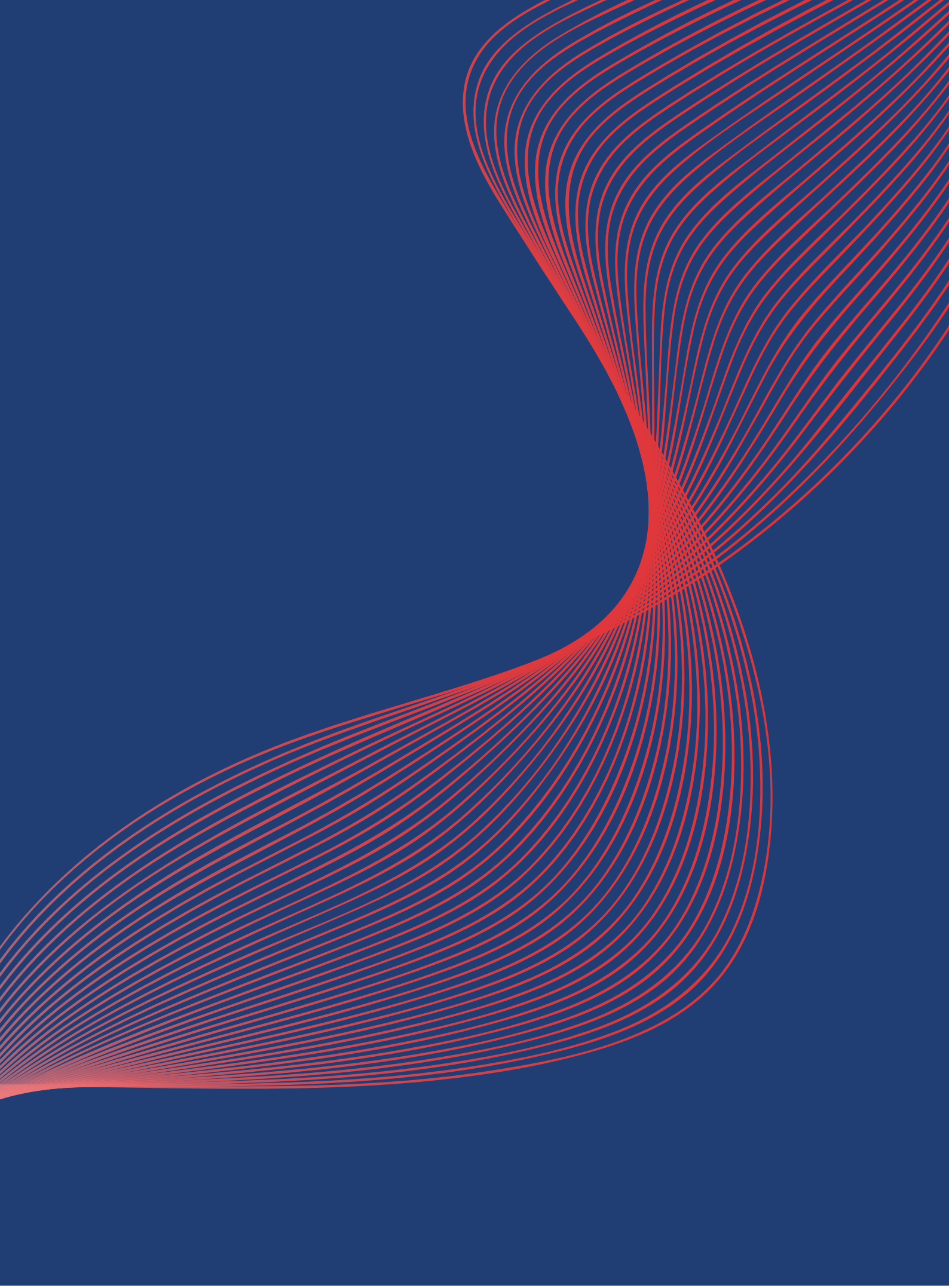
BIOMAG 2022
Birmingham UK

THE 22ND INTERNATIONAL CONFERENCE ON BIOMAGNETISM

28 AUGUST - 1 SEPTEMBER 2022
UNIVERSITY OF BIRMINGHAM
BIRMINGHAM, UK

CONFERENCE BROCHURE

BIOMAG2022.ORG



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WELCOME
TO BIRMINGHAM!

