

TC1 “Foundations of Computer Science” Activity Report

Luís Soares Barbosa, TC1 chair

1 Introduction

Established as Special Group (SG14) in 1989 and approved as a Technical Committee in 1996, TC1 aims at supporting the development of Theoretical Computer Science as a fundamental science, and its engineering, as well as the design of bridges with other sciences and their applications.

This annual activity report, covering essentially the period from 1 July 2021 – 30 June 2022, will be presented to the IFIP General Assembly, to take place in Lille, France, from 20 to 21 September, 2022.

2 Organisation of TC1, Membership, and Activities

Two Business Meeting took place virtually in this period:

- *24 November 2021*. The main discussion topics were i) the proposal of a new Working Group on Quantum Computation (see below), and ii) the preparation of the electoral procedure for TC1 chair for the period 2022-2024. A report on the 2021 IFIP General Assembly was presented.
- *28 February 2022*. Activities and dynamics of each WG were shared by the corresponding chairs, and a report on the new established WG 1.11/2.17 on Foundations of Quantum Computation was presented. The meeting also discussed a number of suggestions for TC1 joint initiatives to develop from 2022 to 2024. The Committee congratulated Mykola Nikitchenko, the Ukraine national representative to TC1, for his presence in the meeting under so difficult circumstances, and expressed wishes for a speedy return of peace.

In December 2021 *Luís Soares Barbosa*, from Minho University, Portugal, and the University of the United Nations, was elected for a second term as TC1 Chair (through an electronic voting procedure), and appointed by the IFIP President in December, 22.

The main activity focus of TC1 as a whole in this period was the structuring and establishment of a new Working Group on Quantum Computation. After five months of intensive preliminary work approaching the relevant community, in both academy and industry, to promote and discuss the future group mission, objectives and dynamics, WG 1.11/2.17 was established in February 2022 under both TC1 and TC2, with formal responsibility of TC1. The cooperation with TC2 in this effort was an important asset, as well as the articulation with the (also new) Domain Committee on Quantum Computation. The WG mission statement and list of the founding members is provided as Appendix B.

The new WG had its first on-line meeting in June 2022, joining together its 23 initial members. The first in-person meeting will take place in July 2023, in Paris, co-located to a main Quantum Computation conference (QPL). Until then the WG is jointly coordinated by the current TC1 and TC2 chairs, *Luís Soares Barbosa* and *Ina Schaefer*, who will consolidate the group dynamics and extend membership through direct contacts with active female researchers in the area. The organization of a Summer School

in February 2023, with a special focus on Quantum Computation and its interconnections to Foundations of Computer Science is currently being considered in collaboration with an academic partner in South Africa.

3 Working Group administration and dynamics

The scientific activity of TC1 takes places in its Working Groups. All of them have either their own flagship conferences and/or are deeply involved in the organisation of conferences with which they collocate their own workshops and business meetings.

Recovering from the Covid-19 pandemic, several Working Groups kept their scientific events and business meetings in hybrid formats, although full in-person meetings are returning. Actually, an effort is being made to return to the organization of events in fully physical format until the end of 2022, after two years of virtual editions.

The WG activity reports, collected in Appendix A to this document, and their web pages, give a good account of both their internal dynamics, and the scientific subjects that their communities are currently tackling.

The following changes in the WG coordination took place:

- *Markus Roggenbach* and *Lutz Schröder* stepped down as chair and vice-chair of WG 1.03, respectively. The new coordination team is composed by *Fabio Gadducci*, from Dipartimento di Informatica, Universit di Pisa, Italy, as chair, *Corina Cîrstea*, from School of Electronics and Computer Science, University of Southampton, UK, as vice-chair, and *Holger Schlingloff*, Fraunhofer FOKUS and Humboldt University of Berlin, Germany, as secretary.
- *Pedro Balbi de Oliveira* was replaced by *Nazim Fates*, from Inria Nancy Grand-Est, Nancy, France, as chair of WG 1.05. The new coordination team also includes *Henryk Fuks*, from Brock University, St. Catharines, Ontario, Canada, as vice-chair, and *Luca Mariot*, from Digital Security Group, Radboud University, Nijmegen, as secretary.

