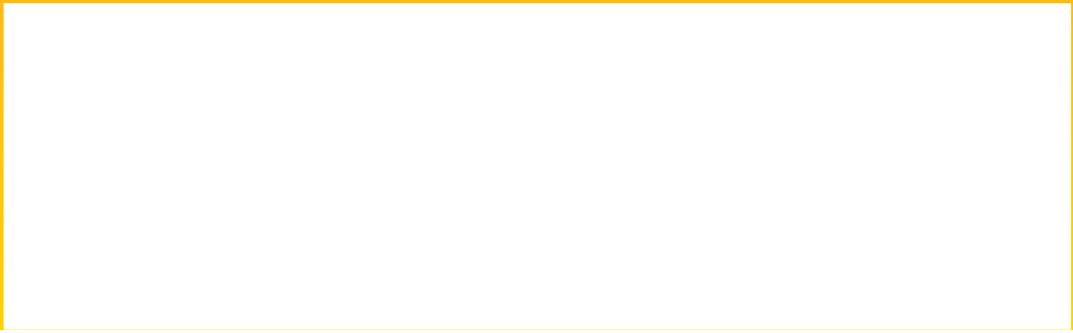




Vienna Center for  
Logic and Algorithms

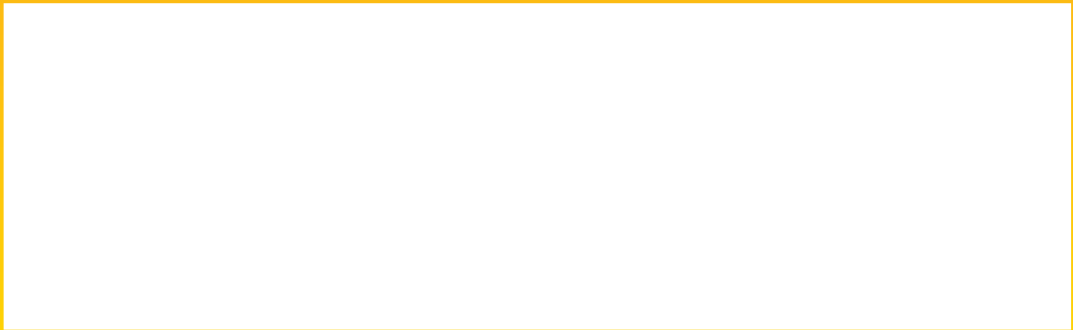


Annual Report 2022/2023



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# About VCLA



Vienna Center for Logic and Algorithms

The Vienna Center for Logic and Algorithms (VCLA) is a globally unique competence center in the field of logic and algorithm research.

It was founded in September 2011 and officially opened in January 2012 in the presence of the rector of the Technische Universität Wien (TU Wien) Sabine Seidler and Turing Award laureate Edmund M. Clarke. The Center was founded by Stefan Szeider and Helmut Veith and led by both until Helmut Veith passed away in March 2016.

In December 2017, Agata Ciabattoni became the new elected co-chair, and the VCLA board structure changed.

The VCLA was funded by TU Wien in association with the FWF - Doctoral College Logical Methods in Computer Science (LogiCS).

The Center aims at promoting international scientific collaboration in logic and algorithms and communicating Austria's excellence in these two areas



of computer science research, using a variety of channels.

These objectives are realized through various activities which include:

- The VCLA International Student Awards for Outstanding Theses
- The LogicLounge series
- The VCLA workshop series
- The VCLA series of winter and summer schools
- The VCLA visitor program
- Hosting talks by renowned international speakers
- Cooperations, and
- Educational outreach

In 2022/2023, all events could again be held in person. The Vienna World Logic Day Lecture, however, is held as an online event to allow for participation from abroad.

[www.vcla.at](http://www.vcla.at)

# In Memoriam

VCLA co-chair Helmut Veith (1971-2016) passed away under tragic circumstances on March 12, 2016.

Helmut was a vital part of the rebirth of the Austrian logic scene, and it was a matter close to his heart to build bridges between the computer science expert and the layman. His vision is being carried on by the students who he mentored, and his colleagues have launched a number of activities in his honor that will keep his legacy alive.

Helmut studied Computational Logic at TU Wien, a *studium irregulare* with a curriculum he designed himself, together with Richard Zach. After appointments at TU Munich and TU Darmstadt, he returned to TU Wien for a full professorship in Computer Aided Verification.

Helmut's passion for logic led him to establish not only the VCLA together with Stefan Szeider, but also to bring to Austria the largest logic conference in history - the Vienna Summer of Logic. Helmut served as the speaker of the Doctoral College "Logical Methods in Computer Science" and as the deputy coordinator of the National Research Network Rigorous Systems Engineering (RiSE).



Photo (c) Nadja Meister

Posthumously, Helmut was awarded the ERC Advanced Grant - one of the highest academic distinctions in Europe - for his project HYDRA (Harnessing Model Checking for Distributed Algorithms).

In honor of Helmut's advocacy for women in computer science, the TU Wien, the Wolfgang Pauli Institute, and Helmut's friends and colleagues funded the Helmut Veith Stipend for Female Master's Students. Memorial site listing his achievements in academia and beyond:

[www.vcla.at/2016/03/helmuth-veith-1971-2016](http://www.vcla.at/2016/03/helmuth-veith-1971-2016)

# Organization

The VCLA is coordinated by the executive board in consultation with the local board while taking into account the strategic advice from the external advisory board.

| Executive Board             |
|-----------------------------|
| Agata Ciabattoni (co-chair) |
| Thomas Eiter                |
| Matteo Maffei               |
| Reinhard Pichler            |
| Stefan Szeider (co-chair)   |
| Georg Weissenbacher         |

| Local Board       |
|-------------------|
| Matthias Baaz     |
| Pavol Cerny       |
| Laura Kovács      |
| Alexander Leitsch |
| Martin Nöllenburg |
| Magdalena Ortiz   |
| Stefan Woltran    |

| External Advisory Board                     |  |
|---|--|
| Roderick Bloem (TU Graz)                    | Georg Gottlob (TU Wien/Oxford University)      |
| Nadia Creignou (Université d'Aix-Marseille) | Anuj Dawar (University of Cambridge)           |
| Fedor Fomin (University of Bergen)          | Mirosław Truszczynski (University of Kentucky) |
| Moshe Y. Vardi (Rice University)            |  |

| PR and Project Management |
|---------------------------|
| Andrea Hackl              |

## Collaborations

The VCLA frequently collaborates with the following co-funding institutions:

- Kurt Gödel Society (KGS)
- Austrian Rigorous Systems Engineering (ARiSE)
- Wolfgang Pauli Institute (WPI)
- Institute of Science and Technology Austria (IST Austria)

## Logic and Algorithms Groups

The Center is hosted by six research groups at the Faculty of Informatics:

- Algorithms and Complexity Group
- Database and Artificial Intelligence Group
- Formal Methods in Systems Engineering Group
- Knowledge-Based Systems Group
- Theory and Logic Group
- Security and Privacy Group



# Activities

The VCLA annual report summarizes our activities throughout the year. This report provides details on the events and activities between October 1, 2022 and September 30, 2023. We divide the activities presented in this report into the following subsections:

- [LogicLounges and Guest Talks \(p. 10\)](#)

The LogicLounge is a series of public lectures bringing together the general public and experts from the fields of logic, philosophy, mathematics, computer science, and artificial intelligence.

