
Chris Wegg

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Nationality: British

EDUCATION:

Caltech; PHYSICS PH.D PROGRAM; ADVISOR: STERL PHINNEY

- Graduation April 2012
- Won 2009 Caltech prize for outstanding undergraduate teaching
- Won 2008 Caltech prize for outstanding graduate teaching
- Winning the two teaching prizes in consecutive years was unprecedented

University College London; PHYSICS MSCI, 1st CLASS WITH HONORS (2003)

- 1st class in every course taken – equivalent to a perfect 4.0 GPA
- 100% score in more than 2/3^{rds} of courses taken
- Highest marks in Physics department every year
- Won departmental prize for best Physics student every year (4 prizes total)

Long Road Sixth Form College; (1998)

- In top 3 highest scores nationwide for Physics A-level
- Took 5 A-levels receiving A's in all — the best results ever at my school

PUBLICATIONS:

1. C. Wegg, J. N. Bode, "MULTIPLE TIDAL DISRUPTIONS AS AN INDICATOR OF BINARY SUPERMASSIVE BLACK HOLE SYSTEMS," *ApJL*, 738, L8 (2011), [arXiv:1011.5874](https://arxiv.org/abs/1011.5874)
2. C. Wegg, E. S. Phinney, "WHITE DWARF KINEMATICS vs MASS," (submitted to MNRAS, [email for preprint](#))
3. C. Wegg "PSEUDO-NEWTONIAN POTENTIALS FOR NEARLY PARABOLIC ORBITS," [arXiv:1202.5336](https://arxiv.org/abs/1202.5336) (Accepted by ApJ.)
4. J. N. Bode, C. Wegg "PRODUCTION OF EMRIS IN SUPERMASSIVE BLACK HOLE BINARIES," (in prep, [email for preprint](#))
5. C. Wegg, E. S. Phinney, "PHOTOMETRIC IDENTIFICATION OF ULTRACOOOL WHITE DWARFS," (in prep, to be submitted before thesis defense in April 2012)
6. C. Wegg, E. S. Phinney, "ANALYTIC SOLUTION TO THE FOKKER-PLANCK EQUATION IN THE SINGULAR ISOTHERMAL SPHERE," (in prep, to be submitted before thesis defense in April 2012)

SOFTWARE AND PROGRAMMING

- C/C++: Numerous projects. Most recent was code to simulate the dynamics of stars orbiting a binary supermassive black hole using a symplectic integrator. For details see <http://arxiv.org/abs/1011.5874>.
- Matlab/IDL: Extensive knowledge of both vector based languages. Used on a daily basis for research and as an electronic engineer at Pelikon and Cambridge Consultants.
- Objective C - Written open source iPhone last.fm daemon 'Scrobbl' with ~2,000 regular users and >50,000 downloads.
- Java: As an academic exercise wrote multithreaded program that cracks the iTunes sharing mechanism using a novel man in the middle attack. Unreleased for DMCA reasons, available on request.
- Assembly: Large amounts of assembly for embedded microcontrollers as Electronic Engineer at Pelikon and Cambridge Consultants.
- Python: Used PyRAF for data reduction. Wrote lightweight curses based last.fm player for headless systems e.g. routers.

RESEARCH AND WORK EXPERIENCE:

- **THEORETICAL ASTROPHYSICS, CALIFORNIA INSTITUTE OF TECHNOLOGY**

Research Asst., Oct 2003-Present

Work on numerous projects including:

- Simulations of stellar dynamics around supermassive black holes. Using own galactic dynamics code demonstrated that binary supermassive black holes can be identified by the large number of flares expected as stars are torn apart by the tidal forces of the black holes.
- Incorporated general relativity into stellar dynamics code, and showed that the rate of extreme mass ratio inspirals (EMRIs) from binary supermassive black holes is greatly enhanced.
- Kinematics of white dwarfs against mass. For the first time showed there is a relation between a white dwarfs mass and its kinematics. Showed that high mass white dwarfs are formed isolated and not through mergers as had previously been thought.
- Photometric identification of ultracool white dwarfs. Showed that the coldest, oldest white dwarfs can be identified purely through their colors. Method verified using data taken and analyzed from the Palomar Hale 4-meter telescope. Doubled known sample of ultracool white dwarfs
- Analytic solution of the dynamics and diffusion of stars in spherical globular clusters. Shows that previously puzzling distribution of blue stragglers arises naturally. It is also important for checking the results of often unreliable N-body galactic dynamic simulations.
- NASA funded feasibility study of future mission BBO. Study identifying issues and areas requiring technological progress in the ambitious NASA mission BBO, designed as a follow up to LISA.

- **PELIKON, CAMBRIDGE, UK**

Electronic Engineer, Summers 2002-2003

Worked as a contractor for company spun off from previous employers, Cambridge Consultants.

Summer 2003 – Solely responsible for the design and prototyping of the first electroluminescent watch from scratch. Designed and prototyped electronics, wrote embedded software. Ultimately resulted in the [DD101 watch sold by ODM](#).

Summer 2002 – Solely responsible for the design and implementation of the first large flexible multiplexed electroluminescent display. Designed and prototyped electronics, wrote software in windows to load any video file and send to electronics, wrote embedded software to receive data from computer and multiplexing protocol to show it on large flexible display.

- **CAMBRIDGE CONSULTANTS, CAMBRIDGE, UK**

Electronic Engineering, June 1998-1999, Summers 2000-2002

Worked on large numerous projects. Some responsibilities in these projects included: prototyped and demonstrated a novel, highly efficient method of driving high voltage capacitive loads, switch mode power supply design, verification and testing of ASICs, and characterizing lithium batteries.

TEACHING

- **Ph5 Analog Electronics for Physicists, Prof: Virginio Sannibale**

Topics included operational amplifiers, diodes, transistors and computer data acquisition. The course culminates in a two-week project of the student's choosing.

Responsibilities: Teaching section including class recitation, supervising laboratories, grading and assigning students final grades. Note that as instructor for this class I was the sole teacher and point of contact for students in my section, they receive no instruction from the nominal Professor.

Projects I have supervised in the past have included a wireless mouse, a superheterodyne receiver, a discrete op-amp and many others.

- **Ph6 & Ph7 Sophomore Lab, Prof: Frank Rice**

Experiments in electromagnetic phenomena, atomic and nuclear physics.

Responsibilities: Teaching section including class recitation, supervising laboratories, grading and assigning students final grades. Note that as instructor for this class I was the sole teacher and point of contact for students in my section, they receive no instruction from the nominal Professor. In addition designed and implemented a novel experiment that allows students to measure and check the energy-time uncertainty relation using a measurement of the lifetime of the 14.4 keV state of ^{57}Fe and the Mossbauer effect.

- **Ph101 Order of Magnitude Physics, Prof: Sterl Phinney**

Emphasis on using basic physics to understand complicated systems. Examples from everyday life, properties of materials, weather, geophysics, biomechanics, acoustics, planetary science, astrophysics

- **Ay125 High Energy Astrophysics, Prof: Sterl Phinney**

High-energy astrophysics, Big Bang cosmology, the final stages of stellar evolution; supernovae, binary stars, accretion disks, pulsars; extragalactic radio sources; active galactic nuclei; black holes