

# 29th International Symposium on Algorithms and Computation

ISAAC 2018, December 16–19, 2018, Jiaoxi, Yilan, Taiwan

Edited by

Wen-Lian Hsu

Der-Tsai Lee

Chung-Shou Liao



#### *Editors*

Wen-Lian Hsu	Der-Tsai Lee	Chung-Shou Liao
Inst. Information Science	Inst. Information Science	Dept. Industrial Engineering
Academia Sinica, Taiwan	Academia Sinica, Taiwan	National Tsing Hua University, Taiwan
hsu@iis.sinica.edu.tw	dtlee@iis.sinica.edu.tw	csliao@ie.nthu.edu.tw

#### *ACM Classification 2012*

Mathematics of computing, Theory of computation, Theory of computation → Data structures design and analysis, Computing methodologies

### **ISBN 978-3-95977-094-1**

#### *Published online and open access by*

Schloss Dagstuhl – Leibniz-Zentrum für Informatik GmbH, Dagstuhl Publishing, Saarbrücken/Wadern, Germany. Online available at <http://www.dagstuhl.de/dagpub/978-3-95977-094-1>.

#### *Publication date*

December, 2018

#### *Bibliographic information published by the Deutsche Nationalbibliothek*

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at <http://dnb.d-nb.de>.

#### *License*

This work is licensed under a Creative Commons Attribution 3.0 Unported license (CC-BY 3.0): <http://creativecommons.org/licenses/by/3.0/legalcode>.



In brief, this license authorizes each and everybody to share (to copy, distribute and transmit) the work under the following conditions, without impairing or restricting the authors' moral rights:

- Attribution: The work must be attributed to its authors.

The copyright is retained by the corresponding authors.

Digital Object Identifier: 10.4230/LIPIcs.ISAAC.2018.0

ISBN 978-3-95977-094-1

ISSN 1868-8969

<http://www.dagstuhl.de/lipics>

## LIPICs – Leibniz International Proceedings in Informatics

LIPICs is a series of high-quality conference proceedings across all fields in informatics. LIPICs volumes are published according to the principle of Open Access, i.e., they are available online and free of charge.

### *Editorial Board*

- Luca Aceto (*Chair*, Gran Sasso Science Institute and Reykjavik University)
- Susanne Albers (TU München)
- Christel Baier (TU Dresden)
- Javier Esparza (TU München)
- Michael Mitzenmacher (Harvard University)
- Madhavan Mukund (Chennai Mathematical Institute)
- Anca Muscholl (University Bordeaux)
- Catuscia Palamidessi (INRIA)
- Raimund Seidel (Saarland University and Schloss Dagstuhl – Leibniz-Zentrum für Informatik)
- Thomas Schwentick (TU Dortmund)
- Reinhard Wilhelm (Saarland University)

**ISSN 1868-8969**

**<http://www.dagstuhl.de/lipics>**



## ■ Contents

Preface	
<i>Wen-Lian Hsu, Der-Tsai Lee, and Chung-Shou Liao</i> .....	0:xi
Program Committee	
.....	0:xiii
External Reviewers	
.....	0:xv–0:xviii

### Invited Talks

Going Beyond Traditional Characterizations in the Age of Big Data and Network Sciences	
<i>Shang-Hua Teng</i> .....	1:1–1:1
Approximate Matchings in Massive Graphs via Local Structure	
<i>Clifford Stein</i> .....	2:1–2:1