- [Conferences \(p. 18\)](#)

They are organized by the members of the research groups hosting the VCLA.

- [Educational Outreach and Science Communication \(p. 22\)](#)

The VCLA is raising awareness about the field of logic and algorithms by running educational outreach projects for teachers and students as well as science communication activities for the general public.

- [VCLA International Student Awards \(p. 25\)](#)

These annual awards aim to recognize and support students all over the world for their outstanding Master and Undergraduate Theses in the field of Logic and Computer Science.

- [Helmut Veith Stipend \(p. 28\)](#)

The Helmut Veith Stipend is awarded annually to excellent international female students who pursue (or plan to pursue) one of the master's programs in Computer Science at TU Wien.

- [Cooperations \(p. 33\)](#)

The VCLA cooperates with academic programs and initiatives, as well as with initiatives raising awareness for gender mainstreaming and diversity in the field.

# Activities - LogicLounge

**At LogicLounge 2023, Carla Gomes and Bart Selman (Cornell, NY) explored the connections between Wittgenstein, Gödel, and ChatGPT.**

On June 6, 2023, the popular public lecture “LogicLounge” was again held at the restaurant/bar “Heuer am Karlsplatz”. The event and subsequent Q&A session was moderated by science journalist Sarah Kriesche, who works for an Austrian radio station (Ö1).

Bart Selman started the LogicLounge with an introduction in which he shared his thoughts on the launch and further development of ChatGPT: “ChatGPT has really transformed events in AI... We realized that this is a real advance that was not expected for another two or three decades – and when in AI we say two or three decades, we mean we don’t really know.”

The main advance, in Selman’s view, lies in commonsense reasoning, which is something that humans do automatically every single day, whereas it has been a challenge for machine learning models such as Google Translate. In its early days, the same was true for ChatGPT, but with versions 3.5 and 4, Selman found himself observing that commonsense reasoning suddenly worked, which he sees as an emergent phenomena. Carla Gomes believes that



ChatGPT can learn from context and has a good understanding of the world, as it has been trained on gigantic volumes of data. In her view, the main question is whether ChatGPT is just using syntactic rules, or if it actually creates a representation of the world, and she is slightly more cautious than Selman in referring to “an emergent behavior of common sense.”

Wittgenstein was one of the first philosophers to study the meaning and truth of a sentence. In the early phase of his work, he believed that a sentence got its meaning from its connection to the outside world, and offered a pictorial-representational theory in his well-known work *Tractatus Logico-Philosophicus*. In the second phase of his career, Wittgenstein abandoned

# Activities - LogicLounge

... continuation from page 10

this theory, stating that semantics was much more about the interaction between people and how languages were used, which he famously referred to as language games. This implied that semantics developed through its use, and Selman observed that ChatGPT acquired semantics in exactly the same way – purely from input, as it had no perception of the world. Gödel, on the other hand, investigated the semantics and limits of formal languages such as logic. His famous incompleteness theory posits that we cannot fully capture mathematical truths in a formal language, which was a revelation for scientists at the time. In Selman's view, ChatGPT blurs the distinction between formal and natural languages, as it can write sentences and code just as easily, and switches effortlessly between the two. This makes it similar to a mathematics textbook that contains both text and formulas.

With regard to ChatGPT's rather loose relationship to facts, Selman tells his students to think about the model as a valuable teacher or tutor. It is extremely good at explaining complex subject matter; however, you need to

double-check any references or citations that it provides. According to Gomes, this is because ChatGPT has been designed to summarize information, which is something that you should not do with, e.g., citations, as it results in a loss in compression. "It is a great tool that is going to get better and better," said Gomes, "but we need safeguards to prevent misinformation, and we need to consider the risks associated with such an amazing technology."

Selman believes that ChatGPT has all the aspects of intelligence, as it is not merely a feed-forward network, but has an architecture that allows it to reflect on itself, much like humans do. It does not just predict the next word, but keeps its output in its buffer like a memory. Another ability of ChatGPT that is similar to human behavior is the division of tasks into sub-tasks, which is something that researchers can exploit to make their daily work easier. And thanks to its training on what is rumored to be 1.5 terabytes of textbooks, it knows much more than any human being ever could, making it "the perfect Renaissance

# Activities - LogicLounge

... continuation from page 11

scholar.” One of the guests at the LogicLounge was more critical of the nature of ChatGPT in observing that it does not engage in cultural practices such as playing, praying, or greeting, and is only producing meaningless content.

When asked about the remaining role of logic in (augmenting) AI, Selman was skeptical. He emphasized that logic had played a huge part in scientific progress, starting with the old Greeks, who employed it to reason properly and settle arguments. Gomes, by contrast, was much more enthusiastic and stressed the great importance of pursuing logic and symbolic AI. In her view, ChatGPT has not been designed for scientific discovery, and has no creativity that allows it to think outside the box. Thus, she ended the talk with encouraging words directed at the audience: “Keep working on your symbolic logic, your foundation, because this is what is missing from the current system. [...] It’s like with the invention of the printing press. There was an explosion, but it wasn’t the end of the books, it was when things started. There is a beautiful journey for researchers ahead of

us [...] and there’s a lot of exciting work to do.”

## About LogicLounge:

Initiated in 2014 at the Vienna Summer of Logic, the LogicLounge has since become an event travelling between Vienna and the venue of the CAV conference, where it has become a regular event in memory of Prof. Helmut Veith (1971 - 2016).

More information is available at:

<http://www.vcla.at/logiclounge>

<https://www.vcla.at/2023/07/logiclounge-chatgpt/>



# Activities - Guest Talks

## Ran Gelles: Distributed Computations in Fully-Defective Networks

On November 24, 2022, [Dr. Ran Gelles](#) from Bar-Ilan University (Israel) held a guest talk on “Distributed Computations in Fully-Defective Networks” at TU Wien (Lecture Hall EI 8 Pötzl, Gußhausstraße 25 – 29).

