

Annual Report 2020



ICE-TCS

Icelandic Centre of Excellence
in Theoretical Computer Science

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1 Introduction

The Icelandic Centre of Excellence in Theoretical Computer Science (ICETCS) has been active since its establishment on 29 April 2005. This fifteenth annual report provides an overview of the activities of the centre during 2020, a year in which our work has been hit by the pandemic just like everywhere else. It will also present some of the activities in 2021 that are planned at the time of writing. As the readers of this report or anyone who has followed the activities of ICE-TCS over the last twelve months will realize, our motto has been “Research must go on!” It is up to our community to judge whether we have been successful in meeting that slogan.

This annual report will briefly report on the main highlights of yet another active year for ICE-TCS. We refer our readers to the data collected at the centre’s web page at

<http://www.icetcs.ru.is>

for full details. In particular, the news archive for the reporting year is at

<http://www.icetcs.ru.is/news-2020.html>

2 Executive Summary and Highlights for the Reporting Period

Once again, the calendar year 2020 has been an active one for ICE-TCS, both nationally and internationally, despite the restrictions on what we could do imposed by the pandemic. By way

of example, we were supposed to host the Nordic Workshop on Programming Theory 2020, but postponed the event to 2021. Moreover, the ICE-TCS seminar series moved online after 9 March 2020 and was replaced by a joint webinar series organized with the Computer Science group at the Gran Sasso Science Institute (GSSI).

The quality and impact of the research carried out by the members of the centre in 2020 is witnessed by the following main achievements.

- Magnus M. Halldorsson and his co-workers published one paper at PODC 2020 and one at DISC 2020, the two premier events on principles of distributed computing. Magnus M. Halldorsson was also selected as one of the [EATCS Fellows vintage 2020](#). Magnus was honoured for "seminal contributions to the theory of approximation and graph algorithms as well as to the study of wireless algorithmics."
- The research group [Permuta Triangle](#) within ICE-TCS has focussed on automating the job of mathematicians. Recently, the group developed software that can generate structural descriptions of permutation classes, and furthermore generate uniformly at random from those classes. In addition, the software has reproduced (and sometimes corrected) results that are covered in academic articles and doctoral theses published by human mathematicians.
- Tarmo Uustalu and his co-workers continued their work on the study of algebraic effects and published papers at LICS 2020 and PPDP 2020, which are coveted outlets in logic in computer science and programming language theory. Tarmo Uustalu was invited to lecture at the [Oregon Programming Languages Summer School](#) and at the [Midlands Graduate School in the Foundations of Computing Science](#), but both events were cancelled due to the pandemic. Tarmo was then reinvited for the 2021 editions of both schools.
- The concurrency group within ICE-TCS published a paper at CONCUR 2020 that was one of the four nominees for the [best paper award](#) and had two papers accepted at CSL 2021. Their work on monitorability has appeared in software engineering outlets such as the International Journal on Software and Systems Modelling (SoSym) and FASE.
- ICE-TCS researchers were again successful in their grant applications.
 - Anna Ingólfssdóttir received a project grant awarded in the field of computer science by the Icelandic Research Fund for the project "Learning and Applying Probabilistic Systems". The project funding is for the period 2020-2022 and amounts to 54,580K ISK, roughly 340,000 EUR.
 - Christian Bean received the only postdoctoral grant awarded in the field of computer science by the Icelandic Research Fund in 2020. Christian's project "Fléttufræðileg könnun og umraðanaflokkar" is for the period 2020-2022 and received 9,775K ISK, which is roughly 71,500 EUR, for the first year.
 - ICE-TCS PhD student Duncan Paul Attard received a doctoral grant from the Icelandic Research Fund for the period 2020-2021. Duncan's project "Ensuring Correctness in Distributed Systems" received 13M ISK, roughly 81,000 EUR.

