Academic Report / "Sachbericht" (01.01.2014–31.12.2014)

Hannes Leitgeb, April 26th 2015

The *Munich Center for Mathematical Philosophy* (MCMP) had yet another wonderful year in 2014 packed with activities. As in previous years, we will give two summaries of MCMP activities for 2014: one relating to Hannes Leitgeb's Alexander von Humboldt Professorship and another one relating to Stephan Hartmann's Alexander von Humboldt Professorship. The present report is only about the former, that is, it only concerns Hannes Leitgeb's group and the more logic-related events, while the more philosophy-of-science-related events would be listed in Stephan Hartmann's report. (Occasionally, there might be some overlap, e.g., when the events in questions were organized jointly.)

Here is the list of selected corresponding activities in 2014, the full details of which can be found on our website at http://www.mcmp.philosophie.uni-muenchen.de/index.html:

(I) We continued to exploit various kinds of media in order to reach the public:

- In particular, over and above the resources that were already described in previous reports, we ran our Massive Open Online Course (MOOC) on the web-based Coursera Platform on "Introduction to Mathematical Philosphy" again. Once again, it was given by Hannes Leitgeb and Stephan Hartmann jointly, and it attracted another 25,000 students worldwide. More about this is to be found at http://www.mcmp.philosophie.uni-muenchen.de/students/online-courses/index.html.

(II) We organized a great number of academic events:

2014: Colloquia on Wednesday

April:	
16th: Vincenzo Crupi (Torino):	Models of Rationality and the Psychology of Reasoning: From Is to Ought, and Back
May:	
07th: Franz Huber (Toronto):	On the Justification of Deduction and Induction
June:	
18th: Chris Menzel (Texas A&M University):	Haecceities and Mathematical Structuralism
July:	
09th: Yasuo Deguchi (Kyoto):	Activity Realism and the Measurement Network
16th: Branden Fitelson (Rutgers):	Coherence
16th: Steve Awodey (CMU):	The Univalence Axiom

2014: Colloquia on Thursday

January:

16th: Andreas Stokke (Umeå University): Judgments and Lotteries

23rd: Catarina Dutilh Novaes (Groningen): Reductio Proofs from a Dialogical Perspective

Peter Brössel (Bochum) & Anna-Maria Eder (Konstanz): How to Resolve Doxastic Disagreement

30th: Ed Mares (University of Wellington): Non-Classical Logic, Belief Revision and Probabilism

May:

08th: Simon Huttegger (UCI): Learning Experiences, Expected Inaccuracy, and the Value of Knowledge

Paolo Mancosu (UC Berkeley): In Good Company? On Hume's Principle and the Assignment of Numbers to Infinite Concepts.

15th: Dietmar Zaefferer (LMU): Do Modus Ponens and Tollens Really Leak? Remarks from a Linguistic Semanticist

Marie Duzi (University Ostrava): A Plea for ß-Conversion by Value

22nd: Simon Huttegger (UCI): An Analogical Inductive Logic for Partially Exchangeable Families of Attributes.

June:

06th: Joao Marcos (UFRN): Logical Consequence Explicated in Terms of Cognitive Attitudes

12th: Benedict Eastaugh (Bristol): Reversals and closure

July:

10th: Yasuo Deguchi (Kyoto): Skolem and Gödel

November:

06th: Stanislav Speranski (Sobolev Institute): A Useful Method for Obtaining Alternative Formulations of the Analytical Hierarchy

December:

04th: Stanislav Speranski (Sobolev Institute):	Quantified Probability Logics: How Boolean Algebras Met Real-Closed Fields
18th: Michael De (Konstanz):	Negation is Not a Modality: A Reply to Berto
Stewart Shapiro (Ohio):	An Aristotelian Continuum

2014: Work in Progress Talks

January:	
16th: Johannes Korbmacher (MCMP):	Grounding
30th: Gil Sagi (MCMP):	Contextualism, Relativism, and the Liar
July:	
17th: Anna-Maria Eder (MCMP):	Rational Belief, Normativity, and Implication
November:	
06th: Rosella Marrano (Florence)	Ordinal Foundation for Degrees of Truth. A Case for Objective Probability?
27th: Johannes Stern (MCMP):	A New Norm for Truth?
December:	
18th: Leon Geerdink (Groningen):	Intuition and Analysis: a Case Study from Early Analytic Philosophy (ft. Carnap)

2014: Workshops and Conferences

Date	Name
03.07.2014	**Structural Realism, Structuralism and Theory Change**
21.07.014 – 25.07.2014	**Summer School on Proof, Truth and Computation**
27.07.2014 – 02.08.2014	**Summer School on Mathematical Philosophy for Female Students**
02.09.2014 – 03.09.2014	**Bridges 2014: Philosophical Exchange on Inter-Theoretical Relations**
12.09.2014	**Predicate Approaches to Modality**
11.11.2014	**Mathematics: Objectivity by Representation**

The Summer School on Proof, Truth and Computation was funded by the Volkswagen Foundation and was co-organized with colleagues from the Department of Mathematics at LMU. More information can be found at http://www.math.lmu.de/~ptc14/ptc2014.html.

The Summer School on Mathematical Philosophy for Female Students was an event designed especially for female students of philosophy. We had 90 applications for it. More about this can be found at:
http://www.mathsummer2014.philosophie.uni-muenchen.de/index.html

The Workshop on "Predicate Approaches to Modality" was supported by the DFG, as was the ANR-DFG-Workshop on "Mathematics: Objectivity by Representation" (see http://www.mcmp.philosophie.uni-muenchen.de/events/workshops/container/math_obj_rep/index.html).

(There are various additional activities that are not listed above, such as e.g. reading groups on different topics of interest in logic and related areas.)

(III) We hosted LMU faculty, doctoral fellows, postdoctoral fellows, junior visiting fellows, and senior visiting fellows.

In particular, this is the list of junior and senior visiting fellows at the MCMP during some period in 2014:

01.01.2014 – 30.06.2014: Markus Pantsar (Helsinki)

01.01.2014 – 30.06.2014: Paolo Mancosu (UC Berkeley)

10.01.2014 – 30.09.2014: Simon Huttegger (UC Irvine)

01.05.2014 – 02.07.2014: Marianna Antonutti Marfori (Paris)

15.05.2014 – 31.07.2014: Chris Menzel (Texas A&M)

01.09.2014 – 30.11.2014: Julien Murzi (Kent)

08.09.2014 – 31.12.2014: Stanislav Speranski (Sobolev Institute of Mathematics)

Paolo Mancosu's stay was funded by an LMU-UCB Visiting Professorship, Marianna Antonutti Marfori's stay was funded by the DAAD, Simon Huttegger spent a sabbatical at the MCMP, and Stanislav Speranski's was funded (and is still being so) by a Humboldt Fellowship of the Alexander von Humboldt Foundation.

Steve Awodey, Vincenzo Crupi, Catarina Dutilh-Novaes, Branden Fitelson, Julien Murzi, Ed Zalta are external members of the MCMP and visit the center on a regular basis; their visits to the MCMP in 2014 are therefore not listed above.

(IV) Some of the members of the MCMP (with non-permanent positions) secured permanent positions elsewhere:

- Our MCMP Fellow and Assistant Professor Ole Hjortland took up a permanent position at the University of Bergen from September 2014.
- Our MCMP Fellow and Assistant Professor Florian Steinberger will take up a permanent position at Birkbeck College London from May 2015.
- Our MCMP Postdoctoral Fellow Jake Chandler will take up a permanent position at La Trobe University at Melbourne from May 2015.
- Our MCMP Doctoral Fellow Thomas Meier will take up a permanent position at the University of Cancun (Mexico) from May 2015.

They remain external fellows of our Center and will return to the MCMP as visitors in the future.

(V) Some of the members of the MCMP (with non-permanent positions) secured fellowships elsewhere:

- Our MCMP Doctoral Fellows Catrin Campbell-Moore and Thomas Schindler will both take up fellowships at the University of Cambridge from October 2015.

(VI) Our international MA program in *Logic and Philosophy of Science* continues to develop very nicely. In the meantime, the first generation of students has finished, and several of them were offered and accepted places in PhD programmes at first-class international departments (such as Stanford, Harvard, Glasgow, or the Graduate School for Systemic Neurosciences here at LMU). More information about the program can be found at http://www.mcmp.philosophie.uni-muenchen.de/students/ma/index.html.

(VII) Awards by members of the MCMP:

Our Postdoctoral Fellow Sam Sanders (who is funded by an Alexander von Humboldt Fellowship) won the Silver Kurt Gödel medal in the 2014 KGRP competition: see http://fellowship.logic.at/

(VIII) For reasons of space, when we now turn to a detailed description of the academic activities of the academic members of the MCMP in 2014, we will not mention their teaching activities and which students they supervised.

Albert J.J. Anglberger

1. Type of Affiliation with the MCMP

Albert Anglberger was an LMU Research Fellow at our Center throughout 2014. So he was funded by the LMU.

2. Research Projects

Albert Anglberger's research project deals with foundational questions in deontic logic (see 2.1 below), i.e. the logic of norms, and how this discipline relates to other field of research, e.g. (formal) ethics or game theory. In 2014 he and his co-authors published one paper in which they compared the deontic logic developed at earlier stages of his research project to practical norms in decision theory (A3). A second paper, in which they develop the philosophical and conceptual foundations of their logic further is currently under revision (AR1). In a related paper (A2), also published 2014, they try to solve a problem the concept of permission in AR1 seems to be stuck with. The work on A2 already led to the start of a new subproject (see 2.1 and paper AR2). In paper A1 (see 2.3), he and his co-author solved an open technical problem in the field of non-classical logics and published it in the international

top journal *Studia Logica*. In addition to that, with another co-author Albert Anglberger also published a paper (A5) on a more traditional question of moral philosophy, i.e., the question what role religious belief can and should (not) play in the justification of morality (see 3.2). The results of his research were presented at various conferences (see below).

2.1 Deontic Logic

In paper AR1 they introduce a new understanding of deontic modals that they call obligations as weakest permissions. They argue for its philosophical plausibility, study its expressive power in neighborhood models, provide a complete Hilbert-style axiom system and a cut-free sequent calculus for it, and show that it can be extended and applied to practical norms in decision and game theory. This paper is currently under revision.

Already at an early stage of their research on AR1, they recognized that their logic presupposes a special interpretation of permissions. According to this interpretation (called the open reading), an act type (e.g. walking) is permitted if and only if every (concrete) action instantiating this very type is normatively acceptable. This concept of permission was thought of inevitably leading to the so-called Free Choice Paradox (FCP). As they show in a A2 (also published in 2014), the cause for FCP can be traced back to a certain property of the underlying theory of actions, and they discuss three solutions which may all block the derivation of FCP. One of these solutions utilizes a certain concept of relevance, which they study in more detail in an additional paper AR2. In that paper they develop a theory of relevant action entailment and present a deontic logic for permission based on it. They further show that it rules out unwanted instantiations of FCP.

In a volume dedicated to Johan van Benthem, they published paper A3, in which they relate their work from AR1 to Johan van Benthem's work on the logic of "best action". After introducing the main ideas behind this proposal, they present some salient features of that logic and conclude with remarks about how to apply it to specific understandings of best actions in games.

In early 2014 Albert Anglberger edited an issue of THE REASONER and interviewed John F. Horty, who is one of the most prominent deontic logicians and formal ethicists of our time (publication A4).

2.2 Ethics and Meta-Ethics

In another publication (A5) published in 2014, they argue that theistic theories still play a crucial role in the justification of various claims in moral philosophy, and they provide an argument that explains why an atheistic foundation of morality should be preferred over its theistic alternatives.

2.3 Logic

The application of classical logic is known to lead to a number of philosophical problems (these are sometimes even called paradoxes). In a number of papers, Paul Weingartner introduces the matrix-based logics RMQ^{-} and RMQ* as more suitable logics for applications in quantum physics and related areas. He presented only the logic's semantics though, and left the question of its axiomatizability open. In their paper (A6) they fill this gap by providing sound and complete HIlbert-style axiomtization for RMQ^{-} and RMQ*. This paper has been accepted for publication by *Studia Logica* and will be published in 2015.

3. Academic Output

Publications in 2014

(A1) "Hilbert-Style Axiom Systems for the Matrix-Based Logics RMQ- and RMQ*" (with J. Lukic), forthcoming in *Studia Logica*.

(A2) “Open Reading without Free Choice” (with H. Dong & O. Roy), in: F. Cariani, D. Grossi, J. Meheus, X. Parent (eds.), *Deontic Logic and Normative Systems*, Lecture Notes in Computer Science 8554, 2014.
(A3) “The Logic of Best Actions from a Deontic Perspective” (with O. Roy & N. Gratzl), in: A. Baltag and S. Smets (eds.), *Johan F. A. K. van Benthem on Logical and Informational Dynamics*, Springer, 2014.
(A4) Editorial and interview with John F. Horty, in: *The Reasoner*, Vol. 8 (2) (2014).
(A5) “Metaethische Bemerkungen zur religiösen Begründung der Moral” (with Ch. Feldbacher), *Erwägen-Wissen-Ethik* 25 (2014).

Papers in Preparation or Revision in 2014
(AR1) “The Logic of Obligation as Weakest Permission” (with O. Roy & N. Gratzl).
(AR2) “Exact Deontic Logic” (with J. Korbmacher).

Selected Talks in 2014
(T1) “The Open Reading of Permission and its Logic(s)” (December 2014, University of Duesseldorf, Germany)
(T2) “Permission and Normality” (November 2014, Bavarian Deontic Meeting, Bayreuth, Germany)
(T3) “Open Reading without Free Choice” (July 2014, Deontic Logic and Normative Systems, Ghent, Belgium)
(T4) “The Logic of Obligation as Weakest Permission” (June 2014, Aktuelle Probleme der Logik, Salzburg, Austria)
(T5) “The Logic of Obligation as Weakest Permission” (April 2014, Central Topics in Logic, LMU Munich, Germany)
(T6) “Open Reading without Free Choice” (March 2014, Bavarian Deontic Meeting, Bayreuth, Germany)

Organized Conferences in 2014
(K1) Salzburg Conference for Young Analytic Philosophy (SOPhiA 2014), Paris-Lodron-Universität Salzburg, September 2014 (75 speakers, 120 attendees)
Website: http://www.sophia-conference.org
(K2) Formal Ethics 2014, University of Rotterdam, Mai 2014
Website: http://www.formalethics.net

Steve Awodey

1. Type of Affiliation with the MCMP

Steve Awodey (Departments of Philosophy and Mathematics, Carnegie Mellon University, Pittsburgh, USA), who is an external fellow of the MCMP, spent one month, July 2014, as a Visiting Fellow at the Center and was supported by MCMP funds. This was the fourth regular visit by Prof. Awodey.