### Regular Papers

Exploiting Sparsity for Bipartite Hamiltonicity	
<i>Andreas Björklund</i> .....	3:1–3:11
Opinion Forming in Erdős–Rényi Random Graph and Expanders	
<i>Ahad N. Zehmakan</i> .....	4:1–4:13
Colouring $(P_r + P_s)$ -Free Graphs	
<i>Tereza Klímová, Josef Malík, Tomáš Masařík, Jana Novotná, Daniël Paulusma, and Veronika Slívová</i> .....	5:1–5:13
The Use of a Pruned Modular Decomposition for Maximum Matching Algorithms on Some Graph Classes	
<i>Guillaume Ducoffe and Alexandru Popa</i> .....	6:1–6:13
A Novel Algorithm for the All-Best-Swap-Edge Problem on Tree Spanners	
<i>Davide Bilò and Kleitos Papadopoulos</i> .....	7:1–7:12
Efficient Enumeration of Dominating Sets for Sparse Graphs	
<i>Kazuhiro Kurita, Kunihiro Wasa, Hiroki Arimura, and Takeaki Uno</i> .....	8:1–8:13
Complexity of Unordered CNF Games	
<i>Md Lutfar Rahman and Thomas Watson</i> .....	9:1–9:12
Half-Duplex Communication Complexity	
<i>Kenneth Hoover, Russell Impagliazzo, Ivan Mihajlin, and Alexander V. Smal</i> .....	10:1–10:12
On the Complexity of Stable Fractional Hypergraph Matching	
<i>Takashi Ishizuka and Naoyuki Kamiyama</i> .....	11:1–11:12
Deciding the Closure of Inconsistent Rooted Triples Is NP-Complete	
<i>Matthew P. Johnson</i> .....	12:1–12:13

29th International Symposium on Algorithms and Computation (ISAAC 2018).

Editors: Wen-Lian Hsu, Der-Tsai Lee, and Chung-Shou Liao

Leibniz International Proceedings in Informatics



Schloss Dagstuhl – Leibniz-Zentrum für Informatik, Dagstuhl Publishing, Germany

Computing Vertex-Disjoint Paths in Large Graphs Using MAOs <i>Johanna E. Preißer and Jens M. Schmidt</i> .....	13:1–13:12
An $O(n^2 \log^2 n)$ Time Algorithm for Minmax Regret Minsum Sink on Path Networks <i>Binay Bhattacharya, Yuya Higashikawa, Tsunehiko Kameda, and Naoki Katoh</i> ...	14:1–14:13
Computing Optimal Shortcuts for Networks <i>Delia Garijo, Alberto Márquez, Natalia Rodríguez, and Rodrigo I. Silveira</i> .....	15:1–15:12
Algorithmic Channel Design <i>Georgia Avarikioti, Yuyi Wang, and Roger Wattenhofer</i> .....	16:1–16:12
Counting Connected Subgraphs with Maximum-Degree-Aware Sieving <i>Andreas Björklund, Thore Husfeldt, Petteri Kaski, and Mikko Koivisto</i> .....	17:1–17:12
Target Set Selection in Dense Graph Classes <i>Pavel Dvořák, Dušan Knop, and Tomáš Toufar</i> .....	18:1–18:13
Counting Shortest Two Disjoint Paths in Cubic Planar Graphs with an NC Algorithm <i>Andreas Björklund and Thore Husfeldt</i> .....	19:1–19:13
Data-Compression for Parametrized Counting Problems on Sparse Graphs <i>Eun Jung Kim, Maria Serna, and Dimitrios M. Thilikos</i> .....	20:1–20:13
Planar Maximum Matching: Towards a Parallel Algorithm <i>Samir Datta, Raghav Kulkarni, Ashish Kumar, and Anish Mukherjee</i> .....	21:1–21:13
Distributed Approximation Algorithms for the Minimum Dominating Set in $K_h$ -Minor-Free Graphs <i>Andrzej Czygrinow, Michał Hanćkowiak, Wojciech Wawrzyniak, and Marcin Witkowski</i> .....	22:1–22:12
Proving the Turing Universality of Oritatami Co-Transcriptional Folding <i>Cody Geary, Pierre-Étienne Meunier, Nicolas Schabanel, and Shinnosuke Seki</i> ...	23:1–23:13
Cluster Editing in Multi-Layer and Temporal Graphs <i>Jiehua Chen, Hendrik Molter, Manuel Sorge, and Ondřej Suchý</i> .....	24:1–24:13
Parameterized Query Complexity of Hitting Set Using Stability of Sunflowers <i>Arijit Bishnu, Arijit Ghosh, Sudeshna Kolay, Gopinath Mishra, and Saket Saurabh</i>	25:1–25:12
Approximate Minimum-Weight Matching with Outliers Under Translation <i>Pankaj K. Agarwal, Haim Kaplan, Geva Kipper, Wolfgang Mulzer, Günter Rote, Micha Sharir, and Allen Xiao</i> .....	26:1–26:13
New and Improved Algorithms for Unordered Tree Inclusion <i>Tatsuya Akutsu, Jesper Jansson, Ruiming Li, Atsuhiko Takasu, and Takeyuki Tamura</i> .....	27:1–27:12
Beyond-Planarity: Turán-Type Results for Non-Planar Bipartite Graphs <i>Patrizio Angelini, Michael A. Bekos, Michael Kaufmann, Maximilian Pfister, and Torsten Ueckerdt</i> .....	28:1–28:13
A Dichotomy Result for Cyclic-Order Traversing Games <i>Yen-Ting Chen, Meng-Tsung Tsai, and Shi-Chun Tsai</i> .....	29:1–29:13

