

DONALD JAMES BARCLAY PAYNE  
Curriculum Vitae

Department of Physics  
University of Melbourne  
Parkville, VIC, 3010  
AUSTRALIA  
phone +61 423 776 996  
fax +61 3 9793 8229

Born in Melbourne, Australia  
6th December

email: [dpayne@physics.unimelb.edu.au](mailto:dpayne@physics.unimelb.edu.au)  
<http://www.ph.unimelb.edu.au/~dpayne/>

## EDUCATION

- 2001 – 2006. *Ph.D. in Physics, University of Melbourne, Australia.*
  - Topic: Magnetic field evolution of and gravitational waves from accreting neutron stars.
  - Advisor: Dr. Andrew Melatos
- 1996 – 2000. *B.Sc (1st class honours, Physics)/B.Eng(1st class honours, Electrical), University of Melbourne, Australia.*
  - Science Honours thesis: Microlensing Quasars.
  - Majors: Physics, Mathematics, Computer & Electrical Engineering, Computer Science.
  - Exchange to University of California at Berkeley, U.S.A. (G.P.A 4.0, Dean's Prize).
- 1988 – 1995. *Melbourne Grammar School, Australia.*
  - Victorian Certificate of Education, Tertiary Entrance Rank 99.7 (top 0.3% of the state).

## WORK AND TEACHING EXPERIENCE

- Jan 2008 - present. Director, Science and policy liaison, EnergyCore Australia
- Dec 2007 - present. Australian Geothermal Energy Group: Direct-Use Geothermal sub-committee chair, compile IEA-GIA direct-use report, presented industry position paper to Martin Ferguson, Peter Batchelor, David Davis, Greg Hunt and others from across parliament with positive feedback.
- Apr 2006 - present. Research Fellow, School of Physics, University of Melbourne.
- 2006 - present. Highfields Sustainability Centre: demonstration project for refrigerant-based, closed-loop, geothermal heat pumps in Australia, along with wind turbine and solar photo-voltaic cells.
- Feb - Mar, 2006. Medical assistant at RAAF, Point Cook Medical centre in support of Operation Acolyte for the Melbourne 2006 XVIII Commonwealth Games.
- Sep, 2003. Lectured second year Electromagnetism (Advanced) one-on-one to a student who missed the normal lecture course.
- 2000 – present. *Teaching Assistant and Laboratory Demonstrator, Physics and Mathematics Departments, University of Melbourne.*
- 1999. *Vacation research scholar, Department of Electrical and Electronic Engineering, University of Melbourne, Australia.*

Markov chain queueing model of blocking probability in a Code Division Multiple Access (CDMA) mobile phone network, (Andrew, Payne & Hanly, 1999).
- 1997 – present. *Medical Assistant, Australian Defence Force Reserves.*
  - 7 week recruit training course, Kapooka, 1 Regimental Training Battalion. Competent in First aid, Field-craft, Drill, Navigation, Physical training and fitness, Military law and history; excellent course report.

- 18 day medical assistant training course. Competent as a medical assistant, passing exams covering anatomy, physiology, microbiology, pharmacology, basic nursing and first aid. Australian Red Cross, Level 3 first aid certificate.
- Ongoing training with Royal Australian Army Medical Corps (RAAMC), at 4th Combat Services Support Battalion (4CSSB), 3 hours per week and one weekend per month.
- Aug, 1998, Trophy; member of winning team in the Military Skills Competition.
- Feb 1998. *Tutor at Nunawading South Primary School, Kumon Institute of Education.*
- June 1994. *Research assistant, Baker Medical Research Institute.*
- Dec 1993. *Laboratory assistant, ICI Australia (now Orica).*

### **RESEARCH INTERESTS**

Gravitational waves from millisecond pulsars, including the recently observed accreting millisecond pulsars. Magnetic field evolution in accreting neutron star binaries. Accretion disk - magnetosphere interactions in systems where the central object has a sufficiently strong magnetic field, including neutron stars and young stellar objects. Geothermal heat-pump renewable energy technology.