- The three-year project “IT MATTERS: Methods and Tools for Trustworthy Smart Systems” was selected for funding by the Italian Ministry for University and Research under the grant programme PRIN. The project sees the involvement of Luca Aceto, who leads the team from the Gran Sasso Science Institute. The funding for Luca Aceto's team is 128,000 EUR.
- Henning Úlfarsson received a Ph.D. Student Grant from the Reykjavik University Research Fund for a period of one year for the research project “Combinatorial Exploration with Applications to Permutation Patterns and Other Structures”. The grant supports the work of ICE-TCS PhD student Emile Nadeau.
- On 3 February 2020, Dylan McDermott, who joined ICE-TCS as a postdoc in November 2020, successfully defended his University of Cambridge PhD thesis supervised by Alan Mycroft.
- On 26 June 2020, Hendrik Maarand, Tarmo Uustalu’s PhD student at Tallinn University of Technology, successfully defended his PhD thesis. In December, his work received an honorable mention from the Estonian national student research competition in the PhD student category in the exact and life sciences domain.
- On 24 November 2020, Ian Cassar successfully defended his PhD thesis. Ian was enrolled in a joint University of Malta/Reykjavik University PhD programme and was supervised by Luca Aceto, Adrian Francalanza and Anna Ingólfssdóttir.
- On 15 October 2020, Raphaël Reynouard, who joined ICE-TCS as a PhD student in August 2020 with Anna Ingólfssdóttir as main supervisor, was selected as one of the two recipients of the [Prix Babbage](#) for the excellence of his academic work throughout his master studies at Université Libre de Bruxelles. This prize is awarded by the jury of the master's degree in computer science of that university. The title of his master thesis is "Learning of Non-Markovian Reward Functions".

As in previous years, ICE-TCS researchers organized high-quality scientific events at Reykjavik University and elsewhere, increasing the international visibility of the centre and of Reykjavik University as a whole. To wit, we mention the following events.

- The 16th annual ICE-TCS Theory Day was held virtually on 29 April 2020 and featured invited talks by [Mohsen Ghaffari](#) (ETH Zurich) and [Moshe Vardi](#) (Rice University, USA).
- Starting on 7 April 2020, ICE-TCS organized a [joint webinar series](#) with the [Computer Science group at the Gran Sasso Science Institute](#). The webinar series was kicked off by Henning Úlfarsson and has hosted talks by a number of high-profile scientists, including Scott Aaronson, Mohsen Ghaffari, Monika Henzinger, Thore Husfeldt, Jon Kleinberg, Laura Kovacs, Orna Kupferman, Marta Kwiatkowska, Edward Lee, Silvio Micali, Christos Papadimitriou, Phillip Rogaway, Sanjit Seshia, Alexandra Silva and Moshe Y. Vardi. Some of the webinars were held in cooperation with the Icelandic Academy of Sciences and other scientific societies, and have involved speakers from disciplines outside core computer science. By way of example, we hosted a [public talk](#) by Marica Branchesi (Gran Sasso Science Institute, Italy) on multi-messenger astronomy and [one](#) by Rodrigo Ferreira (Rice University, USA) on teaching ethics and social justice to computer science

students. The recordings of most of the talks in the series are available from the [web page](#) of the webinar series.

- In the period of 1-6 March 2020, Tarmo Uustalu organized the [25th Estonian Winter School in Computer Science](#) in Palmse, Estonia.

The centre's guest programme was cut short by the pandemic, but in the first two months of 2020 Tarmo Uustalu and Dylan McDermott hosted three international collaborators (Shin-ya Katsumata, Niccolò Veltri, Niels Voorneveld) and a fourth in the autumn (Exequiel Rivas). Other planned research visits to the centre were cancelled.

ICE-TCS researchers have also continued to serve the community in a variety of leading roles. By way of example, we limit ourselves to mentioning that

- Tarmo Uustalu is the publicity chair and member of the [Executive Board of ETAPS](#); he was also vice-chair of the EU COST action [EUTYPES](#) running in the period 2016-2020.
- Magnús Halldórsson chairs the steering committees of SIROCCO and SWAT, and is a member of the steering committee of ALGOSENSORS and DCOSS.
- Antonis Achilleos is a member of the [Executive Committee of the Scandinavian Logic Society](#), and was [DisCoTec 2020](#) workshop co-chair.
- Valentina Castiglioni has been chosen as PC co-chair of [EXPRESS/SOS](#) 2021 and 2022.
- Luca Aceto is the chair of the [editorial board of LIPIcs](#) (Leibniz International Proceedings in Informatics) and was chair of the jury for the first CONCUR Test-of-Time-Award. Since 1 March 2019, he has also acted as head of the Department of Computer Science at Reykjavik University (sometimes abbreviated to CS@RU in what follows).

