Reinhart-Heinrich Doctoral Thesis Award 2008

During the last year, until the required date October 31, 2008, the awarding committee obtained the applications from **14 young scientists**, who had recently finished their PhD thesis. The committee is impressed by the quantity and quality of the received applications. Again, the theses represent a broad and interesting range of actual research topics in our growing field of Mathematical and Theoretical Biology.

The committee pre-selected six candidates, whose complete theses then served as the basis for nominating an ordered list of up to 3 best candidates by each member of the committee. The ranking produced a unique ordering of the best three theses, so that the **awarding committee has the honor to declare**

- *Thomas MAIWALD (Germany)*

as winner of the Reinhart-Heinrich Doctoral Thesis Award 2008

The following next best theses were sent by
- *Michel DURINX (Belgium)*
- *Antti TANSKANEN (Finland)*

Please, read below the brief "laudationes" for each of these three young scientists and, further down, their thesis summaries. The other three pre-selected candidates were

- *Fernando PERUANI*
  (Argentina/Germany/France)
  see the abstract in *ECMTB#10, p. 22*
- *Philip GERLEE (Sweden)*
- *Sheta BANSAL (U.S.A.)*

Thanks to all for their gentle cooperativity!

Thomas MAIWALD
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Dynamical Modeling of Biological Systems

Advisors: Jens Timmer, A. Blumen (Freiburg)

This is a very impressive thesis with a large amount of detailed work and a very broad scope within modern Systems Biology. A lot of good old ideas are put together into a functioning framework of model supported data analysis. In particular, as the most impressive piece of work, Thomas Maiwald manages to develop (and describe) a comprehensive computer tool (Potters wheel) together with the underlying mathematical concepts and convincing applications. Moreover, he specifies this into a mathematical model for a typical biological process, namely the dynamics of the *TGFbeta* pathway. The strong advantage compared to the other theses is that he really uses experimental data to support his model and to estimate

parameters. This allows him to discuss subtleties of the model in detail and to extract conclusions, which would not be possible otherwise. We see here a very convincing example for the frequently demanded mutual interaction between experiment and modeling.

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Michel DURINX
michel.durinx@gmail.com

Life amidst Singularities

Advisors:
J.A.J. Metz, T.J.M von Dooren (Leiden)

Michal Durinx presents a thesis with really excellent results on adaptive dynamics along the lines of the theory that has been developed by the Metz school. He describes the dynamics of interacting and physiologically structured populations. Although heavily dealing with mathematics, he manages to explain concepts and mathematical derivations in a clear way and, moreover, to present results also in an artistic and sometimes humoristic way. One would have liked to see more comparison to experimental ("real world") data, but this might be hard to obtain within the usual framework of evolutionary ecology.

Antti Juho TANSKANEN
Antti.Tanskanen@iki.fi

Mathematical Models on the Impact of Noise and Dyadic Molecular Structures on the Properties of a Cardiac Myocyte

Advisors:
Mats Gyllenberg, Elja Arjas (Helsiniki)

Antti Juho Tanskanen offers significant contributions to help elucidate the impact of noise in calcium-induced calcium release and other noise sources on cardiac functioning and its medical consequences (for example, on polymorphic tachycardia) using a fruitful interplay between mathematical theory, simulations and experimental results. The thesis presents and induces a real understanding of the area. Moreover, originating from it, an impressive set of papers has appeared.

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