VCLA

Vienna Center for Logic and Algorithms

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Annual Report 2016/2017

Contents

About VCLA

Vienna Center for Logic and Algorithms

logics — LOGICAL METHODS IN COMPUTER SCIENCE

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 changes are presented at the end of this report.

The VCLA was funded by TU Wien for its first four-year period and will continue to be funded for another four years in association with the Doctoral College Logical Methods in Computer Science (LogiCS).

The Center aims to promote international scientific collaboration in logic and algorithms and to communicate Austria's excellence in these two areas of computer science research, using a variety of channels.

These objectives are realized through activities such as:

- the VCLA International Student Awards for Outstanding Theses
- the LogicLounge
- the VCLA Workshop Series
- the VCLA Schools, a series of winter and summer schools
- the VCLA Visitor Program
- the hosting of talks by renowned international speakers, and
- the co-organisation of events

In Memoriam

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

Accompanying the rebirth of the Austrian logic scene his marking of the field, space, and time is further on augmented by the students who he mentored, and by his visionary activities of building bridges between the computer science expert and the layman.

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 Vienna Center for Logic and Algorithms with Stefan Szeider, but also to bring the largest logic conference in history to Austria - 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).

Posthumously, Helmut was awarded the ERC Advanced Grant - one of the

Photo (c) Philipp Horak

highest academic distinctions in Europe - for his project HYDRA (Har-nessing Model Checking for Distribut¬ed 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 fund the Helmut Veith Stipend for Female Master´s Students.

Memorial site with his achievements in academia and beyond:

http://www.vcla.at/2016/03/helmut-veith-1971-2016

Organization

The VCLA is managed by a local board in collaboration with an international advisory board. The local board is responsible for day-to-day management and consults with the advisory board about strategic decisions.

The following is the organisational structure from the 2016/2017 reporting period. Since January 2018 the VCLA board has a new structure which is presented at the end of this report.

Board
Thomas Eiter
Georg Gottlob
Alexander Leitsch
Reinhard Pichler
Stefan Szeider (co-chair)
Helmut Veith † (co-chair)

Public Relations and Project Management
Mihaela Rozman

Advisory Board
Matthias Baaz (TU Wien)
Roderick Bloem (TU Graz)
Agata Ciabattoni (TU Wien)
Nadia Creignou (Université d'Aix-Marseille)
Anuj Dawar (University of Cambridge)
Fedor Fomin (University of Bergen)
Laura Kovács (TU Wien)
Miroslaw Truszczynski (University of Kentucky)
Moshe Y. Vardi (Rice University)

Collaborations

The VCLA frequently collaborates with 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 five 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

Conference: ALGO 2017 Congress on Algorithms

The 17th ALGO congress is the premier annual gathering on algorithms in Europe. ALGO 2017 hosted by the Algorithms and Complexity Group at TU Wien in September 2017, attracted more than 320 participants.

ALGO 2017 combined the following six conferences and workshops:

- the European Symposium on Algorithms (ESA)
- the International Symposium on Parameterized and Exact Computation (IPEC)
- the Workshop on Approximation and Online Algorithms (WAOA)
- the International Symposium on Algorithms and Experiments for Wireless Networks (ALGOSENSORS)

ALGO 2017 volunteers

Rector of the TU Wien, Sabine Seidler

- the Workshop on Algorithmic Approaches for Transportation Modeling Optimization, and Systems (ATMOS)
- the International Workshop on Algorithmic Aspects of Cloud Computing (ALGOCLOUD)

ALGO 2017 hosted also the Parameterized Complexity Summer School (PCSS), with a record number of more than 100 participating talents.

The congress was opened by the rector of the TU Wien, Sabine Seidler. The scientific program comprised of over 165 paper presentations, tutorials, the ESA test of time award, the PACE competition awards, the Nerode prize award, and several best paper awards.

Alongside the scientific part of the ALGO 2017 program, the social events

Activities

offered participants a wide range of networking activities to support the academic dialogue. These included three evening events: the Welcome Reception, the Banquet Dinner, and the Heurigen Dinner.

The Banquet Dinner was set in a stimulating environment of one of the most important museums in the world - the Natural History Museum Vienna

(NHM). The Heurigen Dinner honoured the scholarly traditions of gathering in a rustic Viennese tavern.

