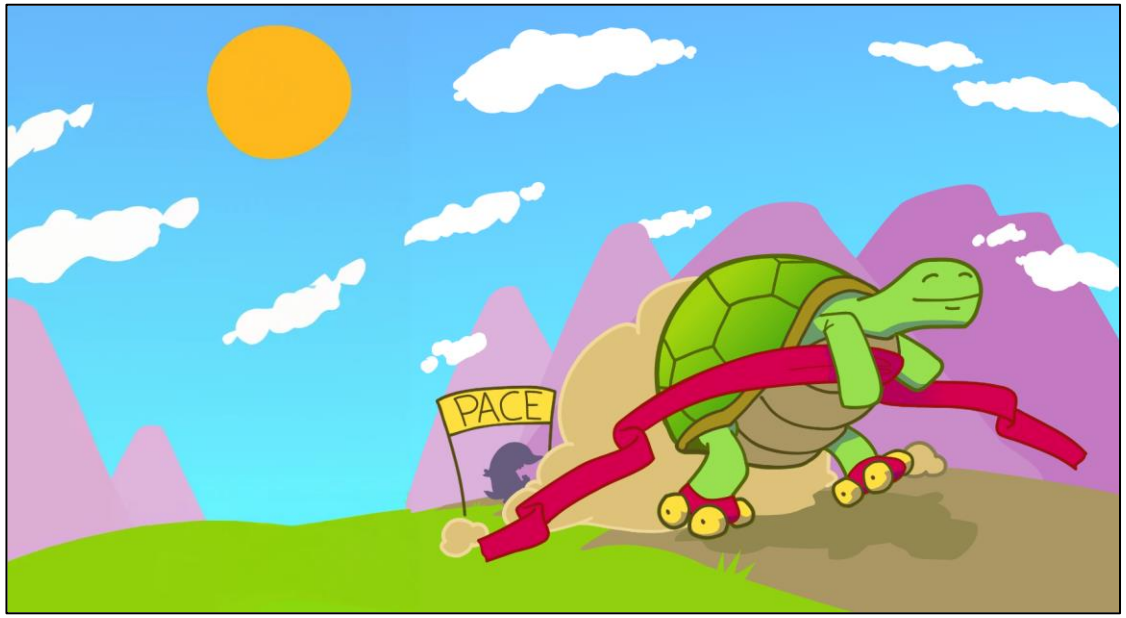
Parameterized Algorithms & Computational Experiments Challenge

www.pacechallenge.org

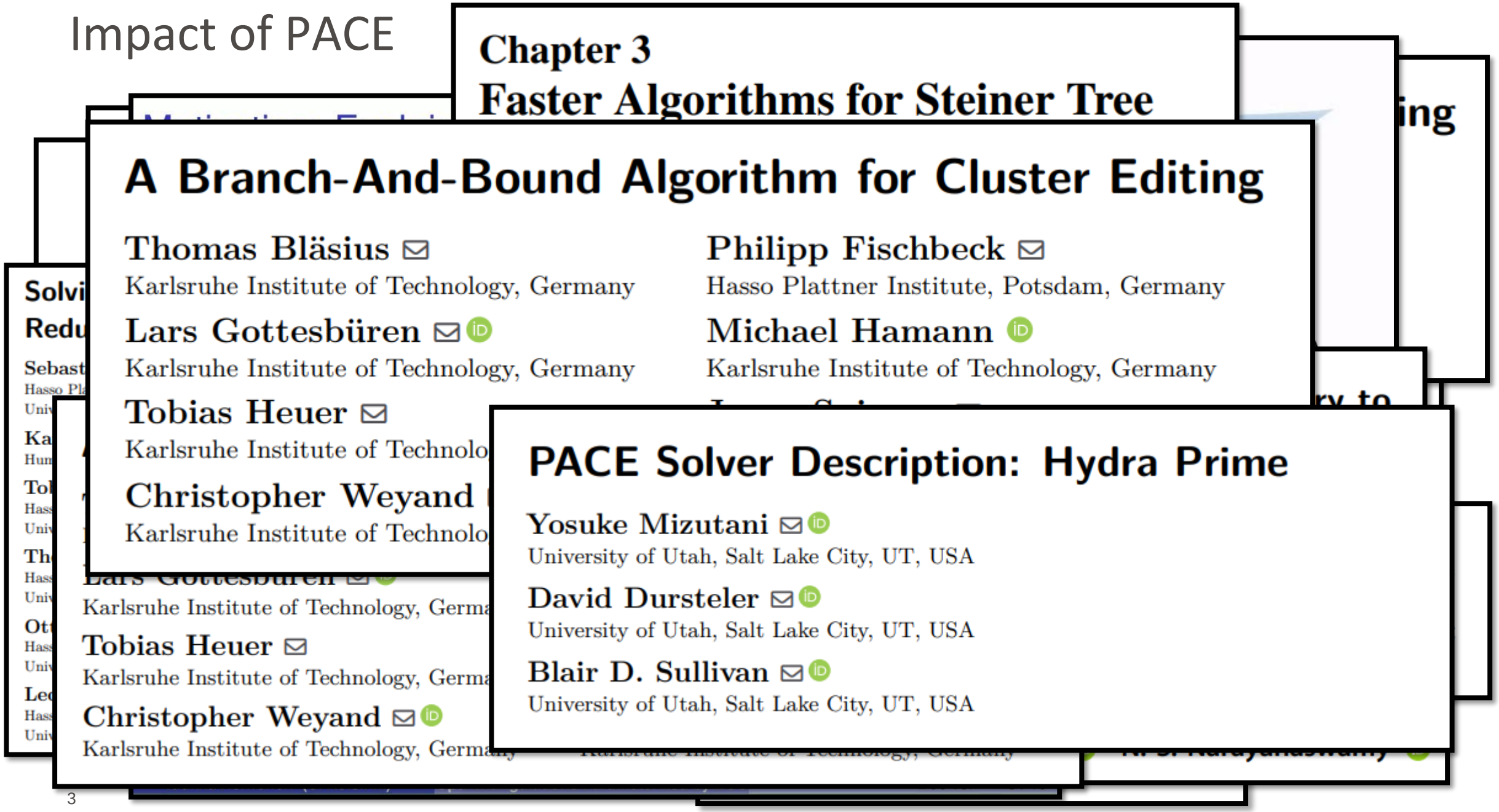


Goals

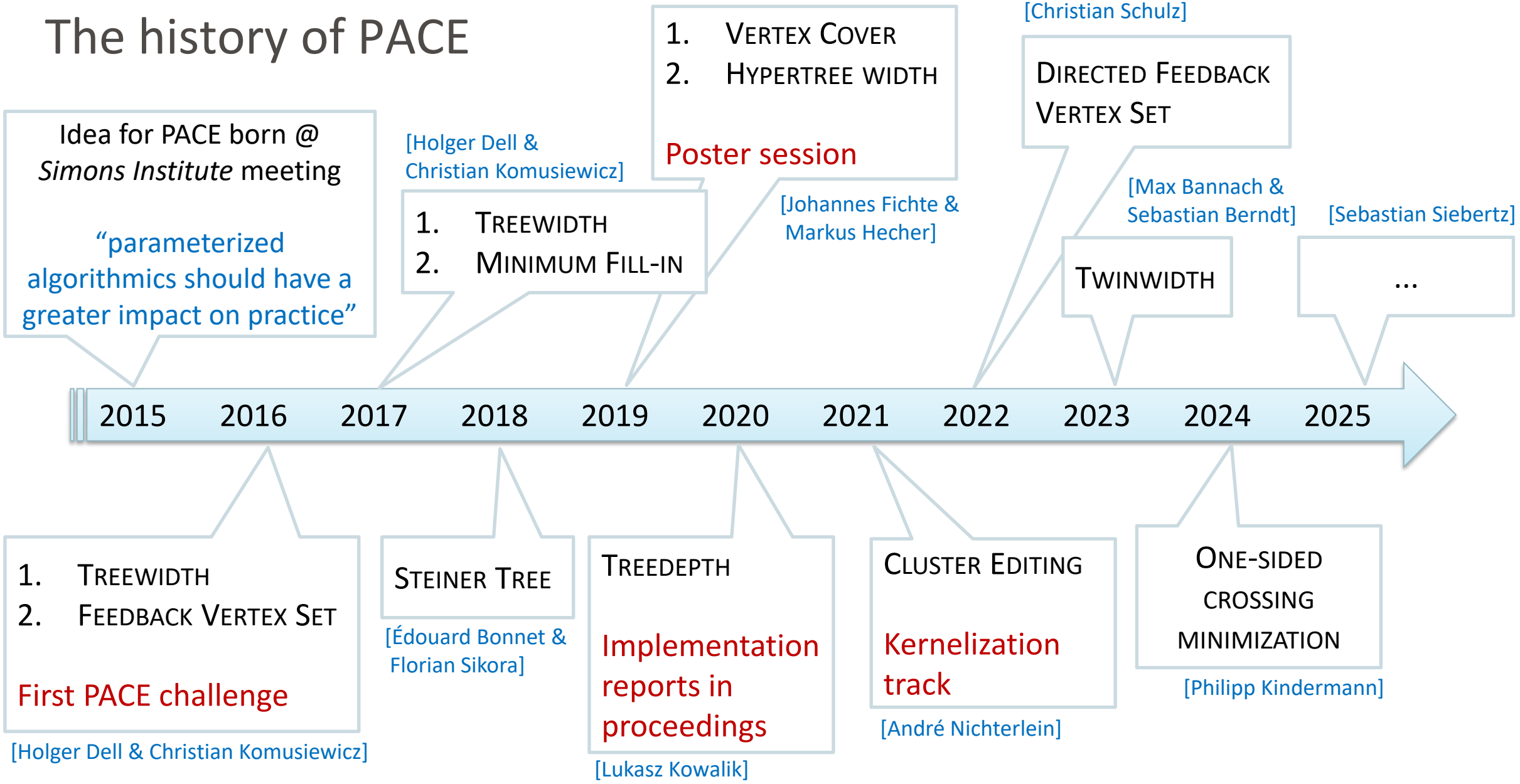
Investigate the applicability of algorithmic ideas from parameterized algorithmics

1. provide bridge between algorithm theory and algorithm engineering practice
2. inspire new theoretical developments
3. investigate the competitiveness of analytical and design frameworks
4. produce universally accessible libraries of implementations & benchmark inputs
5. encourage dissemination of the findings in scientific papers

Impact of PACE



The history of PACE



Steering committee

Max Bannach	European Space Agency
Sebastian Berndt	Universität zu Lübeck
Holger Dell	Goethe University Frankfurt and IT University of Copenhagen
Markus Hecher	MIT
Bart M. P. Jansen*	Eindhoven University of Technology
Łukasz Kowalik	University of Warsaw
Andre Nichterlein	Technical University of Berlin
Christian Schulz	Universität Heidelberg
Manuel Sorge	Technische Universität Wien

Former members

Marcin Pilipczuk	(2021-2023)	Florian Sikora	(2017-2020)
Johannes Fichte	(2020-2023)	Christian Komusiewicz	(2016-2020)
Markus Hecher	(2020-2023)	Frances Rosamond	(2016-2019)
Édouard Bonnet	(2017-2021)	Thore Husfeldt	(2016-2019)
Petteri Kaski	(2016-2020)		

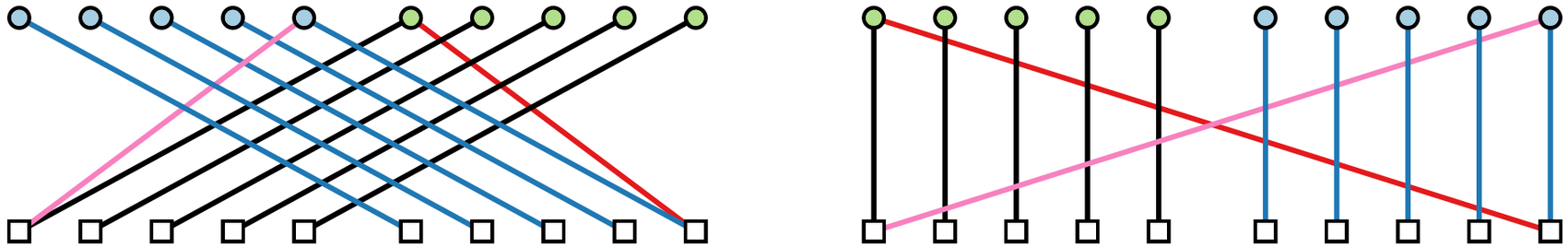
PACE 2026: We need your help!

Wanted:
researcher with experience in theory & practice of parameterized algorithms,
to be the program chair of PACE 2026

- Set up challenge tracks in discussion with the steering committee
- Assemble a program committee to help with selection of instances, setting up the evaluation platform, handling submissions, evaluating implementation reports
- Publish an article summarizing the challenge in the IPEC proceedings

Potentially interested? Contact the steering committee!