Dear all,

I would like to welcome you to the 22nd International Conference on Biomagnetism in Birmingham. The conference was first planned for 2020 but was postponed twice due to the Covid19 pandemic. We are therefore particularly excited that we finally can go ahead and welcome our dear friends and colleagues to Birmingham. The conference will be in a hybrid format to allow for delegates to partake who cannot travel due to existing Covid19 restrictions or CO2-related travel concerns.

Due to the hard work of the Scientific Committee, we have an exciting and scientifically strong program. Our keynote speakers are international leaders in their respective fields. The topics in the programme cover amongst others cognitive neuroscience, clinical neuroscience and cardiology, as well as the development of software tools and new sensor technology. The researchers selected to present include a diverse group of exceptional researchers. In particular there is a strong representation of young talent from all over the globe which vouches good for the future of our field.

The Biomag2022 conference will be held at the campus of the University of Birmingham. The city of Birmingham has a strong research community on MEG including researchers from Aston University and the University of Birmingham. The MEG and OPM research at the University of Birmingham is conducted at Centre for Human Brain Health. Please come visit us. The conference itself will be hosted in the historical Aston Webb buildings. I hope you will get a chance to explore the university campus as well. The Green Heart is a new parkland in the centre of the university with a range of wildflowers, trees, and water features. If you get a chance to visit, I am sure you will be impressed by the Winterbourne Botanical Gardens as well as The Barber Institute of Fine Arts.

I hope you will also find some time to explore the Birmingham city centre and the surrounding areas. The city is one of the most multicultural in the UK, which is contributing to an eclectic vibe as well as a rich cultural life. The city has been in rapid transition over the last decade and the downtown area has recently been rejuvenated. There are plenty of sites to explore around the centre including the canals intersecting the city.

Over the years the Biomag meetings have been my favourite conference where I have enjoyed learning about the recent developments in our field as well as making new friends and collaborations. It is therefore a great privilege for me to chair the Biomag2022 meeting. I would like to thank the many people involved in organising the Biomag conference. Researchers from the 10 MEG sites in the UK have provided invaluable support as well as the Event Management Team at the University of Birmingham.

I wish you all an inspiring Biomag2022 conference!

Professor Ole Jensen
Centre for Human Brain Health,
University of Birmingham

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Edgbaston Campus Map

- Main hall and breakout rooms
- Green Heart Marquee Exhibition, Catering and registration

R0 The Harding Building
R1 Law Building
R2 Frankland Building
R3 Hills Building
R4 Aston Webb – Lapworth Museum
R5 Aston Webb – B Block
R6 Aston Webb – Great Hall
R7 Aston Webb – Student Hub
R8 Physics West
R9 Nuffield
R10 Physics East
R11 Medical Physics
R12 Bramall Music Building
R13 Poynting Building
R14 Barber Institute of Fine Arts
R15 Watson Building
R16 Arts Building
R17 Ashley Building
R18 Strathcona Building
R19 Education Building
R20 J G Smith Building
R21 Muirhead Tower
R23 University Centre
R24 Staff House
R26 Geography
R27 Biosciences Building
R28 Murray Learning Centre
R29 The Alan Walters Building
R30 Main Library
R31 Collaborative Teaching Laboratory
R32 Teaching and Learning Building
R33 Fry Building
R34 Cuore