ALGO 2017 was organized in cooperation with the European Association for Theoretical Computer Science (EATCS), the Vienna Center for Logic and Algorithms (VCLA), and the Zentrum für Informatikforschung (ZIF).

The congress was sponsored by Google, the Wolfgang Pauli Institute, and the NETWORKS project, as well as the Austrian Ministry for Transport, Innovation and Technology.

Chairs

- Stefan Szeider (chair)
- Robert Ganian (co-chair)
- Martin Nöllenburg (co-chair)

Michael Fellows and colleagues

ALGO 2017 Banquet Dinner at the Natural History Museum Vienna

Activities

Co-Organizers

- Doris Dicklberger
- Wolfgang Dvořák
- Ronald de Haan
- Fabian Klute
- Andreas Müller
- Nysret Musliu
- Sebastian Ordyniak
- Karin Prater
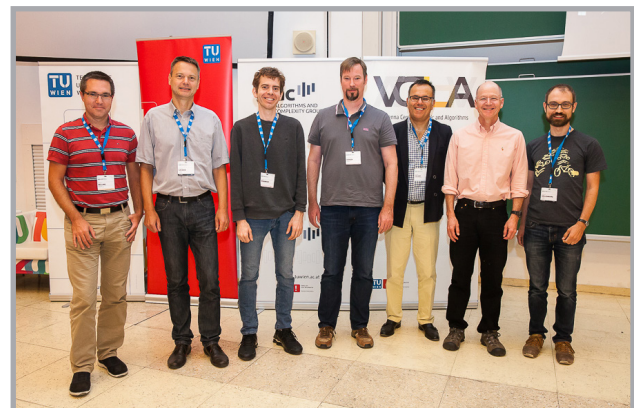- Günther Raidl
- Mihaela Rozman
- Stefan Woltran

Keynote Speakers

- Daniel Delling (Apple Inc)
- Babak Falsafi (EcoCloud and EPFL)
- Jie Gao (Stony Brook U.)
- Fabrizio Grandoni (U. of Lugano)
- David Mount (U. of Maryland)
- Kirk Pruhs (U. of Pittsburgh)
- David Woodruff (Carnegie Mellon U.)

https://algo2017.ac.tuwien.ac.at/
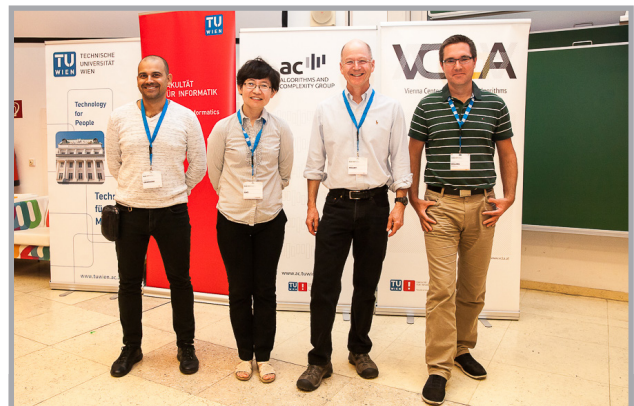
Fabrizio Grandoni, Jie Gao, David Mount, Daniel Delling

Daniel Delling, Stefan Szeider, David Woodruff, Christian Sohler, Babak Falsafi, David Mount, Martin Nöllenburg

ALGO 2017 organizers

Activities

Summer School: Parameterized Complexity Summer School (PCSS) 2017

Following the success of the 2009 AGAPE summer school on Corsica and the 2014 summer school in Bedlewo, the third instalment of the Parameterized Complexity summer school was held at TU Wien, in September 2017 as a pre-event of ALGO 2017.

PCSS 2017 attracted a record number of more than 100 participants.

Apart from providing an introduction to the basics of parameterized complexity the school covered some recent advances and applications in Economics, Logic, and Artificial Intelligence.