PACE 2024



One-Sided Crossing Minimization

Program Committee

Philipp Kindermann
Trier University
(chair)

Fabian Klute
Polytechnic University
of Catalonia

Soeren Terziadis
TU Eindhoven

Sponsors

Thank you to our sponsors:

- **Networks** for sponsoring the prizes

- **Optil.io** (especially Jan Badura) for their online judge system

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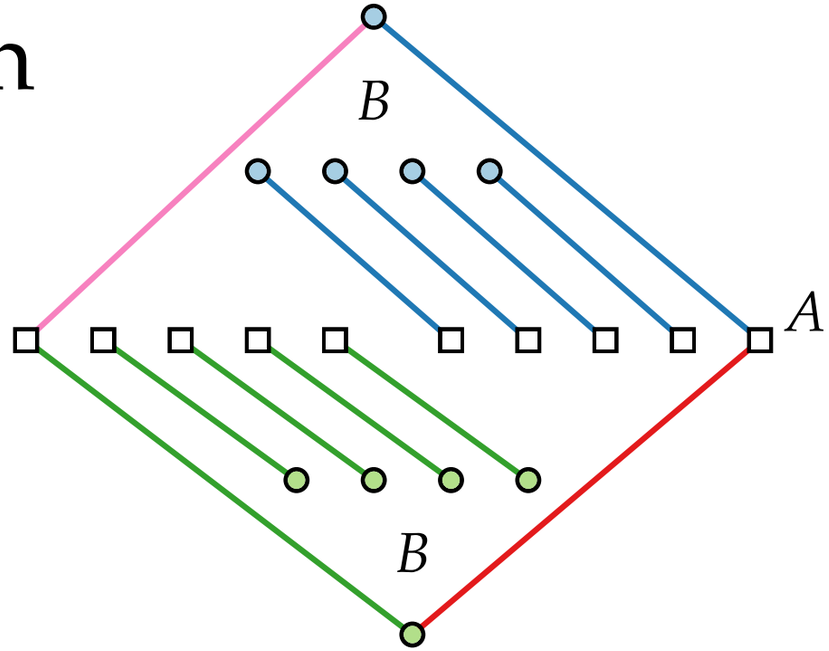

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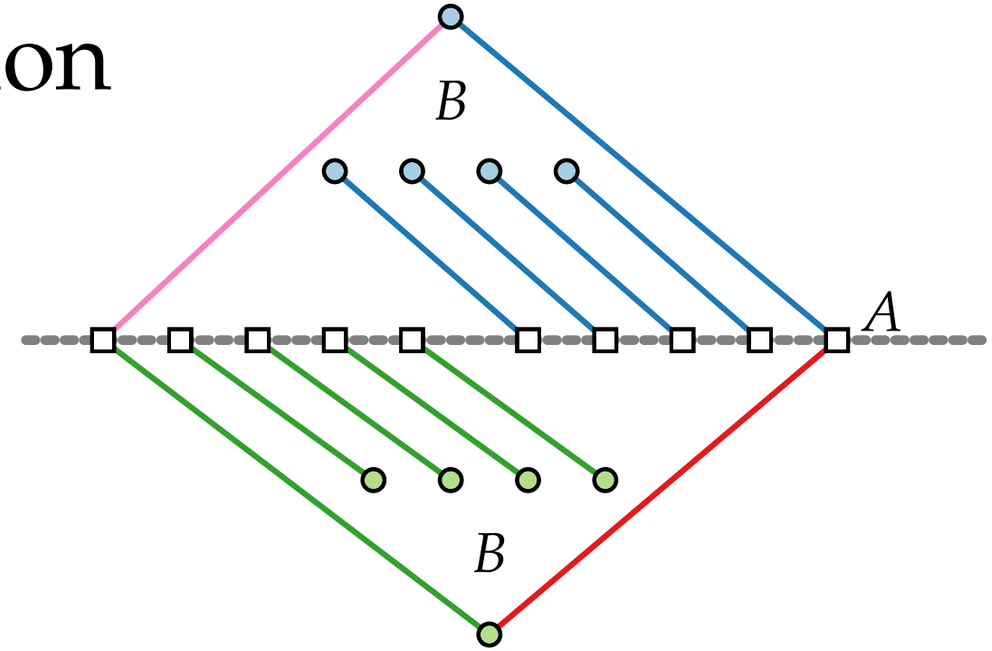

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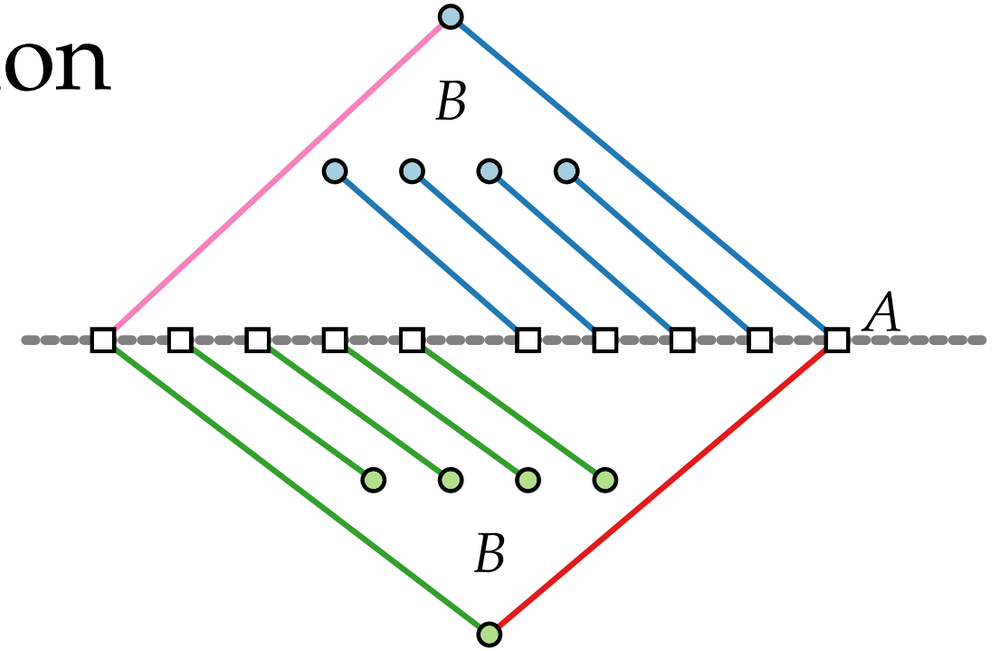

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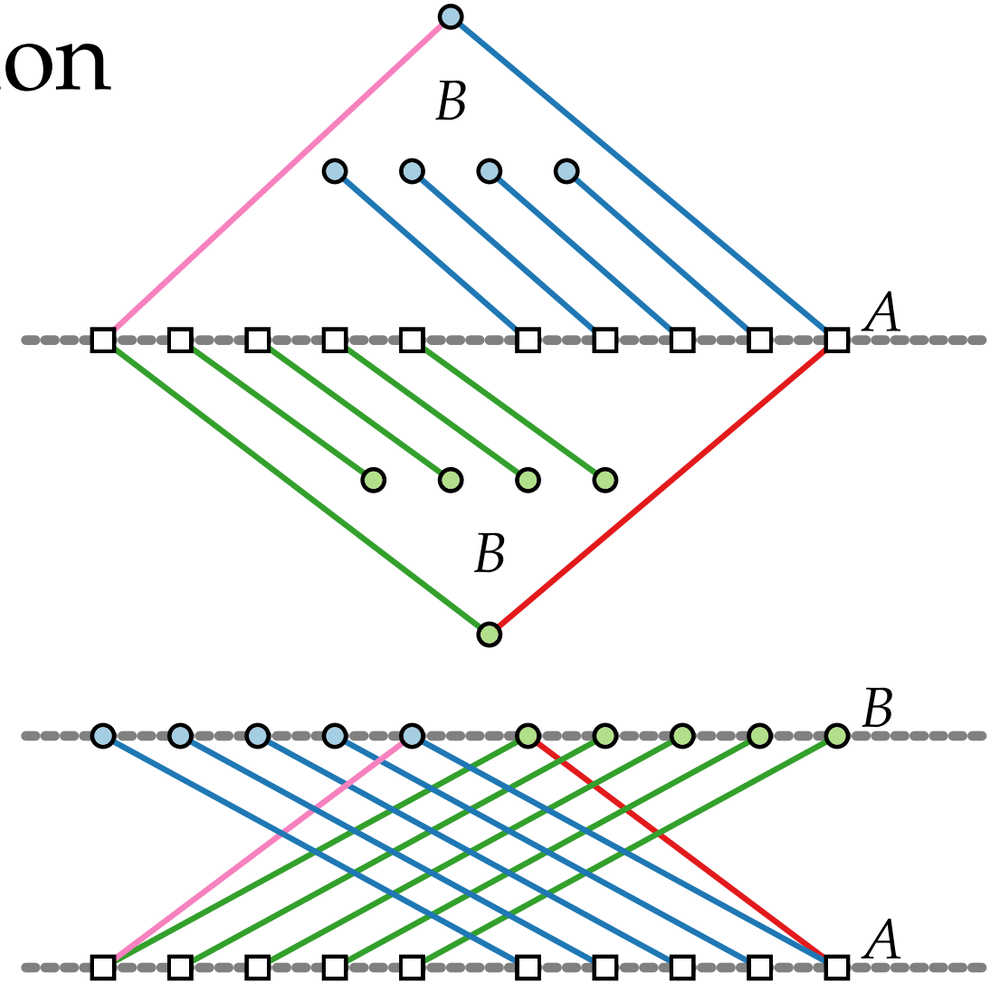

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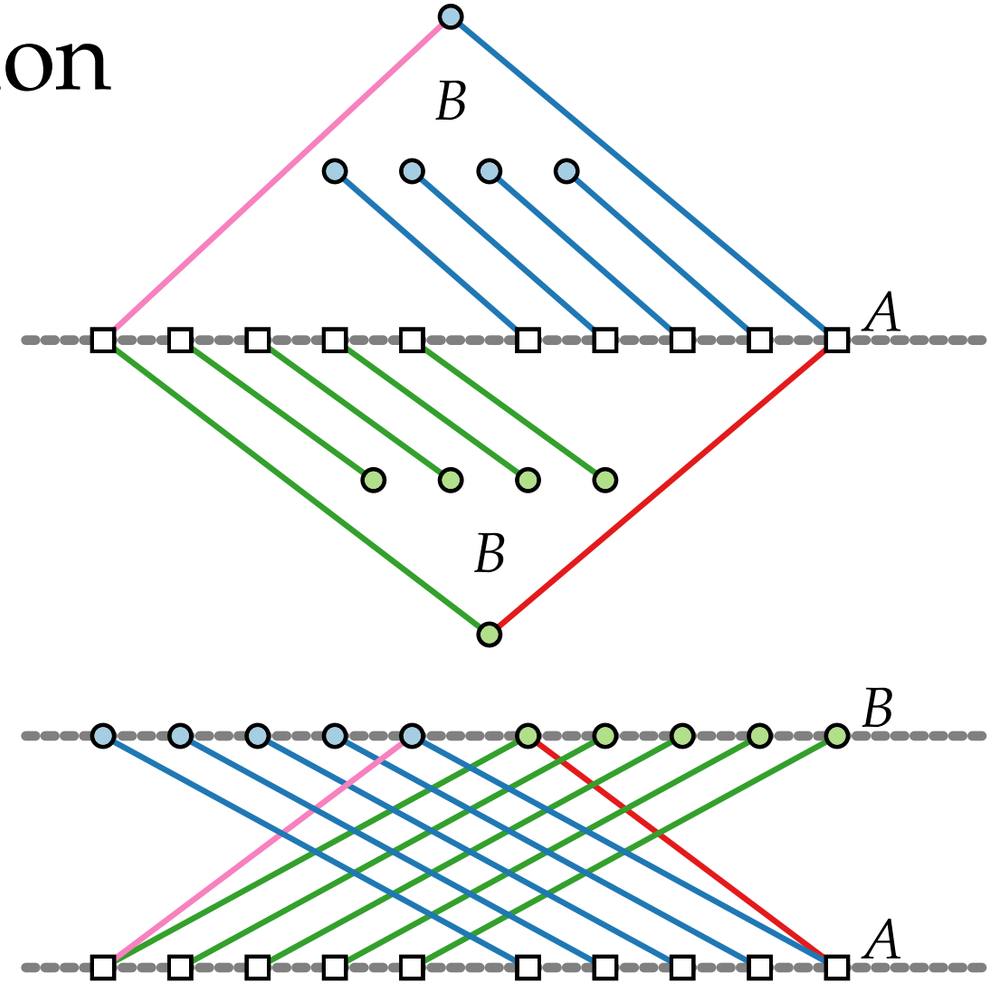

