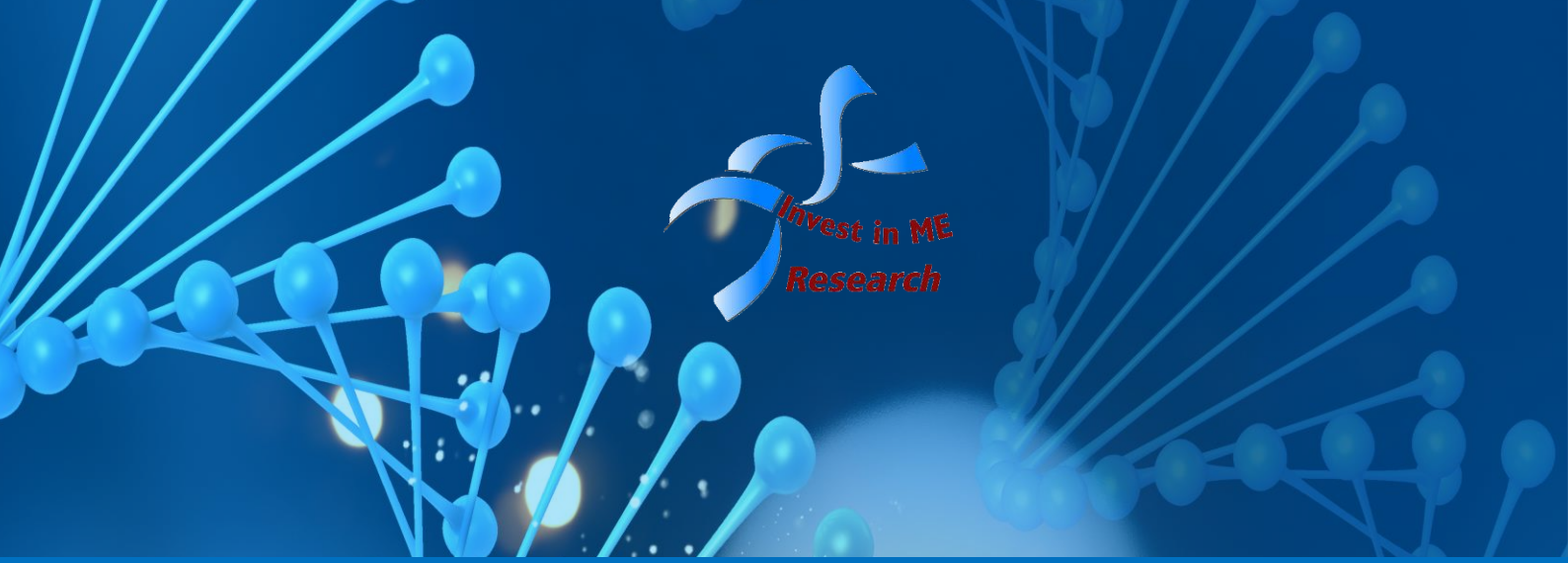
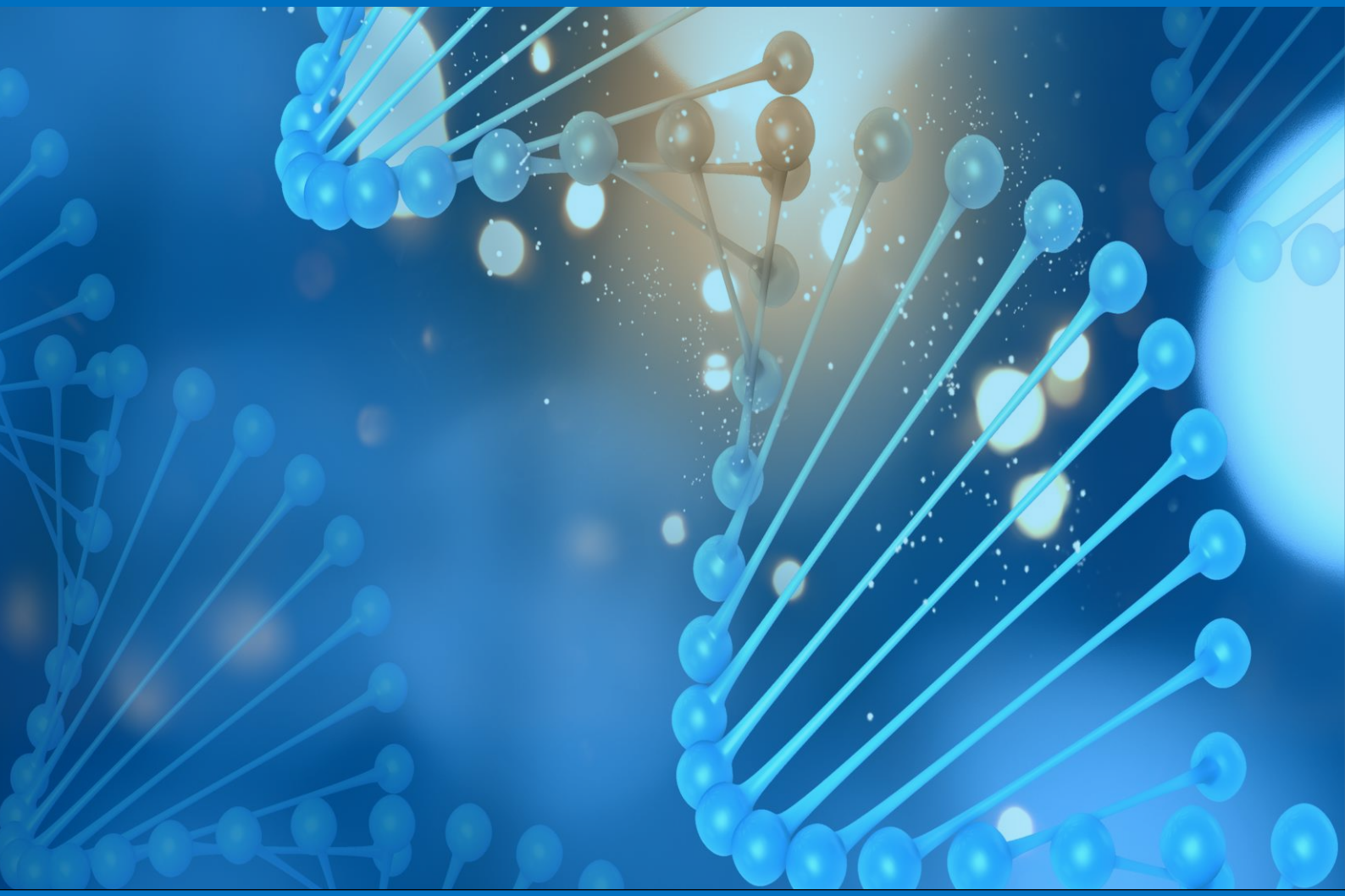


Journal of IiMER



May 2025

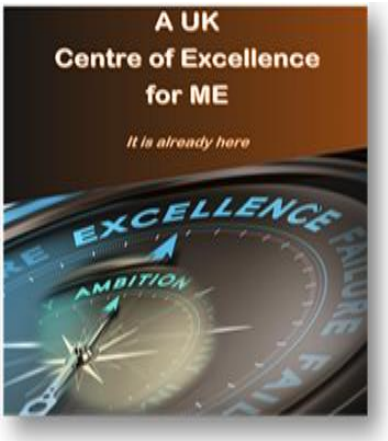
Invest in ME Research

Welcome to International ME Conference Week 2025

Welcome to International ME Conference Week 2025. Another opportunity to reflect on the progress made and the challenges that remain in our objective of improving the lives of people with Myalgic Encephalomyelitis (ME, sometimes referred to as ME/CFS).

We approach the twentieth anniversary of Invest in ME Research and continue to emphasise the urgent need for real, lasting change for people with ME. Our work has spanned pragmatic advocacy, raising standards in education and clinical care, and facilitating and funding biomedical research.

The vision of a Centre of Excellence for ME - an integrated hub for research, clinical trials, and patient care - has been a core element of our strategy. Over the past fifteen years, this vision has taken root at Norwich Research Park, where we have supported pioneering researchers, funded multiple PhD and postdoctoral positions, and enabled the UK's only clinical trial for ME. This progress has only been possible through the dedication of our supporters and the collaborative spirit of the leading researchers.



Norwich Research Park provides a unique environment, combining university, medical school, hospital, clinical trials unit, genomics institute on a single site, with a nearby ME clinic supporting research. This impressive setting has allowed us to lay the groundwork for sustainable progress. Our collaborations with researchers such as Dr Ian Gibson and Professor Simon Carding have resulted in a unique momentum and innovative projects that address the biomedical basis of ME, while support from The Hendrie Foundation, LunaNova and our wider community of supporters.

Recognising that meaningful progress depends on collaboration, we established European networks to enhance research capabilities and promote greater cooperation among scientists across Europe, allowing harmonisation of methodologies and facilitating joint projects. This also included initiating a European network to strengthen the link between clinical experience and research priorities, ensuring that patient needs are central to our efforts. With the launch of Young EMERG (YEMERG), we are facilitating development of the next generation of ME researchers, providing mentorship and resources to ensure this momentum continues.

Over nearly two decades, our charity has worked tirelessly to advance ME research and facilitate meaningful collaborations. Whilst being thankful for the foundations our supporters have enabled and established - evident in the growth of research networks at Norwich and across Europe - we must also acknowledge the persistent challenges that have tempered progress. Our recent experience with the DHSC working group, where our proposals to accelerate research and collaboration were regrettably ignored, serves as a reminder of the obstacles that arise when the same incumbent influences consistently dictate the pace of change, steering outcomes towards predetermined conclusions. As highlighted in our article **Déjà vu?**, published even before we were invited to be involved, such patterns risk perpetuating a status quo in which opportunities for genuine progress are repeatedly missed.

Despite these setbacks, our resolve remains undiminished. The robust research infrastructure and partnerships built through the dedication of our supporters and the wider ME community now offer an invaluable platform for meaningful advancement. It is vital that this momentum is not lost - nor that existing efforts are overlooked, unnecessarily duplicated, and especially not reinvented at the expense of real progress. Instead, we should support the foundations already established, ensuring that the groundwork laid by our collective efforts can be fully realised for the benefit of people with ME.

To new researchers joining our field: you are entering a community that values innovation, collaboration, and the resolve to challenge inertia. In these challenging times for researchers, your commitment is welcome. We invite you to build on these foundations and work with us to improve this critical situation for people with ME and their families.

Our annual international conferences and colloquia have become important platforms for knowledge exchange, setting research priorities, and fostering new collaborations. This year's BRMEC14 colloquium and IIMEC17 conference, focused on translating research into diagnostics and treatments, demonstrate our intent to bridge the gap between scientific discovery and meaningful patient outcomes. Systems biology, which integrates multiple layers of biological data, remains a key focus for discovery of the complex nature of ME.

As we come together for this week of learning, discussion, and collaboration, we invite all delegates to engage fully, share ideas, and forge new partnerships. The collective expertise and dedication within this community are vital to our shared goal: a future where people with ME receive the care, understanding, and hope they deserve, and where a sustained strategy of biomedical research ultimately leads to effective treatments.

Thank you for your continued support and commitment,

Kathleen McCall
Chair, Invest in ME Research
UK charity Nr. 1153730
PO Box 561 Eastleigh SO50 0GQ Hampshire, UK
Email: info@investinme.org Web: www.investinme.org

Sponsoring IIMEC17

Invest in ME Research gratefully acknowledges a generous donation from our European ME Alliance partners, the Irish ME Trust (IMET), to support the IIMEC17 International ME Conference. This vital contribution continues a long-standing partnership that has significantly advanced biomedical research into Myalgic Encephalomyelitis (ME) since the conference series began in 2006.

The charity dedicates substantial resources to organising the conference week, which includes not only arranging the main events but also supporting the European ME Research Group (EMERG), the Young EMERG early-career researcher network, and an increasing number of researchers and clinicians. This support fosters collaboration, brings new expertise into the field, and helps overcome barriers to research progress at a time when funding is increasingly threatened by political and societal challenges. Thanks to supporters like IMET, Invest in ME Research has been able to sustain and augment these efforts each year.

IMET's commitment is especially notable for its longevity and selflessness; for over twenty years, they have supported Invest in ME Research without seeking promotion or special recognition. As a founding member of the European ME Alliance, IMET has played a key role in building a pan-European research community. Their past donations have helped fund important projects such as research at the UK/European Centre of Excellence for ME at Norwich Research Park.

This year, IMET's sponsorship frees Invest in ME Research resources to focus on building research capacity by subsidising attendance for early-career researchers at the IIMEC17 conference, the 14th Biomedical Research into ME Colloquium (BRMEC14), and the Young EMERG Workshop. These events nurture the next generation of ME researchers by reducing financial barriers, encouraging participation, and fostering connections with established experts. Supporting emerging researchers is crucial for sustaining momentum and encouraging innovative, cross-disciplinary approaches.

IMET's support also reflects a broader tradition of generosity from Irish organisations and individuals towards the charity's efforts in facilitating research into ME, funding fellowships, clinical trials, and international CPD-accredited scientific meetings. These efforts have created opportunities for healthcare professionals, patients, and carers to engage with the latest developments in ME research.

The conference week continues to attract and expand a family of international researchers from Europe, North America, and beyond, including representatives from the NIH and CDC, providing a unique platform for advancing biomedical research into ME through open, collaborative dialogue.

Invest in ME Research extends its sincere thanks to the Irish ME Trust for their enduring generosity and partnership. With such partners, Invest in ME Research continues to strive to sustain a global community dedicated to collaboration, innovation, and the development of the next generation of scientific leaders in ME research.

Young EMERG

The European ME Research Group early career researcher network, formed in 2023, brings together the new wave of researchers to form a European support base that can facilitate collaboration with early career investigators in other continents.

