

# THOMAS MACHON

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## Employment

- May 2016 – Present      **Postdoctoral Fellow**  
Department of Physics & Astronomy, University of Pennsylvania  
Supervised by Randall. D. Kamien
- Oct 2015 – Apr 2016      **Early Career Fellow**  
Institute for Advanced Study, University of Warwick  
Independent research fellowship.

## Education

- 2016      **PhD**, Physics and Complexity Science, University of Warwick, UK  
Thesis: *Aspects of Geometry and Topology in Liquid Crystalline Order*  
Supervisors: Gareth P. Alexander and Miha Ravnik (University of Ljubljana).  
Science Faculty PhD Thesis Prize
- 2013      **MSc**, Complexity Science, University of Warwick, UK (Distinction)  
Theses: *Swarming and phase transitions in Danio Rerio*  
and *Knotted Defects in Nematic Liquid Crystals*.
- 2011      **MPhys**, Physics, University of Warwick, UK (1<sup>st</sup> class)  
Highest mark in graduating class.

## Awards and Prizes

- 2016      Science Faculty PhD Thesis Prize, University of Warwick, UK.
- 2015      IAS Early Career Fellowship, University of Warwick, UK (£3,000).
- 2012      Chancellor's International Scholarship, University of Warwick, UK (£50,000).
- 2011      Jersey Bursary, States of Jersey, Channel Islands (£10,000).
- 2011      Styles Prize for Excellence (ranked 1<sup>st</sup> in graduating class), Department of Physics, University of Warwick, UK.

## References

## Teaching Experience

- 2012-2015      Department of Physics, University of Warwick.  
*Teaching Assistant: PX149, Mathematics for Physicists.*
- 2014      Department of Physics & Institute of Mathematics, University of Warwick.  
*Co-supervised Masters students' final year projects.*
- 2013-2014      Institute of Mathematics, University of Warwick.  
*Supervisions (small group tutorials covering all first year courses).*

## Publications & Preprints

8. H. Aharoni, T. Machon and R.D. Kamien, *Composite Dislocations in Smectic Liquid Crystals*, Phys. Rev. Lett. **118**, 257801 (2017).
7. T. Machon and G.P. Alexander, *Global Defect Topology in Nematic Liquid Crystals*, Proc. R. Soc. A **472**, 20160265 (2016).
6. T. Machon, R.E. Goldstein, A.I. Pesci and G.P. Alexander, *Instabilities and Solitons in Minimal Strips*, Phys. Rev. Lett. **117**, 017801 (2016).
5. T. Machon and G.P. Alexander, *Umbilic Lines in Orientational Order*, Phys. Rev. X **6**, 011033 (2016).
4. D.A. Beller, T. Machon, S. Copar, D.M. Sussman, G.P. Alexander, R.D. Kamien and R.A. Mosna, *Geometry of the Cholesteric Phase*, Phys. Rev. X **4**, 031050 (2014).
3. T. Machon and G.P. Alexander, *Knotted Defects in Nematic Liquid Crystals*, Phys. Rev. Lett. **113**, 027801 (2014).
2. T. Machon and G.P. Alexander, *Knotted Nematics*, arXiv:1307.6819 (2013).
1. T. Machon and G.P. Alexander, *Knots and non-orientable surfaces in chiral nematics*, Proc. Natl. Acad. Sci. USA **110**, 14174 (2013).  
Also featured in Liquid Crystals Today **22**, 72 (2013).

## Manuscripts in Preparation

*Boltzmann Learning and a duality for non-equilibrium critical points* (with S.A. Ridout).  
*Singularity Theory and the Structure of Defects in Smectics* (with H. Aharoni, Y. Hu and R.D. Kamien).  
*Contact Topology and the Structure and Dynamics of Cholesteric Liquid Crystals*.  
*Nematic Chainmail and the Abelian Sandpile Model* (with G.P. Alexander).

## Invited Presentations

July 2017	SIAM Conference on Applied Algebraic Geometry <i>Georgia Institute of Technology</i>
July 2017	Seminar <i>Department of Physics, University of Bristol</i>
October 2016	Topology Workshop <i>Department of Physics &amp; Astronomy, University of Pennsylvania</i>
October 2015	Applied Topology Seminar <i>Department of Physics, University of Bristol</i>
September 2014	CECAM Workshop on Knots in Soft Condensed Matter <i>University of Vienna</i>
May 2013	Physics Seminar <i>Department of Physics, University of Ljubljana</i>

## Contributed Presentations

June 2017	GRC on Liquid Crystals (poster) <i>University of New England, Maine</i>
March 2017	APS March Meeting <i>New Orleans</i>
September 2016	Knots and Links in Biological and Soft Matter Systems (poster) <i>ICTP</i>

- April 2014                      The Physics of Soft and Biological Matter Conference  
                                      *Homerton College, University of Cambridge*
- May 2013                        The Mathematics of Liquid Crystals Workshop (poster)  
                                      *Isaac Newton Institute for Mathematical Sciences, University of Cambridge*

## References

### **Randall D. Kamien**

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### **Gareth P. Alexander**

University of Warwick  
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