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 anual activity report, covering essentially the period from 1 July 2019 – 1 July 2020, will be presented to the IFIP General Assembly, to take place virtually from 24 to 25 September, 2020.

2 Organisation of TC1 and Membership

Although all TC1 Working Groups were active during the period reported here, the Technical Committee itself was limited to the usual administrative duties, due, to a large extent, to the effects of Covid-19 and its consequences in academic life worldwide. A Business Meeting scheduled for ETAPS'2020 was cancelled when ETAPS itself was postponed.

The next Business Meeting will take place virtually in October 2020. The pertinence of three concerns shared by several TC1 members was increased along this period and will certainly be part of its agenda:

– The place and (future) impact of technology mediated events (conferences, WG meetings, etc) in the TC1 agenda. Some of the WGs conferences/workshops were run virtually along 2020, and in other cases replaced by a formal publication. Although prompted by a Public Health emergency, this is an important debate that may go further beyond the present context.

– The move from formal publishers to open publication.

– The role of TC1 as the IFIP "branch" on foundations of Computer Science, and the question of how to make it more effective, with increased relevance and visibility.

TC1 contributed with two chapter submissions to the coming AICT 600 book, under preparation on the occasion of IFIP 60th anniversary.

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 colocate their own workshops and business meetings. It is TC1 intention (and currently a topic under discussion) that each WG promotes a specific IFIP event recognised as a flagship conference in the corresponding scientific domain.

The WG activity reports, collected in appendix 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:

– In July 2020, *Martin Kutrib*, from Universität Giessen, Germany, was re-elected for a second term as chair of WG 1.02.

– In July 2020, *Lutz Schröder* stepped down as chair of WG 1.03 to assume the role of vice-chair, and the previous vice-chair *Markus Roggenbach*, from Swansea University, Wales, UK, became chair, following a rota agreed in the WG in 2018.

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	Descriptional Complexity	Martin Kutrib Rogério Reis (Vice)	Andreas Malcher
1.03	Foundations of System Specification	Markus Roggenbach Lutz Schröder (Vice)	
1.05	Cellular Automata and Discrete Complex Systems	Pedro Balbi de Oliveira, Nazim Fates (Vice)	Katsunobu Imai
1.06	Rewriting	Georg Moser	Martin Avanzini
1.07	Theoretical Foundations of Security Analysis and Design	Sebastian Mödersheim Véronique Cortier (Vice)	Luca Viganò
1.08	Concurrency Theory	Ilaria Castellani Mohammad Reza Mousavi (Vice)	
1.09	Verified Software	Jean-Christophe Filliâtre Jim Woodcock (Vice)	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 – Descriptional 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`

2019-20 BRIEF ACTIVITY REPORT

Descriptional 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 descriptional 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 descriptional complexity of bio-inspired computing models and the relationship between descriptional complexity and software reliability.

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

- descriptional complexity of formal systems and structures,

- various measures of descriptional complexity of automata, grammars, languages and of related systems,

- trade-offs between descriptional complexity and mode of operation,

- circuit complexity of Boolean functions and related measures,

- succinctness of description of (finite) objects,

- descriptional complexity in resource bounded or structure bounded environments,

- structural complexity,

- descriptional complexity of formal systems for applications (for example, software reliability, software and hardware testing, modeling of natural languages),

- descriptional complexity aspects of nature motivated (bio-inspired) architectures and unconventional models of computing.

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 descriptional complexity and its applications.

Organisation of WG and Membership

Chairpersonship

The current term of the chairman, vice-chairman, and secretary of the working group ends at the end of 2020. For the election of the chair position for the next term the members of the Working Group were asked by e-mail on July, 10th, 2020 to nominate candidates. The deadline for nominations was July,

22nd, 2020. As result Martin Kutrib was nominated. Since there was only one nominee who in addition agreed with his nomination and can be reelected for a second term, a formal voting process was omitted. Martin Kutrib was appointed as chair of WG 1.02 for the period 2021-2023 by the TC1 chair Luís Soares Barbosa. For the same period Rogério Reis will serve as vice-chair and Andreas Malcher as secretary.