The $b$ -Matching Problem in Distance-Hereditary Graphs and Beyond <i>Guillaume Ducoffe and Alexandru Popa</i> .....	30:1–30:13
New Algorithms for Edge Induced König-Egerváry Subgraph Based on Gallai-Edmonds Decomposition <i>Qilong Feng, Guanlan Tan, Senmin Zhu, Bin Fu, and Jianxin Wang</i> .....	31:1–31:12
Computing Approximate Statistical Discrepancy <i>Michael Matheny and Jeff M. Phillips</i> .....	32:1–32:13
Diversity Maximization in Doubling Metrics <i>Alfonso Cevallos, Friedrich Eisenbrand, and Sarah Morell</i> .....	33:1–33:12
On Polynomial Time Constructions of Minimum Height Decision Tree <i>Nader H. Bshouty and Waseem Makhoul</i> .....	34:1–34:12
Improved Algorithms for the Shortest Vector Problem and the Closest Vector Problem in the Infinity Norm <i>Divesh Aggarwal and Priyanka Mukhopadhyay</i> .....	35:1–35:13
An Adaptive Version of Brandes’ Algorithm for Betweenness Centrality <i>Matthias Bentert, Alexander Dittmann, Leon Kellerhals, André Nichterlein, and Rolf Niedermeier</i> .....	36:1–36:13
Algorithms for Coloring Reconfiguration Under Recolorability Constraints <i>Hiroki Osawa, Akira Suzuki, Takehiro Ito, and Xiao Zhou</i> .....	37:1–37:13
A Cut Tree Representation for Pendant Pairs <i>On-Hei S. Lo and Jens M. Schmidt</i> .....	38:1–38:9
Polyline Drawings with Topological Constraints <i>Emilio Di Giacomo, Peter Eades, Giuseppe Liotta, Henk Meijer, and Fabrizio Montecchiani</i> .....	39:1–39:13
Almost Optimal Algorithms for Diameter-Optimally Augmenting Trees <i>Davide Bilò</i> .....	40:1–40:13
Approximation Algorithms for Facial Cycles in Planar Embeddings <i>Giordano Da Lozzo and Ignaz Rutter</i> .....	41:1–41:13
An Algorithm for the Maximum Weight Strongly Stable Matching Problem <i>Adam Kunysz</i> .....	42:1–42:13
Approximation Algorithm for Vertex Cover with Multiple Covering Constraints <i>Eunpyeong Hong and Mong-Jen Kao</i> .....	43:1–43:11
Correlation Clustering Generalized <i>David F. Gleich, Nate Veldt, and Anthony Wirth</i> .....	44:1–44:13
Partitioning Vectors into Quadruples: Worst-Case Analysis of a Matching-Based Algorithm <i>Annette M. C. Ficker, Thomas Erlebach, Matúš Mihalák, and Frits C. R. Spiessma</i>	45:1–45:12
Coresets for Fuzzy $K$ -Means with Applications <i>Johannes Blömer, Sascha Brauer, and Kathrin Bujna</i> .....	46:1–46:12

