

Parameterized Complexity News

Newsletter of the Parameterized Complexity Community

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Enjoy the Newsletter

Congratulations to all for awards, graduates, new jobs, and research. Read research articles: *Parameterized Algorithmics for Temporal Graph Problems* by Hendrik Molter (TU Berlin) and *Phylogenetics and parameterized complexity* by Steven Kelk (Maastricht Univ). Update Wikipedia with your results. Add your presentations to the FPT Complexity Youtube. Contact Jungho Ahn (Kaist) junghoahn@kaist.ac.kr for assistance. Send us news via [Google form](https://forms.gle/sfZNzKFsfqSywgy7) (<https://forms.gle/sfZNzKFsfqSywgy7>) or directly to our emails. We love hearing from you. Editors: Frances.Rosamond@uib.no, Valia Mitsou vmitsou@irif.fr, Benjamin.Bergougnoux@uib.no and the News Team.

Michał Pilipczuk-ERC Starting Grant



Figure 1: Michał Pilipczuk wins ERC Starting Grant.

CONGRATULATIONS Michał Pilipczuk (Univ of Warsaw). His “Decomposition methods for discrete problems” project has four parts: (i) the theory of sparse graphs and well-structured dense graphs, (ii) systematic investigation of dynamic parameterized data structures, (iii) interplay between parameterization and approximation in planar graphs and related graph classes, (iv) algorithms exploiting structural properties of classes defined by forbidding induced subgraphs. General-purpose tech-

niques that solve whole classes of problems, e.g. expressible in various kinds of logic are sought. The ERC is 1,355,688 euro over 5 years.

Akanksha Agrawal is Rising Star at TCS Women Spotlight Workshop



Figure 2: Akanksha Agrawal is Rising Star at TCS Women Spotlight Workshop

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CONGRATULATIONS Akanksha Agrawal. While a postdoctoral student at the department of computer science under the instruction of **Meirav Zehavi** (Ben-Gurion Univ), Akanksha was selected to give a Rising Star Talk at the TCS Women Spotlight Workshop, part of the 52nd Annual ACM Symposium on the Theory of Computing (STOC 2020). Akanksha has joined IIT Madras as an assistant professor.

Bruno Courcelle wins Barry Cooper Prize

CONGRATULATIONS Bruno Courcelle (Univ of Bordeaux). Bruno has won the 2020 S. Barry Cooper Prize, established by the Association Computability in Europe, for his work on the definability of graph properties in Monadic Second Order Logic, through a sequence of seminal papers and a book (joint with Joost Engelfriet). Bruno is the first to receive this prize. Bruno's work brings together logic, computability, graph grammars, various notions of graph width (tree-width, clique-width and rank-width) and opens new avenues in our understanding of graph structure theory and the computability and complexity of graph algorithms. It has straddled the divide between the logical and algorithmic aspects of theoretical computer science.



Figure 3: Bruno and Barry, performing in a theater play about the French author Octave Mirbeau.

Robert Ganian-Austrian FWF START

CONGRATULATIONS Robert Ganian (TU Wien). Robert has been awarded a START grant from the Austrian Science Fund (FWF), in the amount of roughly 1,120,000 euros. The title is “Parameterized Analysis in Artificial Intelligence” and the project will run for 6 years at the Vienna University of Technology (TU Wien). Apart from investigating problems that arise in the context of AI through the lens of parameterized complexity, the project will also search for connections between parameterized complexity theory and sample complexity. This is the first FWF START grant awarded to a computer scientist since 2015.



Figure 4: Robert Ganian during the FWF START grant prize ceremony.

Steven Kelk wins Dutch NWO



Figure 5: Steven Kelk, NWO award winner, and Simone Linz.

CONGRATULATIONS Steven Kelk (Maastricht Univ) who has received a grant from the Dutch scientific organization NWO for his project “Deep kernelization for phylogenetic discordance”. The 267,000 euros grant finances a PhD student for 4-years. More specifically, Kelk's project seeks to aggressively reduce the size of kernels for various problems in phylogenetics – particularly for measuring the dissimilarity of two phylogenetic trees – and also to leverage this in a wider algorithmic framework (branch and reduce and so on). The launching point is joint work with **Simone Linz** (Univ Auckland) described by Kelk in a presentation given at Oxford last year. http://skelk.sdf-eu.org/Oxford_Kelk_2019_Web.pdf. The project builds on joint work with Linz, although she is not formally involved with this grant.