2. Research Projects and **3. Academic Output**

Three publications resulting directly from Prof. Awodey’s stay at MCMP:

(1) a paper on the philosophy of mathematics resulting from a lecture given in the MCMP Colloquium and soon to be submitted for publication,

(2) a paper on the philosophy of Rudolf Carnap originally given in an MCMP workshop and submitted to the proceedings thereof, to be published as a special issue of the journal *Synthese*, edited by MCMP members Georg Schiemer and Erich Reck,

(3) a technical survey of the new foundational system called Homotopy Type Theory, given as a lecture at the Chiemsee Summer School coorganized by the MCMP, to be published in a volume dedicated to the work of W.W. Tait, edited by MCMP member Erich Reck.

Also, work on the ongoing project on the *Collected Works* of Rudolf Carnap (12 vol.s, Oxford University Press) was advanced by the work conducted by Prof. Awodey while at MCMP.

In addition, Prof. Awodey gave several lectures on his research into Homotopy Type Theory: A survey talk at the Chiemsee Summer School co-organized by the MCMP, and new lecture on the philosophy of mathematics which will eventually become an article.
As in the previous years, Awodey continued to work closely with MCMP doctoral student Hans-Christof Kotzsch on research into higher-order modal logic.
While at the MCMP Prof. Awodey particpated in preparing two externally funded projects, both of which were later approved:

(1) CORCON, Correctness by Construction, EU funding for research travel cooperation which will enable Project members from MCMP as will as several other sites to travel to Pittsburgh and elswhere for short an long-term research visits.

(2) AFOSR-MURI: a major research grant with 5 sites in the US for foundational research on Homotopy Type Theory, $7.5 mil. over 5 years.

Catrin Campbell-Moore

1. Type of Affiliation with the MCMP

Catrin Campbell-Moore is a Doctoral Fellow of the MCMP and is funded by the MCMP.

2. Research Projects

Catrin Campbell-Moore studies probability from a logical point of view. She considers how to formalize probability in a framework where higher order and self-referential probability statements can be expressed. Such expressive richness is desirable but it leads to philosophical and technical challenges, many of which relate to the liar paradox.

During 2014, she finished a project on developing a particular theory for this framework, namely a Kripkean theory for probability. She also continued her work on the application of these frameworks to modeling rational agents, particularly considering how arguments for rational constraints need to be modified in light of such expressive richness. In new work, she developed an alternative theory for this framework by developing a probabilistic version of a revision theory of truth. This gives one insights into the original theory of truth. She also considered a variant of the Kripkean theory that has a close connection to "imprecise probabilities", a theory of probability advanced by authors from philosophy and statistics.

3. Academic Output

Publications Accepted

- "How to Express Self-Referential Probabilities. A Kripkean Proposal", forthcoming in the *Review of Symbolic Logic*.
- "Rational Probabilistic Incoherence? A Reply to Michael Caie", forthcoming in *The Philosophical Review* 124(3), July 2015.

Papers in Preparation

- "The Revision Theory of Probability".
- "A Semantics for Embedded Imprecise Probabilities".
- "Rational Requirements and Self-Reference".

Talks Given

- Formal Epistemology Workshop, USC, LA, "How to Express Self-Referential Probability and Avoid the (Bad) Consequences", June 20–22, 2014
- Philosophy of Probability conference in Venice, "Possible World-Style Semantics for Type-free Probability", 31st of March to 4th of April 2014
- Imprecise Probabilities in Statistics and Philosophy, Munich, "A Semantics for Embedded Imprecise Probabilities", June 27–28, 2014
- Predicate Approaches to Modality, Munich, "A Revision Semantics for Type-Free Probability", September 12, 2014
- Society for Exact Philosophy, Caltech, Pasadena, "A Revision Semantics for Type-Free Probability", 22-24 June 2014
- Graduate Conference on Philosophy of Probability, LSE, London "A Semantics for Embedded Imprecise Probabilities", June 6-7 2014

Job applications
Catrin Campbell-Moore applied for jobs and research fellowships, resulting (in 2015) in an offer of a (3 year) Junior Research Fellowship at Corpus Christi College, Cambridge, which she accepted.

Grants
Travel grant to attend Graduate Conference on Philosophy of Probability, LSE.
$800 funding to attend the Formal Epistemology Workshop, USC, LA.

Reading groups
I attended and helped to organise the Imprecise Probabilities reading group.

Summer Schools attended
Proof, Truth and Computation (see description of workshops before).

Services to the Profession
Member of the Editorial Board for *The Reasoner*
Referee for: *Erkenntnis*, *The Reasoner*

Jake Chandler

1. Type of Affiliation with the MCMP

Jake Chandler is an MCMP Postdoctoral Fellow who is funded by the MCMP.

2. Research Projects

In 2014 Jake Chandler carried out research on two distinct topics: (a) the foundations and philosophical applications of a mathematical model of *belief change* known as the AGM model, (b) the empirical adequacy and philosophical pertinence of various mathematical models of *decision making*.

With regards to (a), his research followed on from that which he had carried out in the period covered by the previous report. This included further advances pertaining to various recent "impossibility" theorems involving the handling of *conditionals* (sentences of the form 'if A, then B') in the AGM framework. I particular, he devised a novel method for handling sentences regarding "doxastic undermining" (sentences of the form 'A is a reason to doubt that B') in the AGM model and put it to work in analysing a famous counterexample to the rule of inference known as "*Modus Ponens*". His research on topic (a) also included further work, in collaboration with Richard Booth (University of Luxemburg), on an extension of a principle known as the "*Harper Identity*", which establishes a theoretically crucial connection between the two kinds of belief change operations countenanced by the AGM model. They have been, in addition, looking into the potential applications of this extension to the domain of voting theory.

He also started preliminary investigations into potential commercially-relevant, concrete applications of the AGM framework to database management systems and in particular to the ubiquitous SQL standard. In preparation for this, he completed, with distinction, an online course on databases with Stanford University.

With regards to (b), he initiated work, in collaboration with Paul Pedersen (Max Planck Center for Adaptive Rationality, Berlin), on a substantial review article of the subject, commissioned for the leading philosophical encyclopaedia (see below).

3. Academic Output

The research carried out led to the acceptance of a paper in one of the very top philosophy journals (Chandler, J., "Preservation, Commutativity and Modus Ponens: Two Recent Triviality Results", accepted for publication in *Mind* after revisions), the completion and submission of a further paper that was previously in progress (Chandler, J., "On the Reduction of Iterated to Single Revision", submitted to the *Journal of Philosophical Logic*), and the near-completion of a third (Chandler, J. and R. Booth, "Iterated Revision and Evidential Relevance"). The aforementioned encyclopaedia entry was commissioned for January 2016 (Chandler, J. and P. Pedersen, "Descriptive Decision Theory", in preparation for E. Zalta, ed., *The Stanford Encyclopaedia of Philosophy*).

During the relevant period, Jake Chandler refereed for a number of journals, including *Philosophy of Science*. Regarding job and grant applications, he submitted an application for the Australian Research Council Discovery Project grant scheme, for the sum of roughly 350 000 EUR (outcome still unknown). He was also interviewed for a permanent position at La Trobe University, Melbourne. This resulted in a job offer, which he accepted.

Vincenzo Crupi

1. Type of Affiliation with the MCMP

Vincenzo Crupi is an External Fellow of the MCMP who spent October-December 2014 at the MCMP (supported by MCMP funds).

2. Research Projects

Vincenzo Crupi's work in this period included: (i) theoretical explorations of the connections between Bayesian confirmation theory and key notions in information theory, such and entropy, scoring rules, and related concepts; (ii) new experimental investigations about the relevance of judgments of evidential impact in human reasoning under uncertainty; (iii) an analysis of the role of normative models in the empirical study of human cognition; and (iv) a survey discussion of how cognitive biases may affect error in medicine.

3. Academic Output

PUBLICATIONS

Tentori, K., Chater, N., and Crupi, V. (forthcoming), "Judging the probability of hypotheses versus the impact of evidence: Which form of inductive reasoning is more accurate and time-consistent?", *Cognitive Science*.

Crupi, V. (forthcoming), "Inductive logic", *Journal of Philosophical Logic*.

Aprà, F., Elia, F., Verhovez, A., and Crupi, V. (forthcoming), *First know thyself*: Cognition and error in medicine, *Acta Diabetologica*.

Crupi, V. and Tentori, K. (forthcoming), "Confirmation theory", in: A. Hájek and C. Hitchcock (eds.), *Oxford Handbook of Philosophy and Probability*, Oxford University Press.

Crupi, V. and Tentori, K. (2014), "Measuring information and confirmation", *Studies in the History and Philosophy of Science*, 47, pp. 81-90.

Crupi, V. and Girotto, V. (2014), "From *is* to *ought*, and back: How normative concerns forster progress in reasoning research", *Frontiers in Psychology*, 5, 219.

Crupi, V., Hjortland, O., Fitelson, B., and Steinberger, F. (eds.) (2014), Papers from the 9th Annual Formal Epistemology Workshop (FEW 2012), *Erkenntnis*, 79 (2014), supplement 6.

INVITED TALKS

"Indicative conditionals and probabilistic support"
Workshop Reasoning and Making Decisions
Ludwigsburg University of Education
Ludwigsburg, November 17, 2014

"Il modello cognitivista dell'errore in medicina" (with G. Cevolani)
IX National Congress of the Italian Society of Emergency Medicine
Turin, November 7, 2014

"Models of rationality and the psychology of reasoning: From is to ought, and back"

Munich Center for Mathematical Philosophy, Ludwig Maximilians University
Munich, April 16, 2014

"The logic and psychology of evidential support"
Logic and Philosophy of Science Seminar
University of Florence
Firenze, March 7, 2014

REFEREED CONFERENCE CONTRIBUTIONS
Nelson, J.D., Meder, B., Szalay, C., Crupi, V., and Tentori, K.
"Implications of disregarding objective utilities when selecting a medical test"
Annual Meeting of the Psychonomic Society
Long Beach, November 23, 2014

Nelson, J.D., Meder, B., Szalay, C., Crupi, V., and Tentori, K.
"Implications of disregarding objective utilities when selecting a medical test" [poster]
15th Biennial European Meeting of the Society for Medical Decision Making
Antwep, June 10, 2014

Crupi, V. and Girotto, V.
"Models of rationality and the psychology of reasoning: From is to ought, and back"
Nordic Network for Philosophy of Science Meeting
Lund, March 27, 2014

ORGANIZATION OF EVENTS
Structures and dynamics of knowledge and cognition
(first FIRB project 2013-2016 workshop)
Turin, May 15, 2014
organizer (with Gustavo Cevolani)

FUNDING
The application for the second three-year period (2014-2016) of the DFG priority program New Frameworks of Rationality (SPP 1516) submitted in 2013 was successful. Title of the research project: "Models of information search: A theoretical and empirical synthesis." It is a joint proposal with: Jonathan Nelson and Björn Meder, MPI Berlin; Laura Martignon, Ludwigsburg; Katya Tentori, Trento. Jonathan Nelson (Berlin) and myself (with the MCMP as the host institution) are the principal investigators for this project.

David Etlin

1. Type of Affiliation with the MCMP

David Etlin spent the whole year at the MCMP as an MCMP Postdoctoral Fellow (funded by the Center).

2. Research Projects

David Etlin worked on his pragmatic theory of vagueness, connecting the Sorites paradox with money pump arguments in decision theory. He also worked on the logic of conditionals.

3. Academic Output

Talks on vagueness at the Universities of Birmingham, Bristol, Cambridge, Sheffield. Comments on conditionals at the APA Central (Chicago).

He also participated in discussion groups on imprecise credences, and on belief and degrees of belief, and he organized a discussion of Dummett's "Truth".

Martin Fischer

1. Type of Affiliation with the MCMP

Martin Fischer is a Postdoctoral Fellow at the MCMP who was funded by the DFG Project on "Syntactical treatments of interacting modalities" throughout most of 2014. The period of 15.02.2014-23.03.2014 he spent at UC Irvine (funded by UC Irvine). From 1.11-31.12.2014 he was a Visiting Fellow at the MCMP (funded by the MCMP).

2. Research Projects

Summary of his research:

One topic of his research was paradoxes of interaction. In this research carried out together with Johannes Stern they investigated the question in which cases paradoxes of multiple modal predicates can be reduced to paradoxes of a single modal predicate.

Another topic concerned the axiomatizability of semantic theories of truth, discussing different criteria of adequacy and some limitative results.

A third topic centred around proof-theoretic methods for modal predicates.
In collaboration with Norbert Gratzl they investigated infinitary proof systems and their connection to partial logic.

3. Academic Output

Publications:

- Martin Fischer: "Truth and Speed-up", *Review of Symbolic Logic*, 7, 2014, 319-340.
- Johannes Stern & Martin Fischer: "Paradoxes of Interaction?", *Journal of Philosophical Logic*, 2014, Online First, DOI 10.1007/s10992-014-9319-5.
- Martin Fischer & Leon Horsten: "The Expressive Power of Truth", *Review of Symbolic Logic*, 2014 , Online First DOI 10.1017/S1755020314000392.
- Martin Fischer & Volker Halbach & Jönne Kriener & Johannes Stern: "Axiomatizing Semantic Theories of Truth", *Review of Symbolic Logic*, 2015, Online First DOI 10.1017/S1755020314000379.

In preparation:
- Martin Fischer & Norbert Gratzl: “Infinitary proof systems and partial logic”.
- Habilitation project at LMU.

Talks:
“Paradoxes of Interacting Modalities”, UC Irvine, 28.02.2014.

Workshop organization: “Predicate Approaches to Modality”, 12.9.2014, at the MCMP, co-organized with Johannes Stern.

Visit: UC Irvine, 15.02.2014-23.03.2014, funded by UC Irvine.

Application for an extension of the DFG-project “Syntactical treatments of interacting Modalities” (granted).

Norbert Gratzl

1. Type of Affiliation with the MCMP

Norbert Gratzl is an Assistant Professor at the MCMP (funded by the MCMP and LMU) and spent the whole year at the Center.

2. Research Projects

Norbert Gratzl’s work was focussed on: (i) definite and indefinite descriptions, (ii) theoretical terms, (iii) quantified argument logic, (iv) deontic logic, and (v) commencing work on investigating syntactical predicates.

