact

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Citizenship: dual New Zealand & British.

Areas of Expertise

Evolutionary biology: molecular evolution, comparative genomics, population genomics, quantitative genetics.

Genome analysis and bioinformatics: up-to-date experience with next-generation sequence analysis & other genome-wide data. Fluency in Perl and R.

Experimental molecular biology: DNA/RNA methods, including next-generation sequencing library construction & transposon-sequencing. Laboratory experience with bacteria, *C. elegans*, Arabidopsis and fission yeast model species.

Employment

2009 – present: Senior Research Fellow/Postdoctoral Fellow, Research Department of Genetics, Evolution & Environment, University College London.
2008 – 2009: Staff Scientist, Population and Comparative Genomics Group, Wellcome Trust Sanger Institute
2004 – 2008: Research Associate, Population and Comparative Genomics Group, Wellcome Trust Sanger Institute
2001 – 2004: Postdoctoral Fellow, Department of Evolutionary Biology, University of Copenhagen.

Post-PhD Training

2014 EMBO Practical Course on Genotype to Phenotype Mapping of Complex Traits (European Bioinformatics Institute).
2008 Ensembl Developers Workshop (Cambridge University)
2007 Short Course in Intermediate Perl (Tom Christiansen Perl Consultancy).
2007 Advanced R Programming and Bioconductor (Wellcome Trust Advanced Course)

Qualifications

2001 PhD (Plant Biology). Massey University (New Zealand)
1994 BSc Honours, 1st Class (Biological Science). Massey University (New Zealand)
1990 BSc (Botany). Victoria University of Wellington (New Zealand).

Awards

2010 Biotechnology and Biological Sciences Research Council funded Capacity and Capability Challenge (CCC) Project with The Genome Analysis Centre, Norwich UK.
2005 Bill and Melinda Gates Foundation Education Scholarship
2001 Danish National Science Research Council Postdoctoral Grant
1997 Massey Vice Chancellors Doctoral Scholarship
1998 JP Skipworth Plant Biology Scholarship

Established collaborations

1) Analysis of *Plasmodium ovale* population diversity in Africa in collaboration with Professor Arnab Pain (King Abdullah University of Science & Technology).

2) Analysis of *Schistosoma mansoni* trematode population diversity in Africa with Professor Robin Gasser (University of Melbourne).

Both these two contracts have been funded and have infrastructure and collaborative networks in place to gather and sequence samples from multiple locations in Africa.

Student Supervision/Teaching

I have supervised nine masters students (two ongoing), two PhD students (one ongoing), two summer internships and many undergraduate projects.

Summer interns:

2011 Genetics Society funded Genes and Development Summer Studentship to Josephine Hellberg.

2010 Wellcome Trust funded Biomedical Summer Studentship to Caitlin Smith.

Msc/MRes/PhD projects:

2016 Statistical modeling of Transposon insertion data in *S. pombe* (Nathan Blake, ongoing)

2015- Transposon-based saturating mutagenesis of *S. pombe* genome (Leanne Grech, PhD ongoing).

2015- Discovery of structural variants in fission yeast genomes (Clemency Jolly, MSc).

2015- Mitochondrial segregation in *S. pombe* (Shoumit Dey, MSc).

2014 Applying transposon mediated mutagenesis to identify genetic interactions in *S. pombe* in the context of Batten disease (Namrata Saha, MSc).

2013 Discovery of insertions and deletions in fission yeast genomes (Rodrigo Pracana, MRes).

2012 Genome-scale discovery of ageing-related elements in *S. pombe* (Dimitra Aravani, MSc).

2011 Transposon-mediated saturating mutagenesis of the *S. pombe* genome (Caroline Biagosch, MSc).

2009 Selective constraint in *Plasmodium* genomes (Sanne Nygaard, PhD).

2004 Molecular mimicry in *Plasmodium* genomes (Sanne Nygaard, MSc).

2003 Retrotransposons within *C. elegans* and *C. briggsae* genomes (Mika Zagrobelny, MSc).

2003 Analysis of alternative splicing in *C. elegans* using microarrays (Søren Mørk, MSc).

Contributions to teaching at UCL:

The Wellcome Trust Advanced Course “Genome-wide Approaches with Fission Yeast”.

