BIOGRAPHICAL SKETCH

NAME: VALENTINA ESCOTT-PRICE

POSITION TITLE: Professor in Biostatistics and Biostatistics

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE	Completion Date	FIELD OF STUDY
Cardiff University, UK	PhD	11/2001	Statistics
St. Petersburg University, Russia	BSc,MSc	06/1991	Mathematics

Positions and Honors

1998-2002 - School of Mathematics, Cardiff University (UK). Research Assistant

2002-2003 - Department of Psychological Medicine, School of Medicine, Cardiff University, UK, Research Assistant

2003- 2005 - Bioinformatics and Biostatistics Unit, School of Medicine, Cardiff University, UK, Lecturer in Biostatistics and Genetic Epidemiology

2005-2010 - Bioinformatics and Biostatistics Unit, School of Medicine, Cardiff University, UK, RCUK Research Fellow

2010-2014 - MRC Centre for Neuro-Psychiatric Genetics and Genomics, School of Medicine, Cardiff University UK, Senior Lecturer

2014-2016 - MRC Centre for Neuro-Psychiatric Genetics and Genomics, School of Medicine, Cardiff University, UK, Reader

2016-present - Dementia Research Institute at Cardiff, Centre for Neuro-Psychiatric Genetics and Genomics, School of Medicine, Cardiff University, UK, Professor

Personal Statement

The quality of my research is based on and strongly supported by my education in Mathematics and Statistics, my professional programming skills, and my expertise in Biostatistics and Genetics. Since January 2002 I have been working in the Department of Psychological Medicine at Cardiff University, now Centre for Neuro-Psychiatric Genetics & Genomics. I have played a pivotal role in applying for the core funding of the Dementia Research Institute (DRI), being one of the three Cardiff group leaders who formed the scientific foundation of the whole UK Dementia Research Institute (DRI) at Cardiff. It is the largest dementia research investment in Wales, and one of the largest MRC investments in the UK (funding six UK universities: Cambridge, Cardiff, UCL, Imperial, Edinburgh and King's college London). In Cardiff, this is now a successfully established institute, with more than 100 researchers, which has secured additional ~£35M funds. At the UK DRI, my lab is at the forefront of deploying groundbreaking computational approaches, such as machine learning and artificial intelligence models, to study disease mechanisms across several neurodegenerative disorders.

The common variant risk for dementia, like other complex disorders, is highly polygenic. I was the first in the world who elucidated the significant polygenic component of Alzheimer's Disease, showcasing its predictive utility for Alzheimer's Disease risk. This breakthrough is a valuable research tool for enhancing experimental designs, including preventative clinical trials, stem cell selection, and high/low-risk clinical studies. By decoding the complex relationships in large-scale genetic and clinical data, the team aims to reveal how specific genes, gene networks and clinical information predict the onset and progression of dementia and dementia related disease and disorders. This research not only enhances the group's scientific understanding but will ultimately revolutionise personalised medicine approaches, potentially leading to more effective prevention and treatment strategies for neurodegenerative diseases.

The power and accuracy of my models and analyses are achieved by accessing national and international *big data* resources of deeply phenotyped data with millions of genetic variants, by my deep understanding and extensive expertise in dementia research, and by my solid training in mathematics. I develop and apply alternative new solutions to the problems posed by such analyses to identify novel genes, to demonstrate genetic overlap between psychiatric and neurodegenerative disorders.

Contribution to Science

I have co-authored in a total of over 300 publications. I am the primary or senior author of over 60 refereed research papers. These include publications in JAMA Psychiatry, Lancet Neurology, Brain, Nature Communications. Since much of the research is multidisciplinary my achievements in applying methods are, as is typical in this type of work, often reflected in multi-author peer-reviewed publications. I have therefore co-authored an additional ~200 research papers, which include 29 publications in *Nature*, *Nature Genetics*, *Nature Neuroscience*, *Science*. My research has been regularly accepted or invited for presentation/seminar at national/international meetings.

My most recent research is focused around evaluation of genetic risk associated with different aspects, in particular, Alzheimer's disease and dementia. Our recent work have investigated the polygenic architecture of Alzheimer's disease and have explored prediction accuracy of AD risk by polygenic risk score and plasma biomarkers in clinical and pathology confirmed cohorts.

[1]Stevenson-Hoare, et al, Escott-Price (2022) Plasma biomarkers and genetics in the diagnosis and prediction of Alzheimer's disease. *Brain,* doi.org/10.1093/brain/awac128

[2]Leonenko, et al, Escott-Price (2021) Identifying individuals with high risk of Alzheimer's disease using polygenic risk scores*. Nature Communications*. 12: 4506

[3]Sierksma, Escott-Price*, De Strooper* (2020) Translating genetic risk of Alzheimer's disease into mechanistic insight and drug target. *Science* 370:61–66. *-corresponding authors

My primary interest, however, remains statistical methodology, and I continually strive to optimise approaches and explore novel methodologies for the analysis of large complex datasets. My current objectives include leveraging artificial intelligence (AI) and machine learning methods to enhance disease risk prediction and patient stratification in large population-level data, as well as employing cutting-edge federated and swarm learning approaches for remote and secure data analyses.

[4]Bracher-Smith, et al, Escott-Price (2022) Machine learning for prediction of schizophrenia using genetic and demographic factors in the UK Biobank. *Schizophrenia Research,* doi.org/10.1016/j.schres.2022.06.006

[5]Bracher-Smith, Crawford, Escott-Price (2021) Accuracy of Machine Learning Methods for Genetic Prediction of Psychiatric Disorders: A Systematic Review. *Molecular Psychiatry*, 26:70–79

The era of *Big Data* brings computational challenges which I am excited to face. Having access to large UK-wide databases with Electronic Health records, my team and myself explore risk of dementias depending on clinical history.

[6]Leonenko et al, Escott-Price (2024) Dementias Platform UK: Bringing genetics into life. *Alzheimer's and Dementia*. doi.org/ 10.1002/alz.13782

[7]Escott-Price (2023) Validation of genetic stratification for risk of Alzheimer's disease using UK Biobank. *Alzheimer's & Dementia*. doi.org/10.1002/alz.079585

[8]Stevenson-Hoare et al Escott-Price V (2023) New cases of dementia are rising in elderly populations in Wales, UK. *Journal of the Neurological Sciences*, doi.org/10.1016/j.jns.2023.120715

URL to a full list of my published work:
https://www.cardiff.ac.uk/people/view/123036-escott-price-valentina