

# Algebraic Biology

## Conference Program

July 2–4, 2007

The Castle of Hagenberg, Austria

### Monday, July 2

- 07:30 Bus from Sommerhaus to Arcotel.  
07:45 Bus from Arcotel to Hagenberg.  
08:15-08:30 Opening.

#### Session 1

Chair: *Bruno Buchberger*

- 08:30-09:30 Invited Talk. Algebraic Systems Biology: Theses and Hypotheses.  
*Bud Mishra.*
- 09:30-10:00 Algorithmic Algebraic Model Checking IV: Characterization of Metabolic Networks.  
*Venkatesh Mysore and Bud Mishra.*
- 10:00-10:15 Coffee break.

#### Session 2

Chair: *René Vestergaard*

- 10:15-10:45 Translating Time-course Gene Expression Profiles into Semi-Algebraic Hybrid Automata via Dimension Reduction.  
*Alberto Casagrande, Kevin Casey, Rachele Falchi, Carla Piazza, Benedetto Rupert, Giannina Vizzotto, Bud Mishra.*
- 10:45-11:15 On Proving the Absence of Oscillations in Models of Genetic Circuits.  
*François Boulier, Marc Lefranc, François Lemaire, Pierre-Emmanuel Morant, Asli Ürgüplü.*
- 11:15-11:45 Attenuation Regulation as a Term Rewriting System.  
*Eugene Asarin, Thierry Cachat, Alexander Seliverstov, Tayssir Touili, Vassily Lyubetsky.*
- 11:45-13:15 Lunch break.

### Session 3

Chair: *Manfred Minimair*

- 13:15-13:45 Glucose-Insulin Control of Type1 Diabetic Patients in  $H_2/H_\infty$  Space via Computer Algebra.  
*Levente Kovács, Belá Paláncz.*
- 13:45-14:15 Exact Parameter Determination for Parkinson's Disease Diagnosis with PET Using an Algebraic Approach.  
*Hiroshi Yoshida, Koji Nakagawa, Hirokazu Anai, Katsuhisa Horimoto.*
- 14:15-14:30 Coffee break.

### Session 4 (Tutorials)

Chair: *Bruno Buchberger*

- 14:30-15:10 Quantified Constraint Solving and Biology.  
*Hoon Hong.*
- 15:10-15:50 Inference of Protein-Protein Interactions by Using Co-evolutionary Information.  
*Tetsuya Sato, Yoshihiro Yamanishi, Katsuhisa Horimoto, Minoru Kanehisa, Hiroyuki Toh.*
- 15:50-16:05 Coffee break.

### Session 5 (Tutorials)

Chair: *Carolyn Talcott*

- 16:05-16:45 A Short Survey of Automated Reasoning.  
*John Harrison.*
- 16:45-17:25 Inference of Complex Regulatory Network for the Cell Cycle System in *Saccharomyces cerevisiae*.  
*Sachiyo Aburatani.*
- 18:00-20:00 Reception.  
20:15 Bus from Hagenberg to Linz (Sommerhaus/Arcotel).

## Tuesday, July 3.

07:45 Bus from Sommerhaus to Arcotel.  
08:00 Bus from Arcotel to Hagenberg.

### Session 6

Chair: *Katsuhisa Horimoto*  
08:30-09:30 Invited Talk. Discrete Models of Biochemical Networks: The Toric Variety of Nested Canalizing Functions.  
*Abdul S. Jarrah, Reinhard Laubenbacher.*  
09:30-10:00 Efficient Haplotype Inference with Pseudo-Boolean Optimization.  
*Ana Graça, João Marques-Silva, Inês Lynce, Arlindo L. Oliveira.*  
10:00-10:15 Coffee break.

