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# EDINBURGH-ST ANDREWS CONSORTIUM FOR MOLECULAR PATHOLOGY, INFORMATICS AND GENOME SCIENCES

## International Molecular Pathology Symposium

Tuesday 9 May 2017
09.00 -17.30
IGMM Lecture Theatre
The University of Edinburgh

### KEYNOTE SPEAKERS

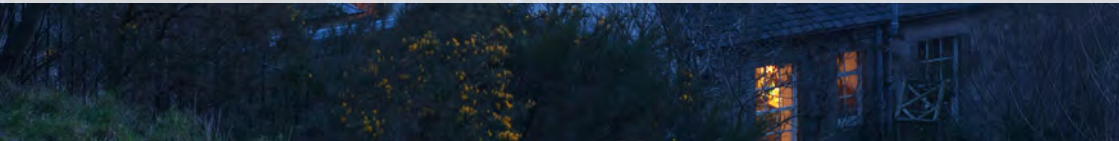
**Professor Adrienne Flanagan**
UCL Cancer Institute

**Professor Jonathan Mill**
University of Exeter Medical School

**Professor Jon Seidman**
Harvard Medical School

# EDINBURGH-ST ANDREWS CONSORTIUM FOR MOLECULAR PATHOLOGY, INFORMATICS AND GENOME SCIENCES

International Molecular Pathology Symposium



## International Molecular Pathology Symposium, IMPS 2017
## 9 May 2017. 09.30 - 17.30
## IGMM Lecture Theatre, The University of Edinburgh

09.30 **Welcome and Introductory remarks.**
Professor David Crossman. University of St Andrews

09.40 **Keynote: Bone Tumours and their Development.**
Professor Adrienne Flanagan. UCL Cancer Institute

### THE EDINBURGH-ST ANDREWS MOLECULAR PATHOLOGY NODE
Chair: Professor Philippa Saunders

10.10 **Infrastructure and Research.**
Professor Tim Aitman. The University of Edinburgh

10.25 **Extending Molecular Pathology Training.**
Professor Simon Herrington. The University of Edinburgh
Professor Mary Porteous. NHS Lothian, University of Edinburgh

### CANCER - HISTOPATHOLOGY & NGS (1)
Chair: Professor Philippa Saunders

10.40 **Ensuring the quality of Next Generation Sequencing.**
Dr Sandi Deans. UK NEQAS, NHS Lothian

11.00 **The Meaning Behind the Picture.**
Professor David Harrison. University of St Andrews

11.20 TEA/COFFEE

### CANCER - HISTOPATHOLOGY & NGS (2)
Chair: Professor William Wallace

11.50 **Overview of the Molecular Pathology Service in NHS Lothian: Developments and Challenges for the Future.**
Dr Anca Oniscu. NHS Lothian

12.10 **Tissue-based NGS: The Need for Morpho-molecular Integration.**
Professor Manuel Salto-Tellez. Queens University Belfast

12.30 **What is ovarian cancer? Lessons from Molecular Pathology.**
Professor Simon Herrington. The University of Edinburgh

12.50 **Inflammatory Bowel Disease-associated Colorectal Cancer Mutational Landscapes & Signatures.**
Professor Mark Arends. The University of Edinburgh

13.10 LUNCH AND POSTERS

## NEUROPATHOLOGY

Chair: Professor Mary Porteous

14.10 **KEYNOTE: Regulatory Genomic Variation in the Human Brain: Epigenetic Trajectories to Neuropsychiatric and Neurodegenerative Disease.**
Professor Jonathan Mill. The University of Exeter Medical School

14.40 **Translational Pathology at Biogen as Part of the Drug Development Pipeline.**
Dr Galina Marsh. Biogen

15.00 **Can Stem Cells Model Aspects of Human Neurodegeneration?**
Professor Siddharthan Chandran. The University of Edinburgh

15.20 TEA/COFFEE

## GENOMICS, CLINICAL DIAGNOSTICS AND DRUG DISCOVERY

Chair: Professor Tim Aitman

15.50 **Using Next Generation Sequencing and Rare Genetic Phenotypes to Find Novel Drug Targets.**
Professor Duncan McHale. UCB Pharma

16.10 **New Developments in Clinical Variant Interpretation.**
Dr James Ware. Imperial College London