(i) He continued to work on definite and indefinite descriptions. A major paper on definite descriptions, “Incomplete Symbols - Definite Description Revisited”, was accepted for publication in the *Journal of Philosophical Logic*. This paper approaches definite descriptions in the spirit of Bertrand Russell (*Principia Mathematica*); it contains a proof-theoretic view on this topic-

The work on descriptions (and their different flavors) connected nicely to (ii) joint work with G. Schiemer on the “Epsilon Reconstruction of Scientific Theories”. In the 60ies R. Carnap proposed a new way to define theoretical terms by use of Hilbert's epsilon terms. Georg Schiemer and Norbert Gratzl took a fresh look on Carnap's approach and they relate this to topics of structuralism, arbitrary reference and Russell's indefinite descriptions and indexed epsilon-terms. This paper is now conditionally accepted in *Erkenntnis*. More work on this topic is currently carried out.

(iii) Due to his ESSLLI-course (together with O. Roy), Edi Pavlovic (PhD-student of Hanoch Ben-Yami CEU/Budapest) applied successfully for a research visit at the MCMP. Together they developed a sequent calculus for quantified argument logic. The main proof-theoretic results have been established.

(iv) Deontic logic is another research interest of Norbert Gratzl. They (i.e., A. Anglberger, O. Roy, Norbert Gratzl) managed already to publish some articles on a new deontic logic that interprets obligation in a new way. The deontic logic of “obligation as weakest permission” has been proposed to analyze rational recommendations to players in game-theoretic situations. This logic departs in many ways from standard deontic logic

(SDL). Its two deontic modalities are non-normal and are two "boxes", while in SDL P(ermission) is a "diamond". And they are not dual to each other. Finally, and more importantly, the main interaction principle between the deontic and the alethic modalities rest on the following idea: A is obligatory only if it is the logically weakest permitted action type that the agent can perform.

(v) Martin Fischer and Norbert Gratzl began to work on a paper that is part of a systematic investigation of syntactical predicates based on proof-theoretic methods. In this paper they focus on one very specific branch. The syntactical predicate they use is one for truth, interpreted in a Kripke-style way via strong Kleene. The method they apply is a method based on Schütte's infinitary proof systems.

3. Academic Output

Appeared
• "The Logic of Best Actions from a Deontic Perspective" (with O. Roy & A. Anglberger), in S. Smets and A. Baltag (eds.), *Johan F. A. K. van Benthem on Logical and Informational Dynamics*, volume to appear (invited contribution; volume in preparation).

Accepted for publication
• "Incomplete Symbols – Definite Descriptions Revisited", *Journal of Philosophical Logic*.

Conditionally accepted
• "The Epsilon-reconstruction of Scientific Theories and Scientific Realism" (together with G. Schiemer).
• "Extensions of hypersequent calculi for S5 to first order logics".

Administrative
• Co-administrator of the MA-programme "Logic and Philosophy of Science"
•Responsible for the ERASMUS-programme at the MCMP (successfully accomplished several new cooperation agreements)

Organizational
• DAAD "Substructural epistemic logics: models, dynamics, proofs", funding about 7.000 €; status: Principal Investigator.
• Successfully organized (together with O. Roy) a workshop "Proof Theory of Modal Logic" at the 5th Indian School on Logic and Its Applications (ISLA) 6-17 January 2014, University Tezpur.

Talks
• "Is, Ought, and Cut", ISLA 2014, Tezpur, January 8, 2014.
• "Obligation as Weakest Permission" (together with: A. J.J. Anglberger), MCMP/ LMU, May 24, 2014.
• "Meta-Ethics and Proof Theory: Is, Ought, and Cut", Formal Ethics, University of Rotterdam, May 30, 2014.
• "Theoretical Terms and Indefinite Descriptions", invited; workshop "Structuralism in Philosophy of Science", MCMP/LMU, July 5, 2014.
• "Kanger's Deontic Logics (with a Glimpse on the Is-Ought-Problem), Trends in Logic, University of Ghent, July 11, 2014.
• "Stig Kanger on Deontic Logic with Actions", University of Bayreuth, November 4, 2014.
• "On the Relations of Logics of Knowledge and Belief" (together with: O. Roy),

Czech Academy of Sciences, Prague, November 10, 2014.

Furthermore, Norbert Gratzl taught ab ESSLLI 2014 course, University of Tübingen, on an Introduction to Proof Theory of Modal Logic (together with O. Roy).

Reviewing
• PC-member of DEON, *Incipiens*, *Minds and Machines*

Book projects
• Continued to work on an edition on mathematical philosophy with S. Huttegger and A. Anglberger.
• Preparatory work on a monograph (together with O. Roy) on proof theory of modal logic.

Andreas Kapsner

1. Type of Affiliation with the MCMP

Andreas Kapsner is a Postdoctoral Fellow at the MCMP who is employed through his DFG-project "New Logics for Verificationism" (all through 2014, parental leave from November 2014).

2. Research Projects

Andreas Kapsner completed work on a book called *Logics and Falsifications*, published in Janary 2014 (Springer, Trends in Logic Series, Vol. 40) , in which he explores the connections between constructive logic, paraconsistency, and verificationistic semantic theories.
The book examines the concept of falsification as a central notion of semantic theories and its effects on logical laws. The point of departure is the general constructivist line of argument that Michael Dummett has offered over the last decades. From there, he examines the ways in which falsifications can enter into a constructivist semantics, display the full spectrum of options, and discuss the logical systems most suitable to each one of them. While the idea of introducing falsifications into the semantic account is Dummett's own, the many ways in which falsificationism departs quite radically from verificationism are here spelled out in detail for the first time.
The book is divided into three large parts. The first part provides important background information about Dummett's program, intuitionism and logics with gaps and gluts. The second part is devoted to the introduction of falsifications into the constructive account and shows that there is more than one way in which one can do this. The third part details the logical effects of these various moves. In the end, the book shows that the constructive path may branch in different directions: towards intuitionistic logic, dual intuitionistic logic and several variations of Nelson logics. Andreas Kapsner argues that, on balance, the latter are the more promising routes to take.

He worked on a question about truth value gluts (true-and-false statements) that turned out to require several papers to answer: Should these non-classical values be treated as designated ones in logical systems? Virtually everyone working on systems with gluts has answered this question in the positive, but Andreas Kapsner found many arguments against this default. The case for undesignated gluts is made in the book mentioned above, the case for them in science and mathematics in "On Gluts in Mathematics and Science" (under review), and for the classic application of gluts, to deal with semantic paradoxes, in "Undesignated Dialetheias"

(in preparation).

He wrote a paper in legal epistemology, "Guilt, Innocence and the Logic of Legal Discourse" (under review), which analyzes and disambiguates two conceptual layers of guilt and innocence and spells out the logical relations between these disambiguated concepts.

Andreas Kapsner also wrote two companion papers with legal scholar Barbara Sandfuchs (U. Passau). Both deal with the new trend to incorporate insights from behavioral economics into policy making (known as "nudging"). They focus on issues with privacy in these new proposals, in one of the papers from a philosophical point of view, in the other from a legal one.
The philosophical essay, "Nudging as a Threat to Privacy", discusses several examples of nudges that must appear problematic to anyone valuing privacy. The paper also re-draws a well established connection between privacy and autonomy and argues that insofar as nudges incur too great a loss of privacy, they are incompatible with the libertarianism that libertarian paternalism is committed to by virtue of its very name. (Prof. Cass Sunstein, the man who implemented these proposals in the White House, will publicly respond to our paper and the worries we express in it.)
The legal paper, "Coercing Online Privacy", currently in the second stage of review in a US law review, deals with the legal upshots of privacy nudges, i.e., nudges that try to improve on people's care for their own sensitive data. Though high in demand these days, they point out that both US and German constitutional law can be interpreted in ways that will make these proposals look unconstitutional.

Together with Peter Verdee (Louvain), Andreas Kapsner started to build a non-monotonic logic out of the Nelson logics he discussed in the book mentioned above. They employ the ideas of so-called adaptive logics. The paper, "Adaptive Nelson Logic", motivates this logic from the perspective of the constructive reconstruction of empirical discourse, in which situations with strong but contradictory pieces of evidence have to be dealt with.

With David Miller (Warwick), Andreas Kapsner has beeninvestigating "The Early History of Dual-Intuitionistic Logic" (in preparation), with special emphasis on the unpublished and wholly unknown work of K.J. Cohen in the 1950s, which had foreshadowed many of the later results and even contains a formal insight that is new by today's lights.

Furthermore, Andreas Kapsner developed, together with indologist Paolo Visigalli (LMU), a reconstruction of one of the most puzzling arguments in classic Hindu philosophy. In "Certainty and the Authorless Veda" (in preparation), they apply Wittgenstein's later thoughts on certainty to explain how philosophers from the school of Mimamsa (one of the six classic Hindu schools) were led from their own conviction in the correctness of the Vedic texts to the conclusion that these text can have no author, human or divine, and from there (arguably) to the final conclusion that god(s) do(es) not exist.

Andreas Kapsner also started work on a discussion piece on Tim Mulgan's book *Ethics for a Broken World*. Mulgan attempts to show that many of the assumptions underlying present theories in political philosophy are highly context sensitive. He does so by delivering a set of lecture notes for a fictional class in a future world that is destroyed by climate change. While this strikes one as a great idea, the book itself has certain weaknesses. These can be explained, which Andreas Kapsner attempts in "World Building and World Breaking", drawing on both narrative theory, more specifically the rather new discipline of "world building", and the philosophical analysis of counterfactuals.

3. Academic Output

Book:
Logics and Falsifications, Trends in Logic Series, Vol.40, Springer.

Papers:
(forthcoming) "Nudging as a Threat to Privacy", with Barbara Sandfuchs, *Review of Philosophy and Psychology*.

(under review) "Coercing Online Privacy", with Barbara Sandfuchs.

(under review) "On Gluts in Mathematics and Science".

(under review) "Guilt, Innocence and the Logic of Legal Discourse".

(in preparation) "Adaptive Nelson Logic", with Peter Verdee, (to be presented in Heijnice June 2015).

(in preparation) "Undesignated Dialetheias".

(in preparation) "The Early History of Dual-Intuitionistic Logic", with David Miller.

(in preparation) "Certainty and the Authorless Veda", with Paolo Visigalli (to be read at Cambridge University in June 2015).

(in preparation) "World Building and World Breaking".

Talks:
13.02.2014: Report on Kalman Cohen's 1954 Oxford Thesis on Alternative Systems of Logic, 5th World Congress on Paraconsistency, Kolkata (with David Miller (Warwick) and Roy Dyckhoff (St. Andrews)

21.02. 2014: "The history of intuitionistic and dual-intuitionistic logic", Asutosh Mookherjee Memorial Institute Seminar, Kolkata

07.05.2014: "On guilt and innocence", 4th World Congress on the Square of Opposition, Vatican

11.06.2014: "Why designate gluts?", Paraconsistent Reasoning in Mathematics and Science, Invited Talk, Munich

03.12.2014: "On the logical treatment of true-and-false statements", Invited Talk, Kyoto University

Application for external funding:
(with Alexander Herrmann, Filmakademie Ludwigsburg): 12.000 € for an interdisciplinary workshop with researchers working on resilience (Bayerischer Forschungsverbund "Fit for Change") and professionals from media and creative industries (planned for the end of 2015).

Johannes Korbmacher

1. Type of Affiliation with the MCMP

Johannes Korbmacher is an MCMP Doctoral Fellow (funded by the Center) who worked on his PhD thesis at the MCMP throughout 2014.

2. Research Projects and **3. Academic Output**

During the indicated period Johannes Korbmacher worked mainly on his doctoral research project. He mainly focused on finishing up his dissertation "Properties Grounded in Identity. A Study of Essential Properties". In his dissertation, he defends the claim that essential properties (those properties of things that "determine what they fundamentally are") should be understood as properties that are grounded in the identity of these things. Ground is the relation that we usually express with the phrase "in virtue of". His dissertation combines most of the research that he has carried out at MCMP into one book length project. He presented part of his work (on the so-called "Iterated Logic of Ground") at the Phloxshop VI "Logics and (their) Grounds" that took place on the 9th of September at the Universtity of Hamburg.

In addition to the work on his dissertation, Ihe co-authored a paper with Georg Schiemer (University of Vienna, formerly an MCMP Visiting Fellow) titled "What are Structural Properties?". They began working on this paper in 2013, and in 2014 they presented it at two conferences: the first congress of the Italian Society for the Philosophy of Mathematics "Philosophy of Mathematics - Objectivity, Cognition, and Proof" that took place on the 29th of May in at Università Vita-Salute San Raffaele in Milan, and at the Symposium on the Foundations of Mathematics that took place on the 8th of July at the Kurt Gödel Research Center in Vienna. Currently, the paper is under review with *Noûs*. Moreover, Johannes Korbmacher started working on a paper on mathematical explanations in the natural sciences together with Lorenzo Casini (University of Geneva, formerly MCMP). They presented early stages of their work at the conference "Explanation Beyond Causation" that took place on the 24th of October at the MCMP. Finally, he started to work on a paper titled "An n-sided Sequent Calculus for Paraconsistent and Paracomplete Theories of Truth" together with Ole Thomassen Hjortland (Univerity of Bergen, formerly MCMP).

Hans-Christoph Kotzsch

1. Type of Affiliation with the MCMP

Hans-Christoph Kotzsch is an MCMP Doctoral Fellow (funded by the Center) who worked on his PhD thesis at the MCMP throughout 2014.

2. Research Projects and **3. Academic Output**

Talks:

- Symposium on the Foundations of Mathematics, KGRC, Vienna, 7-8 July, 2014.
  Title: "Homotopy Type Theory and the Foundations of Mathematics".

Further Activities:

- January-March 2014: Reading Group on the Homotopy Type Theory Book

- Participation at the summer school “Proof, Truth, Computation”, Summer School on the Interactions between Modern Foundations of MAthematics ad Contemporary Philosophy, 21-25 July 2014, Fraueninsel im Chiemsee

Hannes Leitgeb

1. Type of Affiliation with the MCMP

Hannes Leitgeb has been the Chair in Logic and Philosophy of Language at LMU Munich, as well as a Director of the MCMP, since October 2010.

2. Research Projects

Hannes Leitgeb continued to work on, and in the meantime finished, his monograph titled *The Stability of Belief. How Rational Belief Coheres with Probability* in which he develops a new joint theory of all-or-nothing belief and degrees of belief (subjective probabilities). The book is under contract with Oxford University Press and is presently for a final time with a reader.

Secondly, Hannes Leitgeb has written and finished some new papers in 2014, including .

Thirdly, he continued to work on “A Defense of Logicism” (joint article with E. Zalta from Stanford) and “A Theory of Propositions and Truth” (with P. Welch from Bristol).