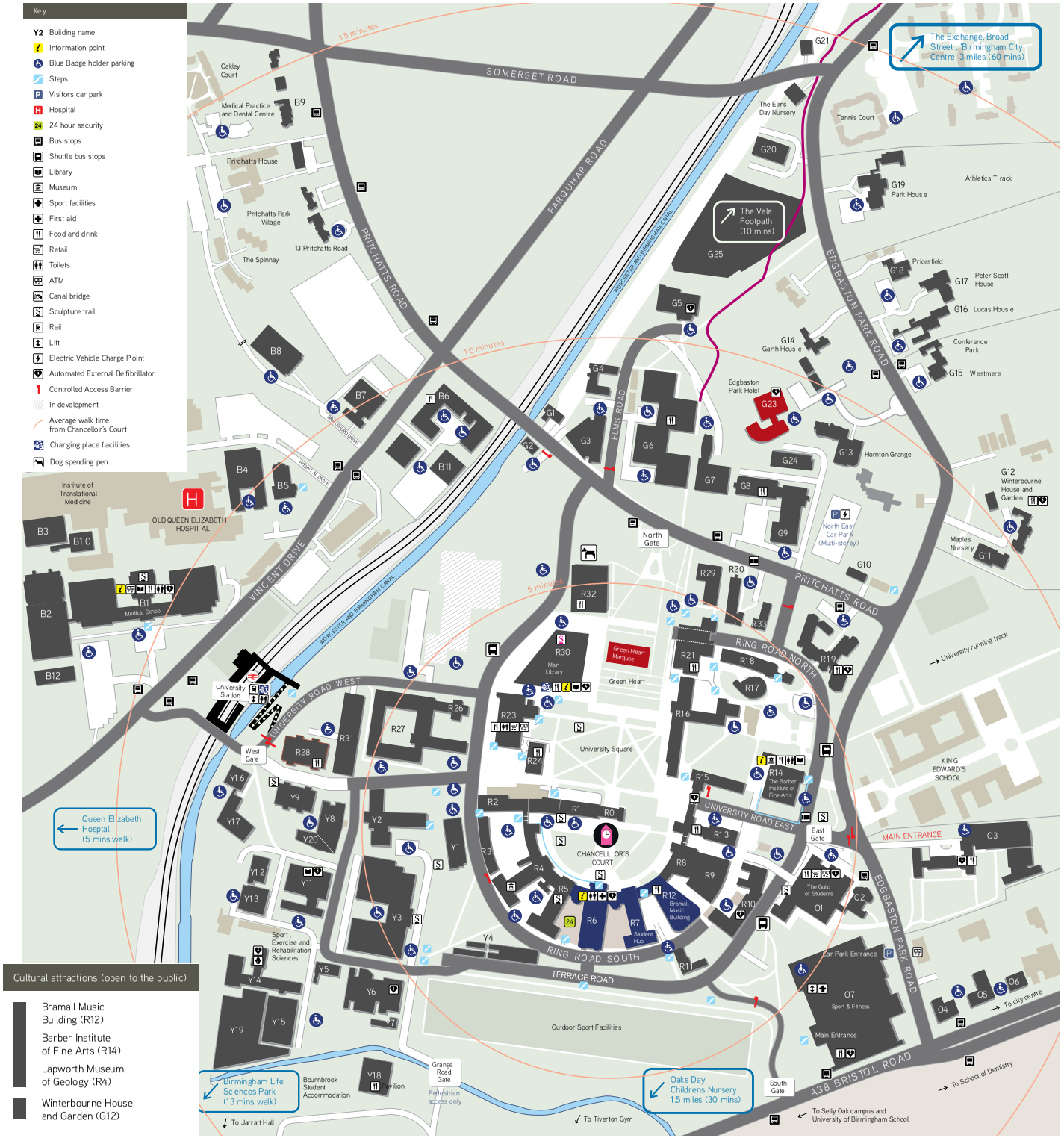
B1 Medical School
B2 Institute of Biomedical Research including IBR West
B3 Wellcome Clinical Research Facility
B4 Robert Aitken Institute for Clinical Research
B5 CRUK Institute for Cancer Studies and Denis Howell Building
B6 Research Park
B7 90 Vincent Drive
B8 Henry Wellcome Building for Biomolecular NMR Spectroscopy
B9 Medical Practice and Dental Centre
B10 Advanced Therapies Facility
B11 BioHub Birmingham
B12 Health Sciences Research Centre (HSRC)