16.30 **KEYNOTE: From Mechanism to Diagnosis of Inherited Heart Disease.**
Professor Jon Seidman. Harvard Medical School

17.10 **Closing remarks.**
Professor Tim Aitman & Professor Simon Herrington

## PROFESSOR TIM AITMAN

### The University of Edinburgh

### Cente for Genomic & Experimental Medicine

Professor Tim Aitman is the Director of the Centre for Genomic and Experimental Medicine within the MRC Institute of Genetics and Molecular Medicine. He is Professor of Molecular Pathology and Genetics at the University of Edinburgh and Director of the Edinburgh-St Andrews Consortium for Molecular Pathology, Informatics and Genome Sciences, one of only six new MRC-EPSRC Molecular Pathology Nodes in the UK. Prof Aitman is the co-Director and Edinburgh PI of the Scottish Genomes Partnership, Clinical Director of the HighSeqX facility in Edinburgh Genomics and also a Consultant Physician in NHS Lothian.

A graduate of Birmingham Medical School and Kings College London he obtained his DPhil at Wolfson College, Oxford University. Before joining the University of Edinburgh in 2014, he was Group Head and Section Chair at the MRC Clinical Sciences Centre, Hammersmith Hospital, Honorary Consultant Physician at Hammersmith Hospitals NHS Trust and Professor of Clinical & Molecular Genetics in the Imperial College London Faculty of Medicine (where he continues as Visiting Professor). Prof Aitman is a Fellow of the Royal College of Physicians, Academy of Medical Sciences and Society of Biology and was recently elected as a Fellow of the Royal Society of Edinburgh. He was the Specialist Adviser for the House of Lords Science and Technology Committee's Inquiry into Genomic Medicine.

Professor Aitman has authored over a hundred scientific papers, many highly cited, and has been invited to give over 150 plenary and state-of-the-art lectures at major national and international conferences. He co-ordinated multiple scientific projects and research consortia with career grant support of over £30 million and has been a mentor of many successful graduate students and postdoctoral scientists.

### PROFESSOR MARK J ARENDS
**The University of Edinburgh**

Mark Arends trained in Medicine (MBChB with Honours) and Pathology (BSc with Honours and PhD in Molecular Pathology) at the University of Edinburgh, becoming a Senior Lecturer in 1995 in the Edinburgh University Department of Pathology and Honorary Consultant at the Royal Infirmary of Edinburgh (MRCPath & FRCPath).

He moved to the University of Cambridge (MA) in January 1999, where he was a University Reader in Histopathology and an Honorary Consultant at Addenbrooke's Hospital, Cambridge. There he was a specialist gastrointestinal and gynaecological pathologist, and for over 10 years he was the lead pathologist for both colorectal pathology and gynaecological pathology in Cambridge. In 2008 he became lead pathologist for the bowel cancer screening programme for the East of England. He has reviewed and written papers about many gastrointestinal and gynaecological diseases, including the molecular pathology and genetic susceptibility syndromes of Gastrointestinal and Gynaecological cancers, especially Lynch Syndrome.

In July 2013 he moved to University of Edinburgh as Professor of Pathology, Head of the Division of Pathology and Director of the Centre for Comparative Pathology for the University of Edinburgh. He is currently the Chair of the Research Committee of the Pathological Society of Great Britain and Ireland. His research includes the genomic, genetic and epigenetic mechanisms of colorectal cancer and gynaecological cancer development and progression, using animal models as well as human tissue samples and cell lines, including inherited susceptibility to colorectal and endometrial cancers.

## PROFESSOR SIDDHARTHAN CHANDRAN
### The University of Edinburgh

Prof Chandran trained in medicine at Southampton University, subsequently undertaking neurology training at the National Hospital for Neurology and Neurosurgery, London and Cambridge. He was awarded a PhD in developmental neurobiology in 2000 from the University of Cambridge. His previous appointments have included Consultant Neurologist, University Lecturer and Fellow of Kings College at the University of Cambridge. In 2009, he was recruited to Edinburgh to become the MacDonald Professor of Neurology.

At the University of Edinburgh he is Director of the Centre for Clinical Brain Sciences, Director of the Euan MacDonald Centre for MND Research and co-Director (with Prof Charles ffrench-Constant) of the Anne Rowling Regenerative Neurology Clinic. He is also a group leader in the MRC Centre for Regenerative Medicine and the Centre for Neuroregeneration.