3. Academic Output

Publications:
The Stability of Belief, book manuscript (in preparation, under contract with OUP).
Logik für Philosophen: Eine Einführung in die klassische Aussagen- und Prädikatenlogik (with A. Hieke), book manuscript (in preparation).
“A Lottery Paradox for Counterfactuals Without Agglomeration”, *Philosophy and Phenomenological Research* 89/3 (2014), 605-636.
“The Review Paradox. A Note on the Diachronic Costs of Not Closing Rational Belief Under Conjunction”, *Nous* 48/4 (2014), 781-793.
“A Way Out of the Preface Paradox?”, *Analysis* 74/1 (2014), 11-15.
“The Stability Theory of Belief”, *The Philosophical Review* 123/2 (2014), 131-171.
“Neural Network Models of Conditionals”, to appear in the *Formal Philosophy Handbook*, co-edited by V. Hendricks.
“Abstraction Grounded. A Note on Abstraction and Truth”, to appear in: P. Ebert and M. Rossberg (eds.), *Abstractionism in Mathematics*.
“Belief as a Simplification of Probability, and What This Entails”, to appear in: A. Baltag and S. Smets (eds.), *Johan F. A. K. van Benthem on Logical and Informational Dynamics*, Outstanding Contributions to Logic 5, Berlin: Springer, 2014, 405-417.
“Belief as Qualitative Probability”, to appear in: A. Garcia de la Sienra Guajardo, C. Crangle, H. Longino (eds.), volume on the occasion of Patrick Suppes' 90th birthday.

Presentations:
“Probabilistic Theories of Type-Free Truth and Probability”, Workshop in Honor of Philip Welch's 60th Birthday, Bristol (22/03/14).
“The Humean Thesis on Belief”, Philosophy of Probability Workshop, Venice (01/04/14).
“Conditionals and Stability”, Workshop on Conditionals, Hamburg (04/04/14).
“The Humean Thesis on Belief”, Seminar on Logic, Probability and Games, CUNY/Columbia (02/05/14).

"The Stability Theory of Belief", Bernstein Center for Computational Neuroscience, Munich (12/05/14).
"On the Humean Thesis on Belief. An Example of Formal Epistemology", Carl von Linde-Akademie, Munich (19/05/14).
"The Humean Thesis on Belief", LSE Fourth Graduate Conference in Philosophy of Probability, London (06/06/14).
"The Humean Thesis on Belief", Triennal Meeting of the Italian Society for Logic and the Philosophy of Science (SILFS), Rome (19/06/14).
"Probabilistic Theories of Type-Free Truth and Probability", Workshop in Philosophical Logic, Rome (21/06/14).
"On Mathematical Structuralism", Symposium on the Foundations of Mathematics, Vienna (07/07/14).
"A Stability Theory of Belief and Degrees of Belief", Summer School on Truth, Proof, Computation, Chiemsee (21/07/14).
"The Humean Thesis on Belief", Conference on the Nature and the Epistemology of Reasoning, Konstanz (24/07/14).
"The Humean Thesis on Belief", Evening Lecture at ESSLI, Tübingen (12/08/2014).
"The Humean Thesis on Belief", Bridges Workshop, New York (03/09/2014).
"The Humean Thesis on Belief. Building a Bridge Between Two Epistemic Modalities", Workshop on the Epistemology of Modality, Aarhus (24/09/2014).
"New Foundations for Hyperintensional Semantics?", J65 Workshop in Honour of Johan van Benthem, Amsterdam (27/09/14).
Descartes Lectures, three lectures with commentaries, Tilburg University (20/10/14-22/10/14).
"On Mathematical Structuralism", Workshop Mathematics: Objectivity by Representation, Schweisfurth Stiftung, Munich (11/11/14).
"The Humean Thesis on Belief", Workshop in Honor of Louis Loeb, University of Michigan (15/11/14).
"The Humean Thesis on Belief", Keynote Lecture (held virtually), Synthese Konferenz, Amsterdam (20/11/14).

Interviews:
Scobel, 3Sat (TV), 08.05.2014. The topic was `Normality'.

Further activities:
Editor-in-Chief of *Erkenntnis*.
Coordinating Editor of *Review of Symbolic Logic*.
Member of the Editorial Board of the *European Journal for the Philosophy of Science*.
Member of the Editorial Board of the *Grazer Philosophical Studies*.
Consulting Editor of *Journal of Philosophical Logic*.
Consulting Editor of *Theoria*.
Associate Editor of *Studia Logica*.
Subject Editor of the *Stanford Encyclopedia of Philosophy* for Philosophy of Mathematics.
Member of the Editorial Board of *PHIBOOK: The Yearbook of Philosophical Logic*, Automatic Press.
Member of the Editorial Board of *The Collected Works of Rudolf Carnap* (Open Court).
Member of Scientific Board of *Munich Graduate School of Systemic Neurosciences* (GSN).
Member of *Center for Advanced Studies*, Ludwig-Maximilians-University Munich.
Forschungsdekan (Dean of Research) of the Faculty of Philosophy, Philosophy of Science and Study of Religion, LMU Munich.

External Assessor for Professorial Appointments or Promotions at: Helsinki, Utrecht, Southern California (all 2014).
Member of Panels and Advisory Boards for: *European Science Foundation Eurocores Review Panel*. Chair of Program Committee of the *15th Congress of Logic, Methodology and Philosophy of Science*, Helsinki, 2015. Member of Program Committee of *Colloquium Logicum*, Neubiberg, 2014.
Co-PI of the Volkswagen Foundation event *Proof, Truth, Computation*, Summer School on the Interactions between Modern Foundations of Mathematics and Contemporary Philosophy, with Helmut Schwichtenberg, Iosif Petrakis, Peter Schuster (2014, EUR 45,600).
Co-PI of the ANR-DFG Project *Mathematics: Objectivity by Representation* with Gerhard Heinzmann from the University of Nancy (from 2014, EUR 262,000 for three years).
PI of the LMU Investitionsfonds Project *Von einem logisch-mathematischen Standpunkt: Richard Swineshead und die Tradition der Calculatores* (from 2013, EUR 100,000 for two years).
Co-PI of the MINCYT-DAAD Project *Truth, Paradoxes and Modalities* with Eduardo Barrio from the University of Buenos Aires (from 2012, for two years).
PI of the DFG Project *Syntactic Approaches to Interacting Modalities* (since 2011, EUR 414,450 for three years). Extension by another 18 months granted by the DFG.
Member of the Advisory Board of the Joint Research Center in Logic of Tsinghua University and the University of Amsterdam (2014-2017).

Hannes Leitgeb also co-organized the Summer School on Proof, Truth and Computation (at Chiemsee), and he organized the Workshop on Mathematics: Objectivity by Representation (in Munich), both in 2014. Finally, he organized a reading group on the draft of the book that he was writing in which various members of the MCMP participated.

Godehard Link

1. Type of Affiliation with the MCMP

Godehard Link is a Resident Member of the MCMP as retired LMU professor. He is self-funded.

2. Research Projects

1. Godehard Link's research in 2014 focussed primarily on finishing the second volume of his major work *Collegium Logicum. Logische Grundlagen der Philosophie und der Wissenschaften*, which appeared with Mentis publishing company, Münster, Germany, in June 2014, comprising 723 pp. The book is written in German. The main goal of the complete work has been to combine thorough technical detail with pertinent philosophical discussion of classical and current topics in logical philosophy. Here is some overview of the material covered.

   Volume 1 (published 2009, 585 pp.) contains a pretty standard, but detailed introduction to logic up to the completeness proof of first-order logic in 12 chapters. Building on this working knowledge, the second volume starts in Chapter 13 with mereology, which is the first of the three first-order theories treated here that are most important for philosophical concerns, the other two being arithmetic (Chapter 17) and set theory (Chapter 21). In addition, Chapter 19 deals with model theory, and Chapter 20 with second-order logic and type theory.

A second theme are modal concepts dealt with in Chapters 14 (propositional modal logic) and 15 (first-order modal logic; conditionals).

The book has also a major focus on the technical developments leading up to Gödel's incompleteness proofs, from Chapter 16 (recursive functions) and Chapter 17 (formal arithmetic representing recursiveness) to Chapter 18 (arithmetization of syntax and Gödel's proof).

The final part of the book extends its scope to some central themes in the philosophy of science, viz., reduction (Chapter 22), probability (Chapter 23) and causality (Chapter 24).

The philosophical discussions include ontology (Chapter 13), conditionals (Chapter 15), the status of second-order logic and logicism (Chapter 20), mathematical truth (Chapter 21), reduction of the mental (Chapter 22), the interpretation of probability (Chapter 23), and causality (Chapter 24).

Godehard Link's research since has been to take up various topics addressed in the book and expand on them, in particular themes in the philosophy of mathematics.

2. Godehard Link also served as the editor of the reader *Formalism and Beyond. On the Nature of Mathematical Discourse*, which appeared in September 2014 with de Gruyter, Boston/Berlin in the Logos Series. This volume grew out of a cooperation between German, Italian, and US-American researchers from 2005 until 2011, which was funded in equal parts by the Alexander von Humboldt Foundation and a matching fund from the University of Notre Dame within the format of one of the Foundation's TransCoop projects, called "Imaginary and Ideal Elements and Limit Concepts in Mathematics: Their Theory, History, and Philosophical Understanding". The title reflected an ongoing philosophical interest in the role of formalist aspects in mathematical theorizing and practice. The contributions presented in the volume cover this ground and extend it in various directions. Papers focussing on central historical figures in the field, like Frege, Russell, Hilbert, and Wittgenstein, are accompanied by those dealing with issues like infinity, finiteness, proof procedures, and ones putting formalist mathematics into historical perspective. The authors are Andrew Arana (University of Illinois, Urbana-Champaign), Patricia Blanchette (University of Notre Dame), Laura Crosilla (University of Leeds), Michael Detlefsen (University of Notre Dame), Godehard Link (LMU, MCMP), Felix Mühlhölzer (University of Göttingen), Karl-Georg Niebergall (Humboldt University Berlin), Marek Polanski (LMU), Daniel Roth (LMU), Matthias Schirn (LMU, MCMP), Gregor Schneider (LMU, MCMP), Peter Schuster (University of Leeds), and Paul Ziche (University of Utrecht).

Apart from the AvH TransCoop funds, additional funding of the MCMP for finalizing the LaTeX editing of the work was gratefully acknowledged.

3. Godehard Link's contribution in the volume mentioned under 2. is entitled "Formal Discourse in Russell: From Metaphysics to Philosophical Logic" (64 pp.) The paper is a case study of the metaphysical sources of Russell's philosophical logic, combined with a moral drawn from it for current ontological debates.

3. Academic Output

1. Monograph *Collegium Logicum. Logische Grundlagen der Philosophie und der Wissenschaften*, Volume 2, Münster: Mentis 2014. 723 pp.

2. "Formal Discourse in Russell: From Metaphysics to Philosophical Logic". In: G. Link (ed.), *Formalism and Beyond. On the Nature of Mathematical Discourse*, Boston/Berlin: de Gruyter 2014, 119-182.

3. Editor of *Formalism and Beyond. On the Nature of Mathematical Discourse*, Boston/Berlin: de Gruyter 2014.

Godehard Link was also an invited discussant at the Workshop on Philosophy of Probability, Venice International University (VIU), 31.03. – 04.04.2014.

Paolo Mancosu

1. Type of Affiliation with the MCMP

Paolo Mancosu (UC Berkeley) spent the period January-June 2014 as a Visiting Fellow at the MCMP and LMU. His stay was supported by a Visiting Professorship in the LMU-UCB program for research in the humanities.

2. Research Projects and **3. Academic Output**

During this period most of Paolo Mancosu's time was devoted to completing a draft of a new book, tentatively titled *Abstraction and Infinity*. The book consists of four chapters, the last two of which were mostly in place by the time he arrived in Munich. By contrast, the first two chapters are the result of his work in Munich.

One of the most influential programs in contemporary philosophy of mathematics is the neo-logicist program. At the core of neo-logicism are a technical result and a set of philosophical considerations. The technical result is called Frege's theorem: second-order Peano arithmetic can be derived from Hume's principle and second order logic. The cluster of philosophical considerations are aimed at showing that Hume's principle is analytic and that second order logic does not take us out of the realm of analyticity. As is well known, there are abstraction principles that are inconsistent (the notorious basic Law V in Frege's Grundgesetze) and abstraction principles, such as the nuisance principle, that are true on a domain if and only if Hume's principle is false on that domain. The attempt at differentiating "good" from "bad" abstractions has given rise, in the last twenty years, to an extensive literature on abstraction principles. This literature is mathematically sophisticated and philosophically stimulating.

It is however surprising that apart from some perfunctory references to Frege's Grundlagen §64, the analytic literature on abstraction principles ignores the extensive discussion on such principles that occupied many mathematicians and philosophers at the end of the nineteenth century and at the beginning of the twentieth century, including Peano, Burali-Forti, Russell, Padoa, and Scholz. The discussion was framed within the context of so-called "definitions by abstraction" (the term was coined by Peano but the idea occurred earlier). An example of such a definition is given by Frege in §64: for all lines a and b, the direction of line a is equal to the direction of line b if and only if a and b are parallel. But Frege's wording in §64 seems to imply that the practice of introducing definitions by abstraction was still considered quite rare when Frege was writing the *Grundlagen*.

In the first half of his book, Paolo Mancosu shows that the logical discussion of definitions by abstraction is anchored in a stable and widespread mathematical (and physical) practice – including complex analysis, geometry, and vector analysis – and how reflection on the mathematical practice led to very important foundational issues. This work is contained in the first two chapters of the book.

The first chapter is devoted to showing that, contrary to what Frege intimates in the *Grundlagen der Arithmetik*, abstraction principles were quite widespread in the mathematical practice that preceded Frege's engagement with abstraction principles. Paolo Mancosu worked extensively with the literature in nineteenth century number theory, geometry, algebra, vector theory, set theory and foundations of the number systems to show the widespread use of abstraction principles in the mathematical practice of the time and to articulate the foundational problems that such principles gave origin to. The second chapter, which builds on the first, analyzes Frege's discussion of abstraction principles in section 64 of the *Grundlagen der Arithmetik*. In the part of chapter two devoted to Frege, he was able to provide for the first time a contextual analysis of this pivotal section of the *Grundlagen* by rooting Frege's concerns in the geometrical tradition originating with Hermann Grassmann and in the tradition of attempts aimed at proving the parallel postulate by making the notion of "direction" prior to the notion of parallelicity. The second part of chapter two gives an extended analysis of the Peano school and Russell and shows how in their considerations on abstraction principles they foreshadowed many of the philosophical and foundational concerns that have been at the center of attention of the neologicist discussion.

Paolo Mancosu's plan is to submit the book to Oxford University Press within a couple of months.