The list of Working Groups of TC1, with their chairs, vice-chairs and secretaries as of the date of writing, is thus established as follows.

WG		Chair	Secretary
1.02	Descriptive Complexity	Martin Kutrib Rogério Reis (Vice)	Andreas Malcher
1.03	Foundations of System Specification	Fabio Gadducci Corina Cîrstea (Vice)	Holger Schlingloff
1.05	Cellular Automata and Discrete Complex Systems	Nazim Fates Henryk Fuks (Vice)	Luca Mariot
1.06	Rewriting	Cynthia Kop Carsten Fuhs (vice)	Carsten Fuhs
1.07	Theoretical Foundations of Security Analysis and Design	Sebastian Mödersheim Véronique Cortier (Vice)	Luca Viganò
1.08	Concurrency Theory	Pedro R. D’Argenio	Ana Sokolova
1.09	Verified Software	Jim Woodcock	Natarajan Shankar
1.10	String Algorithmics & Applications	Jan Holub	

The up-to-date member lists for each WG are available the corresponding web pages (accessible from the TC1 web page at ifip-tc1.org). IFIP web page: www.ifip.org/bulletin/bulltcs/memtc01.htm gives the member list for every Working Group as well.

Appendix A

Reports from TC1 Working Groups

WG 1.02 – Descriptive Complexity

Chair: Prof. Martin Kutrib, Universität Giessen, Germany

Vice-Chair: Prof. Rogério Reis, Universidade do Porto, Portugal

Secretary: Dr. Andreas Malcher, Universität Giessen, Germany

Home page: www.informatik.uni-giessen.de/ifipwg1.2

2021-22 BRIEF ACTIVITY REPORT

Descriptive complexity has historically been a multidisciplinary area of study, with contributions from automata theory, computational complexity, cryptography, information theory, probability, statistics, pattern recognition, machine learning, computational learning theory, computer vision, neural networks, formal languages and other fields. The aims of the working group are therefore to promote research in all aspects of descriptive complexity through conferences, publications, and more informal means of scientific interaction such as electronic news groups. Since 2002 particular emphasis was and is being placed on the descriptive complexity of bio-inspired computing models and the relationship between descriptive complexity and software reliability.

The scope of the working group encompasses all aspects of descriptive complexity, both theory and application. These aspects include but are not limited to

- descriptive complexity of formal systems and structures,
- various measures of descriptive complexity of automata, grammars, languages and of related systems,
- trade-offs between descriptive complexity and mode of operation,
- circuit complexity of Boolean functions and related measures,
- succinctness of description of (finite) objects,
- descriptive complexity in resource bounded or structure bounded environments,
- structural complexity,
- descriptive complexity of formal systems for applications (for example, software reliability, software and hardware testing, modeling of natural languages),
- descriptive complexity aspects of nature motivated (bio-inspired) architectures and unconventional models of computing,
- algorithmic and other descriptive theories of randomness.

Furthermore, the WG tries to promote interaction and the exchange of information across traditional discipline boundaries and to provide a point of contact for all researchers in all disciplines interested in descriptive complexity and its applications.

Organisation of WG and Membership

Chairpersonship

No changes during this period.

New members

The membership of the IFIP Working Group 1.02 has been maintained as follows:

Helmut Jrgensen, Canada,
Wolfgang Thomas, Germany,
Eric Allender, USA,

have been excluded, since they are deceased in the meantime or have not been active in the field of descriptonal complexity for many years.

Matthias Wendlandt, Germany,
Abuzer Yakarylmaz, Latvia,

have been appointed as new members.