Invited Speakers

- Dániel Marx (Hungarian Academy of Sciences)
- Daniel Lokshtanov (U. Bergen)
- Fedor Fomin (U. Bergen)
- Michał Pilipczuk (U. Warsaw)
- Bart Jansen (Eindhoven U. of Technology)
- Neeldhara Misra (Indian IT., Gandhinagar)
- Ramanujan M.S. (TU Wien)
- Fahad Panolan (U. Bergen)
- Meirav Zehavi (Simons Institute)
- Sebastian Siebertz (U. Warsaw)
- Robert Ganian (TU Wien)
- Sebastian Ordyniak (TU Wien)

Organizers

- Robert Ganian
- Sebastian Ordyniak
- M. S. Ramanujan

https://algo2017.ac.tuwien.ac.at/pcss/
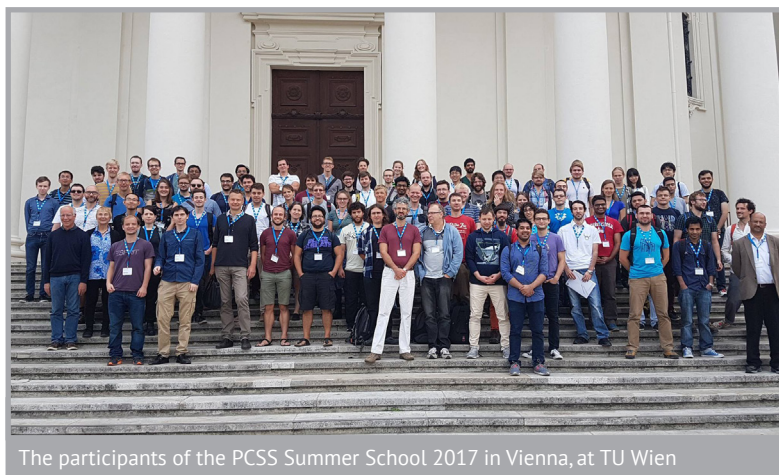
The participants of the PCSS Summer School 2017 in Vienna, at TU Wien

Activities

Workshop: New Trends in Formal Argumentation

The workshop on New Trend in Formal Argumentation took place at TU Wien in August 2017. It was supported by the VCLA.

Argumentation is nowadays a central part of modern Artificial Intelligence research, and a main topic at major AI conferences, with application domains in legal reasoning, multi-agent systems, and decision support.

The workshop on New Trends in Formal Argumentation stimulated intriguing discussions and supported cross-fertilizations and networking between the different groups involved, in particular with the groups of the invited speakers Leon van der Torre and Sanjay Modgil.

Further, all of the participants work in areas closely related to current research at the Institute for Logic and Computation, DBAI group, and within several research projects of DBAI, so that the event directly contributed to research growth of this group.
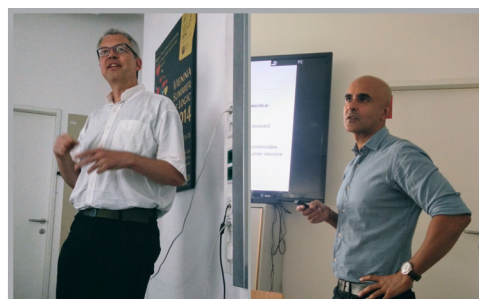
Leon v.d. Torre; Sanjay Modgil

Organizers

- Adrian Haret
- Johannes Wallner
- Stefan Woltran

Invited Speakers

- Sanjay Modgil (King's College London)
- Leon van der Torre (U. of Luxembourg)

Talks

- Martin Diller (TU Wien)
- Johannes Wallner (TU Wien)
- Thomas Linsbichler (TU Wien)
- Christof Spanring (TU Wien)

http://www.dbai.tuwien.ac.at/ntfa17/

Activities

LogicLounge: Fabiana Zollo

After the successes of the Logiclounge series of public discussions first held at the Vienna Summer of Logic in 2014 (the largest event in the history of logic), LogicLounge has since become an event crossing not only the borders of the academic disciplines but also countries.

LogicLounge with Fabiana Zollo took place in Heidelberg in July 2017, as part of the 29th CAV 2017 – Computer Aided Verification Conference, where it has already became a regular event in honour of the late Prof. Helmut Veith (1971-2016).

Fabiana Zollo´s talk on Social Dynamics in the Post-Truth Society: How the Confirmation Bias is Changing the Public Discourse, illuminated the way how information, rumors, and debates on social media are formed and what kind of digital behaviour can we expect in echo chambers which have effects on formation of public opinion.

Recording is available:
http://www.vcla.at/logiclounge

logic n. 1 the science of reasoning.
– ORIGIN from Greek *logikē tekhnē* 'art of reason'.

