Curriculum Vitae – Gareth Paul Alexander

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RESEARCH INTERESTS

Soft condensed matter; topology; defects; liquid crystals; colloids; elasticity; applied mathematics; Fluid dynamics; low Reynolds number motility; self-diffusiophoresis; microfluidics; biophysics; lattice Boltzmann.

EMPLOYMENT

Sep 2011 –	Assistant Professor Physics and Complexity Science, University of Warwick.
Sep 2008 – Aug 2011	Postdoctoral research fellow, University of Pennsylvania. Supervisor: Prof. Randall D. Kamien
Oct 2004 – Jun 2008	College lecturer in physics, Keble College, University of Oxford.

EDUCATION

Oct 2004 – Jun 2008	DPhil in theoretical physics, Keble College, University of Oxford. Supervisor: Prof. Julia M. Yeomans
Oct 2003 – Jun 2004	CASM (part III maths), Clare College, University of Cambridge.
Oct 1999 – Jun 2003	MPhys, Keble College, University of Oxford. (BP Prize: Best MPhys project in theoretical physics)

PUBLICATIONS

1. Gareth P. Alexander and Timon Idema, "The fluid boundary layer in self-diffusiophoresis", *in preparation* (2011).

2. Gareth P. Alexander and Andrea J. Liu, "Self-diffusiophoresis in the Advection Dominated Regime", *in preparation* (2011).

3. Bryan Gin-ge Chen, Elisabetta A. Matsumoto, Gareth P. Alexander, and Randall D. Kamien, "Disclination loops in nematic liquid crystals", *Rev. Mod. Phys.* in preparation.

4. I. Dierking, M. Ravnik, E. Lark, J. Healy, G. P. Alexander, and J. M. Yeomans, "Anisotopy in the annihilation dynamics of umbilic defects in nematic liquid crystals", *submitted* (2011).

5. Miha Ravnik, Gareth P. Alexander, Julia M. Yeomans, and Slobodan Žumer, "Three-dimensional colloidal crystals in liquid crystalline blue phases", *Proc. Natl. Acad. Sci. USA* **108** (13), 5188-5192 (2011). *From the Cover*

6. Slobodan Žumer, Miha Ravnik, Tine Porenta, Gareth P. Alexander, and Julia M. Yeomans, "Blue phases as templates for 3D colloidal photonic crystals", *Proc. of SPIE* **7775**, 77750H (2010).

7. G. P. Alexander and J. M. Yeomans, "Hydrodynamic Interactions at Low Reynolds Number", *Exp. Mech.* **50**, 1283-1292 (2010).

8. Gareth P. Alexander, Bryan Gin-ge Chen, Elisabetta A. Matsumoto, and Randall D. Kamien, "Power of the Poincaré Group: Elucidating the Hidden Symmetries in Focal Conic Domains", *Phys. Rev. Lett.* **104**, 257802 (2010).

9. Elisabetta A. Matsumoto, Gareth P. Alexander, and Randall D. Kamien, "Helical nanofilaments and the high chirality limit of smectics-A", *Phys. Rev. Lett.* **103**, 227801 (2009).

10. Miha Ravnik, Gareth P. Alexander, Julia M. Yeomans, and Slobodan Žumer, "Mesoscopic modelling of colloids in chiral nematics", *Faraday Discuss.* **144**, 159-169 (2010).

11. Bryan Gin-ge Chen, Gareth P. Alexander, and Randall D. Kamien, "Symmetry breaking in smectics and surface models of their singularities", *Proc. Natl. Acad. Sci. USA* **106**, 15577-15582 (2009).

12. G. P. Alexander and J. M. Yeomans, "Numerical results for the blue phases", *Liq. Cryst.* **36**:10, 1215-1227 (2009).

13. G. P. Alexander, C. M. Pooley, and J. M. Yeomans, "Hydrodynamics of linked sphere model swimmers", *J. Phys.: Condens. Matter* **21**, 204108 (2009).

14. G. P. Alexander, C. M. Pooley, and J. M. Yeomans, "Scattering of low-Reynolds-number swimmers", *Phys. Rev. E* **78**, 045302(R) (2008).

15. G. P. Alexander and J. M. Yeomans, "Dumb-bell swimmers", *Europhys. Lett.* **83**, 34006 (2008).

16. G. P. Alexander and D. Marenduzzo, "Cubic blue phases in electric fields", *Europhys. Lett.* **81**, 66004 (2008).

17. C. M. Pooley, G. P. Alexander, and J. M. Yeomans, "Hydrodynamic interaction between two swimmers at low Reynolds number", *Phys. Rev. Lett.* **99**, 228103 (2007).

