University of Birmingham

Dr Dwaipayan Chakrabarti BSc, MSc, PhD

Birmingham Fellow

School of Chemistry (/schools/chemistry/index.aspx)

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About

Dwaipayan Chakrabarti is a Birmingham Fellow in the School of Chemistry.

Dwaipayan has held a number of research fellowships before moving to Birmingham to establish his research group in pursuit of rational design of functional materials in silico. He has nearly 30 research publications including book chapters. His research interests span a number of disciplines in physical and applied sciences interfaced with theoretical and computational chemistry.

Qualifications

- PhD in Chemical Science, Indian Institute of Science, Bangalore, 2006
- MSc in Chemistry, University of Calcutta, 2001
- BSc (Hons) in Chemistry, University of Calcutta, 1999

Biography

Dwaipayan Chakrabarti obtained a PhD from the Indian Institute of Science, Bangalore in 2006, having studied slow dynamics in soft matter systems employing coarse-grained models in computer simulations. He then moved to the University of Cambridge with a Marie Curie Incoming International Fellowship (2006-08) hosted by Prof. David J. Wales in the Department of Chemistry, where he subsequently held an Earnest Oppenheimer Early Career Research Fellowship (2008-11), awarded by the University of Cambridge in the broadly interpreted field of Colloid Science, while collaborating with the Wales group. He also held a Research Fellowship (2009-11) at Clare Hall, a graduate college in Cambridge, where he is now a life member.

Exploring and exploiting chiral superstructures has been a focal point of his post-doctoral research. He has also been the lead developer of a comprehensive computational framework for surveying the underlying potential energy landscapes of rigid molecular systems.

Following a brief stint in the Indian Institute of Technology (IIT) Delhi as an Assistant Professor (2011-12), he returned to Cambridge en route to a Birmingham Fellowship at the University of Birmingham. He has joined the School in the summer of 2013.

Research

RESEARCH THEMES

The focus of his current research is on exploring routes to design novel structures via self or directed assembly. On a broader perspective, he is interested in understanding physical principles of self-assembly in a wide spectrum of condensed matter, especially soft matter, systems to exploit them in the context of materials science. To this end, his research devises and applies computational methods, uses tools of statistical mechanics, and often undertakes a survey of the underlying energy landscape for the system of interest.

RESEARCH ACTIVITY

- Nanoscale and colloidal self-assembly
- Atomic, molecular, and colloidal clusters
- Liquid crystals and their phase transitions
- Crystal structure prediction
- Physical virology

For further details please visit **http://www.stchem.bham.ac.uk/~dchakrabarti/ (http://www.stchem.bham.ac.uk/~dchakrabarti/)**

Publications

- Morgan, J.W.R., Chakrabarti, D., Dorsaz, N. and Wales, D.J. (2013), Designing a Bernal Spiral from Patchy Colloids. ACS Nano, 7: 1246-1256
- Chakrabarti D. and Wales, D.J. (2011), Coupled linear and rotary motion in supramolecular helix handedness inversion. Soft Matter, 7: 2325-2328
- Fejer, S.N., Chakrabarti, D. and Wales, D.J. (2010), Emergent complexity from simple anisotropic building blocks: Shells, tubes and spirals. ACS Nano, 4: 219-228
- Chakrabarti, D., Fejer, S.N. and Wales, D.J. (2009), Rational design of helical architectures. Proc. Natl. Acad. Sci. USA, 106: 20164-20167
- Chakrabarti, D. and Wales, D.J. (2009), Simulations of rigid bodies in an angle-axis framework. Phys. Chem. Chem. Phys., 11: 1970-1977

- Chakrabarti, D. and Wales, D.J. (2008), Tilted and helical columnar phases for an axially symmetric discoidal system. Phys. Rev. Lett., 100: 127801