



THE GUY FOUNDATION

QUARTERLY REVIEW

December 2025

**Welcome to the 14th edition of the Quarterly Review,
a digest of The Guy Foundation and quantum biology news.**

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LOOKING BACK ON 2025



As 2025 draws to a close, it is remarkable to see how far the field of quantum biology has advanced, and I am proud that The Guy Foundation has helped drive that progress. From the Spring Series on water and the Autumn Series

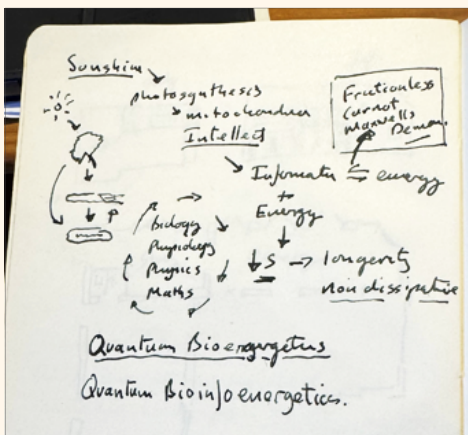
on light, to our expanding space health research, international collaborations, and growing recognition at major scientific meetings, this year has been one of extraordinary momentum.

Earlier this year, the team and I attended the Gordon Research Conference on Quantum Biology in Italy. It was a pleasure to see how far the conversation has evolved since the inaugural meeting in 2023. It was also wonderful to see the Foundation so well represented, with contributions from Alistair Nunn, Alasdair Mackenzie, Betony Adams, Grace Pennelli, Ifigeneia Kalampouka, Philip Kurian, Rhys Mould, and Stan Botchway.

Over the past decade, the landscape of quantum biology has transformed from speculation to substance, and The Guy Foundation has been proud to help catalyse this shift through its research programmes and publications. In its early years, The Guy Foundation focused on hypothesis-driven studies. Today, those hypotheses are being met with experimental confirmation. Recent data from Foundation-supported teams have provided evidence of non-chemical communication between mitochondria; biophoton production during plant growth; light-dependent modulation of cell growth; as well as more exotic quantum effects such as superradiance in biological chromophore networks. These results will help map the future of both quantum biology and medical innovation.

Quantum biology is also moving into one of its most ambitious arenas: space health. Our Space Health Programme continues to expand. In February we were delighted to appoint George Freeman MP as Advisor to The Guy Foundation to lead our international activities. George brings two decades of experience in science policy, innovation, and space strategy, and his support has been instrumental in advancing the Foundation’s mission. In parallel, the University of Westminster’s School of Life Sciences has awarded two fully funded PhD studentships to support this growing field.

This year was designated the International Year of Quantum Science and Technology (IYQ) by UNESCO, marking a century of quantum mechanics. This feels apt for a year that has seen accelerated growth for The Guy Foundation and for quantum biology as a whole. As we enter 2026, we do so with renewed optimism.



Geoffrey Guy’s 2017 doodle with his early thoughts on bioenergetics

I recently rediscovered a sketch I drew for Alistair Nunn in 2017, outlining my early notions of quantum bioenergetics, and the profound role that sunlight might play in fuelling the human body and brain. I am pleased to see that the questions that once seemed absurd are gaining experimental traction. I am grateful to our staff and trustees, advisors, donors, researchers,

collaborators, faculty and friends who continue to share this vision and give such tremendous support to the Foundation.

I wish you a happy and peaceful Christmas holiday season and I look forward to seeing you in the New Year.

Geoffrey Guy

2025 AUTUMN SERIES ON LIGHT

The 2025 Autumn Series brought together a fascinating range of perspectives exploring how light interacts with life - from physics to medicine and health. The series opened with an introduction to the physical principles underlying light-biology interactions, from photon properties and chromophores to mitochondrial modulation and redox signalling. This included a cosmological overview, tracing the role of light in shaping complexity across the universe and suggesting that near-infrared sunlight may form a “metabolic Goldilocks zone” for life (**Session 1 - Michal Cifra and Robert Fosbury**). The discussion then turned to public health, examining the evidence that sunlight exposure, rather than being solely a cancer risk, is correlated with reduced all-cause mortality through mechanisms involving nitric oxide release and immune modulation (**Session 2 – Richard Weller**). Medicine has long treated blue and UV light as inherently harmful, and Richard’s presentation challenged widespread assumptions that may hold near the equator but not at higher latitudes, underscoring The Guy Foundation’s role in promoting rigorous, science-based re-evaluation and questioning entrenched dogma in line with hormetic principles.

Building on the therapeutic potential of specific wavelengths, the series included a session describing pioneering work on specific intensities of green LED therapy as a non-invasive, side-effect-free treatment for chronic pain, supported by both preclinical and clinical data. It was suggested that green light may have played an important role in the evolutionary roots of light-life interactions, modulating mitochondrial and inflammatory function (**Session 3 – Mohab Ibrahim and Alistair Nunn**). Finally, the series examined how modern artificial lighting has disrupted the natural balance of

light wavelengths – particularly the loss of infrared with LED technology and the red-to-blue shift of energy saving protocols – and how restoring this balance could improve health and longevity (**Session 4 – Ifigeneia Kalampouka and Glen Jeffery** and **Session 5 – Roger Seheult**).

The series concluded with a **bumper roundtable session** on 3 December. While we went into the series with an understanding that light plays a role in biological and physiological functions, we were nonetheless surprised at the extent to which light – across the spectrum from ultraviolet to infrared – has a meaningful impact on health. This raises profound questions about the way in which we construct and negotiate our built environment, from more novel environments such as the International Space Station, to the more pressing quotidian implications of having replaced incandescent bulbs with LED lighting, given how long we spend indoors. Our expert roundtable speakers – Professor Stefan Behling and James Sherman (Foster + Partners), Dr Max Gulhane (Regenerative Health), Scott Zimmerman (Silas Inc), and Ulysse Dormoy (Atrium Lighting) - stimulated much discussion about how our built environment has evolved and how we might design lighting environments that better support human health.



Professor Stefan Behling



James Sherman



Dr Max Gulhane



Ulysse Dormoy



Scott Zimmerman

We are currently writing up the series Proceedings, which will be circulated in the new year. In the meantime, the videos of the talks, including the roundtable presentations, are available on our [website](#) and YouTube channel: youtube.com/@theguyfoundation.

2026 SPRING SERIES ON MAGNETIC FIELDS IN BIOLOGY

The Guy Foundation's 2026 Spring Series, which commences on 11 March, will explore an intriguing frontier in interdisciplinary science: the role of magnetic fields in biology. This topic brings together many of the Foundation's long-standing interests, spanning quantum biology, bioenergetics, and space exploration. As such, it has informed the direction of our research programme, with research teams at The Guy Foundation Quantum Biology and Bioenergetics Laboratory currently conducting experiments in hypomagnetic field environments.

