



John Wheeler at age 23 as an NRC Fellow at the Niels Bohr Institute, Copenhagen (1934-35).

SCIENCE & ULTIMATE REALITY:
*Celebrating the Vision of John Archibald Wheeler
in a New Century of Discovery*

ANNOUNCEMENT OF FINALISTS

Young Researchers Competition in Honor of John Archibald Wheeler for Physics Graduate Students, Post-Doctoral Fellows, and Young Faculty

\$10,000 First Prize
Seven \$5,000 Second Prizes

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Of 64 applications received by the deadline January 31, 2001 in an open competition worldwide, 15 young research scientists born on or after January 1970 have been selected to participate in the *Science & Ultimate Reality* symposium and book project celebrating the vision of John Archibald Wheeler. About half of the finalists — 10 men and 5 women from eight different countries — submitted applications based on experimental work.

Our screening panel consisted of four outstanding young physics researchers themselves:

- Anthony Aguirre: Institute for Advanced Study
- Arthur Kosowsky: Rutgers, The State University of New Jersey
- Horatiu Nastase: Institute for Advanced Study
- Max Tegmark: University of Pennsylvania

This entire project and competition are focused on the future of innovative research into the nature of “quantum reality” and related challenges and are inspired by Wheeler’s “Really Big Questions” (“RBQs”):

- Why the quantum?
- How come existence?
- It from bit?
- A “participatory universe”?
- What makes “meaning”?

The 15 finalists will present short research papers at the symposium to be held in Princeton, New Jersey, USA, from Friday evening, March 15 through Monday afternoon, March 18, 2002 (all expenses will be paid). The session for finalist presentations, which will be held on Sunday afternoon, March 17, 2002, will feature 15 talks in 12-minute slots (8 minutes plus 4 minutes Q&A).

Appointed judges will be selected from among the symposium attendees, who will include distinguished research physicists from around the world focusing on challenges for the coming decades in areas related to deep exploration of the nature and meaning of quantum reality. After evaluating the submitted evidence of research accomplishments

and listening to the presentations, the judges will award eight prizes, seven of \$5,000 each and a first-place prize of \$10,000, at the luncheon on Monday, March 18. The eight winners will be invited to submit chapters for possible inclusion in the post-conference book, a book that is expected to convey the spirit of John Wheeler's style of bold adventure into the quest for deep physical understanding of existence.

Winners will be selected on the basis of outstanding merit. The judges will consider not only their research, but their entire record of achievement. The applications of the 15 finalists met our criteria of work that is innovative and substantively engaged with the ideas raised by Wheeler's questions related to quantum reality. They also, therefore, relate to one or more of the following program themes on which the symposium and book are based:

I: Quantum Reality (Theory)

II: Quantum Reality (Experiment)

III: "Big Ideas" in Cosmology

IV: Emergence, Life, & Related Topics

The 15 finalists are listed alphabetically:

—**Nicole Bell** — NASA/FERMILAB, Theoretical Astrophysics Group, Batavia, Illinois, USA; born 12/12/75, Australia: "Coherence, Decoherence and Oscillating Neutrinos — from Quantum Zeno to Getting in Sync"

—**Raphael Bousso** — Kavli Institute for Theoretical Physics, University of California, Santa Barbara, USA; born 5/31/71, Israel: "The Holographic Principle"

—**Anita Goel** — Department of Physics, Harvard University, Cambridge, Massachusetts, USA; born 8/22/73, USA: "The Physics of Life"

—**Steven Gubser** — Department of Physics, Princeton University, USA; born 5/4/72, USA: "On the Connection Between Gauge Theory and Gravity"

—**Jiangping Hu** — Department of Physics, Stanford University, Stanford California, USA; born 1/3/72, China: "An Essay on Space, Time and the Quantum"

—**Olga Khovanskaya** — Sternberg Astronomical Institute, Moscow State University, Russia; born 4/23/77, Russia: "Dilatonic Black Holes in String Gravity and Their Relation with Parameters of [the] Early Universe"

—**Fotini Markopoulou Kalamara** — Perimeter Institute for Theoretical Physics, Department of Physics, University of Waterloo, Canada; born 4/3/71, Greece: "Models of Planck-scale Spacetime and Quantum Cosmology"

—**Michael Murphy** — School of Physics, University of New South Wales, Australia; born 3/17/77, Australia: "Do the Fundamental Constants Vary in Spacetime?"

—**Jeremy O’Brien** — Centre for Quantum Computer Technology, Department of Physics, University of Queensland, Australia; born 11/7/75, Australia: “Exploration of the Quantum Nature of Nature and the Fabrication of a Quantum Computer”

—**Jonathan Oppenheim** — Racah Institute of Physics, The Hebrew University, Jerusalem, Israel; born 11/24/70, Canada

—**Jian-Wei Pan** — Institut für Experimentalphysik, Universität Wien; born 3/11/70, China: “Multi-photon Interferometry and Quantum Non-locality”

—**Mary Rowe** — National Institute of Standards and Technology, Boulder, Colorado, USA; born 1/5/70, USA: “Experimental Violation of Bell’s Inequalities with Efficient Detection”

—**André Stefanov** — GAP (Group of Applied Physics) - Optique, Université de Genève, Suisse; born 8/11/75, Switzerland; “Quantum Correlations with Spacelike Beamsplitters in Motion”

—**Mark Topinka** — Stanford University, Stanford, California, USA; born 4/24/70, USA: “Imaging Flow Through Electronic Wavefunctions”

—**Vlatko Vedral** — Optics Section, Blackett Laboratory, Imperial College, London, England, United Kingdom; born 8/19/71, the former Yugoslavia: “Probabilities from Amplitudes via Information Theory and Thermodynamics”

Congratulations to all 15 finalists from the Program Oversight, Program Development, and Organizing Committees for the celebratory events in honor of John Wheeler.