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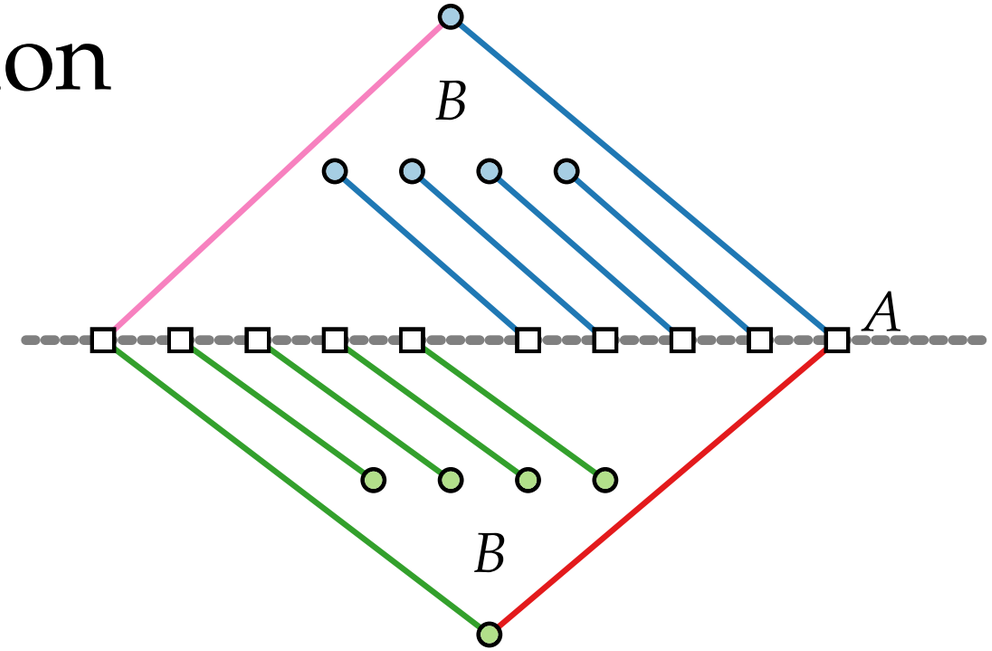

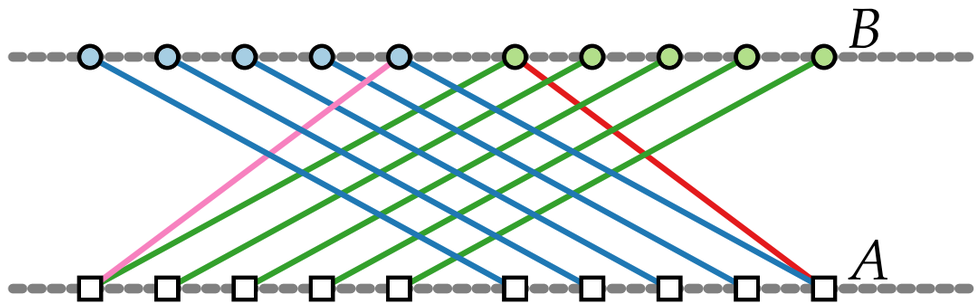

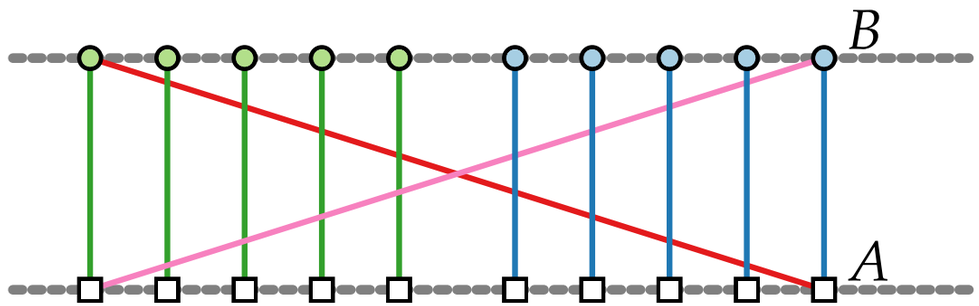

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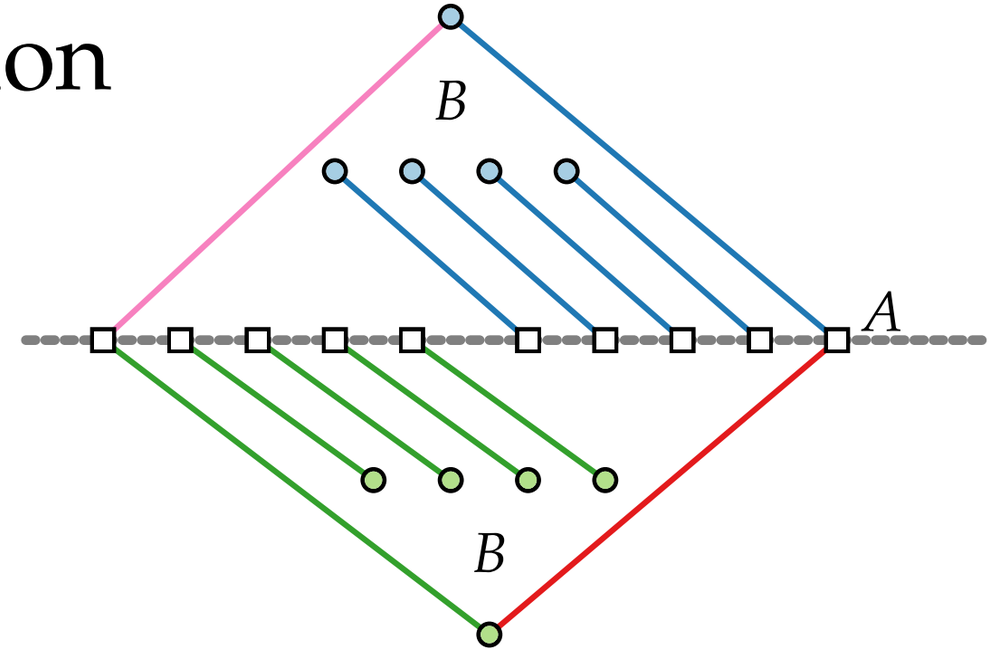

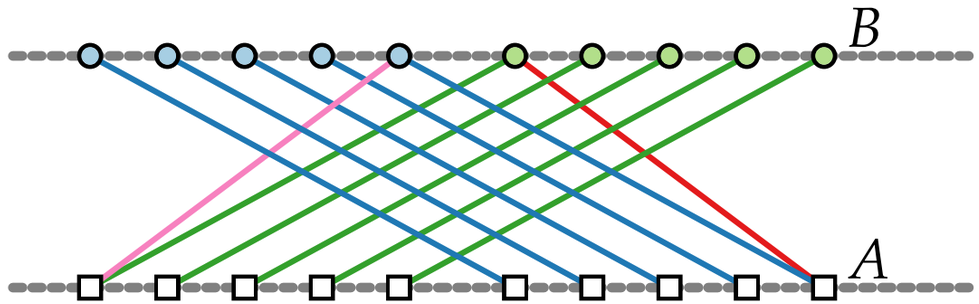

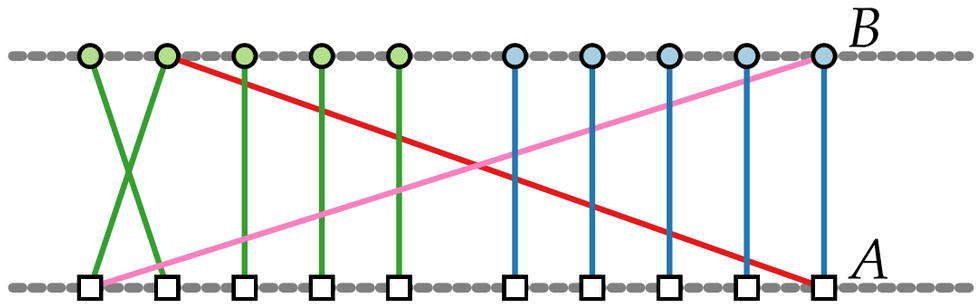

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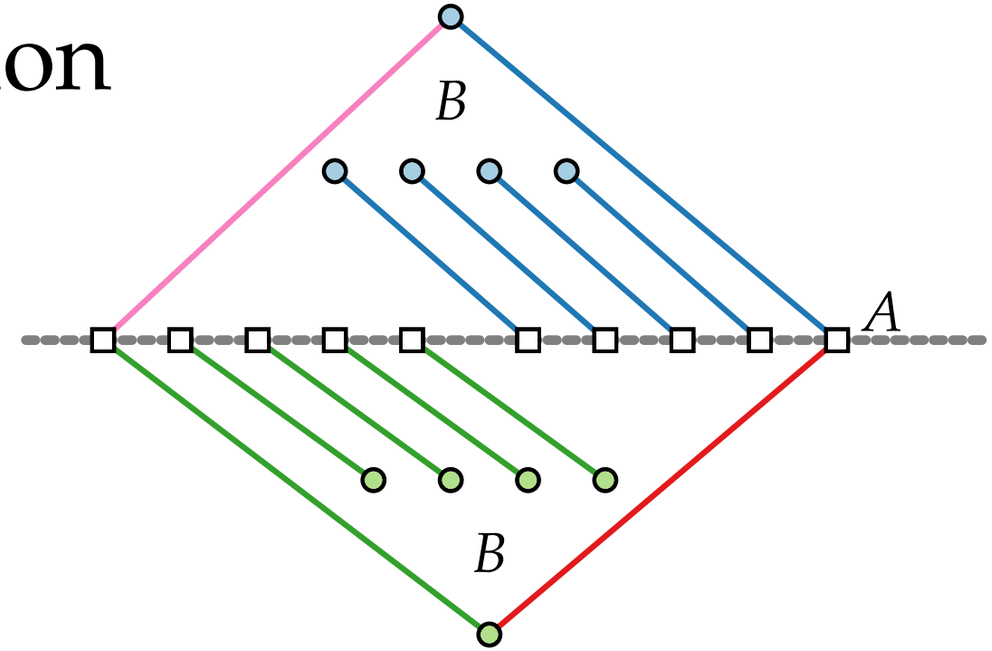

