

AI News Digest

07/20/2026 - 07/26/2026

WEEKLY DIGEST: PHYSICAL & EARTH SCIENCES

Breakthroughs in Quantum Computing and Scientific Discovery

Recent advancements in quantum computing and scientific research have led to significant breakthroughs, enabling simulations of complex quantum systems, degradation of harmful chemicals, and acceleration of scientific discovery. Researchers have developed new methods to efficiently simulate quantum qubits using conventional computers and have discovered new mechanisms to transfer energy. Additionally, advancements in photonic chips and AI have opened up new possibilities for scientific exploration. These developments are expected to have a profound impact on various fields, including physics, chemistry, and medicine.

KEY FINDINGS

- ✓ Researchers have developed a method to efficiently simulate hundreds of interacting quantum qubits using a conventional computer.
- ✓ Two new technologies have been discovered to degrade per- and polyfluoroalkyl substances (PFAS), a family of industrial chemicals that resist breakdown.
- ✓ A new programmable photonic chip has been developed, enabling control over the speed and shape of optical signals.

IMPLICATIONS

- These breakthroughs are expected to accelerate scientific discovery and exploration in various fields.
- The developments in quantum computing and photonic chips may lead to significant advancements in fields such as medicine and materials science.
- The use of AI in scientific research is expected to increase efficiency and lead to new discoveries.

Key Metrics: \$40 million in AI tokens and cloud credits committed by Google to support the US Department of Energy's Genesis Mission.; 15 collaborative projects selected for funding under the Genesis Mission's Phase I, including six led by MIT principal investigators.; Hundreds of interacting quantum qubits simulated using a conventional computer.

1. An ordinary laptop solved a problem thought to require a quantum computer

Category: Research
Departments: Computer Science, Physics, Mathematical Sciences, Electrical & Computer Engineering
Topics: Science & Research, Tensor Networks, Quantum Simulation, Classical Quantum Computing

Impact Score: 20.0

Rubric Scores

Research Relevance: 4	Educational Value: 4	Innovation / Novelty: 4
Practical Impact: 3	Interdisciplinary Potential: 4	Ethical / Policy Implications: 1

Researchers at the Center for Computational Quantum Physics (CCQ) have developed a method to efficiently simulate the behavior of hundreds of interacting quantum qubits using a conventional computer and advanced mathematics. The approach, which utilizes tensor networks to compress the wave function, enabled some calculations to run on a personal laptop. This technique may expand the range of quantum dynamics problems that can be studied and offer a useful strategy for optimization problems. The findings were published in the journal Science.

<https://www.sciencedaily.com/releases/2026/07/260719040000.htm>

2. Scientists found two powerful new ways to destroy forever chemicals

Category: Research
Departments: Civil, Environmental & Construction Engineering, Earth, Environmental & Resource Sciences
Topics: AI for Science & Research, Environmental AI Applications, Water Treatment Technologies

Impact Score: 18.0

Rubric Scores

Research Relevance: 2	Educational Value: 2	Innovation / Novelty: 3
Practical Impact: 4	Interdisciplinary Potential: 4	Ethical / Policy Implications: 3

Researchers at Helmholtz-Zentrum Dresden-Rossendorf (HZDR) are testing two technologies to degrade per- and polyfluoroalkyl substances (PFAS), a family of industrial chemicals that resist breakdown. The approaches use hydrodynamic cavitation and cold atmospheric plasma with gas dispersion, and analyses confirmed that PFAS molecules were degraded and fluoride was released during treatment. In experiments with perfluorooctane sulfonate (PFOS), hydrodynamic cavitation achieved a 37% degradation rate, with the goal of improving this to over 80% and mineralizing 50% of bound fluorine. The technologies aim to help industries treat contaminated wastewater and reduce PFAS pollution.

<https://www.sciencedaily.com/releases/2026/07/260718010147.htm>

3. New programmable photonic chip can control how fast light moves

Category: Research

Departments: Electrical & Computer Engineering, Computer Science, Industrial, Manufacturing & Systems Engineering, Metallurgical, Materials & Biomedical Engineering, Physics

Topics: AI Hardware, Photonic Integrated Circuits, Optical Computing, Coupled-Resonator-Induced Transparency

Impact Score: 17.0

Rubric Scores

Research Relevance: 3

Educational Value: 2

Innovation / Novelty: 4

Practical Impact: 3

Interdisciplinary Potential: 4

Ethical / Policy Implications: 1

Researchers at Seoul National University and the University of Seoul have developed a programmable photonic integrated circuit that can control the speed and shape of optical signals, enabling the delay of light as needed. This innovation addresses a significant challenge in optical computing, where delays are essential for creating buffers and memory functions. The team's approach, based on coupled-resonator-induced transparency (CRIT), provides more flexibility than previous methods and could help overcome bottlenecks in data centers and servers. The study was published in the journal Advanced Science.

<https://www.sciencedaily.com/releases/2026/07/260718010149.htm>

4. A strange quantum effect dramatically boosts energy transfer

Category: Research

Departments: Chemistry & Biochemistry, Physical Therapy & Movement Sciences, Mathematical Sciences, Physics

Topics: Science & Research, Quantum AI, Energy Transfer Mechanisms, Quantum Mechanical Tunneling

Impact Score: 17.0

Rubric Scores

Research Relevance: 3

Educational Value: 2

Innovation / Novelty: 4

Practical Impact: 3

Interdisciplinary Potential: 4

Ethical / Policy Implications: 1

Researchers at the Dalian Institute of Chemical Physics have discovered a new mechanism called proton shuttle-assisted triplet energy transfer (PS-TET), which enables efficient transfer of spin-triplet energy between materials. This process involves the temporary movement of a proton, which greatly increases the speed and efficiency of triplet energy transfer compared to a methylated analog. The study found that PS-TET occurs through quantum mechanical tunneling, even at room temperature, and suggests that quantum effects can be used to control charge and energy transfer in complex materials. The findings have implications for various applications, including solar cells, lasers, and catalysis.

