



ACTIVITY REPORTING FORM
For CDC GRANTS PROGRAM
IMU Simons African Fellowship Program

Name of Grantee: **Dr. Alexis NANGUE**

Home Institution and Country of Grantee: **University of Maroua, Maroua, Cameroon**

Name of the Host: **Prof. Dr. Alan D. Rendall**

Name of the Host Institution and Country: **Institute of Mathematics, Johannes
Gutenberg University of Mainz, Mainz, Germany**

Topic of the Research Activity: **Oscillations and other qualitative features in virus dynamics**

Dates spent Center/Host Institution: **15 April– 15 May 2022 (01 month)**

Initially scheduled for October 2020, this research visit has been postponed several times due to the Corona virus pandemic. However, in the meantime, work has begun on the project, the first results have been published in the International Journal of Biomathematics. The article is titled: Analysis of an initial value problem for an extracellular and intracellular model of hepatitis C virus infection (<https://doi.org/10.1142/S1793524522500413>). During the present research visit it was a question of trying to extend the results of the previous article. We were therefore able for the extracellular and intracellular model of hepatitis C proposed in the last article, to have the following results: the existence of a Hopf bifurcation, the existence of periodic solutions, the existence of a forward bifurcation, the non-existence of a backward bifurcation and the existence of third boundary equilibrium point. Work is continuing for a possible publication of the results obtained. On April 29, 2022, I gave a talk on the theme: "Global analysis of a spatiotemporal cellular model for the transmission of hepatitis C virus with Hattaf-Yousfi functional response", during the weekly Analysis seminar of the Institute of Mathematics. The visit allowed me to meet many other researchers, especially: Dr. Burcu Gürbüz, who is currently on a postdoc position at the Institute of Mathematics, Johannes-Gutenberg-Universität Mainz, and also Dr. Cordula Reisch, TU Braunschweig, Institute for Partial Differential Equations, who gave a very interesting talk on the topic: "Modeling liver infections with Reaction-Diffusion Equations", during the weekly Analysis seminar of the Institute of Mathematics. I discussed a lot with Dr. Burcu Gürbüz, and Dr. Cordula Reisch with the aim of setting up a possible scientific collaboration between us and between the PhD students of our different institutions. I and Dr. Cordula Reisch have tried to see how we can unify our two ways of modeling viral infections, for instance hepatitis B and hepatitis C to improve the understanding of certain infections and consequently find adequate strategies for the control of these infections.

Other visits have been planned for the near future with the aim of intensifying my collaboration with Pr. Alan D. Rendall and planning joint supervision of Doctorates theses with students from my institution.

With my signature I agree that my Activity Report and pictures can be published on the CDC website.

Date: Maroua 23/05/2022

Signature:





