PhilMath Intersem 11. 2021

Juin 2021 / June 2021

Le séminaire aura lieu en format hybride. Pour obtenir le lien Zoom, merci de contacter Emmylou Haffner par email avec comme objet "Zoom-Intersem2021" / Seminar will be on face-to-face and on Zoom. For the link, thanks to write to Emmylou Haffner with subject "Zoom-Intersem2021"

Présentiel : salle Malevitch,483A, Université de Paris, bâtiment Condorcet, 10 rue Alice Domon & Léonie Duquet, 75013 Paris / Face-to-face: Room Malevitch, 483A, Building Condorcet, 75013 Paris (map p. 2).

Mercredi 2 juin / Wednesday June 2	
16:00 / 4 pm	Ouverture / Welcome
16:15–17:15 / 4:15pm – 5:15pm	Marco Panza (CNRS, IHPST, Université Paris 1 Panthéon Sorbonne) *Michael Detlefsen and Mark Luker on the Proof of the Four-Colors Theorem : Empiricism, Platonism, or both?*
17:30–18:30 / 5:30pm – 6:30pm	Andrew Arana (CNRS, Archives Henri Poincaré - PReST, Université de Lorraine) *A vectorial conception of problem-solving*
Jeudi 3 juin / Thursday June 3	
15:00–16:00 / 3pm – 4pm	Andrei RODIN (Saint Petersburg State University) *Mic Detlefsen on Frege-Hilbert Controversy*
16:15-17:15 / 4:15pm – 5:15pm	Paola CANTU (CNRS, Centre Gilles Gaston Granger, Aix-Marseille Université) *Peano's philosophical views between structuralism and logicism*
Lundi 7 juin / Monday June 7	
15:00-16:00 / 3pm – 4pm	Walt DEAN (University of Warwick) *A royal road to incompleteness?*
16:15-17:15 / 4:15pm – 5:15pm	Emmylou HAFFNER (Institut de Mathématique d'Orsay, Université Paris-Saclay) *Reassessing Dedekind's ideal of rigor?*
17:30–18:30 / 5:30pm – 6:30pm	Graham LEACH-KROUSE (Kansas State University) *Coabstraction and the Continuum*
Mardi 8 juin !! salle Mondrian (646A) / Tuesday June 8 ! Room Mondrian (646A)	
15:00–16:00 / 3pm–4pm	Jean-Jacques SZCZECINIARZ (SPHere, Université de Paris) *Mic Detlefsen on Hilbert's Program, some remarks*
16:15–17:15 / 4:15pm – 5:15pm	Sébastien MARONNE (Institut de Mathématiques de Toulouse, Université de Toulouse III Paul Sabatier) *The unreasonable effectiveness of infinite quantities in early modern geometry*
17:30–18:30 / 5:30pm – 6:30pm	Sean WALSH (UCLA, Department of Philosophy) *Infinitesimals, valued fields, and the orders of infinite smallness*
Lundi 14 juin / Monday June 14	
15:00-16:00 / 3pm – 4pm	Iulian TOADER (University of Vienna) *Revisiting Weyl on Dedekind on Proof and Intuition*
16:15–17:15 / 4:15pm – 5:15pm	Gerhard HEINZMAN (Archives Henri Poincaré - PReST, Univ. de Lorraine) *Poincaré against the logicians*
17:30–18:30 / 5:30pm – 6:30pm	John MUMMA (California State University of San Bernardino) *Seeing an equation in a field of dots*
Mardi 15 juin !! salle Rothko (412B) / Tuesday June 15 ! Room Rothko (412B)	
15:00 –16:00 / 3pm – 4pm	Chris PORTER (Drake University) *Chaitin's Omega and Information-Theoretic Incompleteness*
16:15–17:15 / 4:15pm – 5:15pm	Karine CHEMLA (CNRS, SPHere, Univ. de Paris, & Radcliffe Institute, Harvard University) *On Numbers as Formulas — A Second Attempt*
17:30-18:30 / 5:30pm – 6:30pm	Table ronde, avec / Roundtable with Matteo BIANCHETTI, Ellen LEHET (Notre Dame University), Mattia PETROLO (Universidade Federal do ABC), Paul TRANW HOANG (Lone Star College W University Park)