New members

No changes during this period.

Scientific activities and meetings

Events organised by the Working Group

– *21th International Conference on Descriptional Complexity of Formal Systems (DCFS 2019), Košice, Slovakia, July 17–19, 2019 (IFIP Working Conference).*
The conference was jointly organized, under supervision of the DCFS steering committee, by the Košice branch of the Mathematical Institute of the Slovak Academy of Sciences, by the Slovak Artificial Intelligence Society (SAIS), and by the IFIP WG 1.02 on Descriptional Complexity. The program committee was chaired by Galina Jirásková (Slovak Academy of Sciences, Košice, Slovakia) and Stavros Konstantinidis (Saint Mary's University, Halifax, Canada). The scientific part was consisting of four invited lectures and 18 regular contributions, selected by the program committee after a standard reviewing process. The proceedings have been published as volume 11612 of the Lecture Notes in Computer Science book series. A special issue of Information and Computation devoted to extended versions of selected papers is in preparation. Around 40 participants attended the conference. Many of them are members of the WG.

– The *22th International Conference on Descriptional Complexity of Formal Systems (DCFS 2020)* was expected to be jointly organized, under supervision of the DCFS steering committee, by Rudolf Freund (TU Wien) from August 24 to 26, 2020 in Vienna as PC co-chair with Galina Jirásková (Slovak Academy of Sciences) and Giovanni Pighizzini (University of Milano). Due to the development of the crisis caused by the Corona virus, the conference had to be canceled. In order to allow researchers in the area of descriptional complexity to still present their recent results in some form, the DCFS steering committee decided to prepare a volume of collected papers which will be selected by a committee after a standard review process. The volume will be published in the series Lecture Notes in Computer Science and is edited by Galina Jirásková and Giovanni Pighizzini. Interested authors of accepted papers have the option of giving a short presentation during DCFS 2021.

Formal meetings of the Working Group

– July 19, 2019, on the occasion of DCFS 2019.

Forthcoming events

– *23th International Conference on Descriptional Complexity of Formal Systems (DCFS 2021).*
The conference will be held in Seoul, South Korea, and it will be organized by Yo-Sub Han.

– *24th International Conference on Descriptional Complexity of Formal Systems (DCFS 2022).*
The conference will be held in Debrecen, Hungary, and it will be organized by György Vaszil.

Publications

– Michal Hospodár, Galina Jirásková, Stavros Konstantinidis (eds.): Descriptional Complexity of Formal Systems – 21st IFIP WG 1.02 International Conference, DCFS 2019, Košice, Slovakia, July

17–19, 2019, Proceedings. Lecture Notes in Computer Science 11612, Springer 2019.

– International Journal of Foundations of Computer Science, Volume 30 (6–7), 2019, Special Issue with Selected and Extended Papers of the 19th International Conference on Descriptional Complexity of Formal Systems (DCFS 2017), guest editors: Giovanni Pighizzini, Cezar Câmpeanu.

– Theoretical Computer Science, Volume 798, 2019, Special Issue with Selected and Extended Papers of the 20th International Conference on Descriptional Complexity of Formal Systems (DCFS 2018), guest editors: Stavros Konstantinidis, Giovanni Pighizzini.

– Galina Jirásková, Giovanni Pighizzini, Collected Papers dedicated to Descriptional Complexity of Formal Systems, Lecture Notes in Computer Science, Springer 2020, to appear.