There is a growing consensus that magnetic fields play a subtle yet fundamental role in biology. From the navigational systems of migratory birds to the regulation of cellular processes in humans, organisms appear to sense and respond to magnetic influences in ways we are only beginning to understand.

At the molecular level, weak magnetic fields can influence the spin states of electrons involved in chemical reactions – a mechanism known as the radical pair mechanism – which may in turn affect key biological processes such as circadian rhythms, oxidative stress responses, and metabolism. The latter is especially important because the mitochondrion – one of the cell’s primary sites of electron flow and therefore a likely target for magnetic influences – reminds us that life is fundamentally electrical, making a quantum-mechanical perspective particularly illuminating.

While magnetic diagnostics such as MRI have been central to medicine for decades, what is new and exciting is the emerging evidence for therapeutic uses of magnetic fields. Recent research suggests that specific field strengths may be capable of modulating biological activity, in particular stem cell growth and differentiation. These discoveries are opening the door to a new generation of non-invasive medical interventions. This subject is also of particular importance in the context of space health, where the Earth’s protective magnetic field is absent. Understanding how biological systems depend on magnetic cues could be critical for safeguarding astronaut physiology and maintaining health in altered electromagnetic environments.

The 2026 Spring Series promises to be a stimulating programme, advancing dialogue between physicists, biologists, and clinicians to better understand how magnetic fields interact with living systems, and how they might be harnessed for medicine in the years ahead.

For details of the programme see ‘[Dates for your diary](#)’ or visit our [website](#). Videos of the talks will be uploaded to our website and YouTube channel. If you would like to attend the live Zoom sessions and aren’t yet registered, please contact [Nina Copping](#).

RESEARCH MEETING

We were excited to come together in London in October for our Autumn Research Meeting - and delighted that George Freeman FRSA MP, Advisor to The Guy Foundation, and Dr Peter Bonfield, Vice Chancellor, University of Westminster, could join us.

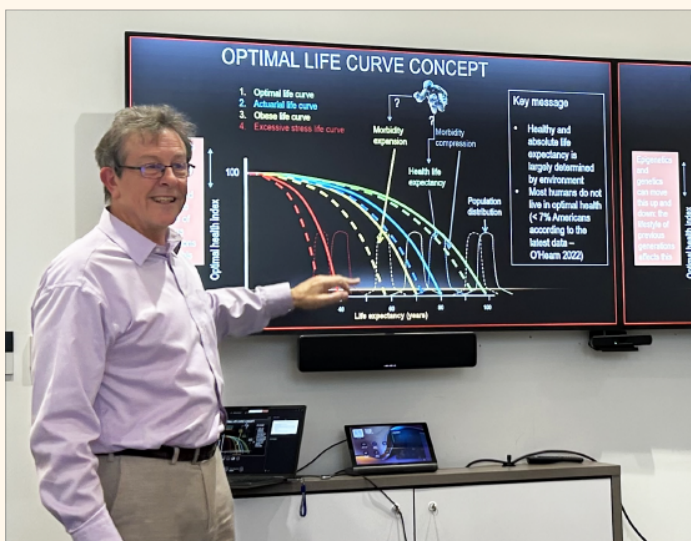


Geoffrey Guy (centre) with George Freeman MP (left) and Dr Peter Bonfield (right)

The **Guy Foundation Quantum Biology and Bioenergetics Laboratory** is a joint initiative with the University of Westminster and the Central Laser Facility, Harwell. Established in 2018, the lab aims to advance our understanding of the fundamental quantum and thermodynamic processes that underpin life. This understanding will in turn help to direct innovations in medicine and health, including in specialist areas such as space health.

Thank you to the laboratory's researchers Rhys Mould, Alasdair Mackenzie, Alix Bailie, Sanika Ghayal and Grace Pennelli for their excellent presentations. We are also indebted to Jimmy Bell, Stan Botchway and Louise Thomas for the outstanding expertise and leadership that has helped to take the laboratory from strength to strength.

To round up the day Alistair Nunn, The Guy Foundation's Director of Science gave an inspirational talk tying together the many facets of quantum biology and bioenergetics and how it can be applied to tackling some of the challenges faced by medicine, with a particular focus on space health. In his talk, Alistair noted that without fully understanding the role of quantum mechanics and thermodynamics in biology, we may be missing a substantial component of what is required to truly understand the process of ageing, and thus, disease. For example, it could help explain why both a modern sedentary lifestyle and space travel seem to accelerate the ageing process. Alistair surmised that deep space travel in the current spacecraft, especially outside low Earth orbit, for instance, which would be required for a trip to Mars, may result in astronauts being



Alistair Nunn tying together the many facets of quantum biology and bioenergetics

very ill indeed, unless Earth's environment can be replicated as closely as possible on the spacecraft. This suggestion is not just based on emerging experimental data, but also on a sound theoretical basis, which this unique approach seems to be providing.

We look forward to sharing further updates, but if in the meantime you would like to find out more, read about our [Research Programme](#) on our website, or contact Nina Copping n.copping@theguyfoundation.org.

SPACE HEALTH PROGRAMME UPDATE

The Space Health Programme continues to make progress in both sector engagement and research activity.



George Freeman MP, who is leading and coordinating our international engagement, was invited to give a talk at the 19th European Space Policy Institute (ESPI) Autumn Conference in October. The conference convened senior representatives from government, space agencies, industry and research to examine Europe's future as a strategic space actor.



George Freeman MP speaking at the ESPI Autumn Conference, held at the Vienna Rathaus
Photo credit: Peter Griesser

The conference marked a year since the publication of our major report: '[The health hazards of space travel: novel insights from quantum biology](#)' in October 2024.

The report, which was produced with our Space Health Working Group, explored the impact of light, magnetism, gravity, and other environmental factors on human physiology, and what these findings mean for the future of long-duration space travel. By integrating novel insights from quantum biology as well as wider perspectives from physics, biology, and medicine, the report considered how we might sustain healthy life beyond Earth.

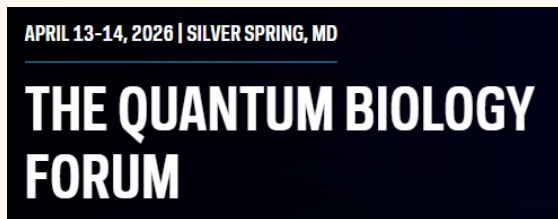
We continue to discuss the report with space agencies and companies and indeed in early October we convened an online workshop for the Canadian Space Agency, in which Geoffrey Guy, Alistair Nunn and Nathan Babcock presented quantum biology perspectives on space health and walked through the implications of the report.

