

Matthew R. Francis, Ph.D.

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Education

- Rutgers University, Piscataway, New Jersey: Ph.D. in Physics and Astronomy, May 2005; thesis title: "From Structure Evolution to Gauge Theories: Topics in Gravitational and Cosmological Physics" (Thesis Advisor: Arthur Kosowsky)
- Johns Hopkins University, Baltimore, Maryland: 1998–1999
- Central College, Pella, Iowa: B.A. Summa Cum Laude in Physics, May 1998

Career History

- Science Writer (freelance)
 - Science blog: Galileo's Pendulum (<http://GalileosPendulum.org>)
 - Physics/math editor, Double X Science (<http://doublexscience.blogspot.com/>)
 - Scientific American Guest Blog: [What Does the New Double-Slit Experiment Actually Show?](#) (published June 7, 2011) and [What We Know About Black Holes](#) (September 2, 2011)
 - Podcasts for [365 Days of Astronomy](#) (<http://365daysofastronomy.org/>): [The Biggest Things in the Universe](#) (June 13, 2011) and [Seeing Through Gravity's Lens](#) (April 22, 2011)
 - Guest series for [Culture of Science](#): Citizen Science as a Cure for Scientific Isolation ([Part 1](#), [Part 2](#), and [Part 3](#))
- Visiting Assistant Professor of Physics, Randolph-Macon College (2009-2011)
- Assistant Professor of Physics, Lambuth University (2007-2009)
- Director, M.D. Anderson Planetarium (2007-2009)
 - Presented twice-monthly public programs and frequent shows for school groups
 - Design and management of website (<http://planetarium.lambuth.edu/>, defunct)
 - Organized Grand Reopening event (February 9, 2008)
 - Keynote Address: Lawrence Krauss (then of Case Western Reserve University)
 - Wrote and produced for the planetarium:
 - "See How Far the Light Came"; written/produced/narrated for the Grand Reopening
 - "Could There Be Life in the Solar System?", show for K-3 schoolchildren; written in collaboration with the Lambuth Education Department
 - "Saturn: News from the Ringed Planet", special presentation on April 7, 2008
 - "Water on Mars, Life on Mars", special presentation for Fall 2008
 - Supervised renovations and projector replacement (Fall 2007)
 - TV interview, "Good Morning West Tennessee", WBBJ/ABC affiliate (February 7, 2008)
- Special Lecturer, New Jersey Institute of Technology (NJIT) (September 2006–June 2007)
- Independent contractor: Python programming for Right Force Orthodontics (June–July 2006)
- Adjunct Faculty Member, Rutgers University (September 2005–June 2006)
- Visiting Scientist, Center for Gravitational Wave Physics, Pennsylvania State University

(October 2005)

- Postdoctoral Researcher, Atacama Cosmology Telescope Project, Rutgers University (July– August, 2005)
- Senior Cyber Net, Baltimore, Maryland: Technical Associate/Systems Administrator (Linux and Windows 95/98), 1999–2000

Public Speaking and Other Outreach

- Presentation at ThirstDC (<http://thirstdc.com/>, November 10, 2011)
- Session moderator for Science Online 2012 (January 19-21, 2012 – upcoming event), North Carolina State University
- Judge, West Tennessee Regional Science Fair (March 14, 2008)
- United Astronomy Clubs of New Jersey Symposium, invited talk (September 23, 2006)

Social Networking

- Twitter: <http://twitter.com/DrMRFrancis>
- Facebook: <https://www.facebook.com/pages/Galileos-Pendulum/191927027511248>
- Google+: <https://plus.google.com/101984328356169025984>
- LinkedIn: <http://www.linkedin.com/pub/matthew-francis/32/672/179>

Computer Skills

- Word processing/typesetting: Word, OpenOffice, LaTeX
- Programming languages: Python, C/C++, Matlab, Fortran 90/95, Perl, R
- Web development: HTML/XHTML, CSS, Wordpress
- Graphics: GIMP, Xfig (vector graphics)
- Audio software: Audacity
- Operating systems: Linux, Mac OS X, various Windows platforms
- Computer algebra systems: Mathematica, Maple, Maxima

Research Publications

- M. R. Francis and E. J. Fertig, Quantifying the dynamics of coupled networks of switches and oscillators, PLoS One, PONE-D-11-19604 (in press).
- M. R. Francis and A. Kosowsky, Post-Newtonian parameters for generalized Einstein-Æther models, in preparation.
- M. R. Francis, A. Kosowsky, and R. E. Byers, A new approach to relativistic point-particle dynamics, in preparation.
- M. R. Francis, R. Bean, and A. Kosowsky, Impact of Systematic Errors on Sunyaev-Zel'dovich Effect Surveys, JCAP 0512 (2005), 001.
- M. R. Francis and A. Kosowsky, The Construction of Spinors in Geometric Algebra, Ann. Phys. 317 (2005), 383–409.
- M. R. Francis and A. Kosowsky, Geometric Algebra Techniques for General Relativity, Ann. Phys. 311 (2004), 459–502.
- M. R. Francis and A. Kosowsky, Geodesics in the Generalized Schwarzschild Solution, Am. J. Phys. 72 (2004), 1204–1209.
- J. Javanainen, J. Ruostekoski, B. Vestergaard, and M. R. Francis, One-Dimensional Modeling of Light Propagation in Dense and Degenerate Samples, Phys. Rev. A 59 (1999), 649–666.