<https://www.sciencedaily.com/releases/2026/07/260722032130.htm>

5. MIT projects selected for funding under US Department of Energy's Genesis Mission

Category: Research

Departments: Computer Science, Electrical & Computer Engineering, Industrial, Manufacturing & Systems Engineering, Mathematical Sciences, Physics

Topics: AI for Science, Scientific Discovery Platforms, AI-Accelerated Materials Design

Impact Score: 16.0

Rubric Scores

Research Relevance: 3

Educational Value: 2

Innovation / Novelty: 2

Practical Impact: 4

Interdisciplinary Potential: 4

Ethical / Policy Implications: 1

The US Department of Energy has selected 15 collaborative projects, including six led by MIT principal investigators, for funding under the Genesis Mission's Phase I. The Genesis Mission aims to build a powerful integrated science discovery platform by leveraging AI, supercomputing, and advanced scientific instruments to accelerate breakthroughs in energy, scientific discovery, and national security. The selected projects, which involve collaborations between academia, industry, and national laboratories, will demonstrate research workflows that integrate AI with scientific investigation and evaluate their scientific merit. The projects focus on areas such as quantum sensing, materials design, and fusion energy, with the goal of identifying promising pathways toward transformative capabilities at scale.

<https://news.mit.edu/2026/mit-projects-selected-funding-under-doe-genesis-mission-0723>

6. Accelerating the frontiers of scientific discovery: Google's \$40M commitment to the Genesis Mission

Category: Business

Departments: Computer Science, Mathematical Sciences, Physics, Earth, Environmental & Resource Sciences, Engineering Education & Leadership

Topics: Science & Research, AI for Scientific Discovery, Large Language Models, AlphaFold Applications

Impact Score: 16.0

Rubric Scores

Research Relevance: 2

Educational Value: 3

Innovation / Novelty: 2

Practical Impact: 4

Interdisciplinary Potential: 4

Ethical / Policy Implications: 1

Google has committed \$40 million in AI tokens and cloud credits to support the US Department of Energy's (DOE) Genesis Mission, a national effort to harness AI and double the pace of American scientific discovery within a decade. As part of this commitment, Google DeepMind will provide access to its frontier AI tools, including AlphaEvolve, AlphaFold 3, and AlphaGenome, to DOE researchers. The tools have already shown practical impact, enabling researchers to accelerate discoveries in areas such as mathematical systems, materials science, and weather forecasting. The expanded commitment also includes providing Gemini for Government seats and tokens to tens of thousands of users across the DOE National Laboratories.

<https://deepmind.google/blog/accelerating-the-frontiers-of-scientific-discovery-googles-40m-commitment-to-the-genesis-mission/>

7. New quantum gravity theory links entropy, dark energy, and life

Category: Research
Departments: Physics, Mathematical Sciences
Topics: Science & Research, Quantum Gravity Theory, Entropy Complexity

Impact Score: 16.0

Rubric Scores

Research Relevance: 3	Educational Value: 2	Innovation / Novelty: 4
Practical Impact: 2	Interdisciplinary Potential: 4	Ethical / Policy Implications: 1

A new theoretical study led by Professor Ginestra Bianconi explores the possibility that the theory of Gravity from Entropy (GfE) can help explain how cosmic complexity emerges in the Universe while adhering to the second law of thermodynamics. According to the study, published in Physical Review D, the Universe's total entropy increases over time, but the entropy per unit of volume decreases as the Universe expands, potentially allowing for local organized structures to develop. The GfE theory describes gravity as emerging from the microscopic properties of spacetime geometry and connects it to information and entropy at the quantum level. The findings may also offer a new perspective on dark energy, with predictions that could be tested through future cosmological observations.

<https://www.sciencedaily.com/releases/2026/07/260719035947.htm>

8. Bristol Myers Squibb Building Life Science Industry's Most Advanced AI Factory on NVIDIA Vera Rubin

Category: Research
Departments: Computer Science, Pharmaceutical Sciences, Biological Sciences, Chemistry & Biochemistry, Nursing
Topics: Healthcare AI, AI Factory Infrastructure, Drug Discovery Acceleration, Large Language Models for Drug Discovery

Impact Score: 15.0

Rubric Scores

Research Relevance: 2	Educational Value: 2	Innovation / Novelty: 3
Practical Impact: 4	Interdisciplinary Potential: 3	Ethical / Policy Implications: 1

Bristol Myers Squibb (BMS) is deploying its second NVIDIA DGX SuperPOD, an AI cluster that will provide access to a unified AI platform for researchers across the company's drug discovery pipeline. The new system, comprising eight DGX Vera Rubin NVL72 systems, will deliver up to 10x the performance per megawatt of the infrastructure it replaces. BMS aims to accelerate drug discovery by enabling researchers to run predictions, train models, and power workflows without limitations, building on the success of its first AI cluster which has already yielded meaningful results, such as AI-enabled target identification and expansion of its library of CELMoD compounds. The company plans to use the new system to translate AI capabilities into measurable impact on drug discovery.

<https://blogs.nvidia.com/blog/bristol-myers-squibb-building-life-science-industrys-most-advanced-ai-factory-on-nvidia-vera-rubin/>