Jason (Nate) Bode

nbode@northwestern.edu • **http://www.natebode.com**

Education:

Caltech; Physics Ph.D 2011; Topic: *Visible outcomes of super-massive black hole binary systems.*

- Academic achievements discussed on pages 4-6

Univ. of Chicago; Undergraduate physics courses (2001-2003)

- Was a "Graduate Student at Large", but took only undergraduate physics courses (see "Note")

Knox College; B.A., Mathematics (1997)

- Phi Beta Kappa 1997: premiere academic honor society (www.pbk.org)
- Magna Cum Laude 1997: received greater than a 3.75/4.0 GPA
- Honors in Mathematics 1997: 100 pg thesis based on year-long study of graduate level Algebra
- Junod Prize 1997: departmental award for top senior Mathematics major
- Fern Prize 1996: university prize for independent research during summer
- 2nd Place Carr Prize 1995: college-wide award for advanced calculus contest
- Merritt Moore Prize 1994: essay-based Philosophy contest, 1st Freshman in >50 yrs
- Hermann R. Muelder Scholarship: academic scholarship
- Honor Board (1994-1997): student judicial board overseeing academic dishonesty

—**N.B.** 1/3 of all undergraduate courses were independent studies.

Budapest Semesters in Mathematics; Hungarian mathematics program (Aut. 1996)

Universidad Central de Barcelona; Study Abroad (Aut. 1995)

Mira Costa Community College; 1 mo. Marine Biology course, Sea of Cortez, Mexico. (Aug. 1992)

Published Articles:

1. Re'em Sari and J. N. Bode, "Slightly Two or Three Dimensional Self-Similar Solutions," (Submitted to Astrophysical Journal and posted to arxiv.org/abs/1109.3451)
2. C. Wegg, J. N. Bode, "Multiple Tidal Disruptions as an Indicator of Binary Super-Massive Black Hole Systems," Astrophysical Journal: iopscience.iop.org/2041-8205/738/1/L8 or arxiv: arxiv:1011.5874 (2010)
3. S. A. Fast, G. S. Young, J. N. Bode, and K. Pelman, "A Three-Dimensional Matching Method for Tropospheric Features", Radio Sci., 35(5), 1065 − 1073 (2000).

Soon to be Published Articles:

Note: These papers are all in the final stages of completion and near-final drafts. Available upon request.

1. J. N. Bode, C. Wegg, "EMRI Production in Super-massive Black Hole Binaries", (science done, pre-final draft complete)
2. E. S. Phinney, J. N. Bode, "Analytic Solution to the Time Evolution of a Circumbinary Disk Following the Merger of Two Black Holes," (being finalized, Download draft at www.natebode.com/drafts/)
3. J. N. Bode, E. S. Phinney, "Simulations of a Circumbinary Disk Following the Merger of Two Black Holes," (small modifications needed, Download draft at www.natebode.com/drafts/)

Research and Work Experience:

- TAPIR, California Institute of Technology

  Research Asst., Oct 2006-Present

  Work with Sterl Phinney on electromagnetic counterparts to gravitational wave signals. In particular, we consider the effects on a gaseous disk due to gravitational wave mass loss and recoil kicks during supermassive black hole mergers.

- TAPIR, California Institute of Technology

  Research Asst., Oct 2004-2006

  Work with Re'em Sari on numerically solving a self-similar solution of the strong shock problem where the shock originates on a semi-infinite plane. This amounted to numerically solving four coupled elliptic PDEs whose boundary conditions depended on the solution. Therefore the boundary conditions needed to be solved for at the same time as the state variables.

- Feynman Lectures in Physics

  Errata Editor, Jul. 2009-Present

  Working with Kip Thorne editing errata for upcoming edition of the Feynman Lectures in Physics.

- Meyer Lab, CfCP, University of Chicago

  Lab Asst., Mar 2002-Jun 2003

  Worked in Stephan Meyer's lab on the development and optimization of a millikelvin cryostat used to test the bolometers to be used on EDGE, a near-infrared balloon experiment to map the large-scale spatial distribution of galaxies and proto-galaxies.

- Various jobs while traveling

  Humanitarian work; Antigua, Guatemala, Jan. 2000-Jul. 2000

  English teacher; Andorra la Vella, Andorra, July 1999

  English teacher; Montpelier, France, June 1999

  Artisanal slate roofing; Shetland Isles, Scotland, Mar. 1999-May 1999

  Commercial fisherman; Mallaig, Scotland, Jan. 1999-Feb. 1999

  Took up jobs while traveling to help pay for the travels and to integrate with cultures more. The humanitarian work entailed many jobs including translation, teaching math and English, building houses, and acting as a dental assistant (the variety of jobs was due to speaking Spanish fluently).

- Applied Research Laboratories, Pennsylvania State University

  Staff Engineer, Jun. 1997-Oct. 1998

  Worked on various problems relating to electromagnetic wave propagation through the atmosphere, with a focus on the meteorological effects.

- Knox College

  Mathematica Programming, Summer 1996

  Worked with Dennis Schneider developing Knox Packages, a pedagogical Mathematica package facilitating the teaching of Calculus and Linear Algebra concepts.

- Knox College

  Tutoring, 1993-1995

  Tutored non-mathematicians on the mathematics of low-level mathematics courses.