### **AWARDS AND HONORS**

- 2008 RMIT Business Plan Competition, 1st and Sustainability prizes for EnergyCore
- 2008, July One of 7 Australian delegates participating in the Lindau 58th meeting of the Nobel Laureates with 25 laureates in attendance, Lindau, Germany
- 2005 David Hay Postgraduate Writing-up Award. Awarded through the faculty of Science, University of Melbourne.
- 2001 - 2004 Australian Postgraduate Award (*awarded on basis of academic merit*).
- 2002 Astronomical Society of Australia prize: *runner up, best talk, at 36th annual scientific meeting.*
- 2000 University of California, Berkeley, Science Faculty Dean's prize for Grade Point Average of 4.
- 1999 Melbourne University Student Exchange Scholarship for travel to The University of California, Berkeley for 1 semester.
- 1997, 1998 & 2000 *Engineering (Esso) Dean's Honour list.*
- 1997 *Science Dean's Honour list.*
- 1997 *Certificate of Excellence for 3rd position in Software Design (a computer science subject).*
- 1996 *Head of Chemistry, Special mention for outstanding achievement in the department.*
- 1996 *Science Dean's Prize for outstanding academic achievement entering the faculty.*
- 1995 *School Prizes: Mathematics Exhibition, Chemistry Prize.*
- 1990 – 1995 *Many distinctions & prizes throughout secondary school in mathematics, science, French & Latin.*

### **EXTRA COURSES**

- 2005, Unleash the Power Within, 4-day course, Anthony Robbins
- 2002, Les Houches Summer School, - Session LXXVIII, Accretion discs, jets and high energy phenomena in astrophysics, France.

- 2002, Chandra X-Ray Data Reduction workshop, Hobart, Tasmania.
- 2001, ATNF Synthesis Imaging workshop, Narrabri, NSW, Australia.
- 2001, AAO Observational techniques workshop, Macquarie University, Sydney, Australia
- 2001, Millimetre Science workshop, Melbourne University, Australia.
- 2001, Audited several courses in the Biological Sciences.
- 2000 *Landmark Forum and Landmark Advanced course, Landmark Education.*
- 1998 *Professional Skills Development course, University of Melbourne, Australia.*
- 1998 & 2000 *Leadership and Communication skills course.*

As mentor to incoming students to the Mathematics Department, and host to incoming international exchange students, University of Melbourne.

- Sep 1997 *Evelyn Wood Speed Reading Dynamics Course.*
- Dec 1994 *Physics Olympiad Training School, Canberra University,* top 16 students in Australia.
- Jan 1994 *Engineering Residential Summer School, University of Melbourne,* top 100 students in Victoria, Australia.

#### ADDITIONAL SERVICE AND ACHIEVEMENTS

- 2005, Co-founded the Melbourne University Entrepreneurial Investment Club (EIC) giving students practical financial education prior to graduation. EIC has since been founded at Monash University and other universities around Victoria and Australia
- 2001, Duty Astronomer at Parkes Radio Telescope and Australia Telescope Compact Array.
- 1999 **Job offers** from Anderson Consulting (now Accenture), PricewaterhouseCoopers and Telstra (declined to pursue further study).
- 1999 – 2002 *Australian Students' Space Association (ASSA)*

Helped found and run this student association. As sponsorship manager during 2000, coordinated the attraction of AUD\$ 30,000 funds to run the *Victorian Youth Space Forum*, 5 days, for 80 high school students, some of whom have run subsequent forums. Also, assisted with planning *SpaceFutures 2000*, a national conference of 200 delegates in Canberra, promoting Australian involvement in the international space industry.

- Staff-Student Liaison Committee, Software Design, 1997, Metric Spaces & Linear Analysis, 1998.
- 1997 Assistant with Computer Science Department on Melbourne University open day.
- Piano: Grade four pianoforte, grade three theory.
- 1986 – 1997 Australian Scouting Association.

Unit Chairman, Northbrook Venturer Unit, 1993 – 1996. Success in many camping and hiking competitions. Ongoing Community service commitment.

#### COMPUTER SKILLS

- Have written code in C, C++, Fortran, Java, HTML, Prolog, Miranda, MatLab, IDL (Interactive Data Language), Palasm, PSpice (CAD tool) 68HC11 assembly and Mathematica. Proficient with L<sup>A</sup>T<sub>E</sub>X, FLUENT-3D & ZEUS-3D.

#### MEMBERSHIP

Engineers Australia. Astronomical Society of Australia. Monash Alumni Association. Melbourne University Alumni. Old Melburnians.