Through conversations over the last year with the space sector on space health, emerging research, and the needs of the sector, the Foundation has put together a proposed International Space Health Research Collaboration (ISHRC), which we will be launching in 2026. This collaboration will work with agencies, companies, universities and individual researchers and scientists to help harness and coordinate the collective efforts and to provide a research facility and resource.

Central to the research programme is **The Guy Foundation Quantum Biology and Bioenergetics Laboratory**, which is undertaking initial experiments on the effects of hypomagnetic fields and altered light environments on cellular energetics to better understand how physical environments influence metabolism, circadian biology, and health, both in space and on Earth.

If you are interested in hearing more about the International Space Health Research Collaboration (ISHRC) please contact **Nina Copping**.

THE QUANTUM BIOLOGY FORUM



The Guy Foundation is thrilled to be playing a part in curating **The Quantum Biology Forum** (quantumbiologyforum.com) which will be held in the US in April 2026. The meeting will explore emerging frontiers at the interface of physics, biology, and medicine. The organisers have kindly provided the following details:

The Quantum Biology Forum: Where Biological Physics Meets Medicine, will be hosted by Northwell Health and is set to take place April 13–14, 2026, at United Therapeutics’ Unisphere in Silver Spring, Maryland. This groundbreaking event will convene leading thinkers from science, medicine, and innovation to explore the transformative potential of quantum biology in healthcare. Attendees will delve into how biological physics and quantum principles, such as mitochondrial bioenergetics, electromagnetic fields, and photon interactions, are redefining life as an electrodynamic process. Experts will discuss revolutionary applications for diagnosing and treating conditions like neurodegeneration, cancer, critical care, and aging, with the goal of improving patient outcomes. Featuring world-class keynotes, visionary panels, and collaborative discussions, the forum aims to drive a paradigm shift in clinical practice and biomedical research. This landmark event is being led by Lance Becker of Northwell’s Feinstein Institutes for Medical Research and Martine Rothblatt, founder and CEO of United Therapeutics.

CALL FOR ABSTRACTS AND INVITATIONS TO ATTEND:

If you're interested in attending, please apply via the event website: www.QuantumBiologyForum.com. Better yet, we encourage you to submit an abstract for a poster presentation — an accepted abstract guarantees your invitation to this prestigious forum. Seating is limited, so bring your best science to share!



Lance Becker, MD – Northwell's Chairman of Emergency Medicine and Scientist at the Feinstein Institutes for Medical Research:

“My interest in quantum biology was ignited through years of research in resuscitation and mitochondrial medicine at Northwell Health.

Witnessing how transferring fresh mitochondria into injured tissues could save lives during cardiac arrest revealed a profound gap: traditional biology's molecular focus overlooks the quantum and thermodynamic forces that truly drive life's electrodynamic essence. Photons, electromagnetic fields, and resonant behaviors may be powerful modulators of life's energies. Inspired by visionaries like Nick Lane, Geoffrey Guy, and many others, my eyes were opened to how energy movement, coherence, and resonance underpin everything from life and evolution to disease. With this Quantum Biology Forum, we hope to spark a global movement: uniting scientists, clinicians, and funders to translate these insights into practical therapies—think mitochondrial transplants for ischemia recovery or bioelectric reprogramming for ALS and cancer. Ultimately, we aim to update Theodosius Dobzhansky's famous words: ‘Nothing in biology makes sense except in the light of evolution, thermodynamics, and quantum mechanics,’ and extend that to medicine, optimizing healthy lifespans for all.

Quantum biology isn't theory—it's the missing biological physics of life. From mitochondrial electron flow to bioelectric signaling, we're discovering that energy itself—not just molecules—determines health. This forum will catalyze the leap from lab to bedside."

Mark Mortenson, Founder & Chief Science Officer, Clene

Nanomedicine: "We have already seen these principles operating first-hand in numerous biological systems. Our CNM-Au8 drug product introduces the first true biological catalyst rooted in physics: gold nanocrystals that restore mitochondrial function by donating surface electrons via plasmon resonance (and more). This isn't traditional drug discovery, it's catalytic, energy-modulating medicine. We're targeting ALS first, then MS and Parkinson's, with the potential to treat all neurodegenerative diseases by reigniting cellular energy where biology alone has failed. By harnessing quantum-scale electron transfer, we're bridging the gap between physics and physiology to create therapies that enhance bioenergetics and combat oxidative stress at its core."

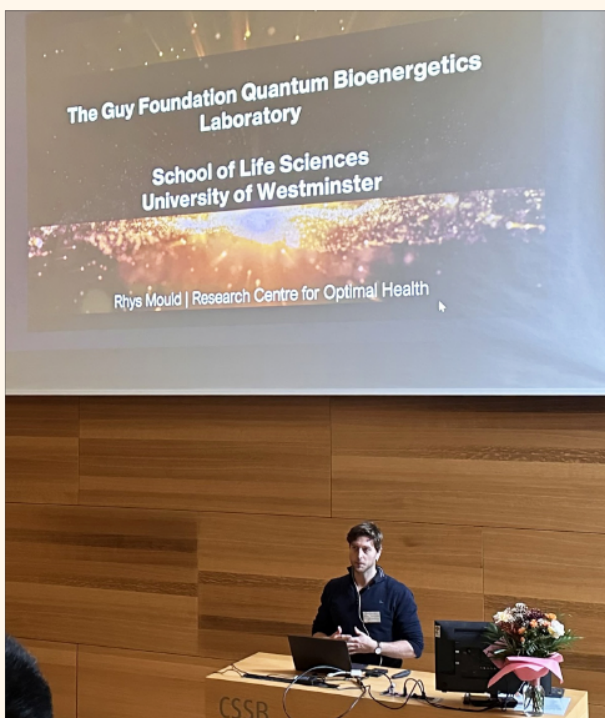
Greg Hurst, Associate Director, Human Organ Design, United

Therapeutics: "Our Print to Perfusion bioprinting crafts a new lung scaffold with 200 million alveoli in just three weeks, with precision rivaling a cross-country drive without veering a hair's width. Quantum biology's energy principles will guide cellularization, turning scaffolds into fully functional breathing organs and ending transplant shortages. This approach leverages bioelectric fields and resonant energy flows to optimize tissue integration, ensuring that bioprinted organs not only mimic structure but also thrive through quantum-informed vitality. It's a fusion of engineering and quantum insights that could redefine regenerative medicine."

QUANTUM BIOLOGY THINK TANK IN HAMBURG

We met Maria Lerm at the GRC in Italy earlier this year and shared some exciting conversations about how quantum biology might advance knowledge and treatment of diseases such as tuberculosis (TB). Maria is a professor in Medical Microbiology at Linköping University, Sweden, where her research focuses on epigenetics and infectious diseases, including TB and post-COVID.

