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# Algebraic Biology

Second International Conference, AB 2007  
Castle of Hagenberg, Austria, July 2-4, 2007  
Proceedings

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# Preface

This volume contains the proceedings of the 2nd International Conference on Algebraic Biology (AB2007). It was held during July 2–4, 2007 in the Castle of Hagenberg, Austria, and was organized by the Research Institute for Symbolic Computation (RISC) of the Johannes Kepler University, Linz.

Algebraic biology is the interdisciplinary forum for the presentation of research on all aspects of applications of symbolic computation (computer algebra, computational logic, and related methods) in biology. The first conference on algebraic biology (AB 2005) was held during November 28–30, 2005 in Tokyo, Japan.

The initiation of the series of algebraic biology conferences was motivated by the recent trends in symbolic computation and biology: In symbolic computation, the recent advances in computer performance and algorithmic methods have accelerated the extension of the scientific fields to which symbolic computation can be applied. In biology, the determination of complete genomic sequences and the subsequent improvements of experimental techniques have yielded large amounts of information about the biological molecules underlying various biological phenomena. Under these circumstances, the marriage of symbolic computation and biology is expected to generate new algebraic models for biological phenomena and new symbolic techniques for biological data analysis.

This remains the intended profile of the series of algebraic biology conferences, and it figured in the manuscripts published in AB 2007. The papers in the present volume are evidence of the healthy growth in the field of algebraic biology.

We received 40 submissions from 22 countries (Armenia, Australia, Bulgaria, Canada, Chile, France, Germany, Greece, Hungary, India, Italy, Japan, Portugal, Romania, Russia, Spain, South Africa, Switzerland, Taiwan, The Netherlands, UK, and USA), and 19 papers were accepted for publication. Each submission was assigned to at least three Program Committee members, who carefully reviewed the papers, in many cases with the help of external referees. The merits of the submissions were discussed by the Program Committee over one week through the Internet, by means of the EasyChair conference management system.

Besides the contributed papers, this volume also includes three invited papers, by Reinhard Laubenbacher (Discrete Models of Biochemical Networks: The Toric Variety of Nested Canalizing Functions), Bud Mishra (Algebraic Systems Biology: Theses and Hypotheses), and Gheorghe Paun (Membrane Computing as a Framework for Bio-Modeling).

The tutorial session of the conference provided an opportunity for scientists in symbolic computation and biology to come together and learn about each others' research problems and problem-solving techniques. The session consisted of five symbolic computation and five biology tutorials. Four tutorial speakers

submitted their papers to the proceedings. These papers are included in this volume.

We are pleased to start our collaboration with Springer, who agreed to publish the conference proceedings in the *Lecture Notes in Computer Science* series.

We, the AB Steering Committee, and the organizers of the conference, are grateful to the following sponsors for their financial contributions towards its operation and success: Austrian Grid, Linzer Hochschulfonds, MapleSoft, the National Institute of Advanced Industrial Science and Technology, Raiffeisen Landesbank Oberösterreich, RISC Software GmbH, Special Research Program SFB F013 of the Austrian Science Fund (FWF), and the Upper Austrian Government.

Our thanks are also due to the members of the Program Committee and the additional referees, and to those who ensured the effective running of the conference.

July 2007

Hirokazu Anai  
Bruno Buchberger  
Hoon Hong  
Katsuhisa Horimoto  
Temur Kutsia

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Reinhard Laubenbacher	Virginia Bioinformatics Institute, USA
Bud Mishra	New York University, USA
Gheorghe Păun	Institute of Mathematics, Romanian Academy, Romania

## Tutorial Speakers

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