

CURRICULUM VITAE: PROFESSOR NICK GILBERT

MRC Human Genetics Unit, Institute of Genetics and Molecular Medicine
and School of Chemistry, University of Edinburgh

Summary: Professor Gilbert started his academic career as post-doctoral fellow with Professor Wendy Bickmore at the MRC Human Genetics Unit (2000-2006). He started his own research group with a Wellcome Trust Career Development Fellowship (2006-2010) and moved to the MRC Human Genetics Unit in 2012, as an MRC Senior Fellow, where he was awarded a personal chair in Chromatin Biology. The Gilbert lab develops new tools to investigate how chromatin is folded inside cells to understand how packaging regulates normal cellular events such as transcription and DNA replication. They also investigate how alterations in chromatin folding can predispose the genome to instability, one of the key drivers for many diseases including cancer. In addition to using cellular models they use synthetic chromatin to gain insight into the molecular mechanisms for regulating chromatin structure.

Education and Qualifications

BSc. Hons. Biochemistry (1st Class), The University of Edinburgh (1992-1995)

Ph.D "Nature and Modulation of the Higher-Order Chromatin Fibre". Department of Biochemistry and Centre for Genome Research, The University of Edinburgh, UK (1996-2000). Supervised by Dr Jim Allan and Prof Austin Smith.

Employment history

Personal Chair in Chromatin Biology (2012) and MRC Senior Research Fellow (2012-2019)

Principal Investigator, MRC Human Genetics Unit, Institute of Genetics and Molecular Medicine, The University of Edinburgh. 6/2010-

Wellcome Trust Career Development Fellow, Institute of Genetics and Molecular Medicine, The University of Edinburgh. 6/2006- 5/2010.

Current Grants

BBSRC Tools and Resources Development Fund. £188,914. Multiplex Bioorthogonal Labelling of Nucleic Acids: A Tool for Super-Resolution Imaging (August 2018 – July 2019)

MRC HGU QQR Funding £1M. Chromatin Architecture and Regulation (April 2018 – April 2023)

MRC Senior Fellowship. £2.5M. Understanding the regulation and topological organisation of DNA in the human genome (August 2012 – July 2019)

EASTBio PhD Studentship with Ann Donaldson (Aberdeen) (September 2016 – August 2019)

Current Responsibilities

Chromosome Research Editorial Advisory Board

Instructor for Wellcome Trust advanced course on "Chromatin Structure and Function"

Wellcome Trust Molecular Basis of Cell Function Expert Review Group

Director Graduate Research and Training, MRC Institute of Genetics and Molecular Medicine

Recent External Seminars

September 2017, EMBO Conference on DNA Topology, Les Diableret, Switzerland

October 2017, Centre for Gene Regulation and Expression, University of Dundee

November 2017, IFOM, Milan

February 2018, Biophysical Society Meeting, San Francisco

February 2018, School of Life Sciences, University of Dundee

March 2018, Department of Molecular and Cell Biology, University of Leicester

April 2018, Keystone Meeting on Chromatin Architecture and Chromosome Organisation, Whistler

May 2018, Max Planck Institute for Molecular Genetics, Berlin

June 2018, Synpromics Ltd, Roslin, UK

July 2018, Gordon Conference on Chromosome Structure and Function, Maine

September 2018, EMBO Conference on Chromosome Structure, Heidelberg

December 2018, Winter training school, Obergurgl, Austria

January 2019, Institute of Medical Sciences, University of Aberdeen

March 2019, Keystone Meeting on 3D Chromosome Organisation, Banff

Teaching

Considerable experience giving undergraduate tutorials and practicals. Have taught microarray and chromatin structure analysis on international training courses (Italy). Teaching on Wellcome Trust molecular biology training course since 2014. I also give a number of lectures at Edinburgh University.