Neeldhara Misra - INAE Young Engineer

CONGRATULATIONS Neeldhara Misra (Indian Institute of Technology Gandhinagar) for being awarded the INAE Young Engineer Award.

The INAE Award is instituted to identify, recognize and encourage young and promising talents in India who have made and are likely to continue to make outstanding

contributions impacting engineering research and design, technology development and transfer.



Figure 6: Neeldhara Misra, INAE Young Engineer.

The Award includes a prize of 100,000 Indian Rupees and a citation. All INAE Young Engineer Awardees also become INAE Young Associates.

Ronald de Haan, New Book!

CONGRATULATIONS to **Ronald de Haan** (Vienna Univ of Technology) on his new book: *Parameterized Complexity in the Polynomial Hierarchy: Extending Parameterized Complexity Theory to Higher Levels of the Hierarchy*, Springer (2020). Free preview at Springer, and it is even on Kindle!



Figure 7: Ronald deHaan and latest PC book.

Parameterized Complexity in the Polynomial Hierarchy was co-recipient of the E.W. Beth Dissertation Prize 2017 for outstanding dissertations in the fields of logic, language, and information. This work extends the theory of parameterized complexity to higher levels of the Polynomial Hierarchy (PH). For problems at higher levels of the PH, a promising solving approach is to develop fixed-parameter tractable reductions to SAT, and to subsequently use a SAT solving algorithm to solve the problem. In this dissertation, a theoretical toolbox is developed that can be used to classify in which cases this is possible. The use of this toolbox is illustrated by applying it to analyze a wide range of problems from various areas of computer science and artificial intelligence.

Tomáš Peitl, Stefan Szeider-CP'2020 Best Paper

CONGRATULATIONS **Tomáš Peitl and Stefan Szeider** (TU Wien) for winning the Best Paper Award at the main track of CP'2020, the 26th International Conference on Principles and Practice of Constraint Programming, for their paper: "Finding the Hardest Formulas for Resolution". In the paper, a resolution-based method (CDCL SAT solver) is used to find the hardest formulas for resolution, which constitutes a self reference, as greatly illustrated by MC Escher in his lithograph "Drawing Hands" (1948). The paper is available at <https://www.ac.tuwien.ac.at/2020/09/best-paper-award-at-cp2020/>



Figure 8: Stefan Szeider and Tomáš Peitl, with Escher's demonstration of self reference.

Online seminars

Due to the pandemic, several online seminars related to parameterized complexity have sprung up. One is organized by Pratibha Choudhary and Saket Saurabh. The talks are at 8:30pm IST every Tuesday on Zoom. See sites.google.com/view/pcseminar for more information.

You can also watch the online seminar series on *Frontiers of Parameterized Complexity* organized by Fedor Fomin, Roohani Sharma and Saket Saurabh. The talks are scheduled once every two weeks on Thursdays at 17:00 GMT+2. More information is available on frontpc.blogspot.com/. If you miss a talk you can always watch them on [this Youtube channel](#). The *Centre for Mathematical Social Science: mathematical analysis of individual and collective decisions* has a webinar series. Contact Arkadii Slinko (a.slinko@auckland.ac.nz) to get a meeting ID and password.

If you have information on another online seminar, please fill this [Google form](https://forms.gle/sfZNzKFsfqSywgy7) (<https://forms.gle/sfZNzKFsfqSywgy7>) or contact us via email.

Parameterized Algorithmics for Temporal Graph Problems

by Hendrik Molter (TU Berlin).

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The aim of this contribution is to provide a brief overview of selected (parameterized) complexity results for temporal graph problems.