MRes course “Systems Biology on Genome-wide approaches and data mining”.

MSci course “Current Topics in Research”.

Lecture for Centre for Mathematics, Physics and Engineering in the Life Sciences and Experimental Biology (CoMPLEX), on “Genome Evolution - Computational Approaches”.

Publications

Listing the number of citations [x] for papers ≥ 50 citations. H-index = 18 (via Google Scholar).

Recent, high profile or relevant work:

- Jeffares DC, Rallis C, Rieux A, Speed D, Převorovský M, Mourier T, [30 additional authors], Balding DJ, Balloux F, Durbin R, Bähler J (2015). The genomic and phenotypic diversity of *Schizosaccharomyces pombe*. *Nature Genetics* 47(3):235-241.
- Jeffares DC, Pain A, Berry A, Cox AV, Stalker J, Ingle CE, Thomas A, Quail MA, Siebenthall K, Uhlemann AC, Kyes S, Krishna S, Newbold C, Dermitzakis ET, Berriman M (2007). Genome variation and evolution of the malaria parasite *Plasmodium falciparum*. *Nature Genetics* 39(1):120-5. [172]
- Mourier T, Jeffares DC (2003). Eukaryotic intron loss. *Science* 300(5624):1393. [173]
- Jeffares DC, Jolly C, Hoti M, Speed D, Rallis C, Dessimoz C, Bähler J, Sedlazeck F (2016). Transient structural variations alter gene expression and quantitative traits in *Schizosaccharomyces pombe*. Preprint at *bioRxiv* doi: <http://dx.doi.org/10.1101/047266>. Downloaded 480 times, since April 13, 2016. In review at *Nature Communications*.
- Benito A, Jeffares DC, Palomero F, Calderón F, Bai F-Y, Bähler J, Benito S (2016). Selected *Schizosaccharomyces pombe* strains have characteristics that are beneficial for winemaking. *PLOS ONE* 11(3): e0151102.
- Poole AM, Jeffares DC, Hoepfner M & Penny D (2015). Does the ribosome challenge our understanding of the RNA World? *Journal of Molecular Evolution* 82(1):1-4.
- Jeffares DC, Tomiczek B, Sojo V, dos Reis M (2015). A beginners guide to estimating the non-synonymous to synonymous rate ratio of all protein-coding genes in a genome. *Methods Mol Biol.* 1201:65-90.
- Stange RR Jr, Jeffares D, Young C, Scott DB, Eason JR, Jameson PE (1996) PCR amplification of the *fas-1* gene for the detection of virulent strains of *Rhodococcus fascians*. *Plant Pathology* 45:407-417.

Intron evolution

- Hoepfner MP, White S, Jeffares DC, Poole AM (2009). Evolutionarily stable association of intronic snoRNAs and microRNAs with their host genes. *Genome Biol. Evol.* 1:420-8.
- Jeffares DC, Penkett CJ, Bähler J (2008). Rapidly regulated genes are intron poor. *Trends Genet.* 24(8):375-378. [99]
- Mourier T, Jeffares DC (2007). Intron Loss and Gain. Chapter in *Wiley Encyclopaedia of Life Sciences*. 2007. doi: 10.1002/9780470015902.a0020785.
- Jeffares DC, Mourier T, Penny D (2006). The biology of intron gain and loss. *Trends Genet.* 22(1):16-22. [223]

Genome evolution/genome analysis

- Bitton DA, Rallis C, Jeffares DC, Smith GC, Chen YY, Codlin S, Marguerat S, Bähler J (2014). LaSSO, a strategy for genome-wide mapping of intronic lariats and branch points using RNA-seq. *Genome Res.* 24(7):1169-1179.
- Long Q, Jeffares DC, Zhang Q, Ye K, Nizhynska V, Ning Z, Tyler-Smith C, Nordborg M (2011). PoolHap: inferring haplotype frequencies from pooled samples by next generation sequencing. *PLOS ONE* 6(1):e15292.
- Nygaard S, Braunstein A, Malsen G, Van Dongen S, Gardner PP, Krogh A, Otto TD, Pain A, Berriman M, McAuliffe J, Dermitzakis ET, Jeffares DC (2010). Long- and short-term selective forces on malaria parasite genomes. *PLOS Genet.* 6(9):e1001099.
- Mourier T, Carret C, Kyes S, Christodoulou Z, Gardner PP, Jeffares DC, Pinches R, Barrell B, Berriman M, Griffiths-Jones S, Ivens A, Newbold C, Pain A (2008). Genome-wide discovery

and verification of novel structured RNAs in *Plasmodium falciparum*. **Genome Res.** 18(2):281-92. [79]

