

Western Institute for Advanced Study

a meeting of minds and effort

An ambitious mission

The Western Institute for Advanced Study is devoted to facilitating scientific research into historically intractable problems, with a highly interdisciplinary and open atmosphere to promote intellectual progress.

- founded in 2018, incorporated in 2019
- 501(c)3 organization based in Colorado
- issues a Grand Challenge each year, with the goal of solving long-standing problems in mathematics, physics and biology

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The first Grand Challenge

The physical basis of consciousness

A mechanistic explanation of consciousness has long proved elusive to philosophers and scientists. It is simply not understood what perceptual experience - the stream of thought - is, or how mental states are produced by the operations of neural networks, or how we might be able to initiate volitional action. The overall goal of this Grand Challenge is to devise a theoretical framework for understanding consciousness in accordance with physical laws – as a form of non-deterministic computation.



The next Grand Challenges

A mechanism for non-deterministic computation

The computational physics toolkits that were adapted to address the first Grand Challenge will be generalized to address three other problems. These newly-established toolkits can be used to model how free energy is distributed across space and time, allowing two or more interacting particle systems to identify a mutually compatible state. This approach allows a quantum computer to solve a computationally-complex three-dimensional matching problem; physically achieve Bayesian inference; and generate shared information between particle systems, yielding gravitational forces at significantly larger scales.



Reporting results

- Results from our first Grand Challenge have been presented at the Society for Neuroscience conference and smaller computational modeling workshops.
- An informal overview of the theory (28 minutes):
[Interview with Scientific Director Izi Stoll, Ph.D.](#)
- A relatively non-technical summary (48 minutes):
[Consciousness as Non-Deterministic Computation](#)
- A full technical presentation (2 hours 32 minutes):
[Probabilistic Coding in Cortical Neural Networks](#)
- A paperback book introducing the new theory:
[What We Are: The Physical Basis of Consciousness](#)
- Pre-prints of the original research papers:
[Western Institute for Advanced Study Archives](#)



Building momentum

The next steps include:

- The publication of research papers addressing the first Grand Challenge in open-access peer-reviewed academic journals.
- A publicity effort to communicate these research findings to the broader scientific community and the public.
- Scientific partnerships to complete the next three Grand Challenges.



Current goal

Raise funds to support future research projects:
\$1,000,000 per year (for the next three years)

Building on previous founding donations of:
\$249,008 in cash + in-kind (as of Sept 2022)



Resource allocation

Annual budget over the next three years:

- Grand Challenge Fellowship Awards: \$432,000
- Executive Director Salary/Benefits: \$120,000
- Scientific Director Salary/Benefits: \$120,000
- Institute Manager Salary/Benefits: \$96,000
- Conference Presentation/Organization: \$76,000
- Open-Access Journal Publications: \$16,800
- Publicity and Public Communications: \$36,000
- Intellectual Property Management: \$12,000
- Accounting and Tax Compliance: \$60,256
- Web Services and Office Space: \$30,600

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Oversight and governance

- The Board of Directors is being overhauled from its start-up stage, with the inclusion of more financial, legal, and public communications expertise to complement our technical expertise.
- With this expanded leadership structure - and a growing number of Governance Advisors with expertise in non-profit management - we are on-track to ensure the Western Institute for Advanced Study is a sustainable and successful research organization.



Alliances and collaborations

- A Board of Scientific Advisors is being recruited, to guide the direction of the Western Institute with a wide variety of field expertise in mathematics, physics, and the biological sciences.
- Collaborations with philosophers and computer scientists are now being initiated, to build on our first success.
- During the transitional stage, three Scientific Fellows will be invited to tackle three more Grand Challenges – focusing on big problems in interdisciplinary sciences.





Shared Leadership Plan

- The five-year Foundational Phase: The founder creates a framework, then recruits a Board of Directors and a Board of Advisors.
- The current Transitional Phase: The team builds collaborations to support governance, partnerships in the scientific community, and interest on the part of the lay public.
- The Future: The Western Institute has a solid reputation, a physical location, and a competitive fellowship program that supports exciting research into intractable problems.

Thank you very much for your time & support.

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