Taming the Infinite:
Logic, Algebra, and Constructive Mathematics

University of Verona

Polo Didattico Zanotto
Viale Università, 4 - 37129 Verona
Room T.3

20 April 2026

Preliminary schedule

09:30 – 10:00	Michael Rathjen (online)	*Chairs tba*
10:00 – 10:30	Helmut Schwichtenberg	
10:30 – 11:00	*Coffee break*	
11:00 – 11:30	Hugo Herbelin	
11:30 – 12:00	Takako Nemoto	
12:00 – 12:30	Jan von Plato	
12:30 – 15:00	*Lunch break*	
15:00 – 15:30	Thierry Coquand (online)	
15:30 – 16:00	Laura Crosilla	
16:00 – 16:30	*Coffee break*	
16:30 – 17:00	Vasco Brattka	
17:00 – 17:30	Ihsen Yengui	
17:30 – 18:00	Gabriele Buriola	
18:00 – 18:30	Hajime Ishihara	

Under the auspices of

Abstracts

Vasco Brattka (University of the Bundeswehr Munich)

The Hahn-Banach Theorem in Computable, Constructive and Reverse Mathematics

The Hahn-Banach theorem is known to be equivalent to weak König's lemma in computable, constructive and reverse mathematics. We will discuss the different meanings of these equivalences and we will present some recent new results. In particular, we will show that the Hahn-Banach theorem exhibits its maximal complexity already on the sequence space ℓ_1.

The talk is based on joint work with Christopher Sorg.

Gabriele Buriola (Julius-Maximilians-Universität Würzburg)

A Constructive Picture of Noetherian Conditions and Well Quasi-Orders

From a constructive perspective the many notions of Noetherianity and well quasi-order form a rich landscape, which we here explore. Besides the well-studied conditions about sequences, we include the finite basis property of the original Higman lemma, trying a first joint analysis of Noetherianity and well quasi-order in the spirit of reverse mathematics with intuitionistic logic.

Thierry Coquand (University of Gothenburg)

Chevalley–Tarski, Joyal and constructible topology

Laura Crosilla (University of Florence)

Predicativity and taming the infinite

Hugo Herbelin (Inria Paris)

Computing with the full axiom of choice via generalised update induction

The generalisation of U. Berger's update induction to arbitrary domains can be seen as the contraposition of a functional variant of Teichmüller-Tukey lemma, which itself is classically equivalent to the full axiom of choice. Being a well-foundedness principle, generalised update induction can be computationally interpreted as a fixpoint combinator, from which a computational interpretation of the full axiom of choice can be obtained, using control operators to interpret classical logic.

The talk will be based on joint works with Jad Koleilat, Jessica Allegro and Étienne Miquey.

Hajime Ishihara (Toho University)

A constructive theory of uniformity

We introduce the constructive notion of a uniformity (uniform structure) with the spirit of Sambin's notion of a basic pair, and show some natural properties of a uniform space, a setoid with a uniform structure. Then we construct a completion of a uniform space as a setoid of Cauchy nets, and define a complete uniform space. We show that a double completion of a uniform space is uniformly equivalent to the completion of the uniform space and the completion of a uniform space is complete, and that product of completions of two uniform spaces is uniformly equivalent to the completion of product of the uniform spaces and product of two complete uniform spaces is complete. If time allows, we see some applications.

Takako Nemoto (Tohoku University)

Turing degrees in semi-intuitionistic arithmetic

We aim to reconstruct the theory of Turing degrees within intuitionistic arithmetic as much as possible. In this talk, we consider what kind of combinations of non-constructive principles and induction are sufficient to construct to show some properties of Turing degrees, e.g., the existence of two incomparable degrees.

Jan von Plato (University of Helsinki)

Are there "constructively strongest" formulas? A Gödelian problem and its solution

Michael Rathjen (University of Leeds)

Constructive Zermelo-Fraenkel Set Theory, Power Set, and the Calculus of Constructions

Classically, Lean's core foundation with a sequence of universes $U_0, U_1, U_2, \dots$, an impredicative Prop, and inductive types is known to have the same strength as ZF+ $<\omega$ inaccessibles. It appears that it is currently not known what the strength of the intuitionistic type system is. The plan is to tell what's known about some of the intuitionistic type and set theories with Prop.

Helmut Schwichtenberg (LMU Munich)

Taming the Infinite

Let C be the Scott-Ershov model of partial continuous functionals. We describe a formal theory TCF having C as its intended model. Every object is represented as a limit of its finite approximations. In this setting higher type constants can be defined by non-terminating equations. Examples are recursion or corecursion operators on streams of signed digits. TCF proves that every type has a cototal canonical inhabitant, which may be partial.

Ihsen Yengui (University of Sfax)

The Gröbner Ring Conjecture

We discuss the problem of constructing finite Gröbner bases over Prüfer domains.