

Jonathan Andrew Pearson

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Personal details

Date of birth March 1st, 1988

Current age 22

Nationality British

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Education

2009-2012 *Doctor of Philosophy* (to be completed)

- **The University of Manchester**, Jodrell Bank Centre for Astrophysics.
- **Supervisor**: Dr. Richard.A. Battye
- **Research**: Interest in theoretical cosmology. Particular interest in elastic dark energy models, spontaneous symmetry breaking, topological defects in cosmology, domain walls, cosmic strings and vortons, inhomogeneous models of the universe, graph theory.
Collaborators: Paul Sutcliffe (Durham), Chris Welshman (Manchester)
- **Teaching**: Tutoring small groups of 1st year undergraduates: core mathematical modules: *maths 1 & 2, dynamics, electricity and magnetism*.
- **Courses audited**: Attendance, with no assessment, of a variety of courses, from the mathematics and physics departments: *differentiable manifolds, differential geometry and vector bundles, quantum field theory*

2005 - 2009 *Undergraduate masters degree*

- **The University of Manchester** Physics with Theoretical Physics 1st class: MPhys (hons).
- **Selection of sub-disciplines studied**: Advanced statistical physics (90%), Bose & Fermi gases (95%), complex variables & integral transforms (90%), early universe (100%), electrodynamics (92%), fluid mechanics (82%), gravitation (90%), lagrangian dynamics (88%), quantum mechanics of atoms & molecules (81%), relativistic quantum physics (82%), solid state physics (92%), symmetries in physics (88%) & various mathematical methods courses.
- **Year long MPhys project**: Supervised by Dr.R.Battye, with title *scaling dynamics of charged domain walls*. Project involves evolving equations of motion with various potentials, with various numbers of interacting fields, whilst investigating the scaling dynamics of resulting topological defects. Numerical work uses Fortran77 & C⁺⁺. Grade for project: 88%

2003 - 2004 *Diploma*

- **The Open University** Diploma in Mathematics (B): Dip.Maths(Open)
- **Selection of sub-disciplines studied**: Group theory, mathematical modelling, affine geometry, linear algebra, inverse geometry.

2001 - 2003 *A levels*

- **Richmond College** Maths (A), Physics (A), Chemistry (D), Further Maths (B)

Publications

- Formation and evolution of kinky vortons (with R.A.Battye, S.Pike and P.M.Sutcliffe)
JCAP09(2009)039 arXiv:[hep-th/0908.1865v1](https://arxiv.org/abs/hep-th/0908.1865v1) (preprint)
- Charge, junctions and the scaling of domain wall networks (in preparation): with R.A.Battye
- Domain walls, charge and dark energy
Conference proceedings, Recontres de Moriond Cosmology 2010

- Stability of X -type junctions (in preparation): with R.A.Battye and A.Moss

Talks

- Recontres de Moriond – Cosmology: 16/3/10 “*domain walls, charge and dark energy*”
- JBCA Internal Seminar: 17/2/10 “*defects, domain walls and dark energy*”
- UK Cosmology Meeting: King’s College London: 18/11/09, “*formation and evolution of kinky vortons*”
- PhD introductory classes: JBCA: 16/11/09 “*evolution of topological defects in field theory*”

Skills

- Can program in C++ & Fortran77, mainly for scientific purposes.
- Able to competently use various operating systems: Mac OS X, Unix & Windows XP.
- Use mathematical, graphing & typesetting packages, including Mathematica, GnuPlot, SuperMongo & L^AT_EX.
- Proven competency in self-learning mathematical, physical, computational methods; also in conveying complex ideas & techniques to peers.

Academic achievements of note

- **Summer 2008, 8 week research project:** *Cosmic texture*. Project involved using Fortran77 and JPL’s HEALPix software to populate a sky map with texture “spots” having pre-determined temperature profiles, and then finding subsequent power spectrum; as well as literature research. Supervised by Dr.R.Battye, of the Theoretical Cosmology Group, Jodrell Bank Centre for Astrophysics.
- **Summer 2007, summer school:** Chosen as one of 30 world-wide delegates at *International Undergraduate Summer School*, hosted by the University of Sheffield, funded by PPARC. Lectures on particle physics & cosmology, with a 4 week project on *quintessence models of dark energy*. Numerical work used Maple.
- **Degree status:** Exam mark average consistently above 80%, graduated in the top 2 students. Started university 1 year early.
- **Online degree notes:** Creating & maintaining an online physics resource (www.jpoffline.com), hosting my original works & typeset lecture notes. Some notes are now used by lecturers, as hand-outs.
- **Pre-university education:** One will notice that all qualifications gained before university were at least 3 years “early”. Delegate at Stanford University’s Education Program for Gifted & Talented Youth, summer 2002 (youngest & one of 3 nationwide to receive a full scholarship from Warwick University, UK).

All reports & projects mentioned (and those unmentioned) may be found on the afore mentioned site www.jpoffline.com.

Non-academic notes

- Holder of full, clean UK drivers license.
- Volunteer work at Lee Abbey Youth Camps; a Christian charity. Pastoral care of children, creating multimedia entertainment resources. Also website manager for <http://camps.leeabbey.org.uk>.
- Member of IvyManchester (church). Lead small group discussions on a weekly basis; organise publicity events; youth leader.
- 2004-2005: Holding the full time position of *booking & scheduling coordinator*, at the NHS Alexandra Hospital, Redditch; phasing in the government initiative for patient choice. Responsible for in- and out-patient waiting lists, informing patients, data handling, inter-department liason.