Scientific activities and meetings

Events organised by the Working Group

- The *23th International Conference on Desriptional Complexity of Formal Systems (DCFS 2021)* was expected to be jointly organized, under supervision of the DCFS steering committee, by Yo-Sub Han (Yonsei University) from June 21 to 24, 2021 in Seoul, South Korea, as PC co-chair with Sang-Ki Ko (Kangwon National University, South Korea). Due to the ongoing crisis caused by the Corona virus, the conference had to be canceled. As for DCFS 2020 the DCFS steering committee decided to prepare a volume of collected papers in order to allow researchers in the area of descriptonal complexity to still present their recent results. The volume edited by Yo-Sub Han and Sang-Ki Ko has been published as volume 13037 of the Lecture Notes in Computer Science book series. It consists of 16 regular contributions which were selected by a committee after a standard review process. A special issue of International Journal of Foundations of Computer Science devoted to extended versions of selected papers is in preparation.
- The *24th International Conference on Desriptional Complexity of Formal Systems (DCFS 2022)* was jointly organized, under supervision of the DCFS steering committee, by György Vaszil (University of Debrecen) and Géza Horváth (University of Debrecen) and the PC co-chair Yo-Sub Han (Yonsei University) from August 29 to 31, 2022 in Debrecen, Hungary. The scientific part was consisting of 4 invited lectures and 14 regular contributions, selected by a program committee after a standard reviewing process. The proceedings have been published in the Lecture Notes in Computer Science book series. A special issue of Theoretical Computer Science, devoted to extended versions of selected papers is planned.

Formal meetings of the Working Group

- August 30, 2022, on the occasion of DCFS 2022 in Debrecen, Hungary.
- The next formal meeting of the working group is planned in 2023 on the occasion of DCFS 2023 in Potsdam, Germany.

Forthcoming events

- *25th International Conference on Descriptive Complexity of Formal Systems (DCFS 2023)*. The conference will be held in Potsdam, Germany, and it will be organized by Henning Bordihn.
- *26th International Conference on Descriptive Complexity of Formal Systems (DCFS 2024)*. The conference will be held in Santa Clara, California, USA, and it will be organized by Nicholas Tran.

Publications

- Information and Computation 284 (2022), special issue with selected and extended papers of the 21st International Conference on Descriptive Complexity of Formal Systems (DCFS 2019), guest editors: Galina Jirásková, Stavros Konstantinidis.
- Journal of Automata, Languages and Combinatorics, special issue with selected and extended papers of the 22nd International Conference on Descriptive Complexity of Formal Systems (DCFS 2020), guest editors: Galina Jirásková, Giovanni Pighizzini, in preparation.
- Yo-Sub Han, Sang-Ki Ko (eds.): Collected Papers dedicated to Descriptive Complexity of Formal Systems (DCFS 2021), Lecture Notes in Computer Science 13037, Springer 2021.
- Martin Kutrib, Nelma Moreira, Giovanni Pighizzini, Rogério Reis: Hot Current Topics of Descriptive Complexity. IFIP's Exciting First 60+ Years, Advancing Research in Information and Communication Technology 600, 3–28, Springer 2021.
- International Journal of Foundations of Computer Science, special issue with selected and extended papers of the 23rd International Conference on Descriptive Complexity of Formal Systems (DCFS 2021), guest editors: Yo-Sub Han, Sang-Ki Ko, in preparation.
- Yo-Sub Han, György Vaszil (eds.): Descriptive Complexity of Formal Systems – 24th IFIP WG 1.02 International Conference, DCFS 2022, Proceedings. Lecture Notes in Computer Science 13439, Springer 2022.

WG 1.03 — Foundations of System Specification

Chair: Prof. Dr. Fabio Gadducci, Dipartimento di Informatica, Università di Pisa, Italy

Co-Chair: Dr. Corina Cîrstea, School of Electronics and Computer Science, University of Southampton, UK

Secretary: Prof. Dr. Holger Schlingloff, Fraunhofer FOKUS and Humboldt University of Berlin, Germany

Home page: ifipwg13.cs.ovgu.de

2021-22 BRIEF ACTIVITY REPORT

Organisation of WG and Membership

Membership

Fabio Zanasi joined the group as a new member in January 2022

Bart Jacobs and Jose Fiadeiro became emeritus members in January 2022.

The group is keeping a stable membership level of around 40 members (excluding emeritus members), and has considered 4 observers (Fabio Zanasi, Daniela Petrisan, Andre Platzer and Xiuyi Fan) in the current report period.

Scientific activities and meetings

Meetings

A meeting, with both in-person and virtual participation, was held in Salzburg, Austria, between 18-19 January 2022.

