



## Edward Witten



**Date of Birth** 26 August 1951

**Place** Baltimore, MD (USA)

**Nomination** 15 May 2006

**Field** Mathematical Physics

**Title** Professor

**Professional address**

Institute for Advanced Study

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### Most important awards, prizes and academies

**Academies:** American Academy of Arts and Sciences, 1984; American Physical Society, 1984; National Academy of Sciences, 1988; Member of the Board, Americans for Peace Now, Feb. 1992-; American Philosophical Society, 1994; Royal Society, 1998; Academy of Sciences of Paris, 2000. **Honors and Awards:** MacArthur Fellowship, 1982; Einstein Medal, Einstein Society of Berne, Switzerland, 1985; Award for Physical and Mathematical Sciences, New York Academy of Sciences, 1985; Dirac Medal, International Center for Theoretical Physics, 1985; Alan T. Waterman Award, National Science Foundation, 1986; Invited Address, International Congress of Mathematicians, 1986 and 2002; Colloquium Lecturer, American Mathematical Society, 1987; Centennial Lecturer, American Mathematical Society, 1988; Fields Medal, International Union of Mathematicians, 1990; Madison Medal, Princeton University, 1992; New Jersey Pride Award, 1996; Award of the Golden Plate, American Academy of Achievement, 1997; Klein Medal, Stockholm University, 1998; Dannie Heineman Prize, American Institute of Physics, 1998; Gibbs Lecturer, American Mathematical Society, 1998; Nemmers Prize in Mathematics, Northwestern University, 2000; Clay Research Award, Clay Mathematics Institute, 2001; Shalom Award, Americans for Peace Now, 2002; National Medal of Science, 2003; Premio Pitagora, Crotona, Italy, 2005; Harvey Prize, the Technion, Israel, 2006.

### Summary of scientific research

Prof. Witten's research interests are in elementary particle physics, quantum field theory, and string theory. He is known for his work on dark matter detection, the behaviour of four-dimensional gauge theories, the applications of quantum field theory to mathematics, and for a variety of contributions to string theory.

### Latest publications

Author of 250 scientific papers. Coauthor (with M.B. Green and J.H. Schwarz) of *Superstring Theory*, Volumes 1 and 2, Cambridge University Press; *Janus Configurations, Chern-Simons Couplings, and the theta-Angle in N=4 Super Yang-Mills Theory*, D. Gaiotto, E. Witten, Apr 2008, 66pp.; *Supersymmetric Boundary Conditions in N=4 Super Yang-Mills Theory*, D. Gaiotto, E. Witten, Apr 2008, 82pp.; *Rigid Surface Operators*, S. Gukov, E. Witten, Apr 2008, 89pp.; *Mirror Symmetry, Hitchin's Equations, and Langlands Duality*, E. Witten, Feb 2008, 15pp.; *Conformal Field Theory in Four and Six Dimensions*, E. Witten, Dec 2007, 16pp. Lectures given at Symposium on *Topology, Geometry and Quantum Field Theory* (Segalfest), Oxford, England, U.K., 24-29 Jun 2002; *Quantum Gravity Partition Functions in Three Dimensions*, A. Maloney, E. Witten, Dec 2007, 71pp.; *Geometric endoscopy and mirror symmetry*, E. Frenkel, E. Witten, Oct 2007, 130pp.; *Gauge theory and wild ramification*, E. Witten, Oct 2007, 63pp.; *Surface operators in gauge theory*, E. Witten, 2007, 6pp, *Fortsch. Phys.* 55:545-550,2007; *Three-Dimensional Gravity Revisited*, E. Witten, June 2007, 82pp.; *Gauge Theory, Ramification, and the Geometric Langlands Program*, S. Gukov, E. Witten, Dec 2006, 159pp.; *Axions in String Theory*, P. Svrcek, E. Witten, 62pp. *JHEP* 0606:051,2006; *Electric-Magnetic Duality and the Geometric Langlands Program*, A. Kapustin, E. Witten, Apr 2006, 225pp.; *New instanton effects in string theory*, C. Beasley, E. Witten, 50pp. *JHEP* 0602:060,2006; *Two-dimensional models with (0,2) supersymmetry: Perturbative aspects*, E. Witten, Apr 2005, 59pp.; *Non-Abelian localization for Chern-Simons theory*, C. Beasley, E. Witten, 133pp. *J. Diff. Geom.* 70:183-23,2005; *The Hitchin functionals and the topological B-*