In October Maria organised a Think Tank in Hamburg which brought together medical doctors, biologists, chemists, and physicists to explore the rapidly growing field of quantum biology. The aim was to bridge the gap between quantum mechanics and biomedicine, developing a shared framework to accelerate discovery. Participants discussed how quantum effects such as coherence, tunnelling, and entanglement might underpin biological processes from enzyme catalysis to magnetic sensing. The group also examined potential applications in diagnostics, drug design,



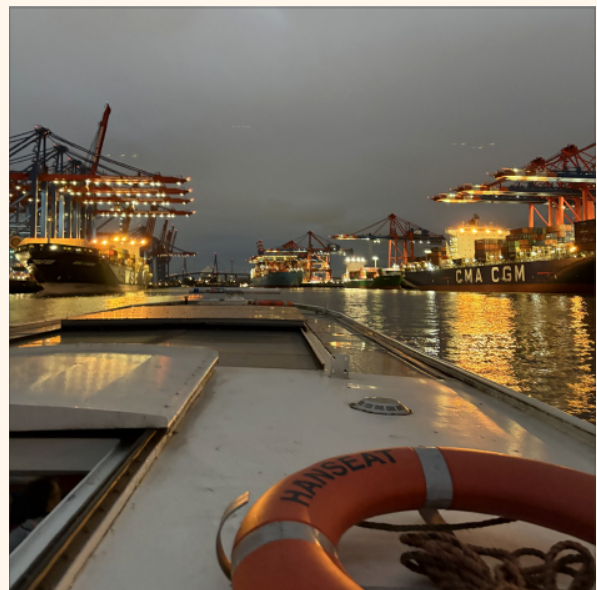
and bioimaging. By fostering collaboration across disciplines, the meeting sought to position quantum biology as a vital new frontier in 21st-century biomedical science.

Rhys Mould was invited to participate and give a short presentation, as representative for The Guy Foundation.

Rhys Mould, University of Westminster, presents his research at the Think Tank

Rhys commented:

“ Being invited to the Quantum Biology Think Tank was a huge honour for me. It was a great opportunity to meet researchers in the field and discuss not only the research itself but the directions and thoughts behind quantum biology. The venue and the organisation (including a river boat dinner and a tour of the particle accelerator!) were excellent, thanks to Maria Lerm and her team. As a biologist, quantum physics often seems mysterious and impenetrable, but being able to meet and talk to people from different disciplines allowed me to return with a greater understanding of the field and new perspectives for my own research. ”



The Think Tank included a tour of the particle accelerator (left) and a river boat dinner (right)

PHYSICAL PRINCIPLES OF QUANTUM BIOLOGY BOOK TO BE PUBLISHED



We were very happy to hear that Dr Nathan Babcock's scientific monograph **Physical Principles of Quantum Biology** is set for official publication as a hard copy book with **World Scientific**. It is now in the final production phase and is scheduled to be published in the new year. Nathan extended his wishes to thank the quantum biology community for all the quality feedback that he has received on the arXiv pre-print, which has helped to shape the forthcoming version.

He has also added a new video to his YouTube series featuring informative lectures about the quantum physical basis for quantum biology. The lecture series provides a chapter-by-chapter overview of the content of the book, presenting the fundamental scope of quantum effects in biology. You can find this helpful video resource [here](#).

NOBEL PRIZE IN PHYSICS FOR QUANTUM TUNNELLING

We were thrilled to see that this year's Nobel Prize in Physics was awarded to John Clarke, Michel H Devoret, and John M Martinis for their pioneering experiments demonstrating macroscopic quantum tunnelling and energy quantisation in electric circuits, work that brought one of quantum mechanics' strangest predictions into the realm of engineered systems.

Quantum tunnelling, where particles pass through barriers that should be impenetrable by classical physics, is not only a

cornerstone of quantum physics but also appears to play an important role in biological processes. Historically, tunnelling was first observed in enzymes, where it contributes to significant reaction rate acceleration, as shown in the pioneering studies of Devault and Chance and later expanded on by Judith Klinman, who provided strong evidence for proton tunnelling in enzyme catalysis. Beyond enzymes, tunnelling has been proposed to play a role in receptor activation, for instance, in olfactory receptors, where the vibrations of odorant molecules may facilitate tunnelling to enable the sense of smell.

More recently, researchers have explored how vibration-assisted tunnelling could influence the activity of neurotransmitters such as serotonin. The 2025 Nobel recognition thus resonates beyond physics, underscoring how quantum effects such as tunnelling may play a profound role in the molecular machinery of life.

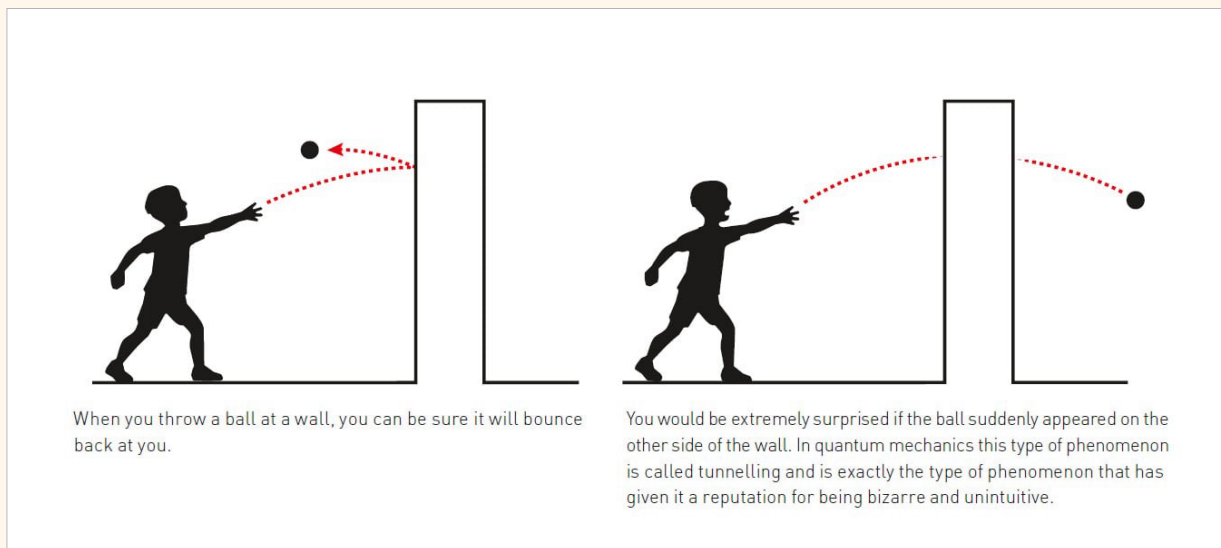


Illustration of quantum tunnelling ©Johan Jarnestad/The Royal Swedish Academy of Sciences

IYQ2025: A RETROSPECTIVE



The International Year of Quantum Science and Technology is coming to an end after twelve months of collaboration and discovery. The initiative – endorsed by UNESCO and celebrated across more than 70 countries – aimed to raise awareness of quantum science’s impact on modern life and its potential to transform our technological future.