He also made progress on a project of a different nature but still related to my scholarly activities. In 2013 he published a book on the editorial history of Doctor Zhivago (*Inside the Zhivago Storm. The editorial adventures of Pasternak's masterpiece*, Milano, 2013). During the research for that book, he was given exclusive access to the Feltrinelli archives in Milan. While in his book the treatment of the Zhivago affair ends with Pasternak's death in May 1960, there is a part of the story that has never been investigated in detail. This is the part of the story leading from Pasternak's death to the arrest of his lover, Olga Ivinskaya, and her daughter Irina Emelianova, who were sentenced to eight years and three years, respectively, of hard labor camp. Olga was the model for Lara in Doctor Zhivago. The condemnation created an international scandal, for it was obviously a revenge act on the part of the Soviets. The frantic events leading to the arrests and a first person perspective can be gathered using documents preserved in the Feltrinelli archives in Milan that have never been used before. These are the letters between Giangiacomo Feltrinelli, Heinz Schewe, and Olga Ivinskaya. In addition to have worked on these letters, during his stay in Germany, Paolo Mancosu was also able to visit the Axel Springer Archive to do research in the Heinz Schewe's Nachlaß. In February, he also went to Viterbo to visit Sergio d'Angelo (Feltrinell's literary scout who brought Doctor Zhivago out of the Soviet Union), who gave him further unpublished materials related to this and other aspects of the Zhivago affair (including letters from Olga Ivinskaya and Boris Pasternak). So far, he has collected all the relevant materials and has transcribed the documentary part of what he hopes will become a small book and an important addition to the Zhivago story.

During his stay in Munich Paolo Mancosu gave one talk at the Center for Advanced Study and one talk at the Center for Mathematical Philosophy. The first talk (on 29 April 2014) was titled "Der Roman um den Roman: Pasternak, Feltrinelli and the editorial adventures of Doctor Zhivago". This lecture inaugurated the Berkeley lectures at LMU. See http://www.cas.uni-muenchen.de/veranstaltungen/berkeley_lecture/index.html

The second lecture (on May 8, 2014) was titled “In Good Company? On the assignment of numbers to infinite concepts”.

During his six months in Munich, he also accepted several invitations to give lectures in Germany and abroad. In Germany he gave two lectures in Berlin (Max Planck Institut für Wissenschaftsgeschichte and TOPOI center at the Humboldt Universität). He also gave lectures in the USA, Italy, France, the Netherlands, Poland, and Austria.

Two articles featuring his presence at the LMU and his talk at the CAS will appear in the LMU Magazine (one in the German version and one in the English version).

Thomas Meier

1. Type of Affiliation with the MCMP

Thomas Meier is a Doctoral Fellow of the MCMP (funded by the MCMP).

2. Research Projects

- Since September 2011, Thomas Meier was writing his doctoral thesis at the Munich Center for Mathematical Philosophy under the supervision of Hannes Leitgeb and Ulises Moulines. In the first part of his doctoral research, he studied how to apply a formal framework and certain mathematical notions that belong to it to the discussion on structural realism in the philosophy of science. Currently, he is working on specific case studies of linguistics, concerning theory change and scientific realism. Thomas Meier submitted his thesis on October 1st 2014.

3. Academic Output

- Talks:

  - September 2nd, 2014: “Structural Realism”, joint session with David Chalmers (NYU / ANU), at the Workshop Bridges 2014, in New York City.

  - December 9th, 2014: “Pragmatic Structural Realism and the Newman Objection”, held at the University of Bern.

- Forthcoming Publications: "La estructura de las teorias empiricas y el reduccionismo" (The Structure of Empirical Theories and Reductionism), forthcoming, in *Stoa.*

Christopher Menzel

1. Type of Affiliation with the MCMP

Chris Menzel (Texas A&M) is an External Fellow of the MCMO who spent the period 15 May 2014 – 31 July 2014 at MCMP. MCMP funded his round trip air travel from the US.

2. Research Projects

During his stay at MCMP Chris Menzel spent the bulk of his research time preparing for two talks that he delivered in July at MCMP. Here is a summary of the content of the talks.

In a 2007 paper, José Bermúdez argued that identity properties, or *haecceities*, like *being identical to Angela Merkel*, can be invoked to meet the challenge that the existence of "indiscernibles" (like *i* and *–i* in the complex field) raise for a certain (now somewhat dated) version of mathematical structuralism. A common response to this move is that haecceities are not structural properties. In his first talk, entitled "Haecceities and Mathematical Structuralism," Chris Menzel argued that there is a clear sense in which haecceities are structural, at least on a strongly model-theoretic conception of structuralism. However, he argued *contra* Bermúdez that they do *not* meet the challenge that indiscernibles raise for the version of structuralism in question.

In his recent book *Modal Logic as Metaphysics*, Timothy Williams argues that the actualism/possibilism (A/P) distinction is in fact confused and should be replaced by the distinction between contingentism and necessitism. In Chris Menzel's second talk, entitled "Actualism: Some Logic, Some Philosophy," he argued that Williamson's argument against the A/P distinction is based on an exceedingly dubious premise (one not accepted by defenders of the distinction) and that, in fact, his own distinction is intertranslatable with the A/P distinction, rightly understood.

3. Academic Output

Results of Research

Papers

1. "Haecceities and Mathematical Structuralism," under review at *Philosophia Mathematica*.
2. "In Defense of the Actualism/Possibilism Distinction," in progress.

Talks

1. "Haecceities and Mathematical Structuralism," Munich Center for Mathematical Philosophy, Ludwig-Maximilian-Universität, Munich, Germany, July 2014.
2. "Actualism: Some Logic, Some Philosophy," Munich Center for Mathematical Philosophy, Ludwig-Maximilian-Universität, Munich, Germany, July 2014.

Julien Murzi

1. Type of Affiliation with the MCMP

Julien Murzi is an External Fellow of the MCMP who stayed at the MCMP from September 1 to November 30 2014, during a sabbatical term at the University of Kent. He was partially supported by the MCMP and by the University of Kent.

2. Research Projects

During his stay, Julien Murzi worked on several projects: (1) a paper on inferentialism and understanding (titled "Inferentialism and Understanding"), co-authored with Florian Steinberger (MCMP); (2) a paper on paradox and logical revision (titled "Instability and

Revenge"); (3) a paper on paradoxes of naïve logical properties (titled "Naïve Logical Properties and Higher-Order Rules"); (4) a paper on structural rules and canonical grounds, co-authored with Prof. Nissim Francez (Tel Aviv); (5) an introduction to a special issue of Topoi on Paradox and Logical revision, co-authored with Massimiliano Carrara (titled "Paradox and Logical Revision: A Short Introduction").

3. Academic Output

During his stay in Munich, the following articles authored by Julien Murzi were published 8in online first versions):

(1) Paradox and Logical Revision (with Massimiliano Carrara) - DOI 10.1007/s11245-014-9286-z
(2) Denial and Disagreement (with Massimiliano Carrara) – DOI 10.1007/s11245-014-9278-z
(3) More Reflections on Consequence (with Massimiliano Carrara), Logique et Analyse 227, pp. 223-258.

Julien Murzi successfully applied to the Mind Association and Aristotelian Society to support a conference co-organised with Florian Steinberger (MCMP), which was held in London on March 19-20. The conference had 8 speakers (Dr Corine Besson (Sussex), Prof. Paul Boghossian (NYU), Dr Matthew Chrisman (Edinburgh), Prof. Sinan Dogramaci (Austin Texas), Prof. Gil Harman (Princeton), Prof. Ian Rumfitt (Birmingham), Dr Gail Leckie (Sussex), Prof. Joshua Schechter (Brown)) and over 50 attendees.

Markus Pantsar:

1. Type of Affiliation with the MCMP

Markus Pantsar was a Visiting Fellow of the MCMP in the period of January 1st 2014 – June 30th 2014. His source of funding was the Academy of Finland.

2. Research Projects and **3. Academic Output**

(i) His research focused on three questions:
1. The nature of infinity in mathematics, based on the theory that arithmetical knowledge is based on biological primitives.
2. The modal nature of arithmetical knowledge, based on the contextual a priori understanding of arithmetical knowledge.
3. The status of mathematics in western popular culture.

(ii)
4. A talk about the above research 1. was presented at the conference "Foundations of the Formal Sciences VIII: History & Philosophy of Infinity" at the University of Cambridge. The resulting paper is currently in consideration for the journal *Synthese* after minor revisions were requested.
5. A talk about the above research 2. was presented at the conference "Philosophy of mathematics: objectivity, cognition, and proof" at the San

Raffaele University in Milan. The resulting paper has been submitted for the conference volume.

6. A talk about the above research 3. was presented at the "Mathematical Cultures 3" conference in London. The resulting paper was submitted for the conference volume.

During the period at MCMP, Markus Pantsar also prepared an application for an Academy of Finland five-year fellow project.

Niki Pfeifer

1. Type of Affiliation with the MCMP

Niki Pfeifer worked as an MCMP Postdoctoral Research Fellow (funded by the MCMP) for the whole year of 2014.

2. Research Projects

Niki Pfeifer worked on various philosophical questions in the context of the new paradigm psychology of reasoning and its relation to formal epistemology [2,8]. He extended the probabilistic truth table task paradigm by investigating experimentally causal and counterfactual conditionals [11]. Moreover, Niki Pfeifer studied formal-analytically uncertain conditionals [7,13]. Furthermore, he investigated natural disasters in a multidisciplinary context [4,12]. Niki Pfeifer prepared an editorial and an interview with Teddy Seidenfeld for *The Reasoner* [5]; he also edited a special issue on themes of the Progic 2013 workshop which was hosted by the MCMP in Munich in September 2013 [6; local organizer: Niki Pfeifer].

Ongoing research includes probabilistic interpretations of the traditional logical square of opposition [3,10]. Furthermore, probability semantics for categorical syllogisms have been investigated [9]. Niki Pfeifer also conducted his ongoing DFG research project PF 740/2-1 "Rational reasoning with conditionals and probabilities. Logical foundations and empirical evaluation" (Project within the DFG Priority Program SPP 1516 "New Frameworks of Rationality") and will start his second DFG project in mid 2015.

3. Academic Output

Papers/Chapters/etc. in 2014

In preparation/submitted

[13] Gilio, A., Pfeifer, N. & Sanfilippo, G. (submitted). "Transitive reasoning with imprecise probabilities".

[12] Pfeifer, N. (submitted). "Cognition and natural disasters: Stimulating an Environmental Historical Debate".

[11] Pfeifer, N. & Stöckle-Schobel, R. (submitted). "Uncertain conditionals and counterfactuals in (non-)causal settings".

[10] Pfeifer, N. (joint work with Sanfilippo, G. & Gilio, A.) (in preparation). "Probabilistic interpretations of the square of opposition".

[9] Pfeifer, N. (joint work with Sanfilippo, G. & Gilio, A.) (in preparation). "Probability semantics for categorical syllogisms".

Published/Accepted for publication

[8] Pfeifer, N. (in press). "Naturalized formal epistemology of uncertain reasoning "(Abstract). *The Knowledge Engineering Review***.**

[7] Pfeifer, N. (2014). "Reasoning about uncertain conditionals". *Studia Logica* 102(4), 849-866. DOI:10.1007/s11225-013-9505-4

[6] Pfeifer, N. (2014). "Editor's note: Special issue on combining probability and logic to solve philosophical problems". *Journal of Applied Logic*, 12(3), 233-234.

[5] Pfeifer, N. (2014). "Editorial and interview with Teddy Seidenfeld". *The Reasoner***,** 8(3), 22-24.

[4] Pfeifer, N. (2014). "Psychological factors in disaster responses: Stimulating an environmental historical debate" (Abstract). In: *Proceedings of the Second World Congress of Environmental History* (p. 36). Guimarães.

[3] Pfeifer, N., Sanfilippo, G. & Gilio, A. (2014). "Probabilistic interpretations of the square of opposition" (Abstract). In: Béziau, J. Y. & Gan-Krzywoszyńska (eds.), *Handbook of the World Congress on the Square of Opposition IV* (p. 88-89). Poznań: Kontekst.

[2] Pfeifer, N. & Douven, I. (2014). "Formal epistemology and the new paradigm psychology of reasoning", *The Review of Philosophy and Psychology*, 5(2), 199-221. DOI:10.1007/s13164-013-0165-0

Editorial work

[1] Pfeifer, N. (ed.) (2014). Special issue on combining probability and logic to solve philosophical problems. *Journal of Applied Logic*, 12(3), 233-234.
Papers by: Alan Hájek; Peter Milne; Igor Douven; Tommaso Flaminio, Lluís Godo, & Hykel Hosni; Teddy Groves; Sean Walsh; Glauber De Bona, Fabio Gagliardi Cozman, & Marcelo Finger; Dana Scott.

Talks in 2014

[T8] Sanfilippo, G., Pfeifer, N. & Gilio, A. "Probabilistic inference and syllogisms". 7th International Conference of the ERCIM WG on Computational and Methodological Statistics (ERCIM 2014), Pisa (Italy), 6.-8.12.2014.

[T7] Pfeifer, N. "The coherence perspective on reasoning about uncertainty". Reasoning and Making Decisions Workshop, Ludwigsburg (Germany), 17.-18.11.2014. (invited talk)

[T6] Pfeifer, N. "Transitivity, uncertain conditionals & cognition". Symposium "Rationality Frameworks for Reasoning in Uncertain Environments" (Symposium organizers: Niki Pfeifer & Gerhard Schurz) at the 22nd Meeting of the European Society for Philosophy and Psychology (ESPP 2014), Noto (Italy), 16.-19.09.2014.

[T5] Pfeifer, N. "Psychological factors in disaster responses: Stimulating an environmental historical debate". Second World Congress of Environmental History, University of Minho (Guimarães, Portugal), 8.-12.07.2014.

[T4] Pfeifer, N. “Mental probability logic: Conditionals and quantification”. Department of Psychology, University of Freiburg (Germany), 18.06.2014. (invited talk)

[T3] Pfeifer, N., Sanfilippo, G. & Gilio, A. “Probabilistic interpretations of the square of opposition”. 4th World Congress on the Square of Opposition (Vatican), 5.-9.05.2014.

[T2] Kern-Isberner, G., Pfeifer, N., & Eichhorn, C. “Experiments on uncertain conditionals and network approaches to reasoning”. Third Conference of the Priority Program "New Frameworks of Rationality". Schloss Etelsen (Germany), 9.-12.03.2014. (invited talk)

[T1] Pfeifer, N. “Coherence based probability logic: Rationality under uncertainty”. Institut für Philosophie (Lehrstuhl für Theoretische Philosophie), Universität Regensburg (Germany), 17.02.2014. (invited talk)

Workshops organized
Niki Pfeifer organized with Gerhard Schurz the symposium: “Rationality Frameworks for Reasoning in Uncertain Environments” at the 22nd Meeting of the European Society for Philosophy and Psychology (ESPP 2014), Noto, Italy, 16.-19.09.2014.