The group is linked to the European ME Research Group (*EMERG)*

The Young EMERG 2025 Symposium for Promoting the Advancement of Research Knowledge in ME (SPARK ME) is another a unique gathering tailored for young and early career researchers, and medical students, passionate about advancing research in ME and post-viral illnesses.
Organised by Young EMERG and Invest in ME Research, YE SPARK ME aims to facilitate collaboration, knowledge exchange, and networking among early career researchers in the field of ME.
At SPARK ME, early career researchers have the opportunity to showcase their work through oral and poster presentations.

The event offers a safe space for early career researchers to discuss challenges and gain valuable insights into pursuing ME research. Through engaging talks, participants will be equipped with knowledge of postdoctoral research funding opportunities, career development and ME/CFS study design and much more!
For this year's event the different nationalities and career stages of those attending the workshop consist of 25% of attendees being UK-based, 45% are based in other European countries, and around 20% are US-based. Then there are a few people from other countries, such as Australia and South Africa. Around half of them are PhD students, the rest are post-docs, other academic researchers, undergraduate students, and some other various job descriptions.

The attendees represent a wide range of research fields, primarily within the biological sciences, including electrophysiology, immunology, neuroscience, genetics, metabolomics, and metagenomics. Additionally, participants from the medical sciences, such as medicine, cardiology, and public health, and from computational and data sciences, including biomarker mining, bioinformatics, and statistics, contributed to the vibrant interdisciplinary atmosphere.
The event even attracts PIs – although not always with the approval of the younger researchers!

"The most helpful aspect of the conference was] … giving perspectives from other fields and learning how they connect to my own"

Young EMERG published a well-received paper last year – Advancing Research and Treatment: An Overview of Clinical Trials in Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS) and Future Perspectives - **https://www.mdpi.com/2077-0383/13/2/325**

Young EMERG Joins WHO Youth 4 Health

In 2023, the European ME Alliance (EMEA) achieved Non-State Actor accreditation from WHO's Regional Office for Europe, enabling active participation in WHO meetings and ensuring ME representation in WHO initiatives. In 2024, as part of the EMERG/EMECC/EMEA/YE strategy, we facilitated the connection of Young EMERG to the WHO Youth4Health network, strengthening ties between ME advocacy and European health initiatives. Johanna Rohrhofer from the Medical University of Vienna has been the representative for YE and passes that role to another in YE this year.

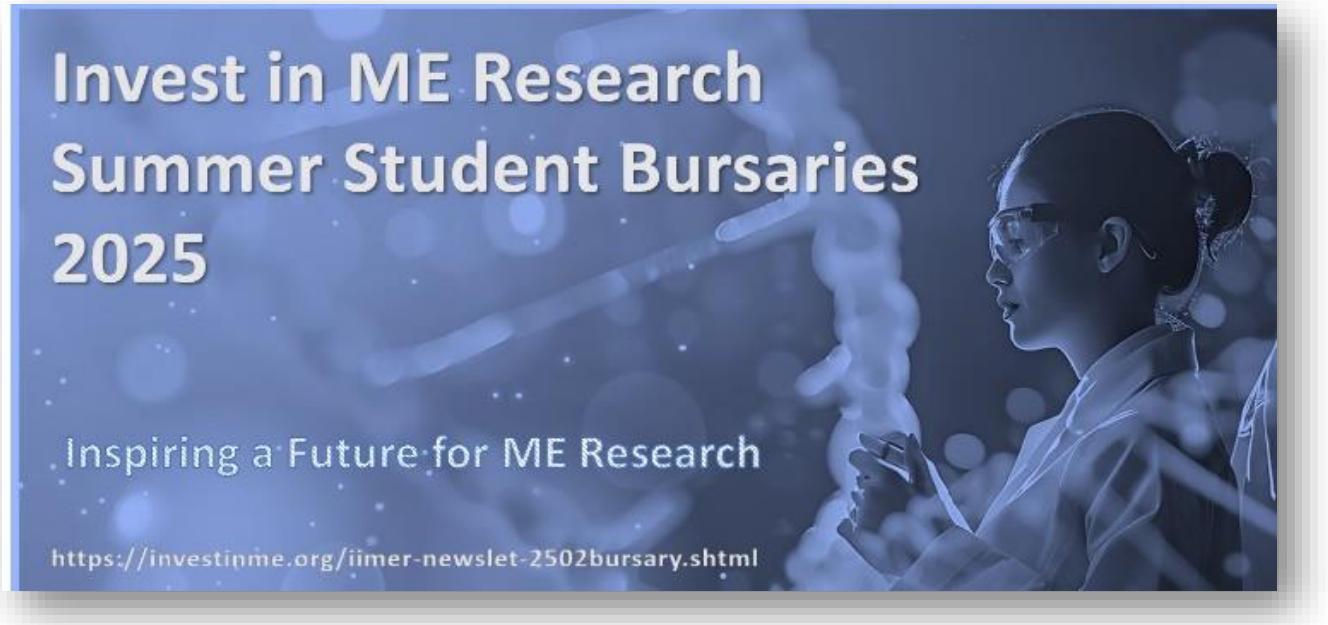
At last year's WHO Regional Committee for Europe, key groups including the European ME Research Group (EMERG), and Young EMERG (supported by WHO's Youth4Health) convened in Copenhagen to highlight ME as a major health challenge and promote youth engagement in European health policy.

Their shared priorities include:

- Official recognition of ME/CFS as a somatic illness by WHO
- Implementation of WHO ICD codes for ME/CFS in national health systems
- Ensuring timely physical, financial, medical, and social support for sufferers
- Incorporating the latest scientific evidence into medical curricula
- Developing disease registries using current diagnostic criteria
- Securing funding for biomedical research
- Rapidly advancing Centres of Excellence for MES

During the NSA event, Young EMERG represented youth perspectives in a private meeting with Dr Hans Kluge, WHO Regional Director for Europe. As our first Youth4Health focal point, Young EMERG connects early career researchers, fostering long-term commitment to ME research, care, and policy improvements.

Through Youth4Health, WHO offers young people a platform to influence health policy, amplifying ME issues within WHO discussions and promoting understanding among youth and healthcare stakeholders. The partnership equips young researchers with resources to build collaborative, interdisciplinary networks and advocate for funding during critical career stages.



Summer Bursaries: Inspiring a Future for ME Research

Invest in ME Research, in collaboration with the Quadram Institute at Norwich Research Park, announced the Summer Student Bursaries for 2025. These bursaries are designed to support undergraduate students in gaining practical experience in biomedical research, with a focus on Myalgic Encephalomyelitis (ME). This initiative aligns with the charity's objective of raising education and fostering the next generation of doctors and researchers.

The discovery of new treatments relies heavily on research into the causes of the disease. The Summer Student Bursaries provide a unique opportunity for students to contribute to this vital research while developing their skills and knowledge in biomedical science. Simultaneously, it raises awareness of ME and influences the next generation of the medical community, which in turn influences peers.

This is not the first time Invest in ME Research has funded summer students, having done so in recent years.

Three eight-week bursaries are being offered, with involvement in various research projects at the Quadram Institute. These projects include investigating the virome in mucosal cavities, exploring fungal and yeast diversity, identifying microbes driving inflammation, analysing the prevalence of fungal infections, and studying gastrointestinal viruses in ME patients.

Each project offers hands-on experience with advanced molecular and microbiological techniques, providing a solid foundation for future careers in biomedical research.

1PhDs and Students Funded by Invest in ME Research at our IIMEC10 conference

There have been over 50 applications for these Invest in ME Research Summer Student bursaries. Quadram Institute had interviewed candidates and offered three applicants these awards, and they have all been accepted. The successful applicants will begin in July.

Thanks to our supporters for making this possible.

Invest in ME Research Fellowships

Invest in ME Research, in partnership with the Quadram Institute, has established two key fellowships based at Norwich Research Park: the Ian Gibson Fellowship and the LunaNova Fellowship. These fellowships are designed to advance biomedical research into myalgic encephalomyelitis (ME), focusing on understanding disease mechanisms and developing new treatments. Both fellowships address the critical need for dedicated ME research funding and expertise in the UK. They strengthen the research base at the centre, and support ongoing clinical trials and PhD studentships.

Ian Gibson Fellowship

Launched in 2022 and named in honour of Dr Ian Gibson, this is the first postdoctoral fellowship in the UK dedicated to ME research. The fellowship supports fundamental biomedical studies, particularly in gut health, microbiology, and immunology. It is part of the broader strategy to develop further a UK Centre of Excellence for ME at Norwich Research Park, ensuring continuity and growth of ME research in a collaborative, multidisciplinary environment.

LunaNova Fellowship

Introduced in 2023 and funded by the technology company LunaNova, this two-year fellowship further expands ME research capacity at the Quadram Institute. The LunaNova Fellowship focuses on the gut-immune-brain axis and the search for biomarkers, with strong links to international partners, including the European ME Research Group. This collaborative approach brings together expertise from across Europe and supports the development of a robust research ecosystem for ME.

Our LunaNova fellowship – Krishani Perera

Dr Krishani Perera, PhD, was awarded the Invest in ME Research Luna Nova Fellowship and joined Professor Simon Carding's laboratory at the Quadram Institute of Bioscience (QIB) in Norwich in July 2024. As a recent entrant to the field of ME research, Krishani is highly motivated to contribute to ongoing investigations into the causes and treatment options for ME/CFS at QIB.

Her two-year fellowship will focus on understanding the link between the reactivation of human endogenous retroviruses (HERVs)-genes embedded within our genome, usually kept inactive-and the accelerated ageing of immune cells in ME/CFS patients. This work is based on clues from previous studies which have shown either dysfunctional immune cells, signs of premature ageing, or the reactivation of different HERV families in people with ME/CFS. Krishani's project aims to demonstrate a causal link between these findings, exploring whether the reactivation of HERVs plays a key role in cellular and immunosenescence, which could help explain the origins of

ME/CFS. Her research will also contribute to the RESTORE-ME clinical trial, a phase IIb, placebo-controlled study investigating microbiota replacement therapy in ME/CFS patients at the Quadram Institute.

Krishani brings a strong background in virology and molecular biology, having completed her PhD in Pathobiology and MSc in Veterinary Biomedicine at Kansas State University, USA. Her research there focused on discovering and characterising antiviral compounds against animal and human coronaviruses, including SARS-CoV-2, and studying how viruses develop resistance to these treatments. She also worked on animal caliciviruses and explored host susceptibility to SARS-CoV-2 during the COVID-19 pandemic. Following this, Krishani undertook postdoctoral research at Irset in Rennes, France, where she investigated immune responses and the persistence of viruses such as Zika, Chikungunya, and Mumps in immune-privileged sites in the human body.

At the Quadram Institute, Krishani is examining ME/CFS through a microbial lens, focusing on the detection of microbes-especially viruses-that may be involved in the condition. She explains, “My research focuses on detecting microbes, particularly viruses, that may be involved in ME/CFS.”

ME/CFS is a serious and often disabling condition, affecting an estimated 17 to 24 million people worldwide, including around 250,000 in the UK. Despite its prevalence, ME/CFS remains under-recognised and is frequently misunderstood and misdiagnosed. Those affected experience a wide range of symptoms, including extreme exhaustion following minimal mental or physical activity (post-exertional malaise), immune dysfunction, and digestive issues. These symptoms can make daily life overwhelming, and many people with ME rely on carers for basic activities such as eating and personal hygiene. As Krishani notes, “Many individuals with ME/CFS face severe mobility issues. This means we must prioritise patient accessibility and comfort when collecting samples, ensuring our studies are as inclusive and accommodating as possible.”

Currently, there is no cure for ME/CFS and the exact cause remains unknown. Krishani explains, “We believe it’s due to a combination of factors, including viral or bacterial infections, immune system dysfunction, and persistent immune activation.” In Professor Carding’s group, Krishani and her colleagues are striving to bring scientific clarity to ME/CFS and to help those affected by this debilitating condition.

While no single virus has been definitively linked to ME/CFS, several are suspected to play a role, with many patients reporting viral infections such as SARS-CoV-2 prior to the onset of symptoms. Some viruses can persist in the body long after the initial infection and may contribute to ongoing immune dysfunction, but research to date has not provided a clear picture and conclusions remain elusive.

Krishani is investigating the links between microbes present in mucus and blood and the development of ME/CFS. At the Quadram Institute, a study funded by Invest in ME Research-the COMPASS ME Study-will analyse the mucosal microbial communities, including viruses, bacteria, and fungi, in individuals with and without ME/CFS. She is also examining the communities of viruses in the bloodstream of people with ME/CFS to determine whether they play a role in immune dysregulation. Part of her research involves studying microbial

extracellular vesicles-tiny membrane-bound packages that may carry microbial components and could serve as diagnostic or therapeutic marker targets for ME/CFS.

Her path to researching the role of viruses in ME/CFS is grounded in her extensive experience in molecular virology. She says, “My expertise spans from identifying antiviral compounds to understanding how viruses develop resistance.” Her work has deepened her interest in how certain viruses evade immune responses and contribute to long-term health issues.

Looking ahead, Krishani hopes to develop future diagnostics for ME/CFS. “Longer term, I want to understand ME/CFS pathology and disease progression. By identifying potential causes and underlying mechanisms, I hope to contribute to the development of better diagnostic tools for early and accurate detection. Ultimately, my goal is to explore effective and targeted treatments to improve patient outcomes and quality of life.”

She stresses the complexity of ME/CFS: “Because there is no one known cause for ME/CFS and it’s a complex condition with interconnected biological mechanisms, we need to be cautious when interpreting data on potential links between symptoms, immune dysfunction and microbes. A simplistic approach could overlook crucial factors, so a comprehensive, interdisciplinary perspective is essential when studying ME/CFS.”