Significant Collaborations

Mark Bradley, Chemistry, The University of Edinburgh. Development of novel probes for investigating genome architecture

Bauke Ylstra, VUMC, Netherlands. Genome-wide chromatin structure analysis

Davide Marenduzzo, Physics, The University of Edinburgh. Modelling of chromatin fibre structures

Selected Publications Since 2010

1. Naughton, C., Sproul, D., Hamilton, C., **Gilbert**, N. (2010) Analysis of active and inactive X chromosome architecture reveals the independent organisation of 30-nm and large scale chromatin structures *Mol. Cell* 40, 397-409.
2. Hamilton, C., Hayward, R. L., **Gilbert**, N. (2011) Global chromatin fibre compaction in response to DNA damage. *Biochem. Biophys. Res. Commun.* 414, 820-5
3. Latham, T., Mackay, L., Sproul, D., Karim, M., Culley, J., Harrison, D.J., Hayward, R.L., Langridge-Smith, P., **Gilbert**, N., Ramsahoye, B. (2012) Lactate, a product of glycolytic metabolism, inhibits histone deacetylase activity and promotes changes in gene expression *Nucleic Acids Res.* 40, 4794-4803.
4. Naughton C, Avlonitis N, Corless S, Prendergast JG, Mati IK, Eijk PP, Cockroft SL, Bradley M, Ylstra B, **Gilbert** N. (2013). Transcription forms and remodels supercoiling domains unfolding large-scale chromatin structures. *Nat Struct Mol Biol.* 20(3):387-95.
5. **Gilbert**, N., Allan, J. (2014) Supercoiling in DNA and Chromatin. *Curr Opin Genet Dev.* 25:15-21
6. Nozawa, R., **Gilbert**, N. (2014) Interphase chromatin LINEd with RNA. *Cell.* 156(5): 864-5
7. **Gilbert**, N., Allan, J. (2014) Supercoiling in DNA and Chromatin. *Curr Opin Genet Dev.* 25:15-21
8. Serrels A, Lund T, Serrels B, Byron A, McPherson RC, von Kriegsheim A, Gómez-Cuadrado L, Canel M, Muir M, Ring JE, Maniati E, Sims AH, Pachter JA, Brunton VG, **Gilbert** N, Anderton SM, Nibbs RJ, Frame MC. (2015) Nuclear FAK Controls Chemokine Transcription, Tregs, and Evasion of Anti-tumor Immunity. *Cell.* 163:160-73
9. Brackley CA, Johnson J, Bentivoglio A, Corless S, **Gilbert** N, Gonnella G, Marenduzzo D. (2016) Stochastic Model of Supercoiling-Dependent Transcription. *Phys Rev Lett.* 117:018101
10. **Gilbert** N, Marenduzzo D. Genome organization: experiments and modeling. *Chromosome Res.* 2017 Mar;25(1):1-4. doi: 10.1007/s10577-017-9551-2.
11. Landré V, Revi B, Mir MG, Verma C, Hupp TR, **Gilbert** N, Ball KL. Regulation of transcriptional activators by DNA-binding domain ubiquitination. *Cell Death Differ.* 2017 24(5):903-916.
12. Nozawa RS, Boteva L, Soares DC, Naughton C, Dun AR, Buckle A, Ramsahoye, Bruton PC, Saleeb RS, Arnedo M, Hill B, Duncan RR, Maciver SK, **Gilbert** N. SAF-A regulates interphase chromosome structure through oligomerisation with chromatin-associated RNAs. *Cell.* 2017 169(7):1214-1227.
13. Mackenzie KJ, Carroll P, Martin CA, Murina O, Fluteau A, Simpson DJ, Olova N, Sutcliffe H, Rainger JK, Leitch A, Osborn RT, Wheeler AP, Nowotny M, **Gilbert** N, Chandra T, Reijns MAM, Jackson AP. cGAS surveillance of micronuclei links genome instability to innate immunity. *Nature.* 2017 548(7668):461-465.
14. Bobkov GOM, **Gilbert** N, Heun P. Centromere transcription allows CENP-A to transit from chromatin association to stable incorporation. *J Cell Biol.* 2018 217(6):1957-1972.
15. Buckle A, Nozawa RS, Kleinjan DA, **Gilbert** N. Functional characteristics of novel pancreatic Pax6 regulatory elements. *Hum Mol Genet.* 2018 27(19):3434-3448.
16. Buckle A, Brackley CA, Boyle S, Marenduzzo D, **Gilbert** N. Polymer simulations of heteromorphic chromatin predict the 3D folding of complex genomic loci. *Mol Cell.* 2018 15;72(4):786-797
17. Nozawa RS, Gilbert N. RNA: Nuclear Glue for Folding the Genome. *Trends in Cell Biol.* 2019