18. G. P. Alexander and J. M. Yeomans, "Flexoelectric blue phases", *Phys. Rev. Lett.* **99**, 067801 (2007).

19. G. P. Alexander and J. M. Yeomans, "Stabilizing the blue phases", *Phys. Rev. E* **74**, 061706 (2006).

TALKS

1. "*Colloidal liquid crystals*", Topological Methods in Complex Systems, IMA Summer School, 25th July to 12th August 2011.

2. "*Topological defects*", 2011 Liquid Crystal Gordon Research Conference, Mount Holyoke College, 19th-24th June 2011.

3. "*Self-diffusiophoresis and Biological Motility*", Informal Seminar, University of Oxford, 8th June 2011.

4. "*Self-diffusiophoresis in the Advection Dominated Regime*", Mathematics and Physics of Soft and Biological Matter, ICTP Trieste, 2nd to 13th May 2011.

5. "*Self-diffusiophoresis in the strongly advecting regime*", APS March Meeting, Dallas, Texas, 22nd March 2011.

6. "*Smectics, Symmetry Breaking and Surfaces*", Condensed Matter Seminar, University of Colorado at Boulder, 10th January 2011.

7. "*Smectics, Symmetry Breaking and Surfaces*", Lorentz Seminar, Instituut-Lorentz, Leiden University, 9th December 2010.

8. "*Defects and Topology in Liquid Crystals*", Workshop on Topology: Identifying Order in Complex Systems, University of Pennsylvania, 3rd November 2010.

9. "*Symmetry in Low Reynolds Number Hydrodynamics*", ACAM-SFI SimBioMa-ESF Workshop: Dynamics of Bacteria and Microswimmers, University College Dublin, 17th-19th May 2010.

10. "*Symmetry breaking in smectics and surface models of their singularities*", Condensed Matter Seminar, University of Virginia, 25th March 2010.

11. "*Helical nanofilaments and the high chirality limit of smectics-A*", Session B12: GSNP Graduate Student Prize and Liquid Crystals: Smectics, APS March Meeting, Portland, Oregon, 15th March 2010.

12. "*Periodic Structures in Chiral Liquid Crystals*", Liquid Crystal Institute Seminar, Kent State University, 28th October 2009.

13. "*Blue Phases: liquid crystals with an extra twist*", Geometry and Materials Seminar, Institute for Advanced Study, 6th October 2009.

14. "*Smectics: symmetry breaking, defects, chirality and all that*", Soft Matter Seminar, University of Oxford, 13th August 2009.

15. "*Hydrodynamic Interactions of Linked Sphere Swimmers*", Soft Active Materials: From Granular Rods to Flocks, Cells and Tissues, Syracuse University, 19th-21st May 2009.

16. "*Kinematic Reversibility and Swimmer Hydrodynamics*", APS March Meeting, Pittsburgh, Pennsylvania, 18th March 2009.

17. "*Hydrodynamic Interactions in Low Reynolds Number Swimmers*", Condensed Matter Physics Seminar, Brown University, 5th March 2009.

18. "*Hydrodynamic Interactions of Microscopic Swimmers*", University of Pennsylvania, 4th March 2008.

19. "*Hydrodynamic Interactions of Microscopic Swimmers*", University of Edinburgh, 22nd January 2008.

20. "*Two Swimmer Interactions at Low Reynolds Number*", Modelling and Computer Simulations of Microswimming and Bacterial Motility, TU Münich, Garching (Münich), 17th-19th September 2007.

21. "*Flexoelectric Blue Phases*", Mesoscale Modelling for Complex Fluids and Flows, University of Oxford, 25th-27th June 2007.

22. "*Electric Field Induced Blue Phases of Liquid Crystals*", Informal Seminar, University of Oxford, 9th May 2007.

23. "*Stabilising the Blue Phases*", 21st International Liquid Crystal Conference, Keystone, Colorado, 2nd-7th July 2006.

TEACHING EXPERIENCE

I have given classes and tutorials for the following undergraduate courses in physics at Oxford:

2007–2008	C6: Theoretical Physics	Class Tutor
2007	B2: Condensed Matter Physics and Photonics	Tutor, St. Hilda's College
2006–2007	B2: Condensed Matter Physics and Photonics	Tutor, St. Hugh's College
2004–2008	B2: Condensed Matter Physics and Photonics	Tutor, Keble College

PROFESSIONAL ACTIVITIES

I have acted as a referee for PNAS, Physical Review Letters, Physical Review E, The European Journal of Physics E, International Journal of Non-Linear Mechanics, and the Journal of the American Chemical Society.

For the academic year 2007–2008 I co-organised the Oxford Condensed Matter Theory group's Informal Seminar series.

I have assisted in the organisation of two internation conferences held in Oxford:
Mesoscale Modelling for Complex Fluids and Flows, 25th-27th June 2007
Mesoscale Modelling for Liquids, CCP5: DL_MESO final meeting, 20th-21st March 2006.

REFERENCES

Available upon request.