O1 The Guild of Students
O2 St Francis Hall
O3 University House
O4 Ash House
O5 Beech House
O6 Cedar House
O7 Sport & Fitness

G1 32 Pritchatts Road
G2 31 Pritchatts Road
G3 European Research Institute
G4 3 Elms Road
G5 Computer Centre
G6 Metallurgy and Materials
G7 IRC Net Shape Laboratory
G8 Gisbert Kapp Building
G9 52 Pritchatts Road
G10 54 Pritchatts Road – Institute for Global Innovation
G11 Maples Nursery
G12 Winterbourne House and Garden
G13 Hornton Grange
G14 Garth House
G15 Westmere
G16 Lucas House
G18 Priorsfield
G19 Park House
G20 Wolfson Advanced Glasshouses
G22 Elms Day Nursery
G23 Edgbaston Park Hotel and Conference Centre
G24 Centre for Human Brain Health
G25 EcoLab

Y1 The Old Gym
Y2 Haworth Building
Y3 Engineering Building
Y4 Terrace Huts
Y5 Estates West
Y6 Maintenance Building
Y7 Grounds and Gardens
Y8 The School of Engineering
Y9 Computer Science
Y11 Chemical Engineering
Y12 Biochemical Engineering
Y13 Chemical Engineering Workshop
Y14 Sport, Exercise and Rehabilitation Sciences
Y15 Civil Engineering Laboratories
Y16 Institute of Occupational and Environmental Medicine
Y17 Public Health
Y18 Bournbrook Student Accommodation
Y19 NBIF
Y20 UKRRIN

UNIVERSITY OF BIRMINGHAM



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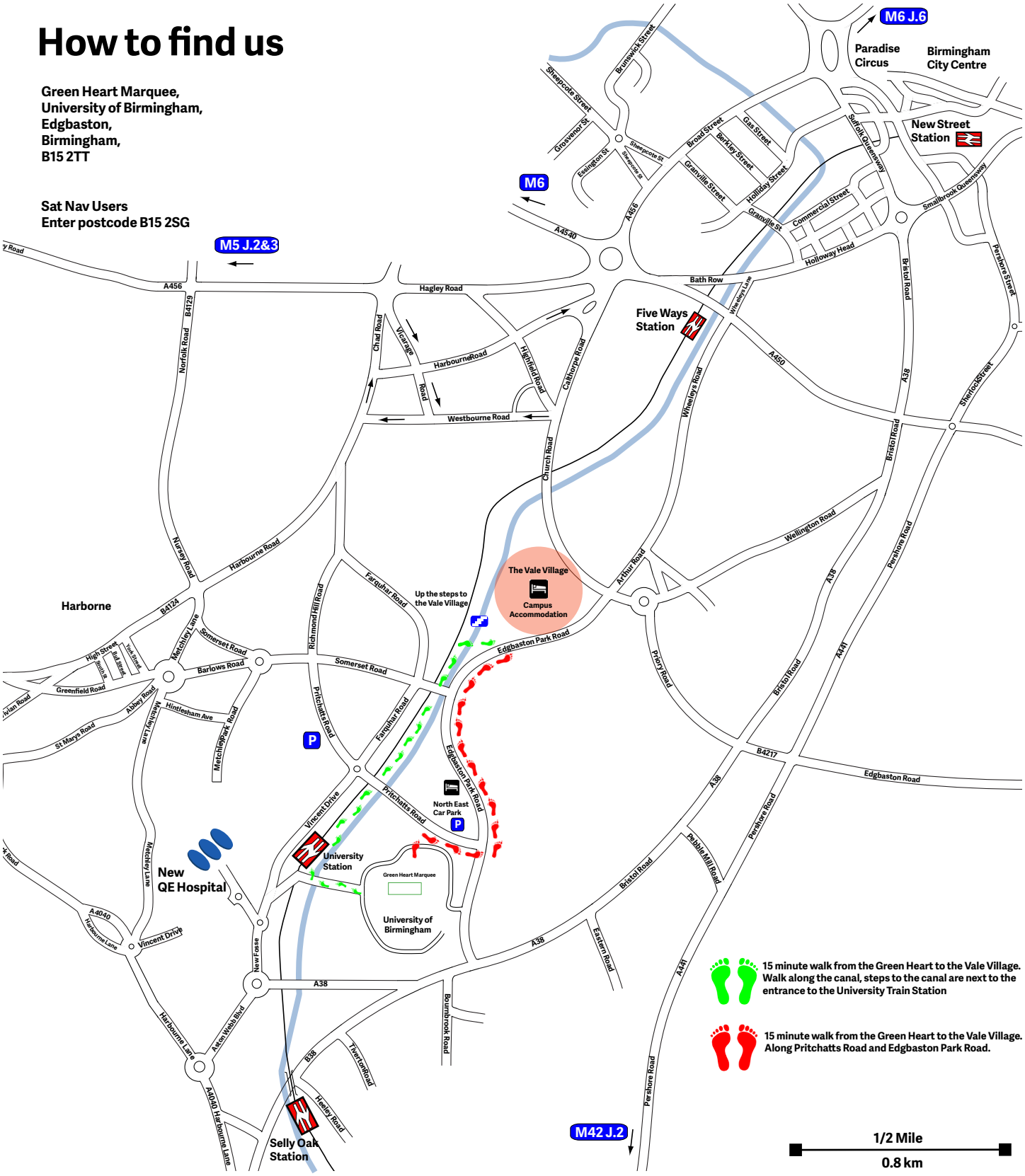