2.1 Research Output in 2020

During the reporting period, ICE-TCS researchers based at Reykjavik University published or had accepted one book chapter, 22 journal papers and 17 conference/workshop papers. Based on the above-mentioned data, it seems fair to say that ICE-TCS continues to contribute a good share of the research output from CS@RU and the majority of journal publications (53.6% in 2020). More importantly, most of the research output of the centre is published in high-quality venues.

The full list of accepted and published papers authored by members of the centre from Reykjavik University in 2020 is in the appendix at the end of this report.

3 Current Members

During the reporting period, ICE-TCS had nine permanent members (seven at Reykjavik University and one at deCODE Genetics and at the University of Iceland), namely Luca Aceto, Antonis Achilleos, Eyjólfur Ingi Ásgeirsson (Department of Engineering at Reykjavik University; Scientific Co-director), Yngvi Björnsson (mostly with CADIA), Bjarni V. Halldórsson (deCODE Genetics), Magnús M. Halldórsson (Scientific Director), Anna Ingólfssdóttir (Scientific Co-director), Páll Melsted (University of Iceland), Henning Úlfarsson and Tarmo Uustalu.

In 2020, the centre hosted five postdoctoral researchers Antonis Achilleos (logic in computer science, runtime verification)¹, Christian Bean (combinatorics, from October 2020), Valentina Castiglioni (concurrency theory), Dylan McDermott (semantics of programming languages), Alexandre Nolin (algorithmics, from February 2020) and Mathias Ruggaard Pedersen (concurrency theory and logic in computer science, until June 2020), a guest postdoc Ülo Reimaa (from University of Tartu, category theory, Feb.-May 2020), and four PhD students, namely Elli Anastasiadi (supervised by Luca Aceto and Anna Ingólfssdóttir), Yasuaki Morita (supervised by Tarmo Uustalu), Emile Nadeau (supervised by Henning Úlfarsson) and Raphaël Reynouard (supervised by Anna Ingólfssdóttir and Luca Aceto). Tarmo Uustalu supervised Hendrik Maarand, a doctoral student at Tallinn University of Technology. In addition, Luca Aceto and Anna Ingólfssdóttir co-supervise Duncan Paul Attard and Ian Cassar, two PhD students from the University of Malta who are enrolled in a joint Reykjavik University/University of Malta doctorate and whose main supervisor is Adrian Francalanza.

4 A first look at 2021

As Niels Bohr and Piet Hein famously said, “Det er svært at spå, især om fremtiden” (It’s difficult to make predictions, especially about the future). This is truer than ever today, given the days we are living. However, judging from the first three weeks in 2021, we trust that 2021 will be rich in events and accolades for ICE-TCS. For starters, the Icelandic Research Fund announced the results of the grant applications for this year and ICE-TCS researchers are involved in all the three project grant applications that were selected for funding. In particular, the following three-year projects have members of ICE-TCS as PIs:

- Antonis Achilleos (PI), Luca Aceto (co-PI) and Anna Ingólfssdóttir (co-PI) received roughly 369K EUR for the project "Mode(l)s of Verification and Monitorability";
- Magnus M. Halldórsson received funding for his project "Constrained Distributed Symmetry Breaking".

In addition, Luca Aceto is also a participant in the project on modelling and validation of smart contracts led by Mohammad Adnan Hamdaqa. We trust that we will be able to hire one postdoctoral researcher and two PhD students in 2021 using project funds.

¹ Antonis Achilleos has also been a part-time assistant professor since July 2019.

ICE-TCS researchers are about to apply for funding from the Reykjavik University Research Fund and we hope to receive further good news on the funding front by mid-February 2021.