Niki Pfeifer served in scientific committees including the PROGIC workshop series and the 1st European Conference on Argumentation, ArgLab, New University of Lisbon, which will take place in Portugal, 9.-12.06.2015.

Editorial activities
Niki Pfeifer was member of the editorial board of *The Reasoner* in 2014 and became member of the editorial board of the *Journal of Applied Logic* in 2014. Finally, Niki Pfeifer served as a reviewer for various philosophical and psychological scientific journals during 2014.

Applications for external funding
Niki Pfeifer successfully applied for a follow-up project within the second funding period of the DFG Priority Program SPP1516 “New Frameworks of Rationality”.

Lavinia María Picollo

1. Type of Affiliation with the MCMP

Lavinia Picollo is a doctoral student at the University of Buenos Aires. She spent the period from the beginning of May to the beginning of August as a Visiting Student at the MCMP. She supported her stay herself.

2. Research Projects

During her stay at the MCMP she investigated deflationism about truth and the paradoxes of validity.

3. Academic Output

The results of her research during her stay at the MCMP helped her writing a substantial part of her PhD thesis, which she is about to submit. She also worked on a joint paper with

Thomas Schindler, a doctoral fellow of the MCMP: the paper investigates from a formal perspective the logical function that deflationism ascribes to truth. The paper was submitted for publication.

Talks:

- "Is there a paradox of logical validity?", Third Reasoning Club Conference, University of Kent, Canterbury, United Kingdom, June 2014.
- "Semantic paradoxes and formal theories of truth", Summer School on Mathematica Philosophy for Female Students, Ludwig-Maximilians University, Munich, Germany, July 2014.
- "Disquotation and the purpose of truth", Segundo Congreso International de la Sociedad Filosófica del Uruguay, Montevideo, Uruguay, August 2014.

As a visiting student at MCMP she also attended some courses. In June she visited Julien Murzi in Canterbury, United Kingdom; in July she visited Volker Halbach at Chiemsee, Germany. She attended the summer school "Proof, Truth, Computation. Modern Foundations of Mathematics and Contemporary Philosophy", Chiemsee, Germany.

Roland Poellinger:

1. Type of Affiliation with the MCMP

Roland Poellinger is an MCMP Postdoctoral Fellow (funded by the MCMP). He spent the whole year working at the MCMP.

2. Research Projects

A. "Learning Causal Structure – Cognition, Computation, Communication"
Background. In Roland Poellinger's dissertation "Concrete Causation" (Logic and Philosophy of Science) Pearl's definition of a causal model is augmented by the addition of epistemic contours transferring knowledge deterministically, non-directionally, and instantaneously. Causal knowledge patterns thus conceived allow for the integration of intensional markers – the nodes of a respective graph not necessarily represent extensionally distinct entities anymore, countering the standard reading of events placed in Bayes nets by the causal modeler. Roland Poellinger's thesis presents the difficulties arising from this augmentation and how causal knowledge patterns can be used for efficient computation in partial nets, once the Markov assumption is relativized suitably: In light of the communicative aspect of causal knowledge patterns (theme "Communication") it can be explained how causal knowledge can be inferred qua intensional bridges and informational links uniquely and consistently (theme "Computation").
Central questions and methodology. Against the backdrop of methodology and results described in his PhD thesis he dedicated myself in the research project "Learning Causal Structure" to the cognitive foundations of models of belief propagation (theme "Cognition"). Current research in this field includes the following questions:

- How do we acquire knowledge about causal relations of given events?
- How do we process seemingly conflicting information in causal paradoxes?
- How is the direction of the "causal flow" determined – with or without the possibility of concrete intervention?

- By what procedures is the existence of confounders inferred, and how is such knowledge translated into corrective actions (to screen off observed events from disturbing factors)?

Building on current trends, the core of his project consists of three closely related questions that emerge from the above-mentioned research field and exceed it in emphasizing foundational aspects of causal modeling:

1. How do we learn causal relations in our environment if we do not know the relata, yet? That means, how do we acquire the variables that represent the events in our surroundings? Or also: How are sense data blobs sorted in existing knowledge?
2. How do we treat a model whose set of variables (so to say, its domain of discourse) is changing (dynamically)? (e. g., when we learn new circumstances or when the lab situation changes)
3. And how are two causal models with separate sets of variables unified? (e. g., in everyday discourse or in the context of scientific research)

B. Additional Focus: "Communicating Mathematical Philosophy – Evaluating Challenges, Formulating Interfaces, Building Channels"
This special focus of this part of his research focuses on the communication side of Mathematical Philosophy and describes the challenges and opportunities of media use in modern academia and our discipline in particular. Among the topics are the following points:

- *Talking research-2-research* (building bridges within the community, e.g. with iTunes U and the development of event formats such as First Sight video abstracts)
- *Making complex contents accessible* (utilizing [social] media for teaching and turning research results into research-based teaching [with videos etc.])
- *Being aware of public awareness* (evaluating how foundations, press, and other public institutions perceive the MCMP and which funding opportunities arise from this perspective)
- *Internal communication* (evaluating tools for collaboration [virtual conferencing etc.] within the team and across research groups)
- *Development of new formats and interactive media* (video abstracts, online video search, etc.)

3. Academic Output

1. Talk: "Relating Physical and Intentional States in Computable Structures", Workshop Implementing Intentionality, University of Pécs (Hungary), Doctoral School of Philosophy, April 2014
2. Talk: "Decision-Making in the Loop and the Moral Imitation Game" (joint work with Fiorella Battaglia), SILFS 2014 – Triennial International Conference of the Italian Society for Logic and Philosophy of Sciences, University of Rome »Roma TRE«, June 2014
3. Talk: "The Mind–Brain Entanglement", Colloquium in Logic, Philosophy of Science, and Philosophy, LMU Munich, May 2014 [recording on iTunes U]
4. Talk: "Non-Causal Links in Causal Chains, Bridges 2014 – Trans-Continental Meeting in Mathematical Philosophy", tandem session with M. Strevens on Unifying

Causal and Non-Causal Knowledge, German House, New York City, September 2014 [recording on iTunes U]

5. Paper: "Anchoring Causal Connections in Physical Concepts" (with Mario Hubert). In: Maria C. Galavotti, Dennis Dieks, Wenceslao Gonzalez, Stephan Hartmann, Thomas Uebel, and Marcel Weber (eds)., *New Directions in the Philosophy of Science*. The Philosophy of Science in a European Perspective (PSE), Vol. 5, Springer, 2014. DOI: 10.1007/978-3-319-04382-1_35
6. Paper: "Wer da? – Turings Test in virtuellen Spielwelten". In: Kathrin Demmler, Klaus Lutz, Sebastian Ring (eds.), *Computerspiele und Medienpädagogik. Konzepte und Perspektiven*, Materialien zur Medienpädagogik, Band 11, kopaed Verlag München, 2014.

Roland Poellinger also gave a course at the University of Pécs (Hungary) in March/April 2014. As a member of the Pécs Graduate School of Philosophy I supervised the following project: Nikoletta Nemesi – PhD thesis: *Indeterminate Identity and Vague Objects* (to be submitted in 2015/16 at the Graduate School of Philosophy, University of Pécs, Hungary).

Organizational Work

1. Organization of the workshop *Implementing Intentionality*, University of Pécs (Department of Philosophy), April 2014 (supported by Universitätsgesellschaft München, the National Cultural Fund of Hungary, and the Scientific Section of Philosophy of the Association of Hungarian PhD and DLA Students)
2. Co-organization of the workshop on *Imprecise Probabilities in Statistics and Philosophy* (with T. Augustin, S. Bradley, M. Cattaneo, S. Hartmann), LMU Munich, June 2014 [video documentation on iTunes U]
3. Organization of *Bridges 2014* – Trans-continental Meeting in Mathematical Philosophy, German House, New York City, September 2014 (cofunded by the German Universities Alliance (GUA), the German Center for Research and Innovation (GCRI), LMU's presidium, Fakultät für Philosophie, Religionswissenschaft und Wissenschaftstheorie (LMU), and Goethe-Institut New York); documentation of the meeting in various media formats – video, photo, social media:
    a. The workshop's website: www.lmu.de/bridges2014
    b. Teaser trailer we used for early advertising: http://vimeo.com/85768178
    c. Online travel diary: www.bridges2014.com
    d. Video recordings of all tandem talks (on *iTunes U*)
    e. Photo documentation by a professional photographer of the *German Center for Research and Innovation* (on the website, see above)

ENB Project Work

Since 2013 he is the leader (principal investigator) of the group *Philosophy of Science and Science Communication* in the *Elitenetzwerk Bayern* project *Exploring Quantum Matter (ExQM)*; short project description:

Exploring Quantum Matter (ExQM) – International PhD Program of Excellence in the *Bavarian Excellence Network – "Elitenetzwerk Bayern"*

ExQM is a Munich-based international program jointly held by several leading research groups at Technische Universität München (TUM), Ludwig-Maximilians-Universitat

München (LMU), Max-Planck-lnstitut für Quantenoptik (MPQ), Walther-Meissner-lnstitut, Walter-Schottky-Institut and Virtuelle Hochschule at LMU.
The program is interdisciplinary and will strongly exchange with partner programs in Vienna, Innsbruck, ETH Zürich, Harvard, Stanford, Caltech etc. also by exploiting new media to set up an international e-library. They address students in physics, mathematics, computer science, and chemistry with research topics comprising quantum simulation, many-body systems, ultracold gases, optical lattices, cavity QED, numerical and tensor methods etc.

MCMP Media & Science Communication
Focus in 2014:

1. Coordination of the MCMP's media team (LMUcast, iTunes U, First Sight video abstracts, etc.); publication of the 500th video on iTunes U by the end of 2014
2. Refinement of our online video search function
3. Launch of the MCMP publication management system (with LMU's internet services and our e-publication experts at LMU's library), cf.: http://epub.ub.uni-muenchen.de/view/subjects/1005.html
4. Coordination of the MCMP internship program "Science & Communication"

To explore more of the MCMP's media activities in 2014, please visit our media page at http://www.mcmp.philosophie.uni-muenchen.de/media

Martin Rechenauer

1. Type of Affiliation with the MCMP

Martin Rechenauer was a Visiting Fellow and research associate with the MCMP for the whole year 2014. He was self-supporting except for travel support for the Venice seminar in April 2014 (see below), which he organized for the MCMP. he acted for the whole year as a stand-in professor at other universities (Konstanz up to September 2014, Bamberg from October 14 onwards).

2. Research Projects

Martin Rechenauer's research, as connected with the MCMP, concerned mostly the project, done together with Olivier Roy, of investigating into the formal foundations contractualist theories of ethical and political justification. Moreover he worked on the philosophical significance of Social Choice Theory.

3. Academic Output

Relevant publications in 2014:

"Kohärenz macht das Subjekt aus: strukturelle Rationalität und kollektive Elemente in der Handlungstheorie", in F. Böhle & W. Schneider (eds.), *Handlung und Subjekt*, transcript-Verlag 2014.

"The Logical Structure of Scanlon's Contractualism", together with Olivier Roy, in: F. Cariani et al. (eds.): DEON 2014, LNAI 8554, pp. 166–176, Springer, 2014.

Paper in preparation:
"The Possibility of Aggregation – a Primer for Philosophers".

Talks:

"On Impartiality and Contractualism", Workshop "Human Rights, Justice and Responsibility", Munich, January 2014

"Contractualist Ethics and its Logical Structure", Paris Seminar Ethics and Economics, Université Paris Sorbonne, January 2014

- "The Logical Structure of Scanlon's contractualism" together with Olivier Roy, Conference Formal Ethics, Rotterdam University, May 2014
- "The Logical Structure of Scanlon's contractualism" together with Olivier Roy, DEON (Deontic Logic and Normative Systems), Ghent University, July 2014
- Commentary on Thomas Schmidt, "Gibt es ein spezifisches Problem ethischer Begründung?", Colloquium "Philosophie und Lebensform" in honour of Julian Nida-Rümelin, November 2014

Martin Rechenauer also organized a seminar "Philosophy of Probability" at the Venice International University (VIU) in April 2014, with participants from members of the MCMP (both permanent and visiting one's) and some external guests, such as Teddy Seidenfeld, Alan Hájek, Wlodek Rabinowicz, David Schmeidler, and others.

Olivier Roy

1. Type of Affiliation with the MCMP

Olivier Roy (Bayreuth) is an External Fellow of the MCMP who visited the Center for various short periods of time throughout 2014. He is funded by the University of Bayreuth.

2. Research Projects

In the period covered, Olivier Roy worked on the "epistemic foundations" of game theory, continuing a long standing collaboration with Eric Pacuit (UMD, Maryland). They are preparing a monograph on the topic, parts of which have recently been published as entry in the *Stanford Encyclopedia of Philosophy* [Pacuit and Roy, 2015]. The question of rationality in games raises important issues regarding the very logical structure of norms and their justification. This has led him to work on a new understanding of deontic modals, i.e. obligations, recommendations, and permissions, in collaboration with Norbert Gratzl, Albert Anglberger (both MCMP) and Huimin Dong (Bayreuth) [Roy et al. 2014a, 2014b, manuscript]. They coined this theory the logic of "obligations as weakest permissions." In parallel, together with Martin Rechenauer (Konstanz and MCMP), Olivier Roy is using modern logical tools to understand one prominent model of the justification of norms: Scanlon's contractualism [Roy and Rechenauer, 2014]. Finally, for many years this interest for norms of rationality has been coupled with an interest for articulating individual and collective decision-making demands. The problem is one of balancing strategic and collaborative consideration, and it crucially involves one's own expectations about what the others will do, and also what they expect of us. This is a problem about which the perspective of epistemic game theory can contribute substantially, and which is in fact the object of the recent DFG grant that Olivier Roy obtained together with Anne Schwekenbecher (Perth, AU) for the initialization of an international collaboration.

3. Academic Output

1. (with Jan-Willem Romeijn) "Radical Uncertainty: Beyond Probabilistic Models of

Beliefs'", in *Erkenntnis*, in press.
2. (with Jan-Willem Romeijn) "Deliberation: individual and Social'", in *Economics and Philosophy*, in press.
3. (with Eric Pacuit) "Epistemic foundations of game theory", in *Stanford Encyclopedia of Philosophy*, in press.
4. (with Ole Thomassen Hjortland) "Dynamic Consequences for Soft Information", *Journal of Logic et Computation*, May 2014.
5. (with Albert Anglberger and Huimin Dong) "Open Reading without Free Choice", in: Cariani et al. (eds.), DEON'14, June 2014.
6. (with Martin Rechenauer) "The Logical Structure of Scanlon's Contractualism", in: Cariani et al. (eds.), DEON'14, June 2014.
7. (with Albert Anglberger and Norbert Gratzl) "The Logic of Best Action from a Deontic Perspective", in: A. Baltag and S. Smets (eds.), *Johan F.A.K. van Benthem on Logical and Informational Dynamics*, Trends in Logic Series, September 2014.