Krishani concludes, “At the end of the day, it’s not just about scientific rigour but about raising awareness-not only to improve research and treatment options but also to foster empathy and respect for those living with this invisible illness. By understanding ME/CFS, we can help create a more supportive and inclusive world for those affected.” She expresses her gratitude: “I am very grateful to the Invest in ME Research charity and the LunaNova fellowship for their support with funding for the research I am conducting.”

Further information: **https://tinyurl.com/Quadram-Krishani**

Light ME Up: Red Light Therapy Study for ME at Quadram Institute

The Quadram Institute, in partnership with the University of East Anglia (UEA) and with support from Invest in ME Research, is conducting a feasibility study called Light ME Up to explore the potential of red light therapy for ME. Launched in 2024, this study investigates whether photobiomodulation can help relieve symptoms of ME. By targeting mitochondrial dysfunction, thought to contribute to ME’s debilitating fatigue, the study aims to open new avenues for treatment.

Light ME Up was set up initially to involve ten participants with ME, recruited through the charity’s network. This has now been expanded. The lamp is designed to stimulate mitochondrial function and

potentially boost cellular energy. Participants' symptoms are tracked for two weeks before and after the intervention using the FUNCAP27 questionnaire, online cognitive tests, activity monitors, and sleep diaries. The study, which received ethical approval from UEA, lasts seven weeks per participant, covering baseline, intervention, follow-up, and feedback.

Led by Dr Katharine Seton, IiMER Ian Gibson Fellowship holder, the study hypothesises that PBM may improve physical and cognitive function by enhancing mitochondrial ATP production. The team is also piloting Mantal, an online research management platform, to facilitate participation for those who are house- or bed-bound-ensuring the study is accessible and patient-inclusive.

The Light ME Up study is a modest yet significant step in ME research, reflecting IiMER and Quadram's commitment to exploring novel interventions. By testing PBM's feasibility and refining remote research methods, the study lays groundwork for scalable trials and enhanced patient engagement.

From Broken Wings to Clearer Skies: Finding New Paths for Connection

Invest in ME Research has been active on Twitter (now X) since the early days of the platform's existence. Twitter has long served as a valuable tool for raising awareness about the charity's work, including the research being funded and facilitated at the Norwich Research Park centre.

Yet it will not have escaped many people's notice that times have changed. The last thing people with ME, or their families and carers, need is added stress or an environment that many now consider toxic and unproductive. Despite this, a platform is still necessary for learning, sharing, and discussing ME-related issues and progress.

Invest in ME Research has been active on Bluesky for some time, and we are gradually sharing more of our news on this platform. Our website will be updated in the next revision to include this new platform.

If you are on Bluesky, you can find us at: **https://bsky.app/profile/investinmeresearch.bsky.social**

Invest in ME Research 2026 International ME Conference Week

Continuing our commitment to international collaboration, Invest in ME Research has already set dates for International ME Conference Week 2026 – **25–29 May 2026**. This will also be the twentieth anniversary of the charity being formed - and twenty years since our very first conference.

BRMEC14 – Integrating Systems Biology in ME Research

The 14th Biomedical Research into ME Colloquium, themed "Investigating the Mechanisms of Myalgic Encephalomyelitis: From Pathogenesis and Aetiology to Treatment Innovation," places systems biology at the heart of efforts to address the complexities of ME and related conditions such as Long Covid.

ME, classified as a neurological disorder (ICD-11: 8.E49), presents with diverse symptoms affecting immune, neurological, endocrine, and metabolic systems. Despite decades of research, its mechanisms remain unclear, with hypotheses including viral triggers, immune dysregulation, and mitochondrial dysfunction. The disease's complexity and patient heterogeneity have hindered progress in identifying causal pathways and targeted treatments.

Systems biology offers a holistic framework by integrating genomics, proteomics, metabolomics, and environmental data to model complex biological networks. This approach reveals emergent properties and dynamic processes often missed by traditional methods, making it well suited to ME's multisystem nature. Key features include multi-omics integration, computational modelling, and network analysis, which together help identify crucial biological interactions and therapeutic targets.

A core strength of systems biology is its ability to bridge laboratory discoveries with clinical observations. By integrating patient data with experimental findings, researchers can stratify patients into meaningful subgroups, aiding biomarker discovery and personalised medicine, as well as informing clinical trial design.

BRMEC14 brings together experts such as Tamas Korcsmaros, Dezso Modos, Marton Olbei (Imperial College London), Anna Niarakis (Toulouse University), and Aurelien Dugourd (EMBL-EBI), who are at the forefront of systems biology and computational medicine. Their collective expertise accelerates the translation of complex data into actionable insights:

Disease Mapping: Dr Anna Niarakis's work on disease maps for rheumatoid arthritis and COVID-19 demonstrates how these tools can be adapted for ME, integrating multi-omics data to visualise mechanisms and identify targets.

Multi-Omics Integration: The Saez-Rodriguez group, presented by Aurelien Dugourd, illustrates how combining diverse datasets can illuminate chronic disease mechanisms, enabling drug repurposing and novel treatments.

Network Medicine: Tamas Korcsmaros's expertise in network analysis helps elucidate interconnected pathways in ME, providing a foundation for targeted interventions.

Cell-Cell Communication: Marton Olbei's research maps changes in cell communication during inflammation and infection, offering deeper insights into disease mechanisms.

Computational Modelling: Dezso Modos applies advanced models to decipher complex biological networks and signalling pathways, enhancing understanding of disease dynamics and supporting novel therapeutic target identification.

Recent studies show that ME/CFS, Gulf War Syndrome, and Fibromyalgia share metabolic disruptions, especially in lipid metabolism and energy production, alongside increased oxidative stress driving cellular damage and inflammation. Identifying reliable biomarkers is essential for earlier diagnosis and targeted therapies, with comprehensive metabolomic and proteomic analyses playing a vital role.

Invest in ME Research's focus on systems biology at BRMEC14 aims to help solve this continuing and devastating medical puzzle. By integrating computational, experimental, and clinical perspectives, systems biology stands to transform understanding of ME-from pathogenesis to treatment innovation. This holistic approach is crucial for addressing the variability and elusive nature of the disease.

Long Covid and ME/CFS: Overlapping symptoms, shared research, and implications for diagnosis and treatment

Long Covid and ME/CFS share striking similarities, necessitating research into their overlapping symptoms, shared biological mechanisms, and implications for diagnosis and treatment-hence their inclusion in the BRMEC14 colloquium. Both conditions, often triggered by viral infections, present with post-exertional malaise (PEM), profound fatigue, cognitive dysfunction, and autonomic issues, complicating differential diagnosis.
Recent studies suggest common pathophysiological pathways, including immune dysregulation, mitochondrial dysfunction, and neuroinflammation, driving collaborative research.
A 2023 study in Nature Reviews Microbiology noted that up to 50% of Long Covid patients meet ME/CFS diagnostic criteria, with PEM as a hallmark. Shared biomarkers-such as elevated cytokines, reduced natural killer cell function, and altered metabolomic profiles-point to common immune and metabolic deficits. For example, a 2024 NIH study identified T-cell exhaustion in both conditions, while metabolomic analyses reveal hypometabolism, suggesting potential diagnostic markers. These findings underscore the need for precise diagnostic tools to distinguish or co-diagnose the conditions, as misdiagnosis risks inappropriate treatment.

Research synergies are accelerating progress. Long Covid's global attention has boosted funding for ME/CFS. Trials targeting mitochondrial function, such as photobiomodulation (Quadram Institute, 2024), and immunomodulators like rapamycin (Mayo Clinic, 2025) show promise for both. BRMEC14 brings together researchers, clinicians, and patient advocates to discuss these advances. The focus on immunology, metabolomics, and patient-involved research provides a platform for sharing data, refining hypotheses, and planning multicentre studies, strengthening the ME/CFS research ecosystem.

The implications are significant. Improved diagnostics could emerge from validated biomarkers, while shared treatment strategies may alleviate symptoms like PEM and fatigue. However, challenges remain, including heterogeneous patient cohorts and limited funding. BRMEC14 aims to foster collaboration and support efforts to translate research into better care for those with ME/CFS and Long Covid.

International ME Conference Week Speakers

A hallmark of the BRMEC colloquia, since their inception in 2011, has increasingly been to take an approach of bringing together experts from various fields and countries, and introducing fresh perspectives to ME research. This aids in stimulating new ideas to accelerate progress and new knowledge and awareness to be raised amongst researchers.

By consistently introducing varied expertise to the field, these events have become a catalyst for innovative thinking in ME research, with the ultimate goal of improving understanding and treatment of this debilitating condition.

Colloquium and Conference Chair

Simon Carding (Quadram Institute, UK) Research Leader, Quadram Institute Bioscience, Norwich Research Park, UK

Simon Carding is Professor of Mucosal Immunology at Norwich Medical School, University of East Anglia, and Research Leader at the Quadram Institute Bioscience, Norwich Research Park. He is internationally recognised for his expertise in mucosal immunology and the gut microbiome, focusing on how gut microbes-including bacteria and viruses-interact with the immune system to influene health and disease.

He leads projects investigating the role of the intestinal microbiome and virome in ME, aiming to identify microbial and viral signatures linked to disease onset or progression. His team is conducting comprehensive analyses of the gut virome in ME, including patients in phase 2 clinical trials, to clarify the impact of microbial dysbiosis on the condition and the gut–microbiome–brain axis, with relevance to mental health and neurodegenerative diseases.

Professor Carding has been a consistent contributor to Invest in ME Research conferences since 2011, delivering expert talks on gut biology, immunology, and ME. He is a member of the Biomarkers and Immune Working Groups of the ME/CFS Common Data Element Project, reflecting his active role in shaping ME biomedical research. His leadership at the Quadram Institute and collaborations with other institutions highlight his commitment to multidisciplinary research bridging immunology, microbiology, and clinical science to improve understanding and treatment of ME.

BRMEC14 Session: Systems Biology Approaches to Study Infections in Complex Diseases

Session Chair: Tamas Korcsmaros (Imperial College London)

Tamas Korcsmaros is a distinguished researcher and lecturer at Imperial College London, specialising in systems biology and network medicine. His work focuses on understanding the complex interactions within biological systems to uncover the mechanisms underlying diseases. With a strong background in bioinformatics and computational biology, he has made significant contributions to the field, particularly in network analysis and multi-omics data integration.

Dr Korcsmaros is known for his innovative approaches to deciphering the intricate web of molecular interactions that influence health and disease. His research aims to bridge the gap between basic science and clinical applications, seeking to identify new therapeutic targets and strategies for treating complex conditions.

At BRMEC14, Dr Korcsmaros will moderate the session on systems biology, bringing his expertise and insights to facilitate discussions on the latest advancements and future directions in the field. This session underscores the importance of integrative and collaborative research efforts in advancing our understanding of ME.

Aurelien Dugourd (Saez-Rodriguez Group, EMBL-EBI, UK)

BRMEC14: Application of Systems Biology to Understand Complex Chronic Diseases

Aurelien Dugourd is a Staff Scientist in the Saez-Rodriguez Group at the European Bioinformatics Institute (EMBL-EBI), UK, specialising in computational biology and multi-omics data integration. His work focuses on developing methods to extract mechanistic insights from genomics, proteomics, and metabolomics data, with the goal of understanding disease processes and supporting therapeutic innovation. Dr Dugourd's research is particularly relevant to complex chronic diseases such as ME/CFS, where intricate molecular interactions contribute to disease heterogeneity.

The Saez-Rodriguez Group, led by Julio Saez-Rodriguez, is renowned for its expertise in computational biology and systems medicine. The group's research integrates computational modelling with experimental data to unravel the molecular mechanisms underlying complex diseases. Their work aims to translate intricate biological data into actionable insights, driving the development of new therapeutic strategies.

At BRMEC14, Aurelien will share his insights and the group's latest advancements in systems biology. His presentation will highlight how integrating multi-omics data can provide a comprehensive understanding of disease pathogenesis, particularly in ME. His participation underscores the importance of interdisciplinary research and collaborative efforts in advancing our knowledge of this complex condition.

Anna Niarakis (Université de Toulouse III-Paul Sabatier - CNRS, France)

BRMEC14: Disease Map Concept and its Application for Complex Conditions

Dr. Anna Niarakis is a Full Professor of Computational Systems Biology at the University of Toulouse III-Paul Sabatier, affiliated with the Centre de Biologie Intégrative (CBI) and the Laboratory of Molecular and Cellular Dynamics. A prominent researcher with a multidisciplinary background in biochemistry, biology, pharmaceutical technology, and computational systems biology, Dr. Niarakis brings valuable expertise in systems biology and bioinformatics to the BRMEC14 colloquium.

Internationally recognized for her leadership in disease mapping, Dr. Niarakis integrates diverse biological and multi-omics data to create detailed maps of molecular pathways and cell communication, advancing our understanding of complex diseases such as rheumatoid arthritis and COVID-19. Her experience in developing and applying disease maps demonstrates her ability to adapt these approaches to a range of conditions. At BRMEC14, Dr. Niarakis will showcase how these comprehensive disease maps can significantly advance ME research by providing an integrated representation of its complex mechanisms. Her work supports the identification of key pathways, the discovery of potential therapeutic targets, and the improvement of biomarker discovery, disease subtype characterization, and predictive modeling. Her contributions to collaborative projects like the COVID-19 Disease Map may highlight the potential for similar international efforts in ME research.

Dr. Niarakis' expertise in integrating complex biological data provides valuable insights into disease progression and heterogeneity, supporting a deeper understanding of ME. Her participation in the colloquium underscores the importance of integrative, data-driven approaches in understanding the complexities of ME, paving the way for improved diagnostics and targeted therapies.

Marton Olbei (Imperial College London, UK)

BRMEC!4: Mapping Cell-Cell Communication and its Changes Upon Inflammation and Infection

Dr Marton Olbei, a research associate in the Tamas Korcsmaros Lab at Imperial College London, is a specialist in computational systems biology and network medicine. His work focuses on developing computational tools to map how cellular communication networks are altered by infection or inflammation – an approach directly relevant to understanding immune dysregulation in ME/CFS.