### Abstract:

In \*fully-defective\* asynchronous networks, all links are subject to an unlimited number of alteration errors, implying that all messages in the network may be completely corrupted. Despite the possible intuition that such a setting is too harsh for any reliable communication, we show how to simulate any algorithm for a noiseless setting over any fully-defective setting, given that the network is 2-edge connected. We further prove that if the network is not 2-edge connected, no non-trivial computation in the fully-defective setting is possible.

Based on work with Keren Censor-Hillel, Shir Cohen, and Gal Sela.

### Short Bio:

Dr. Ran Gelles received his B.Sc. (Summa Cum Laude) and M.Sc. from the



Technion–Israel Institute of Technology, in 2003 and 2009, respectively. He received his PhD in 2014 from the University of California, Los Angeles (UCLA). Between 2014–2016, he served as a Postdoctoral Research Associate at Princeton University, New Jersey. Since 2016, Ran is with the Faculty of Engineering at Bar-Ilan University, Israel. His research interests include coding theory, distributed computing, fault-tolerance, and cryptography.

<https://www.vcla.at/2022/11/talk-ran-gelles/>

# Activities - World Logic Day

## Vienna Logic Day Lecture 2023 - Dov Gabbay: Logic and argumentation for the 21st century



Every year on January 14, we celebrate the World Logic Day. Its main aim is to bring the intellectual history and practical implications of logic to the attention of interdisciplinary science communities. The day also celebrates the idea that logic, as reasoning, is a central quality of human beings.

The third Vienna Logic Day Lecture at the VCLA was an online event offering the possibility for worldwide participation. This guest talk was held by Dov Gabbay (King's College London and University of Luxembourg), who aimed to equip our participants with logical tools designed to address the challenges of modern society.

### Abstract:

The reasoning patterns and technological advances in the 21st century used in artificial intelligence, social media, and political behavior present a challenge to current applied logic and argumentation.

The old logic has to adapt, evolve, or die.

This lecture will show (through a case study) how to adapt intuitionistic and classical logics to an algorithmic version capable of handling reasoning failures, fallacies, bias, alternative truth, and other problems.

We shall use a combination of technical tools developed in the past 40 years.

<https://logicday.vcla.at/vienna-logic-day-lecture/>

### Details of talk:

Date: **January 14, 2023**

Time: **8am PST | 11am EST |  
1pm GMT-3 | 5pm CET  
(Vienna)**

Speaker: **Prof. Dov Gabbay**  
(King's College London and  
University of Luxembourg)

Title: **Logic and argumentation for  
the 21st century**

# Activities - World Logic Day

... continuation from page 14

Moderators:

Prof. Agata Ciabattoni

Prof. Stefan Szeider

The recording is available on the YouTube channel of the Vienna Center for Logic and Algorithms:

[https://www.youtube.com/watch?v=N-BNH0\\_gLDZg](https://www.youtube.com/watch?v=N-BNH0_gLDZg)



Dov Gabbay

To celebrate World Logic Day and spread the word about the Vienna Logic Day Lecture, the VCLA hosts its own website dedicated to this special day - [logicday.vcla.at](http://logicday.vcla.at) - which includes **quotes from our “Ambassadors of Logic”** which are extended with new ambassadors every year!

Here are some new quotes that were added in 2023:

**Daniel Kroening**

(Amazon Web Services)

“Logic is the glue of human discourse, human agreement, and human collaboration.”

**Bahareh Afshari**

(University of Amsterdam)

“Logic and Love, at once apart  
Wit and whim are their start  
Both call on thee to open thy heart  
And once entwined, unable to part”



# Activities - Press Conference

## Press Conference of the Austrian Society for Artificial Intelligence: State of AI in Austria - Triumph or Tragedy?

On June 14, 2023, the Austrian Society for Artificial Intelligence (ASAI) organized a press conference to discuss the state of AI in Austria. VCLA co-chair [Agata Ciabattoni](#) and board member [Thomas Eiter](#) were among the leading Austrian researchers who offered their view on the current state of affairs.

“While Austria plays in the Champions League with regard to its expertise in AI, it plays in the District League with regard to financial means,” lamented [Sepp Hochreiter](#) (JKU), who has developed an Austrian version of ChatGPT that he believes is superior to its Open-AI counterpart. However, Austria was unable to provide him with the resources for further testing, and he might therefore have to accept offers from other countries such as Germany or Saudi Arabia. While this is not a problem for him personally, he feels let down by the government and sees it as a missed opportunity for Austria.

Thomas Eiter likewise lamented the scarcity of resources that made it difficult to keep up with competitors from abroad. Eiter reported that after grad-

uating from university, many students were leaving Austria due to limited opportunities and a lack of perspective. Also, a newly hired Post-Doc had resigned from his job after learning that he was also tasked with teaching responsibilities and could not focus exclusively on his research.



[Christoph Lampert](#) (ISTA) appealed to journalists to present a balanced view of AI in the media. Clearly, AI is associated with certain risks, but it also has great potential; journalists could act as opinion leaders and highlight the positive aspects of AI. [Martina Seidl](#) (JKU) called for exploiting the full power of AI, e.g., in the world of business. She believes that companies can benefit from digitization by bringing



# Activities - Press Conference

... continuation from page 16

order into (data) chaos and optimizing processes, and **Günter Klambauer** (JKU) mentioned applications for AI in medicine and healthcare. **Gerhard Friedrich** (AAU) shared his experience from working in a research department at Siemens, where he cooperated closely with researchers from academia. Friedrich made a valid point when saying that Mozart, the Lipizzaner horses, and Lake Wörthersee were not enough to attract and keep good personnel.

Sepp Hochreiter explained that the President of the National Council and the State Secretary for Digitization had been generally willing to support his efforts, but this would take some time as they had to await budget negotiations. Eiter added that funds were getting smaller, and that bigger initiatives and well-targeted support were needed, and this would eventually result in a substantial return on investment. When asked how much money was needed, Hochreiter gave a ballpark figure of EUR 500 million as a bare minimum – and this budget should be dedicated exclusively to basic research in AI. Agata Ciabattoni underlined the importance of basic research by a

comparison with the development of computers; many believe that the current developments in AI are an equally revolutionary step in the advancement of humanity. In fact, **Bernhard Nessler** (Software Competence Center Hagenberg) stated that a strategy paper for basic AI research had been submitted to the ministry four years ago, but up to now, this call for action had largely passed unnoticed.