Events organised by the Working Group

- The *15th International Conference on Graph Transformation, ICGT 2022*, was held between 7-8 July in Nantes, France, as part of the Software Technologies: Applications and Foundations (STAF) federation. It was organised by Nicolas Behr (CNRS, IRIF, Université Paris Cité, France) and Daniel Strüber (Chalmers – University of Gothenburg, Sweden; Radboud University, Netherlands). It attracted 20 submissions, of which 11 were accepted, and a similar number of participants. The event included a keynote talk by Christian Doczkal on Graph Theory in Coq: Axiomatizing Isomorphism of Treewidth-Two Graphs. Proceedings were published as volume 13349 of the LNCS series. A special issue of the Journal of Logical and Algebraic Methods in Programming is in preparation. The EATCS Best Theory Paper Award assigned by the European Association for Theoretical Computer Science went to Reiko Heckel, Andrea Corradini and Fabio Gadducci for their paper Graph Rewriting Components. The EASST Best Software Science Paper Award assigned by the European Association of Software Science and Technology went to Kristopher Brown, Evan Patterson, Tyler Hanks and James Fairbanks for their paper Computational category theoretic rewriting.
- The *26th International Workshop on Algebraic Development Techniques, WADT 2022* was held between 28-30 June in Aveiro, Portugal, as a standalone workshop. It was organised by Alexandre Madeira and Manuel Martins (both from University of Aveiro, Portugal). It attracted approximately 35 submissions and a similar number of participants. The event included a special track on Quantum

Computation and four invited talks (by Radu Mardare, José Meseguer, José Nuno Oliveira and Peter Selinger). Post-proceedings will be published in the LNCS series.

- The *16th International Workshop on Coalgebraic Methods in Computer Science (CMCS 2022)* is an official workshop of *European Joint Conferences on Theory and Practice of Software, ETAPS 2022*. CMCS 2022 was held between 2-3 April 2022 in München, Germany, as a satellite event of ETAPS 2022. The PC co-chairs were Helle Hvid Hansen (University of Groningen, Netherlands) and Fabio Zanasi (University College London, UK). The event attracted 23 submissions (12 regular submissions and 10 short contributions), of which 20 were accepted. In addition to the contributed talks, the event included 5 invited lectures (by Ana Sokolova, Renato Neves, Sam Staton, Slawomir Lasota and Mahsa Shirmohammadi). The event was attended by 37 participants, of whom 5 took part remotely.

Forthcoming events

- The *10th Conference on Algebra and Coalgebra in Computer Science, CALCO 2023* will be held in Bloomington, IN, USA in June 2023, co-located with the 39th Conference on Mathematical Foundations of Programming Semantics, MFPS XXXIX. It will be organised by Paolo Baldan (University of Padua, Italy) and Valeria de Paiva (Topos Institute, Berkeley, CA, USA).
- The *16th International Conference on Graph Transformation, ICGT 2023*, will be held in Leicester, UK, as part of the Software Technologies: Applications and Foundations (STAF) federation. It will be organised by Maribel Fernandez (King’s College London, UK) and Chris Poskitt (Singapore Management University, Singapore). Proceedings will be published as a volume in the LNCS series.

WG 1.05 — Cellular Automata and Discrete Complex Systems

Chair: Nazim Fats — Inria Nancy Grand-Est, Nancy, France

Vice-Chair: Henryk Fukō — Brock University, St. Catharines, Ontario, Canada

Secretary: Luca Mariot — Digital Security Group , Radboud University, Nijmegen , 6525 EC, The Netherlands

Home page: <https://ifipwg15.inria.fr>

2021-22 BRIEF ACTIVITY REPORT

The Working Group 1.5, on *Cellular Automata and Discrete Complex Systems*, reestablished in 2008, has the following attributions:

- To establish and maintain a permanent, international, multidisciplinary forum for the collaboration of researchers in the field of Cellular Automata (CA) and Discrete Complex Systems (DCS).
- To provide a platform for presenting and discussing new ideas and results.
- To support the development of theory and applications of CA and DCS (e.g. parallel computing, physics, biology, social sciences, and others) as long as fundamental aspects and their relations are concerned.
- To identify and study within an inter- and multidisciplinary context, the important fundamental aspects, concepts, notions and problems concerning CA and DCS.

