Activity Report

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First of all my sincere thanks to IMU for providing me with this opportunity. My visit to New Zealand has been a success in terms of research collaboration. I worked with my collaborators Prof. Graeme Wake and Prof. Bruce van Brunt at Massey University, New Zealand. Following are the details of the research projects we collaborated on:

1. The work on the extension of our earlier paper [**?**] to the case of asymmetric cell division with exponential growth rate was completed. We have got interesting results, which are different from the symmetric cell division case. I am writing up a paper on this project, which is close to submission.

2. We have also completed work on the extension of Hall and Wake's work [**?**] to the case of monomial growth rate of cells. It is of biological significance. We have solved an initial boundary value problem entailing a first order functional PDE with variable coefficients.

3. We have also completed work on the extension of our earlier paper [**?**] by considering stochastic growth rate of cells. This leads to a second order modified Fokker Planck equation with a functional term. We have obtained interesting results which show that adding dispersion changes the long time dynamics of the problem.

4. The work on the extension of van-brunt *et al.* [**?**] to the case of stochastic growth rate of cells also came under discussion. We have made progress in this case as well. It is near completion.

5. We have also made progress on the extension of van-Brunt *et al.* [**?**] to the case of asymmetric division of cells. Progress has been made on this. It is also near completion.

6. We also considered the biologically significant case involving "logisitic" type growth function. We have made some progress on this too and it is work under progress.

References

[1] van-Brunt B, Almalki A, Lynch T, Zaidi AA. On a cell division equation with a linear growth rate. ANZIAM J. 2018; **59**: 293-312

[2] Hall AJ, Wake GC. A functional differential equation arising in modelling of cell growth. J. Aust. Math. Soc. Ser. B. 1989; **30**: 424-435.

[3] van-Brunt B, Gul S, Wake GC. A cell growth model adapted for the minimum cell size division, ANZIAM J. 2015; **57**: 138-149.