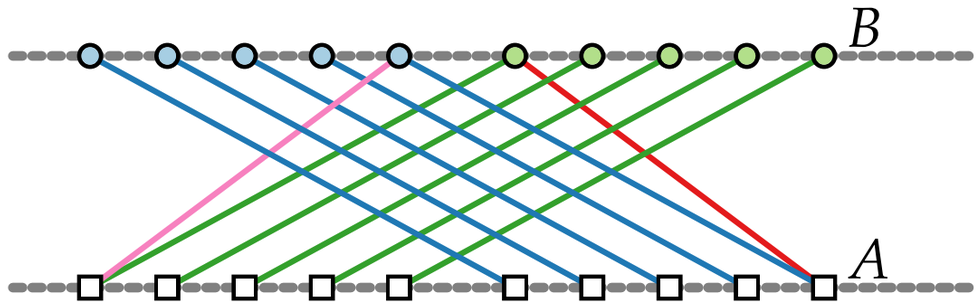

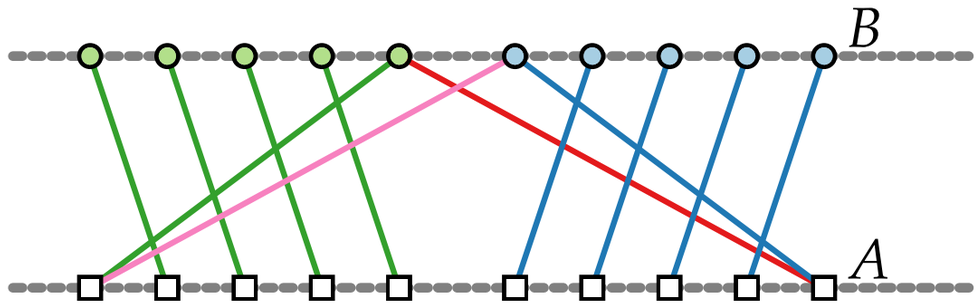

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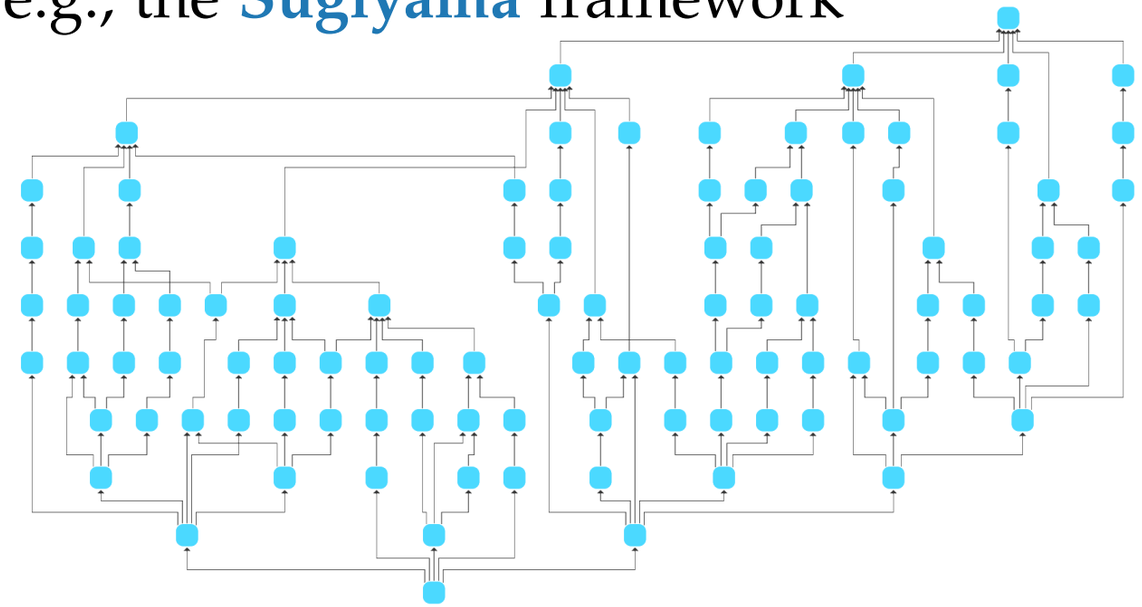
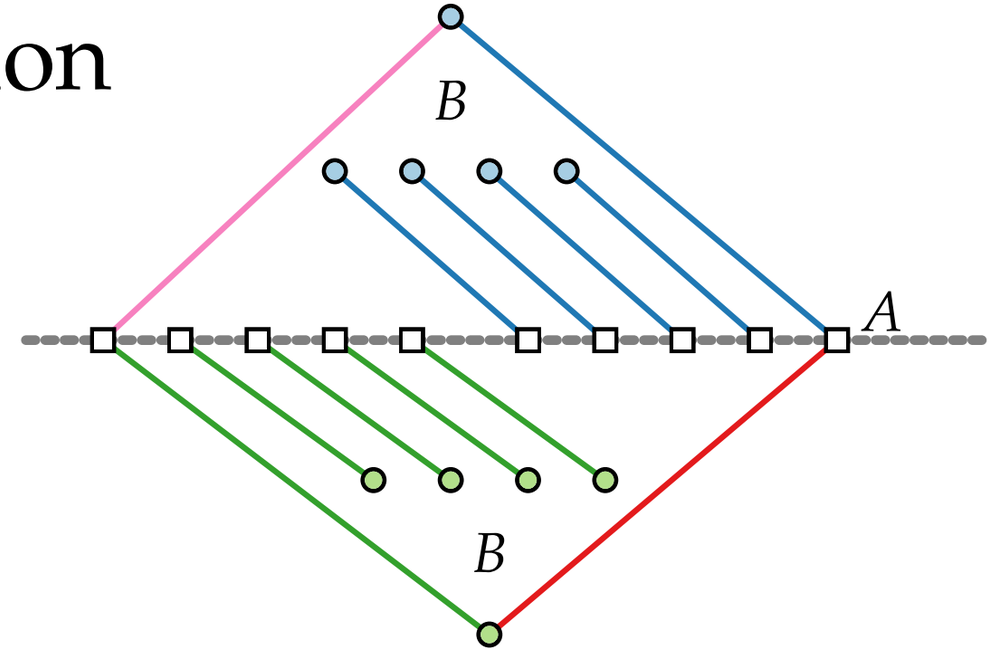
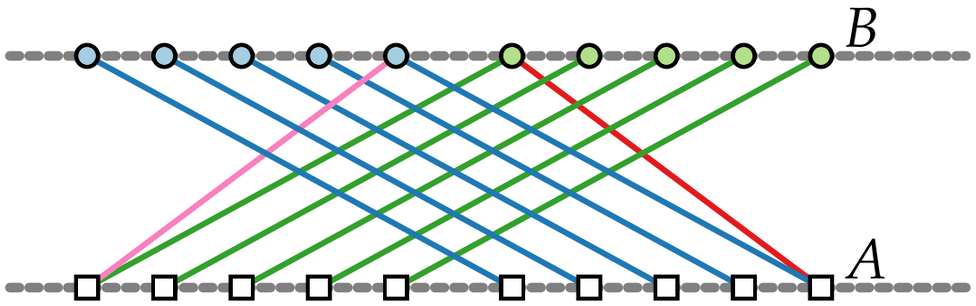
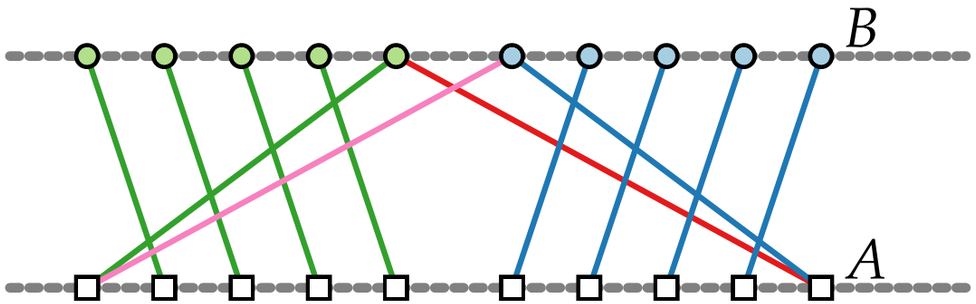
Important classical graph drawing problem; applications in hierarchical graph drawing, e.g., the **Sugiyama** framework









Some Known Results

- NP-hard [Eades & Whitesides '94]
- can be solved optimally via SAT or ILP formulation
- usually only heuristics are used, e.g., in OGDF (Open Graph Drawing Framework)
- can be solved optimally if crossing-free solution exists [Sugiyama et al. '81]
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FPT algorithms (k = #crossings):

- $\mathcal{O}(\varphi^k n^2) \approx \mathcal{O}(1.618^k n^2)$ [Dujmović & Whitesides '04]
- $\mathcal{O}(1.4656^k + kn^2)$ [Dujmović, Fernau & Kaufmann '08]
- $\mathcal{O}(k2^{\sqrt{2k}} + n)$ [Kobayashi & Tamaki '15]

Timeline

September 2023:	Announcement of the Challenge
November 2023:	Definition of the input and output format + tiny test set + verifier + visualizer
December 2023:	Announcement of the ranking methods + autotester
February 2024:	Public instances and details about the benchmark set get published
April 2024:	Submission on `optil.io` opens with public leaderboard
May 20th 2024:	The public leaderboard gets frozen
June 2024:	Submission deadline
June 9th, 2024:	Submission deadline for solver
June 23rd, 2024:	Submission deadline for solver description
July 2024:	Announcement of the results

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- **Prizes**:
  - best 5 submissions + best 5 student submissions per track get a certificate + monetary prize
  - best 3 submissions + best student submission per track invited to publish solver description in proceedigns

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1	Martin_J_Geiger	C#	18,924.87	100.00	1,482.00	16,555.00	346,841.00	20,089.00
2	mppeg	CMake	6,614.69	99.00	1,482.00	16,555.00	346,841.00	20,089.00
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4	Bob	Static binary	5,696.09	97.00	1,482.00	16,555.00	346,841.00	20,089.00
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- Programming Languages: C, C++, C#, Rust, Java, Python, OCaml

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- Compute a linear order $\prec$ of vertices in A
- Both formulations with “lazy” transitivity constraints, two ways to add them:
  - Find cycles in $\prec$
  - Find vertices with same number of predecessors in $\prec$

Data Set

Created generators for several graph classes

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- uniform random (planar)
- cycle
- path
- complete bipartite
- star
- matching
- tree
- lobster
- (double-)caterpillar
- grid
- quadrangulation
- (partial) k-tree
- wheel
- disk intersection
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➡ generated $\approx$ 15,000 graphs

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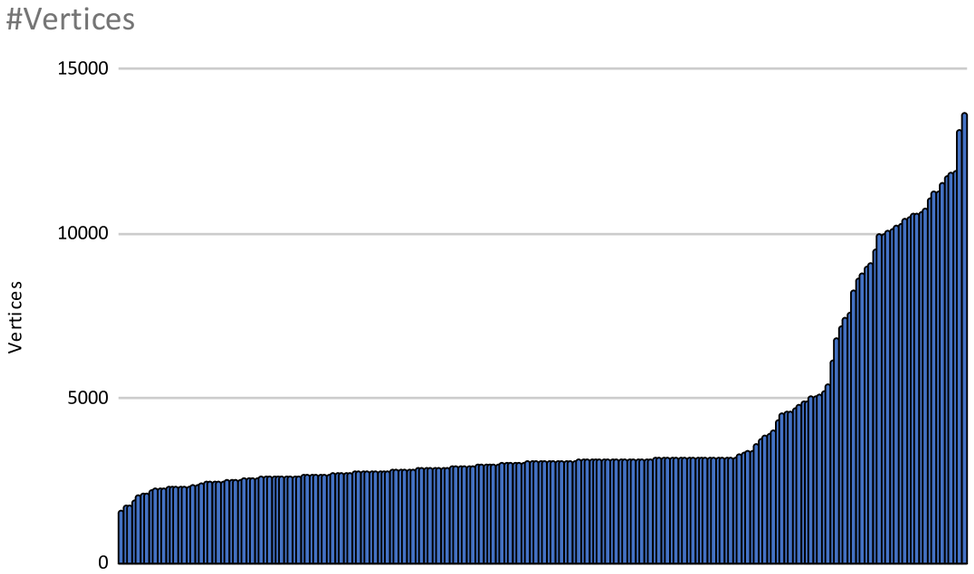
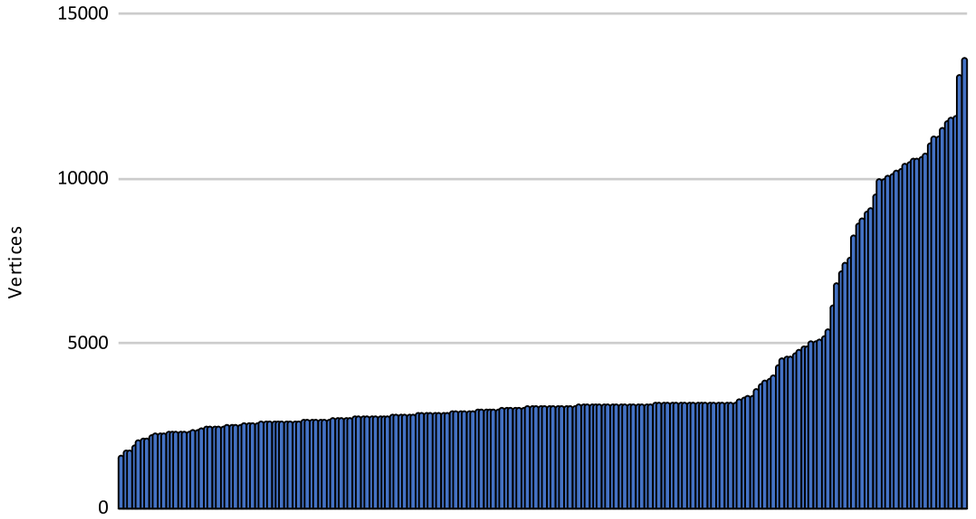
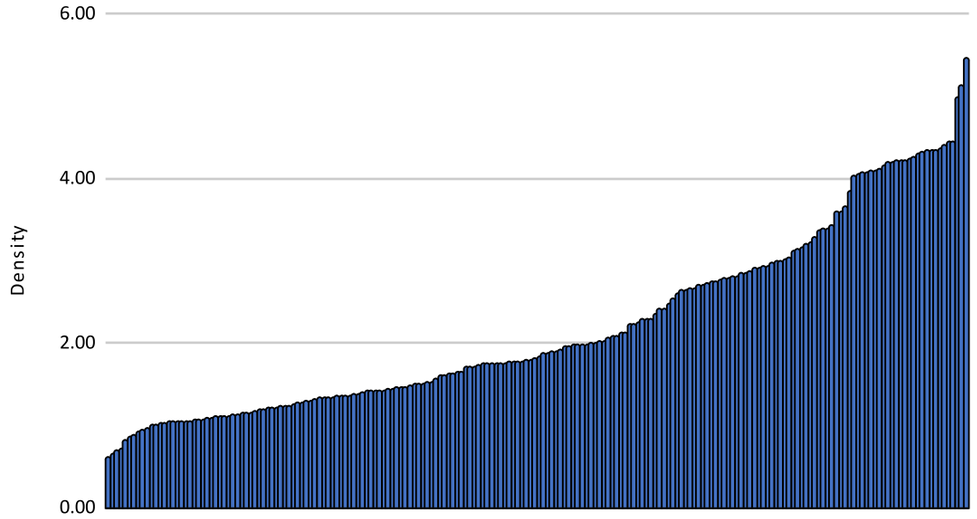