Throughout the year, universities, foundations and research institutes hosted lectures, exhibitions, and public engagement events that bridged the gap between frontier physics and everyday experience. The Guy Foundation was delighted to play a small part in this, by sharing our online lectures.

From quantum computing breakthroughs to advances in sensing, imaging, and secure communications, this initiative has demonstrated how quantum principles are moving rapidly from theoretical foundations into practical applications. The celebrations also encouraged dialogue across disciplines, highlighting how quantum ideas are increasingly shaping the life sciences. New discussions emerged around quantum biology and quantum medicine, with growing recognition that quantum science might offer insights into the mechanisms that sustain life itself.

LINKEDIN

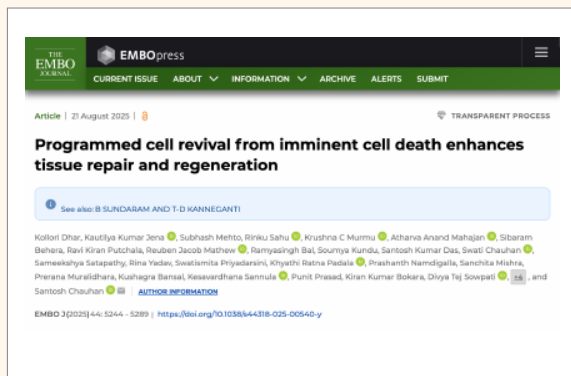


Our Quarterly Review is circulated every three months, so if you’d like more frequent updates on our activities, please follow [The Guy Foundation on LinkedIn](#). It’s a great way to hear the latest news.

BOOKS & PAPERS

JOURNAL CLUB

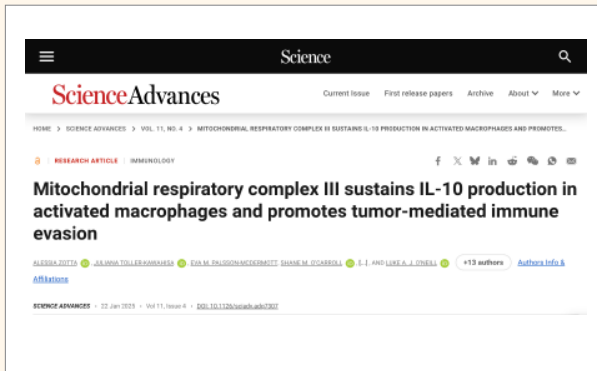
For this issue's journal club, Alistair Nunn and Betony Adams have picked four thought-provoking recent papers.



If you have followed our journey at the Foundation then you will know that mitochondria are at the heart of much of our research, which is why we found the recent paper, **Programmed cell revival from imminent cell**

death enhances tissue repair and regeneration so interesting! It turns out that cells can go a long way towards programmed cell death, and then recover, with the health of the mitochondria being a key component. The research, published in *EMBO*, describes the role that lysosomotropic agents in this programmed cell revival process. The authors note that this process involves the upregulation of genes associated with numerous critical functions, including embryonic development, regeneration, stemness, and inflammation, which in turn activate metabolism, organelle biogenesis, membrane trafficking, transport, and cytoskeleton remodelling. The authors conclude that a better understanding of this cellular recovery from near death may have profound implications for regenerative medicine.

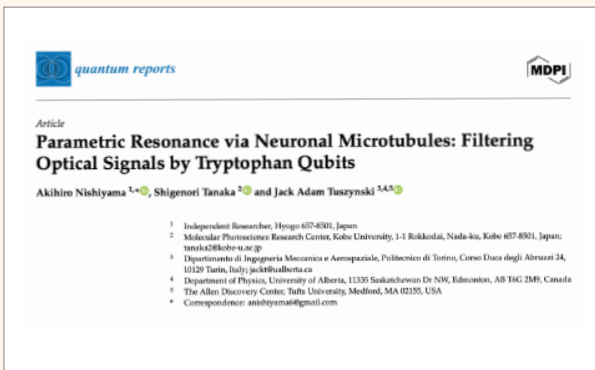
We had a fascinating third session in The Guy Foundation Autumn Series on Light, which explored the therapeutic effects of green light. Alistair Nunn highlighted that one possible mechanism



through which green light exerts its immune-modulating effects may be the activation of mitochondrial complex III. The recent paper **Mitochondrial respiratory complex III sustains IL-10 production in activated**

macrophages and promotes tumor-mediated immune evasion

published in *Science Advances*, describes in detail the relationship between cytokine regulation, mitochondria, and redox-sensitive signalling, in particular with respect to macrophages. While the paper focuses on the implications of this for tumour immunity, the role of complex III in immune responses could have wider implications and is particularly interesting to us in the context of photobiomodulation, given the sensitivity of complex III to specific frequencies of light.



Light-matter interactions in biological systems were also the subject of interest in another recent paper published in the journal *Quantum Reports*. The article, **Parametric Resonance via Neuronal Microtubules:**

Filtering Optical Signals by Tryptophan Qubits, outlines how non-linear optical effects might be achieved in microtubules. The authors model the system using the Hamiltonian for cavity quantum electrodynamics (QED), which describes the behaviour of photons under specific conditions, with tryptophan molecules functioning as qubits in the biological context. The authors demonstrate that, for qubits organised in multiple layers, the time evolution of the system

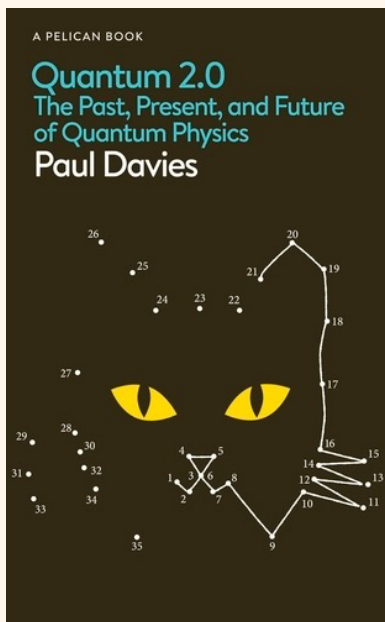
shows binary patterns of parametric amplification of input signals and reduction of output signals. The authors suggest that this behaviour may provide insight into how collective tryptophan interactions in microtubules might translate into non-local information processing in the brain.



