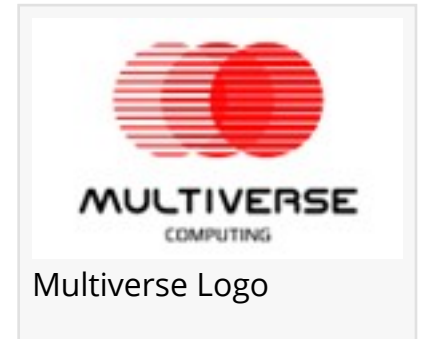


Multiverse Computing Wins Innovate UK Funding to Improve Flood Risk Assessment with Quantum Algorithms

Multiverse leads project with Moody's & Oxford Quantum Circuits to address risks from climate change for UK's Dept of Environment, Food & Rural Affairs

LONDON, UNITED KINGDOM, October 31, 2023 /EINPresswire.com/ -- [Multiverse Computing](#), a global leader in value-based quantum computing and machine learning solutions, along with Moody's Analytics and Oxford Quantum Circuits (OQC), have won funding from Innovate UK to use quantum methods to develop large-scale flood prediction models and remove limitations of traditional modeling methods.



The UK Department of Environment, Food and Rural Affairs is overseeing the project and will be the first customer to use this new solution in computational fluid dynamics in an effort to help the country better adapt to extreme weather events linked to climate change.

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Ilana Wisby, OQC CEO

The three companies won a place in Phase 1 of this competitive process from the UK government's Quantum Catalyst Fund for their joint project, “Quantum-Assisted Flood Modeling: Pioneering Large-Scale Analysis for Enhanced Risk Assessment.” The project team will use quantum computing to address the computational challenges in large-scale flood modeling studies and to make flood risk assessment and management more accurate and efficient.

Multiverse Computing is the lead contractor and software provider for the project and will deliver the technical formulation of the problem and algorithm development. OQC will supply the quantum hardware and ancillary resources, while industry partner Moody's Analytics, a global risk management firm, will contribute industry expertise, data requirements, and insights on computational efficiency.

This is the first time Multiverse proposes to apply quantum algorithms to assess potential flood damage. The improvements to accuracy and effectiveness gained by the quantum approach to computational fluid dynamics problems could contribute to climate change adaptation efforts, according to Enrique Lizaso Olmos, founder and CEO of Multiverse Computing.

"Understanding the changes in flood risk will help everyone prepare for extreme weather events, from government agencies working to mitigate those risks to homeowners trying to protect their homes and properties, as well as insurance agencies quantifying these new risks," said Lizaso Olmos.

Flood modelling involves running two-dimensional hydrodynamical models that numerically solve Shallow Water Equations (SWE), which describe the flow of water in all relevant scenarios such as dam breaks, storm surges, or river flood waves. The computational cost of running simulations with sophisticated models over large areas and high-resolution is a limiting factor for current methods. To counteract these limitations, parallel computing and GPU-based computing have been employed to expedite the simulation process.

"The advent of new technologies, such as quantum computing, offers an exciting avenue for advancement," said Sergio Gago, Moody's Managing Director of Quantum and GenAI. "Specifically, there is promising potential in the application of quantum machine learning (QML) to develop emulators as alternatives to traditional physics-based models."

Moody's RMS estimates that regardless of society's capacity to decrease carbon emissions, by 2050 average cost of flood risk in the UK will increase by at least 20%, with some strong variability by region, season and future emission scenario. RMS flood models estimate there are greater than £700 million (\$850M USD) in losses each year in the country due to inland flooding, with large year-over-year volatility. The flood risk modeling work funded by Innovate UK could help to further improve our understanding of flood risk landscape across geographies and time of the year.

"We recognise the urgency of addressing escalating flood risks which is why this project is so important to us," says Dr. Ilana Wisby, OQC CEO. "By harnessing the power of OQC's quantum computing, we're not only breaking free from the constraints of classical computing, together we are redefining the future of flood management and helping to create a safer, more resilient world for future generations."

The project team will use a Quantum Physics-Informed Neural Network (QPINN) algorithm to improve these risk assessment methods. The algorithm combines classical data processing with quantum processing using a Variational Quantum Circuit (VQC). The data is encoded into the quantum gate parameters of the VQC, and as the algorithm progresses, these parameters are adjusted to improve the accuracy of target function predictions.

Phase 1 lasts three months and ends Nov. 30, 2023. The second phase of the project will last up

to 15 months and starts in January 2024. Approval for Phase 2 is based on a successful completion of Phase 1.

This Small Business Research Initiative competition is funded by the Department for Science, Innovation and Technology (DSIT) and Innovate UK (IUK). The aim of this competition is to explore the benefit of using quantum technologies in various areas of interest for the UK Government, accelerating the adoption of quantum solutions by the public sector and for the public benefit. Thirty projects were awarded funding in Phase 1.

Part of the UK Research and Innovation (UKRI) government organization, Innovate UK supports business-led innovation in all sectors, technologies and regions of the country to help develop and commercialize new products, processes and services that enhance business growth.

About Moody's Analytics

Moody's (NYSE: MCO) is a global integrated risk assessment firm that empowers organizations to make better decisions. Its data, analytical solutions and insights help decision-makers identify opportunities and manage the risks of doing business with others. We believe that greater transparency, more informed decisions, and fair access to information open the door to shared progress. With approximately 14,000 employees in more than 40 countries, Moody's combines international presence with local expertise and over a century of experience in financial markets. Learn more at moodys.com/about.

About Oxford Quantum Circuits

OQC is a world-leading quantum computing company. It brings enterprise ready quantum solutions to its customers' fingertips and enables them to make breakthrough discoveries. The company's quantum computers are available via data centres, private cloud and on Amazon Braket. For more information, visit www.oxfordquantumcircuits.com.

About Multiverse Computing

Multiverse Computing is a leading quantum software company that applies quantum and quantum-inspired solutions to tackle complex problems in finance, banking, manufacturing, energy, and cybersecurity to deliver value today and enable a more resilient and prosperous economy. The company's expertise in quantum algorithms and quantum-inspired algorithms means it can secure maximum results from current quantum devices as well as classical high-performance computers. Its flagship product, Singularity, allows professionals across all industries to leverage quantum computing to speed up and improve the accuracy of optimization and AI models with existing and familiar software tools. The company also has developed CompactifAI, a compressor which uses tensor networks to make large language models more efficient and portable. In addition to finance and AI, Multiverse serves enterprises in the mobility, energy, life sciences and industry 4.0 sectors. The company is based in San

Sebastian, Spain, with branches in Toronto, Paris and Munich.

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