Daniel J M Crouch

Research interests

Statistical methodology, genomewide association studies (GWAS), population genetics, imaging data and spatial statistics, heritability analysis, evolutionary theory

Publications

Nature Communications (2022). Childhood body size directly increases type 1 diabetes risk based on a lifecourse Mendelian randomization approach.
Tom G Richardson, **Daniel J M Crouch**, Grace M Power, Fernanda Morales Berstein, Emma Hazelwood, Si Fang, Yoonsu Cho, Jamie R J Inshaw, Catherine C Robertson, Carlo Sidore, Francesco Cucca, Steven S Rich, John A Todd, George Davey Smith

Evolutionary perspectives on cancer and ageing; book chapter in New Horizons In Evolution (2021). Edited version of Bodmer & Crouch (2020).
Walter F Bodmer, **Daniel J M Crouch**

BioRxiv (2021). Enhanced genetic analysis of type 1 diabetes by selecting variants on both effect size and significance, and by integration with autoimmune thyroid disease.
Under preparation for submission to Nature Genetics.
Daniel J. M. Crouch, Jamie R.J. Inshaw, Catherine C. Robertson, Jia-Yuan Zhang, Wei-Min Chen, Suna Onengut-Gumuscu, Antony J. Cutler, Linda S. Wicker, Carlo Sidore, Francesco Cucca, Stephen S. Rich, John A. Todd.

Nature Genetics (2021). Fine-mapping, trans-ancestral and genomic analyses identify causal variants, cells, genes and drug targets for type 1 diabetes.
C.C. Robertson, J.R.J. Inshaw, S. Onengut-Gumuscu, W.M. Chen, D. Flores Santa Cruz, H. Yang, A.J. Cutler, **D.J.M. Crouch**, E. Farber, S.L. Bridges Jr., J.C. Edberg, R.P. Kimberly, J.H. Buckner, P. Deloukas, J. Divers, D. Dabelea, J.M. Lawrence, S. Marcovina, A.S. Shah, C.J. Greenbaum, M.A. Atkinson, P.K. Gregersen, J.R. Oksenberg, F. Pociot, M.J. Rewers, A.K. Steck, D.B. Dunger, Type 1 Diabetes Genetics Consortium, L.S. Wicker, P. Concannon, J.A. Todd, S.S. Rich

Diabetologia (2021). Divergent genetic effects for type 1 and type 2 diabetes at overlapping association signals.
Jamie RJ Inshaw, Carlo Sidore, Francesco Cucca, M Irina Stefana, **Daniel JM Crouch**, Mark I McCarthy, Anubha Mahajan, John A Todd

Proceedings of the National Academy of Sciences (2020). Polygenic inheritance, GWAS, Polygenic Risk Scores and the search for functional variants.
Daniel J M Crouch, Walter F Bodmer

Diabetes Care (2020). Genetic variants predisposing most strongly to type 1 diabetes diagnosed under age 7 years lie near candidate genes that function in the immune system and in pancreatic beta cells.
JRJ Inshaw, AJ Cutler, **DJM Crouch**, LS Wicker, JA Todd

Journey of Theoretical Biology (2020). Somatic selection of poorly differentiating variant stem cell clones could be a key to human ageing.
Walter F Bodmer, **Daniel J M Crouch**

Frontiers in Immunology (2019). Chronic immune activation in systemic lupus erythematosus and the autoimmune PTPN22 Trp620 risk allele drive the expansion of FOXP3+ regulatory T cells and PD-1 expression.
Ricardo Ferreira, Xaquin Castro Dopico, Joao Oliveira, Daniel Rainbow, Jennie Hsiu Mien Yang, Sarah Todd, Mhairi McNeill, Maristella Steri, Valeria Orru, Edoardo Fiorillo, **Daniel Crouch**, Marcin Pekalski, Francesco Cucca, Timothy Ian Martin Tree, Timothy Vyse, Linda Wicker, John Todd

Proceedings of the National Academy of Sciences (2018). Genetics of the human face: identification of large effect single gene variants.
Daniel J M Crouch, Bruce Winney, Willem Paul Koppen, William J Christmas, Katarzyna Hutnik, Tammy Day, Devendra Meena, Abdelhamid Boumertit, Pirro Hysi, Ayrun Nessa, Tim D Spector, Josef Kittler, Walter F Bodmer

Journal of Theoretical Biology (2017). Statistical aspects of evolution under natural selection, with implications for the evolution of sexual reproduction.
Daniel J M Crouch

International Conference on Biometrics (2016). Extending Non-negative Matrix Factorisation to 3D Registered Data.
Willem P Koppen, William J Christmas, **Daniel J M Crouch**, Walter F Bodmer and Josef V Kittler

