Preface

This volume contains the *Late Breaking Papers* of *ILP 2013: the 23rd International Conference on Inductive Logic Programming* held on August 28-30, 2014 in Rio de Janeiro, Brazil. The ILP conference series, started in 1991, is the premier international forum on learning from structured data. Originally focusing on the induction of logic programs, it broadened its scope and attracted a lot of attention and interest in recent years. The conference now focuses on all aspects of learning in logic, multi-relational learning and data mining, statistical relational learning, graph and tree mining, relational reinforcement learning, and other forms of learning from structured data.

This edition of the conference solicited three types of submissions:

1. long papers (12 pages) describing original mature work containing appropriate experimental evaluation and/or representing a self-contained theoretical contribution.
2. short papers (6 pages) describing original work in progress, brief accounts of original ideas without conclusive experimental evaluation, and other relevant work of potentially high scientific interest but not yet qualifying for the above category.
3. papers relevant to the conference topics and recently published or accepted for publication by a first-class conference such as ECML/PKDD, ICML, KDD, ICDM, etc., or journals such as MLJ, DMKD, JMLR, etc.

We received 42 submissions, 18 long, 21 short submissions, and 3 previously published papers. Each submission was reviewed by at least 3 program committee members. The short papers were evaluated on the basis of both the submitted manuscript and the presentation at the conference. Accepted papers presenting work in progress, i.e., reports on ongoing research are collected in this volume.

The conference program included 3 invited talks. Professor Jure Leskovec introduced on-going work on *Exploring the Structure of On-Line Networks and Communities*. Social interactions of hundreds of millions of people on the Web create massive digital traces, which can naturally be represented, studied and analyzed as massive networks of interactions. By computationally analyzing such network data we can study phenomena that were once essentially invisible to us: the social interactions and collective behavior of hundreds of millions of people. In his talk he discussed how computational perspectives and mathematical models can be developed to abstract online social phenomena like: How will a community or a social network evolve in the future? What are emerging ideas and trends in the network? How does information flow and mutate as it is passed from a node to node like an epidemic?

Professor Hendrik Blockeel discussed *Lifted variable elimination: faster correct inference in probabilistic-logical models*. He started from an intriguing observation, that first-order logic allows inference on the level of variables, that is, we can reason about an object's properties without knowing the object. This boosts inference efficiency. It is not yet clear to what extent probabilistic inference can, similarly, be "lifted" to the level of logical variables. In recent years,

many results have been obtained that contribute towards solving this question. A number of them were discussed in his talk, focusing on intuition rather than technical detail. He discussed how variable elimination, perhaps the simplest approach to probabilistic inference, can be lifted by identifying and exploiting particular kinds of symmetry in a probabilistic-logical model. He also discussed a number of theoretical and experimental results, both positive and negative, that provide insight into the circumstances under which lifting is (not) possible.

Professor William W. Cohen discussed *Learning to Construct and Reason with a Large Knowledge Base of Extracted Information*. Carnegie Mellon University's "Never Ending Language Learner" (NELL) has been running for over three years, and has automatically extracted from the web millions of facts concerning hundreds of thousands of entities and thousands of concepts. NELL works by coupling together many interrelated large-scale semi-supervised learning problems. In this talk he discussed some of the technical problems the group encountered in building NELL, and some of the issues involved in reasoning with this sort of large, diverse, and imperfect knowledge base. Professor Cohen presented joint work with Tom Mitchell, Ni Lao, William Wang, and many other colleagues.

The General Chair was Gerson Zaverucha, the Program Chairs were Gerson Zaverucha and Vítor Santos Costa, and the Local Chair was Aline Marins Paes. We would like to thank the guest speakers for coming to ILP'13 and for their availability during the Conference. The conference was kindly sponsored by FAPERJ, the Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro through grant E-26/101.541/2010. The Universidade Federal do Rio de Janeiro (UFRJ) generously supported ILP'13 by allowing us to use the conference venue, Casa da Ciência. We would like to thank its helpful staff: Camila Costa, Angela Monteiro and Claudia Pereira. We would like to thank Maria de Fatima Cruz Marques for her valuable suggestions. Vítor Santos Costa was supported by the grant SIBILA, NORTE-07-0124-FEDER-000059, and the FCT grants ADE, PTDC/EIA-EIA/121686/2010, and ABLe, PTDC/EEI-SII/2094/2012 (FCOMP-01-0124-FEDER-029010). The Machine Learning journal supported research in this area by opening a special number on ILP'13. Springer Verlag will publish the ILP'13 main proceedings, and CEUR is publishing the late breaking papers. We would like to thank Easychair.org for supporting submission handling. Last, but not least, we would like to thank the Local Organizing Committee: Kate Revoredo and Fernanda Baião helped throughout in the organization, and Roosevelt Sardinha created and maintained the web-site.

June, 2014
Rio de Janeiro and Porto

Gerson Zaverucha
Vítor Santos Costa
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