Parameterized Track – Instances

#Vertices

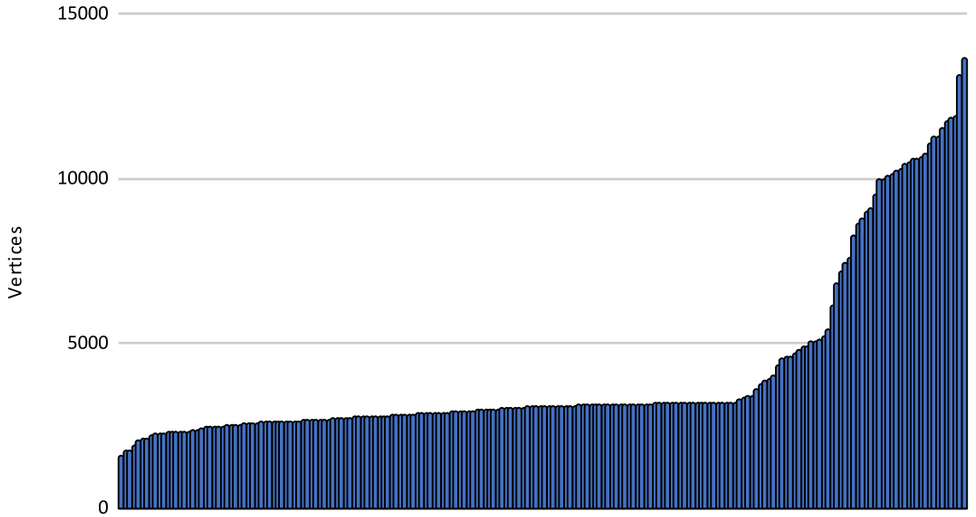


Density

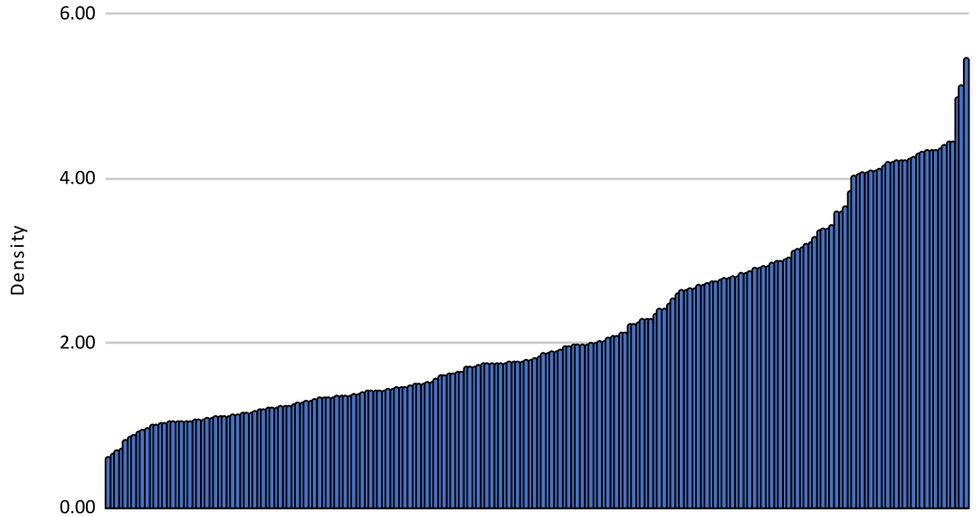


Parameterized Track – Instances

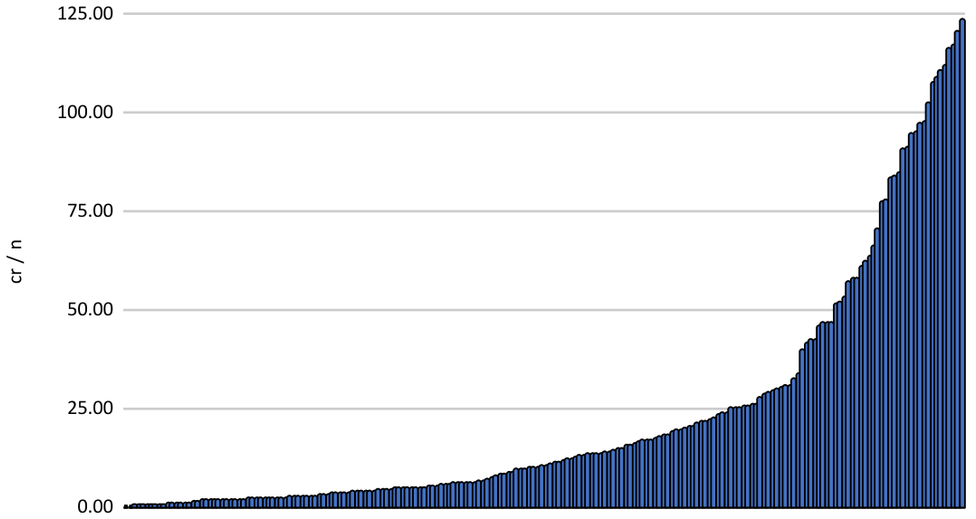
#Vertices



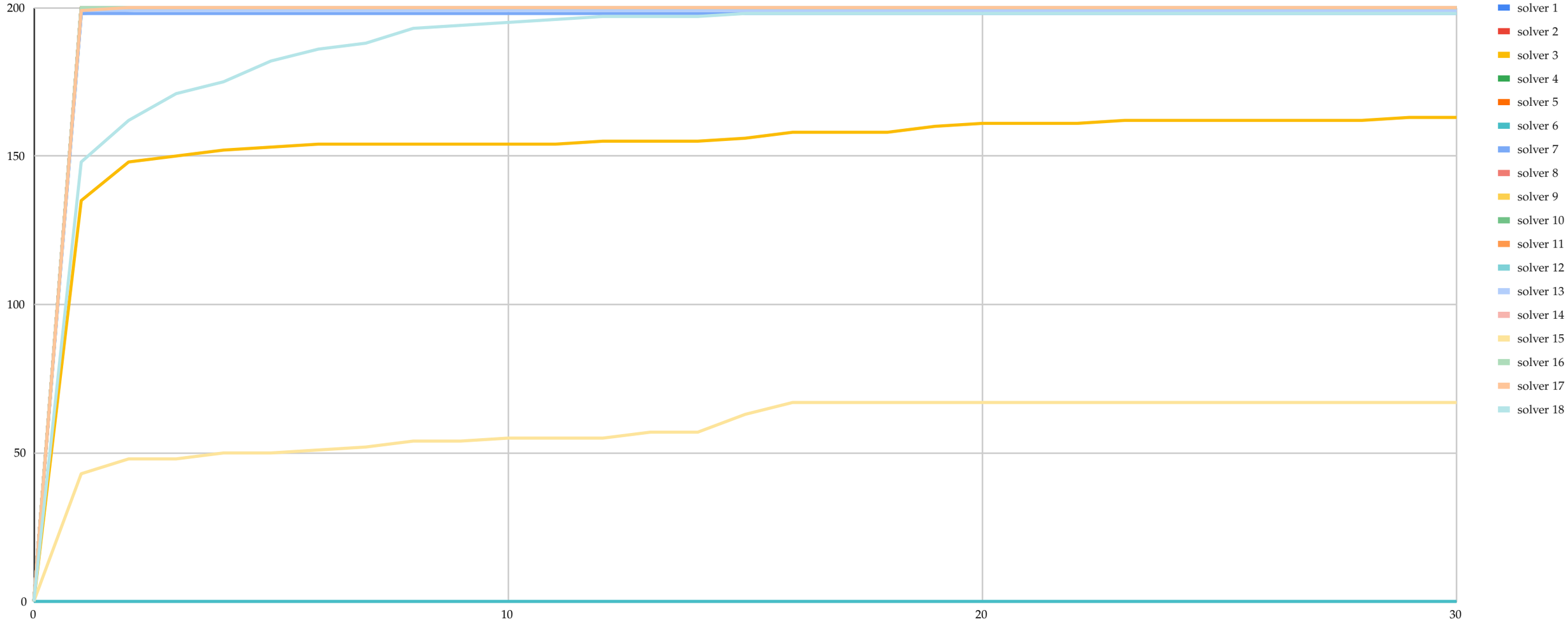
Density



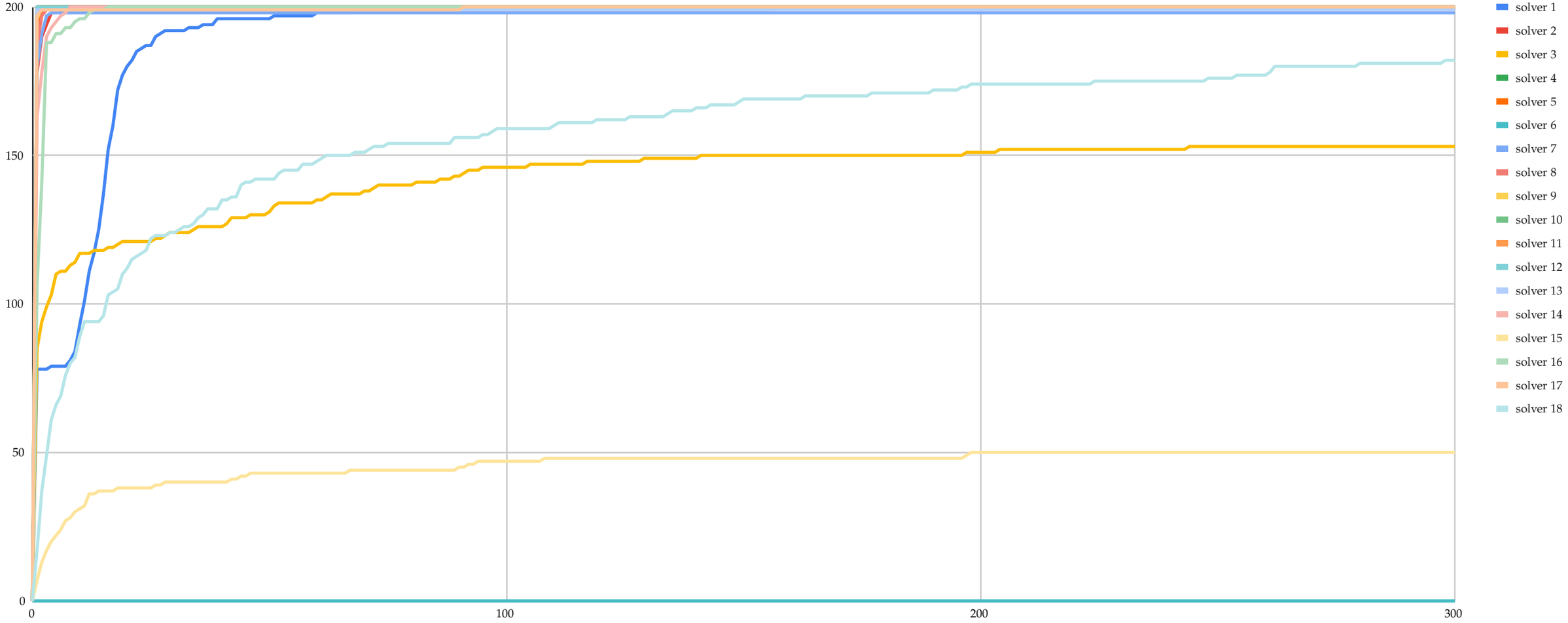
#Crossings / # Vertices



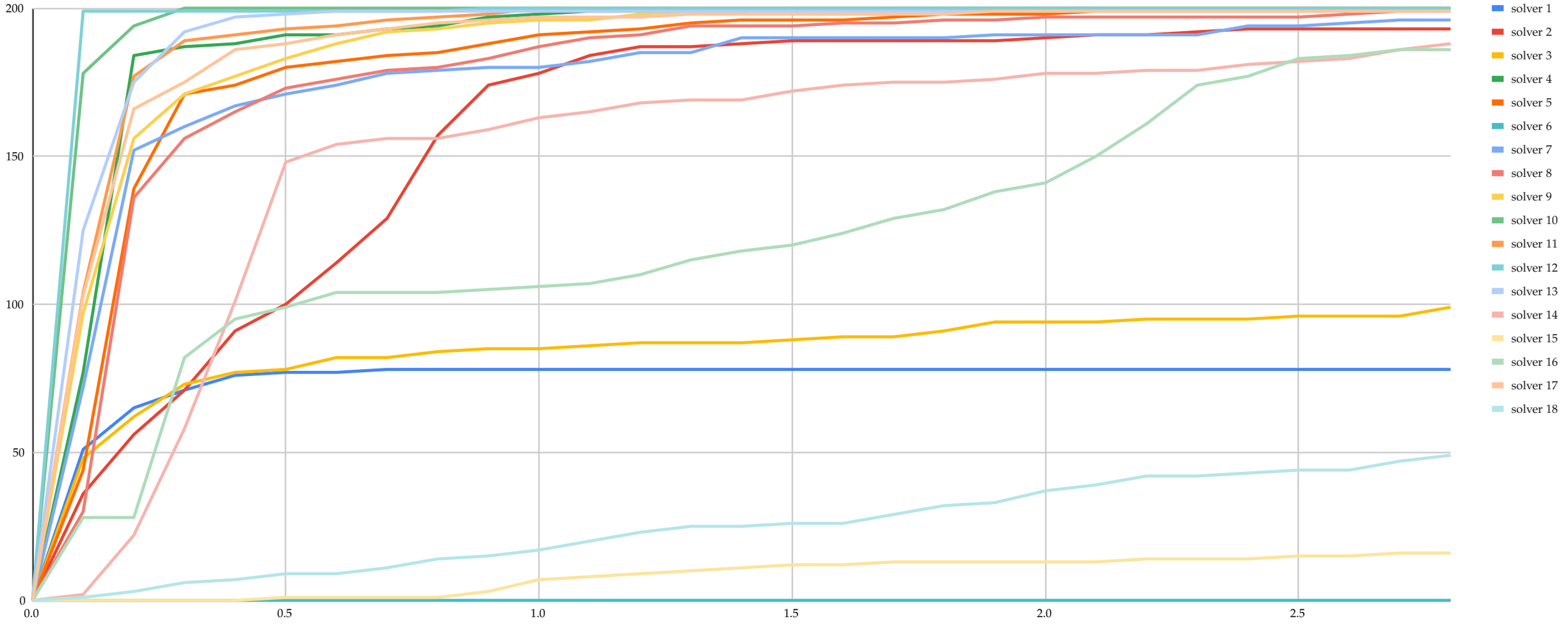
Parameterized Track – #Solutions in x Minutes



Parameterized Track – #Solutions in x Seconds



Parameterized Track – #Solutions in x Seconds



Parameterized Track – Student Ranking

Rank	Team	Member	Score	Time
1				
2				

Parameterized Track – Student Ranking

Rank	Team	Member	Score	Time
1				
2	crossy	Tobias Röhr and Kirill Simonov	200	34.98

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Tobias Röhr and Kirill Simonov