Regarding future events that will see the involvement of ICE-TCS scientists, we hope that this year we will be able to organize the 32nd Nordic Workshop on Programming Theory at Reykjavik University in late October-early November. Valentina Castiglioni will co-chair [EXPRESS/SOS 2021](#), which will take place (on-line for sure, possibly in Paris) co-located with CONCUR 2021, as part of [QONFEST 2021](#). Luca Aceto will deliver a joint invited talk at LICS 2021 and ICTCS 2021 in Rome, if the conferences will be held in person. Tarmo Uustalu has been invited to give a talk at the [Workshop on Polynomial Functors](#) organized by the Topos Institute and to lecture at the [Midlands Graduate School 2021](#) and the Oregon Programming Languages Summer School 2021. Looking further ahead, we plan to make a bid to organize the Logic Colloquium 2022 and we will host NordSec 2022 at Reykjavik University. In keeping with our track record in pre-pandemic years, we look forward to hosting a number of guests at ICE-TCS in the second half of 2021. We keep our fingers crossed and hope that this year won't be too bad.

5 Summary and Self-Evaluation

Overall, despite the impact of the pandemic on the centre's operations, ICE-TCS has maintained a high level of activity during the reporting period. Indeed, we think that it is fair to say that ICE-TCS has contributed the vast majority of all scientific events at Reykjavik University in 2020. We feel that we can be proud of what the centre has achieved since its establishment in 2005 and of its visibility within the international TCS community, which is also witnessed by the high quality of applications from TCS researchers for academic positions at the Department of Computer Science and the wide interest in postdoctoral vacancies at ICE-TCS. Of course, we are always looking at ways in which we can improve our activities and scientific impact, and welcome suggestions on this point from our advisory board and other readers of this report. As Salvador Dali said, "Have no fear of perfection - you'll never reach it." We are certainly far from being even close to anything like perfection, but our journey since 29 April 2005 has been a rewarding one and, in our biased opinion, Reykjavik University as a whole would have been a much less interesting place of work without the contribution given by ICE-TCS over the last 15 years.

For the time being, we will keep exploiting all available means to maximize our impact and research collaborations, as we have done since April 2005. Let's hope that 2021 will cooperate with us!

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Appendix: List of ICE-TCS Publications and Accepted Papers in 2020

Book Chapters

1. Tarmo Uustalu, Niccolò Veltri, Noam Zeilberger. The sequent calculus of skew monoidal categories. In Claudia Casadio, Philip J. Scott, eds., *Joachim Lambek: The Interplay of Mathematics, Logic and Linguistics*, v. 20 of *Outstanding Contributions to Logic Series*, Springer, to appear.

Journal Papers

1. Luca Aceto, Antonis Achilleos, Adrian Francalanza, Anna Ingólfssdóttir. The complexity of identifying characteristic formulae. *J. Log. Algebraic Methods Program.* 112, article 100529, 2020.
<https://doi.org/10.1016/j.jlamp.2020.100529>
2. Luca Aceto, Antonis Achilleos, Adrian Francalanza, Anna Ingólfssdóttir, Sævar Örn Kjartansson. Determinizing monitors for HML with recursion. *J. Log. Algebraic Methods Program.* 111, article 100515, 2020.
<https://doi.org/10.1016/j.jlamp.2019.100515>
3. Luca Aceto, Antonis Achilleos, Adrian Francalanza, Anna Ingólfssdóttir and Karoliina Lehtinen. An operational guide to monitorability with applications to regular properties. *Int. J. Softw. Systems Modelling (SoSym)*, to appear.
4. Luca Aceto, Elli Anastasiadi, Valentina Castiglioni, Anna Ingólfssdóttir and Mathias Ruggaard Pedersen. On the axiomatizability of priority III: Priority strikes again. *Theor. Comput. Sci.* 837, pp. 223-246, 2020.
<https://doi.org/10.1016/j.tcs.2020.07.044>
5. Luca Aceto, Ian Cassar, Adrian Francalanza and Anna Ingólfssdóttir. Comparing controlled system synthesis and suppression enforcement. *Int. J. Softw. Tools Technol. Transfer (STTT)*, to appear.
6. Antonis Achilleos. Modal logics with hard diamond-free fragments. *J. Log. Comput.* 30(1), pp. 3-25, 2020.
<https://doi.org/10.1093/logcom/exaa001>
7. Michael Albert, Bjarki Gudmundsson and Henning Ulfarsson. [Collatz meets Fibonacci](#). *Math. Magazine*, to appear
8. Christian Bean, Murray Tannock, Henning Ulfarsson. Pattern avoiding permutations and independent sets in graphs. *J. Combinat.* 11(4), pp. 705-732, 2020.
<https://doi.org/10.4310/joc.2020.v11.n4.a7>
9. K. M. J. De Bontridder, B. V. Halldórsson, M. M. Halldórsson, C. A. J. Hurkens, J. K. Lenstra, R. Ravi, and L. Stougie. Local improvement algorithms for a path packing

