



ARI: Past, Present, Future

Aart Middeldorp

University of Innsbruck



Outline

1. Past, Present, Future
2. Final Remarks
3. ISR 2024

Outline

1. Past, Present, Future
2. Final Remarks
3. ISR 2024

Austria – Japan joint project about development of infrastructure for software tools that aim to automatically (dis)prove confluence, termination and related properties in variety of rewrite formalisms, in connecton with Confluence Competition (CoCo) and Termination and Complexity Competition (termCOMP)

- A** To develop infrastructure to support the confluence and termination communities (including tool authors, competition organizers, and general researchers). Starting from the existing infrastructure for CoCo (including the Confluence Problems Database COPS and the community-serving web front end CoCoWeb), we will develop a collection of robust software tools for evaluating confluence, termination and complexity methods and tools.
- B** To make tools participating in CoCo more reliable by formalizing techniques in the proof assistant Isabelle/HOL such that more (dis)proofs produced by the tools can be certified, in particular for the commutation and infeasibility categories.
- C** To develop confluence and induction proving techniques for logically constrained rewrite systems (LCTRSs), a very expressive rewrite formalism in which rules are equipped with logical constraints which are checked by powerful SMT solvers.

Task A: Infrastructure

- ① problem format
- ② duplicate checking
- ③ tagging and query interface
- ④ LiveView
- ⑤ StarExec and CoCoWeb
- ⑥ equivalence of rewrite systems



Task B: Formalization and Certification

- ① commutation
- ② infeasibility
- ③ CPF format
- ④ formalization and certification for TRS/CTRS/GCR categories

- ▶ presentation by Dohan on Thursday
- ? certification for AGCP, CO3

Task C: Logically Constrained Rewrite Systems

- ① confluence
- ② implementation in Ctrl
- ③ rewriting induction
- ④ LCTRS category for CoCo

- ▶ semantics of LCTRSs
- ▶ presentation by Takahito on Wednesday

Outline

1. Past, Present, Future
2. Final Remarks
3. ISR 2024

- ▶ slides (beamer and 4-up version) will be made available from

<https://ari-informatik.uibk.ac.at/meetings/final>

- ? bylaws for termCOMP SC
- ? registrations for ISR 2024

University Center Obergurgl

- ▶ superb location (at 1940 meters)
- ▶ everything under one roof (lecture rooms, guest rooms, dining room, bar, sauna)
- ▶ full board
- ▶ reasonably priced
- ▶ easily accessible by train (tztal Bahnhof) and bus (Obergurgl)
- ▶ <https://www.uibk.ac.at/uz-obergurgl/>

Outline

1. Past, Present, Future

2. Final Remarks

3. ISR 2024

Location Lecturers and Courses Schedule Final Remarks

ISR 2024

- ▶ **three tracks**
 - A basic track on term rewriting
 - B basic track on lambda-calculus and type theory
 - C advanced track
- ▶ slots of 1.5 hours
- ▶ 5 courses in advanced track with 4 slots each
- ▶ August 25 (arrival) – September 1 (departure)
- ▶ **six days** (Monday – Saturday)
 - ▶ five days with courses
 - ▶ full day excursion (rafting, hiking, climbing, trail running, ...)

Outline

1. Past, Present, Future

2. Final Remarks

3. ISR 2024

Location Lecturers and Courses Schedule Final Remarks

Lecturers

▶ Frédéric Blanqui	Inria	track C
▶ Ugo Dal Lago	University of Bologna	track C
▶ Herman Geuvers	Radboud University Nijmegen	track B
▶ Nao Hirokawa	JAIST	track C
▶ Cynthia Kop	Radboud University Nijmegen	track C
▶ Aart Middeldorp	University of Innsbruck	track A
▶ Niels van der Weide	Radboud University Nijmegen	track B
▶ Sarah Winkler	Free University of Bolzano – Bozen	track C

Courses in Track C

▶ Randomized Programming and Rewriting	Ugo Dal Lago
▶ Interoperability of Proof Systems using Lambdapi	Frédéric Blanqui
▶ SAT/SMT Solving and Applications in Rewriting	Sarah Winkler
▶ Termination and Complexity in Higher-Order Term Rewriting	Cynthia Kop
▶ Tools in Rewriting	Nao Hirokawa

Outline

1. Past, Present, Future

2. Final Remarks

3. ISR 2024

Location Lecturers and Courses Schedule Final Remarks

	26.08 Monday	27.08 Tuesday	28.08 Wednesday	29.08 Thursday	30.08 Friday	31.08 Saturday
09:00–10:30	1	4	7	excursion	e4	12
10:30–11:00	break		break			
11:00–12:30	2	5	e3		10	13
12:30–14:00	lunch		lunch			
14:00–15:30	3	e2	8		11	e6
15:30–16:00	break		break			
16:00–17:30	e1	6	9		e5	test

	26.08 Monday	27.08 Tuesday	28.08 Wednesday	29.08 Thursday	30.08 Friday	31.08 Saturday
09:00–10:30	SW	UD	CK	excursion	FB	NH
10:30–11:00	break		break			
11:00–12:30	NH	SW	UD		CK	FB
12:30–14:00	lunch		lunch			
14:00–15:30	FB	NH	SW		UD	CK
15:30–16:00	break		break			
16:00–17:30	CK	FB	NH		SW	UD



Outline

1. Past, Present, Future

2. Final Remarks

3. ISR 2024

Location Lecturers and Courses Schedule Final Remarks