CONFERENCE PROGRAMME

SATURDAY
27 AUG

17.00 - 22.00	Workshop on Optically-Pumped Magnetometers (WOPM) and dinner	Edgbaston Park Hotel

SUNDAY
28 AUG

09.00 - 17.00	Satellite Meetings			Edgbaston Park Hotel
	Workshop on Optically-Pumped Magnetometers – WOPM	Algorithms in Biomagnetism	Hands-on Workshop on Human Neocortical Neurosolver	
	Connecting to the networks of the human brain		European MEG Society one-day satellite workshop	
17.00 - 18.30	Opening Ceremony and reception, Great Hall (in person only) Opening address: Paul Furlong, Emeritus Professor of Clinical Neuroimaging, President for the Association of Neurophysiological Scientists			Great Hall

CONFERENCE PROGRAMME

MONDAY
29 AUG

09.00 - 11.00	In-person Registration, exhibition, and poster viewing (hybrid)			Green Heart Marquee
09.00 - 11.00	WOPM sessions (hybrid)			Great Hall
11.00 - 11.15	Welcome address (hybrid) Professor Ed Wilding, Head of the School of Psychology, College of Life & Environmental Sciences, University of Birmingham, and Prof. Ole Jensen, Centre for Human Brain Health, University of Birmingham and Biomag 2022 Chair			Great Hall
11.15 - 12.15	Keynote: Neural Dynamics of the Primate Attention Network. Professor Sabine Kastner			
12.15 - 13.15	Oral poster presentations (hybrid)			
12.15 - 13.15	Poster session (virtual only)			Online
13.15 - 14.15	Lunch and exhibition viewing			Green Heart Marquee
14.15 - 16.15	Symposium 1: Great Hall Advances and applications in the field of dynamic functional connectivity (hybrid)	Symposium 2: C-block LT Biomagnetic Imaging in Dementia (hybrid)	Symposium 3 (hybrid): Bramall Optically Pumped Magnetometers for Magnetoencephalography	
16.15 - 17.30	Poster session with refreshments – (in person only)			Green Heart Marquee
16.15 - 17.30	Virtual exhibition			Online
17.00 - 18.00	Data analysis competitions: results and discussion			C-block Lecture Theatre

