Chris Wegg: CV

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Nationality: British

Education:

Caltech; Physics Ph.D program; Advisor: Sterl Phinney (2013)

- Thesis on "The dynamics of white dwarfs, black holes and stellar cusps" defended 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 2/3rds 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, Cambridge; (1998)

- In top 3 highest scores nationwide for Physics A-level
- Took 4 1/2 A-levels receiving A's in all — the best results ever from school

Publication Summary:

- **Two most important first author publications:**

  – **C. Wegg**, O. Gerhard, "Mapping the three-dimensional density of the Galactic bulge with VVV red clump stars", MNRAS, 435, 1874 (2013). **119 Citations.**

  – **C. Wegg**, O. Gerhard, M. Portail, "The structure of the Milky Way's bar outside the bulge", MNRAS, 450, 4050 (2015). **68 Citations.**
- Full list of publications below or see orcid.org/0000-0001-6240-8771
- 19 refereed journal publications, 7 first author, 5 second author
- 536 citations, h-index of 12
- 193 citations normalized by author count, normalized h-index of 8: the majority of my papers have been influential papers together with a small number of co-authors

Research and Work Experience:

- Dynamics Group, Max-Planck-Institut für extraterrestrische Physik

  Post-Doctoral Scholar, Sep 2012-Present

  – Utilized red clump stars as standard candles to non-parametrically measure and map the three dimensional structure of the bulge galaxy. Paper cited >110 times in 4 years.

  – Showed that the Milky Way has a 5kpc long bar that is naturally connected to the barred bulge of the inner Milky Way. Paper cited >60 times in 2 years.

  – Numerous collaborations with PhD and postdoctoral students within the dynamics group. Most significant work has resulted papers that show: (a) The first dynamical model fitted data to data of the entire central bulge and bar. (b) That the rotation rate of the bar is significantly slower than previously thought, and that this can explain the Hercules stream of stars in the solar neighbourhood. (c) The first chemodynamical model fitted to the inner Galaxy. (d) The most accurate measurements of the mass and distance to Sgr A*, the supermassive black hole at the center of the Milky Way.

  – Current ongoing collaborations with Phil Lucas (Hertforshire) and Leigh Smith (Cambridge); Sanjib Sharma and Joss Bland-Hawthorn (Sydney); and Matias Schultheis (Nice)

  – Referee for MNRAS, A&A, ApJ and ApJL.

- Theoretical Astrophysics, California Institute of Technology

  Research Asst., Oct 2003-June 2012

  – 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 tidal disruption flares.

  – 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. Showed there is a relation between a white dwarfs mass and its kinematics. Showed that most high mass white dwarfs are formed isolated and not though mergers as had previously been postulated.

- Pelikon, Cambridge, UK *Electronic Engineer, 2002-2003*

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

  Responsible for the design and prototyping of the first electroluminescent watch from scratch. Designed and prototyped electronics, wrote embedded software.

  Responsible for the design and implementation of the first large flexible multiplexed electroluminescent display. Designed and prototyped electronics, wrote embedded software to receive video file and multiplexing protocol to show it on large flexible display.

- Cambridge Consultants, Cambridge, UK *Electronic Engineering, June 1998-1999, Summers 2000-2002*

  Worked on numerous large projects for engineering and technology consulting firm. 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.

International Conferences

Presented Talks at International Conferences (past 2 years only, invited marked *):

- EWASS, Liverpool, 2018*
- Lund Observatory Colloquium, Sweden, 2017*
- VVV Science Team Meeting, Edinburgh, 2017
- IAU Symposium 334:Rediscovering our Galaxy, Potsdam, 2017
- EWASS, Prague, 2017
- Microlensing 21: Ushering in the New Age of Microlensing from Space, Pasadena, 2017*
- Galactic Archaeology and Stellar Physics, Canberra, 2016
- EWASS, Athens, 2016
- Galactic Surveys, Sexten Center for Astrophysics, Italy, 2016
- EWASS, Tenerife, 2015

Attended International Conferences/Workshops (past 2 years only):

- The Milky Way and its environment, IAP, Paris, 2016
- MIAPP: The new Milky Way, Garching, 2015

Prizes

- 2009 Caltech prize for outstanding undergraduate teaching
- 2008 Caltech prize for outstanding graduate teaching
- Winning the two university wide teaching prizes in consecutive years was unprecedented
- 2003 UCL Deans List for outstanding academic performance (awarded to top 5%)
- 2003 Burhop Prize Prize for best 4th year UCL Physics Student
- 2002 Departmental Prize for best 3rd year UCL Physics Student
- 2001 Wood Prize for best 2nd year UCL Physics Student
- 2000 Oliver Lodge Prize for best 1st year UCL Physics Student

Teaching

- Won Caltech teaching prize in 2008 for teaching graduate students, and 2009 for teaching undergraduate students. Winning the two teaching prizes in consecutive years was unprecedented.
- Ph5 **Analog Electronics for Physicists**

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

  Responsibilities: Teaching section including class recitation, supervising laboratories, grading and assigning students final grades. Sole teacher and point of contact for students. Many projects supervised including a wireless mouse, a superheterodyne receiver, and a discrete op-amp.
- Ph6 & Ph7 **Sophomore Lab**

  Experiments in electromagnetic phenomena, atomic and nuclear physics.