model at one loop, V. Pestun, E. Witten, 33pp. *Lett. Math. Phys.* 74:21-51,2005; Direct proof of tree-level recursion relation in Yang-Mills theory, R. Britto, F. Cachazo, B. Feng, E. Witten, Jan 2005, 8pp. *Phys. Rev. Lett.* 94:181602,2005; Gauge theory amplitudes in twistor space and holomorphic anomaly, F. Cachazo, P. Svrcek, E. Witten, Sep 2004, 8pp. *JHEP* 0410:077,2004; New instanton effects in supersymmetric QCD, C. Beasley, E. Witten, 43pp. *JHEP* 0501:056,2005; Supersymmetry and other scenarios, E. Witten, 2004, 6pp. *Int. J. Mod. Phys. A* 19:1259-1264,2004; Twistor space structure of one-loop amplitudes in gauge theory, F. Cachazo, P. Svrcek, E. Witten, June 2004, 42pp. *JHEP* 0410:074,2004; Conformal super-gravity in twistor-string theory, N. Berkovits, E. Witten, 43pp. *JHEP* 0408:009,2004; Parity invariance for strings in twistor space, E. Witten, Mar 2004, 17pp. *Adv. Theor. Math. Phys.* 8:779-796,2004; MHV vertices and tree amplitudes in gauge theory, F. Cachazo, P. Svrcek, E. Witten, Mar 2004, 27pp. *JHEP* 0409:006,2004; Yangian symmetry in  $D = 4$  superconformal Yang-Mills theory, L. Dolan, C.R. Nappi, E. Witten, Jan 2004, 16pp. Cincinnatti 2003, *Quantum theory and symmetries* 300-15; The past and future of string theory, E. Witten, Jan 2002, Cambridge 2002, *The future of theoretical physics and cosmology* 455-62; Perturbative gauge theory as a string theory in twistor space, E. Witten, Dec 2003, 97pp. *Commun. Math. Phys.* 252:189-258,2004; A Relation between approaches to integrability in superconformal Yang-Mills theory, L. Dolan, C.R. Nappi, E. Witten, Aug 2003, 19pp. *JHEP* 0310:017,2003;  $SL(2,Z)$  action on three-dimensional conformal field theories with Abelian symmetry, E. Witten, Jul 2003, 23pp. In Shifman, M. (ed.) *et al.: From fields to strings*, vol. 2 1173-1200; Residues and world sheet instantons, C. Beasley, E. Witten, 48pp. *JHEP* 0310:065,2003; Proton decay in intersecting D-brane models, I.R. Klebanov, E. Witten. 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Witten, Jul 2002, 9pp. Hamburg 2002, *Supersymmetry and unification of fundamental interactions*, vol. 1 604-10; M theory and quantum mechanics, E. Witten, 1998, *Nucl. Phys. Proc. Suppl.* 62:463-466,1998. Also in Philadelphia 1997, *Supersymmetries in physics* 463-6; Hunting the Higgs, G. Kane, E. Witten, 2002, *New Sci.* 173N2336:28-32,2002; The mass question, E. Witten, 2002, *Nature* 415:969-971,2002; A Note on fluxes and superpotentials in M theory compactifications on manifolds of  $G(2)$  holonomy, Chris Beasley, E. Witten, 16pp. *JHEP* 0207:046,2002; A Gravity dual of the chiral anomaly, I.R. Klebanov, P. Ouyang, E. Witten, 15pp. *Phys. Rev. D* 65:105007,2002; Deconstruction,  $G(2)$  holonomy, and doublet triplet splitting, E. Witten, Oct 2001, 20pp. Hamburg 2002, *Supersymmetry and unification of fundamental interactions*, vol. 1 472-91; *Multitrace operators, boundary conditions, and AdS/CFT correspondence*, E. 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