At BRMEC14, Dr Olbei will present on "Mapping Cell-Cell Communication and Its Changes Upon Inflammation and Infection", demonstrating how advanced network analysis and multi-omics data integration can reveal how disease states disrupt cellular interactions. This systems biology approach helps identify key molecular pathways, potential biomarkers, and therapeutic targets by deciphering the complex immune and cellular networks involved in ME/CFS.

Dr Olbei's expertise, combined with the Korcsmaros Lab's pioneering work in predictive computational modelling, supports the development of personalised medicine and deeper mechanistic insight into ME/CFS pathophysiology. His participation at BRMEC14 highlights the importance of collaborative, integrative research for tackling the complexities of ME.

BRMEC14 Session: Genomics

Simon Carding (Session Chair)
Professor Carding will guide the genomics session, focusing on the role of genetic research in uncovering risk factors and mechanisms in ME/CFS.

Chris Ponting (University of Edinburgh, UK)

Blood and Genetic Biomarkers of ME/CFS

Professor Chris Ponting is Chair of Medical Bioinformatics at the University of Edinburgh and Section Head at the MRC Human Genetics Unit. A Fellow of the Academy of Medical Sciences, he is internationally recognised for his work in genomics, protein science, and evolutionary biology. Professor Ponting leads the DecodeME genetic study of ME/CFS and has made significant contributions to understanding how genetic variation influences disease.

He is actively involved in ME/CFS research initiatives, including the DecodeME study, which aims to identify genetic factors associated with ME/CFS. His work also extends to analysing blood biomarker data to understand differences between people with ME and healthy controls. Professor Ponting's presentation is expected to provide valuable insights into the genetic aspects of ME/CFS, potentially shedding light on the disease's pathogenesis and opening avenues for future treatment strategies.

Marte Viken (University of Oslo, Norway)

An Association Study of NK Cell Receptor Genes in ME

Dr Marte Kathrine Viken is a senior researcher and project group leader at Oslo University Hospital and the University of Oslo. Her research focuses on immunogenetics, particularly the genetic factors influencing immune-mediated diseases, including ME/CFS and narcolepsy. Dr Viken leads studies investigating how genetic variation in immune cell receptors, such as natural killer (NK) cell receptors and HLA genes, may contribute to disease susceptibility and immune dysfunction.

Dr Viken will present research examining associations between genetic variants in natural killer (NK) cell receptor genes and ME/CFS. Her work explores how differences in these immune cell receptors may influence susceptibility to ME/CFS and contribute to immune dysregulation observed in patients. The presentation will summarise findings from immunogenetic studies in Norwegian ME/CFS cohorts, discuss the relevance of NK cell function and HLA associations in disease mechanisms, and highlight the implications for understanding the role of immune genetics in ME/CFS pathogenesis.

BRMEC14 Session: Molecular Biology

Elisa Oltra (Universidad Catolica de Valencia San Vicente Mártir, Spain)
Dr Oltra will introduce talks on molecular mechanisms, biomarkers, and therapeutic strategies for ME/CFS.

Alain Moreau (Université de Montréal / CHU Sainte-Justine, Canada)

BRMEC14: From Discovery to Hope: Novel Insights into Biomarkers and Treatments for Myalgic Encephalomyelitis

Professor Alain Moreau is a Full Professor at the Université de Montréal, with appointments in the Faculty of Dentistry and the Department of Biochemistry and Molecular Medicine. He leads the Molecular Genetics Laboratory of Musculoskeletal Diseases at CHU Sainte-Justine and directs the Interdisciplinary Canadian Collaborative Myalgic Encephalomyelitis (ICanCME) Research Network. His research encompasses the molecular genetics of musculoskeletal conditions such as paediatric scoliosis and osteoarthritis, as well as complex adult diseases, including myalgic encephalomyelitis (ME/CFS).
Professor Moreau's work in ME/CFS centres on molecular profiling of patient samples to identify biomarkers and unravel disease mechanisms, with the ultimate aim of developing targeted treatments.

At BRMEC14, he will present recent discoveries relating to novel biomarkers, including circulating microRNAs, and discuss how these findings are being translated into potential therapeutic approaches for ME/CFS. Professor Moreau will highlight how molecular profiling-particularly the analysis of circulating microRNAs-is advancing our understanding of ME/CFS pathophysiology and enabling the identification of distinct patient subgroups. These advances pave the way for precision medicine strategies, allowing treatments to be tailored to individual biological profiles.

Anne Bertolotti (MRC Laboratory of Molecular Biology, Cambridge, UK)

BRMEC14: Boosting Cellular Defence Mechanisms as a Treatment for Neurodegenerative Diseases

Dr Anne Bertolotti specialises in cellular responses to misfolded proteins and chronic stress-processes increasingly recognised as relevant to ME/CFS. Her research focuses on the selective inhibition of phosphatases that regulate protein folding stress responses, which could provide insights into whether these protective pathways are disrupted in ME patients.

At BRMEC14, Dr Bertolotti will discuss strategies to enhance cellular defences and improve protein homeostasis, with potential implications

for ME/CFS and other chronic conditions. There is growing evidence that ME involves chronic cellular and oxidative stress, protein misfolding, and possible impairment of the unfolded protein response (UPR)-a key pathway ensuring proper protein folding and cellular resilience. Dr Bertolotti's work directly targets these mechanisms, making her research highly relevant to understanding the molecular basis of ME.

Her expertise bridges molecular biology, neuroimmune disease, and inflammation, offering valuable perspectives on how defects in protein clearance and stress responses may contribute to persistent symptoms in ME. As a leading expert in proteostasis regulation, Dr Bertolotti brings fresh ideas to ME research, addressing important but underexplored mechanisms in disease pathology and potential therapeutic targets.

Session: Chronic Infection Aetiology

Session Chair: David Price (Cardiff University, UK)

Professor David Price is Chair of Infection and Immunity at Cardiff University School of Medicine and a leading member of the European ME Research Group (EMERG). He graduated with double first class honours in medical sciences and pathology from the University of Cambridge and completed his clinical training at King's College Hospital, London. Professor Price specialised in internal medicine, infectious and tropical diseases, and subsequently earned a doctorate in molecular immunology at the University of Oxford. He has held academic clinical appointments and conducted research with fellowship support at the NIH Vaccine Research Center.

Appointed to his current role at Cardiff in 2007, Professor Price's research focuses on the development and application of advanced biotechnologies to characterise immune responses to globally significant pathogens, including HIV-1 and SARS-CoV-2. His work investigates how overactive or dysfunctional immune responses may contribute to long-term illness, and he is actively involved in research on immune mechanisms and persistent infection in conditions such as ME/CFS and Long Covid. Professor Price has also led initiatives to develop new diagnostic tests and treatments for post-infectious diseases. At the conference, Professor Price will chair the session on chronic infection as a potential driver of ME/CFS, drawing on his expertise in infection, immunity, and translational research.

Douglas D. Fraser (Western University in London, Canada)

Douglas Fraser is a Professor and Clinician Scientist in Paediatric Critical Care/Trauma Medicine at Western University in London, Ontario, Canada. He is a Fellow of the R oyal College of Physicians and Surgeons of Canada. Professor Fraser leads the Translational Research Centre at Western University, which includes a human tissue biobank that has supported research for over 15 years.

His research focuses on immunology, infectious diseases, and the identification and validation of diagnostic and prognostic biomarkers for a range of conditions. Utilising advanced multiplex technologies,

such as Proximity Extension Assay and Luminex Assay, his work aims to detect biomarker profiles that support early disease detection, monitoring, and therapeutic intervention. His team has identified novel proteins that may improve diagnostic precision and provide insights into disease mechanisms.

BRMEC14: Large International Study LC-OPTIMIZE

At BRMEC14, Professor Fraser will discuss how multiplex technologies can be applied to diagnostic processes and precision medicine. He will present findings from an international study investigating the long-term impact of COVID-19 and its potential overlap with ME/CFS, focusing on the identification of diagnostic and prognostic biomarkers.

IIMEC17: Innovative Technologies and Clinical Applications

Professor Fraser's expertise in immunology and infectious diseases is relevant to ME/CFS research, particularly given the role of immune system dysfunction and potential infectious triggers in the condition. His research on systemic inflammation, long COVID, and biomarker discovery will be discussed during the chronic infection and biomarkers

Professor Fraser's clinical background ensures that his research findings have practical clinical relevance. His collaborative approach supports multidisciplinary discussions at BRMEC14, contributing to developments in biomarker research.

Nancy Klimas (Nova Southeastern University, USA)

BRMEC14: Comparative Analysis of Pre-Pandemic ME/CFS and Long COVID Cohorts: Phenotyping Insights and the Sipavibart Monoclonal Antibody Trial

Professor Nancy Klimas is a clinical immunologist whose research focuses on the complex interactions between neuroinflammation, immune dysfunction, and energy metabolism in ME/CFS and related conditions. Her work employs advanced computational modelling to dissect disease mechanisms and identify targeted therapeutic strategies. A key area of her research involves a two-stage treatment approach aimed at reducing neuroinflammation and resetting the hypothalamic-pituitary-adrenal (HPA) axis, which is currently being tested in clinical trials.

Her team investigates immune cell function abnormalities, including natural killer cell dysfunction, and explores how these contribute to chronic symptoms and disease progression. She applies multi-omics and phenotyping techniques to characterise patient subgroups, aiming to personalise treatment approaches.

At BRMEC14, Professor Klimas will present comparative analyses of clinical and biological data from pre-pandemic ME/CFS and Long COVID cohorts to highlight shared and distinct features. She will also report on the ongoing sipavibart monoclonal antibody trial, evaluating its potential to modulate immune responses and improve outcomes in Long COVID, with implications for ME/CFS treatment strategies. Her research advances understanding of the neuro-immune mechanisms underlying these complex illnesses and supports the development of precision medicine approaches tailored to individual patient profiles.

BRMEC14 Session: Nervous System and Neuroinflammation

Session Chair: Jonas Bergquist (University of Uppsala, Sweden / EMERG)

Professor Bergquist will moderate talks on neuroinflammation and nervous system dysfunction in ME/CFS.

Stuart Bevan (Kings College London, UK)

BRMEC14: Sensory Symptoms in Post-Covid Syndrome (PCS) Patients with Pain and Fatigue

Professor Stuart Bevan is Professor of Pharmacology at King's College London and an internationally recognised expert in sensory neuroscience and pain research. With a scientific career spanning several decades, he has made significant contributions to understanding how sensory signals are detected and transmitted by peripheral sensory neurons. His research has focused on the molecular and cellular mechanisms underlying pain, including the roles of ion channels such as TRPV1, TRPM8, and TRPA1 in mediating responses to heat, cold, and chemical stimuli.

Before joining King's College London, Professor Bevan spent 20 years as Head of Pain Research at Novartis, where he led efforts to identify new analgesic targets and advance pain therapeutics. He has collaborated extensively with clinical researchers to investigate pain mechanisms in conditions such as osteoarthritis, fibromyalgia, and neuropathic pain.

Professor Bevan has published widely in leading scientific journals and is known for his work on the pharmacology of sensory neurons and the development of novel approaches to pain management. At BRMEC14, he will present research on sensory symptoms in Post-Covid Syndrome patients with pain and fatigue, exploring the overlap with ME/CFS and discussing potential shared mechanisms and therapeutic strategies. His expertise provides valuable insight into the biological basis of sensory dysfunction in chronic illness.

Denise Visser (University Medical Center Utrecht, Netherlands)

Dr Denise Visser is a postdoctoral researcher at University Medical Center Utrecht, specialising in neuroimaging and neuroinflammation. Her research uses advanced PET imaging to investigate brain inflammation and molecular changes in neurological conditions, including studies on tau pathology and cerebral blood flow in neurodegenerative diseases, with a focus on glial cell activity.

BRMEC14: Neuro-PET Data of Post-COVID Patients

At BRMEC14, Dr Visser will present neuro-PET data from post-COVID patients, highlighting evidence of neuroinflammation. Her findings provide insight into the neurological effects of post-COVID syndrome and may reveal mechanisms shared with ME/CFS, supporting a deeper understanding of these conditions.

Felipe Correa-da-Silva (Netherlands Institute for Neuroscience, Netherlands)

BRMEC14: Delineating Clinical Phenotypes and HPA-Axis Dysfunction in ME

Dr Felipe Correa-da-Silva is a postdoctoral researcher at the Netherlands Institute for Neuroscience. His work centres on molecular biology and neuroendocrinology, particularly the role of neuron-glia interactions and hypothalamic function in disease. He has a strong interest in the hypothalamic-pituitary-adrenal (HPA) axis and its dysfunction in ME/CFS, exploring how this contributes to clinical phenotypes and symptom variability. His research aims to delineate subgroups within ME/CFS by combining clinical phenotyping with biological measures, supporting the development of more targeted and personalised treatment approaches.

Dr Correa-da-Silva is also involved in the Netherlands Brain Bank's ME/CFS donor programme, advancing research into the neurological aspects of ME/CFS. At BRMEC14, he will discuss how clinical phenotyping and HPA axis evaluation can help define distinct ME/CFS subgroups, facilitating more precise research and treatment strategies.

Maxim N. Artyomov and Tomas Paulenda (Washington University in St. Louis, USA)

BRMEC14: Itaconate modulates immune responses via inhibition of Peroxiredoxin 5

Professor Maxim N. Artyomov and Dr Tomas Paulenda are leading researchers in immunometabolism and systems immunology. Their recent work demonstrates that itaconate-a metabolite produced during inflammation-inhibits peroxiredoxin 5 (PRDX5), an antioxidant enzyme critical for managing mitochondrial oxidative stress in immune cells. This non-covalent inhibition alters mitochondrial peroxide levels and the redox environment in activated macrophages, significantly affecting immune signalling pathways and fine-tuning inflammatory responses.