Professor Siddharthan Chandran works in the emerging discipline of Regenerative Neurology. His research combines laboratory and clinical activity that includes human stem cells and specialist clinics (multiple sclerosis and motor neurone disease) to both study disease as well as undertake early-phase clinical trials. The ultimate aim of his research is to develop novel regenerative therapies for neurodegenerative disease through linked clinical research and laboratory studies that include human stem cells.

Neurodegenerative diseases affect cells in the nervous system called neurons. Twenty million people worldwide are diagnosed with a neurodegenerative disease each year, and at present they are all progressive and incurable. The Chandran group links clinical activity with laboratory research into two such conditions: multiple sclerosis and motor neurone disease. Measuring disease course and treatment outcomes through disease bio-registers builds an increasingly accurate clinical picture. In parallel, studies in the lab —including using human stem cells—focus on understanding what is going wrong in the neurons and supporting cells called glia. Bringing these two strands together, the group aims to develop novel regenerative therapies and bring them to early-phase clinical trials.

### PROFESSOR DAVID CROSSMAN
**The University of St Andrews**

David Crossman is Dean of the Faculty of Medicine and Head of the School of Medicine at the University of St Andrews. He is an Honorary Consultant cardiologist at NHS Fife where he has weekly clinical commitments. He moved to Scotland over two years ago having run the medical school at UEA. He is Chair of the MRC/NIHR EME board (Translational medicine). He is interested in the pathological basis of myocardial infarction.

**DR SANDI DEANS**
**UK NEQAS**
**NHS Lothian**

Dr Sandi Deans is a Consultant Clinical Scientist and the Director of UK National External Quality Assessment Service (UK NEQAS) for Molecular Genetics which is based in the Department of Laboratory Medicine, Royal Infirmary of Edinburgh. The UK NEQAS scheme delivers assessment of molecular genetic testing, molecular pathology testing, newborn screening, prenatal diagnosis, preimplantation genetic diagnosis and is involved in the new technical next generation sequencing scheme.

Sandi is the National Laboratory and Scientific Lead within the NHS England 100,000 Genomes Project implementation unit and collaborates closely with Genomics Enlgand to deliver high quality sequencing for both the rare diseases and cancer programmes.

She sits on many committees including the European Molecular Quality Network Board, UK NEQAS Steering Committees for Clinical Cytogenetics, Cellular Pathology Techniques and Molecular Genetics, and has recently been appointed as Board member and Treasurer of the International Quality Network for Pathology (IQN Path). She is a past UK NEQAS Executive Director, Association of Clinical Genetic Science Executive Committee member and has been involved in the selection panels for MCADD extended mutation screening laboratories and the Cancer Research UK Stratified Medicine Technical Hub laboratories. She is a Senior Honorary Lecturer in the Medical School, University of St Andrews and is a collaborator in the Universities of Edinburgh and St Andrews Molecular Pathology Node including the joint supervisor of one of the 2016 Masters students.

### PROFESSOR ADRIENNE M FLANAGAN
**UCL Cancer Institute**

Adrienne is Professor and Head of Academic Pathology at UCL, and an NIHR Senior Investigator. She is the Clinical Lead for the London Sarcoma Service, practicing clinical pathology at the Royal National Orthopaedic Hospital, Stanmore. She is the Cancer Lead for the 100,000 Genomes Project for the N. Thames Genome Medical Centre, and the Sarcoma Lead for the Genomics England Clinical Interpretation Partnership (GeCIP). Her research focuses on the genetics of bone and soft tissue tumours, the results of which she translates into clinical practice, and uses for stratifying patients for treatment. Adrienne is the HTA Corporate Licence Holder for UCL, and Director of the Biobank for Health and Disease at UCL, UCLH and RNOH.

Adrienne is the Meeting Secretary of Pathological Society of Great Britain and Ireland, and a trustee or member of various committees including the Sarcoma UK Research Advisory Committee, The Jean Shanks Foundation, The Chordoma Foundation (USA), and the Ollier's Disease - Red Robin Trust.

