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Research Interests: physical organic chemistry, molecular recognition, non-covalent interactions supramolecular chemistry, single-molecule biophysics, molecular machines

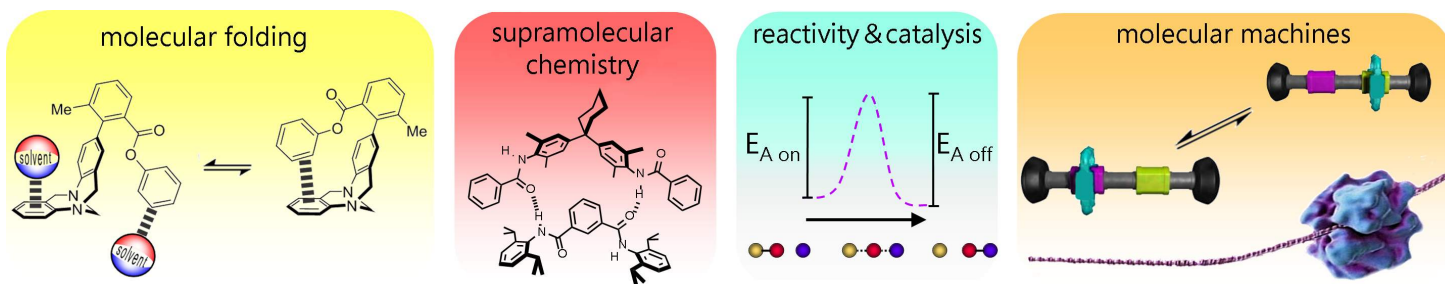


Physical Organic Chemistry

By studying the properties and behaviour of intramolecular and supramolecular systems in a systematic way, we seek to investigate the fundamental phenomena governing non-covalent interactions and chemical reactivity; i.e. the key determinants of structure and activity in chemical and biological systems.

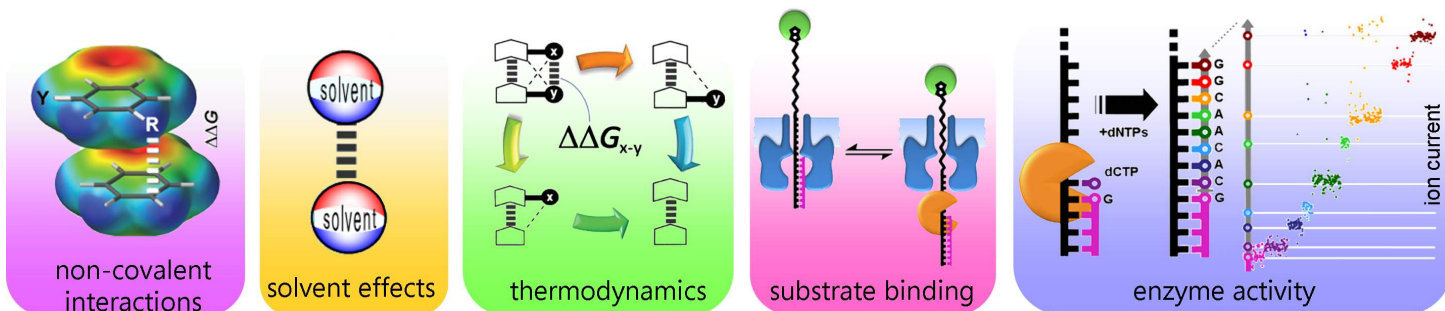
Single-molecule studies of molecular machines and enzymes

We are developing nanopore-based biophysical approaches for monitoring the activity and conformational dynamics of molecular machines and enzymes in real-time. The method works on the principle that conformational changes in a single macromolecule held near (or threaded through) a transmembrane protein pore will induce tiny (but detectable) changes in the ion current flowing through the pore under an applied transmembrane potential (voltage).



Physical Organic Chemistry

Single Molecule Studies



SELECTED RECENT PUBLICATIONS

1. 'A single-molecule nanopore device detects DNA polymerase activity with single-nucleotide resolution'
S. L. Cockroft, J. Chu, M. Amarin, H. Bayley, M. R. Ghadiri. *J. Am. Chem. Soc.* (2007) In press.
2. '[Modular multi-level circuits from immobilized DNA-based logic gates](#)'
B. M. Frezza, S. L. Cockroft, M. R. Ghadiri. *J. Am. Chem. Soc.* (2007), 129(48), 14875-14879
3. '[Chemical double-mutant cycles: Dissecting non-covalent interactions](#)'
S. L. Cockroft, C. A. Hunter. *Chem. Soc. Rev.* (2007) 36, 172-188
4. '[Desolvation tips the balance: Solvent effects on aromatic interactions](#)'
S. L. Cockroft, C. A. Hunter, *Chem. Commun.* (2006) 36, 3806-3808 ([cover article](#))
5. '[Electrostatic control of aromatic stacking interactions](#)'
S. L. Cockroft, C. A. Hunter, K. R. Lawson, J. Perkins, C. J. Urch. *J. Am. Chem. Soc.* (2005) 127, 8594-8595