WG 1.03 — Foundations of System Specification

Chair: Prof. Markus Roggenbach, Swansea University, Wales, UK

Vice-Chair: Prof. Lutz Schröder, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

Home page: `ifipwg13.cs.ovgu.de`

<div align="center">2019-20 Brief Activity Report</div>

Organisation of WG and Membership

Chairpersonship

Effective July 1, 2020, the chair Lutz Schröder stepped down to assume the role of vice-chair, and the previous vice-chair Markus Roggenbach became chair, following a rota agreed at the 2018 meeting at the Royal Holloway meeting.

New members

Jan Rutten, Dominique Duval, Peter Padawitz have been granted emeritus status. The group is keeping a stable membership level of around 40 members (excluding emeritus members), and has considered nine observers in the current report period.

New organisation rules

None.

Scientific activities and meetings

Meetings

The working group has held a meeting in

- Massa Marittima, Italy, January 13–18, 2020.

A subsequent meeting planned for September 2020 was cancelled due to the ongoing Covid-19 pandemic. The next meeting is planned for March 2021, to be colocated with ETAPS 2021 in Luxembourg.

Events organised by the Working Group

- The *25th International Workshop on Algebraic Development Techniques, WADT 2020*, is an official workshop of *European Joint Conferences on Theory and Practice of Software, ETAPS 2020.* As ETAPS 2020 was cancelled due to the ongoing Covid-19 pandemic, WADT 2020 took place as a virtual workshop on April 29, 2020.

Forthcoming events

- The *15th IFIP WG 1.3 International Workshop on Coalgebraic Methods in Computer Science, CMCS 2020*, is an official workshop of *European Joint Conferences on Theory and Practice of Software, ETAPS 2020.* As ETAPS 2020 was cancelled due to the ongoing Covid-19 pandemic, CMCS 2020 will take place as a virtual conference in September & October 2020.

– The *9th Conference on Algebra and Coalgebra in Computer Science, CALCO 2021* will be held in August, 2021, in Salzburg, Austria, in colocation with the 37th Conference on Mathematical Foundations of Programming Semantics, MFPS XXXVII.

WG 1.05 — Cellular Automata and Discrete Complex Systems

Chair: Prof. Pedro P.B. de Oliveira, Mackenzie Presbyterian University, São Paulo, Brazil

Vice-Chair: Dr. Nazim Fatès, INRIA Nancy, France

Secretary: Prof. Katsunobu Imai, Hiroshima University, Japan

Home page: http://www.iec.hiroshima-u.ac.jp/ifip15

2019-20 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

The 2020 annual admin meeting of WG 1.5 took place on August 10th, from 18:00 to 20:00 hours (London time), during AUTOMATA 2020, which was held in virtual form due to the pandemic, and had the following attendance (15 members and 1 guest):

Members of the WG 1.5: Andreas Malcher, Anna Lawniczak, Danuta Makowiec, Dipanwita Chowdhuri, Enrico Formenti, Georgios Sirakoulis, Guillaume Theysier, Ilkka Törmä, Katsunobu Imai (*Secretary*), Jarkko Kari, Martin Kutrib, Nazim Fatès (*Vice-Chair*), Pedro de Oliveira (*Chair*), Pierre Guillon and Ville Salo.
Guest: Hector Zenil.

The meeting effectively started with Pierre Guillon presenting the updated slides of the planned organisation details of AUTOMATA 2021, to be held at the University of Aix-Marseille, in Marseille, France, tentatively in July 12-14.

The next topic in the agenda was the presentation of the details of a firm bid we had received for hosting AUTOMATA 2022.

Then, a discussion was held related to the proposal by the organisers of AUTOMATA 2021 to publish the proceedings of the event in an open fashion.

Finally, two proposals of new memberships to WG-1.5 had been made, led by Enrico Formenti, Pierre Guillon and the Chair of the group.

The results of all the topics of the agenda are detailed below.

New members

As mentioned above, two new members have been proposed and approved. Both are young researchers who have been very active in the fields of AUTOMATA and in the events themselves. They are:

– *Kévin Perrot* (http://pageperso.lif.univ-mrs.fr/ kevin.perrot): Aix-Marseille Université, Laboratoire d'Informatique et Systèmes - LIS, Marseille, France.