Another issue raised was the limited IT infrastructure in Austria. Nessler criticized the scarcity of GPUs available to Austrian researchers, and **Robert Legenstein** (TU Graz) added that applicants had expressed their dissatisfaction with local computing capacity in job interviews. According to **Axel Polleres** (WU Vienna), scientists who had left for Amazon or Google were now willing to return to Austria due to layoffs or for personal reasons. However, Austria needed to provide a more attractive research environment, and IT infrastructure was an important part of that.

<https://www.vcla.at/2023/06/state-of-ai-in-austria/>

# Activities - Conferences

## **COST Action DigForASP (Digital Forensics: Evidence Analysis via Intelligent Systems and Practices)**

The colloquium DigForASP (Digital Forensics: Evidence Analysis via Intelligent Systems and Practices) was held at TU Wien Informatics from January 26-27, 2023.

**Date: January 26-27, 2023**

**Organizer:** [Agata Ciabattoni](#) (TU Wien)

### **Speakers:**

[Pedro Cabalar](#) (Universidade da Coruña): “Deontic Equilibrium Logic: preliminary work”

[Xavier Parent](#) (TU Wien): “Logics for normative reasoning and their proof theory”

[Daniele Theseider Dupré](#) (Università del Piemonte Orientale “Amedeo Avogadro”): “From common sense reasoning to Neural Network models: a conditional and multi-preferential approach for explainability and neuro-symbolic integration”

**Invited talk by Emmanuel Sallinger** (TU Wien): “Anti money-laundering activities at the Bank of Italy using Data-log extensions”

[Esra Erdem](#) (Sabanci University, Istanbul): “Explanation generation in applications of Answer Set Programming”

[Giovanbattista Ianni](#) (Università della Calabria): “On the connection between games, stream reasoning, and timeline analysis”

[David Billard](#) (HEG-Genève): “Anonymization of the Bank Attack Database”

[Viviana Mascardi](#) (DIBRIS): “MACISTE 4 HEALTH: a MultiAgent system for the data aCt Implementation and verification in the healthcare Sector”

[Juan Carlos Nieves](#) (Umeå University): “Topic Planning in Information-Seeking Dialogues”



Esra Erdem during her talk at DigForASP

# Activities - Conferences

## Women in Logic - 7th International Workshop

The 7th international workshop “Women in Logic” was held as a satellite event of the 8th International Conference on Formal Structures for Computation and Deduction (FSCD 2023) at **Sapienza University in Rome, Italy**, on **July 1, 2023**.

The workshop aimed to provide an opportunity to increase awareness of the valuable contributions made by women in the area of logic in computer science. Its main purpose was to promote the excellent research done by women, with the ultimate goal of increasing their visibility and representation in the community.

The program included four sessions, a poster session, and an informal social event. Invited talks were given by **Marie Kerjean** (CNRS, Université Sorbonne

Paris Nord) “From Functional Analysis to Proofs and Program” and **Sandra Alves** (University of Porto) “Quantitative Weak Linearisation.” **Pamina Georgiou** (TU Wien) talked about “Tales of Automated Software Verification with First-order Theorem Provers.”

VCLA Co-Chair **Agata Ciabattoni** was part of the program committee that consisted of thirteen women. The VCLA was one of the main sponsors of the workshop along with the ILLC, SIGLOG, and the TOPOS institute.



<https://sites.google.com/view/wil2023/home>



Photo (c) Women in Logic

# Activities - Conferences

## **MOSAIC 2023: Modalities in Substructural Logics II - Theory, Methods and Applications**

The EU-funded project RISE-MSCA MOSAIC is investigating modal logics based on the general setting of substructural logics. The workshop “Modalities in Substructural Logics II - Theory, Methods and Applications” was held in the Kontaktraum of Campus Gußhaus at TU Wien on September 27-29, 2023.

Each conference day started with an invited talk that was followed by four sessions each focused on key topics in the field. A highlight was the invited talk by

**Carles Sierra** (AI Research Institute of Barcelona) “On the Engineering of Social Values”

in which he focused on ethical concerns surrounding modern technology. On September 27, the program included a social dinner at Bastei Beisl in the first district of Vienna.

The densely packed program included more than forty talks. Besides Carles Sierra, four other researchers had been invited to give a talk:

**Nick Bezhaniashvili** (Univ. of Amsterdam): “Degrees of the Finite Model Property for Superintuitionistic and Modal Logics”

**Serafina Lapenta** (Univ. of Salerno): “Metamathematics of Random Variables via Non-classical Logic”

**Elaine Pimentel** (Univ. College of London): “Ecumenical and Substructural Views of Proof-theoretic Semantics”

**Adam Přenosil** (Univ. of Barcelona): “Semisimplicity, Glivenko Theorems, and the Excluded Middle”

More information can be found here:

<https://sites.google.com/view/mosaic2023/home>



# Activities - Conferences

... continuation from page 20



**Date:** September 27-29, 2023

**Venue:** TU Wien, Campus Gußhaus

## Chairs

Agata Ciabattoni (chair)

Tommaso Flaminio (co-chair)

## Organizing Committee

Agata Ciabattoni

Josephine Dik

Robert Freiman

Dominik Pichler

Dmitry Rozplokhas



Carles Sierra is giving his invited talk





# Activities - Education

## FPT Fest 2023 in honor of Mike Fellows Sorting Network Race in Bergen, Norway

On June 12-16, 2023, a symposium in honor of Mike Fellows was held at the Grand Hotel Terminus in Bergen.

VCLA Co-Chair Stefan Szeider organized a mini-symposium with four talks on SAT and CSPs (propositional satisfiability and constraint satisfaction problems). These talks were given by Sebastian Ordyniak, Ramanujan M.S., Max Bannach, and George Osipov.

Tuukka Korhonen, winner of the Outstanding Master Thesis Award of the VCLA International Student Awards (edition 2021), gave an invited talk on “Computing Treewidth.”

In addition, the VCLA printed sorting networks ([www.vcla.at/sort](http://www.vcla.at/sort)) in Norway to have an interactive fun event with the FPT Fest participants, who were asked to use the sorting networks to sort parameterized complexity classes by set-inclusion. This activity was part of the talk “Computational Thinking – Computer Science Unplugged!” by Frances A. Rosamond.

<https://www.uib.no/en/rg/algo/160260/fpt-fest-2023-honour-mike-fellows>



VCLA Co-Chair Szeider at the panel discussion.



