Editorial DEON 2020/2021 Special Issue

We are pleased to present this Special Issue of the *Journal of Logic and Computation*. The issue collects contributions that were first presented at the 15th International Conference 'Deontic Logic and Normative Systems' (DEON), which was organized by the Munich Center for Mathematical Philosophy at LMU Munich (Germany) and took place online in July 2021. The conference proceedings were published by College Publications as the third volume of their DEON series. All contributing authors and program committee members from the DEON conference were invited to submit a manuscript to this special issue. Authors were asked to revise and significantly extend their conference contributions, and each manuscript underwent regular peer-review according to the Journal's general policy. Of the nine papers submitted, five made it through that process and are presented in this issue.

DEON 2020/2021's special focus was on 'Norms in Social Perspective'. The social dimension plays a role in several prominent aspects of normative reasoning, from the adoption of norms in a community of agents to their argumentative evaluation, justification and update. Recent years have seen a growing body of literature on the role of groups, networks and interaction in normative reasoning, and the aim of DEON 2020/2021's special focus was to continue this positive trend by encouraging submissions that explore the application of deontic logic to this area. The papers collected in this issue respond both to the general themes of DEON and to the special theme of DEON 2020/2021.

In their contribution titled 'Consistency and Permission in Deontic Justification Logic', Faroldi, Ghari, Lehman and Studer focus on two key axioms that are known to collapse in Standard Deontic Logic:

(D) $\neg O\bot$
(NOC) $\neg(OA \wedge O\neg A)$

As Faroldi *et al.* show, the two axioms can be kept apart using the richer framework of Justification Logic, which has been interpreted in deontic logic terms in recent work by both these authors and others. Here, the counterpart of formulas OA in SDL are formulas $t : A$, where t represents a reason for A being obligatory. In particular, the authors compare two systems, JD and JNoC, obtained by adding termed counterparts of the above axioms to the core principles of justification logic. Depending on whether the constant specification is axiomatically appropriate, they study the relative strength of both systems. In addition, they consider a weaker system in which aggregation of terms is disabled, showing how this allows one to have (NOC) without (D), while still using an axiomatically appropriate constant specification. Finally, Faroldi *et al.* discuss an enrichment of their systems with a specific operator for strong permission that satisfies the free choice principle, and a corresponding extension of their justification semantics.

While Faroldi *et al.* include the reasons for obligations in the very object language of their formal-logical system, there is also a long-standing line of research that treats reasons and/or norms as the driving engine behind obligations and permissions, thus providing an operational semantics for deontic logic. Prominent examples of such work are Horty's *Reasons As Defaults* (OUP, 2014) and the work on Input/Output Logic following two seminal papers by Makinson and van der Torre. Pere Pardo and Christian Straßer's paper titled 'Modular Orders on Defaults in Formal Argumentation' can be seen as fitting into this tradition, and in particular as contributing to the comparison and unification of the various frameworks in it. Pardo and Straßer show how existing default logic accounts of reasoning on the basis of modularly ranked reasons (modeled as defaults) can be recaptured in terms of structured argumentation frameworks. This way they are able to explicate

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and bring under one umbrella different types of reasoning with defaults: the greedy style known from traditional default logic, Hansen's approach in terms of normative commitments and Brewka–Either's hypothetical reasoning.

In their paper 'Avoiding Pragmatic Oddity: a bottom-up Defeasible Deontic Logic', Governatori *et al.* introduce an extension of Defeasible Deontic Logic designed to address the Pragmatic Oddity paradox, a well-known challenge in Contrary-to-Duty (CTD) reasoning originally proposed by Prakken and Sergot. This new proposal builds upon an earlier version by Governatori and Rotolo, adhering to the same fundamental principles: (i) the Pragmatic Oddity problem must be resolved within a comprehensive logical framework for CTD reasoning; (ii) non-monotonic methods are necessary to handle CTD reasoning; and (iii) logical models for CTD reasoning should be computationally feasible and, ideally, efficient. The new model excels in several significant aspects. It offers a bottom-up characterization of the logic, effectively eliminating the issue of non-determinism associated with the top-down approach. Notably, the paper investigates the computational complexity of the problem and demonstrates that the resulting logic is computationally feasible, exhibiting polynomial time complexity in relation to the input theory's size. This provides valuable insights for the efficient implementation of the logic.

Notions of weak and strong permissions have been extensively discussed in recent years. Olszewski and Parent's paper 'Permissive and Regulative Norms in Deontic Logic' introduces a novel perspective on these concepts. The authors examine these notions from the viewpoint of input/output (I/O) logic. Conceptually, the paper is founded on a generalized notion of coherence, synthesizing insights from various studies in deontic logic. Technically, its major contributions comprise (i) an extension of the permission account initially proposed by Makinson and Van der Torre to encompass the entire family of I/O systems developed over the last two decades; (ii) a series of characterization results for strong permissions, established through the so-called non-repetition property; and finally, (iii) a new I/O logic that has not been previously explored. Interesting features of the logic include that it supports reasoning by cases, that the output is not closed under logical consequence and that it incorporates a built-in consistency check to filter out excess output. This novel logic is particularly well-suited for contrary-to-duty reasoning. Furthermore, the paper discusses the implications of all these findings for our understanding of the coherence of a normative system.

The foundational framework Bringing-It-About (BIAT) logic dissects actions in terms of their outcomes. In their paper 'Proof theory for the logics of bringing-it-about: ability, coalitions, and means-end relationship', Dalmonte, Grellois and Olivetti provide an extensive overview of BIAT extensions and establish their completeness within the context of bi-neighbourhood semantics. Subsequently, the authors give a proof-theoretical examination of these logics. The paper introduces hypersequent calculi for all these logics, demonstrating their soundness and syntactic properties, with a particular emphasis on the admissibility of the cut rule. As a result, they confirm their completeness concerning the axiomatization. Furthermore, the paper showcases that these calculi support terminating proof searches, thereby offering a practical decision procedure for the logics. To cap it off, the authors also reveal a method for extracting finite countermodels from a failed proof. This not only affirms the semantic completeness of the calculi but also establishes the finite model property of the logics in a constructive manner.

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