



Berlin
Mathematical
School

BMS Kovalevskaya Colloquium

Friday 18 July 2014 at 14:15

Tea & Cookies starting at 13:00

BMS Loft, Urania, An der Urania 17, 10787 Berlin

Myfanwy Evans (*U Erlangen*)

Geometry... in a Material World...

We are living in a material world, and geometry has a big role to play. As an example, take our own skin. Human skin is a complex organ whose many layers perform a variety of different roles, from insulation and temperature regulation to the sensation of touch. Of particular interest, to bathing children and discerning adults alike, is the wrinkly swelling of skin after soaking in water. The swelling behavior is a consequence of the highly symmetric geometry of keratin fibers (the structural proteins) inside the cells. While it may appear an unconventional perspective on a biochemical system, we argue that the ability of human skin to swell multifold when absorbing water is best understood as the geometric problem of packing helices and embedding the hyperbolic plane in Euclidean 3-space.

The intricate structure inside skin cells touches on various branches of modern geometry, from triply-periodic minimal surfaces and symmetric hyperbolic patterns to entanglement and braids. In her talk, using the skin cell geometry as a guide, Evans will explore the latest advances at the interface of geometry, soft matter physics and biological materials, and discuss the way forward towards geometrically inspired new materials.

Myfanwy Evans is a Humboldt postdoctoral fellow at the University of Erlangen. Her research interests lie at the boundary of geometry and topology with soft matter physics. Evans received her PhD from the Australian National University in Canberra in 2011, and is currently working on various projects combining geometry with soft matter and statistical physics in Erlangen.