This discovery builds on Artyomov's earlier work exploring itaconate's role in modulating macrophage behaviour and inflammation.

In light of their recent important research, the charity is delighted to announce the addition of Maxim N. Artyomov and Tomas Paulenda to the BRMEC14 programme.

These findings are highly relevant to ME, a condition marked by immune dysregulation, mitochondrial dysfunction, and persistent oxidative stress. The study links itaconate's regulation of mitochondrial redox balance to mechanisms often impaired in ME, suggesting that by inhibiting PRDX5, itaconate may influence the handling of reactive oxygen species in immune cells. This could contribute to the mitochondrial dysfunction and abnormal oxidative stress observed in ME patients.

The research supports the view that immune-metabolic crosstalk is central to ME pathology, aligning with the metabolic trap hypothesis and highlighting how disruptions in immune cell metabolism may perpetuate ME symptoms. Demonstrating itaconate's anti-inflammatory effects and its modulation of immune signalling, the study points to new therapeutic possibilities for managing chronic immune activation and inflammation in ME.

At BRMEC14, Drs Artyomov and Paulenda will present their systems biology approach, which integrates computational modelling, multi-omics data, and redox signalling. Their work exemplifies the synergy between systems biology, immunology, and redox signalling, and supports the colloquium's aim of translating molecular discoveries into clinical solutions. Their participation will enrich discussions on how metabolic rewiring and redox imbalances drive immune dysfunction in ME, advancing collaborative research in this complex field.

BRMEC14 Session: Immune System Primary and Secondary

Session Chair: Eva Untersmayr-Elsenhuber, Medical University of Vienna, Austria

Professor Untersmayr-Elsenhuber, a leader in immunology and ME/CFS research, will guide the session, highlighting recent advances in understanding immune dysfunction and its role in ME/CFS pathogenesis.

Muzlifah Haniffa, Wellcome Sanger Institute, UK

BRMEC14: Impact of Viral (SARS-CoV-2) Infections on Immune Cells and Insights for ME

Prof Haniffa is currently serving as the Interim Head of Cellular Genetics and Senior Group Leader at the Wellcome Sanger Institute and is a renowned immunologist and dermatologist. Her talk promises to offer valuable perspectives on the immunological aspects of ME.

Prof Haniffa's research focuses on applying cutting-edge genomic technologies to unravel complex biological processes. As a key contributor to the Human Cell Atlas initiative, her work in mapping human cell types and states across tissues may offer new perspectives on the multi-system nature of ME. Her collaborative approach and interdisciplinary expertise make her a valuable addition to the ongoing efforts to understand and address this complex condition.

Prof Haniffa is a pioneer in applying single-cell genomics technologies to understand tissue homeostasis, immunity, and disease pathogenesis. Her expertise in decoding the development and functional maturation of the human immune system is particularly relevant to ME research, as immune dysfunction is a key area of investigation in the field. This could provide valuable insights into the immunological aspects of ME, potentially shedding light on the disease's underlying mechanisms.

The presentation will be part of the Immunology session, moderated by EMERG member Associate Professor Eva Untersmayr-Elsenhuber of the Medical University of Vienna, Austria. Professor Haniffa's research on the impact of SARS-CoV-2 on immune cells could provide crucial insights into ME,

potentially illuminating the similarities between post-viral fatigue syndromes and ME. Her innovative use of stem cell culture systems and skin organoids as experimental models may offer new avenues for understanding the complex pathophysiology of ME.

As ME research continues to face challenges due to limited funding, the participation of esteemed researchers like Prof Haniffa in BRMEC14 is vital for advancing our understanding of this debilitating condition. Her presentation could potentially open new doors for collaborative research and innovative treatment strategies and showcases the international nature of the colloquium.

Christian Puta Friedrich Schiller University Jena, Germany

BRMEC14: Immunometabolic Aspects of PEM

Dr Christian Puta, Professor of Sports Medicine and Health Promotion at Friedrich Schiller University Jena, will present on the immunometabolic aspects of post-exertional malaise (PEM) in ME/CFS. Dr Puta brings significant expertise in exercise physiology, sensory signal transduction, and health promotion to the field of ME research.

His work focuses on the mechanisms underlying PEM, a core symptom of ME/CFS, and addresses the challenges of studying PEM without causing prolonged recovery in patients. Dr Puta's research has identified key physiological changes during PEM, including reduced peak oxygen uptake, decreased systemic oxygen extraction, and alterations in red blood cell morphology. These findings shed light on the complex biological responses triggered by exertion in ME/CFS.

As leader of the Pain, Perception, Prevention Workgroup, Dr Puta also investigates sensori-motor control in chronic pain and the interplay between the autonomic nervous system and inflammatory responses to pain and exercise. His multidisciplinary approach integrates immune profiling and metabolic assessments to better understand how immune and metabolic changes contribute to PEM and its impact on patient health. Dr Puta's expertise and research will provide valuable insights into the biological basis of PEM, informing efforts to develop targeted therapeutic strategies and improve the management of ME/CFS.

Maureen Hanson Cornell University, USA

BRMEC14: Inflammatory signaling pathways revealed by cell-free RNA analysis

Professor Hanson will share findings from her group's studies on immune cell abnormalities in ME/CFS, including altered T and B cell function, cytokine profiles, and immune gene expression. Her research aims to identify biomarkers and clarify the role of immune dysregulation in disease persistence.

Maureen Hanson is Liberty Hyde Bailey Professor of Molecular Biology and Genetics and Director of the Center for Enervating Neuroimmune Disease at Cornell University. Her research is internationally recognised for advancing the understanding of immune dysfunction in ME/CFS.

Professor Hanson's team investigates how the immune system is altered in people with ME/CFS, focusing on both immune cell metabolism and gene expression. Her group examines how immune cells, such as monocytes and T cells, adjust their metabolic processes in response to activation, and whether these responses are abnormal in ME/CFS. Using advanced techniques like the Seahorse flux analyser and flow cytometry, they study differences in fatty acid metabolism and energy production between ME/CFS patients and healthy controls.

Her research also explores changes in gene expression and the content of extracellular vesicles-tiny packages released by cells that carry proteins, RNA, and other molecules-before and after exercise. These studies aim to identify molecular signatures that distinguish ME/CFS and reveal how immune signalling is disrupted, particularly in response to physical stress.

In addition, Professor Hanson's team analyses the gut and blood microbiome to understand their role in immune activation and persistent symptoms. By integrating findings from immune cell metabolism, gene expression, and microbiome studies, her work seeks to clarify the biological mechanisms underlying ME/CFS and to identify potential biomarkers for diagnosis and targets for therapy.

Through major NIH-funded projects and collaborations, Professor Hanson's research is helping to build a clearer picture of the immune abnormalities in ME/CFS, supporting the development of effective treatments and improved clinical care for people with this disabling condition.

Session: Orthostatic Intolerance and Autonomic Physiology

Session Chair: Jos Bosch, University of Amsterdam, Netherlands / EMERG

Dr Bosch, an expert in psychophysiology and ME/CFS cohort research, will chair this session focused on autonomic dysfunction and orthostatic intolerance, which are common in ME/CFS.

Linda van Campen, Stichting Cardio Zorg, Netherlands

BRMEC14: Cardiac Aspects of Orthostatic Intolerance

Dr Linda van Campen is clinician and researcher at Stichting Cardio Zorg in the Netherlands, with extensive experience in the assessment and management of cardiovascular dysfunction in ME/CFS. She has played a leading role in advancing the understanding of orthostatic intolerance-a common and debilitating symptom in ME/CFS patients, characterised by abnormal heart rate and blood pressure responses upon standing.

Dr van Campen's research has contributed to the identification of various forms of orthostatic intolerance in ME/CFS, including postural orthostatic tachycardia syndrome (POTS) and orthostatic hypotension. Her work has highlighted the importance of careful cardiovascular assessment in ME/CFS, as these abnormalities can often go unrecognised yet have a major impact on daily functioning and quality of life.

At BRMEC14, Dr van Campen will present clinical and research findings on cardiac function in ME/CFS patients experiencing orthostatic intolerance. She will discuss patterns of heart rate and blood pressure abnormalities, their diagnostic value, and implications for patient management. Her talk will also address practical strategies for recognising and treating orthostatic intolerance in ME/CFS, aiming to improve outcomes and provide guidance for clinicians.

Artur Fedorowski Karolinska Institutet, Stockholm, Sweden

BRMEC14: Mechanisms Underlying Cardiovascular Autonomic Dysfunction, POTS and IST in Long COVID and ME

Artur Fedorowski from the Karolinska Institutet in Stockholm, Sweden, will share his extensive knowledge on autonomic physiology and its dysregulation in ME. Dr. Federowski's work has significantly contributed to our understanding of the autonomic nervous system's role in chronic illnesses. His presentation at #BRMEC14 will explore the intricate mechanisms underlying autonomic dysfunction in ME patients, offering potential avenues for diagnostic and therapeutic interventions. Dr. Federowski's participation underscores the colloquium's commitment to fostering international collaboration and advancing ME research.

Professor Fedorowski will present research on the mechanisms of postural orthostatic tachycardia syndrome (POTS) and inappropriate sinus tachycardia (IST), syndromes frequently seen in both ME/CFS and Long COVID. His work explores autonomic nervous system regulation and its disruption in these conditions.

Peter Novak Brigham and Women's Hospital, Harvard Medical School, USA

BRMEC14: Orthostatic Intolerance and its Management-Strategies for Clinicians and Researchers

Dr Peter Novak is a neurologist and autonomic specialist at Brigham and Women’s Hospital and Harvard Medical School, with extensive expertise in orthostatic intolerance and autonomic disorders. His research has significantly advanced understanding of conditions such as postural orthostatic tachycardia syndrome (POTS) and hypocapnic cerebral hypoperfusion (HYCH), both of which frequently overlap with ME/CFS.

Dr Novak’s work employs comprehensive autonomic testing, including tilt-table tests, cerebral blood flow velocity monitoring, and cardiopulmonary exercise testing, to characterise the physiological mechanisms underlying orthostatic intolerance. He has identified biomarkers such as hypocapnia and cerebral hypoperfusion that help distinguish subtypes of orthostatic intolerance and guide diagnosis and treatment.

At BRMEC14, Dr Novak will present practical strategies for clinicians and researchers on diagnosing and managing orthostatic intolerance in ME/CFS, drawing on his extensive clinical experience and research into autonomic dysfunction. His insights aim to improve patient care and inform targeted therapeutic approaches for this complex and often debilitating aspect of ME/CFS.intolerance in ME/CFS, based on his extensive experience in autonomic testing and patient care.

Mette Olufsen North Carolina State University, USA

BRMEC14: Models Extracting the Sympathetic/Parasympathetic Tone

Mette Olufsen is a distinguished professor from North Carolina State University, USA, who brings a unique perspective to the session with her expertise in mathematical modelling and physiology. Her work focuses on developing quantitative models to understand complex biological systems, including the autonomic nervous system. Professor Olufsen's presentation will highlight how mathematical modelling can be applied to unravel the intricacies of orthostatic intolerance in ME, providing a novel approach to research and treatment. Her participation in the colloquium exemplifies the interdisciplinary nature of #BRMEC14, fostering innovative solutions to complex medical challenges.

Professor Olufsen will discuss mathematical and computational models that assess the balance between sympathetic and parasympathetic nervous system activity. These models can help objectively evaluate autonomic dysfunction in ME/CFS.

Branislav Milovanović Institute for Cardiovascular Diseases-Dedinje, Serbia

BRMEC14: Assessment of Autonomic Nervous System Function in Patients with ME and Post-COVID-19 Syndrome Presenting with Recurrent Syncope: Neurocardiological Approach

Professor Branislav Milovanović is a full professor of Internal Medicine – Cardiology at the Faculty of Medicine in Belgrade and Chief of the Neurocardiologist Laboratory at the Institute for Cardiovascular Diseases-Dedinje in Serbia. He is also a professor at the Medical Faculty in Saransk, Russia, and an active member of the European Academy of Sciences and Arts. Professor Milovanović is a pioneer of neurocardiology in Serbia, having introduced clinical assessment protocols for autonomic nervous system function and organized key international symposia in the field. His expertise includes non-invasive electrocardiology, cardiovascular risk assessment, autonomic nervous system dysfunction, chronic fatigue syndrome (ME/CFS), syncope, and post-COVID-19 syndrome.

At BRMEC14, Professor Milovanović will present a neurocardiological approach to assessing autonomic nervous system function in patients with ME/CFS and post-COVID-19 syndrome who experience recurrent syncope (fainting). His presentation will focus on how autonomic dysfunction contributes to these symptoms, using cardiovascular autonomic reflex tests and heart rate variability analysis to improve diagnosis and treatment strategies. This work highlights the importance of cardiovascular autonomic neuropathy in understanding and managing both ME/CFS and post-COVID conditions, offering a comprehensive clinical perspective on recurrent fainting in these patient groups.

BRMEC14 Session: Metabolism Body and Cell

Session Chair: Rikke Olsen Aarhus Universitet, Denmark

Dr Rikke Katrine Jentoft Olsen is Associate Professor at the Department of Clinical Medicine, Research Unit for Molecular Medicine, Aarhus University. She holds a master's degree in molecular biology and a PhD in medicine. Her research focuses on the molecular genetics and cellular pathology of inborn errors of metabolism, with particular emphasis on fatty acid oxidation disorders and mitochondrial dysfunction. She integrates genetic diagnostics with studies of cellular mechanisms and the development of novel treatments, including mitochondrial vitamins and cofactors.

In recent years, Dr Olsen has initiated research programmes investigating the role of mitochondrial and metabolic dysfunction in post-inflammatory fatigue, specifically in Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS). She is actively involved in clinical and research networks, serving on the boards of the International Network for Fatty Acid Oxidation Research and Management (INFORM) and the European ME Research Group (EMERG). Dr Olsen also contributes to the Danish Neonatal Screening Programme for inborn errors of metabolism.