Hasso Plattner Institute, University of Potsdam, Germany

for

Second Place Among Student Teams in the Parameterized Track

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
THENETWORKCENTER.NL

Parameterized Track – Student Ranking

Rank	Team	Member	Score	Time
1	Arcee	Kimon Boehmer, Lukas Lee George, Fanny Hauser and Jesse Palarus	200	28.54
2	crossy	Tobias Röhr and Kirill Simonov	200	34.98

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Kimon Boehmer,
Université Paris-Saclay, France

Lukas Lee George, Fanny Hauser, and Jesse Palarus
Technical University Berlin, Germany

for

First Place Among Student Teams in the Parameterized Track

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
THENETWORKCENTER.NL

Parameterized Track – General Ranking

Rank	Team	Member	Score	Time
1				
1				
3				
4				
5				

Parameterized Track – General Ranking

Rank	Team	Member	Score	Time
1				
1				
3				
4				
5	crossy	Tobias Röhr and Kirill Simonov	200	34.98

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Tobias Röhr and Kirill Simonov

Hasso Plattner Institute, University of Potsdam, Germany

for

Fifth Place in the Parameterized Track

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
THENETWORKCENTER.NL

Parameterized Track – General Ranking

Rank	Team	Member	Score	Time
1				
1				
3				
4	Arcee	Kimon Boehmer, Lukas Lee George, Fanny Hauser and Jesse Palarus	200	28.54
5	crossy	Tobias Röhr and Kirill Simonov	200	34.98

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Kimon Boehmer,
Université Paris-Saclay, France

Lukas Lee George, Fanny Hauser, and Jesse Palarus
Technical University Berlin, Germany

for

Fourth Place in the Parameterized Track

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
THENETWORKCENTER.NL

Parameterized Track – General Ranking

Rank	Team	Member	Score	Time
1				
1				
3	mppeg	Michael Jünger, Paul Jünger, Petra Mutzel and Gerhard Reinelt	200	25.22
4	Arcee	Kimon Boehmer, Lukas Lee George, Fanny Hauser and Jesse Palarus	200	28.54
5	crossy	Tobias Röhr and Kirill Simonov	200	34.98

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Michael Jünger, Paul Jünger, Petra Mutzel, and Gerhard Reinelt

University of Cologne University of Bonn Heidelberg University

for

Third Place in the Parameterized Track

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
THENETWORKCENTER.NL

Parameterized Track – General Ranking

Rank	Team	Member	Score	Time
1				
1	mjdv	Ragnar Groot Koerkamp and Mees de Vries	200	10.37
3	mppeg	Michael Jünger, Paul Jünger, Petra Mutzel and Gerhard Reinelt	200	25.22
4	Arcee	Kimon Boehmer, Lukas Lee George, Fanny Hauser and Jesse Palarus	200	28.54
5	crossy	Tobias Röhr and Kirill Simonov	200	34.98

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Ragnar Groot Koerkamp and **Mees de Vries**

ETH Zurich, Switzerland The Netherlands

for

Second Place in the Parameterized Track

€ 400,-

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
THENETWORKCENTER.NL

Parameterized Track – General Ranking

Rank	Team	Member	Score	Time
1	LUNCH	Kenneth Langedal, Matthias Bentert, Thorgal Blanco and Pål Grønås Drange	200	5.15
1	mjdv	Ragnar Groot Koerkamp and Mees de Vries	200	10.37
3	mppeg	Michael Jünger, Paul Jünger, Petra Mutzel and Gerhard Reinelt	200	25.22
4	Arcee	Kimon Boehmer, Lukas Lee George, Fanny Hauser and Jesse Palarus	200	28.54
5	crossy	Tobias Röhr and Kirill Simonov	200	34.98

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Kenneth Langedal, Matthias Bentert, Thorgal Blanco, Pål Grønås Drange

University of Bergen, Norway

for

First Place in the Parameterized Track

€ 400,-

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

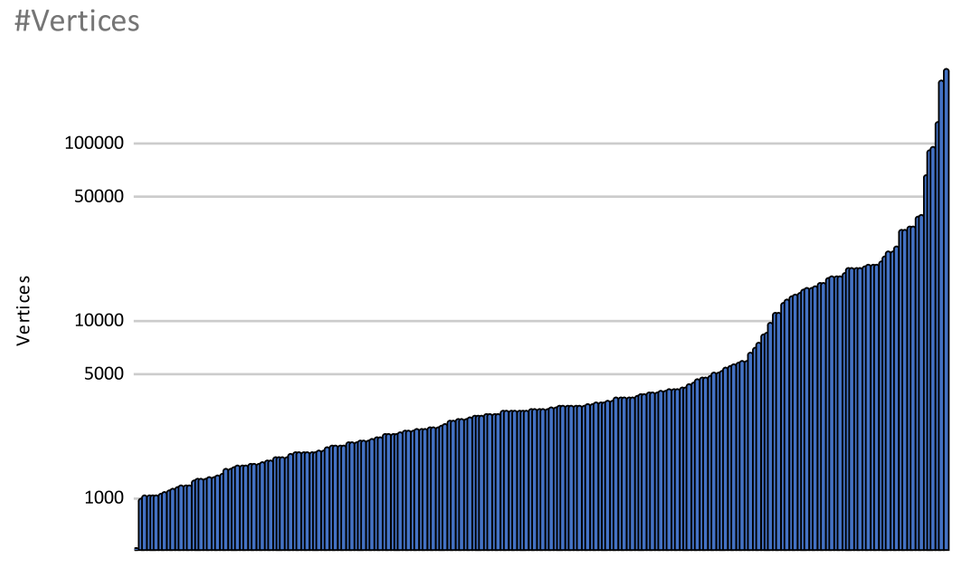
Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
THENETWORKCENTER.NL

Heuristic Track – Instances

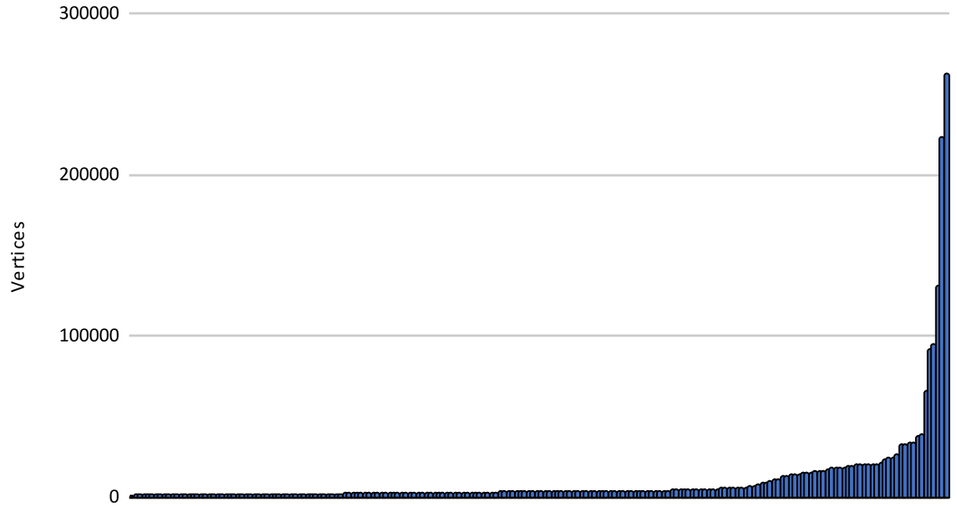
Heuristic Track – Instances

Heuristic Track – Instances

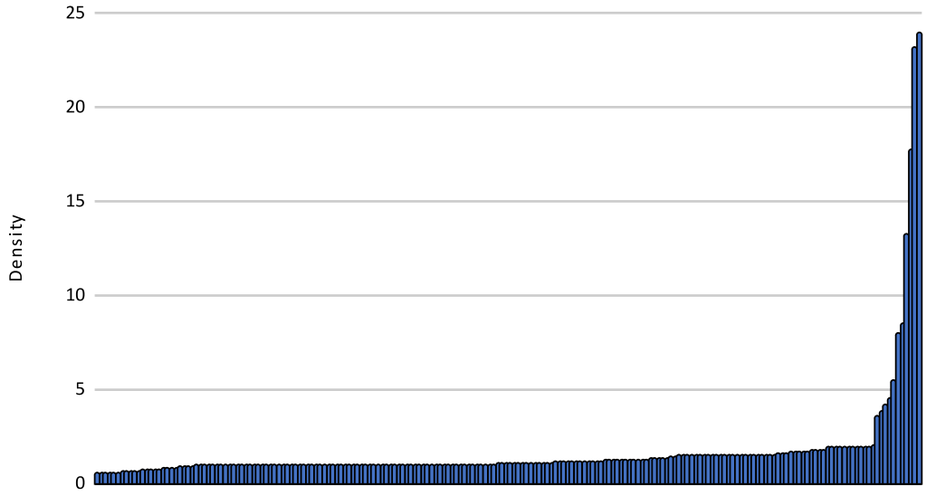


Heuristic Track – Instances

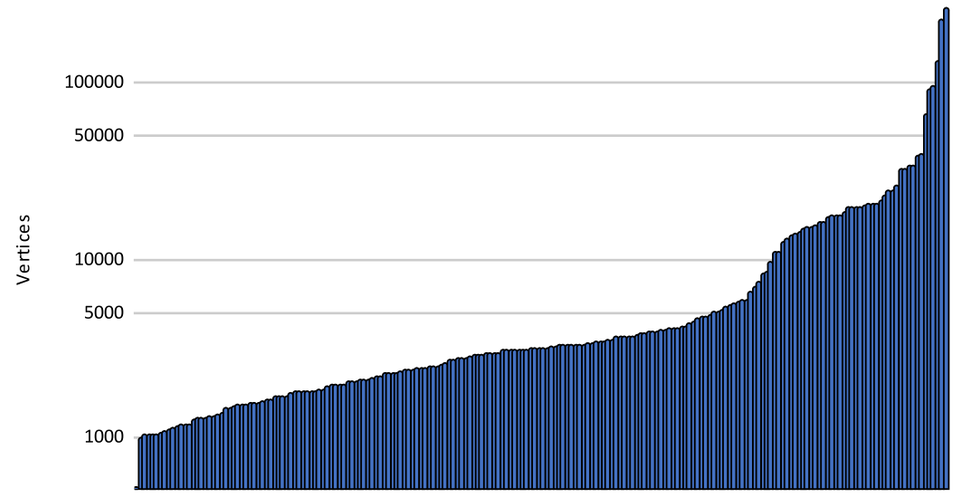
#Vertices



Density



#Vertices



Heuristic Track – Student Ranking

Rank	Team	Member	Score	Time
1				
2				
3				
4				
5				

Heuristic Track – Student Ranking

Rank	Team	Member	Score	Time
1				
2				
3				
4				
5	KongQi	Qi Kong, Zhouxing Su and Zhipeng lü	199.66556	38664.61

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Qi Kong, Zhouxing Su, and Zhipeng Lü

Huazhong University of Science and Technology, Wuhan, China

for

Fifth Place Among Student Teams in the Heuristic Track

€ 50,-

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
THENETWORKCENTER.NL

Heuristic Track – Student Ranking

Rank	Team	Member	Score	Time
1				
2				
3				
4	tlopez	Toan Lopez and Florian Sikora	199.93344	80556.06
5	KongQi	Qi Kong, Zhouxing Su and Zhipeng lü	199.66556	38664.61

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Toan Lopez and Florian Sikora

Université Paris Dauphine, France

for

Fourth Place Among Student Teams in the Heuristic Track

€ 100,-

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
THENETWORKCENTER.NL

Heuristic Track – Student Ranking

Rank	Team	Member	Score	Time
1				
2				
3	axs	Chenghao Zhu, Yi Zhou and Bo Peng	199.99037	59409.74
4	tlopez	Toan Lopez and Florian Sikora	199.93344	80556.06
5	KongQi	Qi Kong, Zhouxing Su and Zhipeng lü	199.66556	38664.61

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Chenghao Zhu,
U. of Electronic Science and Technology of China

Yi Zhou, and Bo Peng
Southwestern U. of Finance and Economics, Chengdu

for

Third Place Among Student Teams in the Heuristic Track

€ 175,-

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
THENETWORKCENTER.NL

Heuristic Track – Student Ranking

Rank	Team	Member	Score	Time
1				
2	UAIC_OCM	Andrei Arhire, Eugen Croitoru, Matei Chiriac and Alex Dumitrescu	199.99735	56047.38
3	axs	Chenghao Zhu, Yi Zhou and Bo Peng	199.99037	59409.74
4	tlopez	Toan Lopez and Florian Sikora	199.93344	80556.06
5	KongQi	Qi Kong, Zhouxing Su and Zhipeng lü	199.66556	38664.61

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Andrei Arhire, Eugen Croitoru, Matei Chiriac, and Alex Dumitrescu

Alexandru Ioan Cuza University of Iași, Romania

for

Second Place Among Student Teams in the Heuristic Track

€ 250,-

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NETWORKS
THENETWORKCENTER.NL

Heuristic Track – Student Ranking

Rank	Team	Member	Score	Time
1	Arcee	Kimon Boehmer, Lukas Lee George, Fanny Hauser and Jesse Palarus	199.9998	38339.44
2	UAIC_OCM	Andrei Arhire, Eugen Croitoru, Matei Chiriac and Alex Dumitrescu	199.99735	56047.38
3	axs	Chenghao Zhu, Yi Zhou and Bo Peng	199.99037	59409.74
4	tlopez	Toan Lopez and Florian Sikora	199.93344	80556.06
5	KongQi	Qi Kong, Zhouxing Su and Zhipeng lü	199.66556	38664.61