Traditionally, graphs are used to abstractly model diverse real-world systems, where vertices and edges represent elementary system units and some kind of interactions between them, respectively. In many scenarios, however, this modeling paradigm using static graphs may be too restrictive or oversimplifying, as interactions often change over time in a highly dynamic manner. For example, in a social network friendships are added and removed over time and links in a communication network may change dynamically, either according to a specific known pattern (satellites following a trajectory) or in an unpredictable manner (mobile ad-hoc networks). The common characteristic in all these application areas is that the system structure, i.e., graph topology, is subject to *discrete changes over time*. In many cases it is well-motivated that we have full information over the changes which happened in the past or will happen in the future. Among others this is often the case in public transport systems, network analysis, and social science studies arising from physical proximity networks.

A *temporal graph* is a mathematical model that tries to capture these dynamic changes. It is a graph whose edge set may change over time. Given a static *underlying* graph G , a temporal graph is obtained by assigning to every edge of G a set of positive integer time-labels, indicating the discrete time steps in which this edge is active. We call the graph resulting from considering all edges that are active at time step i the *i th layer* of the temporal graph.

In many cases, the existence of the time dimension adds some degree of freedom in defining a specific temporal variant of a static graph problem. For example, depending on the application domain, the temporal analogue of a “shortest path” between two vertices can be translated as (a) the topologically shortest path, having the smallest number of edges, (b) the fastest path, having the smallest time duration, or (c) the foremost path, arriving as early as possible (regardless of the starting time). The variety of temporal analogues of static graph problems naturally leads to fundamental algorithmic questions which are still far from being well understood.

As we all know, *parameterized algorithmics* is a very successful paradigm for designing algorithms to solve *static* graph problems. Not surprisingly, it is a natural fit for temporal graph problems as well. Here, the question arises how to transfer (structural) graph parameters to the temporal setting. In the literature, these parameters have commonly been adapted in one of the following two straightforward ways:

1. Take the maximum parameter value over all layers.
2. Take the parameter value of the underlying graph.

However, both of these notions disregard the changing nature of a temporal graph very well. In fact, for many temporal graph problems NP-hardness is shown for constant values of many structural graph parameters that are adapted to the temporal setting in the above described fashions. This suggests that the temporal dimension can hold a lot of information even if every layer or the underlying graph structure is very simple. Hence, we are challenged to define new parameters that quantify the complexity of the temporal dimension in some meaningful way. In the following, we review a selection of attempts to define temporal graph parameters that do not fall in any of the two above mentioned cases.

A generic way to transfer a structural graph parameter to the temporal setting is the concept of a “ Δ -slice parameter”. It is particularly interesting in the context of problems that make use of so-called *Δ -time windows*, which are sets of Δ consecutive time steps. The Δ -slice version of a parameter is the maximum value of this parameter over the union graphs of all Δ -time windows. We have employed *Δ -slice degeneracy* in our work on temporal clique and temporal k -plex enumeration [1, 5] to obtain practical FPT results. We also discussed the concept briefly for treewidth [3]. Intuitively, this can be seen as an “interpolation” between the two concepts discussed in the previous paragraph and even though they found successful applications they suffer from the same “weakness”.

We have followed a different approach in our work on temporal paths with waiting time constraints [2]. Here, we introduced a “timed” version of the feedback vertex number, which quantifies the minimum number of *vertex appearances* that need to be removed from a temporal graph to make its underlying graph cycle-free. A vertex appearance is a pair consisting of a vertex and a time step, and its removal “deactivates” all edges that are incident with the vertex at that time step. We showed that deciding whether two vertices are connected by a temporal path with waiting time constraints is in FPT when parameterized by the *timed feedback vertex number* whereas the problem is W[1]-hard when parameterized by the feedback vertex number of the underlying graph [2]. Of course, one could define timed versions of other parameters that quantify the vertex deletion distance to some graph class.

An alternative very basic way to measure “temporality” is to count the number of vertices that witness changes over time, that is, they have different neighborhoods in different layers. We did this in our work on temporal separators [7] and call this number the size of the *temporal core*.

It is noteworthy that the two parameters “timed feedback vertex number” and “size of the temporal core” can capture some of the complexity hidden in the temporal dimension, however they are both invariant under reordering

the time steps. Hence, one could argue that they are not truly temporal. The last example of a temporal graph parameter is quite specific but it tries to capture how much change over time happens in the temporal graph. In another work on temporal separators [4], we investigated temporal unit interval graphs, which are temporal graphs where every layer is a unit interval graph. We introduced a parameter that quantifies how much the intervals are allowed to move around when going from one time step to the next. We call this parameter the *shuffle number* of a temporal unit interval graph.