Talks and Posters:

1. Invited talk, Seminar, Nov. 2010 at CITA, "Evolution of Circumbinary Disks Following Super Massive Black Hole Mergers: Analytics and Simulations,"
2. Invited talk, Wunch Talk, Nov. 2010 at Princeton, "Evolution of Circumbinary Disks Following Super Massive Black Hole Mergers: Analytics and Simulations,"
3. Invited talk, Gravitational Wave Lunch Seminar, Nov. 2010 at MIT, "Evolution of Circumbinary Disks Following Super Massive Black Hole Mergers: Analytics and Simulations,"
4. Invited talk, UCSB Lunch Talks, Nov. 2010 at UCSB, "Evolution of Circumbinary Disks Following Super Massive Black Hole Mergers: Analytics and Simulations,"
5. Invited talk, 2010 LISA Symposium, Jun. 2010 at Stanford University, "Circumbinary Disks Following Super Massive Black Hole Mergers,"
6. APS Poster Session, Apr. 2007 in Jacksonville, Fl, "Variability in Circumbinary Disks Following Massive Black Hole Mergers," http://meetings.aps.org/link/BAPS.2007.APR.S1.10
7. AAS Poster Session, Jan. 2009 in Long Beach, Ca, "Observability of Circumbinary Disks Following Massive Black Hole Mergers," 449.05
8. Theoretical Astrophysics in Southern California (TASC) talk, 2007 at UCLA, "Simulations of Circumbinary Disks Following Massive Black Hole Mergers."
9. Theoretical AstroPhysics Including Relativity (TAPIR) talks given several times a year to graduate students from various fields ranging from Planetary Science to Cosmology.

Teaching

- Ph2b **Statistical Physics**, Profs: Chris Martin and Brad Fillipone

  Course Description: Second term of physics for non physics majors which includes mainly statistical physics and thermodynamics.

  Responsibilities: Giving section, having office hours, grading of homeworks, quizzes and exams, producing questions and solutions for quizzes and exams.

- Ph2a **Vibrations, Waves, and Quantum Mechanics**, Profs: Marc Kamionkowski and Chris Martin

  Course Description: Physics for non physics majors which includes (but not limited to) coupled harmonic oscillators, Fourier analysis, and quantum mechanics.

  Responsibilities: Giving section, having office hours, grading of homeworks, quizzes and exams, producing questions and solutions for quizzes and exams.

- Ph136abc-**Applications of Classical Physics**, Prof: Kip Thorne

  Course Description: Graduate level classical physics course working through 27 topics of classical physics over the course of a year. Subject material comes from the outstanding book Applications of Classical Physics by Blandford and Thorne (unpublished).

  Responsibilities: Having office hours, writing solutions for homeworks, finding errata for book and problems, grading.

- Ph77-**Senior Lab - Atomic Physics**, Prof: Eric Black

  Course Description: Atomic physics lab for physics majors in their senior year dealing with subjects like nuclear magnetic resonance and optical pumping.

  Responsibilities: Teaching the lab course and grading lab notebooks.

- Ma250-**Mathematica Programming**, Prof: Dennis Schneider

  Course Description: Teach in depth Mathematica programming skills to fully take advantage of Mathematica's power (at Knox College).

  Responsibilities: Grading homeworks and mentoring students.

- Ma151-2-**Calculus II**, Prof: Mary Armon

  Course Description: Second term calculus course. An introduction to the theory and applications of the integral calculus as well as an introduction to infinite series and parametric equations.

  Responsibilities: Grading homeworks.

Research Grants

- **LISA Symposium Travel Grant** *June 2010*

  Travel grant to attend the 2010 LISA Symposium located at Stanford University. Gave a talk on results from two upcoming papers (items 1 and 2 under publications above).

- **GGR Travel Grant** *April 2007*

  Travel grant to attend the 2007 April APS meeting held in Jacksonville, Florida. Gave poster presentation (item 1 under Publications above).

- **DAP Travel Grant** *April 2007*

  Travel grant to attend the 2007 April APS meeting held in Jacksonville, Florida. Gave poster presentation (item 1 under Publications above).

- **Fern Prize** *June 1995*

  Summer funding to work on programming pedagogical illustrations for the Mathematica add-on Knox Packages

Software and Programming

- Professional level Mathematica skills. Advanced skills with Fortran and Illustrator.

Note

My unique life path and, in particular, my unconventional path to theoretical astrophysics is obscured by the CV structure. For clarity: I graduated college in 1997 with a degree in pure mathematics (and limited exposure to physics). That same year I began working in a research group at Penn. State where my work on the interactions between the atmosphere and radio-wave propagation piqued my interest in physics (and culminated in a paper on my work being published in 2000, after I had left). After about a year and a half at Penn. State I began an extensive world tour traveling from city to city finding local jobs, doing humanitarian work and living in the culture. It was about two years into my travels that it became clear that my preferred path was one in physics research. In the summer of 2001 I began an intense series of undergraduate courses in physics at the Univ. of Chicago, since my undergraduate training was in mathematics. It was during this time that I gained more research experience working in the laboratory of cosmic microwave background expert Stephan Meyer. In Autumn 2002 I applied for graduate school in physics and matriculated in Autumn 2003 in the physics Ph.D. program at Caltech.