The scope of the working group encompasses all fundamental aspects of cellular automata and discrete complex systems, including: Dynamics, Algebraic aspects, Complexity issues, Emergent properties, Formal language processing, Models of parallelism and distributed systems, Phenomenological descriptions, Scientific modelling and Practical applications.

Organisation of WG and Membership

Chairpersonship

In December 2021, the group elected its new head with the Belenios online voting system. Nazim Fats was elected as the new chair of the working group for the triennium 2022-2023-2024. Henryk Fuks and Luca Manzoni were respectively nominated as the new vice-chair and secretary.

Events

The 2022 admin meeting of IFIP WG-1.5 has not yet been hold. Indeed, the AUTOMATA conference will take place during the 10th and 11th of October, 2022 (see <https://cse.iitkgp.ac.in/workshop/Automata22/>).

The conference received 18 submissions on the EasyChair system, out of which only three were accepted as full papers, one as an exploratory paper. Consequently, LNCS refused to published the proceedings on the basis of a too small number of papers. Different propositions are studied, such as merging the proceedings of this year with the next year proceedings, or simply to publishing these papers in a special issue of a journal.

We have no clear explanation of this decrease of activity. This can nevertheless be partially explained by the situation of the COVID epidemics and by the fact that the workshop is taking place in India, which increases the cost of travel.

The workshop will probably take place in a virtual mode.

For the next editions of the workshop, one solution would be to organise it on biannual basis, in the odd years only in order to alternate with the ACRI conference on cellular automata. In the even years, the annual meeting of the working group could take place online, joined with a small informal scientific meeting.

WG 1.06 — Rewriting

Chair: Dr. Cynthia Kop, Radboud University Nijmegen, The Netherlands

Co-chair and Secretary: Dr. Carsten Fuhs, Birkbeck, University of London, United Kingdom

Home page: <https://ifip-wg-rewriting.cs.ru.nl/>

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The Working Group aims to promote research efforts in rewriting and its applications. To do this, it aims to establish a close cooperation between existing groups and to facilitate the emergence of new ones. It wants to increase awareness of rewriting techniques in the computer science community at large and foster development of applications of theoretical advances.

Organisation of WG and Membership

The annual meeting of the IFIP WG 1.6 in 2022 was co-located with FSCD 2022 in Haifa, Israel (as part of the Federated Logic Conferences) on 31 July. At this meeting, we have welcomed Sandra Alves and Naoki Nishida as new members.

Unlike the last two years, the meeting was held in person, but as many of the members could not travel to Israel at the time, we have decided to additionally hold an online meeting in early October. We will there discuss (among other things) if we should continue to do annual online meetings in addition to the in-person meetings.

The Working Group currently comprises 13 honorary members and 44 active members.

Chairpersonship and Secretary

Cynthia Kop is the current Chair of the Working Group. Her term will end in 2024. Carsten Fuhs is the current Co-chair and Secretary of the Working Group. Like the Chair's term, his term will end in 2024.

International School on Rewriting

The 13th *International School on Rewriting* (ISR for short) will take place in the week of 19–26 September 2022, within the Computational Logic Autumn Summit in Tbilisi, Georgia. The school is organised by Besik Dundua and Temur Kutsia. It has both a basic track which introduces students to term rewriting, and an advanced track that includes topics from active research. See the School's website for further information on the organisation of the school:

<https://viam.science.tsu.ge/clas2022/isr/>.

The 14th ISR will be organised by Aart Middeldorp in Obergurgl, Austria, in either July or August 2024.

Events organised by the Working Group

- The annual meeting of the WG in 2022 took place on 31 July 2022.
- The 12th ISR was organised virtually in Madrid in July 2021.
- The 13th ISR will be held in Tbilisi in September 2022.
- The 14th ISR will be held in Obergurgl in July or August 2024.

Forthcoming events

The next *virtual* meeting of the working group is planned for early October 2022. The next *physical* meeting is planned for July 2023, likely co-located with FSCD 2023 in Rome, Italy.