In conclusion, parameterized algorithmics are a well-suited tool to tackle temporal graph problems and there seems to be a lot of space to explore when it comes to (structural) temporal graph parameters. In our contribution to Hans Bodlaender’s Festschrift [3], we give an overview how treewidth as a structural parameter is used in the context of temporal graphs and how it can be adapted to the temporal setting. In my doctoral thesis [6] I give an overview of recent results that I was involved in, including most of the ones mentioned in this article. Overall, temporal graph algorithmics is a still relatively young research field that comprises many (parameterized) algorithmic questions that are not yet well-understood. It waits for your contributions!

References

- [1] M. Bentert, A.-S. Himmel, H. Molter, M. Morik, R. Niedermeier, and R. Saitenmacher. “Listing all maximal k -plexes in temporal graphs”. In: *ACM Journal of Experimental Algorithmics* 24(1), 13:1–13:27, 2019.
- [2] A. Casteigts, A.-S. Himmel, H. Molter, and P. Zschoche. “The computational complexity of finding temporal paths under waiting time constraints”. In: *Proceedings of the 31st International Symposium on Algorithms and Computation (ISAAC ’20)*. Accepted for publication.
- [3] T. Fluschnik, H. Molter, R. Niedermeier, M. Renken, and P. Zschoche. “As time goes by: Reflections on treewidth for temporal graphs”. In: *Treewidth, Kernels, and Algorithms - Essays Dedicated to Hans L. Bodlaender on the Occasion of His 60th Birthday*, 49–77, 2020.
- [4] T. Fluschnik, H. Molter, R. Niedermeier, M. Renken, and P. Zschoche. “Temporal graph classes: A view through temporal separators”. In: *Theoretical Computer Science*, 806, 197–218, 2020.
- [5] A.-S. Himmel, H. Molter, R. Niedermeier, and M. Sorge. “Adapting the Bron-Kerbosch algorithm for enumerating maximal cliques in temporal graphs”. In: *Social Network Analysis and Mining* 7(1), 35:1–35:16, 2017.
- [6] H. Molter. “Classic graph problems made temporal – A parameterized complexity analysis”. Doctoral thesis, 2020. To appear in: *Foundations of Computing of TU Berlin*.
- [7] P. Zschoche, T. Fluschnik, H. Molter, and R. Niedermeier. “The complexity of finding separators in temporal graphs”. In: *Journal of Computer and System Sciences*, 107, 72–92, 2020.

Phylogenetics and parameterized complexity

by Steven Kelk (Maastricht Univ),

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Phylogenetics is the branch of computational biology concerned with inferring the evolutionary history of a set of species X given only partial information about that history. The central challenge is to construct a tree (or sometimes a graph) whose leaves are bijectively labelled by X , subject to some optimality criterion, but there are also many interesting secondary challenges such as quantifying the dissimilarity of these trees. The field is awash with NP-hard problems and this makes it an excellent domain in which to deploy, adapt and extend techniques from parameterized complexity (PC), as noted in the surveys [3, 5]. Unsurprisingly, many of the talks at the recent Dagstuhl seminar *Algorithms and Complexity in Phylogenetics* directly concerned PC [1]. In this short, personal perspective I list a number of directions in the field that I think are interesting for the PC community.

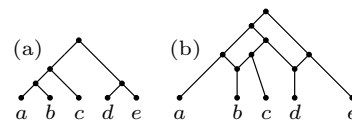


Figure 9: (a) A phylogenetic tree and (b) a phylogenetic network.

Networks and distances. Networks are simply generalisations of phylogenetic trees to graphs; see Figure 9. From the PC perspective, the *hybridization number* problem is particularly accessible: given a set of trees on X , topologically embed them into a network $N = (V, E)$ such that $k := |E| - (|V| - 1)$ is minimized. There are extensive FPT results in this area (often with k as parameter) but in its most general form the problem remains a tough nut to crack both theoretically and practically [8]. A recent trend is to induce tractability by constraining the topology of N , which in turn has stimulated a subliterature on special types of elimination orders on X (see e.g. [4]). The hybridization number literature overlaps with the *distance* literature: given two phylogenetic trees T and T' , compute the minimum number of modification operations required to transform T into T' .

