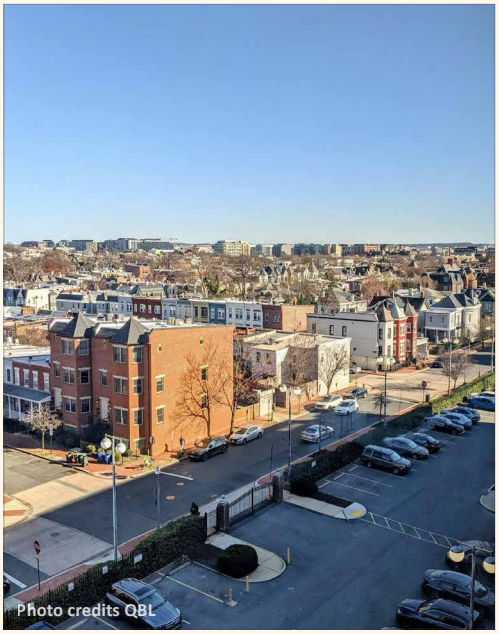
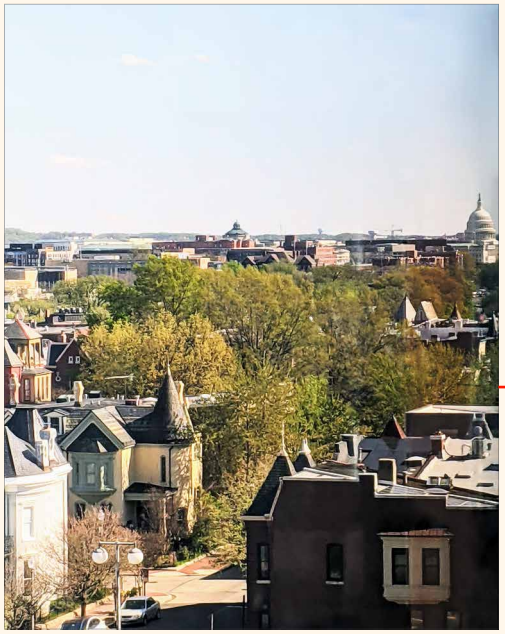
View from the Lab

We enjoy, in what is an increasingly online world, taking a peek at the landscapes of our quantum biology community – a glimpse out of your laboratory windows. We asked Philip Kurian for the view from the **Quantum Biology Laboratory (QBL) at Howard University** and to hear an update from the team.

The QBL is an interdisciplinary research group – comprising ~60% physicists, and with trainees recruited from across the biological,chemical, computational, and mathematical sciences – that investigates how quantum phenomena influence living systems and their information-processing modalities over multiple scales.





Above left: A blue-sky view from the Quantum Biology Laboratory's "penthouse" office suite on the sixth floor of the Howard University Cancer Center

Above right: Another view from the QBL. At the far-right of the frame is the US Capitol building, with the historic LeDroit Park / Shaw neighbourhood of Washington, DC, in the foreground

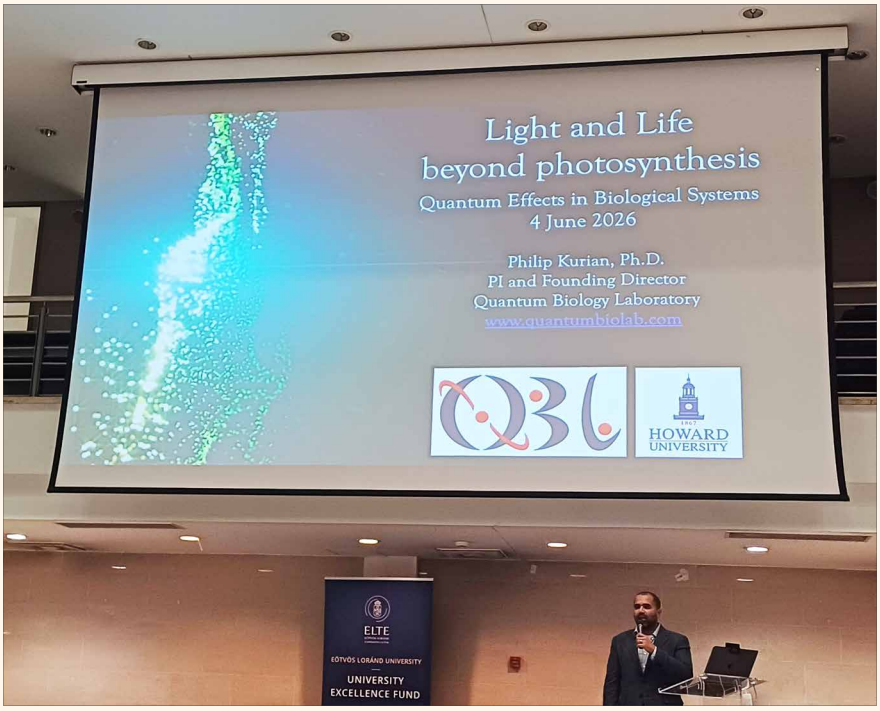
The laboratory is particularly interested in the role of quantum optics and related electromagnetic interactions in biology, bridging research in quantum foundations, state-of-the-art spectroscopies, and whole-organism experimental biology. The group's latest advances have included building slime-machine interfaces with the unicellular *Physarum polycephalum*, to develop better heuristics for solving the travelling salesperson problem.

Philip tells us:

"It is an exciting time to be a part of the QBL at Howard University, where I have the privilege of leading the most outstanding group of scientists in the world. Not only do we have in press what may be the most comprehensive and sweeping yet integrative quantum biology review to date, but we also have several high-impact papers in development that serve as key milestones on our determined trek toward realizing the long-term vision: to rigorously prove how living systems harness quantum principles for exploratory advantage."

In the last two years, the QBL has also published fascinating research on the potential role of quantum-enhanced photoprotection in neurodegenerative diseases such as Alzheimer's. Their 2024 study explored the intriguing possibility that quantum optical processes in amyloid fibrils and in other neuroproteins may actually protect neural tissue from oxidative stress, by enhancing the rate of spontaneous emission from electronically excited states. The work provides a novel perspective on how photophysical mechanisms could contribute to resilience against dementia and exemplifies the QBL's broader mission of applying the principles of quantum physics to understand the etiology of complex diseases.

As part of The Guy Foundation's **collaborative research programme**, the QBL worked with the Foundation from 2020 – 2023 on a major project reflecting our shared interest in how light interacts with biological systems. The QBL team investigated whether networks of light-reactive biomolecules can exhibit superradiance – a collective quantum effect that enhances light emission even in the ultraweak or single-photon regime. Using advanced spectroscopy, the QBL and coworkers experimentally demonstrated this phenomenon in polymerised microtubules, while simulations predicted even greater effects in larger assemblies and in amyloid fibrils. The work provides important evidence that collective quantum optical phenomena occur in living systems, even at thermal equilibrium, and introduces new theoretical and computational tools for studying light-matter interactions in biology. Philip presented some of this research at the recent QuEBS conference in Budapest, as part of The Guy Foundation Keynote Lecture series.



Philip Kurian presenting one of The Guy Foundation Keynote Lectures at QuEBS 2026

With projects spanning neuroscience, slime mould biocomputing, quantum information, photobiology, and quantum optics, the QBL continues to establish itself as one of the leading centres advancing the emerging field of quantum biology. We look forward to following the team's future discoveries.

A selfie of the QBL group at the base of Casper Mountain in Wyoming, with Garden Creek Falls in the backdrop.

You can learn more about the Quantum Biology Laboratory and its research on the **QBL 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**.