Event: 7th meeting of the Reading-Bath-Cardiff network on generalised solutions for nonlinear PDE

Venue: Department of Mathematics and Statistics, University of Reading, UK

Room: M113

Date: 13th of June 2017

Programme:

<u>10.30-11.00</u> **Coffee and discussions**

<u>11.00-11.50</u> **Melanie Rupflin** (Oxford, UK) **Flowing to minimal surfaces**
Abstract: *We discuss the construction and properties of a gradient flow that is designed to change surfaces into critical points of the Area functional, i.e. into minimal immersions.*

<u>12.00-12.50</u> **Michael Ruzhansky** (Imperial, UK) **Very weak solutions to hyperbolic systems**
Abstract: TBA

<u>13.00-14.00</u> **Lunch and coffee**

<u>14.00-14.50</u> **Ali Taheri** (Sussex, UK) **TBA**
Abstract: TBA

<u>15.00-15.50</u> **Abderrahim El Moataz Billah** (Caen, France) **On the p-laplacian and Infinity-Laplacian on graphs with applications in image processing and machine learning**
Abstract: Partial differential equations (PDEs) involving the p-Laplace and ∞-Laplace operators still generate a lot of interest both in the setting of Euclidean domains and on discrete graphs. These operators in their different forms, i.e., continuous, discrete, local, and nonlocal, are at the interface of many scientific fields as they are used to model many interesting phenomena, e.g., in mathematics, physics, engineering, biology, and economy. Some closely related applications can be found in image processing, computer vision, machine learning, and game theory. In this talk I will introduce a new family of partial difference operators on graphs and study equations involving these operators. This family covers local variational p-Laplacian, ∞-Laplacian, nonlocal p-Laplacian and ∞-Laplacian, p-Laplacian with gradient terms, and gradient operators used in morphology based on the partial differential equation. For p=∞, I will investigate the connection with Tug-of-War games. Finally, I will present the adaptability of this new formulation for different tasks in image and point cloud processing, such as filtering, segmentation, clustering, and inpainting, etc.

<u>16.00-16.50</u> **Lucia Scardia** (Bath, UK) **Equilibrium measure for a nonlocal dislocation energy**
Abstract: In this talk I will present a recent result on the characterisation of the equilibrium measure for a nonlocal and anisotropic energy arising as the Gamma-limit of discrete interacting dislocations, and an extension to more general anisotropies. This is joint work with J.A. Carrillo, J. Mateu, M.G. Mora, L. Rondi and J. Verdera.

<u>17.00-17.30</u> **Discussions**

<u>17.30-18.30</u> **Supper (Pizzas!)**