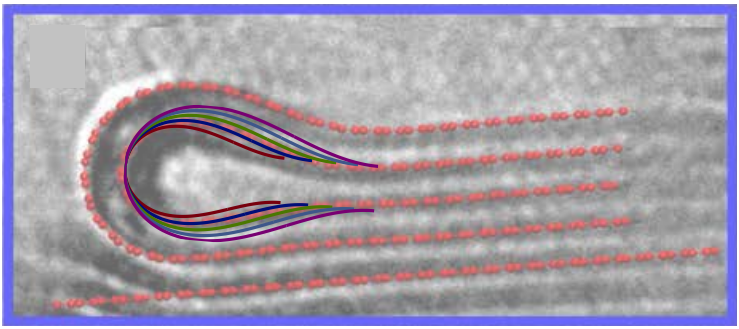

Folded conformations of graphene

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In this talk we employ the calculus of variations to investigate the folding behaviour of a graphene sheet. The elastic and van der Waals energies are included in the model and a second order variational problem is derived. The variational problem gives rise to a fourth order Euler-Lagrange equation that may be tackled analytically that in turn leads to a parametric solution that depends on the ratio of the bending rigidity of graphene to the strength of the van der Waals interaction between parallel graphene sheets. Using typical values for these physical parameters we find that the shortest length of graphene sheet to adopt the folded conformation to be on the order of 10 nm.

This is joint work with Asst Prof Duangkamon Baowan from Mahidol University, Bangkok; Prof Wolfgang Bacsa from CEMES, Toulouse; and, Prof Jim Hill from University of South Australia, Adelaide. The figure above originally appeared in Lopez-Bezanilla et al, *J. Phys. Chem. Lett.* **3**, 2097–2102 (2012) and is decorated with analytic solution curves (unbroken lines).