– *Luca Mariot* (https://lucamariot.org): Delft University of Technology, Cyber Security Research Group, Delft, The Netherlands.

New organisation rules

An issue that raised significant considerations during our admin meeting had to do with the proposal by the organisers of AUTOMATA 2021 to change the publication of the proceedings from LNCS to the open publication scheme provided by OASIcs (https://www.dagstuhl.de/en/publications/oasics), the OpenAccess Series in Informatics, a service provided by the same institution that publishes LIPIcs, the Schloss Dagstuhl, in Germany, even hosted at the same server. A good round of discussions on the topic had started in our mailing list last year, were resumed during the meeting, and the proposal was eventually approved as the publication scheme for the next years to come, even though not out of a consensus but reflecting a sense of overall trend favouring the move. Important in this respect is that the group members should take a cohesive stance to the expected benefits this should bring to our community, which should translate into more visibility and reachability for AUTOMATA and, in turn, increased number of submissions and their quality.

Scientific activities and meetings

Events organised by the Working Group

– AUTOMATA 2020 - *The 26th International Workshop on Cellular Automata and Discrete Complex Systems*, Stockholm, Sweden, during August 10-12, 2020.
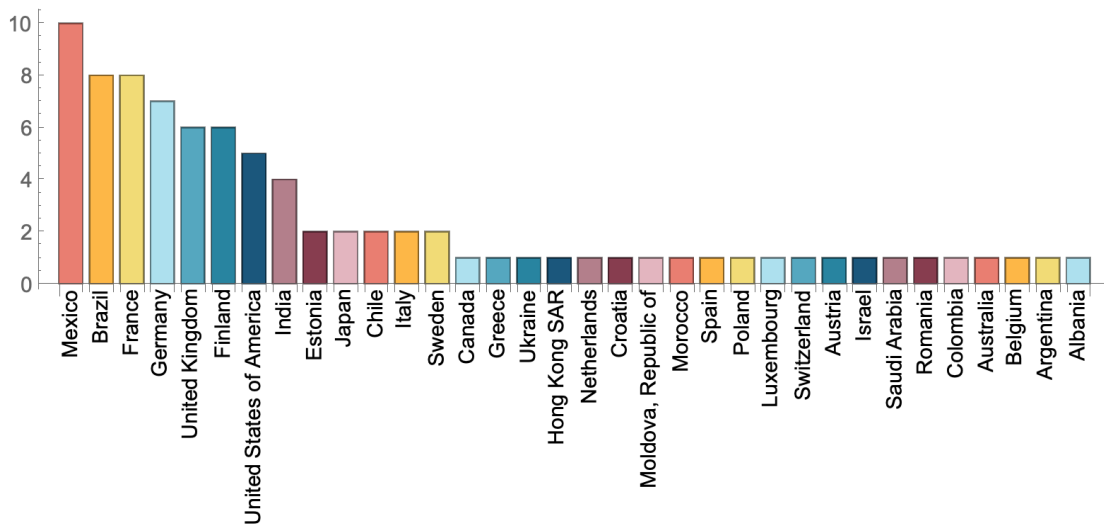
AUTOMATA 2020 was organised by Hector Zenil, from Karolinska Institute, in Stockholm, Sweden, and held virtually due to the pandemic. The event had been planned as usual, but the pandemic enforced it to turn virtual. In spite of that, everything flowed very well, with negligible technological mishaps along the way. With the lower organisation costs plus the funding received, free access to the full event was offered to all members of the Programme and Steering Committees, as well as to many students worldwide, which led to the possibility of waiving the registration fee for 80% all participants. Also, access was granted to all members of WG-1.5 to the virtual room where our admin meeting took place.

