

## DR ALEXANDER JAMES MARSDEN

**Email:** marsden.alex@gmail.com  
**Website:** www.alexandermarsden.com

### PROFESSIONAL APPOINTMENTS

#### Research Associate

*University of Manchester, UK*

April 2016 -

Investigating 2D materials as friction and wear coatings with Prof. Ian Kinloch and an industrial sponsor.

#### Early Career Fellow and Research Associate

*University of Warwick, UK*

October 2015 - April 2016

Investigating the growth and electronic structure of transition metal dichalcogenides with Dr Neil Wilson.

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### EDUCATION

#### Doctor of Philosophy, Physics

*University of Warwick, UK*

2011 - 2015

Title: van der Waals Epitaxy in Graphene Heterostructures

Supervisor: Dr Neil Wilson

My project involved growing graphene on copper via CVD, and then combining it with atomic species and molecular overlayers. I studied the resulting heterostructures with microscopy (AFM, SEM and aberration-corrected TEM) and surface science techniques (including XPS, ARPES and LEED).

#### Master of Physics, First Class Honours

*University of Warwick, UK*

2007 - 2011

Final-year project involved processing satellite data in MATLAB to further understand the solar wind.

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### PROFESSIONAL EXPERIENCE

#### Proficiencies

- Sample preparation: graphene and hBN CVD; transfer to TEM grids and other supports; organic and inorganic molecular beam deposition.
- Microscopy: Optical, AFM, SEM, TEM (including aberration corrected TEM)
- Surface science: ARPES, XPS, LEED. 14 weeks synchrotron experience (Antares at Soleil, France; Spectromicroscopy and APE at Elettra, Italy)
- Transferrable Skills Certificate: Includes "Academic Writing" and "Project Management"
- Programming skills: L<sup>A</sup>T<sub>E</sub>X, Python, Wavemetrics Igor, Mathematica, MATLAB

#### Undergraduate Laboratory Demonstration

2011 - 2014

#### Agar Scientific

June - August 2013

Three month placement to develop graphene oxide TEM supports. Opportunity to work in industrial setting, producing progress reports and communicating with company. Results of placement is product going to market. Now working with spin-off company Electron Microscopy Resolutions for continuing development.

#### Silson

July - September 2015

Developing graphene TEM supports.

#### Assistant Editor for 'Reinvention: A Journal of Undergraduate Research'

2010 - 2012

Role included finding referees for manuscripts; communicating with authors; working as part of an editorial team to progress the journal, including organising an international conference at Warwick on undergraduate research.

## Article Reviewer

Reviewed for *Surface and Coatings Technology*

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### AWARDS AND FUNDING

- £18.5k Named researcher on EPSRC Institutional Support Grant
    - Investigate the electronic structure of novel heterostructures of 2D materials. Resulted in publication in *Science Advances*.
  - £3k IAS Early Career Fellowship
    - Competitive fellowship designed by the Institute of Advanced Study at the University of Warwick to enhance the careers of promising PhD holders at the University.
  - £500 Postgraduate Student Travel Awards (RMS, IOP, EMS)
  - £2.3k Undergraduate Research Scholarship Summer Program. 2008, 2009, 2010.
  - £350 Undergraduate Small Grants Fund. June 2010.
  - £3k Smith's Engineering Group Undergraduate Sponsorship. October 2007.
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### PUBLICATIONS

