UNIVERSITY OF CAPE TOWN

Department of Mathematics and Applied Mathematics

University of Cape Town • Rondebosch 7701 • South Africa
TEL: +27-(0)21-650-3191/2 • FAX: +27-(0)21-650-2334
EMAIL: admin@maths.uct.ac.za • TELEX: 5-22208 UCTAD SA
WEB SITE: http://www.mth.uct.ac.za

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Biocomplexity Faculty Search
c/o C. Howard
Department of Physics
Indiana University
Swain West 117
727 East 3rd Street
Bloomington, IN 47405-7105
USA

Dear Professor de Ruyter

Confidential
Referee's Report: Dr G. Q. Witten

I have known Dr Witten since 1995 when he started a postgraduate research programme in this Department. I was supervisor of his PhD studies and we have collaborated on research in Bio-Mathematics/Theoretical Biology especially in the modelling of metabolism and ecological processes.

Dr Witten's research has involved using mathematical techniques to integrate data from many experiments to develop realistic and accurate models of specific systems. His work on modelling ruminant digestion and metabolism within specific organs and tissues has increased our understanding of how animals adapt to and recover from undernutrition. Subsequently, paediatricians have expressed interest in the relevance of this work to child development.

A significant aspect of his research is the development of models that integrate information across time and spatial scales and between levels of the system. His present work on modelling the immune system involves the very rapid responses at the cellular level and the development of either immunity or disease in the whole body. His approach is such that the immunological models may link to epidemiological studies. His recent research on a model of HIV and the immune system based on the results of experimentation at the cellular level has shown why one potential AIDS vaccine could not work. This model may now be used in the design of future research programmes.

His interests and expertise are wide and he has also developed models of ecosystems that range from the microbial population of the digestive system to whole arid landscapes. Dr Witten's research has demonstrated the substantial role that the interaction between Mathematics and the Biological Sciences can play in research and development. He has the ability to quickly understand the concepts involved in many branches of science and how mathematics may be used to increase

our understanding. The quality of his research is such that he was a finalist at the National Science and Technology Forum Awards in South Africa for young scientists.

His considerable ability in teaching mathematics at University level has been recognised as he has twice been nominated for the distinguished teaching award at this University. His enthusiasm for his approach to mathematics and is infectious and his students have been inspired to undertake further studies in Applied Mathematics. He has the drive and ability to forge and maintain productive links with academics and scientists in many different countries. For example, he was instrumental in developing a joint PhD project with West Africa countries and France to be funded by IRD. He is also responsible for the African node of the Santa Fe Institute and reviews applications for fellowships at the Institute from Africa.

Dr Witten has played a substantial leadership role in the development of Biomathematics in South Africa. At present he supervises students in mathematical biology at the African Institute of Mathematical Sciences. He has been responsible for the establishment of the SA Biomathematics network and the Biomathematics sessions at the annual conference of the Society for Applied and Numerical Mathematics.

I can confidently recommend him for the appointment as Assistant Professor in Biocomplexity at Indiana University.

Yours Sincerely

F.D. Richardson

Dr F.D. Richardson
Honorary Research Associate

E-Mail fdr@uctvms.uct.ac.za
fd.rich@mweb.co.za

Home: + 27 21 852 4833
Fax: + 27 21 650 2334