(c) Anna Petukhova

(c) Damien Zufferey

Activities

Summer School: LAIVe 2017

Summer school on Logic, Artificial Intelligence and Verification – LAIVe, took place at TU Wien in July 2017.

LAIVe was hosted by the Doctoral College Logical Methods in Computer Science (LogiCS) and the Austrian Society for Rigorous Systems Engineering (RiSE), with a friendly support of VCLA and the Austrian Ministry for Transport, Innovation and Technology.

The summer school was designed for master and doctoral students in Computer Science and Mathematics with a strong interest in Logic, Artificial Intelligence and Automated Verification. The final 40 participants engaged in the topics put forward by the featured speakers.

Organizers

- Gerald Berger (TU Wien)
- Jens Katelaan (TU Wien)

Featured Speakers

- Johannes Fuernkranz (TU Darmstadt)
- Cezary Kaliszyk (U. Innsbruck)
- Dan Olteanu (U. Oxford)
- Diego Calvanese (Free U. of Bolzano-Bozen)
- Marco Montali (Free U. of Bolzano-Bozen)
- Matteo Maffei (TU Wien)

http://forsyte.at/events/laive-summer-school-2017/

(c) Gerald Berger

(c) Gerald Berger

Activities

**Distinction:
Helmut Veith Stipend Award
Ceremony**

The first recipient of the annually awarded Helmut Veith Stipend for outstanding female master's students in computer science is Mariëlle Rietdijk.

The award was presented to her on March 14, 2017, by the Vice Rector for Academic Affairs of TU Wien Kurt Matyas. The award ceremony was followed by the panel discussion "More female students in computer science. Who cares?", with renowned scientists debating the diversity in STEM Studies.

Mariëlle Rietdijk came to Vienna from the Netherlands. She holds a bachelor's degree in Artificial Intelligence from Utrecht University and pursues the European Master's degree in Computational Logic at TU Wien. Marielle currently works on program synthesis using proof theory, a topic that Helmut Veith was very excited about.

The Helmut Veith Stipend is dedicated to the memory of an outstanding computer scientist who worked in the fields of logic in computer science, computer-aided verification, software engineering, and computer security.

(c) Christian Lendl

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

Students who are awarded a scholarship receive EUR 6000 annually, and a waiver of all tuition fees at TU Wien. The annual deadline is November 30.

http://forsyte.at/helmut-veith-stipend/

Certificate design: Nikita Veith and Merlin Zalodek

Activities

Cooperation: Logical Methods in Computer Science

The Doctoral College Logical Methods in Computer Science (LogiCS) was established in March 2014 and led by Helmut Veith† and Stefan Szeider.

LogiCS is a PhD degree program funded by the Austrian Science Fund FWF and run jointly by three Austrian universities (TU Wien, TU Graz and JKU Linz). Its faculty comprises fifteen renowned researchers with strong records in research, teaching and advising, complemented by eleven associated members.

logics LOGICAL METHODS IN COMPUTER SCIENCE

The program is aimed at highly motivated students who want to work in one of three fundamental fields of computer science: Databases and Artificial Intelligence, Verification, and Computational Logic.

The program has been very successful so far: It attracted excellent students from seventeen countries, and fifty percent of the fully funded students are female. (In 2017 the FWF renewed the grant of the LogiCS Doctoral College for another 4 years.)

http://logic-cs.at/phd

Several of the LogiCS students

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Invited Speakers and Visitors

Thirteen talks by speakers from countries across the world have been hosted by the VCLA during the past year. An online listing with abstracts is available at http://www.vcla.at/category/talks

- -

Evgenij Thorstensen (University of Oslo, Norway): Self join elimination and new notions of query containment

Tomáš Vojnar (Brno University of Technology, Czech Republic): Abstraction Refinement and Antichains for Trace Inclusion of Infinite State Systems

Johannes Kinder (University of London, United Kingdom): High System-Code Security with Low Overhead

Victor Dalmau (University Pompeu Fabra, Spain): Approximation of MIN CSP

Rupak Majumdar (University of California at Berkeley, USA): [Software Testing] Hitting families of schedules

Filippo Bonchi (CNRS ENS-Lyon, France): Full Abstraction for Signal Flow Graphs

Ondřej Kunčar (TU München, Germany): CoCon: A Non-Leaking Conference System

Danny Hermelin (University of Haifa, Israel): Fractals for Kernelization Lower Bounds