The unification of gravity and quantum mechanics remains a holy grail in physics research, but has proven a difficult thing to test experimentally. A recent paper, **Classical theories of gravity produce entanglement,**

published in *Nature*, investigates the parameters of a possible experiment that might be used to verify that gravity is also subject to the laws of quantum mechanics. The experiment leverages the uniquely quantum phenomenon of entanglement, placing a massive object in a quantum superposition of two locations and letting it gravitationally interact with another mass. If the two objects subsequently become entangled, this is considered unambiguous evidence that gravity obeys the laws of quantum mechanics, a conclusion that follows from classical descriptions of matter being dependent on local interactions. The authors of the paper extend this classical description to the full framework of quantum field theory and conclude that theories with classical gravity can in fact transmit quantum information and, thus, generate entanglement through physical, local processes.

Book corner



For this issue's book corner Alistair Nunn reviews a new book by Paul Davies, *Quantum 2.0: The Past, Present, and Future of Quantum Physics*, published in November 2025 by Penguin. Thanks to Paul Davies's team for sending us a pre-publication copy, we were excited to read it.

QUANTUM 2.0: THE PAST, PRESENT, AND FUTURE OF QUANTUM PHYSICS **BY PAUL DAVIES**

I was lucky enough to be sent an advanced reading copy of this book. In short, it is a must read. It is beautifully written, with a handy bibliography, and as much as it can in dealing with such a non-intuitive subject as quantum mechanics, is very accessible to a lay audience. The truth is that many shy away from the subject, not just because of the maths, but because the world of atoms, is well, weird!

Our normal ability to make sense of the macro world simply fails when applied to the micro world, especially when we consider the basics, such as wave-particle duality, entanglement, superposition, the uncertainty principle and our role as observers. The paradox here, of course, is that quantum mechanics is one of the most

successful theories ever developed by humans, and even if we don't fully understand the actual nature of the reality it seems to imply, we can apply it.

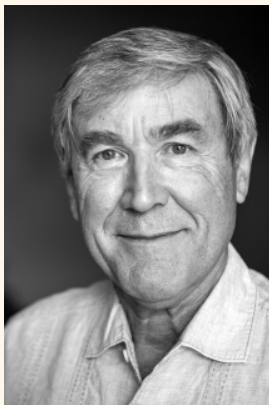
In this book, Paul takes the reader through the history of its origins, and how it was developed, and then onto how it has been applied, for instance, in understanding how our universe may have started, to developing standard computers and medical imaging. It implies that space is not empty. This earlier work has been described as quantum 1.0, but with the advent of quantum computing and the information age, and developments in medical devices and sensing, we are moving into quantum 2.0. But the catch continues to be that we still do not fully understand it, for instance, we are still trying to understand how we apply it to gravity. Indeed, Einstein always struggled with it – there are also several interpretations, such as the many worlds theory, or pilot wave theory, which attempt to explain it. Despite the fact that many brilliant minds have worked on it, there is still no real consensus on the nature of reality (yet!) it implies. Some even say it is unknowable.

From the past to now, Paul then speculates on where we might be going with it, and critically, there is still a lot more to learn. There are also cautionary lessons here, especially, for instance, around artificial intelligence and what a quantum computer may be capable of, or somewhat scarily, become. As ever, science can be used for good, but also for bad. He also touches upon its role in biology: this has been difficult in the past, as we simply did not have the technology to more fully investigate it, but perhaps with quantum 2.0 this may change.

Quantum mechanics has already revolutionised the world, but how much further is this revolution going to go? Will it lead to an ultimate understanding of reality? I suspect it might, but we have a way to go yet. My suspicion is that biology may be telling us as much about quantum mechanics as quantum mechanics is telling us about biology. When you have read this book, and I urge you to, perhaps you will also come to this conclusion, both practically, but also, maybe, existentially. How has the physics of our Universe led to beings that are conscious?

Enjoy.

Alistair Nunn



Paul Davies
Photo credit:
Christopher Michel
commons.wikimedia.org

Paul Davies is a theoretical physicist, cosmologist and astrobiologist at Arizona State University and a prominent science communicator. As well as hundreds of research papers, he is a bestselling science author of over 30 books. His work spans quantum gravity, early-universe cosmology, quantum black holes and the nature of time, astrobiology (including the idea that life on Earth may have originated on Mars) and an evolutionary theory of cancer.

CONFERENCES & MEETINGS

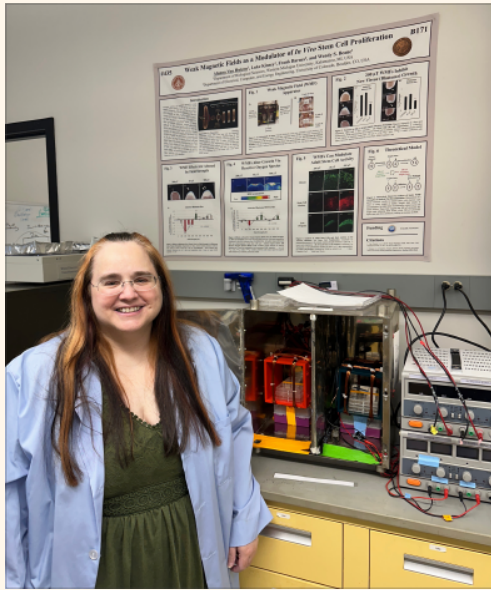
The Guy Foundation [website](#) includes a page dedicated to quantum biology related conferences and meetings, both online and in person. If you have any to add, please let us know.

SPIE PHOTONICS WEST CONFERENCE, JANUARY 2026

The 2026 SPIE Photonics West Conference is just around the corner, from 17 – 22 January in San Francisco. The conference bills itself as the premier event for lasers, biomedical optics, optoelectronics, and technologies supporting biophotonic, quantum, and vision applications. See the [website](#) for more details. We were delighted to see that Wendy Beane, Western Michigan University, will be presenting an invited paper entitled **The application of quantum biology in controlling tissue growth**.