Further activities:
- ESSLLI course "Proof Theory for Modal Logic", together with Norbert Gratzl (MCMP).
- Preparations for a guest lecture on MCMP's Coursera's course "Introduction to Mathematical Philosophy".
- Originator of a DAAD-funded, German-Czech collaboration project on "Substructural Logic and Information Dynamics". Two bilateral workshops in Prague organized, visit of Ondrej Majer (Czech Academy of Sciences) and Marta Bilkova (Charles University) in Munich. The leadership of this project was then transferred to Norbert Gratzl (MCMP).
- Grant obtained: DFG scheme for the Initiation of an International Cooperation, project "Moral Obligations for Large-Scale Collective Actions", together with Anne Schwenkenbecher (Murdoch University, Perth, Australia).
- Grant proposals (all still under evaluation): 1. DFG-Poland bilateral funding scheme "Beethoven", project "Permissions, Information and Institutional Dynamics, Obligations, and Rights" (PIOTR), with Robert Trypuz and Piotr Kulicki (both John Paul II Catholic University Lublin, Poland); 2. DFG-ANR (France) bilateral funding scheme, project "Collective Attitudes Formation" (ColAForm), with Michael Cozic (Paris); 3. DFG-GACR (Czech Republic) bilateral funding scheme, project "From Shared Evidence to Group Attitudes" (SEGA), with Marta Bilkova (Charles University) and Ondrej Majer (Czech Academy of Science).

Articles:
Eric Pacuit and Olivier Roy, "Epistemic foundations of game theory'", in: E. Zalta (ed.), *Stanford Encyclopedia of Philosophy*, Spring 2015 edition.

Olivier Roy, Albert Anglberger, and Huimin Dong, "Open Reading without Free Choice", in: Cariani et al. (eds.), DEON'14, Lecture Notes in Computer Sciences, June 2014a.

Olivier Roy, Albert Anglberger and Norbert Gratzl, "The Logic of Best Action from a Deontic Perspective", in: A. Baltag and S. Smets (eds.), *Johan F.A.K. van Benthem on Logical and Informational Dynamics*, Trends in Logic Series, September 2014b.

Olivier Roy, Albert Anglberger and Norbert Gratzl, "The Logic of Obligation as Weakest Permission", under review at the *Review of Symbolic Logic*.

Olivier Roy and Martin Rechenauer, "The Logical Structure of Scanlon's Contractualism", in: Cariani et al. (eds.), DEON'14, Lecture Notes in Computer Sciences, June 2014.

Gil Sagi

1. Type of Affiliation with the MCMP

Gil Sagi was an MCMP Postdoctoral Fellow in the period between January 1st 2014 and December 31st 2014, funded by the MCMP. (In the meantime, she is an Assistant Professor at the MCMP.)

2. Research Projects

Gil Sagi's research was devoted to issues concerning logicality and model theory. She developed and expanded her work on the meaning of logical terms in model-theoretic semantics. One avenue of research was studying the view by which logical operations in model-theoretic semantics represent intensions, and drawing implications for criteria for logicality. Another avenue of research connects logicality and meaning in a novel manner. The (logical) forms of expressions on the proposed view are on a level of meaning comparable to the level of extensions and intensions. Forms are more coarse-grained than extensions and intensions, and formal languages of pure logic are characterized as "sub-extensional". An additional topic she pursued was that of contextualist accounts of the liar paradox. In her work on that topic, she showed that such approaches are committed to semantic relativism.

3. Academic Output

Papers that were published in the said period:

- "Models and Logical Consequence", *Journal of Philosophical Logic*, 43: 943-964, 2014.
- "Formality in Logic: From Logical Terms to Semantic Constraints", *Logique et Analyse*, 227: 259-276, 2014.

Papers that were submitted to journals in that period:

- "The Modal and Epistemic Arguments Against Invariance Criteria for Logical Terms" (accepted in March 2015)
- "Contextualism, Relativism and the Liar" (still under review)

Papers that were in preparation in that period:

- "Logicality and Meaning" (submitted in March 2015. Earlier version was entitled "What is a fixed term?")
- "Extensionality and Logicality".

Talks:

- "What is a Fixed Term?", Invited talk for the Young Epistemology and Logic Workshop in Graz, November 2014.

- "What is a Fixed Term?", Harvard Logic Seminar, September 2014.
- "What is a Fixed Term?" Invited talk for the ERE 2014 Workshop (part of ECAP8), Bucharest, September 2014.
- "Formality in Logic: From Logical Terms to Semantic Constraints", Models in Formal Semantics and Pragmatics ESSLLI Workshop, Tübingen, August 2014.
- "Contextualism, Relativism and the Liar", Philosophy Department at the University of Konstanz, June 2014.
- "Extensionality and Logicality", Third Reasoning Club Conference, Kent, June 2014.
- "Extensionality and Logicality", Logica Symposium, Hejnice, Czech Republic, June 2014.
- "Formality in Logic: From Logical Terms to Semantic Constraints", Logic Grammar and Meaning Conference, The University of East Anglia, June 2014.
- "Contextualism, Relativism and the Liar", Third Workshop on Philosophy of Logic, Munich - Buenos Aires Logic Group, April 2014.
- "What is a Fixed Term?", Buenos Aires Logic Group, SADAF, April 2014.
- "Formality in Logic: From Logical Terms to Semantic Constraints", Buenos Aires Logic Group, SADAF, March 2014.
- "Contextualism, Relativism and the Liar", *The Munich Center for Mathematical Philosophy*, LMU, January 2014.

Interviews:

- Scholion Research Center, The Hebrew University of Jerusalem, December 2014.

Further activities:

- Organization of reading group: "Homotopy Type Theory", at the MCMP, November 2013 – July 2014.
- Conference attended: "Symposium of the Foundations of Mathematics", Vienna, July 2014.
- Visit to other academic institution: Buenos Aires Logic Group, SADAF, March 23rd – April 7th 2014.

Sam Sanders

1. Type of Affiliation with the MCMP

Sam Sanders is a Postdoctoral Fellow at the MCMP who is funded by an Alexander vo Humboldt Fellowship. He worked at the MCMP throughout January 1st 2014 to December 31st 2014.

2. Research Projects

Sam Sanders' research focused on the foundational role of Nonstandard Analysis. In particular, he obtained various mathematical results, interesting in their own right, but also with foundational and philosophical implications. Good examples are papers number 1) and 4) below, in which a nonstandard arithmetical formulations are given for impredicative objects. These mathematical results cast a serious shadow over the Russell-Weyl-Fefermann-program in the philosophy of mathematics, as discussed in paper 8).

Another good example of this foundational enterprise is paper 5), in which it is shown that second-order arithmetic implicitly involves higher-order objects due to the coding needed to represent analysis (as in e.g. Reverse Mathematics). In paper 9), he and co-author B. Eastaugh discuss the dire implications of such results for philosophical programs as nominalism.

3. Academic Output

The first seven papers on his arXiv website were prepared during 2014.:
http://arxiv.org/find/math/1/au:+Sanders_S/0/1/0/all/0/1

A full list is as follows:

1) "Bar recursion as primitive recursion with nonstandard numbers".
Sam Sanders

2) "Reverse Mathematics of Brouwer's continuity theorem and related principles".
Sam Sanders

3) "Uniform and nonstandard existence in Reverse Mathematics".
Sam Sanders

4) "Searching through the reals".
Sam Sanders

5) "More than bargained for in Reverse Mathematics".
Sam Sanders

6) "Taming the Reverse Mathematics zoo".
Sam Sanders

7) "Transfer equals comprehension".
Benno van den Berg and Sam Sanders

These papers were also submitted for publication and/or were presented at conferences.

Papers that are "work in progress" are as follows:

8) "On the contingency of predicativism" (Presented at SOTFOMII).
Sam Sanders

9) "On the pitfalls of formalization".
Benedict Eastaugh and Sam Sanders

10) “On the constructive nature of physics”.
Stephan Hartmann and Sam Sanders

11) “On the local constructivity of Nonstandard Analysis”.
Horst Osswald and Sam Sanders

12) “Explaining Reverse Mathematics”.
Damir Dzhafarov and Sam Sanders

Furthermore, Sam Sanders presented the following talks at conferences and scientific institutes:

1) Visit to Tohoku University and Keio University (Sendai and Tokyo) with a talk in Sendai and a commentator role in Tokyo (Feb 5 – March 4)

http://ctj.keio.ac.jp/news/2-26-27-philosophy-of-mathematics-and-logic-meeting

http://www.sendailogic.com/index.html

2) Talk during CORCON kick-off meeting in Genoa (March 2014, Italy).

http://www.illc.uva.nl/LogicList/newsitem.php?id=6452

3) Talk during the 2014 Arbeitstagung in Munchenwiller (UBern)

4) Talk during CiE2014 in Budapest (Hungary, June 2014)

5) Attendance of WTC in Prague (Czehc Replublic June 2014)

6) Talk during the Vienna Summer of Logic (Vienna, Austria, July 2014)

7) Attendance of Summer School in Chiemsee (July 2014, co-organized by MCMP)

8) Visit with three talks to Bulgarian Academy of Science and Sofia University (Nov 5 – Nov 12 2015)

9) Visit to Sendai and Tokyo with talk in Sendai (Nov 19 – 30)

http://www.sendailogic.com/index.html

Further activities:

Sam Sanders won the Silver Kurt Goedel medal in the 2014 KGRP competition:

http://fellowship.logic.at/

He reviewed two paper in Reverse Mathematics for CiE2015 in Budapest, as mentioned in the conference proceedings. Finally, he also visited Ulrich Kohlenbach at the University of Darmstadt in January 2014.

Thomas Schindler

1. Type of Affiliation with the MCMP

Thomas Schindler is an MCMP Doctoral Fellow, funded by the MCMP, who was working on his thesis throughout 2014 (with research stays in between at the University of Buenos Aires, which were partially funded by the joint Buenos Aires-Munich-DAAD project on "Modality, truth, and paradox").

2. Research Projects

Thomas Schindler was investigating the computational complexity of truth (with Stanislav Speranski), the relation between the T-schema and set-theoretic comprehension, and how the T-schema allows the truth predicate to fulfill its logical function (with Lavinia Picollo). From August he was mainly occupied with finishing his PhD thesis, which he submitted in October 2014 (and in the meantime defended successfully).

3. Academic Output

Papers:

"Axioms for Grounded Truth", *The Review of Symbolic Logic* 7 (2014), pp. 73-83.

"A disquotational theory of truth as strong as Z2-", 18 p., *Journal of Philosophical Logic* (2014), Online First, DOI: 10.1007/s10992-014-9327-5.

"Arithmetic with Fusions" (with J. Ketland), 20 p., *Logique et Analyse* (accepted).

"La Paradoja de Cantor (Cantor's Paradox)", in: E. Barrio (ed.), *Paradojas, Paradojas y más Paradojas,* College Pub., London (2014), pp. 199-212 (ISBN: 978-1- 84890-161-2).

Talks:

"A note on truth and comprehension", Logic Colloquium, Buenos Aires (Argentina), November 2014 (invited).

"Deflationism and the purpose of truth", 3rd Reasoning Club Conference, Canterbury (UK), June 2014 (invited).

"Deflationism and the purpose of truth", Logic Workshop, Buenos Aires (Argentina), April 2014 (invited).

Further activities:
Two of Thomas Schindler's applications in that period of time were successful: he was offered a visiting appointment from the Tilburg Center for Logic, General Ethics, and Philosophy of Science (TiLPS) for April and May 2015. He was offered a Junior Research Fellowship at Clare College Cambridge for the period from October 2015 to September 2018. He accepted both of them.

Conferences attended: Logic Workshop 2014, Buenos Aires (Argentina), April 2014; 3rd Reasoning Conference, Canterbury, June 2013; Summer School on Proof, Truth and Computation, Chiemsee (Germany), July 2014.

Gregor Schneider

1. Type of Affiliation with the MCMP

Gregor Schneider was a Visiting Fellow at the MCMP in 2014 (covered by LMU/MCMP funds in September and October 2014).

2. Research Projects

Gregor Schneider's research topics in 2014 comprised:

a) Mathematics and ethics: he discovered a strong relation between geometry and virtue ethics in ancient philosophy, a parallelism of Euclid's *Elements* and Aristotle's *Nicomachean Ethics*, which can be established by prior findings of mine concerning the virtues and geometrical diagrams in Plato's *Meno*.

b) The reconstruction of Euclid's axiomatization of elementary geometry: he was able to provide a historically appropriate and systematic justification of all five Euclidean postulates (see his articles).

c) Mathematics and pedagogy: he investigated the pedagogy of mathematics, the diagnosis and therapy of developmental dyscalculia, and the history of mathematics to build a new theory of (embodied) mathematical imagination which overcomes the 20th century gap between abstract thoughts and visualizations in the didactics of mathematics and cognitive psychology, and the gap between syntax and model in modern logic.

d) Problems in the foundation of mathematics: his research was focused on the formalization of informal set theory, the existence of non-standard models of PA, and the relation of thought and image in axiomatizations.

3. Academic Output

"The Interpretation of Classes in Axiomatic Set Theory". In: *Formalism and Beyond* (ed. by G. Link), 2014, pp.275-313. (with D. Roth)

"On Euclid's Five Postulates"*, Revista Brasileira de História da Matemática*, 2015 (accepted).

"Setting things straight. A new reading of Plato's concepts round and straight in Parmenides 137de" (under review).

"Die metamathematische Rechtfertigung der euklidischen Postulate" (under review).

"Mathematical structuralism and mathematical imagination. The indistinguishability of mathematical objects and their value for axiomatizations" (in preparation).

"Plato on Aristotle's ethics in the Meno" (in preparation).

"Mathematische Vorstellungsbildung in der pädagogischen Praxis" (in preparation).

Article in the dm-magazine *alverde*/*atempo*, May 2014 (print run: 1.3 M): "Über die Einheit der Welt. Gottfried Willhelm Leibniz' «Monadologie»".

In September 2014 Gregor Schneider applied successfully for a six-month project and post-doc grant about a comparison of ancient and 20th century ideas in a philosophically grounded pedagogy of mathematics.

Stanislav Speranski

1. Type of Affiliation with the MCMP

Stanislav Speranski is a Postdoctoral Fellow at the MCMP who is funded by an Alexander von Humboldt Fellowship. In 2014 he spent the final two months at the MCMP (since his fellowship started on 01/11/2014).