- problem: A performance analysis based on linear programming. *Oper. Res. Lett.* 49(1), pp. 62–68, 2021.
<https://doi.org/10.1016/j.orl.2020.11.005>
10. Ravi Boppana, Magnús M. Halldórsson, Dror Rawitz. Simple and local independent set approximation. *Theor. Comput. Sci.*, 846, pp. 27-37, 2020.
<https://doi.org/10.1016/j.tcs.2020.07.044>
 11. Valentina Castiglioni, Konstantinos Chatzikokolakis, Catuscia Palamidessi. Logical characterization of differential privacy. *Sci. Comput. Program.* 188, article 102388, 2020.
<https://doi.org/10.1016/j.scico.2019.102388>
 12. Valentina Castiglioni, Michele Loreti, Simone Tini. The metric linear time - branching time spectrum on nondeterministic probabilistic processes. *Theor. Comput. Sci.* 813, pp. 20-69, 2020.
<https://doi.org/10.1016/j.tcs.2019.09.019>
 13. Valentina Castiglioni, Simone Tini. Probabilistic divide & congruence: branching bisimilarity. *Theor. Comput. Sci.* 802, pp.147-196, 2020.
<https://doi.org/10.1016/j.tcs.2019.09.037>
 14. Valentina Castiglioni, Simone Tini. Raiders of the lost equivalence: probabilistic branching bisimilarity. *Inf. Proc. Lett.* 159-160, article 105947, 2020.
<https://doi.org/10.1016/j.ipl.2020.105947>
 15. Rajiv Gandhi, Magnús M. Halldórsson, Christian Konrad, Guy Kortsarz, Hoon Oh. Radio aggregation scheduling. *Theor. Comput. Sci.* 840, pp. 143-153, 2020.
<https://doi.org/10.1016/j.tcs.2020.07.032>
 16. Magnús M. Halldórsson, Stephan Holzer, Evangelia Anna Markatou, Nancy A. Lynch. Leader election in SINR model with arbitrary power control. *Theor. Comput. Sci.* 811, pp. 21-28, 2020.
<https://doi.org/10.1016/j.tcs.2019.01.024>
 17. Magnús M. Halldórsson, Christian Konrad. Improved distributed algorithms for coloring interval graphs with application to multicoloring trees. *Theor. Comput. Sci.* 811, pp. 29-41, 2020.
<https://doi.org/10.1016/j.tcs.2018.11.028>
 18. Magnús M. Halldórsson, Christian Konrad, Tigran Tonoyan. Limitations of current wireless link scheduling algorithms. *Theor. Comput. Sci.* 840, pp. 154-165, 2020.
<https://doi.org/10.1016/j.tcs.2020.07.033>
 19. Hendrik Maarand, Tarmo Uustalu. Operational semantics with semicommutations. *J. Log. Algebraic Methods Program.*, to appear.
 20. Murilo Santos de Lima, Mário César San Felice, Orlando Lee. Group parking permit problems. *Discrete Applied Mathematics* 281, pp. 172-194, 2020.
<https://doi.org/10.1016/j.dam.2019.05.013>