Wendy commented:

“ I’m delighted for this year’s SPIE Photonics West conference because it brings together researchers across disciplines who appreciate the wide-ranging scope of how quantum phenomena influence living systems. It’s wonderful to see the inclusion of quantum biology in this conference. The expanding knowledge on quantum-biological mechanisms – especially the radical-pair chemistry that can influence cellular redox signals – opens the door to interdisciplinary collaborations with biologists such as myself that we couldn’t have imagined a decade ago. I’m looking forward to speaking about my group’s work, which shows that very weak static magnetic fields can change reactive oxygen



Wendy Beane will be presenting her research at SPIE 2026

species levels in adult planarian stem cells, altering how these animals initiate and shape tissue growth. It's a striking example of how a non-invasive physical stimulus can guide biological outcomes, and we believe this work may help us better understand and likely control new tissue growth. I look forward to connecting with colleagues at this premier event. ”

APS GLOBAL PHYSICS SUMMIT, MARCH 2026

The American Physical Society (APS) 2026 Global Physics Summit, will take place from 15 – 20 March, in Denver and online, uniting the traditional March and April Meeting communities under one banner. This integrated event will showcase the full spectrum of physics, from condensed matter to cosmology to biophysics. See their [website](#) for more details.

THE QUANTUM BIOLOGY FORUM, APRIL 2026

The Quantum Biology Forum will take place from the 13 – 14 April 2026, in the Washington D.C. area, USA. Read more about the event and some thoughts from the organisers in our main article section [here](#). For more information see their [website](#). The deadline for abstract submission is 13 February 2026.

QUANTUM TECHNOLOGY IN THE LIFE SCIENCES (QLIFE) 2025

The Quantum Technology in the Life Sciences (qLIFE) conference took place from 19 – 21 November 2025 in Woollyungah / Wollongong, Australia. Described by the organisers as the first international conference series focused on the life sciences applications of quantum technologies, it brought together researchers and experts from academia, industry and medicine from around the world to explore the latest advances and innovations.

PhD student Tristen Gwynn, from Stellenbosch University, who attended the conference, had this feedback:

“ It was exciting to see how broad the field has become. I was particularly struck by the diversity of NV-centre nanodiamond applications, as well as emerging MEG technologies that may enable real-time brain-activity measurements during movement. The conference really highlighted how rapidly quantum sensing in medicine and biology is expanding. ”



Sun setting over the city of Wollongong
Photo credit: quantum.bio/destination

QUANTUM BIOLOGY SEMINARS ROUND-UP

The Big Quantum Bio meetings

Clarice Aiello of the [Quantum Biology Ecosystem](#) organises these meetings which take place online on selected Thursdays and are free to attend.

QIS and Quantum Sensing in Biology Interest Group

The National Institutes of Health's Quantum Information Sciences (QIS) and Quantum Sensing in Biology Interest Group hosts monthly online meetings. For more information visit their [website](#).

QIS and Quantum Sensing in Biology Interest Group

These meetings are hosted by the Bioelectrodynamics group at The Czech Academy of Sciences. For more information visit their [website](#). Video recordings of previous presentations can be viewed on [YouTube](#).

If you have conferences or meetings to include, please let us know.

JOB OPPORTUNITIES

Postdoctoral, PhD and undergraduate research positions are available in the Fay group, a new research group in theoretical and computational chemistry at UCLA. For more information see their [website](#).

The Quantum Neurobiology Lab at the University of Waterloo is currently [actively recruiting graduate students](#), who are advised to contact them, along with any undergraduates interested in volunteering in the lab.

If you are looking for a research position, visit our directory of [QB centres](#).

DATES FOR YOUR DIARY



THE GUY FOUNDATION

2026 SPRING SERIES PROGRAMME MAGNETIC FIELDS AND BIOLOGY

Magnetic fields are increasingly being recognised as crucial to biological processes, from bird navigation to human cellular functions. In this series we will explore the 'magnetobiology' field, including the underlying mechanisms, the evidence for its effects in plants, animals and humans and its potential for medicine.

Session 1

Magnetic fields and biology

Wednesday 11 March

Professor Jonathan Woodward, University of Tokyo
Professor Clarice Aiello, The Quantum Biology Institute

Session 2

The therapeutic use of magnetic fields

Wednesday 25 March

Professor Margit Egg, University of Innsbruck
Professor Martyn A Sharpe, Houston Methodist Hospital
Kamran Ansari, Stanford University and GP Bullhound Young
Entrepreneur of the Year

Session 3

The evidence for magnetobiology – Part I animals and humans

Wednesday 22 April

Professor Wendy Beane, Western Michigan University

Programme continued on next page



THE GUY FOUNDATION

**2026 SPRING SERIES PROGRAMME
MAGNETIC FIELDS AND BIOLOGY**

Session 4

The evidence for magnetobiology – Part II plants

Wednesday 6 May

Professor Massimo Maffei, Università di Torino

Session 5

Implications of magnetobiology

– roundtable session

Wednesday 20 May

Dr Betony Adams, The Guy Foundation and Stellenbosch University

Professor Alistair Nunn, The Guy Foundation
and University of Westminster

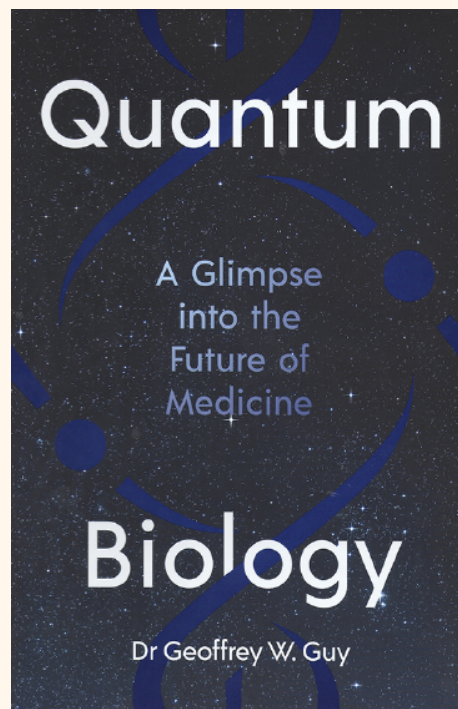
Followed by roundtable discussion

All sessions 15:00hrs – 17:00hrs UK-time on Zoom
Please contact n.copping@theguyfoundation.org to register

COMMUNITY NEWS

THE DORCHESTER LITERARY FESTIVAL

Geoffrey Guy was invited to talk at the 11th Dorchester Literary Festival in October, about his recent book *Quantum Biology*, which invites readers to look at health and medicine in a new light, both literally and figuratively. The book explores how the body's energy and communication systems may go beyond traditional biochemical models, which would transform how we understand everything from space travel to cancer to the healing power of light. Geoffrey has long been an advocate for making science more accessible to the general public, and the festival offered a novel platform for inspiring conversations about quantum biology and the future of medicine, while enjoying the beautiful Dorchester landscape.



Geoffrey Guy at the Dorchester Literary Festival (left) and his book on quantum biology (right)

ROYAL INSTITUTION QUANTUM EVENT

Rhys Mould and colleagues from The Guy Foundation Quantum Biology and Bioenergetics Laboratory recently took part in the ‘For Your Inspiration’ event in London aimed at inspiring the next generation of quantum researchers.