## PROFESSOR DAVID HARRISON

### The University of St Andrews

David Harrison is Professor of Pathology at University of St Andrews and holds honorary chairs at Universities of Edinburgh and Florida. He is also Director of Development for Laboratory Medicine in Edinburgh and formerly was Director of the Edinburgh Cancer Research Centre. He is Deputy Director of the MRC Edinburgh/St Andrews Molecular Pathology node. He is Chair of the Department of Health Committee on Carcinogenicity and until summer 2017, Deputy Chair of the Food Standards Agency Committee on Toxicity. His research interests are the application of systems biology to pathology and the integration of digital pathology and omics.

**PROFESSOR SIMON HERRINGTON**
**The University of Edinburgh**
**Cancer Research UK Edinburgh Centre**

Simon Herrington graduated in biochemistry with honours from the University of Cambridge in 1982 and medicine with honours from the University of London in 1985. He trained in Internal Medicine (MRCP 1988) and then became a CRC clinical research fellow in the Nuffield Department of Pathology, University of Oxford, receiving his DPhil in 1991. He was appointed clinical lecturer in Pathology in Oxford where he completed his training in clinical cellular pathology (MRCPath 1994). He was appointed clinical senior lecturer in molecular pathology and consultant in pathology at the University of Liverpool in 1995 and was promoted to a Personal Chair in 1999. In 2003, he was appointed to the Chair of Pathology at the University of St Andrews, moving to the Chair of Pathology at the University of Dundee in 2010 and the Chair of Molecular Cancer Pathology at the University of Edinburgh in 2015. He also works as a consultant pathologist, specialising in gynaecological pathology, was co-editor of the 4th Edition of the WHO Classification of Tumours of Female Reproductive Organs and edited the 15th Edition of Muir's Textbook of Pathology. He sits on the Board of Worldwide Cancer Research and is a past President of the International Society of Gynecological Pathologists. He is Editor in Chief of the Journal of Pathology and the Journal of Pathology: Clinical Research. He has a long-standing interest in the molecular pathology and optical imaging of cancer, collaborating with physical scientists to develop molecular imaging approaches to cancer diagnosis.

**DR GALINA MARSH**
**Biogen**

Galina Marsh received her PhD degree in Pharmacology from University of Medicine and Dentistry of New Jersey. She then joined Harvard Medical School as a postdoctoral fellow and conducted research on protein folding and molecular chaperones. She entered the pharmaceutical industry as a Research Investigator at Eisai Research Institute in Andover, MA, where she worked on development of natural product based anti-cancer therapeutic agents. She travelled to remote locations in Madagascar and Kyrgyzstan while developing novel anti-cancer agents from local natural product extracts. She then joined the Biomarkers and Personalized Medicine Unit at Eisai Co., Ltd., where she led immunohistochemistry assay development and validation for oncology and neurodegenerative disease translational biomarker programs. In 2015, she joined Biogen, Inc. (Cambridge, MA) as the Associate Director of Translational Pathology. The Translational Pathology group supports company-wide biomarker research and target validation efforts to advance the drug development pipeline. The focus of the group is on developing validated and quantifiable tissue based assays, and on connecting molecular analyses with the complexity of morphology.

**DR DUNCAN MCHALE**
**UCB**

Duncan joined UCB in September 2011 as the Head of Global Exploratory Development for UCB. This group is responsible for the early testing of our new therapies in humans in collaboration with the New Medicines Therapeutic area colleagues. The group runs studies from the first time we test the therapy in humans until we have established proof of concept. The group is based in both Braine and Slough and Duncan is based mainly in Braine.

Prior to joining UCB Duncan was the Head of Translational Sciences at AstraZeneca and established the Clinical Personalised Healthcare and Biomarkers group there. The key product the group worked on was Iressa which was AstraZeneca's first Personalised Medicine. Prior to AstraZeneca Duncan was the European Head of Translational and Molecular Medicine at Pfizer and led the biomarker strategy for Maraviroc which is Pfizer's first anti HIV drug.

Duncan is a clinical geneticist and trained in General Adult Medicine at the University of Newcastle upon Tyne and then completed a PhD in the genetics of Cerebral Palsy at Leeds University. He has spent 15 years in Industry focusing on pharmacogenetics, early development and personalised medicine. He was the chair of the EFPIA Pharmacogenetics working party and was one of the authors of the ICH E15 and E16 guidelines focusing on biomarker development and qualification. He is a member of the MRC Stratified Medicine Steering committee.

