Ryan N. Lang **Curriculum Vitae**

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Cambridge, MA 02139

EDUCATION

- Massachusetts Institute of Technology
  - Doctor of Philosophy in Physics (candidate) June 2009
    - Thesis: Observable Signatures of General Relativistic Dynamics in Compact Binaries
    - Advisor: Scott A. Hughes
  - Master of Engineering in Electrical Engineering and Computer Science June 2003
    - Thesis: Design of a High-Index Contrast Arrayed Waveguide Grating
    - Advisor: Hermann A. Haus
  - Bachelor of Science in Physics June 2003
  - Bachelor of Science in Electrical Science and Engineering June 2002

RESEARCH EXPERIENCE

- MIT Department of Physics January 2005-present
  MIT Kavli Institute for Astrophysics and Space Science
  - Wrote software and carried out extensive calculations to ascertain how well the proposed gravitational wave observatory LISA can measure parameters of binary black hole coalescence sources. Focused on the effects of spin precession physics and advanced localization for potential electromagnetic counterpart searches.
  - Used perturbation theory to study the effects of tidal deformations to a neutron star in a neutron star-black hole binary.
- MIT Department of Physics September 2003-August 2004
  - Carried out experimental research of highly correlated electron systems using heat capacity, magnetic susceptibility, and neutron scattering measurements.
- MIT Department of Electrical Engineering and Computer Science June 2002-June 2003
  Research Laboratory of Electronics at MIT
  - Worked on design of an arrayed waveguide grating device customized for extremely small, high index contrast integrated optics. Developed new coupled mode input stage to better control amplitude and phase profiles in the device.
- Jet Propulsion Laboratory June 2001-August 2001
  - Intern, Quantum Sciences and Technology Group
  - Aligned laser systems for gravity gradiometer instrument.
- TRW Space and Electronics Group June 2000-August 2000
  - Co-op student, Superconducting Electronics Organization
  - Wrote software and carried out experiments on superconducting electronic circuits.

PUBLICATIONS

- "Advanced localization of massive black hole coalescences with LISA"
  Ryan N. Lang and Scott A. Hughes, Classical Quantum Gravity, submitted.
- "Localizing coalescing massive black holes with gravitational waves"
  Ryan N. Lang and Scott A. Hughes, Astrophys. J. 677, 1184 (2008).
- "Measuring coalescing massive binary black holes with gravitational waves: The impact of spin-induced precession"
  Ryan N. Lang and Scott A. Hughes, Phys. Rev. D 74, 122001 (2006).

PRESENTATIONS

- 24th Texas Symposium on Relativistic Astrophysics (Vancouver, BC) Dec. 9, 2008
  - Invited talk: "Locating massive black hole coalescences on the sky with gravitational waves"
- Theoretical Astrophysics Center seminar (University of California, Berkeley) Nov. 24, 2008
  - Invited talk.
- Astrophysics with Radio and Gravitational-Wave Observations (Charlottesville, VA) Nov. 7-8, 2008
  - Talk: "Measuring binary black hole inspirals with LISA"
- 7th International LISA Symposium (Barcelona, Spain) June 17, 2008
  - Talk: "Advanced localization of massive black hole coalescences with LISA"
  - Awarded travel grant by organizing committee
- 11th Eastern Gravity Meeting (The Pennsylvania State University) May 13, 2008
  - Talk: "Advanced localization of massive black hole coalescences with LISA"
- 10th Eastern Gravity Meeting (Cornell University) May 31, 2007?
  - Talk: "Localizing merging massive black hole binaries with gravitational waves"
- 209th Meeting of the American Astronomical Society (Seattle, WA) January 2007
  - Poster: "Tracking Cosmological Black Hole Mergers with LISA"
- 9th Eastern Gravity Meeting (MIT) March 24, 2006
  - Talk: "The impact of spin-induced precession on the measurement of massive black hole binaries"

SKILLS

- C, C++, Java, Scheme, MATLAB, Mathematica, Microsoft Office, LaTeX, Windows, Linux

AWARDS AND HONORS

- MIT Department of Physics Fellowship
- Awarded U.S. Patent 7260291: "Coupled mode arrayed waveguide grating"
- Siebel Scholar, Class of 2003
- MIT Class of 1947 Scholarship
- Honor society memberships: Sigma Pi Sigma, Phi Beta Kappa, Eta Kappa Nu, Tau Beta Pi

TEACHING EXPERIENCE

- MIT Physics 8.901: Astrophysics I (Stellar astrophysics) Spring 2006, Spring 2007, Spring 2008
  - Teaching assistant: Composed solutions for problem sets, graded problem sets and exams, assisted students with homework, gave several guest lectures.
- MIT Physics 8.981: Special Topics in Astrophysics (Gravitational wave astrophysics) Fall 2007
  - Part-time teaching assistant: Graded problem sets.
- MIT Physics 8.01L: Physics I (Slow-paced introductory mechanics) Fall 2004
  - Recitation instructor: Prepared and taught two recitation sections of about 25 students, developed and graded exams, gave partial guest lecture.
- MIT EECS 6.011: Introduction to Communication, Control, and Signal Processing Fall 2002
  - Teaching assistant: Taught several small tutorial sessions (prepared material and open questions), composed solutions for problem sets, graded problem sets and exams.
- MIT EECS 6.004: Computation Structures Fall 2000 OR Spring 2001??
  - Grader: Graded problem sets.
- MIT EECS 6.001: Structure and Interpretation of Computer Programs Fall 1999 and Spring 2000
  - Lab assistant: Assisted students with software homework assignments.

PROFESSIONAL ACTIVITIES

- Member, American Physical Society
- Referee for The Astrophysical Journal