  Responsibilities: Teaching section including class recitation, supervising laboratories, grading and assigning students final grades. Sole teacher and point of contact for students. 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.
- Teaching assistant for Ph101 **Order of Magnitude Physics**, Ay125 **High Energy Astrophysics**, Prof: Sterl Phinney and Ph 1 **Classical Physics**, Prof. David Politzer

Chris Wegg: Refereed Journal Publications

All final versions of publications are available on the open access arXiv pre-print server (follow [OA] hyperlinks).

1. J. Hunt, J. Bovy, A. Perez-Villegas, J. Holtzman, J. Sobeck, D. Chojnowski, F. Santana, P. Palicio, **C. Wegg** *et al*, "The Hercules stream as seen by APOGEE-2 South", Accepted by MNRAS. [OA]
2. **C. Wegg**, O. Gerhard, M. Portail, "The Initial Mass Function of the Inner Galaxy Measured From OGLE-III Microlensing Timescales", ApJL, 840, 2 (2017) **1 Citation.** [OA]
3. A. Perez-Villegas, M. Portail, **C. Wegg**, O. Gerhard, "Revisiting the Tale of Hercules: How Stars Orbiting the Lagrange Points Visit the Sun", ApJL, 840, 2 (2017). **6 Citations.** [OA]
4. M. Blaña Díaz, **C. Wegg** *et al*, "Andromeda chained to the box - dynamical models for M31: bulge and bar", MNRAS, 466, 4279 (2017). **1 Citation.** [OA]
5. M. Portail, **C. Wegg**, O. Gerhard, M. Ness, "Chemodynamical Modelling of the Galactic Bulge and Bar", MNRAS, 470, 1233 (2017). **3 Citations.** [OA]
6. M. Portail, O. Gerhard, **C. Wegg**, M. Ness, "Dynamical modelling of the galactic bulge and bar: the Milky Way's pattern speed, stellar and dark matter mass distribution", MNRAS, 465, 1621 (2017). **18 Citations.** [OA]
7. **C. Wegg**, O. Gerhard, M. Portail, "MOA-II Galactic Microlensing Constraints: the Inner Milky Way Has a Low Dark Matter Fraction and a Near Maximal Disc", MNRAS, 463, 557 (2016). **8 Citations.** [OA]
8. Z. Li, O. Gerhard, J. Shen, M. Portail, **C. Wegg**, "Gas Dynamics in the Milky Way: A Low Pattern Speed Model", ApJ, 824, 13 (2016). **14 Citations.** [OA]
9. D. M. Nataf, O. A. Gonzalez, L. Casagrande, G. Zasowski, **C. Wegg**, *et al* "Interstellar extinction curve variations towards the inner Milky Way: a challenge to observational cosmology", MNRAS, 456, 2692 (2016). **22 Citations.** [OA]
10. S. Chatzopoulos, O. Gerhard, T. Fritz, **C. Wegg**, *et al*, "Dust within the nuclear star cluster in the Milky Way", MNRAS, 453, 939 (2015). **9 Citations.** [OA]
11. **C. Wegg**, O. Gerhard, M. Portail, "The structure of the Milky Way's bar outside the bulge", MNRAS, 450, 4050 (2015). **68 Citations.** [OA]
12. M. Portail, **C. Wegg**, O. Gerhard, "Peanuts, brezels and bananas: food for thought on the orbital structure of the Galactic bulge", MNRAS Letters, 450, 66 (2015). **27 Citations.** [OA]
13. M. Portail, **C. Wegg**, O. Gerhard, I. Martinez-Valpuesta, "Made-to-measure models of the Galactic box/peanut bulge: stellar and total mass in the bulge region", MNRAS, 448, 713 (2015). **63 Citations.** [OA]
14. S. Chatzopoulos, T. K. Fritz, O. Gerhard, S. Gillessen, **C. Wegg**, R. Genzel, O. Pfuhl, "The old nuclear star cluster in the Milky Way: dynamics, mass, statistical parallax, and black hole mass", MNRAS, 447, 948 (2015). **72 Citations.** [OA]
15. J. N. Bode, **C. Wegg**, "Production of EMRIs in supermassive black hole binaries", MNRAS, 438, 573 (2014). **20 Citations.** [OA]
16. **C. Wegg**, O. Gerhard, "Mapping the three-dimensional density of the Galactic bulge with VVV red clump stars", MNRAS, 435, 1874 (2013). **119 Citations.** [OA]
17. **C. Wegg**, E. S. Phinney, "White Dwarf Kinematics Versus Mass", MNRAS, 426, 427 (2012). **14 Citations.** [OA]
18. **C. Wegg** "Pseudo-Newtonian Potentials for Nearly Parabolic Orbits," ApJ, 749, 183 (2012). **19 Citations.** [OA]
19. **C. Wegg**, J. N. Bode, "Multiple Tidal Disruptions as an Indicator of Binary Supermassive Black Hole Systems," ApJL, 738, L8 (2011). **41 Citations.** [OA]