
## UCL Undergraduate Mathematics Colloquium

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# Generalised Functions

## $6^{th} October 2016$

*Abstract:* Discipline from introductory analysis courses instruct young students that the function is differentiable with derivative zero everywhere other than the jump point of discontinuity: the left limit is obviously strictly less than the right limit. So the function is of derivative 0 on the whole domain except just one point, can we say the derivative exists on the whole domain, in somewhat sense? Also recall from the same course that if one alter only one point the Riemann integral of the function does not alter. So if we integrate this . . .
The talk is a beginner(-maybe)-friendly sightseeing introduction to some interesting ideas in modern analysis.
In the first part I will cover the basics from the theory of distributions:
i) test functions; ii) distributions; iii) differential operator on $\mathcal{D}'$;
iv) distributions with compact support; v) convolution on $\mathcal{D}'$;
vi) Fourier transform on $\mathcal{D}'$; vii) Schwartz space; viii) tempered distributions.
In the second part I will talk about applications of the theory:
ix) ODEs with jump singularities; x) Poisson equation on $\mathbb{R}^n$;
xi) MalgrangeEhrenpreis theorem; xii) Hormander-Lojasiewicz theorem.

Speaker: **Ruoyu Wang**
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5pm - Drayton House B03 Ricardo LT