WG 1.07 — Theoretical Foundations of Security Analysis and Design

Chair: Prof. Sebastian Mödersheim, Technical University of Denmark

Vice-Chair: Prof. Véronique Cortier, University of Nancy, France

Secretary: Prof. Luca Viganò, King's College London, UK

Home page: <http://ifipwg1-7.compute.dtu.dk>

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The WG 1.7 promotes activities in the area of theoretical foundations of security analysis and design, and has been established in 1999. It mainly aims at investigating the theory of security, as well as of privacy and trust, at discovering and promoting new areas of application of theoretical techniques in computer security and at supporting the systematic use of formal techniques in the development of security related applications.

Organisation of WG and Membership

Currently the WG has 32 members, from 14 countries and 4 continents:

- Europe: 23 (France: 6, UK: 3, Germany: 5, Italy: 2, Belgium, Denmark, Ireland, Luxemburg, Netherlands, Spain, Switzerland: 1)
- America: 6 (USA)
- Asia: 1 (China)
- Australia: 2

Chairpersonship

Assoc. Prof. Sebastian Mödersheim, Technical University of Denmark (DTU), elected on 27 June 2019.

Scientific activities and meetings

One of the founding members of the group, Joshua Guttman reached his 66.66th birthday in December, which we celebrated with a Festschrift. In fact it was due to the Covid problems of the past two years that we decided not to celebrate his 65th birthday, because the priority was on a social gathering rather than on the precise number. The Festschrift appeared in December, but at the time, traveling was still very difficult so we decided to hold only a short online celebration and postpone the main event yet a bit later, namely as a workshop of the Computer Security Foundations Symposium (CSF), which was this year associated to the Federated Logic Conference FLoC in Haifa this August.

The Festschrift was organized by Daniel Dougherty, José Meseguer, Sebastian Alexander Mödersheim, and Paul Rowe. It contains an incredible 23 contributions from researchers both inside and outside our working group, celebrating Joshua's research contributions, in particular his work on protocol verification and the influential strand space formalism he introduced. The event was attended by over 30 participants, also beyond the author list, and can be called an inofficial Workgroup meeting this year, including a lot of scientific exchange and also allowing to meet in person and celebrate which was so long missed during the pandemic.

Forthcoming events

- Hot Issues in Security Principles and Trust (HotSpot). We consider to re-apply for a workshop at the next Euro-S& P.

WG 1.08 — Concurrency Theory

Chair: Prof. Pedro R. D’Argenio, Universidad Nacional de Córdoba & CONICET, Argentina

Secretary: Dr. Ana Sokolova University of Salzburg, Austria

Home page: www.concurrency-theory.org/organizations/ifip

2021-22 BRIEF ACTIVITY REPORT

The aim of this working group is to develop the theoretical foundations of concurrency, exploring the frontiers of existing theoretical models such as labelled transition systems, process calculi, event structures and Petri nets, and various forms of enriched automata, so as to obtain a deeper understanding of concurrent systems and push forward the associated verification techniques.

Organisation of the WG and Membership

Currently, the WG has 52 members (10 women, 42 men). Since the WG creation in 2005, there has been a turnover of -13, + 13. We have been constantly trying to improve the gender balance within the WG, both when recruiting new members and when choosing invited speakers and sending personal invitations for the events organised by the WG.

The last recruitment campaign was held in 2016, resulting in the recruitment of 10 new members (6 men and 4 women). For the forthcoming WG 1.8 meeting, which will take place next 12th of September, we plan to define new recruitments as well as update the current list of member given that some of them has been inactive for quite some time.

Chairpersonship

Prof. Pedro R. D’Argenio (UNC & CONICET, Argentina) and Dr. Ana Sokolova (University of Salzburg, Austria) started coordinating the WG 1.8 in January 2021 respectively as chairperson and secretary of the WG. A round of elections was held by the TC chair in December 2020, which led to their election.

Events organised by the WG

1) TRENDS (New Trends in Concurrency Theory)

Since 2012, the WG organises an annual event called TRENDS, in affiliation with the conference CONCUR (the main conference in the field). TRENDS was originally a half-day workshop, consisting of invited talks only. Since 2016, it was turned into a full-day workshop, with both invited talks and a number of “highlight talks” given by WG members or other participants. The aim of TRENDS is to stir discussion on recent trends and open problems in Concurrency Theory. It is informal, without proceedings. Editions 2020 and 2021 were held online due to the sanitary crisis.

