Advances in Modal Logic

Volume 14

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Edited by

David Fernández-Duque

Alessandra Palmigiano

and

Sophie Pinchinat

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Preface

Advances in Modal Logic (AiML) was initiated in 1995 and aims at providing a venue in which the state of the art of modal logic and its many applications may be regularly presented. It consists of a series of conferences and their respective volumes of proceedings. AiML is the main international forum at which research on all aspects of modal logic is presented. The first installment was held in 1996 in Berlin, Germany, and since then it has been organized biennially, with meetings in 1998 in Uppsala, Sweden; in 2000 in Leipzig, Germany (jointly with ICTL 2000); in 2002 in Toulouse, France; in 2004 in Manchester, UK; in 2006 in Noosa, Australia; in 2008 in Nancy, France; in 2010 in Moscow, Russia; in 2012 in Copenhagen, Denmark; in 2014 in Groningen, The Netherlands; in 2016 in Budapest, Hungary; in 2018 in Bern, Switzerland (Jointly with LATD 2018); and in 2020, organized virtually by the University of Helsinki, Finland, due to the exceptional circumstances of the COVID pandemic. Information about AiML and related events, including conference proceedings, is available at the website `www.aiml.net`.

The fourteenth conference in the series was was organized at the University of Rennes, France, by Sophie Pinchinat (IRISA), with the assistance of Sophie Maupilé, Aurélie Amet, Guillaume Aucher, Dylan Bellier, Frédéric Bouvet, Lénaïg Cornanguer, Catherine Jacques-Orban, Antoine L'Azou, Pierre Le Scornet, Hervé Marchand, Nicolas Markey, Alexandre Terefenko and Adrien Thomas. It was held jointly with LAMAS&SR 2022. Due to loosening of the COVID restrictions and improvements in the status of the pandemic, AiML 2022 was held as a mostly in-person conference with assistance for participants who could only attend virtually. The conference website can be found at `https://aiml2022.irisa.fr/`.

This volume contains abstracts of invited talks and contributed papers from the conference. The invited talks were given by

- Willem Conradie (University of the Witwatersrand)
- Wesley Holliday (Univeristy of California, Berkeley)
- Francesca Poggiolesi (CNRS, IHPST)
- Rineke Verbrugge (University of Groningen)

The Programme Committee received 54 regular paper submissions. Of these, 35 were selected for this volume by a reviewing process where every paper received at least three independent expert reviews. The volume includes papers on propositional modal logics, their products, predicate modal logics, temporal and epistemic reasoning, modal logic with non-boolean basis, provability

and interpretability logics, inquisitive, dynamic, connexive, intuitionistic, substructural, dependence logics and hybrid logics, and other related logics. The topics include history of modal reasoning, decidability and complexity results, proof theory, model theory, interpolation, as well as other related problems in algebraic logic.

In addition, there were 28 submissions for short presentations at the conference, and 19 were accepted for presentation.

The members of the Programme Committee for the conference were

- Erman Acar, VU Amsterdam
- Bahareh Afshari, University of Amsterdam
- Natasha Alechina, University of Utrecht
- Steve Awodey, Carnegie Mellon
- Philippe Balbiani, CNRS, Toulouse University
- Marta Bilkova, Academy of Sciences of the Czech Republic
- Xavier Caicedo, University of los Andes
- Walter Carnielli, State University of Campinas
- Agata Ciabattoni, TU Wien
- Ivano Ciardelli, University of Munich
- Willem Conradie, University of the Witwatersrand
- Laurent De Rudder, University of Liege
- Tommaso Flaminio, Spanish National Research Council
- Sabine Frittella, INSA Centre Val de Loire
- Nick Galatos, University of Denver
- Sam van Gool, IRIF, Université de Paris
- Giuseppe Greco, VU Amsterdam
- Thomas Icard, Stanford University
- Ramon Jansana, University of Barcelona
- Peter Jipsen, Chapman University
- Joost Joosten, University of Barcelona
- Stanislav Kikot, Sber Automotive Technologies
- Philip Kremer, University of Toronto
- Alexander Kurz, Chapman University
- Roman Kuznets, TU Wien
- Fei Liang, University of Shandong
- Minghui Ma, Sun Yat-Sen University, Guangzhou
- Morteza Moniri, Shahid Beheshti University
- Tommaso Moraschini, University of Barcelona
- Drew Moshier, Chapman University, Orange CA