## PROFESSOR JONATHAN MILL

### The University of Exeter Medical School

Jonathan Mill is Professor of Epigenetics at the University of Exeter Medical School. He graduated with a degree in Human Sciences from Oxford University, where he took a particular interest in cannibalism, before undertaking his PhD in Psychiatric Genetics at the Institute of Psychiatry. After spending three years as a Canadian Institutes of Health Research (CIHR) postdoctoral fellow at the University of Toronto, he returned to the Institute of Psychiatry to establish the Psychiatric Epigenetics group in the MRC Social, Genetic and Developmental Psychiatry Centre. He joined the University of Exeter Medical School in 2012. Jonathan's group studies the role of epigenetic processes in complex disease, with a particular emphasis on neurodegenerative and neuropsychiatric disorders. Current areas of research include: 1) regulatory genomic profiling in post-mortem brain tissue (autism, schizophrenia, depression, and dementia); 2) investigating the role of epigenetic variation in mediating phenotypic/disease discordance between genetically-identical individuals; 3) describing dynamic genomic processes in human brain development and ageing; and 4) exploring interactions between the epigenome, environment and DNA sequence variation, with the aim of undertaking an integrated genetic-epigenetic approach to disease.

More information on their work can be found at www.epigenomicslab.com.

**DR ANCA ONISCU**
**NHS Lothian**

Anca Oniscu is a Consultant Pathologist in NHS Lothian with a special interest in Molecular Pathology. She is the clinical lead of the molecular pathology solid tumour service, which carries out molecular pathology testing of a wide range of tumours with an integrated approach. In addition to molecular pathology, Anca also developed special interests in gynaecological and soft tissue pathology.

**PROFESSOR MARY PORTEOUS**
**NHS Lothian**
**The University of Edinburgh**

Mary has been a Consultant Clinical Geneticist in Edinburgh since 1992 and is currently Service lead for the SE Scotland Genetic Service. She holds honorary Professorships at Edinburgh and Edinburgh Napier Universities. She has a longstanding interest in genetic service development, in particular translating research findings into clinical practice. She was the first chair of the Scottish Clinical Genetic Forum and chaired the Scottish Molecular Pathology Review Group co-authoring the report which lead to the establishment of a Nationally funded Molecular Pathology Consortium. Mary was a co-founder of the Scottish Genetic Education Network (ScotGEN) and is currently lead examiner for the Certificate of Medical Genetics run through the Royal College of Pathologists.

## PROFESSOR MANUEL SALTO-TELLEZ
### Queens University Belfast

Professor Manuel Salto-Tellez (MD-LMS, FRCPath, FRCPI) is the Chair of Molecular Pathology at Queen's University Belfast, Clinical Director for Molecular Diagnostics for Northern Ireland and Deputy Director of the Centre for Cancer Research and Cell Biology.

By Sept 2016, Professor Salto-Tellez was author or co-author of more than 225 internationally peer-reviewed articles in translational science, molecular pathology and diagnostics, including work published in NEJM, Nature Medicine, Gastroenterology, FASEB, EMBO, Cancer Research and Clinical Cancer Research, among others. He has published a similar number of abstracts in international conferences and is editor or contributor to some of the key textbooks of pathology and oncology.

Professor Salto-Tellez studied Medicine in Spain (Oviedo), Germany (Aachen) and The Netherlands (Leiden). He specialised in Histopathology in the UK (Edinburgh and London) and in Molecular Pathology in USA (Philadelphia). For more than 10 years he worked at the National University of Singapore and it's National University Hospital, where he was Associate Professor, Senior Consultant, Director of the Diagnostic Molecular Oncology Centre, Vice-dean for Research and senior scientist at the Cancer Research Institute.

Professor Salto-Tellez serves in the following committees: Colorectal Group of the UK National Cancer Research Institute; Molecular Pathology Committee of the Association of Clinical Pathology; Cancer Research UK Biomarker Expert Review Panel; NCRI CM-Path; UK NEQAS Committee for DNA Quality; Molecular Pathology Committee of Genomics England; Genomics England GCIPs on colorectal cancer and data interpretation; Wales Cancer Research Centre's External Advisory Board (EAB); Cancer Research UK Experimental Medicine Expert review Panel; as well as ad-hoc committees and review panels with NIHR, NIH and others.