At the conference, Dr Olsen will chair the session on metabolic pathways in ME/CFS, drawing on her extensive background in mitochondrial medicine and metabolic research to guide discussions on recent advances and their implications for diagnosis and treatment.

Chris Armstrong University of Melbourne, Australia

BRMEC14: Mitochondrial Dysfunction in ME: Insights from Metabolomics and Precision Medicine

Dr Armstrong will present metabolomic data revealing mitochondrial dysfunction and altered energy metabolism in ME/CFS. His research aims to identify metabolic biomarkers and inform precision medicine approaches for diagnosis and therapy.

Dr Christopher Armstrong, from the Department of Biochemistry and Molecular Biology at the University of Melbourne, Victoria, Australia, will be presenting in the Metabolism Body and Cell session at BRMEC14. His research focuses on applying metabolomics techniques to understand the biochemical alterations in ME patients.

As a leading researcher in ME metabolism, Dr Armstrong has made significant contributions to the field since publishing the first metabolomics paper on ME in 2015. His work explores various aspects of metabolism in ME, including energy metabolism, amino acid metabolism, and oxidative stress. Dr Armstrong's presentation is expected to provide insights into the metabolic underpinnings of ME, potentially shedding light on the disease's pathogenesis and opening avenues for future diagnostic and treatment strategies.

James Baraniuk Georgetown University Medical Centre, USA

BRMEC14: Exertional Exhaustion (PEM) Evaluated by Effects of Exercise on Cerebrospinal Fluid Metabolomics–Lipidomics and Serine Pathway in ME

Professor Baraniuk will discuss how exercise affects cerebrospinal fluid metabolites and lipids in ME/CFS patients, focusing on changes in the serine pathway. This work provides insights into the biochemical basis of post-exertional malaise.

Dr Baraniuk's research focuses on ME, Gulf War Illness (GWI) and other pain conditions. His work employs advanced techniques including functional Magnetic Resonance Imaging (fMRI), biomarker discovery through proteomic, metabolomic, and transcriptomic assays in blood and cerebrospinal fluid, autonomic testing, and heart rate variability (HRV) analysis.

Recent findings from Dr Baraniuk's team have revealed distinct molecular signatures in ME and GWI, suggesting they are separate conditions with unique brain chemistry profiles. His research has shown that these disorders produce different abnormal patterns of brain activity after moderate exercise, which could lead to improved diagnoses and treatments. Dr Baraniuk's work on exercise- induced changes in cerebrospinal fluid microRNAs has provided new insights into the biological basis of these conditions.

Helena Cochemé, MRC Laboratory of Medical Sciences, UK

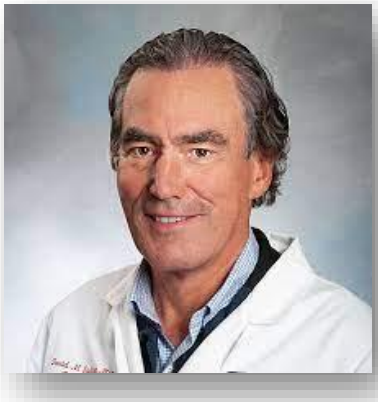
BRMEC14: Redox Signalling in Aging and Its Implications for ME/CFS and Long-COVID Research

Professor Helena Cochemé, Head of the Redox Metabolism Research Group at the MRC London Institute of Medical Sciences, is a leading biochemist specialising in redox signalling and mitochondrial dysfunction in metabolic health and ageing. Her research uses in vivo models, particularly Drosophila, to investigate how reactive oxygen species (ROS) and redox changes regulate cell signalling, stress responses, autophagy, and lifespan. Recent findings from her group have shown that redox regulation can modulate autophagy, extend lifespan, and that systemic extracellular acidification is a hallmark of ageing.
Professor Cochemé also explores the interplay between mitochondrial function, redox state, and metabolic pathways in determining cellular health and disease susceptibility. Her team employs high-throughput screening and translational studies to identify redox-sensitive pathways as potential therapeutic targets.

Her expertise is highly relevant to ME/CFS and Long COVID, as redox imbalance, oxidative stress, and mitochondrial dysfunction are increasingly recognised as contributors to fatigue, post-exertional malaise, and multi-system symptoms. Professor Cochemé's work provides mechanistic insights into how disruptions in redox signalling may drive persistent symptoms in these conditions, suggesting new avenues for biomarker discovery and treatment strategies.

At BRMEC14, Professor Cochemé will discuss how redox signalling and oxidative stress contribute to ageing and chronic disease, drawing important connections to ME/CFS and Long COVID. Her participation will enrich discussions, bridge basic science and clinical research, and inspire new collaborative efforts to better understand and treat these complex conditions.

David Systrom Assistant Professor of Medicine, Brigham and Women's Hospital, Harvard Medical School, USA



Dr David Systrom is Assistant Professor of Medicine at Harvard Medical School and a pulmonary and critical care physician at Brigham and Women's Hospital, where he directs the Dyspnoea Clinic and the Advanced Cardiopulmonary Exercise Testing Program. With over 35 years on the Harvard faculty, he is internationally recognised for his research into exercise intolerance in ME/CFS and related conditions.
Dr Systrom's work focuses on invasive cardiopulmonary exercise testing (iCPET), which measures cardiovascular, respiratory, and metabolic responses during maximal exercise. He has shown that many people with ME/CFS experience impaired cardiac preload, reduced peak cardiac output, and poor systemic oxygen extraction during exercise. These abnormalities reflect neurovascular dysregulation and autonomic dysfunction rather than deconditioning, and his studies indicate that small fibre neuropathy may contribute to these circulatory and metabolic problems.

His research helps explain the profound fatigue, post-exertional malaise, and orthostatic intolerance in ME/CFS. He is currently leading a major study using muscle biopsies to investigate skeletal muscle mitochondrial dysfunction in ME/CFS and has completed the first randomised controlled trial of pyridostigmine in ME/CFS, which improved exercise capacity by increasing cardiac output and right ventricular filling pressures. By comparing ME/CFS with long COVID, his work highlights shared mechanisms and supports the development of common treatment approaches.

BRMEC14: Metabolic Insights from Invasive Cardiopulmonary Exercise Testing in ME

Dr Systrom will present findings from invasive cardiopulmonary exercise testing in ME/CFS, highlighting abnormalities in oxygen delivery and utilisation, and their relationship to exercise intolerance and fatigue.

IIMEC17: Neurovascular Dysregulation During Exercise in ME

At the Invest in ME Research Conference, Dr Systrom will present on "Neurovascular Dysregulation During Exercise in ME", sharing insights from his research into how abnormalities in vascular and autonomic function contribute to the hallmark symptoms of ME/CFS. His work supports efforts to better characterise disease mechanisms and identify potential therapeutic targets, in alignment with the aims of Invest in ME Research.

Anouk Slaghekke Vrije Universiteit Amsterdam, Netherlands

BRMEC14: Microvascular Abnormalities in Skeletal Muscle

Anouk Slaghekke is a researcher specialising in physiology and movement sciences, with a focus on the interplay between muscle oxygenation, skeletal muscle structure and function, and immunology. Her research investigates how microvascular abnormalities in skeletal muscle contribute to the symptoms of ME/CFS, particularly exercise intolerance and post-exertional malaise.

Recent studies involving Slaghekke have examined muscle biopsies from people with ME/CFS, both before and after exercise challenges. These studies aim to identify structural and functional changes in muscle tissue, such as impaired blood flow, reduced oxygen delivery, and the presence of microclots. By comparing findings in ME/CFS to those in long COVID and healthy controls, her work seeks to clarify whether microvascular dysfunction is a common underlying factor in these conditions.

Understanding microvascular abnormalities is important because they may explain why patients experience rapid muscle fatigue and prolonged recovery after exertion. This research could lead to the identification of new biomarkers for ME/CFS and inform the development of targeted therapies to improve muscle function and quality of life for affected individuals.

She will discuss evidence for microvascular dysfunction in the skeletal muscle of ME/CFS patients, which may contribute to impaired oxygen delivery and reduced exercise capacity.

Session: In Vitro Models and Biomarker Discovery

Session Chair: Simon Carding Quadram Institute, UK / EMERG

Professor Carding will introduce this session on advanced laboratory models and biomarker discovery for ME/CFS.

Elisa Oltra Universidad Catolica de Valencia San Vicente Mártir, Spain

iPSC

Dr Elisa Oltra is Professor of Cell and Molecular Biology at the Universidad Católica de Valencia San Vicente Mártir in Spain and a leading researcher in the application of induced pluripotent stem cells (iPSC) to biomedical research. Her group has pioneered the use of iPSC-based systems as sensitive bioassays to investigate metabolic and environmental factors present in the plasma of people with ME/CFS.

Dr Oltra will discuss the use of induced pluripotent stem cells (iPSC) to model ME/CFS in vitro, enabling the study of disease mechanisms at the cellular level and supporting drug screening efforts.

iPSCs are stem cells that can be generated from adult cells and have the ability to become any cell type in the body. Dr Oltra's research explores how iPSCs can be used as "sensors" to detect disease-specific metabolic imbalances and responses to environmental cues. By exposing healthy iPSCs to plasma or serum from ME/CFS patients, her team studies changes in cell morphology, differentiation, growth, and metabolic activity. These changes can reveal the presence of disease-related factors in patient body fluids and provide evidence of altered cellular metabolism in ME/CFS.

This approach offers several advantages over traditional cell lines or primary cell cultures. iPSC-based assays can be standardised, are highly sensitive to metabolic and environmental changes, and allow for high-throughput screening. Dr Oltra's work also investigates how iPSC systems might predict individual responses to stem cell therapies and support the development of precision medicine strategies for ME/CFS.

Her research is important for advancing in vitro disease modelling, identifying potential biomarkers, and developing new diagnostic and drug-screening platforms. In the context of BRMEC14, Dr Oltra's expertise in iPSC technology provides valuable tools for understanding ME/CFS pathophysiology and for translating laboratory findings into clinical applications.

Emily Jones Carding Group, Quadram Institute, UK

BRMEC14: Organs-on-Chips

Dr Emily Jones is a researcher at the Quadram Institute with expertise in developing organ-on-chip and microphysiological systems to model human tissues and disease processes. She has played a central role in collaborative projects that design and implement organ-on-chip technologies, such as the recently developed gut-brain axis microphysiological system. This platform connects a gut barrier model to a neuronal cell compartment, allowing researchers to study how substances-including neurotoxins-cross the gut lining and affect brain cells.

Dr Jones's work focuses on building simplified, cost-effective, and user-friendly organ-on-chip devices that can be used by a wide range of researchers, including those working in high-containment laboratories. Her research aims to provide more physiologically relevant models than traditional cell culture or animal testing, enabling the study of cell behaviour, inter-organ communication, and disease mechanisms in a controlled environment.

By using human-derived cells and creating interconnected models, Dr Jones's organ-on-chip systems help reveal how diseases develop and progress at the cellular level. This approach is particularly valuable for studying complex, multisystem conditions such as ME/CFS, where traditional models may not capture the intricacies of tissue interactions or immune responses. Her work also supports the identification of new therapeutic targets and the reduction of animal use in research, making organ-on-chip technology a powerful tool for translational biomedical science.

The Carding Group will present their development of organ-on-chip platforms, which replicate human tissue environments to study ME/CFS pathology and test therapeutic interventions in a controlled setting.

Tamas Korcsmaros Imperial College London, UK

BRMEC14: Organoids

Dr Korcsmaros will explain how organoid models-miniaturised, three-dimensional tissue cultures-can be used to investigate ME/CFS mechanisms and host-microbe interactions.

Organoids are three-dimensional, stem cell-derived structures that closely mimic the architecture and function of human tissues. Under Dr Korcsmaros's leadership, the Organoid Facility at Imperial serves as a multidisciplinary hub, supporting the generation, culture, and biobanking of organoids from both induced pluripotent stem cells (iPSC) and adult biopsies. The facility provides expertise and training for researchers, facilitates the design and execution of organoid-based experiments, and develops complex disease models with integrated multi-omics readouts.

Dr Korcsmaros's research focuses on using organoids to model human disease more accurately than traditional cell cultures or animal models. By collaborating with engineering and clinical teams, his group is advancing the use of organoids and organ-on-chip systems to study cell-cell and cell-microbiome interactions in a physiologically relevant context. This is particularly important for diseases like ME/CFS, where tissue-specific pathology and complex intercellular communication are central to disease mechanisms.

Organoid models are revolutionising biomedical research by enabling patient-specific disease modelling, drug screening, and precision medicine approaches. The work of Dr Korcsmaros and his facility lowers the barrier for researchers to access these cutting-edge methods, supports the development of more accurate disease models, and helps translate laboratory findings into clinical applications. In the context of BRMEC14, his expertise is crucial for advancing in vitro modelling of ME/CFS and related conditions, supporting the discovery of novel therapeutic targets and personalised interventions.

Dezso Modos, Imperial College London, UK

BRMEC14: In Silico Models

Dr Dezso Modos is a systems biologist and Imperial College Research Fellow with a background in medicine and computational biology. His research focuses on developing and applying in silico (computer-based) models to integrate and analyse complex biological data, particularly in the context of human disease. He has worked extensively on multi-omics data integration, network biology, and the use of computational tools to unravel disease mechanisms.

Dr Modos has contributed to projects involving the reconstruction of signalling networks and the analysis of patient-specific pathways, including studies on inflammatory and immune-mediated

diseases. His expertise includes designing computational workflows that combine genomics, transcriptomics, proteomics, and metabolomics data to identify disease drivers and potential therapeutic targets.

In the context of ME/CFS, in silico models are essential for handling the vast and heterogeneous datasets generated by modern research. Dr Modos's work enables researchers to visualise and interpret complex biological interactions, predict disease-associated pathways, and prioritise hypotheses for experimental validation. This approach supports precision medicine by identifying patient subgroups and informing personalised treatment strategies.