Peacock CS, Seeger K, Harris D, Murphy L, Ruiz JC, Quail MA, Peters N, Adlem E, Tivey A, Aslett M, Kerhornou A, Ivens A, Fraser A, Rajandream MA, Carver T, Norbertczak H, Chillingworth T, Hance Z, Jagels K, Moule S, Ormond D, Rutter S, Squares R, Whitehead S, Rabinowitsch E, Arrowsmith C, White B, Thurston S, Bringaud F, Baldauf SL, Faulconbridge A, Jeffares D, Depledge DP, Oyola SO, Hilley JD, Brito LO, Tosi LR, Barrell B, Cruz AK, Mottram JC, Smith DF, Berriman M (2007). Comparative genomic analysis of three *Leishmania* species that cause diverse human disease. **Nature Genetics** 39(7):839-47.

[503]

Zagrebely M, Jeffares DC, Arctander P (2004). Differences in non-LTR retrotransposons within *C. elegans* and *C. briggsae* genomes. **Gene** 330:61-6.

Early evolution of life

Commentaries about our research on this topic:

Evolution: Genome data shake tree of life. Science 1998 May;80:672.

Making Life Simple. New Scientist 1999 Jan;2169:34-7

Penny D, Hoepfner MP, Poole AM, Jeffares DC (2009). An overview of the introns-first theory. **Journal of Molecular Evolution** 69(5):527-40.

Neumann N, Jeffares DC, Poole AM (2007). Outsourcing the nucleus: nuclear pore complex genes are no longer encoded in nucleomorph genomes. **Evol. Bioinform. Online.** Feb 27;2:23-34.

Willerslev E, Mørk S, Hedegaard MM, Rønn R, Jeffares DC (2002). JAWS: Just Add Water System - A device for detection of nucleic acids in Martian ice caps. **Proceedings of the First European Workshop on Exo-Astrobiology**, 16-19 September 2002:309-312.

Poole A, Jeffares D, Penny D (1999). Early evolution: prokaryotes, the new kids on the block. **Bioessays** 21(10):880-9. [148]

Poole AM, Jeffares DC, Penny D (1998). The path from the RNA world. **Journal of Molecular Evolution** 46(1):1-17. [238]

Jeffares DC, Poole AM, Penny D (1998). Relics from the RNA world. **Journal of Molecular Evolution** 46(1):18-36. [242]

Jeffares DC, Poole AM, Penny D (1995). Pre-rRNA processing and the path from the RNA world. **Trends Biochem. Sci.** 20(8):298-9.

Other topics

Jacobsen N, Nielsen PS, Jeffares DC, Eriksen J, Ohlsson H, Arctander P, Kauppinen S (2004). Direct isolation of poly(A)⁺ RNA from 4 M guanidine thiocyanate-lysed cell extracts using locked nucleic acid-oligo(T) capture. **Nucleic Acids Res.** 32(7):e64.

Jeffares DC, Phillips MJ, Moore S, Veit B (2004). A description of the Mei2-like protein family; structure, phylogenetic distribution and biological context. **Dev. Genes Evol.** 214(3):149-58.

Anderson GH, Alvarez ND, Gilman C, Jeffares DC, Trainor VC, Hanson MR, Veit B (2004). Diversification of genes encoding mei2-like RNA binding proteins in plants. **Plant Mol. Biol.** 54(5):653-70.

Greer DH, Jeffares D (1998). Temperature-dependence of carbon acquisition and demand in relation to shoot growth of kiwifruit (*Actinidia deliciosa*) vines grown in controlled environments. **Functional Plant Biology** 25(7):843-850.