CENIDE & WIN Seminar Series on 2D-MATURE

DFG IRTG 2803 & NSERC CREATE

Jonathan Coleman

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"Solution processing of nanosheets: From kitchen blender to printed electronics"

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10:00 a.m. ET / 16:00 p.m. CET

Jonathan Coleman is currently the Erasmus Smith's Professor of Natural and Experimental Philosophy (1724) in the School of Physics and a PI in the CRANN and AMBER research centres. He graduated with First Class Honours and a Gold Medal in Physics in 1995 and completed a PhD in Physics in TCD in 1999, working in the research group of Werner Blau. After completing an Irish Government funded postdoc, he became a junior lecturer in 2001, rising to the Chair of Chemical Physics in 2011. He was appointed to his current position in 2022. Prof Coleman's area of interest is in solution processing of nano-materials, predominately carbon nanotubes, nanowires and 2D nanosheets such as graphene. He is most well known for developing Liquid Phase Exfoliation, a versatile and widely used method for preparing 2D materials. These solution processing methods allow the formation of dispersions, suspensions and solutions of nanostructures and facilitate the production of coatings, thin films and composites. Coleman works on applying these materials and methods in a number of areas including electro-mechanical sensors, printed electronics and energy storage materials. Prof Coleman has been involved in a number of industry-academic collaborative projects with companies including Hewlett-Packard, Intel, SAB Miller, Nokia-Bell Labs and Thomas Swan. He is the coordinator of the Graphene Flagship consortium 2D-PRINTABLE.

While graphene and related 2D materials are extremely exciting due to their novel properties and applications potential, developing methods to produce them in large quantities and process them into functional structures was initially challenging. A versatile approach to solution processability was achieved via the discovery of liquid phase exfoliation (LPE), a method for converting layered materials to nanosheets in liquids in a scalable way. This method yields printable inks which can be patterned into functional structures for a range of applications. This talk will describe LPE as a method to produce a wide range of different nanosheets as well as related methods for the processing and printing of nanosheets. I will describe methods for the characterisation (particularly morphological and electrical) of printed networks and discuss the electronic and electrochemical applications of networks and composites.