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Kimon Boehmer,
Université Paris-Saclay, France

Lukas Lee George, Fanny Hauser, and Jesse Palarus
Technical University Berlin, Germany

for

First Place Among Student Teams in the Heuristic Track

€ 350,-

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
THENETWORKCENTER.NL

Heuristic Track – General Ranking

Rank	Team	Member	Score	Time
1				
2				
3				
4				
5				

Heuristic Track – General Ranking

Rank	Team	Member	Score	Time
1				
2				
3				
4				
5	guilhermefonseca	Guilherme D. da Fonseca	199.99978	26336.25

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Guilherme D. da Fonseca

LIS, Aix-Marseille Université

for

Fifth Place in the Heuristic Track

€ 100,-

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
THENETWORKCENTER.NL

Heuristic Track – General Ranking

Rank	Team	Member	Score	Time
1				
2				
3				
4	Arcee	Kimon Boehmer, Lukas Lee George, Fanny Hauser and Jesse Palarus	199.9998	38339.44
5	guilhermefonseca	Guilherme D. da Fonseca	199.99978	26336.25

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Kimon Boehmer,
Université Paris-Saclay, France

Lukas Lee George, Fanny Hauser, and Jesse Palarus
Technical University Berlin, Germany

for

Fourth Place in the Heuristic Track

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
THENETWORKCENTER.NL

Heuristic Track – General Ranking

Rank	Team	Member	Score	Time
1				
2				
3	Martin_J_Geiger	Martin Josef Geiger	199.99983	41662.87
4	Arcee	Kimon Boehmer, Lukas Lee George, Fanny Hauser and Jesse Palarus	199.9998	38339.44
5	guilhermefonseca	Guilherme D. da Fonseca	199.99978	26336.25

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Martin Josef Geiger

University of the Federal Armed Forces Hamburg, Germany

for

Third Place in the Heuristic Track

€ 200,-

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
THENETWORKCENTER.NL

Heuristic Track – General Ranking

Rank	Team	Member	Score	Time
1				
2	LUNCH	Kenneth Langedal, Matthias Bentert, Thorgal Blanco and Pål Grønås Drange	199.99994	80545.43
3	Martin_J_Geiger	Martin Josef Geiger	199.99983	41662.87
4	Arcee	Kimon Boehmer, Lukas Lee George, Fanny Hauser and Jesse Palarus	199.9998	38339.44
5	guilhermefonseca	Guilherme D. da Fonseca	199.99978	26336.25

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Kenneth Langedal, Matthias Bentert, Thorgal Blanco, Pål Grønås Drange

University of Bergen, Norway

for

Second Place in the Heuristic Track

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
THENETWORKCENTER.NL

Heuristic Track – General Ranking

Rank	Team	Member	Score	Time
1	CIMAT_Team	Carlos Segura, Lázaro Lugo, Gara Miranda and Edison David Serrano Cárdenas	199.99996	59236.67
2	LUNCH	Kenneth Langedal, Matthias Bentert, Thorgal Blanco and Pål Grønås Drange	199.99994	80545.43
3	Martin_J_Geiger	Martin Josef Geiger	199.99983	41662.87
4	Arcee	Kimon Boehmer, Lukas Lee George, Fanny Hauser and Jesse Palarus	199.9998	38339.44
5	guilhermefonseca	Guilherme D. da Fonseca	199.99978	26336.25

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Carlos Segura, Lázaro Lugo, Gara Miranda, and Edison David Serrano Cárdenas

Centro de Investigación en Matemáticas, Mexico & Universidad de La Laguna, Spain

for

First Place in the Heuristic Track

€ 400,-

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
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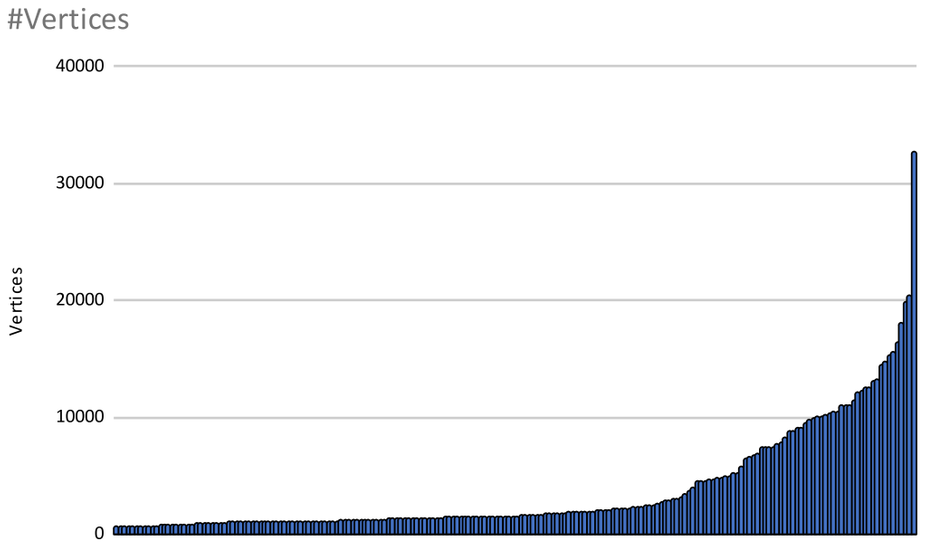
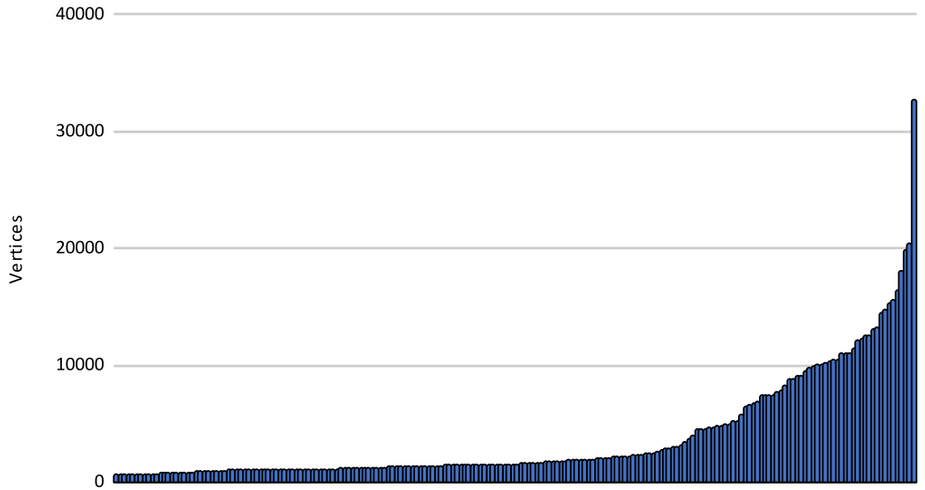
Exact Track – Instances