TUESDAY
30 AUG

08.15	Morning refreshments (in-person only)			Green Heart Marquee
08.45 - 10.45	Symposium 4: Great Hall Rhythms in Auditory, Visual, and Audiovisual Speech Processing: Multisensory representations in unisensory cortices and beyond (hybrid)	Symposium 5: Bramall Recent advances in biomagnetic applications of optically pumped magnetometers beyond MEG (hybrid)	C-block LT Early Career Researchers Award Presentations (hybrid)	
10.45 - 11.30	Refreshment break, exhibition and poster viewing (hybrid)			Green Heart Marquee
11.30 - 12.30	Keynote: Professor Stan Dehaene			Great Hall
12.30 - 13.30	Oral poster presentations (hybrid)			Great Hall
12.30 - 13.30	Poster session (virtual only)			Green Heart Marquee
13.30 - 14.30	Lunch, exhibition viewing and poster viewing (hybrid)			Green Heart Marquee
13.30 - 15.30	International Advisory Board meeting (IAB only - hybrid)			Rose Sedgewick
14.30 - 15.30	Poster session (in person only) and Virtual exhibition time			Green Heart Marquee
14.30 - 15.30	Virtual exhibition time			Online
15.30 - 16.00	Refreshment break, exhibition and poster viewing (hybrid)			Green Heart Marquee
16.00 - 18.00	Symposium 6: Bramall How can we study social cognition in the MEG lab? The tug-of-war between experimental control and ecological validity (hybrid) deep brain recordings (hybrid)	Symposium 7: C-block LT Magnetocardiography (hybrid)	Symposium 8: Great Hall New insights from animal and human studies into the functional role of sensorimotor beta burst dynamics (hybrid)	
19.00 - 22.00	Aston University social event			Aston University

CONFERENCE PROGRAMME

WEDNESDAY
31 AUG

08.15	Morning refreshments			Green Heart Marquee
08.45 - 10.45	Symposium 9: Great Hall Time-resolved cortico-subcortical connectivity in patients with deep brain recordings (hybrid)	Symposium 10: Bramall Symposium 10: Multivariate methods to disclose brain networks in multiple functional neuroimaging modalities (hybrid)	Symposium 11: C-block LT Applications of MEG in Psychiatry: The Past, Present and the Future (hybrid)	
10.45 - 11.30	Refreshment break, exhibition and poster viewing (hybrid)			Green Heart Marquee
11.30 - 12.30	Keynote: Prof. Margot Taylor			Great Hall
12.30 - 13.30	Oral poster presentations (hybrid)			Green Heart Marquee
12.30 - 13.30	Poster session (virtual only)			Online
13.30 - 14.30	Lunch, exhibition viewing and poster viewing (hybrid)			Green Heart Marquee
14.30 - 15.30	Poster session (in person only)			
14.30 - 15.30	Virtual exhibition time			Online
15.30 - 16.00	Refreshment break, exhibition and poster viewing (hybrid)			Green Heart Marquee
16.00 - 18.00	Symposium 12: Great Hall Infant MEG: Examining normal and abnormal brain development (hybrid)	Symposium 13: Bramall Oscillations and memory: From local to large-scale synchronization, from working memory to long-term memory, from correlation to causation (hybrid)	Symposium 14: C-block LT Contribution of MEG, EEG and TES to the pre-surgical diagnosis and treatment of epilepsy (hybrid)	
19.00 - 23.00	Conference social event (in-person only)			Custard Factory

THURSDAY
01 SEPT

08.15	Morning refreshments			Green Heart Marquee
08.45 - 10.45	Symposium 15: Great Hall The pathophysiology of mild Traumatic Brain Injury (hybrid)	Symposium 16: Bramall Insights into the laminar basis of neural oscillations: multimodal and multi-species approaches (hybrid)	Symposium 17: C-block LT Tracking neural development of cognitive functions (hybrid)	
10.45 - 11.30	Refreshment break and exhibition viewing (hybrid)			Green Heart Marquee
11.30 - 12.30	Town Hall (hybrid)			Great Hall
12.30 - 13.30	Keynote: Professor Mark Woolrich			

