*Eighth Workshop Dynamical Systems Applied*
*to Biology and Natural Sciences DSABNS 2017*
*Évora, Portugal, January 31st - February 3rd, 2017*

# NEW INSIGHTS INTO MATHEMATICS OF IMMUNE RESPONSES

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Immune system is characterised by complex interactions between a large number of different constituents contributing to various types of immune response. Major problems occur when an immune response to viral infections results in the subsequent breakdown of immune tolerance and onset of *autoimmunity*, where immune system is attacking host's own healthy cells. In this talk I will discuss a model of autoimmune dynamics [1, 2] with T cells having different activation thresholds that can explain different types of immune response. I will also show some recent results on the role of cytokines in multi-stability between different steady states and periodic solutions [3], and discuss the influence of stochastic effects on autoimmune dynamics [4].

## References

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[3] F. Fatehi, Y.N. Kyrychko, K.B. Blyuss. (2016). *Dynamics of interactions between regulatory T cells and cytokines in autoimmunity*. Submitted.

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 ISBN: 978-989-98750-3-6