## PUBLICATIONS & PROCEEDINGS

Available at: <http://www.ph.unimelb.edu.au/~dpayne/research.htm>

### Refereed Articles

1. **Payne, D. J. B.** & Melatos, A., 2007, Burial of the polar magnetic field of an accreting neutron star. III. Applications to observations *MNRAS*, in preparation
2. **Payne, D. J. B.** & Melatos, A., 2007, Burial of the polar magnetic field of an accreting neutron star. II. Hydromagnetic stability of axisymmetric equilibria *MNRAS*, Vol. 376, p. 609
3. **Payne, D. J. B.** & Melatos, M., 2006, Magnetic Burial and the Harmonic Content of Millisecond Oscillations in Thermonuclear X-Ray Bursts *ApJ*, Vol. 652, p. 597
4. **Payne, D. J. B.** & Melatos, M., 2006, Frequency spectrum of gravitational radiation from global hydromagnetic oscillations of a magnetically confined mountain on an accreting neutron star *ApJ*, Vol. 641, p. 471
5. Melatos, A. Scheltus, D., Whiting, M., Eikenberry, S. S., Romani, R. W., Rigaut, F., Spitkovsky, A., Arons, J., & **Payne, D. J. B.**, 2005 Near-Infrared, Kilosecond Variability of the Wisps and Jet in the Crab Pulsar Wind Nebula *ApJ*, Vol. 633, p. 931
6. Melatos, A. & **Payne, D. J. B.**, 2005, Gravitational Radiation from an Accreting Millisecond Pulsar with a Magnetically Confined Mountain *ApJ*, Vol. 623, p. 1044
7. **Payne, D. J. B.** & Melatos, A., 2004, Burial of the polar magnetic field of an accreting neutron star. I. Self-consistent analytic and numerical equilibria *MNRAS*, Vol. 351, p. 569

### Conference Proceedings

1. **Payne, D. J. B.**, Vigelius, M. and Melatos A., Magnetic field evolution of an accreting neutron stars, A DECADE OF ACCRETING MILLISECOND X-RAY PULSARS: AIP Conference Proceedings, Volume 1068, pp. 144-151 (2008).
2. **Payne, D. J. B.**, Vigelius, M. and Melatos A., Burial of the polar magnetic field of an accreting neutron star and gravitational wave emission, ASTROPHYSICS OF COMPACT OBJECTS: International Conference on Astrophysics of Compact Objects. AIP Conference Proceedings, Volume 968, pp. 227-232 (2008).
3. Vigelius, M., **Payne D. J. B.** and Melatos A., Gravitational Radiation from Accreting Millisecond Pulsars, Proceedings of the Eleventh Marcel Grossman Meeting on General Relativity, Berlin, Germany 2006 ed. by H. Kleinert, T. T. Jantzen, R. Ruffini, World Scientific, Nov 2008
4. Melatos, A., **Payne D. J. B.** and Peralta, C., Gravitational Radiation from Accreting Neutron Stars, American Astronomical Society, HEAD meeting #9, #18.65; Bulletin of the American Astronomical Society, Vol. 38, p.393, 2006
5. **Payne, D. J. B.**, Melatos, A. & Phinney, E. S., Gravitational waves from an accreting neutron star with a magnetic mountain, The Astrophysics of Gravitational Wave Sources, University of Maryland, USA, April, 2003. AIP Conference Proceedings Vol 686(1) pp. 92-98. October 15, 2003

6. **Payne, D. J. B.** & Melatos, A. Accretion Induced Distortion of the Polar Cap Magnetic Field of an Accreting Neutron Star, Radio Pulsars, ASP Conference Proceedings, Vol. 302. Held 26-29 August 2002 at Mediterranean Agronomic Institute of Chania, Crete, Greece. Edited by Matthew Bailes, David J. Nice and Stephen E. Thorsett. San Francisco: Astronomical Society of the Pacific, 2003., p.317
7. Melatos, A., **Payne, D. J. B.**, & Phinney, E. S., Gravitational Waves from Recycled Pulsars: Magnetic Burial, Non Electromagnetic Windows for Astrophysics, 25th meeting of the IAU, Joint Discussion 1, 16-17 July, 2003, Sydney, Australia
8. Lachlan L. H. Andrew, **Donald J. B. Payne** & Stephen V. Hanly, Queueing Model for Soft-blocking CDMA Systems, in Proc. Vehicular Technology Conference 1999-Fall, 436-440, Amsterdam, The Netherlands, Sept. 1999.