Streaming Algorithms for Planar Convex Hulls <i>Martín Farach-Colton, Meng Li, and Meng-Tsung Tsai</i> .....	47:1–47:13
Deterministic Treasure Hunt in the Plane with Angular Hints <i>Sébastien Bouchard, Yoann Dieudonné, Andrzej Pelc, and Franck Petit</i> .....	48:1–48:13
Competitive Searching for a Line on a Line Arrangement <i>Quirijn Bouts, Thom Castermans, Arthur van Goethem, Marc van Kreveld, and Wouter Meulemans</i> .....	49:1–49:12
Stabbing Pairwise Intersecting Disks by Five Points <i>Sariel Har-Peled, Haim Kaplan, Wolfgang Mulzer, Liam Roditty, Paul Seiferth, Micha Sharir, and Max Willert</i> .....	50:1–50:12
Point Location in Incremental Planar Subdivisions <i>Eunjin Oh</i> .....	51:1–51:12
Convex Partial Transversals of Planar Regions <i>Vahideh Keikha, Mees van de Kerkhof, Marc van Kreveld, Irina Kostitsyna, Maarten Löffler, Frank Staals, Jérôme Urhausen, Jordi L. Vermeulen, and Lionov Wiratma</i> .....	52:1–52:12
Extending the Centerpoint Theorem to Multiple Points <i>Alexander Pilz and Patrick Schnider</i> .....	53:1–53:13
Approximate Query Processing over Static Sets and Sliding Windows <i>Ran Ben Basat, Seungbum Jo, Srinivasa Rao Satti, and Shubham Ugare</i> .....	54:1–54:12
Multi-Finger Binary Search Trees <i>Parinya Chalermsook, Mayank Goswami, László Kozma, Kurt Mehlhorn, and Thatchaphol Saranurak</i> .....	55:1–55:26
On Counting Oracles for Path Problems <i>Ivona Bezáková and Andrew Searns</i> .....	56:1–56:12
Reconstructing Phylogenetic Tree From Multipartite Quartet System <i>Hiroshi Hirai and Yuni Iwamasa</i> .....	57:1–57:13
Rectilinear Link Diameter and Radius in a Rectilinear Polygonal Domain <i>Elena Arseneva, Man-Kwun Chiu, Matias Korman, Aleksandar Markovic, Yoshio Okamoto, Aurélien Ooms, André van Renssen, and Marcel Roeloffzen</i> .....	58:1–58:13
Minimizing Distance-to-Sight in Polygonal Domains <i>Eunjin Oh</i> .....	59:1–59:12
Partially Walking a Polygon <i>Franz Aurenhammer, Michael Steinkogler, and Rolf Klein</i> .....	60:1–60:9
Stabbing Rectangles by Line Segments – How Decomposition Reduces the Shallow-Cell Complexity <i>Timothy M. Chan, Thomas C. van Dijk, Krzysztof Fleszar, Joachim Spoerhase, and Alexander Wolff</i> .....	61:1–61:13
Impatient Online Matching <i>Xingwu Liu, Zhida Pan, Yuyi Wang, and Roger Wattenhofer</i> .....	62:1–62:12