He is on the editorial board of the following journals: Journal of Clinical Pathology, Expert Opinion on Molecular Diagnostics, Cytopathology, Journal of Oncopathology and Pathogenesis. He holds more than £5M in competitive grant funding.

**PROFESSOR PHILIPPA SAUNDERS**
**The University of Edinburgh**
**MRC Centre for Inflammation Research**

My research explores the roles played by sex steroids and their receptors in the women's health. Current projects include the role of androgens in fertility and wellbeing, the aetiology of the neuroinflammatory disorder endometriosis and the origins of endometrial cancers – all projects benefit from collaboration with colleagues in pathology and in the use of a wide range of molecular and imaging methodologies. My research benefits from extensive collaborations with Clinical and Non-clinical colleagues, engagement with Pharma and funding from the Medical Research Council. I have published more than 225 papers and I am particularly proud of having supported and mentored more than 50 students during Masters and PhD projects. External to the University I serve as Registrar of the Academy of Medical Sciences.

## PROFESSOR JON SEIDMAN
### Harvard Medical School

Dr. Jonathan Seidman is the Henrietta B. and Frederick H. Bugher Professor of Cardiovascular Genetics at Harvard Medical School. He received his undergraduate degree from Harvard University (1972) and his PhD degree from the University of Wisconsin-Madison. His postdoctoral studies were carried out in Dr. Philip Leder's laboratory at the National Institute of Child Health and Human Development. He has been a member of the Genetics Department, Harvard Medical School since 1981.

The Seidman Laboratory, which Jonathan co-runs with his wife Christine Seidman, MD, studies the genetic basis for human disease. The laboratory's principle focus of research is genetic and non-genetic approaches to define mechanisms leading to human cardiac disease. The current focus of the research is defining the genetic contribution to both adult and pediatric cardiovascular disease using genomic approaches including target-capture DNA sequencing, RNAseq, single cell RNAseq and ChIPseq. To further understand the mechanisms by which gene mutations cause disease, the lab models human mutations in animals and cultured cells. Most recently, they have assessed the effects of sarcomere protein titin mutations on contractile function in induced pluripotent stem cell (iPS) derived cardiomyocytes.

Dr. Seidman is a member of The Genetics Society of America and the American Society of Human Genetics. He has received several awards including the 12th Annual Bristol-Myers Squibb Award for Distinguished Achievement in Cardiovascular Research (2002), jointly with Christine Seidman, MD; the Lefoulon-Delalande Foundation Grand Prix for Science (2007), joint recipient with Christine Seidman, MD; the Katz Prize for Cardiovascular Research awarded by Columbia University School of Medicine (2008), jointly with Christine Seidman, MD; the Distinguished Scientist Award from the American Heart Association (2013) and the Sarnoff Cardiovascular Research Foundation Mentorship Award (2014). He is also a member of the National Academy of Science (2007) and the Institutes of Medicine (2007).

**PROFESSOR WILLIAM WALLACE**
**NHS Lothian**

William Wallace is a Consultant Pathologist at the Royal Infirmary of Edinburgh with an established interest in lung pathology. He has been the lead for respiratory / thoracic pathology in Lothian since 2002 and has developed a national and international reputation as an expert in this area. He has lead significant changes to the way specimens are processed and reported to support developments in lung cancer practice and has played a central role in the introduction of molecular pathology into the lung cancer service. He has served on national and international guideline development groups for lung cancer and interstitial lung disease and advises the RCPath on NICE Health Technology scoping exercises.

**DR JAMES WARE**
**Imperial College London**

James Ware is a Clinical Senior Lecturer in Genomic Medicine at Imperial College London and the MRC London Institute of Medical Sciences and Honorary Consultant Cardiologist at Royal Brompton and Harefield Hospitals. He graduated from the University of Cambridge and pursued clinical training rotations in London and Geneva before undertaking a PhD at Imperial College London. After receiving his PhD he undertook postdoctoral research at Imperial, Harvard and the Broad Institute before starting his research group at Imperial.

James' overarching research aims are to understand the impact of genetic variation on the heart and circulation and to use genome information to improve patient care. He has a particular interest in developing new and quantitative approaches to discriminate between pathogenic and benign genetic variation.

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