TRENDS 2022 will take place physically (with also online access) next September 12, 2022. (<https://concurrency-theory.org/events/trends/2022/>). As usual, it will be co-located with CONCUR 2022 within the umbrella event CONFEST 2022 (<https://confest2022.mimuw.edu.pl/>). It will consists of the following 3 invited talks:

- Kirstin Peters, Augsburg University, DE. *Multiparty Session Types for Distributed Algorithms.*
- Stefan Kiefer, University of Oxford, UK. *Strategies in Countable MDPs.*
- Javier Esparza, Technische Universität München, DE. *State Complexity of Population Protocols.*

The workshop will be followed by the WG business meeting.

2) OPCT (Open Problems in Concurrency Theory)

Another event that is regularly organised by the WG 1.8 is the workshop OPCT (Open Problems in Concurrency Theory), which aims at identifying the most important open problems in Concurrency Theory. This is a research seminar without proceedings, where participation is on invitation only. Its average duration is of three days, and its frequency is of one edition every 2-3 years. The three editions of OPCT took place respectively in 2014 in Bertinoro, in 2017 in Vienna, and in 2019 in Lisbon, and they were always very successful, gathering each time an attendance of 50-60 people. See the following links:

OPCT 2014: <http://www.sti.uniurb.it/events/opct2014/>

OPCT 2017: <http://opct2017.famaf.unc.edu.ar/Home.html>

OPCT 2019: <https://popl19.sigplan.org/track/opct-2019-papers>

While OPCT is usually organised as a stand-alone event, its 2019 edition was held in affiliation with the POPL conference: <https://popl19.sigplan.org/>

The next edition is scheduled for the end of June 2023 following the original stand-alone format of the 2014 and 2017 editions.

3) TTCS (Topics in Theoretical Computer Science)

A further event that is sponsored by the WG 1.8 is the international conference on Topics in Theoretical Computer Science (TTCS), whose first two editions were held at the School of Computer Science, Institute for Research in Fundamental Sciences (IPM), Tehran, Iran, respectively in 2015 and 2017, while the third one in 2020 was held online. See the following links:

TTCS 2015: <http://cs.ipm.ac.ir/ttcs/2015/>

TTCS 2017: <http://cs.ipm.ac.ir/ttcs/2017/>

TTCS 2020: <http://cs.ipm.ac.ir/ttcs/2020/>

It is our intention to keep the agreement.

Publications

In the past, four special issues of the Journal of Logical and Algebraic Methods in Programming (JLAMP) have been organised: two of them as an outcome of OPCT 2014 and 2017, and the other two as an outcome of TRENDS 2014, 2015, and 2016:

OPCT 2014: <https://doi.org/10.1016/j.jlamp.2015.10.002>

OPCT 2017: <https://www.sciencedirect.com/science/journal/23522208/vsi/100VL3RVOMN>

TRENDS 2014-2015: <https://doi.org/10.1016/j.jlamp.2017.01.002>

TRENDS 2015-2016: <https://doi.org/10.1016/j.jlamp.2019.07.001>

We expect to produce a new special issue after OPCT 2023.

Contribution for creating the CONCUR Test-of-Time award

Our WG contributed to the creation of a Test-of-Time award for the papers published in the CONCUR conferences. The first edition took place during CONCUR 2020 and papers for the periods 1990-1993 and 1992-1995 were awarded. The second edition took place during CONCUR 2021 and papers for the periods 1994-1997 and 1996-1999 were awarded.

The third edition will take place during CONCUR 2022 (September 13-16, 2022, Warsaw) and papers for the periods 1998-2001 and 2000-2003 were awarded. The Jury of the Award for this last edition was chaired by Ilaria Castellani, and composed by Paul Gastin, Orna Kupferman, Mickael Randour, and Davide Sangiorgi. Four of them are members of the WG. The selection has already been made public and it is worth mentioning that three of the four awarded papers were co-authored by WG members.