There were 100 registered participants, 85 of them from 34 countries connected at some point, the largest turnout having been 65, during Stephen Wolfram's talk, and with an average of 50 attendees during the three days. The following is the breakdown of the 85 participants and a corresponding bar chart:

Mexico: 10; Brazil: 8; France: 8; Germany: 7; United Kingdom: 6; Finland: 6; USA: 5; India: 4; Estonia: 2; Japan: 2; Chile: 2; Italy: 2; Sweden: 2; Canada: 1; Greece: 1; Ukraine: 1; Hong

Kong: 1; Netherlands: 1; Croatia: 1; Moldova: 1; Morocco: 1; Spain: 1; Poland: 1; Luxembourg: 1; Switzerland: 1; Austria: 1; Israel: 1; Saudi Arabia: 1; Romania: 1; Colombia: 1; Australia: 1; Belgium: 1; Argentina: 1; Albania: 1.

The technical programme had 10 full papers and 2 exploratory papers (out of 21 submissions) and 7 invited talks, and ran for two days. The third day was an adjoined special session on Algorithmic Information Dynamics. Further details about the event are available in https://www.automata2020.com.

Forthcoming events

– AUTOMATA 2021 - *The 27th International Workshop on Cellular Automata and Discrete Complex Systems*, to be held at Aix-Marseille Université, in Marseille, France, tentatively in July 12-14, 2021. Together with Kévin Perrot, the WG-1.5 member Pierre Guillon is heading the organisation, which also counts on the support of the member Guillaume Theyssier and associates of the Natural Computation Group of Aix-Marseille Université. The last day of AUTOMATA 2021 will be shared with a *Workshop on Automata Networks* that will follow in celebration of the 70th birthday of Eric Goles, a member of WG-1.5. Everything is on track; hopefully the pandemic will be controlled by then, so that the event can happen in its traditional mode.

– AUTOMATA 2022 - *The 28th International Workshop on Cellular Automata and Discrete Complex Systems*, to be held at the Indian Institute of Technology Kharagpur, in Kharagpur, India. More detail will follow during the next months.

Publications

– H. Zenil, editor. Cellular Automata and Discrete Complex Systems: 26th IFIP WG 1.5 International Workshop - Proc. of AUTOMATA 2020. *Lecture Notes in Computer Science* 12286, Springer: Heidelberg - Germany, 2020. Forthcoming.

WG 1.06 — Rewriting

Chair: Prof. Georg Moser, University of Innsbruck, Austria

Secretary: Dr. Martin Avanzini, INRIA Sophia Antipolis, France

Home page: `tcs-informatik.uibk.ac.at/ifip-wg1.6/`

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The Working Group aims to promote research efforts in rewriting and its applications. For that it aims to establish 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 2020 has been co-located FSCD-IJCAR 2020, in Paris and has been held *virtually* on June 30. As the hosting conference decided to go virtual, the Working Group decided to follow suit. Switching to online mode turned out to be seamless. The Working Group currently comprises 13 honary members and 39 active members. At the annual meeting we have welcomed Carsten Fuhs, Jakob Grue Simonsen, and Akihisa Yamada as new members.

Chairpersonship and Secretary

Georg Moser is acting Chair of the Working Group. His term will end in 2021. Martin Avanzini is acting Secretary of the Working Group, like the Chair's term, his term will end in 2021.

International Summer School in Rewriting

The 11th *International Summer School in Rewriting* (*ISR* for short) was held in Paris, France. The school took place from July 1 to July 6, 2019. The school was organised by Frederic Blanqui. See the School's website for further information on the organisation and success of the school: `https://isr2019.inria.fr/`.

The 12th ISR should have been held in Madrid, Spain, but was postponed due to COVID-19 pandemic. It will be held at UCM, Madrid in 2021. The school will be organised by Narciso Marti Oliet. Further, the 13th ISR will be organised by Besik Dundua and Temur Kutsia in the 2nd half of September 2022, within the Computational Logic Autumn Sumit in Tbilisi, Georgia.