# Activities - Education

## European Researchers' Night: School Workshops

On September 29, 2023, the VCLA together with TU Wien Informatics edu-LAB held workshops on computer science for elementary school children at the University of Applied Arts Vienna as part of the European Researchers' Night.

The workshops started with a discussion of the words informatics and algorithms. The instructor would ask if the children had heard these words before, and most children replied that they had not (except for their teachers mentioning the topic of the workshop in the morning). The children learned that an algorithm was basically a set of instructions or rules that had to be followed,

and that such rules could also take the form of something as simple as a morning greeting routine.

Subsequently, the children were introduced to the VCLA sorting networks. The sorting network works in the following way: Every participant steps on one of the orange squares (the input nodes) and receives a card with a random number on it. They then go on to the nearest sorting node (the gray circles in the picture) and compare numbers with the other person who steps on it. The person with the lower number follows the blue line, while the person with the higher number



# Activities - Education

... continuation from page 23

follows the red line. This process is then repeated until everyone arrives at another orange square (the output node). In this way, all the numbers will be sorted correctly in ascending order, and this works with letters (or other input) as well! At the workshops, the activity was carried out with numbers and animals of different size which were only visible under ultraviolet light (we used special pens for this).

The second activity consisted of slightly sticky tiles that had to be placed onto a sheet of paper. The tiles had black lines on them, and the children were asked to lay them on a map that depicted a house, a school building, a cat, a tiger, a pond, and a small forest. Essentially, the children needed to find their way home from school, and there was more than one possible solution. Once the tiles had been laid, the instructor placed the line-following robot Ozobot onto the map, and the robot followed the trail that the children had prepared. Some tiles contained a color code that either made the robot accelerate or turn in circles, almost like a dance. Everyone had fun in finding swifter routes, or in

trying out what the robot would do if it was led to the tiger or the pond.

We hope we could help spark some interest in informatics in the young generation! TU Wien Informatics edu-LAB is currently offering similar workshops to primary school children at the Faculty of Informatics.

<https://www.vcla.at/2023/10/european-researchers-night-school-workshops/>

**Date: 29 September 2023**

**Venue: University of Applied Arts Vienna**





# Activities - Distinction

## VCLA International Student Awards: Award Ceremony

The VCLA International Student Awards are presented annually. The winners are invited to attend the award ceremony, and they receive a cash prize from an award fund of EUR 2,000. Since 2016, the awards have been dedicated to the memory of Helmut Veith (1971-2016), the initiator of the awards. For the first time since the awards' inception in 2014, both the Outstanding Undergraduate Research Award as well as the Outstanding Master Thesis Award were presented to female computer scientists! The award ceremony was held at TU Wien on September 26, 2023.

The Outstanding Master Thesis Award was presented to **Lydia Blümel** (University of Leipzig) for her master thesis "Defining Defense in Abstract Argumentation from Scratch – A Generalizing Approach" under the supervision of Markus Ulbricht, in which she devised a general representation scheme of semantics for abstract argumentation frameworks. The runner-up in this category, **Vitor Rodrigues Greati** (Universidade Federal Do Rio Grande do Norte, now University of Groningen), was also invited to present his outstanding pa-

per on "Hilbert-Style Formalism for Two-Dimensional Notions of Consequence."

**Barbora Šmahlíková** (Brno University of Technology) is the recipient of the Outstanding Undergraduate Research Award for her bachelor paper "Next Generation of Rank-Based Algorithms for Omega Automata." The young researcher, who also received the Czech Republic's Award for a Gifted Student in 2022, presented her work on the complementation of Büchi automata at the award ceremony. The warm weather allowed all participants to enjoy drinks and Italian pastries on the terrace of the event room.



Master Thesis Award Winner:  
Lydia Blümel

Photo (c) Nadja Meister

# Activities - Distinction

... continuation from page 25



Undergraduate Thesis Award Winner:  
Barbora Šmahlíková

Photo (c) Nadja Meister



Master Thesis Award - Runner-up:  
Vitor Rodrigues Greati

Photo (c) Nadja Meister

## Outstanding Master Thesis Award

Lydia Blümel

Defining Defense in Abstract Argumentation from Scratch – A Generalizing Approach

**Supervisor:** Markus Ulbricht (University of Leipzig, Germany)

## Outstanding Master Thesis Award - Runner-up

Vitor Rodrigues Greati

Hilbert-Style Formalism for Two-Dimensional Notions of Consequence

**Supervisor:** João Marcos (Universidade Federal do Rio Grande do Norte)

## Outstanding Undergraduate Research Award

Barbora Šmahlíková

Next Generation of Rank-Based Algorithms for Omega Automata

**Supervisor:** Ondřej Lengál (Brno University of Technology)

# Activities - Distinction

... continuation from page 26

## Award Committee

- Robert Ganian (chair)
- Jules Wolms (co-chair)
- Shqiponja Ahmetaj
- Michele Chiari
- Jan Dreier
- Anela Lolic
- Jan Maly
- Johannes Oetsch
- Xavier Parent
- Anna Rapberger
- Michael Rawson
- Emanuel Sallinger
- Zeynep G. Saribatur
- Stefan Schupp
- Sebastian Skritek
- Friedrich Slivovsky
- Manuel Sorge

All winning theses can be accessed via the following website:

<https://www.vcla.at/2023/07/student-awards-announcement/>

More information on the awards as well as the award ceremony can be found here:

<https://www.vcla.at/2023/10/report-vcla-award-ceremony/>

<http://www.vcla.at/vcla-awards/>

Photo (c) Nadja Meister



# Activities - Distinction

## Helmut Veith Stipend Winner 2022: Alina Ehart

Helmut Veith (1971-2016) was a strong advocate and mentor for women in computer science. To honor Helmut's efforts, a stipend for outstanding female students in computer science was established in 2017 with the financial support of TU Wien, the Wolfgang Pauli Institute, and generous donations of friends and colleagues of Prof. Veith.

**Alina Ehart** is the seventh recipient of the Helmut Veith Stipend for Female Master's Students in Computer Science, submission period November 2022.

Alina has a Bachelor's degree in Applied Computer Science with a focus on cyber security from Alpen-Adria-Universität Klagenfurt. Due to her previous studies of information technology at HTBLuVA Villach with a focus on network technologies, Alina was credited some classes and thus able to complete her Bachelor studies in only five semesters. Her Bachelor thesis "Machine-Learning-supported User Entity Behaviour Analysis" focused on improving User Entity Behavior Analysis

for enhanced cybersecurity by leveraging machine learning models. The primary objective was to develop individualized anomaly detection models for each user, utilizing their training data in form log files. These models were subsequently tested and evaluated against anomalies identified by a company's proprietary software.