13.30 - 14.15	Lunch and exhibition viewing (hybrid – exhibition closes after lunch)		Green Heart Marquee
14.15 - 15.45	Symposium 18: Great Hall Open source and the MEG community: advancing science together (hybrid)	Symposium 19: Bramall Predicting clinical endpoints from M/EEG: Challenges and opportunities of large-scale data analysis (hybrid)	
15.45 - 16.00	Closing remarks		Great Hall
16.00	Conference closes		

Sabine Kastner,

Professor of Psychology, Princeton Neuroscience Institute, Princeton University

Sabine Kastner is a Professor of Neuroscience and Psychology at Princeton University. She studies the neural basis of visual perception, attention, and awareness in the healthy, adult primate brain, in patients with brain lesions and during development. Kastner is a Fellow of the American Academy of Arts & Sciences, the American Psychological Society, the Society for Experimental Psychology and a Member of the German National Academy of Sciences (Leopoldina). Kastner is passionate about public outreach such as fostering the careers of young women in science, promoting neuroscience in schools and public education and exploring the intersection of visual neuroscience and art.

Neural Dynamics of the Primate Attention Network

The selection of information from cluttered sensory environments is one of the most fundamental cognitive operations performed by the primate brain. This process engages a large-scale network that consists of multiple nodes, distributed across cortical and subcortical regions. The lecture will focus on temporal dynamics within this network that shape both the sampling of and responses to our environment, with an emphasis on thalamocortical interactions. The lecture will also discuss the importance of comparative electrophysiology and neuroimaging in human and monkey brains.

Stan Dehaene,

Professor, Experiential Cognitive Psychology, College De France

Stanislas Dehaene, PhD, is a French psychologist and cognitive neuroscientist. He holds the Chair of Experimental Cognitive Psychology at the Collége de France in Paris. He directs the NeuroSpin center in Saclay, south of Paris, France's advanced brain imaging research center. His research investigates the neural bases of human cognitive functions such as reading, calculation and language, with a particular interest for the differences between conscious and non-conscious processing, and for the impact of education on the brain. Prof. Dehaene is a member of six academies and a recipient of the Brain Prize. In 2018, he became the president of the newly created French Scientific Council for Education, which advises the French government on scientific approaches to learning and teaching. He is the author of multiple books including Reading in the Brain: The Science and Evolution of a Human Invention (2009) and How We Learn: Why Brains Learn Better Than Any Machine...For Now (2020), which were translated into more than fifteen languages.

Tracking mental languages with magnetoencephalography

Natural language is often seen as the single factor that explains the cognitive singularity of the human species. Instead, we propose that humans possess multiple internal languages of thought, akin to computer languages, which encode and compress structures in various domains (mathematics, music, shape...). These languages rely on cortical circuits distinct from classical language areas. Each is characterized by (1) the discretization of a domain using a small set of symbols, and (2) their recursive composition into mental programs that encode nested repetitions with variations. I will present several tasks of elementary shape or sequence perception in which minimum description length in the proposed languages demonstrably captures human behaviour and brain activity, and where magneto-encephalography tracks the postulated mental structures in real time.

Dr Margot J. Taylor,
Director of Functional Neuroimaging,
Hospital for Sick Children and Professor,
University of Toronto

Dr. Taylor is the Director of Functional Neuroimaging and Senior Scientist at the Hospital for Sick Children and Professor in Medical Imaging and Psychology at the University of Toronto. Dr. Taylor's research has centred on the neural bases of social-cognitive development using MEG, fMRI and MRI. She and her team assess functional and structural brain correlates of high-level cognitive skills from early childhood into adulthood, in typically developing, autistic and very preterm-born populations. Her current focus is the application of OPMs to investigate emerging neural signatures of autism in toddlers.

MEG over time: brain function over the years, the lifespan and across disorders

Understanding brain functioning across the age spectrum is fundamental to advancing our knowledge on both typical and atypical development.
In this presentation, I will review some of our studies using MEG throughout development, determining source, connectivity and oscillatory differences between typical development and children and adults with autism or children born very preterm. The protocols include a range of social-cognitive tasks, such as emotional processing, theory of mind and working memory, which have protracted development normally and show deficits in these clinical populations.