The team at the Royal Institution event, from left to right: Louise Thomas, Sanika Ghayal, Grace Pennelli, Rhys Mould

Rhys commented:

“ 2025 is the United Nation's Year of Quantum Science and Technology, celebrated by events and discussion world-wide to raise awareness of the impact quantum has on all aspects of life. One of these celebrations was held here in the UK by the Institute of Physics, at the prestigious Royal Institution in London.

Our team from Westminster were invited to talk to students aged 16-18 on our work in quantum biology, how we got into the field, and why The Guy Foundation takes such a special interest in quantum physics. People, myself included, can often find quantum mysterious and impenetrable, but we found that in the context of biology, students were engaged and surprised to see that quantum physics underpins the very nature of biological life itself - using familiar examples such as the mitochondria, and exciting applications such as how quantum mechanics may have consequences for astronauts in deep space. Quantum Biology is a field that is growing rapidly, and through this event we hope to have inspired some future quantum biologists! ”

QUANTUM BIOLOGY HACKATHON

The first Quantum Biology Hackathon took place at the Haus der Kulturen der Welt (HKW) in Berlin from 31 October to 2 November. The event was co-hosted by **HKW** and the **Quantum Biology Institute team (QBI)**, and led by Clarice Aiello, with Pedro Alvarez from the University of Oldenburg, Germany. The Hackathon brought together six interdisciplinary teams representing six regions of the world. Stellenbosch University's Abbas (Omid) Hassasfar acted as team leader for Africa and the Middle East and he gave us this report:

“ The first two days of the Hackathon were dedicated to concept development and collaborative problem solving. Teams worked intensively on framing their questions, refining

their hypotheses, and building preliminary models to explore their problems. Throughout these working sessions, participants exchanged ideas across disciplines and regions, creating a dynamic environment for rapid learning. The final day opened function and why fast-paced, collaborative formats such as with a keynote by Clarice Aiello, who provided a broader context on how quantum effects may influence biological hackathons can accelerate discovery. Following the keynote, each team then delivered a presentation summarising their project and the insights developed over the previous two days.

This was followed by a lively panel discussion involving the organisers and team leaders. The discussion ranged from open theoretical challenges to possible applications in medicine and sensing, and participants noted the unique value of collective exploration that crosses scientific and geographic boundaries.”

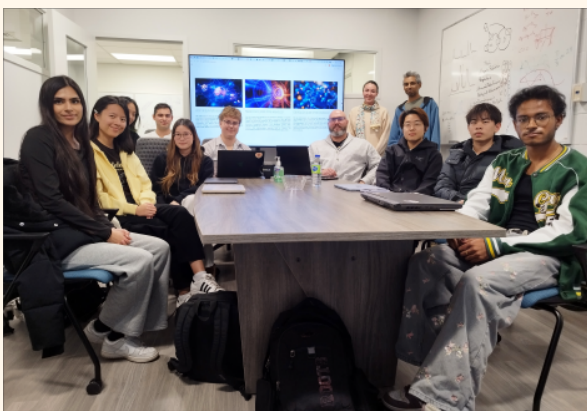


Hackathon organisers and team leaders, from left to right: Pedro Alvarez, Omid Hassasfar, Clarice Aiello, Gesa Grüning, Lara Patricia

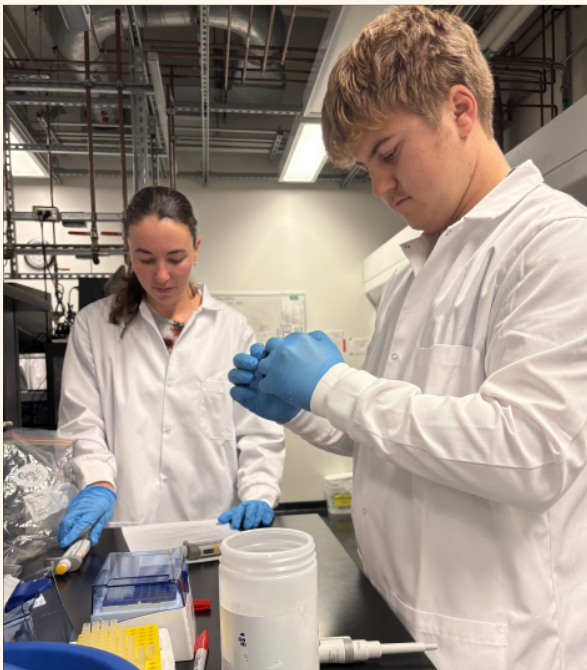
Photo credit Abbas (Omid) Hassasfar

VIEW FROM THE LAB

We enjoy finding out more about the landscapes of our quantum biology community, a literal glimpse out of your laboratory windows. In this last edition of the year we are delighted that Travis Craddock agreed to share an update from his lab in Canada with us.



Travis Craddock with his growing research group



Hard at work in the lab!

Photo credits: Lea Gassab

Travis is an Associate Professor in the Departments of Biology, and Physics & Astronomy at the University of Waterloo, a member of the Waterloo Institute for Nanotechnology, and head of the Quantum Neurobiology Lab. He has long centred on the brain. His graduate research focused on sub-neural biomolecular information processing and nanoscale neuroscience descriptions of memory, consciousness, and cognitive dysfunction in neurodegenerative disorders.

His group is now focused on how quantum mechanics might offer new perspectives on brain processes, specifically the underlying physical and molecular processes of neuroinflammation.

The aim of this work is to improve diagnosis and identify novel treatment strategies for neuroinflammatory illnesses including Alzheimer's and Parkinson's diseases.



The University of Waterloo campus under a light dusting of early snow. The University (including the Waterloo, Kitchener, and Cambridge campuses) is situated on the Haldimand Tract, land promised to the Haudenosaunee of the Six Nations of the Grand River, and is the traditional territory of the Neutral, Anishinaabeg, and Haudenosaunee peoples. Photo credit: Lea Gassab.

To read more about this research and the other members of the group see their [website](#).

For a directory of [Quantum Biology Centres](#) across the world visit our website. If you would like to add your centre please contact [Nina Copping](#).

We hope you have enjoyed reading the Quarterly Review.
Please feel free to get in touch - n.copping@theguyfoundation.org.

Season's Greetings
and we look forward to seeing you in 2026!

The Guy Foundation team



The Guy Foundation team at the Research Meeting in October (see page 8). From left to right: Nina Copping, Rhys Mould, Sanika Ghayal, Alistair Nunn, Geoffrey Guy, Grace Pennelli, Alix Bailie, Alasdair Mackenzie, Louise Thomas and Jimmy Bell

www.theguyfoundation.org



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