2. Research Projects and **3. Academic Output**

Monadic second-order arithmetic plays a key role in logic, the foundations of mathematics and those of computer science. In particular, related definability and computability techniques have been successfully applied in probabilistic logics, Kripke's theory of truth, adaptive logics, and more. Conventionally, the basic language is such that all arithmetical functions and relations on the natural numbers are first-order definable. However, in many situations we want to drop this strong requirement. So one of the most important and fundamental questions here is:
- Which weak arithmetical structures (on the domain of the natural numbers, and whose first-order theories are decidable) behave like the standard model in the monadic second-order setting?
Stanislav Speranski proposes an attractive approach to proving that a given weak arithmetical structure indeed behaves in this way. The approach itself and some important applications of it will appear in his article in the journal *Computability*; see below.
Also in that period he started to work together with Thomas Schindler (MCMP) on clarifying and generalising some definability, expressibility, and complexity results in Kripke's theory of truth.
In the same period, he started to prepare his paper "Some new results in monadic second-order arithmetic", which was recently (that is, in the first part of April 2015) accepted for publication in *Computability*, i.e. the journal of the Association of Computability in Europe.
Also he started to prepare some material for a joint paper with Thomas Schindler; its working title is "Truth, definability, comprehension", and it concerns Kripke's theory of truth; this paper is still in preparation.
Furthermore, Stanislav Speranski gave two talks in the Colloquium in Mathematical Philosophy at the MCMP:
- "A useful method for obtaining alternative formulations of the analytical hierarchy" (06/11/2014);
- "Quantified probability logics: how Boolean algebras met real-closed fields" (04/12/2014).

He participated in one meeting which was organised by the Alexander von Humboldt Foundation (in Würzburg, Germany). An abstract appeared in the documents of the meeting: S.O. Speranski (2014). "Non-deductive logics: expressibility vs. computability". Networking Guide, Network Meeting of the Alexander von Humboldt Foundation, 26–28 November 2014, Julius-Maximilian University of Würzburg, pp. 35–36.

Florian Steinberger

1. Type of Affiliation with the MCMP

Florian Steinberger was an Assistant Professor at the MCMP in 2014 (funded by the MCMP and LMU).

2. Research Projects

In 2014, Florian Steinberger continued to pursue two principal lines of research. The first project is concerned with the question of the normative status of logic: in what sense, if any, can logic be said to have normative authority over our thinking? During the last year he explored this question from a number of angles, both historical (Kant, Frege, Carnap) and systematic. It is also the topic of his habilitation, which he is writing under the supervision of Prof. Hannes Leitgeb, Prof. John MacFarlane (UC Berkeley), Prof. Josef Perner (University of Salzburg). The second project examines a view in the philosophy of language and logic known as (logical) inferentialism. Here he was primarily concerned with the clarification of various foundational conceptual issues, with the correct formulation of the central notion of *harmony*, as well as with the ramifications of the view so understood for our knowledge of logic and for our understanding of the logical constants.

3. Academic Output

Publications:

"Frege and Carnap on the Normativity of Logic", forthcoming in *Carnap on Logic*, special issue of *Synthese*, G. Schiemer (ed.).

"How Tolerant Can You Be: Carnap on Rationality", to appear in *Philosophy and Phenomenological Research*.

"Inferential Role Semantics" (with Julien Murzi), to appear in *Blackwell Companion to Philosophy of Language*, second edition, B. Hale, A. Miller and C. Wright (eds.).

"The Normative Status of Logic", commissioned entry for *Stanford Encyclopedia of Philosophy*.

Furthermore:

Books in preparation:

- *Inference and Logic* (with Julien Murzi).
- *The Normativity of Logic.*

Editorial Work:

- *Logical Inferentialism* (with Neil Tennant), under review at *Routledge*.

Manuscripts:

- "Understanding and Inference", in preparation.
- "On the Constitutive Normativity of Logic", in preparation.

- "Consequence and Credence", in preparation.

- "The Bridge From Logic to Epistemology", in preparation.

Talks:

- Nov 2014, "Three Ways Logic May Be Normative", Mathematics: Objectivity By Representation' Workshop, Munich
- Sep 2014, "Understanding and Inference", LangCog Workshop, University of Lisbon (submitted)
- Aug 2014, "Modal Logic", Summer School in Mathematical Philosophy for Female Students', MCMP Munich
- May 2014, "Credence and Consequence", ExGen Conference, University of Uppsala
- Mar 2014, "Explosion and the Normativity of Logic", University of Cambridge (invited)
- Jan 2014, "Rationality for Us", University of Oxford (invited)

Job interviews:

- May 2014, Monash University (offer made – declined).

- May 2014, Birkbeck College, University of London (offer made – accepted).

Further activities:

- Course Coordinator MCMP

- Deputy Women's Officer, Faculty of Philosophy, Philosophy of Science and Religious Science

- Junior Researcher in Residence, Center for Advanced Studies, LMU Munich (summer term 2014)

- Conference Grants (Mind Association, Aristotelian Society) 1700 Pounds – successful

Johannes Stern

1. Type of Affiliation with the MCMP

Johannes Stern is a Postdoctoral Fellow at the MCMP who was funded by the DFG Project on "Syntactical treatments of interacting modalities" through most of 2014. From 1.11-31.12.2014 he was a Visiting Fellow at the MCMP (funded by the MCMP).

2. Research Projects

In 2014 Johannes Stern substantially revised and submitted the papers "Axiomatizing Semantic Theories of Truth?" (together with his co-authors), "Necessities and Necessary Truths. Proof-theoretically" and "How Belieflike Can a Modal Operator Be?". The first

paper discusses the connection between axiomatic and semantic theories of truth. The second paper is a contribution to the debate whether modal notions are best conceived of as operators or predicates. The third paper offers a limitative result for self-referential treatment of belief.
He also finished the revisions of his doctoral thesis, which he submitted for publication. Furthermore he continued his research project on norms of truth on which he is currently writing a paper. Further novel research is concerned with the prospects of axiomatizing supervaluational truth in some non-classical logic.

3. Academic Output

Monographs:

Toward Predicate Approaches to Modality, forthcoming in Trends in Logic, Springer.

Peer-reviewed journals:

1. "Necessities and Necessary Truths. Proof-Theoretically.", *Ergo*, forthcoming (24 pages).

2. "Axiomatizing Semantic Theories of Truth?" (with M. Fischer, V. Halbach and J. Kriener), *The Review of Symbolic Logic*, FirstView:1-22.

3. "Paradoxes of Interaction?" (with Martin Fischer), *Journal of Philosophical Logic*, Online First 2014, DOI 10.1007/s10992-014-9319-5.

4. "Modality and Axiomatic Theories of Truth I: Friedman-Sheard", *The Review of Symbolic Logic* 7(2): 273-298, 2014.

5. "Modality and Axiomatic Theories of Truth II: Kripke-Feferman", *The Review of Symbolic Logic* 7(2): 299-318, 2014.

6. "Montague's Theorem and Modal Logic", *Erkenntnis* 79(3): 551-570, 2014.

Submitted:

"How Belief-Like Can a Modal Operator Be?"

Talks:

5. 9.2014: "A New Norm for Truth", Colloquium Logicum 2014, Neubiberg.

Together with Martin Fischer and Hannes Leitgeb, he secured funding for an 18-month extension of the DFG project "Syntactical Treatments of Interacting Modalities."

He organized a one-day workshop on Predicate Approaches to Modality (MCMP, Munich, 12.09.2014).

In 2014 he was a referee for *Abstracta*, *Incipiens*, *Mind*, *Studia Logica* and *The Review of Symbolic Logic*.

Marta Sznajder

1. Type of Affiliation with the MCMP

Marta Sznajder is an MCMP Doctoral Fellow (funded by the MCMP) who spent the whole year 2014 at the MCMP.

2. Research Projects

Marta Sznajder was working on her dissertation about the use of conceptual spaces in inductive logic. In the Basic System of Inductive Logic, the last published account of his late inductive logic, Rudolf Carnap introduced a new element to the systems of inductive logic, namely the so-called attribute spaces. These geometrical structures meant to model meanings of the predicates of the object language have a very similar structure to the conceptual spaces employed by cognitive scientists like Peter Gärdenfors. The first goal of her project was to develop a critical understanding of Carnap's Basic System and the role of attribute spaces within it. Then she compared attribute spaces with conceptual spaces in the more recent literature.

3. Academic Output

Papers under review:
"Intensional transitive verbs in dialog", under review in *Journal of Philosophical Logic*.
"A geometric principle of indifference", with I. Douven and L. Decock, under review in *Journal of Applied Logic*.

Papers in preparation:
"Inductive logic and conceptual spaces: Carnap's Basic System and beyond".
"The relative a priori and theory change in late Carnapian inductive logic".
"Inductive logic on conceptual spaces", with J. W. Romeijn.

Talks given:
"Anything goes? - Late Carnap, Inductive Logic, and Bayesianism", Philosophy of Probability, Venice International University, April 2014.
"A geometrical rationality constraint in Carnapian inductive logic", Reasoning Club Conference, University of Kent, June 2014.
"Geometrical representations of concepts in inductive logic", Inductive Logic and Conformation in Science II, University of Utah, October 2014.

Conferences attended:
Celebration event in honour of Johan van Benthem, Amsterdam, September 2014
Imprecise Probabilities in Statistics and Philosophy, MCMP, June 2014

Visits to other academic institutions:
She visited the Department of Theoretical Philosophy at the University of Groningen between September and December 2014, working with Jan-Willem Romeijn. During that time she also co-organized a reading group on formal epistemology.

She was a referee for a volume in the *Synthese* Library.

Dietmar Zaefferer

1. Type of Affiliation with the MCMP

Dietmar Zaefferer is an Emeritus at LMU who spent the entire year of 2014 as Visiting Fellow of MCMP. He was self-funded.

2. Research Projects

Dietmar Zaefferer's research in 2014 was focused on two strands, one belonging to the very foundations of linguistic theory, the other to the interface between linguistics and formal logic.

(a) Strand one aims at explaining at least some of the structures found in all human languages (linguistic universals) by relating them to their neighborhood in the human mind and investigating the ways our faculty of language is embedded in, and partially shaped by, the human faculty for planning, performing and understanding actions and other events. He therefore christened it *Shared Structures of Language and Action*. One of the most intriguing findings of this research was the discovery, that the closest relative of linguistic structures in the structure of action is neither syntactic nor semantic structure, but what linguists call information structure: The difference between an entity viewed as displaying a gap between its actual and its preferred state and whatever closes this gap. In plain action this gap is mostly a material one, whereas in language it is always epistemic in nature.

(b) Strand two is concerned with the ubiquitous phenomenon of conceptual relativization, which is reflected in language not only in overt bi-clausal conditional constructions like *'If you're happy and you know it, clap your hands!*' (to quote a well-known children's song), but also by monoclausal sentences such as *'In case of danger, break glass*', by microtexts like *'Short of cash? Try cyberbegging'* or phrases such as *'out of sight, out of mind'*. Here the prominent finding is the analogy between spatial, temporal and situational relocation: conditional constructions relativize the main content to a certain situation just like local and temporal constructions relativize the main content to certain domains in space or time.

3. Academic Output

(a) - Efforts on strand one went mainly into a meeting that Dietmar Zaefferer organized together with Roel Willems (Radbout University and Max Planck Institute for Psycholinguistics) and which took place in 2014. This event was a theme session at the 36th Annual Conference of the German Linguistic Society (March 5-7, 2014, Marburg University, Marburg/Lahn, Germany). In line with the overall conference topic ""God particles" of language? Theoretical and empirical approaches and the future of linguistic categories" it was called "Converging Evidence? Embodied Views of Basic Categories in Language and Cognition".

- One outcome of this workshop was published as Report of Theme Session 8 in the *Mitteilungen der DGfS* Nr. 79, Juni 2014, pp. 53 - 57.

(b) Intermediate results of strand two were presented and discussed at a talk given at MCMP on May 15, 2014, under the heading "Do Modus Ponens and Tollens Really Leak? Remarks from a Linguistic Semanticist".

There he argued that at least some, and possibly all, of the so-called counterexamples to classical conditional-based syllogisms such as *modus ponens* and *modus tollens* proposed in the philosophical literature disappear as soon as the coding sentences are given an appropriate semantic analysis that captures the abovementioned spatial, temporal and situational relocation expressed in the problematic examples.

Further activities:

- One application for external funding submitted October 1, 2013 by Roel Willems (Radbout University and Max Planck Institute for Psycholinguistics) and the undersigned was a proposal for a research program lasting for three years plus three more if extended with the title *Shared structures of language and action* to the DFG (German Research Foundation) as part of the Priority Programme *XPrag.de: New Pragmatic Theories based on Experimental Evidence* (SPP 1727). This proposal was rejected in April 2014.

- In April 2014 e reviewed four papers for COLING 2014, the 25th International Conference for Computational Linguistics.

- In June 2014 he gave an interview for radioWissen of the *Bayerischer Rundfunk* (Bavarian Broadcasting, *BR*) on the topic of linguistic relativity. The program was aired on July 3, 2014.

Edward N. Zalta

1. Type of Affiliation with the MCMP

Ed Zalta is an External Fellow of the MCMP who spent June 2014 at the Center. He was funded by the MCMP.

2. Research Projects and **3. Academic Output**

- Two papers that Ed Zalta wrote with other MCMP visitors at the time (Christopher Menzel and Otávio Bueno) appeared in 2014:

- Bueno, O., Menzel, C., and Zalta, E., "Worlds and Propositions Set Free", *Erkenntnis*, 79 (2014): 797-820.

- Menzel, C., and Zalta, E., "The Fundamental Theorem of World Theory", *Journal of Philosophical Logic*, 43/2 (2014): 333-363.

- One other paper I co-authored appeared in 2014:

- Nodelman, U., and Zalta, E., "Foundations for Mathematical Structuralism", *Mind*, 123/489 (2014): 39-78.

- He was working with Hannes Leitgeb on a paper in defense of logicism in the philosophy of mathematics.

- His work on computational metaphysics, which continued during this period, led to an invitation to give a Plenary Lecture at the 25th International Conference on Automated Deduction (CADE-25) Berlin, Germany, 1-7 August 2015.

- His work in the philosophy of mathematics, which continued during this period, led to an invitation to give a Keynote Lecture at the Conference of the International Academy for the Philosophy of Science, A Coruña, Spain, September 21-23, 2015.

- He taught a blockseminar at the MCMP (12 lectures total: 3 lectures/week for 4 weeks).

We hope that this amounts to a helpful summary of what was going on academically at the MCMP in the period from 01/01/2014 to 31/12/2014.

Hannes Leitgeb, April 26th 2015
MCMP, LMU Munich