Vacancy

The Netherlands Institute for Systems Biology (NISB) and Centrum Wiskunde & Informatica (CWI) invite applications for the position of a

PhD position (OIO): *Cell-based modeling of* in vitro *angiogenesis: role of tip cell selection, cross-talk between diffusive and contact-dependent signaling, and endothelial cell-matrix interactions.*

The opening is a research position within the field of **computational biology**

Research background
Angiogenesis, the outgrowth of sprouts from existing blood vessels, is essential for many biomedical phenomena, including tumor growth and tissue engineering. A detailed understanding of its mechanisms will help identify specific targets for therapeutical intervention. The key players of angiogenesis are endothelial cells (ECs), the cells lining the inner walls of mature blood vessels, and the surrounding matrix proteins. We have previously built simple models of the ECs' self-organization into angiogenic sprouts. In this project we aim to refine our understanding of angiogenic sprouting, by including the selection of "tip cells"—the leading cells of blood vessel sprouts—and the interactions between the ECs and the protein matrix they live in. The final goal of this project is to develop a multiscale, explanatory model of angiogenesis.

Job description
You will further develop and analyze cell-based models of angiogenesis and, depending on your interest, validate the cell-based models using mean-field approaches. Techniques include ordinary differential equations (ECs' regulatory networks), the Cellular Potts Model (cell behavior) and PDEs (protein matrix). Model insights and predictions will be interpreted and validated in close collaboration with our experimental collaborators.

Location
The work will be embedded in the Biomodeling and Biosystems Analysis group of the Netherlands Institute for Systems Biology (NISB) and within the Life Sciences group of the Center for Mathematics and Computer Science (CWI) in Amsterdam. As the "core modeling group" of the Netherlands Consortium for Systems Biology, the Biomodeling and Biosystems Analysis group develops quantitative and predictive models and multiscale computer simulations in collaboration with systems biology groups at participating institutes.

Profile
Candidates ideally fulfill the following criteria:

- M.Sc. in theoretical biology, computer science, mathematics or a related discipline
- able to communicate with scientists in biology and mathematics
- good programming skills in C++ and Python or equivalent

Conditions of employment
The vacancy concerns a temporary research position for four years. The salary and terms of employment are in accordance with the "CAO-onderzoekinstellingen". Besides the salary, CWI offers attractive and flexible terms of employment, like a collective health insurance, pension-fund, and initial help with housing for foreigners.

Websites
http://www.sysbio.nl and http://www.cwi.nl

Applications and requests for information
Direct requests for information or applications **before 1 December 2008** to:

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Center for Mathematics and Computer Science (CWI) and Netherlands Institute for Systems Biology (NISB)
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Applications should include a **motivation letter**, a curriculum vitae, list of publications, and the names and addresses of at least two persons that can be approached to obtain further information.

Closing time
1 December 2008

Literature
Roeland M. H. Merks, Sergey V. Brodsky, Michael S. Goligorksy, Stuart A. Newman, James A. Glazier (2006). Cell elongation is key to in silico replication of in vitro vasculogenesis and subsequent remodeling. *Developmental Biology* 289, 44-54. doi:10.1016/j.ydbio.2005.10.003

Roeland M. H. Merks, Erica D Perryn, Abbas Shirinifard, James A Glazier (2008). Contact-inhibited chemotaxis in de novo and sprouting blood-vessel growth. *PloS Computational Biology* 4 (9), e1000163. doi: 10.1371/journal.pcbi.1000163