Events organised by the Working Group

- The annual meeting of the WG in 2020 has taken place on June 30, 2020.

- The 11th ISR has been organised in Paris in 2019.

- the 12th and 13th ISR will be held in Madrid, Spain and in Tiblisi, Georgia, respectively.

Forthcoming events

Georg Moser's and Martin Avanzini's term ends next year and the new Chair/Secretary will organise the next annual meeting. Our major remaining activity for 2020 will be to moderate the election of the new Chair, who will then propose the new Secretary to the Working Group.

WG 1.07 — Theoretical Foundations of Security Analysis and Design

Chair from 27 June 2019: 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`

2019-20 Brief Activity Report

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 33 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: 7 (USA)

– Asia: 1 (China)

– Australia: 2

Chairpersonship

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

New and old members

Since September 2019, we have Steve Kremer as a new member: `https://members.loria.fr/SKremer/`. Steve is an excellent researcher in the theoretical foundations of security.

Scientific activities and meetings

Remarkable results in the field of the WG

In the past years, the WG had a setback in that the conference POST that we had established as an ETAPS conference got cancelled. Moreover the associated workshop HotSpot had failed to attract enough papers. In our meeting in September 2019 we discussed the reasons and came to the conclusion that a major reason is that ETAPS is not so focused on security and therefore is less attractive to researchers in security. We were however convinced that there is a large interest in an open workshop like HotSpot for foundational research in security, and therefore have relaunched it with the 5th European Symposium on Security and Privacy (Euro S&P) with the WG-members Joshua Guttman and Sebastian Mödersheim as the co-chairs. The special focus was on three topic areas:

– Privacy and quantitative information flow

– Secure Compilation

– Voting Protocols

Also we have a mixture of presentation-only contributions and for-publication contributions. In fact, this is the first edition of HotSpot with formal proceedings. Due to Covid-19, the event did not happen in June as originally planned, but recently on September 7th. We consider it highly successful, with 34 participants, excellent contributions and exciting discussions.

The FOSAD summer school planned for summer 2020 was postponed to August 2021 due Covid-19.

The members of the WG are actively involved in national and international projects on security; as members of the editorial boards of many highly reputed journals; as PC members of many international conferences, and as PC and chairs; as well as in the dissemination of the theory and methodology of security in Universities, international schools (e.g. FOSAD school below), seminars etc.

Events organised by the Working Group

Since September 2019, the WG members have organized the following events:

– ESORICS 2019: 24th European Symposium on Research in Computer Security (Program co-chair: Peter Ryan).

– ESORICS 2020: 25th European Symposium on Research in Computer Security (Program co-chair: Steve Schneider).

– STAST 2020: 10th International Workshop on Socio-Technical Aspects in Security. Affiliated with ESORICS 2020. (Program co-chair: Luca Viganò).

– and as already mentioned, HotSpot 2020: 6th Workshop on Hot Issues in Security Principles and Trust. (Program co-chairs: Joshua Guttman and Sebastian Mödersheim).

Forthcoming events

– 20th International School on Foundations of Security Analysis and Design (FOSAD 20) University Residential Center of Bertinoro, Italy 30 August-3 September 2021;

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

Publications

– Joshua Guttman, Sebastian Mödersheim (Eds.): Hot Issues in Security Principles and Trust, HotSpot 2020, Held as Part of Euro S&P 2020, September 7th, 2020, Proceedings, IEEE Press.

WG 1.08 — Concurrency Theory

Chair: Dr. Ilaria Castellani, INRIA Sophia Antipolis, France

Secretary: Prof. Mohammad Reza Mousavi, University of Leicester, UK

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

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 recruitement campaign was held in 2016, resulting in the recruitment of 10 new members (6 men and 4 women). As some members are expected to step down, we plan to organise a new round of recruitments in the coming months.