Having grown up in the Austrian province Carinthia, Alina financed her studies with seasonal work as a skiing and snowboarding instructor in the winter and as a kid's climbing instructor and retail worker in the summer. Her research interests are media engineering, human-computer interaction, and cyber security. Alina is currently



Alina Ehart

# Activities - Distinction

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enrolled in the Master's program Media and Human-Centered Computing at TU Wien and has expressed interest to work on autonomous driving in order to make road traffic safer for everyone.

The award ceremony was combined with the VCLA International Student Awards on September 26, 2023. VCLA board member Georg Weissenbacher introduced the stipend to the guests; subsequently, Kurt Matyas, outgoing Vice Rector for Academic Affairs, had the

pleasure of presenting the stipend to Alina. Moreover, Matyas announced that the Helmut Veith Stipend will from now on be fully financed by TU Wien (up to now, it had been co-financed by TU Wien and the Wolfgang Pauli Institute), and it will be increased to EUR 7,000 annually.

<https://www.vcla.at/2023/09/helmut-veith-stipend-announcement/>

<https://www.vcla.at/2023/10/report-vcla-award-ceremony/>



Georg Weissenbacher, Nikita Veith, Alina Ehart, Wolfgang Veith, Herta Veith, Anna Prianichnikova, Agata Ciabattoni, Kurt Matyas

Photo (c) Nadja Meister

# Activities - Distinction

## Helmut Veith Stipend: Award Ceremony for the Winners of 2019-2021

As the VCLA had unfortunately not been able to hold an award ceremony for the winners of the Helmut Veith Stipend in the past few years due to COVID-19, the center organized a belated award ceremony for the winners of 2019-2021 on November 4, 2022. The event took place at the Boecklsaal of TU Wien during a joint two-day workshop of the doctoral colleges LogiCS@TUWien and UnRAVeL (RWTH Aachen).

Stefan Szeider (co-chair of the VCLA) presented the VCLA and its activities to the students of the doctoral colleges. Subsequently, Kurt Matyas, Vice Rector for Academic Affairs at TU Wien, officially awarded the stipends to the

winners of the years 2019-2021: **Daniela Martinez Duarte** from Colombia (2019), **Anna Baghumyan** from Armenia (2020), and **Ana Vesic** from Serbia (2021). All recipients have already been presented in previous annual reports. Helmut's family was again present to commemorate his achievements, and to congratulate the winners.

The annual deadline to apply for the scholarship is November 30.

<http://www.vcla.at/2022/11/helmut-veith-stipend-award-ceremony-2/>



Photo (c) VCLA



# Activities - Distinction

## Tobias Geibinger Receives an ASAI Master Thesis Award

**Tobias Geibinger**, an affiliated PhD student in the Doctoral College Logics for Computer Science at TU Wien (LogiCS@TUWien) that is co-funded by the EC H2020 Marie Skłodowska-Curie CO-FUND, received one of the **ASAI Master Thesis Awards** for his thesis “Investigating Constraint Programming and Hybrid Answer-set Solving for Industrial Test Laboratory Scheduling.”

The award ceremony was held as part of an Austrian Society for Artificial Intelligence (ASAI) networking event at TU Wien on July 5, 2023. In a statement, the jury highlighted the clear definition of the research questions, the practical relevance of the research project as well as the carefully conducted evaluation.

The second ASAI Master Thesis Award 2023 went to Michael Bernreiter, a Pre-Doc researcher of the Database and Artificial Intelligence Group at TU Wien’s Faculty of Informatics, for his thesis “A General Framework for Choice Logics” supervised by Stefan Woltran. More information on the awards is available on the website of TU Wien Informatics.

*“I started working on test laboratory scheduling when I was employed by Prof. Nysret Musliu as a Master student in his Christian Doppler Laboratory. The topic was fascinating to me because it allowed me to apply methods based on logical modelling techniques on a challenging real world problem, for which no solution methods that could solve all instances of realistic size were known at the time.*

*Furthermore, the methods developed in my thesis are also used in practice in a test laboratory and make the life of the human planner a lot easier.”*



Tobias Geibinger

\*(c) Nadja Meister

# Activities - Distinction

## KR 2023: Best Paper Awards for VCLA Board Members and (Former) LogiCS Students

The 20th International Conference on Principles of Knowledge Representation and Reasoning (KR 2023) was held in Rhodes, Greece, from Sep 2-8. During the conference, the KR'23 Ray Reiter Best Paper Prize, the Marco Cadoli Distinguished Student Paper Award, and the Best Student Paper Award of the Description Logic Workshop were presented to researchers of TU Wien Informatics!

The **Ray Reiter Best Paper Prize** was introduced in 2004 in honor of the contributions made by Canadian computer scientist and logician Ray Reiter. The prize of USD 2,000 is sponsored by the Artificial Intelligence Journal. In 2023, the prize was presented to VCLA Co-Chair **Agata Ciabattoni** and **Dmitry Rozplokhas**, a PhD student in the doctoral college LogiCS@TUWien, for their paper “Streamlining Input/Output Logics with Sequent Calculi.”

The **Marco Cadoli Distinguished Student Paper Award** was presented to **Rafael Kiesel** and **Thomas Eiter** for their paper “Knowledge Compilation and more with SharpSAT-TD.” Rafael is a former student of the LogiCS doc-

toral program; his supervisor Thomas is Professor of Knowledge-Based Systems at the Faculty of Informatics of TU Wien and member of the VCLA executive board.

Moreover, the **Best Student Paper Award of the Description Logic Workshop 2023** (co-located with KR 2023) was presented to **Sanja Lukumbuzya**, **Magdalena Ortiz** and **Mantas Simkus** for their paper “On the Expressive Power of Ontology-Mediated Queries: Capturing coNP.” Sanja is now a PostDoc researcher in the Knowledge-Based Systems group of TU Wien Informatics, and Magdalena is a VCLA local board member.

<https://www.vcla.at/2023/09/kr2023-awards/>



Agata Ciabattoni and Dmitry Rozplokhas



# Activities - Cooperations

## Vienna Ball of Sciences 2023 - Logic Riddle “Family Ties”

After a break of two years due to the pandemic, the Vienna Ball of Sciences was held again on 28 January 2023 in the Vienna City Hall (Rathaus). It was a night of dancing, music, and .... logic riddles! Due to the success of the bee puzzle at the last ball, the VCLA has once again engaged people’s minds with a problem that may be solved with logical reasoning.