At BRMEC14, Dr Modos will present on the application of in silico models in ME/CFS research, demonstrating how computational analysis can accelerate biomarker discovery, improve disease stratification, and guide the development of targeted therapies. His contribution is particularly valuable for translating big data into actionable biological insights in ME/CFS and related complex diseases.
Dr Modos will present computational (in silico) models that simulate biological processes in ME/CFS, aiding in hypothesis generation and the design of experimental studies.

Dr Vicky Whittemore, Program Director in the National Institute of Neurological Disorders and Stroke at the National Institutes of Health in the United States

IIMEC17: Hinxton Criteria

Dr Vicky Whittemore is a Program Director in the Synapses, Channels and Neural Circuits Cluster at the National Institute of Neurological Disorders and Stroke (NINDS), part of the US National Institutes of Health (NIH). She oversees a portfolio of research grants focused on neurological conditions, including ME/CFS, and plays a key role in coordinating NIH efforts to advance biomedical research into this complex disease.
Dr Whittemore holds a PhD in anatomy from the University of Minnesota, followed by postdoctoral training at the University of California, Irvine, and a Fogarty Fellowship at the Karolinska Institute in Stockholm. She was previously on the faculty at the University of Miami School of Medicine, working with The Miami Project to Cure Paralysis, and has held leadership roles in several non-profit organisations including the Tuberous Sclerosis Alliance and Citizens United for Research in Epilepsy (CURE). She also served a four-year term on the National Advisory Neurological Disorders and Stroke Council.

Recently, Dr Whittemore led the NIH Roadmap for ME/CFS project, overseeing programme development and management. She supports collaborative research initiatives and promotes multidisciplinary approaches to improve understanding of ME/CFS. A regular speaker at Invest in ME Research's international conferences, she facilitates scientific exchange between US and European researchers.

At IIMEC17, Dr Whittemore will discuss the Hinxton Criteria, which emerged from the 2024 Biomedical Research into ME Colloquium (BRMEC13) held at Hinxton Hall. This collaboration between NIH researchers, Invest in ME Research, and the European ME Research Group (EMERG) aims to establish refined diagnostic criteria and research standards for ME that reflect current scientific knowledge and encourage international cooperation. The Hinxton Criteria are distinct from the earlier International Consensus Criteria (ICC) and represent a complementary approach to diagnosis.

Dr Jesper Mehlsen, Copenhagen University Hospital, Denmark

IIMEC14:European Protocol for Pathobiology, Diagnosis, and Treatment of ME

Dr Jesper Mehlsen graduated as a medical doctor in 1979 and finished his specialist training in 1990. He has published more than 140 scientific papers in peer reviewed journals, mainly on the autonomic nervous system and more recently on complex diseases possibly resulting form HPV-vaccination.

For over 35 years, he has worked clinically and in research with dysfunction of the autonomic nervous system. Such dysfunction may lead to symptoms from a number of different organs often dominated by diminished control of blood pressure and heart rate. Over the past 5 years, he has worked clinically and in research with patients who suspect side effects due to HPV vaccination to be the cause of a number of symptoms, common to those seen in chronic ME.

Dr Mehlsen is co-chair of the European ME Research Group (EMERG). Dr Mehlsen ran a clinic for ME patients in Copenhagen, Denmark, until recently where he provided clinical care and applies his research insights to patient management. He has been actively involved in developing a European consensus on treatment protocols for ME/CFS, aiming to establish standardised approaches that can be adopted across clinical settings.

His research interests include methods for studying autonomic cardiovascular control, mathematical modelling of cardiovascular responses, and the neuroinflammatory reflex. Dr Mehlsen is also involved in discussions on clinical trials and standards within the ME research community, including chairing sessions at the Biomedical Research into ME Colloquium (BRMEC13). His work integrates clinical observation with advanced physiological and mathematical analyses to explore the underlying mechanisms of ME and related disorders.

Rowan Gardner, Precision Life, UK

IIMEC17: Precision diagnostic tests and personalised treatments for ME and Long COVID

Rowan Gardner is Co-founder and Chief Business & Investment Officer at PrecisionLife, a UK-based precision medicine company focused on complex chronic diseases such as ME/CFS and Long COVID. With over 30 years of experience applying computational methods to life science and patient data, she specialises in identifying mechanistically defined patient subgroups to enable more targeted diagnostics and personalised treatments. Rowan holds a Master's degree in biochemistry from the University of Oxford and has played key roles in pioneering life science ventures, including Oxford Molecular Group and collaborations with CERN on cloud computing in healthcare. She is also an independent board member at Digital Health and Care Wales, contributing to the digital transformation of NHS services.

At the Invest in ME Conference, Rowan will present an update on PrecisionLife's collaborative MetX study with the Metrodora Institute, which has achieved the first replicated genetic associations in both ME and Long COVID, confirming key genetic risk factors across diverse populations. She will discuss how these findings are being used to provide participants with detailed reports on disease mechanisms, support the development of novel diagnostic tools and targeted therapies, and design more effective clinical trials. Rowan will highlight how PrecisionLife's advanced data analytics are accelerating the development of precision medicine approaches for ME/CFS and Long COVID, aiming to improve patient stratification, diagnosis, and treatment outcomes.

Jonas Bergquist, Uppsala University, Sweden

IIMEC17: Multi-Omic Biomarker Discovery for Diagnosis and Disease Mechanisms in ME/CFS

Professor Jonas Bergquist, MD, PhD, is a Full Chair Professor in Analytical Chemistry and Neurochemistry at Uppsala University, Sweden, where he directs the Proteomics and Metabolomics platforms. He also holds adjunct and visiting professorships at the University of Utah, Binzhou Medical University in China, and the Swedish University of Agricultural Sciences. His research group focuses on developing advanced analytical tools for molecular diagnostics and biomarker discovery, particularly in cerebrospinal fluid and other complex biological samples. Professor Bergquist's work aims to better understand neuroimmunological involvement in diseases such as ME/CFS by applying proteomics and metabolomics techniques.

Since 2019, he has led a clinical collaborative research centre in Uppsala dedicated to ME, working in partnership with institutions including Harvard Medical School, Stanford University, Montreal University, and Melbourne University. His multidisciplinary approach integrates molecular data with clinical insights to identify biomarkers and explore disease mechanisms, including neuroinflammation

and immune dysregulation. Professor Bergquist is also a member of the European ME Research Group (EMERG), which was established to develop coordinated biomedical research across Europe.

In addition to his research activities, Professor Bergquist contributes to several collaborative initiatives, including the ME/CFS Common Data Element Project. His work supports efforts to develop objective diagnostic tools and improve understanding of ME/CFS pathophysiology, with the goal of facilitating better patient stratification and targeted treatment approaches.

Professor Bergquist will discuss the latest advances in proteomic and metabolomic biomarker discovery for ME/CFS, aiming to improve diagnosis, disease monitoring, and understanding of disease mechanisms.

Wenzhong Xiao, Harvard Medical School, USA

IIMEC17: Patient-Reported Treatment Outcomes in ME/CFS and Long COVID

Wenzhong Xiao, PhD, is Director of the Immuno-Metabolic Computational Center at Massachusetts General Hospital and Assistant Professor of Surgery (Bioinformatics) at Harvard Medical School. He also leads a Computational Genomics Group at Stanford Genome Technology Center, with a research career spanning computational genomics, bioinformatics, and the integrative analysis of complex molecular and clinical datasets relevant to immune and metabolic diseases, including ME/CFS and Long COVID.

Dr Xiao holds a PhD in chemistry and structural biology from the University of California, Berkeley, and a master's degree in statistics. His academic background is complemented by postdoctoral training in computational genomics at Stanford University School of Medicine5. He has played a pivotal role in developing data-driven approaches to interpret large-scale patient data, aiming to uncover disease mechanisms, identify diagnostic and predictive biomarkers, and inform the development of targeted therapies.

A significant aspect of Dr Xiao's work involves the application of advanced computational tools to analyse diverse data types, such as electronic health records, genomic sequencing, proteomics, and patient-reported outcomes. He has contributed to landmark studies, including the Severely Ill Patient Study, and has been instrumental in collaborative efforts that bridge research centres and patient communities, reflecting a spirit of partnership that aligns with Invest in ME Research's ethos.

At the Invest in ME Research Conference, Dr Xiao will present on "Patient-Reported Treatment Outcomes in ME/CFS and Long COVID". His talk will explore findings from a large-scale survey involving thousands of patients, examining symptom profiles, comorbidities, and the effectiveness of over 150 treatments. The research highlights the value of patient-reported data in understanding real-world treatment responses, identifying patient subgroups, and guiding the design of future clinical trials. Dr Xiao's expertise in computational analysis ensures that these complex datasets are translated into actionable insights, supporting the pursuit of improved diagnostics and personalised care for people with ME/CFS and Long COVID.

Ola D. Saugstad, University of Oslo, Norway

IIMEC17: A Review of Experiences of Treatment Protocols for Severely Affected People with ME

Ola D. Saugstad is Professor Emeritus of Pediatrics at the University of Oslo and Research Professor at Oslo University Hospital. He is internationally recognised for his extensive research in neonatology, particularly in the fields of hypoxia, oxygen metabolism, and newborn resuscitation. Over his career, he has published more than 300 scientific articles and book chapters, and has received numerous awards for his contributions to paediatric medicine.

In recent years, Professor Saugstad has contributed to research on ME, with a focus on the most severely affected patients. He has co-authored studies investigating genetic associations in ME/CFS, such as the 2022 publication examining the T cell receptor alpha (TRA) locus, which found no replication of previously reported genetic associations in ME/CFS. He has also published commentary on the need for improved recognition and care for young people with ME.

At the Severely Affected Clinic in Oslo, Professor Saugstad has been involved in the development and review of treatment protocols for patients with severe ME. His work at this clinic informs his presentation at the Invest in ME Research Conference, where he will review experiences and outcomes related to treatment approaches for this patient group. His recent research and clinical activities reflect a commitment to advancing understanding and care for people with ME, in line with the objectives of Invest in ME Research.

Olli Polo, Integrativ Clinic, Sweden

IIMEC17: Dysautonomia in ME/CFS - The Role of Sleep Disturbance

Olli Polo, MD, PhD, is a Finnish pulmonologist and sleep specialist with lo ngstanding expertise in ME/CFS, currently practising at the Integrativ Clinic in Stockholm, Sweden. He previously served as a professor of pulmonology at Tampere University and has been involved in clinical and research work focused on sleep disorders, autonomic dysfunction, and ME/CFS for over fifteen years.

Dr Polo's research and clinical interests centre on the interplay between the sympathetic nervous system, circadian rhythm disturbances, and tissue hypoxia in ME/CFS. He has published extensively on sleep disorders, including restless leg syndrome and sleep apnoea, and has contributed to the understanding of how sleep disturbance can exacerbate dysautonomia in ME/CFS. Dr Polo also explores the role of connective tissue abnormalities, such as Ehlers-Danlos syndrome, as potential contributors to the disease.

His clinical approach includes both established and experimental therapies, such as low-dose naltrexone, supplemental oxygen, saline, vitamin B12, and dopamine agonists, while advising caution

with psychiatric medications and certain sleep aids. Dr Polo is known for his patient-centred care and for advocating for improved recognition and treatment of ME/CFS in both clinical and public spheres.

At IIMEC17 Dr Polo will draw on his clinical and research experience to discuss how sleep disruption may contribute to autonomic dysfunction in people with ME/CFS.

Andrew Wilson, UEA, UK

IIMEC17: Clinicians Panel Discussion - Translating Research into Diagnostics and Treatments

This panel session will bring together clinicians and clinician-researchers to discuss current issues in the clinical management of ME. The discussion will focus on the challenges of diagnosis, the development and implementation of diagnostic tools, and the translation of research findings into practical treatment approaches. Panel members will share their experiences from clinical practice and research, consider barriers to effective diagnosis and care, and explore how new scientific developments can be integrated into routine clinical work.

The session will be moderated by Andrew Wilson of the University of East Anglia, a clinical researcher with expertise in designing and conducting clinical trials and investigations into new treatments and biomarkers in respiratory and related diseases.

The panel discussion includes clinicians involved in the colloquium and conference presentations.

Eva Untersmayr-Elsenhuber, Medical University of Vienna, Austria

IIMEC17 - Austria: Concerted research efforts for ME/CFS

Eva Untersmayr-Elsenhuber is Professor at the Centre for Pathophysiology, Infectiology and Immunology at the Medical University of Vienna, where she leads several major research initiatives focused on ME/CFS. Her work is central to Austria's growing national response to ME/CFS, bringing together multidisciplinary teams and patient organisations to address critical gaps in diagnosis, care, and research.

Part of the EMERG group, Professor Untersmayr-Elsenhuber coordinates the "Care for ME/CFS" project, which has produced Austria's first practical guideline for ME/CFS, based on scientific evidence and patient experience. This guideline aims to improve long-term care by accounting for disease-specific limitations and is freely accessible to clinicians and the public. Her team's approach actively involves patients in the research process, ensuring that lived experience informs both clinical recommendations and future research priorities.

Her recent studies have identified immune system alterations and possible biomarkers in ME/CFS, including differences in immune competence and intestinal barrier function among patient subgroups. These findings suggest that tailored diagnostic and therapeutic strategies may be needed for different groups of ME/CFS patients. Professor Untersmayr-Elsenhuber's research also addresses the needs of severely and very severely affected individuals, using qualitative methods to understand their care requirements and inform the development of high-level home care and telemonitoring solutions.

She is leading the establishment of Austria's first ME/CFS Biobank, designed to support future research and facilitate international collaboration. Her ongoing projects include investigations into the impact of mast cell activation, the differentiation between ME/CFS and depression, and the assessment of healthcare pathways for post-acute infection syndromes.