Cancer Epidemiology (2013). Incorporating non-genetic risk factors and behavioural modifications into risk prediction models for colorectal cancer.
Jane M Yarnall, **Daniel J M Crouch**, Cathryn M Lewis

European Journal of Human Genetics (2013). REGENT: a risk assessment and classification algorithm for genetic and environmental factors.
Daniel J M Crouch, Graham H M Goddard, Cathryn M Lewis

European Journal of Human Genetics (2012). Inferring separate parental admixture components in unknown DNA samples using autosomal SNPs.
Daniel J M Crouch, Michael E Weale

European Journal of Human Genetics (2010). Genes predict village of origin in rural Europe.
Colm O'Dushlaine, Ruth McQuillan, Michael E Weale, **Daniel J M Crouch**, Åsa Johansson, Yurii Aulchenko, Christopher S Franklin, Ozren Polašek, Christian Fuchsberger, Aiden Corvin, Andrew A Hicks, Veronique Vitart, Caroline Hayward, Sarah H Wild, Thomas Meitinger, Cornelia M van Duijn, Ulf Gyllensten, Alan F Wright, Harry Campbell, Peter P Pramstaller, Igor Rudan and James F Wilson

Employment

Senior Statistical Programmer (senior postdoc), Wellcome Centre for Human Genetics, University of Oxford 2018-present

-Data analysis and methods design to determine the influence of environmental factors on Type I Diabetes when there are genetic ancestry confounders, using UK Biobank.
-Assessing the impact on rare de novo variants on Type I Diabetes
-GWAS and fine mapping for Type I Diabetes
-Various data analyses for Type I Diabetes research projects

Senior Postdoctoral Fellow, Department of Oncology, University of Oxford 2014-2018

-Worked primarily on GWAS mapping of 3-dimensional facial features, including both method design and data analysis.
-Also completed some theoretical analysis of effects of linkage disequilibrium on selection when genetic drift is acting, and how this relates to sex and recombination.

Postdoctoral Fellow, University of Oxford 2012-2014

-First stages of research on genetics of facial features

Research Associate (temporary), King's College London 2011

-Implementation of a disease risk prediction algorithm into an R package

Temporary work 2007-2008

Education

PhD Statistical Genetics, King's College London 2008-2013

-Thesis: Predicting Ancestral and Biogeographic Origin from Genome-wide SNP data
-Implementation of Machine Learning methods for predicting geographic ancestry from genetic SNP data
-Development of maximum likelihood and Bayesian models for predicting complex admixture components and geostatistical prediction of coordinates of origin
-Developed an R package implementing aspects of this work

MSc Genetic Epidemiology, University of Sheffield 2006-2007

-Thesis: Probability of Polymorphism under Natural Selection.
-Research project involved simulation of multi-allele gene populations using C++ in order to determine the rates of occurrence of stable equilibria

BSc Genetics, University of Sheffield 2003-2006

George Abbot School 1996-2003

Computational skills

- R programming
- LaTeX
- Git / Github
- Bash

Awards

- Early career speaker bursary, Fisher Memorial Trust (2018)
- Cancer Research Student Bursary (2006)

Teaching

- DPhil Genomic Medicine and Statistics (GMS), Oxford (2019 to present)
  - -Statistical models for polygenic traits
- Tutor in Human Sciences (Oxford, 2013-2017)
  - -First year Quantiative Methods (statistics)
  - -First year Genetics and Evolution
  - -Second year Human Genetics
- Prospective Human Sciences undergraduate interviews (Magdalen College Oxford, 2014)

Supervision

- DPhil co-supervision, Oxford
  - -Jia-Yuan Zhang (2019-present)
  - -Jamie Inshaw (2018-2020, completed)
  - -Devendra Meena (2014-2018, completed)
- Co-supervision of Forensic Science masters project (King's College London, 2010-2011)

Management

- Candidate interviews at Wellcome Centre for Human Genetics (2019)
- JDRF/Wellcome Diabetes and Inflammation Lab Steering Group (Oxford, 2018-)
  - *-Steering group members meet monthly to discuss core aims of the lab programme and how they can be achieved*
- Day to day management of the People of the British Isles lab (Oxford, 2014-2018)
  - *-Overseeing the curation and storage of the People of the British Isles samples and database, and facilitating collaborations with external researchers*

Public Engagement

- Main source for *New Scientist* article "Anonymised genomes cannot be linked to faces as previously claimed" (17th November 2021)
- Guest on *The Insight* science podcast, episode on human facial genetics (2020)
- 'The genetics of human facial features', article for *Lost Cousins* genealogical newsletter (2017)
- Engaging study participants as part of regular DNA and phenotype collection events for the People of the British Isles project, plus various museum and science festival events (2012-2018)

Professional memberships

- Adelphi Genetics Forum (Life Fellow)