Chairpersonship

Dr. Ilaria Castellani (INRIA Sophia Antipolis, France) and Prof. Mohammad Reza Mousavi (University of Leicester, UK) have been coordinating the WG 1.8 since June 2014, respectively as chairperson and secretary of the WG. A round of elections was held by the TC chair in March 2018, which led to their re-election for a second term. This second term will come to an end by December 31, 2020. The election of a new chair will be organised by the WG coordinators in November-December 2020.

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.

- TRENDS 2019: the workshop was held in Amsterdam on August 31, 2019, as a satellite event of CONCUR 2019: `https://concurrency-theory.org/events/workshops/trends/2019`. The programme included the following 3 invited talks:

  - Laura Bocchi, University of Kent, UK.
    Time-sensitive protocol design and implementation.

  - Joost-Pieter Katoen, RWTH Aachen University, DE.
    Towards the Automated Synthesis of Probabilistic Programs.

- Barbara König, University of Duisburg-Essen, DE.
  Fixpoint Games.

  and the following 6 highlight talks:

  * Rob van Glabbeek. *Reward Testing Equivalences for Processes.*
  * Hubert Garavel. *Converting Safe Petri-Nets to NUPNs.*
  * Jaco van de Pol and Laure Petrucci. *Taming NDFS for Parametric Timed Automata.*
  * Jos Baeten, Cesare Carissimo and Bas Luttik. *Pushdown Automata and Context-Free Grammars in Bisimulation Semantics.*
  * Mark Bouwman, Bas Luttik and Tim Willemse. *Action-based justness for automated verification of liveness.*
  * Mauricio Cano, Ilaria Castellani, Cinzia Di Giusto and Jorge A. Pérez. *Multiparty Reactive Sessions.*

The workshop was followed by the WG business meeting, as usual.

TRENDS 2020: due to the sanitary crisis, the workshop was held online on September 5, 2020:
`https://concurrency-theory.org/events/workshops/trends`
It was again be co-located with CONCUR: `https://concur2020.forsyte.at/` within the larger event QONFEST 2020:

$$\text{https://qonfest2020.github.io/venue.html}$$
$$\text{https://qonfest2020.github.io/program.html}$$

The programme consisted of the following 3 invited talks:

- Ana Sokolova, University of Salzburg, AT.
  Tracing Probability and Nondeterminism.
  `https://youtu.be/IcyeFgVBsSM`

- Gustavo Petri, ARM Research, UK.
  Armour: Software Defined Security Policies for Networked Systems.
  `https://youtu.be/ZpBhgWFyz4k`

- Kostas Chatzikokolakis, University of Athens, GR.
  Refinement relations for quantitative information flow.

The workshop was 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:

$$\text{http://www.sti.uniurb.it/events/opct2014/}$$
$$\text{http://opct2017.famaf.unc.edu.ar/Home.html}$$
$$\text{https://popl19.sigplan.org/track/opct-2019-papers}$$

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 last edition of OPCT was organised in 2019, and the next edition is expected to take place in 2021 or 2022.

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:

<div align="center">

http://cs.ipm.ac.ir/ttcs/2015/
http://cs.ipm.ac.ir/ttcs/2017/

</div>

The third edition of TTCS was held online on July-1-2, 2020:

<div align="center">

`https://dblp.org/db/conf/ttcs/ttcs2020.html`
`http://cs.ipm.ac.ir/ttcs/2020/`

</div>

The main information about TTCS 2020 is summarised below.