Austria is becoming one of the most active research hubs for ME and we are delighted that Professor Untersmayr-Elsenhuber will present at IIMEC17 with details of the research landscape emerging in Austria and the practical steps being taken to improve care and scientific understanding of ME/CFS.

Jos Bosch, University of Amsterdam, Netherlands

IIMEC17 - Netherlands: A Foundational Strategy of Research for ME/CFS

Jos Bosch is Associate Professor at the University of Amsterdam and a leading figure in the Netherlands' national biomedical research strategy for ME/CFS. He coordinates the Dutch ME/CFS Cohort- and Biobank (NMCB) Consortium, a major initiative funded by a ZonMw grant of over seven million euros, which brings together all Dutch university medical centres, patient organisations, and the Ministry of Health to address fundamental questions about ME/CFS: its underlying mechanisms, improved diagnosis, and potential treatments.
Under his leadership, the consortium is implementing harmonised research protocols that align with international standards, enabling direct comparison with large cohorts in the UK, Germany, and Canada. This approach is designed to accelerate progress and enhance the quality and impact of Dutch research. The consortium's work is structured around three themes: outreach, relevance, and clinic, each with dedicated advisory input from patients.

At IIMEC17, he will outlining the collaborative, patient-centred approach that is shaping the Dutch research landscape aimed at advancing understanding and care for people with ME/CFS.

Etianne Martini Sasso, National Centre for Neuroimmunology and Emerging Diseases (NCNED), Australia

IIMEC17 - Neurological and Immunological mechanisms underlying ME: an innovative and multidisciplinary investigation

Etianne Martini Sasso will represent Professor Sonya Marshall-Gradisnik's group at the National Centre for Neuroimmunology and Emerging Diseases (NCNED), Griffith University, Australia, and will speak on the neurological and immunological mechanisms underlying ME.
The NCNED research team is recognised for its studies into ion channel dysfunction-particularly the TRPM3 ion channel-in ME and Long COVID.

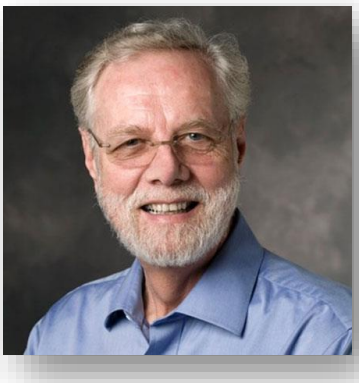
Etianne's current research focuses on characterising TRPM3 ion channel function in natural killer (NK) cells using advanced patch-clamp

electrophysiology. This work has demonstrated impaired TRPM3 activity in NK cells from both ME and post-COVID-19 patients, suggesting shared pathomechanisms between the conditions.

Additionally, the team investigates immune cell alterations and neuroimaging findings that reveal impaired brain connectivity and structural changes in ME and Long COVID. These findings are informing new approaches to diagnostic testing and pharmacotherapeutic interventions, with the aim of translating research discoveries into improved clinical care for people with ME and related disorders.

Professor Ron Davis Professor of Biochemistry and Genetics at the Stanford School of Medicine in Stanford, California, USA

IIMEC17 - Diagnostic Breakthroughs and Therapeutic Horizons for ME



Ron Davis, PhD, is Professor of Biochemistry and Genetics at Stanford School of Medicine and Director of the Stanford Genome Technology Center. He is internationally recognised for his leadership in developing innovative technologies and for his longstanding commitment to advancing research into ME/CFS.

Professor Davis's recent work has focused on identifying reliable diagnostic biomarkers and exploring new therapeutic avenues for ME/CFS. His team developed the "nanoneedle" diagnostic platform, which distinguishes ME/CFS patients from healthy controls by measuring changes in the electrical properties of blood cells exposed to stress. This technology has shown high accuracy in early studies and is now being tested in larger cohorts to confirm its utility as a clinical diagnostic tool. The platform is also being used to screen potential drug treatments by observing whether candidate compounds can normalise the abnormal cellular responses seen in ME/CFS samples.

In addition to the nanoneedle, Professor Davis's group has pioneered a neutrophil assessment platform, revealing that neutrophils from ME/CFS patients move more slowly than those from healthy individuals. This work is ongoing and may yield further diagnostic markers. His research has also highlighted the role of factors in blood plasma that may drive the illness, with ongoing investigations into possible infectious or metabolic contributors.

Professor Davis collaborates widely with international research teams and is involved in developing animal models to study disease mechanisms and test therapeutic candidates. At IIMEC17, he will summarise progress in biomarker discovery, the development of new diagnostic tools, and early results from therapeutic screening. His work is closely aligned with the goals of Invest in ME Research, aiming to accelerate the path toward effective diagnosis and treatment for ME/CFS.

He is a world leader in biotechnology, especially in recombinant DNA and genomic methods applied to biological systems. As Director of the Stanford Genome Technology Center, he focuses on integrating nano-fabricated solid-state devices with biology. His team develops innovative genetic and molecular technologies for a range of organisms, including humans, setting standards in clinical genomics.

BRMEC14 AGENDA Day 1

#BRMEC14

#BRMEC14 PROGRAMME – Day 1 28th May 2025		
Arrival Refreshments		
08:55	Welcome to *BRMEC14*	Chair: Simon Carding, Quadram Institute
09:00 ***Systems Biology and AI****: Chair Tamas Korcsmaros, Imperial College London*		
09:10	Application of systems biology to Understand complex chronic Diseases	Aurelien Dugourd, Saez-Rodriguez Group, EMBL-EBI
09:30	Disease Map concept and its application for COVID and other complex conditions	Anna Niarakis, Université de Toulouse III-Paul Sabatier - CNRS
09:55	Mapping cell-cell communication and its changes upon inflammation and infection.	Marton Olbei, *Imperial College London*
10:15	*Discussion*	*Chaired Discussion*
10:35 BREAK		
11:05 ***Genomics****: Chair Simon Carding*		
11:10	Preliminary results from DeCodeME project	Chris Ponting, University of Edinburgh
11:35	An association study of NK cell receptor genes in ME	Marte Viken, University of Oslo
12:00	Pending notification 'large scale genetic data	Cindy Boer, Erasmus University Med. Center
12:20	*Discussion*	*Chaired Discussion*
12:30 LUNCH		
13.30 ***Molecular Biology****: Chair Elisa Oltra, Universidad Catolica de Valencia San Vicente Mártir*		
13:30	From Discovery to Hope: Novel Insights into Biomarkers and Treatments for ME	Alain Moreau, Université de Montréal / CHU Sainte-Justine
13:55	Boosting cellular defense mechanisms as a treatment for neudegenerative diseases	Anne Bertolotti, MRC Laboratory of Molecular Biology
14:20	*Discussion*	*Chaired Discussion*
14.30 ***Chronic Infection Aetiology*** *(viral / non viral): Chair David Price, Cardiff University*		
14:30	Large international study LC-OPTIMIZE	Douglas Fraser, Western University
15:00	Comparative Analysis of Pre-Pandemic ME/CFS and Long COVID Cohorts: Phenotyping Insights and the Sipavibart Monoclonal Antibody Trial	Nancy Klimas, Nova Southeastern University
15:25	*Discussion*	*Chaired Discussion*
15:35 BREAK		
16:05 **Nervous System and Neuroinflammation**: Jonas Bergquist, University of Uppsala		
16:10	Sensory symptoms in Post-Covid Syndrome (PCS) patients with Pain and Fatigue	Stuart Bevan, Wolfson Centre for Age Related Disease, Kings College London
16:35	Neuro-PET data of post-COVID patients	Denise Visser, University Medical Center Utrecht
17:00	Delineating Clinical Phenotypes and HPA-Axis Dysfunction in ME	Felipe Correa-da-Silva, Netherlands Inst. For Neuroscience
17:25	*Chaired discussion*	Discussion
17:30	Itaconate modulates immune responses via inhibition of Peroxiredoxin 5	Maxim N. Artyomov / Tomas Paulenda Washington University in St. Louis
18:00	**Adjourn and evening dinner for delegates**	

BRMEC14 AGENDA Day 2

#BRMEC14

#BRMEC14 PROGRAMME – Day 2 29th May 2025		
08:15 Arrival Refreshments		
08:45	Welcome to *BRMEC12 Day 2*	Chair: Simon Carding, Quadram Institute
Immune System Primary and Secondary *Chair: Eva Untersmayr-Elsenhuber, Medical University of Vienna*		
09:00	Chair: Opening	Eva Untersmayr-Elsenhuber
09:05	Impact of viral (SARS-CoV-2) infections on immune cells and insights for ME	Muzlifah Haniffa, Wellcome Sanger Institute
09:35	Immunometabolic Aspects of PEM (provisional title)	Christian Puta, Friedrich Schiller Univ. Jena
10:00	Inflammatory signaling pathways revealed by cell-free RNA analysis	Maureen Hanson, Cornell University
10:25	*Discussion*	*Chaired Discussion*
10:35 BREAK		
11:05 ***Orthostatic intolerance and autonomic physiology*** *Chair: Jos Bosch, University of Amsterdam*		
11:10	Cardiopulmonary Exercise Testing and Autonomic Dysfunction in ME	Linda van Campen, Stichting Cardio Zorg
11:30	Autonomic Dysfunction and Syncope Mechanisms in ME/CFS: Clinical Insights and Research Advances	Artur Fedorowski, Karolinska Institutet
11:55	Advancements in Autonomic Neurology: Unraveling Orthostatic Intolerance and Dysautonomia in ME/CFS	Peter Novak, Harvard Medical School
12:20	Models extracting Sympathetic/parasympathetic tone	Mette Olufsen, North Carolina State Univ.
12:45	***LUNCH***	
13:45	Assessment of ANS Function in Patients with ME/CFS and Post-COVID-19 Presenting with Recurrent Syncope	Branislav MIlovanovic, Institute for cardiovascular diseases-Dedinje
14:05	*Discussion*	*Chaired Discussion*
14:10 ***Metabolomics Body and Cell*** *Chair: Rikke Olsen, Aarhus Universitet*		
14:10	Mitochondrial Dysfunction in ME: Insights from Metabolomics and Precision Medicine	Chris Armstrong, University of Melbourne
14:35	Exertional Exhaustion (PEM) Evaluated by Effects of Exercise on Cerebrospinal Fluid Metabolomics–Lipidomics and Serine Pathway in ME	James Baraniuk, Georgetown University Medical Centre
15:00	Redox Signaling in Aging and Its Implications for ME/CFS and Long-COVID Research	Helena Cochemé, MRC Laboratory of Medical Sciences
15:25	Metabolic Insights from Invasive Cardiopulmonary Exercise Testing in ME	David Systrom, Harvard Medical School
15:50 BREAK		
16:20	Microvascular abnormalities in skeletal muscle	Anouk Slaghekke, Vrije Univit, Amsterdam
16:40	*Discussion*	*Chaired Discussion*
16:40 In vitro Models and Biomarker Discovery Chair: Simon Carding		
16:40	iPSC	Elisa Oltra, *Universidad Catolica de Valencia*
17:00	Organs-on-chips	Emily Jones, Carding Group, Quadram Inst.
17:20	Organoids	Tamas Korcsmaros, Imperial College London
17:40	In silico models	Dezso Modos, Imperial College London
18:00	*Discussion*	*Chaired Discussion*
18:10 Adjourn and evening dinner		

IIMEC17 AGENDA

#IIMEC17

IIMEC17 PROGRAMME – 30th May 2025		
Arrival Refreshments		
09:00	Opening of conference/Session Chair BRMEC14 Colloquium Days 1-2 Research Summary	Simon Carding, Quadram Institute, UK
09:15	Clinical Trials Standards (incl. Hinxton criteria status)	Vicky Whittemore, NIH, USA
09:35	European Protocol for Pathobiology, Diagnosis, and Treatment of ME	Jesper Mehlsen, Copenhagen University Hospital, Denmark
09:55	Innovative technologies transforming diagnostic processes, patient outcomes, precision medicine and drug repurposing with a Phase III, double-blind, placebo-controlled, multi-arm platform trial	Douglas Fraser, Western University, Canada
10:25 BREAK		
10:55	Precision diagnostic tests and personalised treatments for ME and Long COVID	Rowan Gardner, Precision Life, UK
11:15	Multi-Omic Biomarker Discovery for Diagnosis and Disease Mechanisms in ME/CFS	Jonas Bergquist, Uppsala University, Sweden
11:35	Patient-Reported Treatment Outcomes in ME/CFS and Long COVID	Wenzhong Xiao, Harvard Medical School, USA
11:55	A Review of Experiences of Treatment Protocols for Severely Affected People with ME	Ola D. Saugstad, University of Oslo, Norway
12:15	Dysautonomia in ME/CFS - The Role of Sleep Disturbance	Olli Polo, Integrativ Clinic, Sweden
12.35	Neurovascular Dysregulation During Exercise in ME	David Systrom, Harvard Medical School, USA
13:00 BREAK		
13:30	Clinicians Panel Discussion - Translating Research into Diagnostics and Treatments	Artur Fedorowski, Karolinska Institutet Peter Novak, Harvard Medical School Jesper Mehlsen, Copenhagen Univ.Hospital Olli Polo, Integrativ Clinic Kristian Sommerfelt, Univ. of Bergen Ola D. Saugstad, Univ. Oslo
14:00	Austria: Concerted research efforts for ME/CFS	Eva Untersmayr-Elsenhuber, Medical University of Vienna, Austria
14:20	Netherlands: A Foundational Strategy of Research for ME/CFS	Jos Bosch, University of Amsterdam, Netherlands
14:40	Neurological and Immunological mechanisms underlying ME: an innovative and multidisciplinary investigation	Etianne Martini Sasso, NCNED, Australia
15:00	Diagnostic Breakthroughs and Therapeutic Horizons for ME	Ron Davis, Stanford School of Medicine in Stanford, California, USA
15:30 IIMEC17 LUNCH		