- Eric Pacuit, University of Maryland
- Fedor Pakhomov, Ghent University
- Sophie Pinchinat, IRISA, University of Rennes I
- Daniele Porello, University of Genova
- Vit Puncochar, Academy of Sciences of the Czech Republic
- Revantha Ramanayake, University of Groningen
- Christian Retoré, University of Montpellier
- Umberto Rivieccio, Universidade Federal do Rio Grande do Norte
- Claudette Robinson, University of Johannesburg
- Gabriel Sandu, University of Helsinki
- Igor Sedlar, Academy of Sciences of the Czech Republic
- Ilya Shapirovsky, New Mexico State University
- Apostolos Tzimoulis, VU Amsterdam
- Sara Uckelman, Durham University
- Jouko Väänänen, University of Helsinki
- Heinrich Wansing, University of Bochum
- Frank Wolter, University of Liverpool

The Programme Committee was chaired by

- David Fernández-Duque (ICS of the Czech Academy of Sciences and Ghent University)
- Alessandra Palmigiano (VU Amsterdam and University of Johannesburg)

The Steering Committee of AiML for 2018–2020 consisted of

- Lev Beklemishev (Steklov Mathematical Institute)
- Guram Bezhanishvili (New Mexico State University)
- Rajeev Goré (Australian National University)
- Giovanna D'Agostino (University of Udine)
- Stéphane Demri (CNRS, France)
- Agi Kurucz (King's College London)
- Sara Negri (University of Helsinki) (local organizer AiML 2020)
- Nicola Olivetti (Aix-Marseille University)
- Rineke Verbrugge (University of Groningen)

Many other people assisted with the reviewing process, including: Dylan Bellier, Luca Carai, Davide Catta, Diana Costa, Andrew Craig, Tiziano Dalmonte, Andrea De Domenico, Fabio De Martin Polo, Martín Diéguez, Ali Farjami, Davide Fazio, Raul Fervari, Damiano Fornasiere, David Gabelaia, Patrick Girard, Maksim Gladyshev, Quentin Gougeon, Gianluca Grilletti, Andreas Herzig, Loan Ho, Emil Jerábek, Alex Kavvos, Kohei Kishida, Daniil

Kozhemiachenko, Andrey Kudinov, Taishi Kurahashi, Timo Lang, Tim Lyon, Krishna Balajirao Manoorkar, Sérgio Marcelino, Brett McLean, Jérôme Mengin, Yoàv Montacute, Emery Neufeld, Mattia Panettiere, Xavier Parent, Pawel Pawlowski, Elaine Pimentel , Adam Prenosil, Renyan Feng, Mehrnoosh Sadrzadeh, Giorgio Sbardolini, Dmitry Shkatov, Daniel Skurt, Gavin St. John, Lutz Strassburger, Michal Stronkowski, Andrew Tedder, Bruno Teheux, Matteo Tesi, Sara Ugolini, Giovanni Varricchione, Kentaro Yamamoto, and Aybüke Özgün. We apologize to anyone whose name was inadvertently left off this list.

We are grateful to the organizers of the conference for bringing it to life despite the challenges that come with the pandemic, including the necessary arrangements for those participants who could not join us physically. We would like to thank the members of the Programme Committee and subreviewers for their time and effort and the thoughtful reports and discussion to ensure the highest scientific standards of the conference and its proceedings. We are also grateful to the authors for their excellent contributions and we thank Jane Spurr, without whom this volume would not have been possible. Special thanks go to Guram Bezhanishvili and Nicola Olivetti, for their invaluable advice throughout the preparation for our conference. We thank the IRISA staff, Sophie Maupilé, Antoine L'Azou, Catherine Jacques-Orban and Agnès Cottais for their help on the administrative, financial and communication tasks of the conference organization. Finally, we are tremendously grateful to Sophie Maupilé for closely assisting Sophie Pinchinat in coordinating the local organization of the conference, and to Pierre Le Scornet who was in charge of both the website of the conference and of the participants registration.

We would like to thank Inria, Université de Rennes 1, Rennes Métropole, Région Bretagne, Fondation Rennes 1, MDPI AG and Mitsubishi Electric R&D Centre Europe for generously sponsoring the conference, the Université de Rennes 1 for help in the organization and online facilities, and Inria for providing the conference rooms.

July 8th, 2022

David Fernández-Duque
Alessandra Palmigiano
Sophie Pinchinat