21. Jason P. Smith, Henning Ulfarsson. The poset of mesh patterns. *Discrete Mathematics* 34(6), article 111848, 2020.
<https://doi.org/10.1016/j.disc.2020.111848>
22. Tarmo Uustalu, Niccolò Veltri, Noam Zeilberger. Eilenberg-Kelly reloaded. *Electron. Notes Theor. Comput. Sci.* 352, pp. 233-256, 2020.
<https://doi.org/10.1016/j.entcs.2020.09.012>

Conference and Workshop Papers

1. Luca Aceto, Antonis Achilleos, Adrian Francalanza, Anna Ingólfssdóttir and Karoliina Lehtinen. The best a monitor can do. In Christel Baier, Jean Goubault-Larrecq, eds., *Proc. of 29th EACSL Ann. Conf. on Computer Science Logic, CSL 2021 (Ljubljana, Jan. 2021)*, v. 183 of *Leibniz Int. Proc. in Inform.*, pp. 7:1-7:23. Dagstuhl Publishing, 2021.
<https://doi.org/10.4230/lipics.csl.2021.7>
2. Luca Aceto, Duncan Paul Attard, Adrian Francalanza and Anna Ingólfssdóttir. On Benchmarking for Concurrent Runtime Verification. In *Proc. of 24th Int. Conf. on Fundamental Approaches to Software Engineering, FASE 2021 (Luxembourg, March 2021)*, *Lect. Notes in Comput. Sci.*, Springer, to appear.
3. Luca Aceto, Valentina Castiglioni, Wan Fokkink, Anna Ingólfssdóttir and Bas Luttik. Are two binary operators necessary to finitely axiomatise parallel composition? In Christel Baier, Jean Goubault-Larrecq, eds., *Proc. of 29th EACSL Ann. Conf. on Computer Science Logic, CSL 2021 (Ljubljana, Jan. 2021)*, v. 183 of *Leibniz Int. Proc. in Inform.*, pp. 8:1-8:17. Dagstuhl Publishing, 2021.
<https://doi.org/10.4230/lipics.csl.2021.8>
4. Luca Aceto, Valentina Castiglioni, Anna Ingólfssdóttir, Bas Luttik, Mathias Ruggaard Pedersen. On the axiomatisability of parallel composition: a journey in the spectrum. In *Proc. of 31st Int. Conf. on Concurrency Theory, CONCUR 2020 (Vienna, Sept. 2020)*, *Leibniz. Int. Proc. in Informatics*, pp.18:1-18:22. Dagstuhl Publishing, 2020.
<https://doi.org/10.4230/lipics.concur.2020.18>
5. Valentina Castiglioni, Michele Loreti and Simone Tini. Measuring adaptability and reliability of large scale systems. In Tiziana Margaria, Bernhard Steffen, eds., *Proc. of 9th Int. Symp. on Leveraging Applications of Formal Methods, ISoLA 2020 (Rhodes, Oct. 2020)*, *Part II*, v. 12477 of *Lect. Notes in Comput. Sci.*, pp. 380-396. Springer, 2020.
https://doi.org/10.1007/978-3-030-61470-6_23
6. Steven Chaplick, Magnus M. Halldorsson, Murilo Santos de Lima, Tigran Tonoyan. Query minimization under stochastic uncertainty. In Yoshiharu Kohayakawa and Flávio Keidi Miyazawa, eds., *Proc. of 14th Latin-American Symp. on Theoretical Informatics, LATIN 2020 (São Paulo, May 2020)*, *Lect. Notes in Comput. Sci.*, pp. 181-193. Springer, 2020..
https://doi.org/10.1007/978-3-030-61792-9_15