1st CONCUR ToT award: <https://concur2020.forsyte.at/test-of-time.html>

2nd CONCUR ToT award: <https://qonfest2021.lacl.fr/test-of-time.php>

3rd CONCUR ToT award: <https://concur2022.mimuw.edu.pl/tot-award/>

WG 1.09/2.15 — Verified Software

Chair: Prof. Jim Woodcock University of York, UK

Secretary: Dr. Natarajan Shankar, SRI International, US

Past-Chair: Dr. Jean-Christophe Filliâtre, CNRS, Orsay, France

Home page: <https://www.lri.fr/~filliatr/1.9/>

2021-22 BRIEF ACTIVITY REPORT

The aims of 1.9/2.15 are to contribute to a comprehensive theory of programming that covers the features needed to build practical and reliable programs; to contribute to a coherent toolset that automates the theory and scales up to the analysis of industrial-strength software; and to collect realistic, verified programs as part of the Verified Software Initiative (VSI) Repository.

Since the creation of the group in 2011, we had twelve physical meetings. These meetings are sometimes co-located with conferences of our domain (e.g. CAV, POPL) to limit travels, though this is not a rule.

We invite different observers to attend our meetings each time, and we collectively decide to elect some of them as new members whenever they participated actively and constructively to our meetings.

Our meetings encourage talks on work in progress and leave much room to discussion. Each talk is typically given one hour.

We also run the VSTTE conference and the Verified Software Competition ([vscomp http://vscomp.org/](http://vscomp.org/)), not to be confused with the VerifyThis competition, another competition of our domain).

Organisation of WG and Membership

Chairpersonship

Jim Woodcock FREng (University of York) became chair of the working group.

New members

No changes in the members during the period.

The current number of members of the group is 21 (+ 3 emeriti).

New organisation rules

No changes in the organisation rules during the period.

Scientific activities and meetings

Events organised by the Working Group

We had no physical meetings of the working group in the period (July 2021 – July 2022), due do the COVID-19 situation.

The postponed “Verified Software” Programme at the Isaac Newton Institute took place in Cambridge between the 4th of July 2022 and the 12th of August 2022.

WG 1.10 – String Algorithmics & Applications

Chair: Prof. Jan Holub, Czech Technical University in Prague, Prague, Czech Republic

Home page: <http://www.stringology.org/ifip/>

2021-22 BRIEF ACTIVITY REPORT

The WG 1.10 aims to promote research in String Algorithmics (combinatorics on words, string algorithms) and applications. It proposes a unique forum for the best available research that will provide sustained inspiration within the stringological community for still better research. We intend to take advantage of the applied nature of a very theoretical topic to encourage both theory and practice in the group. At both ends our main concern is to promote relevant research of the very highest quality.

The scope the group is paradoxically both well-focussed and broad: well-focussed because the underlying combinatorial object is text, a simple word, a piece of string; broad because of the numerous applications (combinatorics on words, finite automata), but also algorithms on strings, and so the application areas for those algorithms, of which a partial list follows:

- computational biology (including system biology, biology/PPI networks),
- text compression,
- natural language processing,
- information retrieval, both on and off the Internet (including search engines, massive indexing applications),
- data mining,
- pattern recognition,
- software engineering,
- cryptology,
- computational geometry,
- computational musicology.

Organisation of WG and Membership

Chairpersonship

Jan Holub is a chair of WG since 2019 when the WG was re-established.

New members

No changes in the members during the period.

New organisation rules

No changes in the organisation rules during the period.

Events organised by the Working Group

- 25th Prague Stringology Conference (PSC 2021). Prague, Czech Republic, August 30–31, 2021,
- 28th International Symposium on String Processing and Information Retrieval (SPIRE 2021). Lille, France, October 4–6, 2021,
- 33rd Annual Symposium on Combinatorial Pattern Matching (CPM 2022). Prague, Czech Republic, June 27–29, 2022.

Forthcoming events

- 26th Prague Stringology Conference (PSC 2023). Prague, Czech Republic, August, 2023,
- 29th International Symposium on String Processing and Information Retrieval (SPIRE 2029). Concepcin, Chile, November 8–10, 2022,
- 34th Annual Symposium on Combinatorial Pattern Matching (CPM 2023). Paris, France.

Appendix B

New WG 1.11/2.17 on Foundations of Quantum Computation