Preface

The flourishing of non-classical logics since the 1950s has had a tremendous impact on a wide scope of subjects not only in philosophy (including metaphysics, epistemology, ethics, and so on), but also in many related disciplines such as economics (including decision theory and game theory), cognitive science, computer science, and linguistics, to mention a few. Ever since then, a movement known as 'philosophical logic' has emerged, with a Russellian motto at its core: 'Logic is fundamental to philosophy'. On the other hand, a majority of philosophers believe that without philosophical import, logic is merely a collection of vacuous intelligence games. In the last few decades, more and more logicians and philosophers have devoted their research to a closer and stronger connection between logic and philosophy. In particular, more attention has been paid to the philosophical perspective of logic, and to the construction and application of logical frameworks for analyzing philosophical concepts and theorizing philosophical doctrines.

Following this tendency, many researchers in the Asian area have already been engaged in this movement. To promote mutual understanding and collaboration for future researchers in Asia on logic, a series of biennial conferences was established and held in Asian countries since 2012, known as the Asian Workshop on Philosophical Logic (AWPL).

Almost at the same time, we were awarded a funding from personal annual donation to establish a second series of biennial conferences, entitled the 'Taiwan Philosophical Logic Colloquium' (TPLC), based at the Department of Philosophy, National Taiwan University. The TPLC-series aims to provide a solid and accessible forum for dialogs amongst logic-minded philosophers and philosophically orientated logicians in the Asian and Australasian regions on a variety of significant issues from philosophical and/or logical perspectives. We hope that the establishment of TPLC and AWPL will promote the development of logic and analytic philosophy in the Asian area, especially philosophical logic.

The scope of the TPLC-series covers philosophical logic (in a broad sense), non-classical logics, algebraic logic, all kinds of semantics/logics relating to philosophical concepts (in metaphysics, epistemology, and philosophy of

language), philosophy of logic/mathematics, and their applications in computer science and cognitive science. It is dedicated to promoting both theoretical and empirical studies of logic (typically non-classical logics), with a close connection to some related disciplines, drawing on diverse methods and approaches from philosophy, computer science, mathematics, psychology, and linguistics.

This volume collects papers from the participants of the Second Taiwan Philosophical Colloquium (TPLC-2014) held during October 24–25, 2014. Though the topics are diverse, a majority of papers share two noticeable features in common: (i) the fundamental setting falls within the category of non-classical logics—modal logic, epistemic logic, logic of public announcement, logic of games, logic of truth-making, dynamic logics of speech acts, etc.; (ii) almost every paper involves, one way or the other, models of some sorts—ultraproducts, (causal) structural models, Kripke models, models for channel theory, and so on.

The title 'Structural Analysis of Non-Classical Logics' was suggested by Robert Goldblatt. It indicates implicitly that all authors have been working on the construction of various types of structures for non-classical logic of some sort. In doing so they provide analysis for the construction of various models as required in the framework they are working on. With an emphasis on the philosophical perspective, it therefore shows a somewhat dynamic aspect of constructing appropriate models for some desired non-classical logics.

In the opening chapter 'Semantical Approach to Cut Elimination and Subformula Property in Modal Logic', Hiroakira Ono discusses semantical study of cut elimination and subformula property in modal logics. A unified exposition is given for model-theoretic approach to finite model property, subformula property and cut elimination. At the same time, an attempt is made to clarify connections between model-theoretic and algebraic approaches to cut elimination.

Robert Goldblatt's 'Ultraproducts of Admissible Models for Quantified Modal Logic' (Chap. 2) continues work on models for quantified modal logic which have a restriction on which sets of worlds are admissible as propositions. In his 2011 book 'Quantifiers, Propositions and Identity', he showed that the problem of incompleteness of some such logics under their Kripkean possible-worlds semantics could be overcome, by showing that for any propositional modal logic S there is a quantificational proof system QS that is complete for validity in models whose algebra of admissible propositions validates S. In the present article he constructs ultraproducts of admissible models and uses them to derive compactness theorems that then combine with completeness to yield strong completeness: any QS-consistent set of formulas is satisfiable in a model whose admissible propositions validate S. The Barcan Formula is analyzed separately and shown to axiomatize certain logics that are strongly complete over admissible models in which the quantifiers are given their Kripkean actualist interpretation.

In 'Logic and/of Truthmaking' (Chap. 3), Jamin Asay addresses some basic questions about how truthmaker theory relates to various concerns in the philosophy of logic. He first defends truthmaker theory from Timothy Williamson's attack on it, showing how Williamson's logic-driven objections to truthmaker theory are unsuccessful. Then he explores some issues in the logic of the truthmaking relation

itself, arguing that theorists, when trying to understand the nature of the relation, have been attempting to reconcile what may be inconsistent desiderata.

Duen-Min Deng's chapter 'Structural Models for Williamson's Modal Epistemology' (Chap. 4) examines Williamson's (2007) counterfactual-based account of modal epistemology. Deng argues that Williamson's account faces two serious problems—the cotenability problem and the gap problem. As Deng diagnoses it, these problems somehow indicate that our standard way of understanding counterfactuals under the received possible-worlds semantics may have insufficient 'structures' to distinguish various constraints on our counterfactual thinking. The remedy, Deng suggests, is to invoke the 'structural semantics' as developed by Pearl (2009) and Halpern (2000). Based on this semantics, Deng offers some philosophical elucidation for various kinds of modality, and provides his own account of how our modal knowledge can be grounded in our knowledge of counterfactuals.