7. Marek Cygan, Magnus M. Halldórsson, Guy Kortsarz. Tight bounds on subexponential time approximation of set cover and related problems. In *Proc. of 18th Int. Wksh. on Approximation and Online Algorithms, WAOA 2020 (Pisa, Sept. 2020)*, *Lect. Notes in Comput. Sci.*, Springer, to appear.
8. José Espírito Santo, Luís Pinto, Tarmo Uustalu. Calling paradigms and the box calculus (extended abstract). In Ugo de'Liguoro, Stefano Berardi, eds., *Abstracts of 26th Int. Conf. on Types for Proofs and Programs, TYPES 2020 (Torino, March 2020)*, pp. 123-124. Univ. di Torino, 2020.
9. Pierre Fraigniaud, Magnús M. Halldórsson, Alexandre Nolin. Distributed testing of distance-k colorings. In Andrea Werneck Richa and Christian Scheideler, eds., *Proc. of 27th Int. Coll. on Structural Information and Communication Complexity, SIROCCO 2020 (Paderborn, June/July 2020)*, v. 12156 of *Lect. Notes in Comput. Sci.*, pp. 275-290. Springer, 2020.
https://doi.org/10.1007/978-3-030-54921-3_16
10. Magnús M. Halldórsson, Fabian Kuhn, Yannic Maus. Distance-2 coloring in the CONGEST model. In *Proc. 2020 ACM Symp. on Principles of Distributed Computing, PODC 2020 (Salerno, Aug. 2020)*, pp. 233-242. ACM, 2020.
<https://doi.org/10.1145/3382734.3405706>
11. Magnús M. Halldórsson, Fabian Kuhn, Yannic Maus, Alexandre Nolin. Coloring fast without learning your neighbors' colors. In Hagit Attiya, ed., *Proc. of 34th Int. Symp. on Distributed Computing, DISC 2020 (Virtual Conf., Oct. 2020)*, v. 179 of *Leibniz Int. Proc. in Inform.*, pp. 39:1-39:17, Dagstuhl Publishing, 2020.
<https://doi.org/10.4230/lipics.disc.2020.39>
12. Shin-ya Katsumata, Exequiel Rivas, Tarmo Uustalu. Interaction laws of monads and comonads. In *Proc. of 35th Ann. ACM/IEEE Symp. on Logic in Computer Science, LICS 2020 (Saarbrücken, July 2020)*, pp. 604-618. ACM Press, 2020.
<https://doi.org/10.1145/3373718.3394808>
13. Dylan McDermott, Maciej Piróg, Tarmo Uustalu. Degrading lists. In *Proc. of 22nd Int. Symp. on Principles and Practice of Declarative Programming, PPDP 2020 (Bologna, Sept. 2020)*, *ACM Int. Conf. Proc. Series*, article 6, 14 pp. ACM Press, 2020.
<https://doi.org/10.1145/3414080.3414084>
14. Gavin Rens, Jean-François Raskin, Raphaël Reynouad, Giuseppe Marra. Online learning of non-Markovian reward models. In *Proc. of 13th Int. Conf. on Agents and Artificial Intelligence, ICAART 2021 (Online, Feb. 2021)*, SciTePress, to appear.
15. Tarmo Uustalu, Niccolò Veltri, Noam Zeilberger. Deductive systems and coherence for skew prounital closed categories. In Claudio Sacerdoti Coen, Alwen Tiu, eds., *Proc. of 15th Int. Wksh. on Logical Frameworks and Metalanguages: Theory and Practice, LFMTTP 2020 (Paris, June 2020)*, v. 332 of *Electron. Proc. in Theor. Comput. Sci.*, pp. 35-53. Open Publishing Assoc., 2021.
<https://doi.org/10.4204/eptcs.332.3>
16. Tarmo Uustalu, Niccolò Veltri, Noam Zeilberger. Proof theory of partially normal skew monoidal categories. In David I. Spivak, Jamie Vicary, eds., *Proc. of 3rd Applied Category Theory Conf., ACT 2020 (Cambridge, MA, July 2020)*, v. 333 of *Electron. Proc.*

in Theor. Comput. Sci., pp. 230-246. Open Publishing Assoc., 2021.

<https://cgi.cse.unsw.edu.au/~eptcs/paper.cgi?ACT2020:60>

17. Tarmo Uustalu, Niels Voorneveld. Algebraic and coalgebraic perspectives on interaction laws. In Bruno C. d. S. Oliveira, ed., *Proc. of 18th Asian Symp. on Programming Languages and Systems, APLAS 2020 (Fukuoka, Nov./Dec. 2020)*, v. 12470 of *Lect. Notes in Comput. Sci.*, pp. 186-205. Springer, 2020.

https://doi.org/10.1007/978-3-030-64437-6_10