Vladislav Ryzhikov and Michael Zakharyaschev (Birkbeck, University of London, United Kingdom): Horn fragments of temporal logics and ontology-based access to temporal data

Odile Papini (Aix-Marseille Université, France): Prioritized Assertional-Based Removed Sets Revision of DL-Lite Belief Bases

Iyad Kanj (DePaul University, USA): The complexity of tree partitioning

Emilia Oikarinen (Aalto University, Finland): Minimum-Width Confidence Bands via Constraint Optimization

Matti Järvisalo (University of Helsinki, Finland): The Implicit Hitting Set Approach and Preprocessing for Maximum Satisfiability Solving

Media Coverage

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

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September 14, 2017
Live broadcast interview for *W24* (German)
Stefan Szeider on the topic of algorithms (2:17)
https://www.youtube.com/watch?v=oYTCqUvQDPk

September 11, 2017
Newspaper interview in print and on *Stuttgarter-Zeitung.de* (German)
Fake news is everywhere
https://www.stuttgarter-zeitung.de/inhalt.forscherin-fabiana-zollo-zu-echokam-
mern-es-sind-nicht-die-algorithmen.c39a776f-d4f4-4335-91f4-4ebe5fd952ca.
html?utm_term=Autofeed&utm_campaign=Echobox&utm_medium=Social&utm_
source=Twitter#link_time=1505111925

September 4, 2017
Magazine interview on Futurezone.at (German)
Algorithms: Most of the time they lack the human oversight
https://futurezone.at/science/algorithmen-es-fehlt-oft-die-menschliche-kon-
trolle/283.786.441

March 18, 2017
Article in *Der Standard* (German)
Computerexpertin: "Die Informatik muss sich von innen heraus ändern"
https://derstandard.at/2000054163787/Computerexpertin-Die-Informa-
tik-muss-sich-von-innen-heraus-aendern

March 15, 2017
Article in *Der Standard* (German)
Computerwissenschaften: Erste Studentin erhält Helmut-Veith-Preis
https://derstandard.at/2000054207154/Computerwissenschaften-Erste-Studen-
tin-erhaelt-Helmut-Veith-Preis#3680,808214,1489575794

March 15, 2017
Tiroler Tageszeitung (German)
Erster Helmut-Veith-Preis an der TU Wien vergeben
https://www.tt.com/ticker/12742451/erster-helmut-veith-preis-an-der-tu-wien-vergeben

VCLA Chairs 2014-2017

Helmut Veith and Stefan Szeider, founders and co-chairs of the VCLA (2014-2017)

© Nadja Meister / Anna Petukhova

Stefan Szeider and Helmut Veith were co-chairs of the Vienna Center for Logic and Algorithms until Helmut passed away in March 2016. They founded the VCLA in 2011, assuming the strategic leadership over its activities.

Stefan Szeider is a full professor at TU Wien and head of the Algorithms and Complexity Group at the Faculty of Informatics. He is also the deputy speaker of the Doctoral College Logical Methods in Computer Science and 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.

Helmut Veith was a full professor at TU Wien and head of the Formal Methods in Systems Engineering Group at the Faculty of Informatics. He was also an adjunct professor at Carnegie Mellon University and the speaker of the Doctoral College Logical Methods in Computer Science.

In his research, Helmut Veith applied formal and logical methods to problems in software technology and engineering. His work focused on model checking, software verification and testing, embedded software and computer security.

VCLA Chairs since 2018

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

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In December 2017 the VCLA board warmly welcomed the new elected VCLA co-chair, Agata Ciabattoni, to fill the position which was left empty by the late Helmut Veith.

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.

Agata Ciabattoni is mainly working in non-classical logics: proof theory, semantics and applications in various fields, ranging from programming languages to Indian Philosophy.

Organization since 2018

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

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

Local Board
Alexander Leitsch
Matthias Baaz
Laura Kovács
Martin Nöllenburg
Magdalena Ortiz
Stefan Woltran

International 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)	Miroslaw Truszczynski (University of Kentucky)
Moshe Y. Vardi (Rice University)	

PR and Project Management	Mihaela Rozman

Collaborations

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

Logic and Algorithms Groups

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