

A. K. CHATTOPADHYAY

## A Mathematical Model of Immunology

*Aston University, Non-linearity and Complexity Research Group,  
Birmingham, UK*

*E-mail: A.K.Chattopadhyay@aston.ac.uk*

In this work [1], we discuss the response of a virus activated mammalian immune system. Based on a model of two thermally interacting membranes, we calculate the strength of the chemical bond (immunological synapse) formed between the body defence cell (T-cell) and the external pathogen as a function of the system parameters, the interaction being mediated by other co-receptor molecules. Results obtained from our theoretical model indicate that the cell:cell contact interfaces are on a nanometer scale, the corresponding density decaying with increasing membrane-membrane separation. The interaction time scales, of the order of a few hours, also agree with biological observations.

[1] A. K. Chattopadhyay & N. Burroughs, *Europhysics Letters*, **77**, 48003 (2007).