Many such distances are NP-hard to compute. From a combinatorial perspective, distances that can be fully or partially characterized by *maximum agreement forests*, which are minimum-size partitions of X that induce non-overlapping isomorphic subtrees in the input trees, remain intriguing (see e.g. [9] and citing articles).

Branching and kernelization. An interesting aspect of the networks and distances literature is that, while FPT results are typically based on branching algorithms or kernelization, kernelization mainly functions as a classification tool. This is because branching algorithms are more likely to yield fast algorithms in practice. Recently the phylogenetics community has started to redress this balance by revisiting and optimizing existing kernelization results. This involves the development of new reduction techniques and supporting analytical machinery [7]; research is ongoing and a PhD position is available!

Structural graph theory. Given a set of t trees, each with leaves labelled by a subset of X , is there a single tree on X that topologically embeds them all? This NP-hard problem was shown to be FPT in t in the seminal work of Bryant and Lagergren [2], using Courcelle's Theorem. To leverage MSOL they merged the input trees into a single graph (a *display graph*) and then bounded its treewidth. In doing so they overcame one of the natural barriers between phylogenetics and PC - the lack of a *single* input graph - and indirectly built a bridge between treewidth and other phylogenetics parameters. Subsequent articles have studied phylogenetic variants of chordalizations and minors, but the surface has only been scratched. An intriguing open question is whether the *chain reduction* - a very common kernelization technique whereby common caterpillar-like regions in the input trees are reduced - is treewidth-preserving in the display graph (see [6] and references therein).

The above list is just a small sample of problems in phylogenetics potentially interesting to the PC community. I firmly believe that a deep, two-way relationship between PC and phylogenetics is possible and desirable. I hope you will join myself and other phylogenetics researchers on this journey!

References

- [1] M. Bordewich, B. Dorn, S. Linz, and R. Niedermeier. Algorithms and complexity in phylogenetics (dagstuhl seminar 19443). In *Dagstuhl Reports*, volume 9. Schloss Dagstuhl-Leibniz-Zentrum fuer Informatik, 2020.
- [2] D. Bryant and J. Lagergren. Compatibility of unrooted phylogenetic trees is FPT. *Theoretical computer science*, 351(3):296–302, 2006.
- [3] L. Bulteau and M. Weller. Parameterized algorithms in bioinformatics: An overview. *Algorithms*, 12(12):256, 2019.
- [4] J. Döcker, L. van Iersel, S. Kelk, and S. Linz. Deciding the existence of a cherry-picking sequence is hard on two trees. *Discrete Applied Mathematics*, 260:131–143, 2019.
- [5] J. Gramm, A. Nickelsen, and T. Tantau. Fixed-parameter algorithms in phylogenetics. *The Computer Journal*, 51(1):79–101, 2008.
- [6] R. Janssen, M. Jones, S. Kelk, G. Stamoulis, and T. Wu. Treewidth of display graphs: bounds, brambles and applications. *Journal of Graph Algorithms and Applications*, 23(4):715–743, 2019.
- [7] S. Kelk and S. Linz. New reduction rules for the tree bisection and reconnection distance. *Annals of Combinatorics*, 24:475–502, 2020.
- [8] L. van Iersel, R. Janssen, M. Jones, Y. Murakami, and N. Zeh. A practical fixed-parameter algorithm for constructing tree-child networks from multiple binary trees. *arXiv preprint arXiv:1907.08474*, 2019.
- [9] C. Whidden, R. G. Beiko, and N. Zeh. Fixed-parameter algorithms for maximum agreement forests. *SIAM Journal on Computing*, 42(4):1431–1466, 2013.

Conferences and Workshops

IPEC 2020. Due to the COVID-19 pandemic, IPEC 2020 will be an online event taking place on 14–18 December 2020. On each day, there will be two roughly 90-minute sessions of invited and contributed talks with a 30-minute break in between, scheduled between 8am and noon UTC (i.e., spanning European morning / Asian afternoon or evening). The conference will also feature virtual rooms for coffee break discussions. Participating in the conference will be free of charge.