Exact Track – Instances

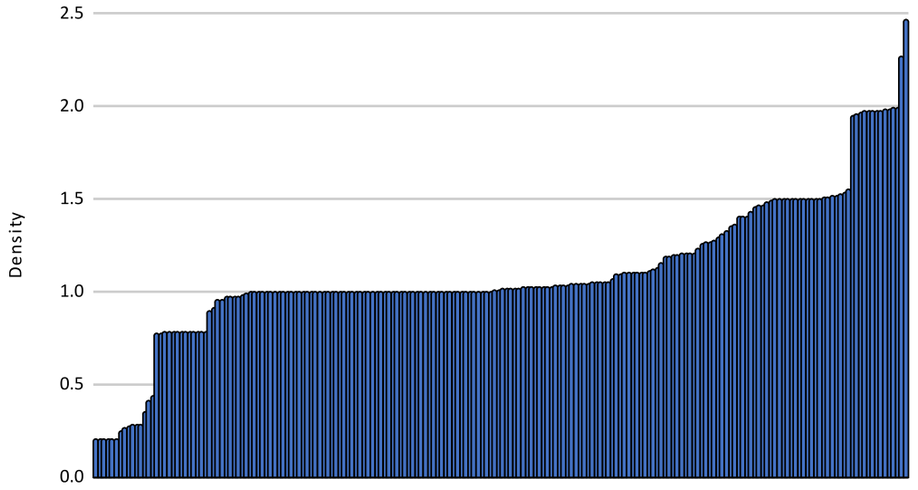


Exact Track – Instances

#Vertices

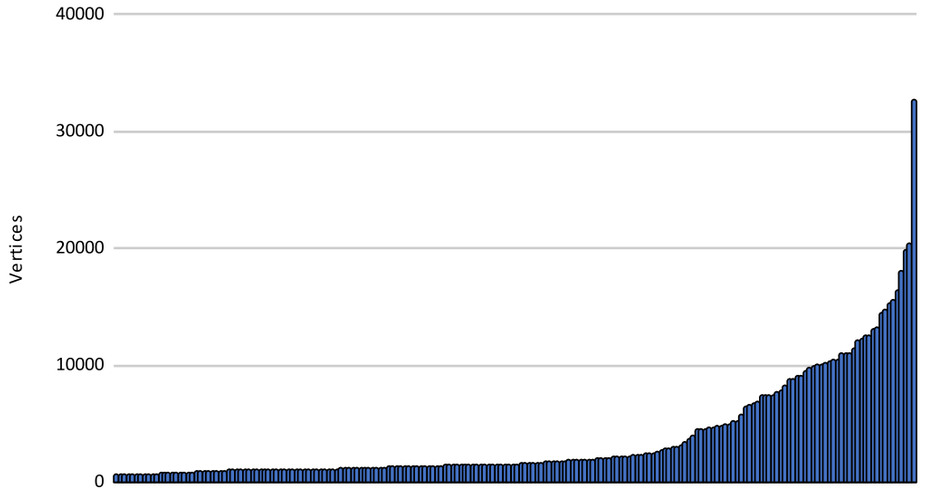


Density

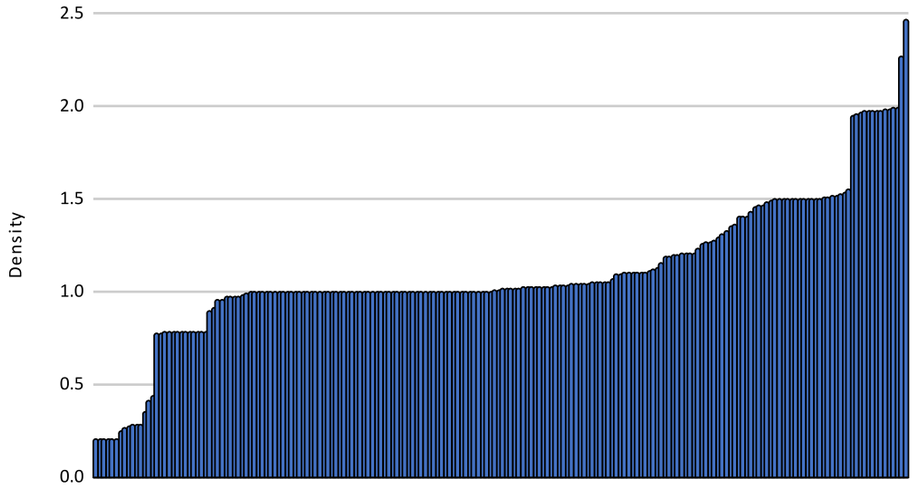


Exact Track – Instances

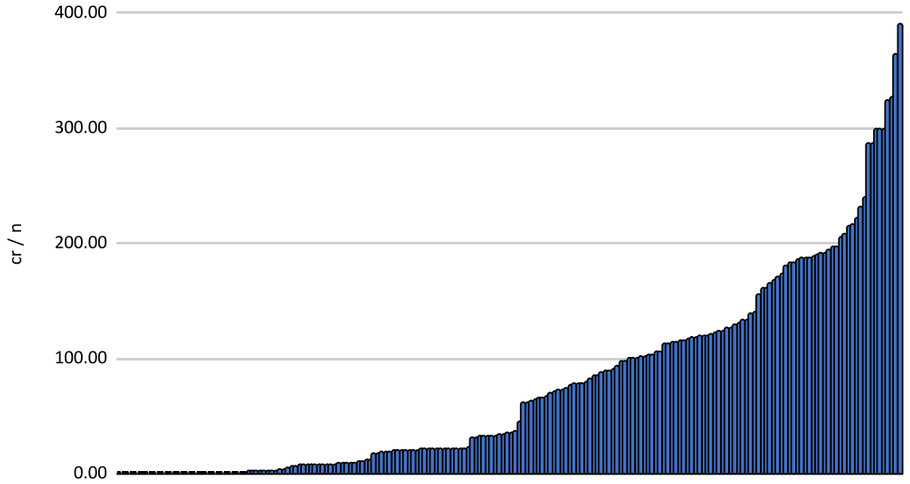
#Vertices



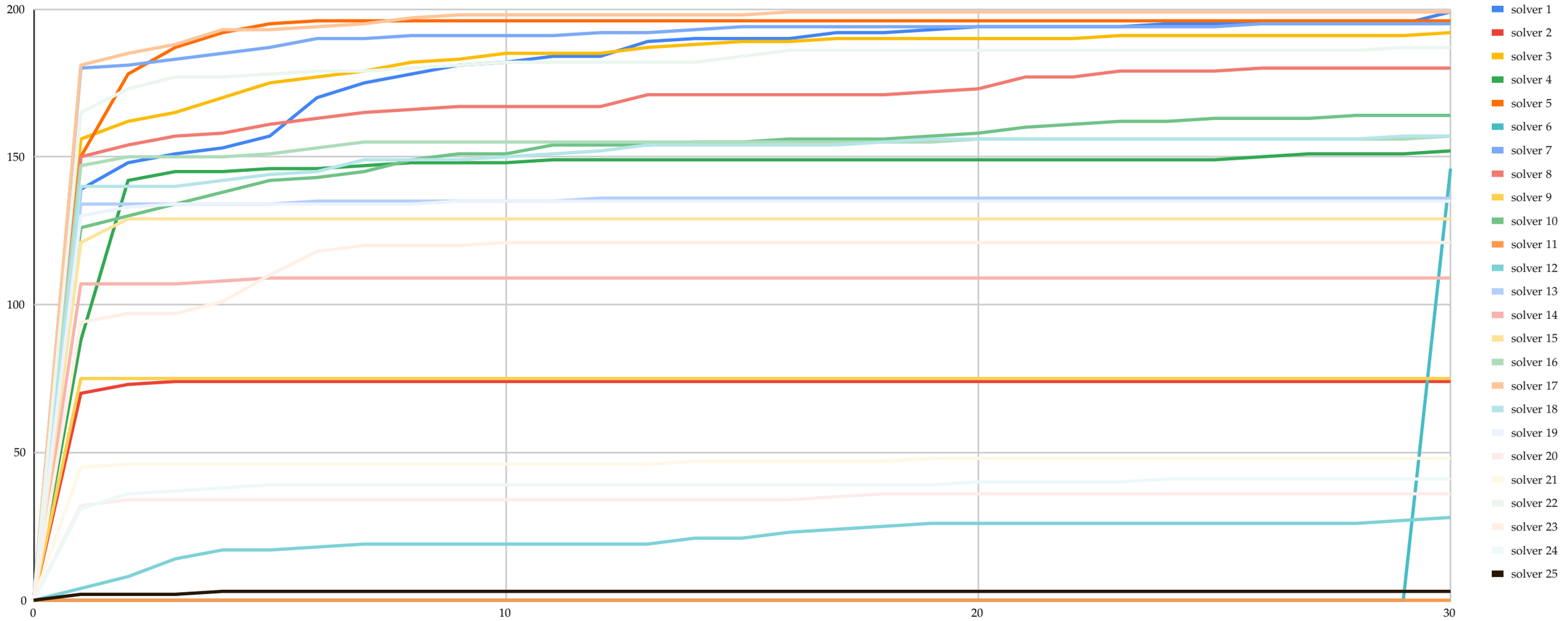
Density



#Crossings / # Vertices



Exact Track – #Solutions in x Minutes



Exact Track – Student Ranking

Rank	Team	Member	Score	Time
1				
2				
3				

Exact Track – Student Ranking

Rank	Team	Member	Score	Time
1				
2				
3	studentgroupfuberlin	Garvin Konopka, Colin Alexander Voigt and Joshua Alexander Hanheiser	192	15520.39

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Garvin Konopka, Colin Alexander Voigt, and Joshua Alexander Hanheiser

Freie Universität Berlin, Germany

for

Third Place Among Student Teams in the Exact Track

€ 175,-

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
THENETWORKCENTER.NL

Exact Track – Student Ranking

Rank	Team	Member	Score	Time
1				
2	Arcee	Kimon Boehmer, Lukas Lee George, Fanny Hauser and Jesse Palarus	152	11189.13
3	studentgroupfuberlin	Garvin Konopka, Colin Alexander Voigt and Joshua Alexander Hanheiser	192	15520.39

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Kimon Boehmer,
Université Paris-Saclay, France

Lukas Lee George, Fanny Hauser, and Jesse Palarus
Technical University Berlin, Germany

for

Second Place Among Student Teams in the Exact Track

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
THENETWORKCENTER.NL

Exact Track – Student Ranking

Rank	Team	Member	Score	Time
1	crossy	Tobias Röhr and Kirill Simonov	180	19099.31
2	Arcee	Kimon Boehmer, Lukas Lee George, Fanny Hauser and Jesse Palarus	152	11189.13
3	studentgroupfuberlin	Garvin Konopka, Colin Alexander Voigt and Joshua Alexander Hanheiser	192	15520.39

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Tobias Röhr and Kirill Simonov

Hasso Plattner Institute, University of Potsdam, Germany

for

First Place Among Student Teams in the Exact Track

€ 350,-

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
THENETWORKCENTER.NL

Exact Track – General Ranking

Rank	Team	Member	Score	Time
1				
2				
3				
4				
5				

Exact Track – General Ranking

Rank	Team	Member	Score	Time
1				
2				
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4				
5	crossy	Tobias Röhr and Kirill Simonov	180	19099.31

9th Parameterized Algorithms and Computational Experiments Challenge

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ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

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Tobias Röhr and Kirill Simonov

Hasso Plattner Institute, University of Potsdam, Germany

for

Fifth Place in the Exact Track

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
THENETWORKCENTER.NL

Exact Track – General Ranking

Rank	Team	Member	Score	Time
1				
2				
3				
4	Guilucand	Andrea Cracco	187	9358.96
5	crossy	Tobias Röhr and Kirill Simonov	180	19099.31

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Andrea Cracco

Universitá degli Studi di Verona, Italy

for

Fourth Place in the Exact Track

€ 150,-

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
THENETWORKCENTER.NL

Exact Track – General Ranking

Rank	Team	Member	Score	Time
1				
2				
3	CRGone	Alexander Dobler	192	15520.39
4	Guilucand	Andrea Cracco	187	9358.96
5	crossy	Tobias Röhr and Kirill Simonov	180	19099.31

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Alexander Dobler

TU Wien, Austria

for

Third Place in the Exact Track

€ 200,-

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
THENETWORKCENTER.NL

Exact Track – General Ranking

Rank	Team	Member	Score	Time
1				
2	uzl	Max Bannach, Florian Chudigiewitsch, Kim-Manuel Klein and Marcel Wienöbst	195	7692.89
3	CRGone	Alexander Dobler	192	15520.39
4	Guilucand	Andrea Cracco	187	9358.96
5	crossy	Tobias Röhr and Kirill Simonov	180	19099.31

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Max Bannach,
European Space Agency

Florian Chudigiewitsch, Kim-Manuel Klein, and Marcel Wienöbst
University of Lübeck, Germany

for

Second Place in the Exact Track

€ 300,-

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
THENETWORKCENTER.NL

Exact Track – General Ranking

Rank	Team	Member	Score	Time
1	mppeg	Michael Jünger, Paul Jünger Petra Mutzel and Gerhard Reinelt	199	5682.93
2	uzl	Max Bannach, Florian Chudigiewitsch, Kim-Manuel Klein and Marcel Wienöbst	195	7692.89
3	CRGone	Alexander Dobler	192	15520.39
4	Guilucand	Andrea Cracco	187	9358.96
5	crossy	Tobias Röhr and Kirill Simonov	180	19099.31

9th Parameterized Algorithms and Computational Experiments Challenge

PACE

Uniting FPT and practice

ALGO/IPEC 2024 September 2 – 6 London, United Kingdom

This is to certify that the 2024 PACE Program Committee recognizes

Michael Jünger, Paul Jünger, Petra Mutzel, and Gerhard Reinelt

University of Cologne University of Bonn Heidelberg University

for

First Place in the Exact Track

€ 400,-

Philipp Kindermann, Universität Trier
2024 PACE Program Committee Chair

Bart M. P. Jansen, TU Eindhoven
PACE Steering Committee Chair

NET WORKS
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Biggest Issues

- Hard to predict how hard instances are and to find *interesting* instances (not too few edges, not too many crossings, common heuristics not optimal).

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- Some instances had multi-edges ➡ had to reevaluate those and change the ranking.
- For two exact submissions, non-optimal instances were found later ➡ disqualified.

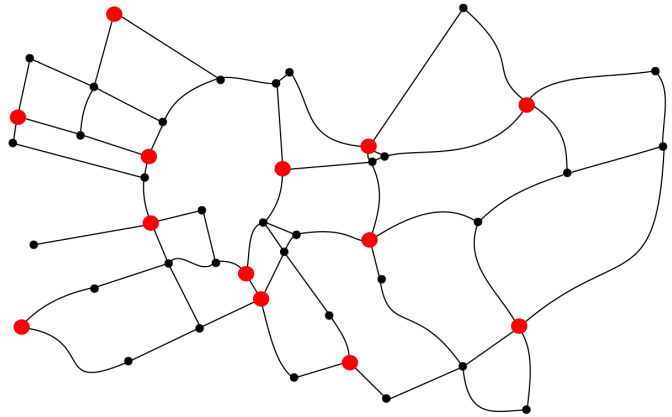
PACE 2025

Organizers: Sebastian Siebertz, Mario Grobler
University of Bremen

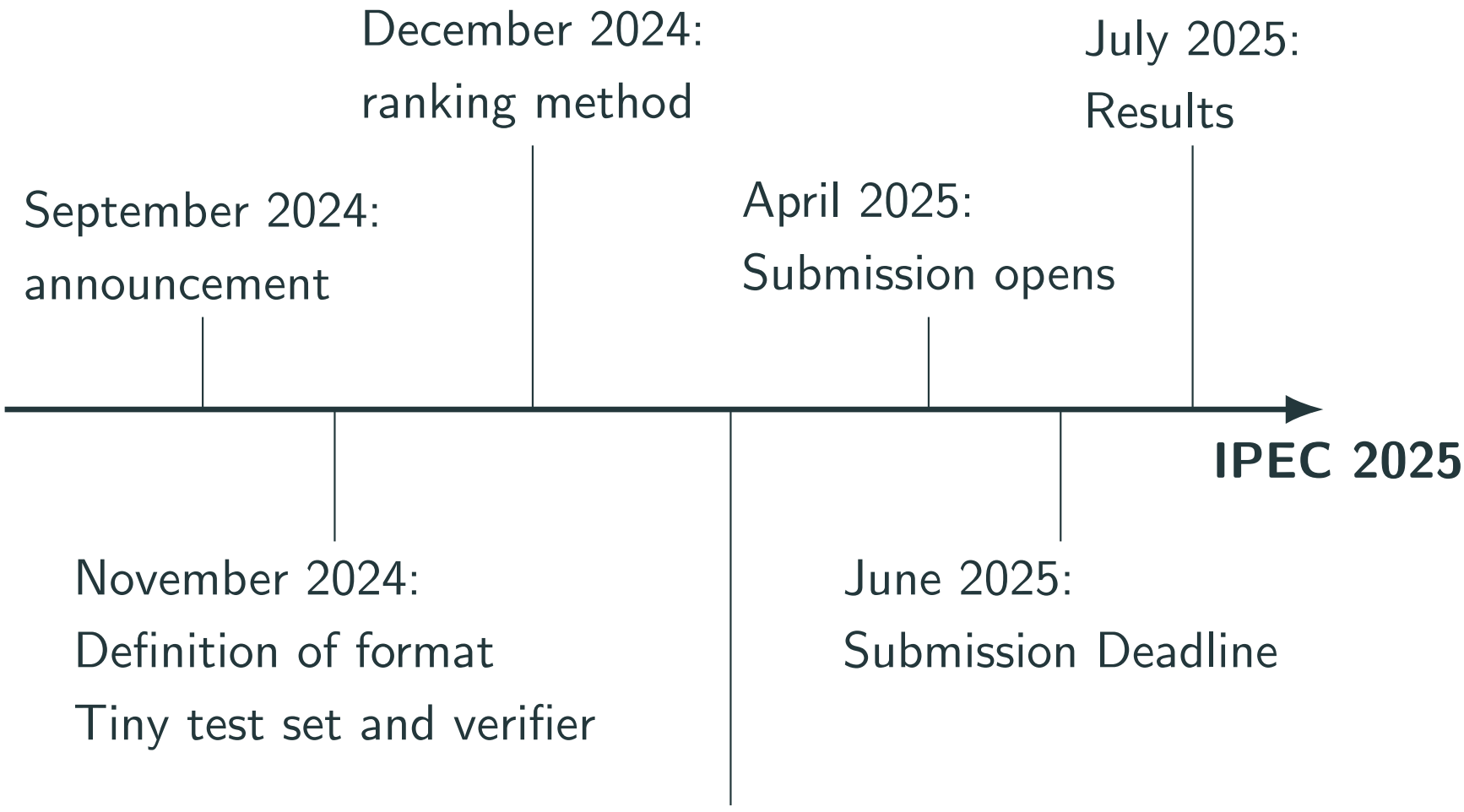
Problems: Dominating Set and Hitting Set

Tracks:

- **Exact Track:** on structurally restricted instances,
  e. g. , planar graphs, small treewidth graphs, . . .
- **Heuristic Track:** on large general instances



Timeline


December 2024:
ranking method
July 2025:
Results
September 2024:
announcement
April 2025:
Submission opens
IPEC 2025
November 2024:
Definition of format
Tiny test set and verifier
June 2025:
Submission Deadline
Early February 2025:
Public instances and details about benchmark set