## Contributed Presentations

1. **Payne, D. J. B.**, Magnetic field evolution in accreting X-ray pulsars, XXIII Texas Symposium on Relativistic Astrophysics, December, 2006
2. **Payne, D. J. B.**, Gravitational waves from an accreting neutron star, Australian National Institute for Theoretical Astrophysics, Gravity 2004, Sydney University, Australia.
3. **Payne, D. J. B.**, Melatos, A. & Phinney, E. S., Gravitational waves from an accreting neutron star with a magnetic mountain, The Astrophysics of Gravitational Wave Sources, University of Maryland, USA, April, 2003. AIP Conference Proceedings Vol 686(1) pp. 92-98. October 15, 2003
4. **Payne, D. J. B.** & Melatos, A. Accretion Induced Distortion of the Polar Cap Magnetic Field of an Accreting Neutron Star, Radio Pulsars, ASP Conference Proceedings, Vol. 302. Held 26-29 August 2002 at Mediterranean Agronomic Institute of Chania, Crete, Greece. Edited by Matthew Bailes, David J. Nice and Stephen E. Thorsett. San Francisco: Astronomical Society of the Pacific, 2003., p.317
5. **Payne, D. J. B.** & Melatos, A., Magnetic Mountains on Young Neutron Stars, Young Neutron Stars and their Environment, International Astronomical Union. Symposium no. 218, held 14-17 July, 2003 in Sydney, Australia
6. Melatos, Andrew, **Payne, Donald. J. B.** & Phinney, E. Sterl, Gravitational waves from Recycled Pulsars: Magnetic Burial, Non Electromagnetic Windows for Astrophysics, 25th meeting of the IAU, Joint Discussion 1, 16-17 July, 2003, Sydney Australia
7. **Payne, D. J. B.** & Melatos, A., Magnetic field evolution in accreting neutron star binaries, XXI Texas Symposium, Arcetri, Florence, December, 2002.
8. **Payne, D. J. B.**, Magnetic field evolution in accreting neutron star binaries, Accretion discs, jets and high energy phenomena in astrophysics, summer school in physics, Les Houches, Session LXXVIII, 29 Jul-23 Aug, 2002.
9. **Payne, D. J. B.**, Magnetic field evolution in accreting neutron star binaries, Astronomical Society of Australia, 36<sup>th</sup> Annual Scientific Meeting, Mollymook, NSW, July, 2002. Awarded runner-up best talk.
10. **Payne, D. J. B.**, Magnetic field reduction in accreting neutron stars, Annual Australian Pulsar Meeting, Orange, NSW, March, 2002.

## Other Talks

1. Payne, D. J. B., Gravity Waves - the next test of Einstein, Talk Astronomical Society of Victoria, December, 2005 and May, 2006
2. Payne, D. J. B., Gravity Waves from small places, Talk to School of Physics, University of Melbourne, Geoff Opat Seminar Series, September, 2003.
3. Payne, D. J. B., Magnetic field evolution in accreting neutron star binaries, Talk to School of Physics, University of Melbourne, Geoff Opat Seminar Series, October, 2002.
4. Payne, D. J. B., Magnetic field evolution in accreting neutron star binaries, Talk given in September, 2002 at Arcetri Observatory, Florence, Italy. University of Milan, Milan, Italy. University of Heidelberg, Germany. Potsdam University, Germany. University of Amsterdam, Amsterdam, The Netherlands. Utrecht University, Utrecht, The Netherlands. Imperial College, London, United Kingdom. Oxford University, Oxford, United Kingdom.
5. Payne, D. J. B., Search for Extra-Terrestrial Intelligence, March, 2001 at Radio Astronomy open day, University of Melbourne.

## REFEREES

- Dr. Andrew Melatos,  
Department of Physics  
University of Melbourne  
Parkville, VIC, 3010  
phone: +61 3 8344 5436 e-mail: amelatos@physics.unimelb.edu.au
- Prof. Rachel Webster,  
Department of Physics  
University of Melbourne  
Parkville, VIC, 3010  
phone: +61 3 8344 5450 e-mail: rwebster@physics.unimelb.edu.au
- Dr. Mark Wardle  
Department of Physics  
Macquarie University  
NSW, 2109  
phone: +61 2 9850 8909 e-mail: wardle@physics.mq.edu.au
- Prof. Dong Lai,  
618 Space Sciences Building  
Cornell University  
Ithaca, NY 14853  
phone: 607-255-4936 e-mail: dong@astro.cornell.edu
- Prof. Edward F. Brown  
Department of Physics and Astronomy  
Michigan State University  
3250 Biomedical Physical Sciences  
East Lansing, MI 48824-2320  
phone: 1 517 355-9200x2420 e-mail: ebrown@pa.msu.edu