- 17 **Marsden, A. J.** et al. Self-assembly of TMA and TPA on graphene. (In preparation)  
— 2016 —
- 16 Bosch-Navarro, C., Laker, Z. P. L., **Marsden, A. J.**, Wilson, N. R., Rourke, J. P. Non-covalent functionalization of graphene with a hydrophilic self-limiting monolayer for macro-molecule immobilization. *FlatChem* 1, 5256 (2016).
- 15 **Marsden, A. J.** et al. Growth of large crystalline grains of vanadyl-phthalocyanine without epitaxy on graphene *Adv. Funct. Mater.* (2016)  
— 2015 —
- 14 Grigg, A. T., **Marsden, A. J.** et al. Vitrification of B-tricalcium phosphate in sodium aluminoborophosphate glass and the effect of Ga<sup>3+</sup> substitution. *J. Solid State Chem.* 231, 175184 (2015).
- 13 Bosch-Navarro, C., Laker, Z. P. L., **Marsden, A. J.** et al. Covalently Binding Atomically Designed Au<sub>9</sub> Clusters to Chemically Modified Graphene. *Angew. Chemie Int. Ed.* **54**, 95609563 (2015).
- 12 Turyanska, L. ... **Marsden, A. J.** et al. Ligand-Induced Control of Photoconductive Gain and Doping in a Hybrid Graphene-Quantum Dot Transistor. *Adv. Electron. Mater.* **1**, 1500062 (2015).
- 11 Mudd, G. W. ... **Marsden, A. J.** et al. High Broad-Band Photoresponsivity of Mechanically Formed InSe-Graphene van der Waals Heterostructures. *Adv. Mater.* **27**, 37603766 (2015).
- 10 Wood, G. E., **Marsden, A. J.** et al. van der Waals epitaxy of monolayer hexagonal boron nitride on copper foil: growth, crystallography and electronic band structure. *2D Mater.* **2**, 025003 (2015).
- 9 **Marsden, A.J.** et al. Effect of oxygen and nitrogen functionalization on the physical and electronic structure of graphene. *Nano Res.* **8**, 26202635 (2015).
- 8 Li, Z., Young, R.J., Kinloch, I.A., Wilson, N.R., **Marsden, A.J.**, Raju, A.P.A. Quantitative determination of the spatial orientation of graphene by polarized Raman spectroscopy. *Carbon* **88**, 215224 (2015)
- 7 Svatek, S. A. ... **Marsden, A. J.** et al. Adsorbate-Induced Curvature and Stiffening of Graphene. *Nano Lett.* **15**, 159164 (2015).  
— 2014 —
- 6 Skilbeck, M. S., **Marsden, A.J.** et al. Multimodal microscopy using half and half contact mode and ultrasonic force microscopy. *Nanotechnology* **25**, 335708 (2014).
- 5 Thomas, H. R., **Marsden, A. J.**, Walker, M., Wilson, N. R. and Rourke, J. P. Sulfur-Functionalized Graphene Oxide by Epoxide Ring-Opening. *Angew. Chemie Int. Ed.* **53**, 76137618 (2014).
- 4 Lai, C.-Y., Tang, T.-C., Amadei, C. A., **Marsden, A. J.** et al. A nanoscopic approach to studying evolution in graphene wettability. *Carbon* **80**, 784792 (2014).  
— 2013 —
- 3 **Marsden, A. J.** et al. Is graphene on copper doped? *Phys. status solidi - Rapid Res. Lett.* **7**, 643646 (2013).

- 2 **Marsden, A. J.**, Phillips, M. and Wilson, N. R. Friction force microscopy: a simple technique for identifying graphene on rough substrates and mapping the orientation of graphene grains on copper. *Nanotechnology* **24**, 255704 (2013).
- 1 Wilson, N. R., **Marsden, A. J.** et al. Weak mismatch epitaxy and structural feedback in graphene growth on copper foil. *Nano Res.* **6**, 99112 (2013).

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— Non-peer reviewed —

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- **Marsden, A. J.** Exploring Flatlands Future during Materials Week at Warwick. *Exchanges: The Warwick Research Journal*, **3**(2), 247-252 (2016).
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### CONFERENCES

- 10 Electron Microscopy Characterisation of Organic-Inorganic Interfaces, London, UK. *Poster presentation*  
————— 2015 —————
- 9 MMC 2015, Manchester, UK. *Poster presentation (2nd Prize Poster Competition)*  
————— 2014 —————
- 8 MRS Spring 2014, San Francisco, USA. *Oral presentation*
- 7 MMC 2014, Manchester, UK. *Poster presentation*
- 6 EMRS Spring 2014, Lille, France. *Poster presentation*  
————— 2013 —————
- 5 WCAS 2013, Warwick, UK. *Oral presentation*
- 4 NanoteC 13, Sussex, UK. *Oral presentation*
- 3 ISSC 2013, Nottingham, UK. *Oral presentation*  
————— 2012 —————
- 2 EMC 2012, Manchester, UK. *Oral presentation*
- 1 NanoteC 12, Brighton, UK. *Poster presentation*