An invited talk is planned by the 2020 EATCS-IPEC Nerode Prize winner. In addition, there will be a session presenting the results of the 5th Parameterized Algorithms and Computational Experiments Challenge (PACE 2020).

Co-Chairs are **Yixin Cao** (Hong Kong Polytechnic Univ) and **Marcin Pilipczuk** (Univ of Warsaw).

IPEC 2021. The International Symposium on Parameterized and Exact Computation (IPEC) is an annual conference covering all aspects of parameterized and exact algorithms and complexity.

The 16th edition will be part of ALGO 2021, which also hosts ESA 2021 and a number of more specialized conferences and workshops. ALGO 2021 will take place on September 6-10, 2021, Lisbon, Portugal. Due to the

COVID-19 pandemic, IPEC might be held online. The CFP will be available soon.



Figure 10: Meirav Zehavi and Petr Golovach, IPEC'21 Co-Chairs.

Co-Chairs are **Meirav Zehavi** (Ben-Gurion Univ) and **Petr Golovach** (Univ Bergen).

CIAC 2021. The 12th International Conference on Algorithms and Complexity, is intended to provide a forum for researchers working in all aspects of computational complexity and the use, design, analysis and experimentation of efficient algorithms and data structures. 10-12 May 2021 – Larnaca, Cyprus. <http://easyconferences.eu/ciac2021/>.

Invited Speakers are **Henning Fernau** (Trier Univ), **Katharina Huber** (Univ of East Anglia), **Seffi Naor** (Technion Haifa).

CMSC 2021. The 5th Creative Mathematical Sciences Communication Conference, in-cooperation with SIGCSE, will be held at Adam Mickiewicz University in Poznan, Poland, 2-6 July, 2021. You are warmly invited to register now at the conference website: <https://cmsc.wmi.amu.edu.pl>.

The CMSC is a unique gathering of computer scientists and mathematicians, teachers, musicians, dancers, dramatists, game designers, educators and communicators of all sorts.

An Online Event was organized as a “teaser” in order to feel the spirit of the full CMSC'21 to come. The fast-paced, 15-min per presentation, program felt as exciting as a carnival as dancers whirled mathematical shapes, an algorithmic music ensemble gave a premier performance, and presentations stimulated imaginative new possibilities in the remote style we are now, at least for awhile, adapting to.

Access a pdf describing all the speakers and activities of the online event at the *Journal of Humanistic Mathematics*, <https://scholarship.claremont.edu/jhm/>. Scroll to the bottom of the page.

View a recording of the online 2020 event on the CMSC website <https://cmsc.wmi.amu.edu.pl/news/>.

Conference Series Chair: **Frances Rosamond** (Univ Bergen), Organizing Committee Chair: **Malgorzata Bednarska** (Adam Mickiewicz Univ), PC Co-Chairs: **Sarah Carruthers** (Vancouver Island Univ and Univ of Victoria) and **Brett Stephenson** (Univ of Tasmania and Guilford Young College).

Special Issues

The following Special Issues are for the journal *Algorithms*, an MDPI peer-reviewed, open access journal. Papers are published on an ongoing basis, papers may be submitted at any point before the deadline. Many univ libraries have funds to support open access submissions. Further information can be found at the Special Issue website: https://www.mdpi.com/journal/algorithms/special_issues

Parameterized Algorithms in Bioinformatics.

Submissions due: 31 October 2020.

Editors **Laurent Bulteau** and **Mathias Weller** (CNRS Université Gustave Eiffel).

Bioinformatics raise challenges of all kinds for computer scientists. Sequences, trees, networks, and graphs, data come in a large variety of forms and yield interesting and often computationally difficult problems. Parameterized algorithms make it possible to find exact solutions to these problems efficiently, often making use of the inherent structure of biological data. From sequence comparison and genome assembly to second-structure prediction and phylogenetics, parameterized algorithms can be and have been applied to all facets of bioinformatics in order to improve running times and/or the quality of results.

Parameterized Complexity and Algorithms for Nonclassical Logics.

Submissions due: 31 January 2021.

Editor **Arne Meier** (Institut für Theoretische Informatik, UNI-Hannover).

