

AI News Digest

07/06/2026 - 07/12/2026

WEEKLY DIGEST: DATA & MATHEMATICAL SCIENCES

Advancements in Quantum Physics and Information Theory

This week, significant developments in quantum physics and information theory have emerged. Jesse Thaler has been appointed the new director of the MIT Laboratory for Nuclear Science, promising to advance research in theoretical particle physics. Meanwhile, researchers have made strides in understanding spurious correlations in data analysis, emphasizing the importance of sample size. Additionally, a groundbreaking study has revealed quantum entanglement in a macroscopic crystal, showcasing the potential for new applications in quantum technologies.

KEY FINDINGS

- ✓ Jesse Thaler appointed director of MIT Laboratory for Nuclear Science.
- ✓ Information theory can enhance ensemble methods for time-series forecasting.
- ✓ Quantum entanglement observed in a centimeter-sized crystal.

IMPLICATIONS

- Thaler's leadership may drive innovative research in nuclear science.
- Improved ensemble methods could lead to more accurate forecasting models.
- The discovery of quantum entanglement in larger crystals could revolutionize quantum computing.

Key Metrics: New director appointed effective August 1.; Research involves a crystal composed of cerium, palladium, and silicon.

1. Jesse Thaler named director of the Laboratory for Nuclear Science

Category: Research

Departments: Physics, Computer Science, Electrical & Computer Engineering, Mathematical Sciences

Topics: Science & Research, AI-Enabled Scientific Discovery, Quantum Field Theory Integration, Interdisciplinary AI Education

Impact Score: 21.0

Rubric Scores

Research Relevance: 4

Educational Value: 3

Innovation / Novelty: 4

Practical Impact: 3

Interdisciplinary Potential: 5

Ethical / Policy Implications: 2

Professor Jesse Thaler has been appointed as the new director of the MIT Laboratory for Nuclear Science (LNS), effective August 1, succeeding Professor Bolek Wyslouch. Thaler, a theoretical particle physicist known for integrating quantum field theory with machine learning, aims to advance AI-driven research within LNS, which is expanding its focus on AI-enabled scientific discovery through the Department of Energy's Genesis Mission. He previously directed the National Science Foundation's AI Institute for Artificial Intelligence and Fundamental Interactions (IAIFI) and has emphasized interdisciplinary education and research, which he plans to replicate at LNS. Thaler's leadership is expected to enhance collaborative efforts in fundamental physics and related fields.

<https://news.mit.edu/2026/jesse-thaler-named-director-laboratory-nuclear-science-0707>

2. Information Theory and Ensemble Models

Category: Applications

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

Topics: Ensemble Models, Information Theory, Time-Series Forecasting, Forecast Combination Optimization

Impact Score: 20.0

Rubric Scores

Research Relevance: 4

Educational Value: 3

Innovation / Novelty: 4

Practical Impact: 4

Interdisciplinary Potential: 3

Ethical / Policy Implications: 2

The article discusses the application of information theory to improve ensemble methods for time-series forecasting. It explores how different ensemble strategies can be evaluated and optimized based on the information they provide, aiming to enhance the accuracy of predictions. The findings suggest that leveraging information-theoretic principles can lead to more effective combinations of forecasts, ultimately improving decision-making in various domains reliant on time-series data.

<https://towardsdatascience.com/information-theory-and-ensemble-models-ded31db10d8/>

3. Inside the Subspace Where Spurious Correlations Are Born

Category: Research

Departments: Mathematical Sciences, Computer Science, Psychology

Topics: AI Ethics & Safety, Spurious Correlations, Statistical Principles, Data Analysis Limitations

Impact Score: 19.0

Rubric Scores

Research Relevance: 3

Educational Value: 4

Innovation / Novelty: 2

Practical Impact: 3

Interdisciplinary Potential: 4

Ethical / Policy Implications: 3

The article discusses the phenomenon of spurious correlations, particularly how small sample sizes can lead to large correlations purely by chance. It emphasizes that larger sample sizes do not necessarily guarantee meaningful relationships, as they can still produce misleading correlations. The author explores the underlying statistical principles that contribute to these occurrences, highlighting the importance of understanding the context and limitations of data analysis in research.

<https://towardsdatascience.com/inside-the-subspace-where-spurious-correlations-are-born/>

4. Schrödinger's anthill: Quantum entanglement found in a crystal large enough to hold

Category: Research

Departments: Physics, Electrical & Computer Engineering, Mathematical Sciences

Topics: Quantum Information Science, Macroscopic Quantum Entanglement, Quantum Metrology, Solid-State Physics

Impact Score: 19.0

Rubric Scores

Research Relevance: 4

Educational Value: 3

Innovation / Novelty: 5

Practical Impact: 2

Interdisciplinary Potential: 4

Ethical / Policy Implications: 1

Researchers at TU Wien have demonstrated that quantum entanglement can be observed in a macroscopic crystal, specifically a centimeter-sized strange metal composed of cerium, palladium, and silicon. Utilizing quantum Fisher information, the team measured the crystal's response to neutron bombardment, revealing that the collective behavior of its constituent particles exhibited strong entanglement rather than independent responses. This work establishes a novel link between quantum information science and solid-state physics, suggesting that quantum phenomena can manifest in larger systems than previously thought. The findings contribute to the understanding of quantum behavior in complex materials and may have implications for quantum metrology.

<https://www.sciencedaily.com/releases/2026/07/260701015242.htm>