In 'Motivating the Causal Modeling Semantics of Counterfactuals, or, Why We Should Favor the Causal Modeling Semantics over the Possible-Worlds Semantics' (Chap. 5), Kok Yong Lee argues that, from the perspective of philosophical semantics, one should favor the causal modeling semantics of counterfactuals over the orthodox possible-worlds semantics. Lee offers two reasons for this thesis. First, the possible-worlds semantics suffers from a specific kind of counterexamples which the causal modeling semantics can handle with ease. Secondly, the causal modeling semantics, but not the possible-worlds one, has the theoretical resources enough for accounting for backtracking counterfactuals. Lee's own causal modeling semantics differs from the standard causal modeling semantics in that, while both accounts feature a kind of causal manipulation known as 'intervention', Lee's semantics also specifies a distinct causal manipulation that he calls 'extrapolation'.

Hanti Lin's paper, 'The Meaning of Epistemic Modality and the Absence of Truth' (Chap. 6), proposes a new approach to natural language semantics, with a focus on epistemic modals. Instead of evaluating sentences at possible worlds, the new approach evaluates sentence at possible information states; instead of evaluating sentences to be true or not, the new approach evaluates sentences to be acceptable or not.

In 'Revising a Labelled Sequent Calculus for Public Announcement Logic' (Chap. 7), Shoshin Nomura, Katsuhiko Sano, and Satoshi Tojo provide a cut-free labeled sequent calculus GPAL for Public Announcement Logic (PAL) based on Maffezioli and Negri's (2011) system G3PAL. The authors show that G3PAL lacks rules of accessibility relation in updated models so an axiom in Hilbert-style axiomatization of PAL cannot be derived. GPAL will be free of this deficiency. The soundness of GPAL with regard to Kripke semantics with certain specified constraints on possible worlds involved is proved, and a direct proof of the semantic completeness of GPAL for the link-cutting semantics of PAL is provided.

Joshua Sack's chapter 'Logics for Dynamic Epistemic Behavioral Strategies' (Chap. 8) is devoted to reasoning about epistemic behavioral strategies in extensive form games with incomplete or imperfect information with chance moves. Sack shows how the probabilistic logic of communication and change can capture not

just behavioral strategies that depend on what players believe about the game structure, but also epistemic behavioral strategies that depend on beliefs players have of each other. An extension of this logic is also considered to compare one strategy with infinitely many alternatives and to express various game theoretic notions such as best response, Nash equilibrium, and rationality.

The ninth chapter 'Measurement-Theoretic Foundations of Observational-Predicate Logic' is devoted to an analysis of the Phenomenal Sorites Paradox. The Phenomenal Sorites Paradox is a version of the Sorites Paradox, where observational predicates occur. Satoru Suzuki proposes a new version of logic for observational predicates—Observational-Predicate Logic (OPL)—that makes it possible to reason about observational predicates without inviting the Phenomenal Sorites Paradox on perceptual indiscriminability in the statistical sense. To accomplish this aim, he provides the language of OPL with a statistical model in terms of measurement theory.

In 'Channel Theoretic Reflections on Dynamic Logics of Speech Acts' (Chap. 10), Tomoyuki Yamada examines how it is possible to capture the regularities that enable agents to perform illocutionary acts of commanding and the background conditions that support them in logical terms. For this purpose, Yamada models the relevant kind of regularities in the form of constraints of local logics introduced in Barwise and Seligman's channel theory by building information channels with the language and the models of 'dynamified' deontic logic he developed. In doing so, it is shown that the language of the dynamified deontic logic needs to be substantially extended in order to talk about the relation between acts of saying things and acts of commanding. The chapter concludes by hinting at how this can be done.

Sakiko Yamasaki and Katsuhiko Sano's chapter 'Constructive Embedding from Extensions of Logics of Strict Implication into Modal Logic' (Chap. 11) is concerned with a proof-theoretic approach to Gödel-Mckinsey-Tarski embedding, i.e., the embedding from intuitionistic logic to modal logic S4. Dyckhoff and Negri employed labeled sequent calculi to provide a constructive proof of Gödel-Mckinsey-Tarski embedding from intermediate logics to extensions of modal logic S4. The authors generalize Dyckhoff and Negri's result to *sub*-intuitionistic logics, i.e., extensions of logic of strict implication. For this purpose, the authors provide a cut-free, sound and complete labeled sequent calculus for Corsi's logic F of strict implication, and employ a variant of Gödel-Mckinsey-Tarski translation sending an atom P to $P\&\square P$ to establish a constructive embedding result.

The final chapter 'Common Knowledge and the Knowledge Account of Assertion' is devoted to the assertion account of common knowledge, to be compared with the iteration account and fixed-point account. This chapter continues Syraya C.-M. Yang's recent work on models for epistemic logics, which justifies a majority of Williamson's theses in his knowledge-first epistemology. Yang extends the constructed models to a multi-agent system for epistemic logic of common knowledge with the knowledge account of assertion. Adhering to the communication-oriented notion of common knowledge—common knowledge rising from communication, he highlights the substantial role assertion plays in the

acquisition and transition of knowledge in a group of agents, and proposes that the propositional content of a sentence s is common knowledge to a group of agents if and only if everyone knows that s holds and also that everyone knows that s is asserted. Details of the semantic rules and some fundamental semantic properties of common knowledge are studied in due course.

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                                                                                              Duen-Min Deng
                                                                                                     Hanti Lin