Temporal logics play a prevalent role in program verification, nonmonotonic logics are omnipresent in artificial intelligence, hybrid, or modal logics, and description logics are central to ontology-based research. However, there are numerous other nonclassical logics that are also of interest. A non-exhaustive list of possible directions with an emphasis on nonclassical logics:

- Parameterized complexity classifications
- Parameterized proof-theoretic approaches
- Parameterized counting complexity investigations
- Parameterized enumeration complexity

Experimental studies

New results on lower bounds and developments on fine-grained parameterized complexity.

Algorithms for Hard Graph Problems.

Submissions due: 31 March 2021.

Editor **Frank Gurski** (Heinrich Heine Univ).

Since many interesting problems on graphs are hard, several approaches for solving hard problems have been applied to these problems. These include **parameterized algorithms**, exponential time algorithms, approximation algorithms, randomized algorithms, heuristic algorithms, and algorithms for special graph classes. For this Special Issue on “Algorithms for Hard Graph Problems”, we welcome papers presenting original research concerned with all fields of solving hard graph problems. Works on undirected graphs as well as works on directed graphs are welcome.

FPT Complexity Youtube channel

We are building up a youtube channel “FPT Complexity”, collecting lecture videos, conference and seminar talks. Subscribe to the channel and watch videos covering the latest theories in FPT. With recommendations for videos or playlists, or for help in adding your own, contact **Jungho Ahn** (Kaist) junghoahn@kaist.ac.kr.

Out and About - Moving Around

CONGRATULATIONS to **Julien Baste**, who has obtained a position as Assistant Professor in Lille, north of France. This is a permanent position in France. All our very best wishes to Julien.

CONGRATULATIONS to **Sushmita Gupta**, who has joined the Institute of Mathematical Sciences, Chennai, the IMSc. Our very best wishes to Sushmita.

CONGRATULATIONS to **Daniel Marx**, who is now tenured faculty at CISPA, which is a new and very well funded research institute in Saarbrücken. Daniel is looking to hire massively to build his group. Good opportunity, there.

CONGRATULATIONS to **Fábio Protti**, who has been made a full professor at the Institute of Computing of Fluminense Federal University. Colleague Celina de Figueiredo reports that there was a beautiful and touching ceremony which took the whole of Wednesday afternoon. All our very best wishes to Fábio.

CONGRATULATIONS New PhDs

Lars Jaffke, *Bounded Width Graph Classes in Parameterized Algorithms*, University of Bergen.

Advisors: Prof. Michael R. Fellows, Prof. Jan Arne Telle. Lars has accepted a postdoc position at the University of Bergen. Congratulations, Dr. Jaffke.

Oscar Defrain, *On the equalization problem in graphs, hypergraphs, and lattices*, Université Clermont Auvergne. Advisor: Prof. Lhouari Nourine.

Oscar has accepted a postdoc position at the University of Warsaw. Congratulations, Dr. Defrain.

Jan Dreier, *Two New Perspectives on Algorithmic Meta-Theorems, Evaluating Approximate First-Order Counting Queries on Bounded Expansion and First-Order Queries on Random Graphs*, RWTH Aachen.

Advisor: Prof. Peter Rossmanith.

External Reviewer: Sebastian Siebertz

Jan has accepted a postdoc position in the group of Stefan Szeider at TU Wien. Congratulations, Dr. Dreier.

Roohani Sharma, *Advancing the Parameterized Toolkit for Cut Problems*, Institute of Mathematical Sciences, HBNI.

Advisor: Prof. Saket Saurabh.

Roohani has an independent research position at Max Planck Institute for Informatics. Congratulations, Dr. Sharma.

Torstein J. F. Strømme, *Exploiting graph structures for computational efficiency*, University of Bergen.

Advisor: Prof. Jan Arne Telle.

Congratulations, Dr. Strømme.

FAMILY MATTERS

Congratulations Arne and Julia Meier (Institut für Theoretische Informatik, UNI-Hannover). Hoorah for two new Parameterized Complexity scientists, baby Leonie Anna Meier with her big brother Jonas Heinrich Meier.



Figure 11: Leonie Anna Meier with her big brother Jonas Heinrich.