CAMPUS PARIS RIVE GAUCHE

| Paris 13e

1 LES GRANDS MOULINS

16 rue Marguerite Duras
- UFR LAC
- UFR LCAO
- Département LSH
- Bureau vie étudiante
- Bureau des relations internationales
- Service de l'orientation et de l'Insertion pro
- Service culture

2 LA HALLE AUX FARINES

Esplanade Pierre Vidal-Naquet
- Amphis
- SCRIPT
- FabLab
- Maison des étudiants et de la vie associative (MEVA)
- Relais handicap Diderot
- Service social et aide aux étudiants

3 TOUR VOLTAIRE

2 rue Marguerite Duras
- Réservée à l'administration

4 CONDORCET

4 rue Elsa Morante
- UFR Physique
- Département Sciences exactes
- Département HPS
- Laboratoire SPHERE

5 BUFFON

4 rue M.A Lagroua Weill-Hallé
- UFR Sciences du vivant

15 rue Hélène Brion
- Amphi Buffon

6 LAMARCK B

35 rue Hélène Brion
- UFR Chimie
- UFR Sciences du vivant
- UFR STEP

7 LAMARCK A

39 rue Hélène Brion
- Direction des études et de la formation
- Inscriptions

8 SOPHIE GERMAIN

8 Place Aurélie Nemours
- UFR Informatique
- UFR Mathématiques
- Locaux syndicaux étudiants
- Service des sports (inscriptions)
- Médecine préventive (SIUMPPS)
- Amphi Turing

9 rue de la Croix Jarry
- Complexe sportif

9 LAVOISIER

15/17 rue Jean Antoine de Baïf
- UFR Chimie

10 OLYMPE DE GOUGES

8 Place Paul Ricœur
- UFR EILA
- UFR Études anglophones
- UFR Études psychanalytiques
- UFR GHES
- UFR Linguistique
- UFR Sciences sociales
- École d'Ingénieur Denis Diderot
- Centre de Ressources en Langues

université PARIS 7 DE PARIS

USPC Université Sorbonne Paris Cité

MARDI 2 / TUESDAY 2

16:00–18:30, salle Malevitch (483A) / 4pm – 6:30pm, Room Malevitch (483A) / & Zoom

16:15–17:15 / 4:15pm – 5:15pm
Marco PANZA (CNRS, IHPST, Université Paris 1 Panthéon Sorbonne)
Mic Detlefsen on the 4 color theorem (titre provisoire)

17:30–18:30 / 5:30pm – 6:30pm
Andrew ARANA (CNRS, Archives Henri Poincaré - PReST, Université de Lorraine)
A vectorial conception of problem-solving

MERCREDI 3 / WEDNESDAY 3 15:00–18:30, salle Malevitch (483A) / 3pm – 6:30pm, Salle / Room Malevitch (483A) / & Zoom

15:00–16:00 / 3pm – 4pm
Andrei RODIN (Saint Petersburg State University)
Mic Detlefsen on Frege-Hilbert Controversy
16:15-17:15 / 4:15pm – 5:15pm
Paola CANTU (CNRS, Centre Gilles Gaston Granger, Aix-Marseille Université)
Peano's philosophical views between structuralism and logicism

This paper is part of a larger project that aims at a comprehensive historical and philosophical evaluation of the contributions of the Peano School to mathematics, logic, and the foundation of mathematics based on an investigation of the school's axiomatic practices. A detailed analysis of several mathematical practices that can be considered as markers of logicism is a fruitful way to reconstruct Peano's philosophical views : the link between functions and relations, the role of metatheoretical investigations, the kind of semantics, the use of definitions by abstraction, and the foundational or non-foundational value of axiomatics. This paper will focus on Peano's semantics, coping with an apparent contradiction in the Peano School approach to concept script. On the one hand, symbols stand for ideas. On the other hand, the linguistic expressions associated to the symbols are sometimes considered as meanings, sometimes as a way to read the symbols and sometimes as a way to indicate the adopted interpretation. Besides, they are used in the analysis of the independence of the axioms of arithmetic, where they sometimes occur together with the notion of interpretation. Focusing on this aspect and by means of a comparative investigation of Peano's logico-mathematical, linguistic and notational practices we would like to assess 1) whether Peano's symbolic language is a concept script and 2) whether Peano's symbolization is a formalization in modern sense. Peano's view is characterized as a form of structural algebraism, which differs from both the algebra of logic tradition using mathematical symbols to express logical calculi, and from Frege's logical investigation centred on the effort to understand the functional nature of predication.