### Session 7

Chair: *Hiroshi Yoshida*  
10:15-10:45 An Algebraic Algorithm for the Identification of Glass Networks with Periodic Orbits along Cyclic Attractors.  
*Igor Zinovik, Daniel Kroening and Yury Chebiryak.*  
10:45-11:15 Analyzing Biological Pathways using SAT-based Approaches.  
*Ashish Tiwari, Carolyn Talcott, Merrill Knapp, Patrick Lincoln, Keith Laderoute.*  
11:15-11:45 Relating Attractors and Singular Steady States in the Logical Analysis of Bioregulatory Networks  
*Heike Siebert, Alexander Bockmayr.*  
11:45-13:15 Lunch break.

### Session 8

Chair: *François Boulter*  
13:15-13:45 Cascaded Games.  
*Jittisak Senachak, Mun'delanji Vestergaard, René Vestergaard.*  
13:45-14:15 On Differential Algebraic Decision Methods for the Estimation of Anaerobic Digestion Models.  
*Elena Chorukova, Sette Diop, Ivan Simeonov.*  
14:15-14:30 Coffee break.

### **Session 9 (Tutorials)**

Chair: *Hiroyuki Toh*

- 14:30-15:10 Manifestation and Exploitation of Invariants in Bioinformatics.  
*Limsoon Wong.*
- 15:10-15:50 Towards a Statistical Definition of a Species in Terms of Probabilities of Conspecificity, with Examples Drawn from the Study of African Plio-Pleistocene Hominids.  
*Francis Thackeray.*
- 15:50-16:05 Coffee break.

### **Session 10 (Tutorials)**

Chair: *Hoon Hong*

- 16:05-16:45 New combinatorial results for words over four letters.  
*Veikko Keränen.*
- 17:00 Bus from Hagenberg to Linz (Sommerhaus/Arcotel).

## Wednesday, July 4.

07:45 Bus from Sommerhaus to Arcotel.  
08:00 Bus from Arcotel to Hagenberg.

### Session 11

Chair: *Hoon Hong*  
08:30-09:30 Invited Talk. Membrane Computing as a Framework for Bio-Modeling (An Informal Glimpse).  
*Gheorghe Pañ.*  
09:30-10:00 Protein Structure Prediction using Residual Dipolar Couplings.  
*Ioannis Z. Emiris, Sotirios I. Pantos.*  
10:00-10:15 Coffee break.

### Session 12

Chair: *Tayssir Touili*  
10:15-10:45 A Stochastic Pi-Calculus for Concurrent Objects.  
*Céline Kuttler, Cédric Lhoussaine, Joachim Niehren.*  
10:45-11:15 Modeling Static Biological Compartments with Beta-Binders.  
*Maria Luisa Guerriero, Corrado Priami, Alessandro Romanel.*  
11:15-11:45 Deducing Interactions in Partially Unspecified Biological Systems.  
*Paolo Baldan, Andrea Bracciali, Linda Brodo, Roberto Bruni.*  
11:45-13:15 Lunch break.

### Session 13

Chair: *Ruriko Yoshida*  
13:15-13:45 Reduction of Algebraic Parametric Systems by Rectification of their Affine Expanded Lie Symmetries.  
*Alexandre Sedoglavic.*  
13:45-14:15 Prefix Reversals on Binary and Ternary Strings.  
*Cor Hurkens, Leo van Iersel, Judith Keijsper, Leen Stougie, John Tromp, Steven Kelk.*  
14:15-14:45 Toric Ideals of Phylogenetic Invariants for the General Group-Based Model on Claw Trees  $K_{1,n}$ .  
*Sonja Petrović, Julia Chifman.*  
14:45-15:00 Coffee break.

## Session 14 (Tutorials)

Chair: *Katsuhisa Horimoto*

15:00-15:40 A Systematic Treatment of Growth Terms Appearing in Continuum Mechanics Formulations for Biological Materials.

*Hans Irschik.*

15:40-16:20 Harmonicity vs. Frustration in Protein Folding and Function.

*Nobuhiro Go.*

17:30 Bus from Hagenberg to Linz (Sommerhaus/Arcotel).

19:00-22:00 Conference dinner. Arcotel, Linz.

22:15 Bus to Hagenberg.