University of North Texas

Logic and Dynamics Seminar

Presents

Julia Romanowska

University of Warsaw

Friday, February 6 at 2:00 p.m. in GAB 461

Employment:
PhD student at the University of Warsaw

Education:
PhD studies in Mathematics (currently)
MSc in Mathematics (2013)
MSc in Computer Science (2011)
BSc in Mathematics (2010)

Current Research:
Weierstrass function, fractal geometry and complex networks

Interests and Activities:
Hiking, scuba diving, and music

Homepage:
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Julia Romanowska

A post-lecture reception with cookies, coffee, and tea will be held at 3:30 p.m. in the General Academic Building, Room 472.

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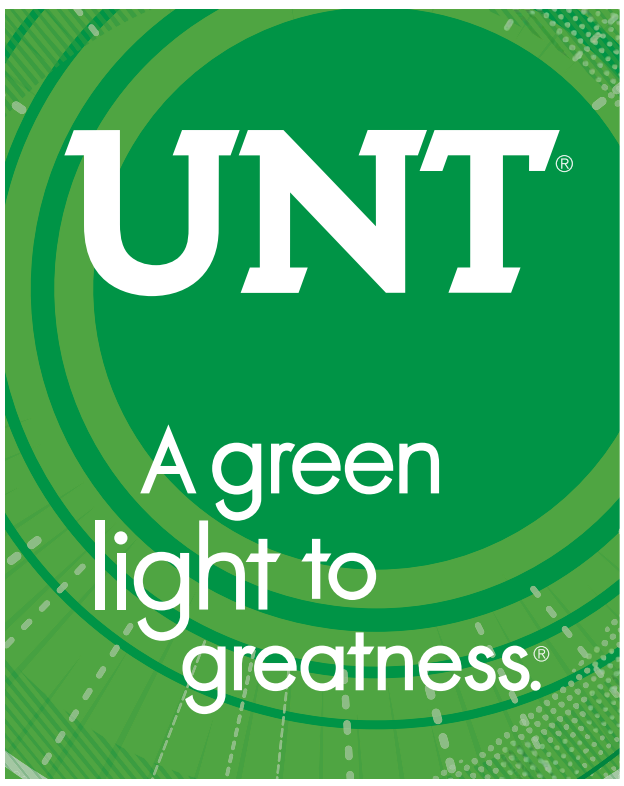

Classical Weierstrass Function

In my talk I will examine dimension of the graph of the famous Weierstrass non-differentiable function

$$W_{\lambda,b}(x) = \sum_{n=0}^{\infty} \lambda^n \cos(2\pi b^n x)$$

for an integer $b \geq 2$ and $1/b < \lambda < 1$. In our recent paper, together with Balázs Bárány and Krysztof Barański, we prove that for every b there exists (explicitly given) $\lambda_b \in (1/b, 1)$ such that the Hausdorff dimension of the graph of $W_{\lambda,b}$ is equal to $D = 2 + \frac{\log \lambda}{\log b}$ for every $\lambda \in (\lambda\, b\, , 1)$. We also show that the dimension is equal to D for almost every λ on some larger interval. This partially solves a well-known thirty-year-old conjecture. Furthermore, we prove that the Hausdorff dimension of the graph of the function

$$f(x) = \sum_{n=0}^{\infty} \lambda^n \phi(b^n x)$$

for an integer $b \geq 2$ and $1/b < \lambda < 1$ is equal to D for a typical Z-periodic C^3 function ϕ. In my talk I will talk about these results as well as I will introduce Ledrappier-Young theory and results of Tsujii, which were used in the proofs.