The year 2022 marked the anniversary of Gregor Mendel’s 200th birthday. As Mendel researched the inheritance of traits, this year’s logical problem was based on family relations. The puzzle “**family ties**” required visitors to discover who was related to whom, and to determine each person’s hair and eye color. The author of the puzzle was **Anouk Michelle Oudshoorn**, a student in the doctoral college LogiCS@TUWien. You may download the puzzle on the VCLA website, and then see if you arrived at the correct solution! The fastest visitor to solve the puzzle on the evening of the ball was **Lukas Wimmer**, a student of physics at TU Wien – congratulations! Among the other highlights of the ball was a giant green pea in the city’s courtyard, and people lined up

to take their picture with an oversized Venus of Willendorf dressed in a ball gown.



<https://www.vcla.at/2023/01/vienna-ball-of-sciences-2023/>

# Activities - Cooperations

## VCLA Participates in FFG-Funded Project “Transformer - Co-Creation Space”

The Vienna Center for Logic and Algorithms will participate in the project “**Transformer**,” (2024-2026), which has received approval following the FFG call **Co-Creation Spaces Climate & Energy**. For this project, six faculties of TU Wien are teaming up to offer extra-curricular learning opportunities with a focus on the environment. Children and teenagers will actively participate in the revitalization of a vacant building located at Rennweg 89a in Vienna, which will then be used as a creative learning space for all kinds of activities.

Participants will develop a responsibility for living organisms as well as an understanding of cycles and synergy effects through unrestricted, joint trying out, learning and practicing in a wholly new learning environment. We believe that young people should participate in the creation of a healthy and environmentally friendly future, and be guided on this path in the best possible way, so that challenges can be accepted optimistically and are also allowed to be fun. Young students will gain hands-on experience in many

different fields such as architecture, electronics, and computer science, which may positively influence their career choice. Children will become active citizen scientists, allowing them to conduct research and acquire new skills.

<https://www.vcla.at/2023/10/vcla-participates-in-ffg-funded-project-transformer/>

<https://transformer.project.tuwien.ac.at/>



**TRANSFORMER**

# Activities - Cooperations

## MSCA COFUND Doctoral Program LogiCS@TUWien

The Doctoral College Logical Methods in Computer Science (LogiCS) is an interdisciplinary Marie Skłodowska-Curie COFUND doctoral program at TU Wien that educates 20 PhD students for 4 years on logical methods in Computer Science and their applications, in particular in Artificial Intelligence, Databases, Verification, Algorithms, Security and Cyber-Physical Systems.

LogiCS was established in March 2014 by Helmut Veith† and Stefan Szeider. The first two editions of this doctoral program were funded by the Austrian Science Fund (FWF) and run jointly with universities in Graz and Linz. LogiCS@TUWien is the third generation and was officially launched on October



1, 2021. VCLA co-chair Stefan Szeider acts as Chair & Program Coordinator and Anna Prianichnikova as the Program Manager. The VCLA supports the doctoral college in various ways, e.g., through the advertising of open positions.

The faculty of LogiCS comprises renowned researchers with strong records in research, teaching, and advising. Among the successful graduates of LogiCS are Anna Lukina (now Assistant Prof. at TU Delft), Kees van Berkel (now Assistant Professor of AI Ethics at TU Wien), Katalin Fazekas (now Hertha Firnberg Fellow at TU Wien) and Juan P. Aguilera (recipient of the FWF Start Prize 2024).



<https://www.vcla.at/msca>

# Activities - Cooperations

## Joint Workshop of the Doctoral Colleges LogiCS and UnRAVeL

In the first week of November 2022, the doctoral colleges LogiCS (cf. page 35) and UnRAVeL (RWTH Aachen) held a joint two-day workshop in Vienna. The pre-doc students were able to present their work and exchange ideas during presentations, discussions, and leisure activities. The program was organized by Anna Prianichnikova (Scientific Coordinator), Beatrix Buhl (Office Services), and Georg Weissenbacher (Professor, TU Wien Informatics).

In addition to keynote speeches by Christina Büsing (RWTH) and Stefan Szeider (TU Wien), the program included elevator pitches by the students as well as “speed dating” sessions. LogiCS graduate Anna Lukina gave a talk on *Career Paths and Success Stories*, and four students of each doctoral college had the opportunity to present their work in more detail. In the course of the workshop, the Helmut Veith Stipend was officially awarded to the winners of the years 2019-2021. The students also enjoyed the leisure activities which included a guided tour of the Viennese museum Belvedere.

<https://www.vcla.at/2022/12/joint-workshop-of-the-doctoral-colleges-logics-and-unravel/>

**Date: November 3-4, 2022**

**Venue: Boecklsaal, TU Wien**



Georg Weissenbacher, Beatrix Buhl, Anna Prianichnikova, Agata Ciabattoni, Ezzio Bartocci, Laura Kovacs, Stefan Szeider



The students of LogiCS and UnRAVeL.

# Activities - Cooperations

## MSCA COFUND Doctoral Program LogiCS@TUWien Proficiency Evaluation Day

The proficiency evaluations of the researchers of the interdisciplinary program LogiCS@TUWien are an important milestone on their way to achieving their doctoral degree.

The first proficiency evaluation of the doctoral program was held on June 29, 2023 from 11:00 - 15:00 hours at the Zemanek Seminar Room of TU Wien Informatics. The students presenting their work were **Pedro Sousa Bernardo** (supervisor Matteo Maffei), **Anton Varonka** (supervisor Laura Kovacs), **Francesco Pontiggia** (supervisor Ezio Bartocci), **Oliviero Nardi** (supervisor Stefan Woltran), and **Tobias Geibinger** (supervisor Thomas Eiter). The evalu-

ations were chaired by Ezio Bartocci, Maria Christakis, Martin Nöllenburg, and Ulrich Schmid.

The program concluded with a get-together in the faculty's garden at which the researchers enjoyed ice cream from a popular ice cream café at Schwedenplatz.

**Date: June 29, 2023**

**Venue: Zemanek Seminar Room,  
TU Wien Informatics**



# Media Coverage

The VCLA was present in the media through its members and activities.