– TTCS 2020: The 3rd IFIP International Conference on Topics in Theoretical Computer Science (TTCS 2020) was initially programmed to take place in Tehran like to the two previous editions; however, due to the COVID-19 travel restrictions it was held online on July-1-2, 2020. For this edition of TTCS, we received 24 submissions. An international Programme Committee comprising 45 leading scientists from 16 countries reviewed the papers. All papers received at least 3 and at most 5 review reports. We accepted 8 papers for presentation at TTCS 2020. The conference included the following invited talks:

- Filippo Bonchi, University of Pisa, Italy.
  Interacting Hopf Algebras: the theory of linear systems
- Mohammad Taghi Hajiaghayi, University of Maryland, College Park, USA.
  Massively Parallel Algorithms and Applications for Maximal Matching and Edit Distance

Publications

Two special issues of the Journal of Logical and Algebraic Methods in Programming (JLAMP) have been organised: the first one, handled by the WG 1.8 chair and secretary, gathers contributions by the invited speakers of TRENDS 2015 and TRENDS 2016, while the second one, handled by the OPCT 2017 organisers (the WG 1.8 chair and secretary together with two other WG members, Pedro D'Argenio and Ana Sokolova), covers the topics presented at the workshop OPCT 2017.

– JLAMP SI:TRENDS16: JLAMP special issue on Trends in Concurrency Theory (selected invited contributions from the workshops TRENDS 2015 and 2016). The three submitted papers have been accepted and the special issue has appeared in October 2019: `https://doi.org/10.1016/j.jlamp.2019.07.001`

– JLAMP SI:OPCT 2017: JLAMP special issue on Open Problems in Concurrency Theory (dedicated to the workshop OPCT 2017). Among the 12 submitted papers, 11 have been accepted and one has been withdrawn. The volume is under press.

Contribution for creating the CONCUR Test-of-Time award

During the past year, our WG contributed to the creation of a Test-of-Time award for the CONCUR conference, by performing a preliminary analysis of the papers published during the first 20 years of CONCUR (1990-2009) and then submitting a detailed proposal to the CONCUR Steering Committee. The first edition of the award took place during the CONCUR 2020 conference: `https://concur2020.forsyte.at/test-of-time.html`

The Jury of the Award was chaired by Luca Aceto, the first chair of WG1.8, and composed entirely by WG members (3 men and 2 women), including Jos Baeten, the second chair of our WG. None of the Jury members had participated in the preliminary analysis and proposal. Three of the four awarded papers were authored or co-authored by WG members.

WG 1.09/2.15 — Verified Software

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

Vice-Chair: Prof. Jim Woodcock University of York, UK

Secretary: Dr. Natarajan Shankar, SRI International, US

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

2019-20 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 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/`, not to be confused with the VerifyThis competition, another competition of our domain).

Organisation of WG and Membership

Chairpersonship

We plan to find a new chair, and Jim Woodcock is taking responsibility in the interim.

New members

No changes in the members during the period, but we plan to draw fresh members to the group.

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 meeting in the period (July 2019 – July 2020), partly due do the COVID-19 situation.

The "Verified Software" Programme at the Isaac Newton Institute, initially scheduled from 27th July to 4th September 2020, is postponed to next year. See `https://www.newton.ac.uk/event/vso` for more details.

Forthcoming events

We plan to have an in-person meeting at every FMCAD, at least, and virtual meetings in the meantime.

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/`

The WG was re-established in January 2019.

Organisation of WG and Membership

Chairpersonship

Jan Holub was elected as chair of WG for the next three years.

New members

There are 21 members of the re-established WG: Amihood Amir, Hideo Bannai, Travis Gagie, Roberto Grossi, Jan Holub, Costas S. Iliopoulos, Thierry Lecroq, Inbok Lee, Moshe Lewenstein, Stefano Lonardi, Laurent Mouchard, Gonzalo Navarro, Kunsoo Park, Solon P. Pissis, Simon J. Puglisi, M. Sohel Rahman, Rajeev Raman, Wojciech Rytter, William F. (Bill), Esko Ukkonen, Bruce Watson.

Formal meetings of the Working Group

The first meeting was held on August 30, 2019. It was connected to Prague Stringology Conference 2019 and workshop StringMasters. Due to COVID-19 restrictions the second meeting is planned for autumn 2020 to be online only.