17:30-18:30 / 5:30pm – 6:30pm
Tim BAYS (Notre Dame University) tbc

LUNDI 7 / MONDAY 7

15:00–18:30, salle Malevitch (483A) / 3pm – 6:30pm, Room Malevitch (483A) & Zoom

15:00-16:00 / 3pm – 4pm
Walt DEAN (University of Warwick)
A royal road to incompleteness ?

One of the goals of Detlefsen 1990 ("On an alleged refutation of Hilbert's program using Gödel's first incompleteness theorem") was to refute an argument popularized by Kreisel, Smorynski, and Simpson that Gödel's first theorem "effectively kills Hilbert's programme". The first goal of this talk will be to offer a reading of the second volume of Grundlagen der Mathematik (1939) which supports a key premise in

Detlefsen's argument — i.e. that Hilbert should not be understood as committed to the finitary decidability of real propositions or that his commitment to "real soundness" (i.e. that no sentence provable by an ideal theory can be refutable by real means) should be understood as engendering a commitment to "real conservativity". The second goal of the talk will be to trace the reception of the incompleteness theorems in Grundlagen der Mathematik —e.g. in regard to Hilbert & Bernays's use of the Liar paradox as a framework for presenting Gödel's results, the details of their formalization of the second incompleteness theorem, and its interaction with their formal truth definition for first-order arithmetic. Building on this and subsequent work on arithmetical incompleteness, I will finally illustrate a means by which these considerations connect with the second goal of Detlefsen 1990 —i.e. highlighting the potential aptness of "consistency-minded" definitions of provability (e.g. in the manner of Feferman 1960) in the formulation of ideal theories.

16:15-17:15 / 4:15pm – 5:15pm

Emmylou HAFFNER (Institut de Mathématique d'Orsay, Université Paris-Saclay)

Reassessing Dedekind's ideal of rigor ?

Ideals of rigor have been an important interest of Mic Detlefsen's. In this talk, I will start from Mic's analysis of Dedekind's ideal of rigor and question to which extent this ideal is relevant to rigor in the making, as observed in Dedekind's mathematical drafts. Indeed, considerations about rigor in mathematics often rely on questions of justification and/or verification of results, rather than how they were found. In this talk, I will propose to shift the focus and look behind the scene to consider the shaping of rigorous mathematics. This will raise an additional consideration : To what extent does rigor support or guide mathematical research in its various phases ? What are some consequences of such an ideal of rigor, if any, on mathematical research ? To do so, I will use two examples. Firstly, I will consider the genesis of his late Dualgruppe theory (equivalent to our modern lattice). Focusing on a specific law of Dualgruppe theory, I will show that the elaboration of a rigorous work can be the outcome of a process that is not necessarily so. I will put forward the trial-and-error and inductive aspects of Dedekind's research practices. Secondly, I will consider the genesis of Was sind und was sollen die Zahlen ?, Dedekind's famous essay on the natural numbers. Dedekind wrote several versions of this text, from the 1870s to 1888. I will particularly be interested in what seems to be an important step of mathematical writing, in Dedekind's drafts, namely arranging the order of propositions in a deductive hierarchy.

17:30–18:30 / 5:30pm – 6:30pm

Graham LEACH-KROUSE (Kansas State University)

Coabstraction and the Continuum

MARDI 8 / TUESDAY 8

15:00–18:30, salle Malevitch (483A) / 3pm – 6:30pm, Room Malevitch (483A)
& Zoom

15:00–16:00 / 3pm–4pm

Jean-Jacques SZCZECINIARZ (SPHere, Université de Paris)

Mic Detlefsen on Hilbert's Program, some remarks

16:15–17:15 / 4:15pm – 5:15pm

Sébastien MARONNE (Institut de Mathématiques de Toulouse, Université de Toulouse III Paul Sabatier)

The unreasonable effectiveness of infinite quantities in early modern geometry

17:30–18:30 / 5:30pm – 6:30pm

Sean WALSH (UCLA, Department of Philosophy)

Infinitesimals, valued fields, and the orders of infinite smallness

In the 1960s, Abraham Robinson famously used model theory to defend the coherence of the calculus as based on infinitesimals. In Appendix 2 to his 1974 paper "Differentials, Higher-Order Differentials and the Derivative in the Leibnizian Calculus," Bos argued that Robinson's non-standard analysis did not take into account the distinct orders of infinite smallness present in the infinitesimals in the historical calculus. In this talk, we describe how incorporating a valuation —in the sense of valued fields— can help non-standard analysis to overcome this deficit. After describing the proposal, we test it out on the historical cases from Euler and Bernoulli to which Bos drew attention. This is based on joint work with Tim Button, and in particular Sections 4.5-4.6 of the book *Philosophy and Model Theory* (Oxford University Press, 2018).