Prof Mark Woolrich,
Professor of Computational Neuroscience, Oxford Centre for Human Brain Activity (OHBA), University of Oxford

Mark Woolrich is a Professor of Computational Neuroscience at the University of Oxford, Head of Analysis and Associate Director at the Oxford centre for Human Brain Activity (OHBA), and a Group Leader in the Wellcome Centre for Integrative Neuroimaging (WIN). His background is in engineering science and his early research career was in fMRI analysis, through which he became a key contributor to FSL. His research now focuses on the development of new computational methods for analysing neuroimaging data, including functional MRI and MEG/EEG data; allowing novel questions to be asked about the function and dysfunction of the human brain.

Dynamic Brain Networks and Machine Learning in MEG

This talk will describe how machine learning methods can be used to infer the dynamics of large-scale networks at sub-second timescales from MEG data. This can be used to describe the dynamics of large-scale phase locking networks in rest and task, to infer transient spectral events (e.g. beta bursts), and to provide a link between phenomena such as replay and the activity of resting state networks. The talk will finish with a look at new deep-learning-based approaches, which are offering exciting new possibilities for the future.

SYMPOSIUMS

SYMPOSIUM

NUMBER: 01

Advances and applications in the field of dynamic functional connectivity

Co-chairs:

Arjan Hillebrand, Amsterdam UMC, Vrije Universiteit Amsterdam, Department of Clinical Neurophysiology and MEG Center, Amsterdam, Netherlands, and Prejaas Tewarie, Amsterdam UMC, Vrije Universiteit Amsterdam, Department of Clinical Neurophysiology and MEG Center, Amsterdam, Netherlands

Symposium description:

Cognitively relevant fluctuations in oscillatory neuronal activity typically occur at the millisecond time scale. Interactions between distinct neuronal populations take place at similar time-scales. Magnetoencephalography offers the temporal resolution to characterise these fast fluctuations in functional connectivity. The last decade has brought the field new insights on the estimation of dynamic connectivity, its relevance for cognition, and clinical applications. This ranges from in-depth analysis of sliding window approaches, use of Hidden Markov models, application of Kalman filtering and the use of high temporal resolution metrics of functional connectivity. This symposium will shed light on new methods, but also on applications of dynamic connectivity in cognitive neuroscience and neurological disorders.

Speakers:

Dissociation between phase and power correlation networks in the human brain is driven by co-occurrent neuronal bursts

Rikkert Hindriks, Department of Mathematics, VU University, Amsterdam, Netherlands

Characterization of dynamic resting-state electrophysiological functional connectivity fluctuations: application to clinical populations

Pablo Nunez, Biomedical Engineering Group, University of Valladolid, Spain and Coma Science Group, University of Liege, Belgium

Hidden Markov Modelling of time-varying functional connectivity: implementation and interpretation

Christine Ahrends, Department of Clinical Medicine – Center of Functionally Integrative Neuroscience, Aarhus University, Aarhus, Denmark

Mixtures of large-scale functional brain networks in MEG revealed by DyNeMo

Chetan Gohil, Department of Psychiatry, OHBA, University of Oxford, Oxford, United Kingdom

Wednesday 31 August: 19.00 – 23.00: Main conference social event

Tickets are required to join this event. If you haven't purchased one but would like to attend, please check with the team at the registrations desk to see if there are any available.

Tickets include a street food feat and complimentary drinks. A bar will also be open to purchase additional drinks.

This will take place at the Custard Factory, Gibb Street, Digbeth, B9 4AA.

Please note that there will be coaches taking attendees to the venue from the University of Birmingham and returning to the campus. Further details will be provided during the event.

We have also listed local restaurants and activities on the website. (link to **https://biomag2020.org/**)

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You can find them in the Green Heart Marquee, along with a presence on the virtual event platform

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