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September 28, 2023

TU Wien

Frauenpower bei der VCLA-Preisverleihung (see below)

<https://www.tuwien.at/tu-wien/aktuelles/news/frauenpower-bei-der-vcla-preisverleihung>

September 27, 2023

TU Wien Informatics

Female Computer Scientists Excel at VCLA

<https://informatics.tuwien.ac.at/news/2497>

September 2023

researchersnight.eu

Informatik begreifen (Schulworkshop)

Understanding Informatics (school workshop)

<https://www.researchersnight.eu/informatik-begreifen-schulworkshop>

August 27, 2023

science.orf.at

Man muss es nicht künstlich intelligent nennen

(No need to call it artificially intelligent; feat. VCLA board member Georg Gottlob)

<https://science.orf.at/stories/3220926/>

July 19, 2023

vut.cz (Brno University of Technology)

She's world class in what she enjoys. Student's algorithm „hack“ awarded at TU Wien

[https://www.vut.cz/en/but/news-f19528/she-s-world-class-in-what-she-enjoys-student-s-algorithm-hack-awarded-at-tu-wien-d243373?aid\\_redir=1](https://www.vut.cz/en/but/news-f19528/she-s-world-class-in-what-she-enjoys-student-s-algorithm-hack-awarded-at-tu-wien-d243373?aid_redir=1)

July 17, 2023

TU Wien Informatics

VCLA Presents International Student Awards 2023

<https://informatics.tuwien.ac.at/news/2463>



# Media Coverage

June 15, 2023

derstandard.at

Österreichische KI-Szene rechnet mit Politik ab: "Wie blöd kann man sein?"

(Austrian AI scene reckons with politics: "How stupid can someone be?")

referring to ASAI press conference with participation of VCLA co-chair Agata Ciabattoni and board member Thomas Eiter

<https://www.derstandard.at/story/3000000174728/oesterreichische-ki-szene-rechnet-mit-politik-ab-wie-bloed-kann-man-sein>

June 13, 2023

TU Wien

Das war die AI + Logic Week 2023

(Recap of AI and Logic Week 2023 incl. LogicLounge)

<https://www.tuwien.at/tu-wien/aktuelles/news/news/das-war-die-ai-logic-week-2023>

June 12, 2023

TU Wien Informatics

AI for a Sustainable Future

(Article on AI and Logic Week)

<https://informatics.tuwien.ac.at/news/2443>

June 8, 2023

Kurier

Künstliche Intelligenz als Weltenretter

(Artificial Intelligence is saving the world)

[https://www.vcla.at/wp-content/uploads/2023/06/23\\_06\\_08\\_Kurier\\_K%C3%BCnstliche-Intelligenz-als-Weltenretter.pdf](https://www.vcla.at/wp-content/uploads/2023/06/23_06_08_Kurier_K%C3%BCnstliche-Intelligenz-als-Weltenretter.pdf)

June 5, 2023

derstandard.at

KI als "Superkraft" im Kampf gegen Klimakrise und Artensterben

(AI as "superpower" in the fight against climate crisis and extinction of species)

<https://www.derstandard.at/story/3000000173225/ki-als-superkra>

# Media Coverage

June 5, 2023

science.orf.at

Künstliche Intelligenz - „Superkraft“ für Nachhaltigkeitsforschung  
(AI - Super Power for Sustainability Research)

<https://science.orf.at/stories/3219637/>

April 24, 2023

TU Wien Informatics

Save the Date: AI and Logic Week

<https://informatics.tuwien.ac.at/news/2415>

February 1, 2023

TU Wien

Kniffliges VCLA-Logik-Rätsel am Wiener Ball der Wissenschaften 2023  
(Tricky VCLA Logics Puzzle at the Vienna Ball of Sciences 2023)

<https://www.tuwien.at/tu-wien/aktuelles/news/news/kniffliges-vcla-logik-raet-sel-am-wiener-ball-der-wissenschaften-2023>

January 26, 2023

TU Wien Informatics

Call for Nominations – VCLA International Student Awards 2023

<https://informatics.tuwien.ac.at/news/2360>

December 22, 2022

wwtf.at

Informations- und Kommunikationstechnologien: ICT-22

(list of projects funded in the ICT-22 call;

many of the winners are affiliated with the VCLA)

<https://www.wwtf.at/funding/programmes/ict/#ICT22>



# Media Coverage

December 2, 2022

science.orf.at

Algorithmen sind wie Drogen

(Algorithms are like drugs; interview with LogicLounge speaker Stuart Russell)

<https://science.orf.at/stories/3216369/>

November 28, 2022

oe1.orf.at

Soziale Medien als Gehirnwäsche: wie Algorithmen unser Verhalten verändern

(Social media as brainwashing: how algorithms change our behavior; Sarah Kriesche / Stuart Russell)

<https://oe1.orf.at/programm/20221128/698782/Soziale-Medien-als-Gehirnwaesche>

November 25, 2022

netidee.at

Shqiponja Ahmetaj erhält Hedy Lamarr Preis 2022

(Computer scientist Shqiponja Ahmetaj receives Hedy Lamarr prize 2022)

<https://www.netidee.at/fresh-foundations-reasoning-shape-constraint-language/shqiponja-ahmetaj-erhaelt-hedy-lamarr-preis>

November 11, 2022

TU Wien Informatics

Helmut Veith Stipend 2019-2021 awarded

<https://informatics.tuwien.ac.at/news/2318>

November 8, 2022

TU Wien

Verleihung des Helmut-Veith-Stipendiums im Zuge des Workshops

LogiCS/unRAVeL (Award ceremony of Helmut Veith Stipend during workshop)

<https://www.tuwien.at/tu-wien/aktuelles/news/news/verleihung-des-helmut-veith-stipendiums-im-zuge-des-workshops-logics-unravel>

# VCLA Chairs



Agata Ciabattoni and Stefan Szeider, co-chairs of the VCLA since December 2017

© Luiza Puiu / Nadja Meister

Agata Ciabattoni and Stefan Szeider are co-chairs of the Vienna Center for Logic and Algorithms. Stefan Szeider and Helmut Veith (1971-2016) founded the VCLA in 2011, assuming chair's strategic leadership over its activities.

Agata Ciabattoni is a full professor at TU Wien. In 2011, she has been awarded a START prize, the highest Austrian award for early career researchers, for her project “Non classical proofs: Theory, Applications and Tools.”

In her research, Ciabattoni focuses on non-classical logics (Deontic Logics, Fuzzy Logics, Substructural Logics...), investigating their proof theory and semantics, and applying them to various fields, including Artificial Intelligence, Legal Reasoning and Indian Philosophy.

Stefan Szeider is a full professor at TU Wien and head of the Algorithms and Complexity Group. He is also the chair of the MSCA COFUND Doctoral Program LogiCS@TUWien, and the scientific co-organizer of the Vienna Gödel Lectures.

In his research, Szeider combines algorithmic and logic-based methods for the efficient solution of hard problems that arise in Artificial Intelligence, Automated Reasoning, and Combinatorial Optimization, complemented by complexity-theoretic methods for establishing theoretical limits and lower bounds.

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