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Faculty

EDMUND BERTSCHINGER
Institute Community and Equity
Officer
Professor of Physics

EMAIL: edbert@mit.edu

PHONE: (617) 324-7319

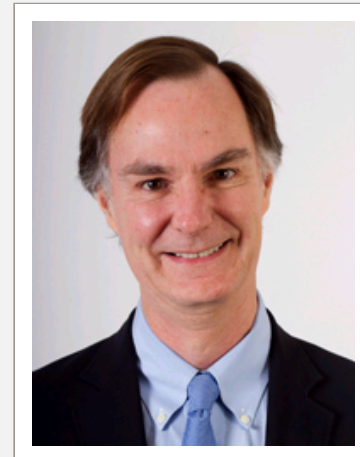
ASSISTANT: [Shauna Bush-Fenty](#) (617) 715-2066

ADDRESS:

Office of the Provost
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77 Massachusetts Avenue, Bldg. [4-250](#)
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- [The Institute Community & Equity Office \(ICEO\)](#)
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- ["Advancing Diversity and Excellence in Physics"](#) (PDF)
- ["Diversifying physics"](#) [*IOP Physics World*, 06.06.13]
- ["Edmund Bertschinger appointed as Institute Community and Equity Officer"](#) [*MIT News Office*, 06.20.13]



Area(s) of Physics:

[Theoretical astrophysics](#), [gravitation](#) and [cosmology](#)

Research, Teaching and Administrative Interests

Ed Bertschinger is Professor of Physics at MIT. He is a theoretical astrophysicist whose work focuses on cosmology, gravitation, and relativistic astrophysics. As a member of the [MIT Kavli Institute for Astrophysics and Space Research](#), he leads a research program studying dark energy and dark matter. He and his research students (from high school to postdoctoral) investigate the formation of cosmic structure after the big bang, the physics of dark matter both in the early universe and in forming galaxies, the physics of gravitation in general relativity and alternative theories, and the physical processes governing matter and radiation close to black holes. His group uses a combination of analytical, computational, and statistical methods.

Professor Bertschinger is passionate about education. He enjoys teaching a wide range of undergraduate and graduate classes in general physics, relativity and cosmology. In 2002, he received the Physics Department's Buechner Teaching Prize for his undergraduate and graduate classes in general relativity. He also loves mentoring research students. His students at the high school and undergraduate level have won national prizes for their work, including First Prize in the Intel Science Talent Search. His former PhD students have been appointed to the faculties of Harvard, Princeton, UC Berkeley, Columbia, the Institute for Advanced Study, and other fine organizations.

As Physics Department Head from 2007-2013, Ed Bertschinger set a goal to make MIT not only the top-ranked university for science and engineering, but also to make it one of the best places to work and study for everyone. He feels strongly that more must be done to increase diversity and inclusion within the university and the profession. Excellence demands searching from the widest possible sources to draw talent; that talent must then be nurtured with effective mentoring and research support to achieve its full potential. He is co-chair of both the MIT Committee on Race and Diversity and the Faculty Advisory Committee of the Office of Minority Education and is recipient of the Dr. Martin Luther King, Jr. Leadership Award. In 2011 he chaired the organizing committee of the MIT150 Symposium "Leaders in Science and Engineering: The Women of MIT".

Biographical Sketch

Professor Bertschinger received his BS in physics from Caltech in 1979 and his PhD in Astrophysical Sciences from Princeton University in 1984. Following postdoctoral positions at the University of Virginia and at UC Berkeley, he joined the MIT faculty in 1986. From 2002-2007 he served as Astrophysics Division Head before becoming Physics Department Head. He is a recipient of the Guggenheim Fellowship, Alfred P. Sloan Research Fellowship, and Helen B. Warner Prize of the American Astronomical Society.

Selected Publications

- E. Bertschinger, On the Growth of Perturbations as a Test of Dark Energy and Gravity, *Astrophysical Journal*, 648, 797 (2006).
- J. D. Schnittman & E. Bertschinger, A Model for High Frequency Quasi-periodic Oscillations from Accreting Black Holes, *Astrophysical Journal*, 606, 1098 (2004).
- E. Bertschinger, Cosmological Perturbation Theory and Structure Formation, in *Proc. Cosmology 2000*, ed. M. C. Bento, O. Bertolami, and L. Teodoro (2000).
- E. Bertschinger, Simulations of Structure Formation in the Universe, *Annual Reviews of Astronomy and Astrophysics*, 36, 599 (1998).
- E. Bertschinger, Cosmological Dynamics, in *Cosmology and Large Scale Structure*, proc. Les Houches Summer School, Session LX, ed. R. Schaeffer, J. Silk, M. Spiro, and J. Zinn-Justin (Amsterdam: Elsevier Science), 273 (1996).
- C.-P. Ma & E. Bertschinger, Cosmological Perturbation Theory in the Synchronous and Conformal Newtonian Gauges, *Astrophysical Journal*, 455, 7 (1995).
- E. Bertschinger & A. Dekel, Recovering the Full Velocity and Density Fields from Large-Scale Redshift-Distance Samples, *Astrophysical Journal*, 336, L5 (1989).