LUNDI 14 / MONDAY 14

15:00–18:30, salle Malevitch (483A) / 3pm – 6:30pm, Room Malevitch (483A)
& Zoom

15:00-16:00 / 3pm – 4pm

Iulian TOADER (University of Vienna)

Revisiting Weyl on Dedekind on Proof and Intuition

I reconsider an intriguing case of normative disagreement in the history of philosophy of mathematics : Weyl's criticism of Dedekind's principle that "In science, what is provable ought not to be believed without proof." The criticism is reconstructed as a series of three objections : (1) Dedekind's rigorous proofs are epistemologically incorrect and, thus, incapable of justifying belief, (2) withholding belief until rigorous proofs are given is epistemologically perverse, and (3) the proof revisions demanded by Dedekind are driven by epistemologically unreasonable norms of reasoning. I discuss several questions that Weyl's criticism, when properly understood, raises about normativity in mathematics, such as : What are the standards by which we assess higher-order norms of belief like Weyl's correctness and Dedekind's rigor ? Are these norms categorical, i.e., binding on everyone, or hypothetical, i.e., depending on one's goals ?

16:15–17:15 / 4:15pm – 5:15pm

Gerhard HEINZMAN (Archives Henri Poincaré - PReST, Univ. de Lorraine)

Poincaré against the logicians

Poincaré did not believe that logical reasoning could express the essential structure of an extensive mathematical proof. Instead of accepting the non-invariance of mathematical reasoning with respect to its

content one has to grasp the architecture of the subject in question (Detlefsen 1992). Subsequently the architecture involved was interpreted differently : as theorematic reasoning in Peirce's sense (Heinzmann 1995), as an aesthetic structure (Heinzmann 1997), as the right insight in what was later expressed by Hintikka's IF-logic (2012) and as the insight in what can be expressed by a dialogical type theoretical reconstruction of the Erlangen notion of a Constructive Language (Orthosprache ; Rahman 2012).

We will give an overview of these proposals and proceed to critical analysis of the arguments regarding Poincaré's general philosophical position.

17:30–18:30 / 5:30pm – 6:30pm

John MUMMA (California State University of San Bernardino)

Seeing an equation in a field of dots

A well known picture proof —discussed extensively in the work of Marcus Giaquinto— relies on conceiving the arithmetical equation 1+2+...+n=n(n+1)/2 in terms of a rectangular array of dots. The topic of my talk is the principle of arithmetical generality at play in the proof. The picture of the array does not, in fact, determine the path of reasoning to the general equation. There are (at least) two. In one, generality is secured via mathematical induction. Successive instantiations of the equation are identified in the picture. In the other, a symmetry displayed by a sub-configuration of the rectangle is recognized as independent of the rectangle's particular length. After describing both procedures for seeing the general equation, I reflect on the concept of number presupposed in the idea that a proof concerning it can be found in a picture of dots at all.

MARDI 15 / TUESDAY 15

15:00–18:30, ! salle Mondrian (646A) / 3pm – 6:30pm, !Room Mondrian (646A)

15:00 –16:00 / 3pm – 4pm

Chris PORTER (Drake University)

tba

16:15–17:15 / 4:15pm – 5:15pm

Karine CHEMLA (CNRS, SPHere, Université de Paris)

On Numbers as Formulas — A Second Attempt

In March 2019, at the Conference "Mathematics in Philosophy: Purity and Idealization", in honor of Mic Detlefsen, I gave a talk titled "On Numbers as Formulas." The talk gave rise to a written exchange with Mic, which leads me to return to the same issue from a different viewpoint. The key point will be to contrast contentual and non-contentual ways of computing, and from this perspective highlight in which respect some inscriptions of numbers have been used as a basis for a formal work in mathematics.

17:30-18:30 / 5:30pm – 6:30pm

Table ronde, avec Matteo BIANCHETTI, Ellen LEHET (Notre Dame University), Paul TRAN-HOANG (Lone Star College - University Park)