Extensions of Self-Improving Sorters <i>Siu-Wing Cheng and Lie Yan</i> .....	63:1–63:12
Online Scheduling of Car-Sharing Requests Between Two Locations with Many Cars and Flexible Advance Bookings <i>Kelin Luo, Thomas Erlebach, and Yinfeng Xu</i> .....	64:1–64:13
Packing Returning Secretaries <i>Martin Hoefer and Lisa Wilhelmi</i> .....	65:1–65:12
Simple $2^f$ -Color Choice Dictionaries <i>Frank Kammer and Andrej Sajenko</i> .....	66:1–66:12
Succinct Data Structures for Chordal Graphs <i>J. Ian Munro and Kaiyu Wu</i> .....	67:1–67:12
Tree Path Majority Data Structures <i>Travis Gagie, Meng He, and Gonzalo Navarro</i> .....	68:1–68:12
Encoding Two-Dimensional Range Top- $k$ Queries Revisited <i>Seunghun Jo and Srinivasa Rao Satti</i> .....	69:1–69:13
Longest Unbordered Factor in Quasilinear Time <i>Tomasz Kociumaka, Ritu Kundu, Manal Mohamed, and Solon P. Pissis</i> .....	70:1–70:13
Packing Sporadic Real-Time Tasks on Identical Multiprocessor Systems <i>Jian-Jia Chen, Nikhil Bansal, Samarjit Chakraborty, and Georg von der Brüggen</i>	71:1–71:14
A Relaxed FPTAS for Chance-Constrained Knapsack <i>Galia Shabtai, Danny Raz, and Yuval Shavitt</i> .....	72:1–72:12
Covering Clients with Types and Budgets <i>Dimitris Fotakis, Laurent Gourvès, Claire Mathieu, and Abhinav Srivastav</i> .....	73:1–73:12



## ■ Preface

This volume contains the proceedings of the 29th International Symposium on Algorithms and Computation (ISAAC 2018), held in Jiaoxi, Yilan, Taiwan, December 16–19, 2018. ISAAC is an annual international symposium that covers the very wide range of topics in the field of algorithms and computation. The main purpose of the symposium is to provide a forum for researchers working in algorithms and theory of computation from all over the world.

In response to our call for papers, we received 195 submissions from 37 countries. Each submission was reviewed by at least three Program Committee members, possibly with the assistance of external reviewers. After an extremely rigorous review process and extensive discussion, the Program Committee selected 71 papers. The best paper award was given to “Exploiting Sparseness for Bipartite Hamiltonicity” by Andreas Björklund. Selected from submissions authored by students only, the best student paper award was given to “Opinion Forming in Erdős-Rényi Random Graph and Expanders” by Ahad N. Zehmakan.

In addition to selected papers, the program also included plenary talks by two prominent invited speakers, Shang-Hua Teng, University of Southern California, USA and Clifford Stein, Columbia University, USA.

We thank all the Program Committee members and external reviewers for their professional service and volunteering their time to review the submissions under time constraints. We also thank all authors who submitted papers for consideration, thereby contributing to the high quality of the conference. We would like also to acknowledge our supporting organizations for their assistance and support, in particular Ministry of Science and Technology, Taiwan, National Tsing Hua University, Academia Sinica, Taiwan, and Association for Algorithms and Computation Theory. Finally, we are deeply indebted to the Organizing Committee Co-Chairs, Ho-Lin Chen and Wing-Kai Hon, whose excellent effort and professional service to the community made the conference an unparalleled success.

December, 2018

Wen-Lian Hsu, Der-Tsai Lee and Chung-Shou Liao





## ■ Program Committee

Sang Won Bae (Kyonggi University, Korea)  
Mark Bun (Princeton University, USA)  
Hubert Chan (The University of Hong Kong, Hong Kong)  
Danny Chen (University of Notre Dame, USA)  
Ho-Lin Chen (National Taiwan University, Taiwan)  
Kai-Min Chung (Academia Sinica, Taiwan)  
Leah Epstein (University of Haifa, Israel)  
MohammadTaghi Hajiaghayi (University of Maryland, USA)  
Wing-Kai Hon (National Tsing Hua University, Taiwan)  
Seok-Hee Hong (University of Sydney, Australia)  
Sun-Yuan Hsieh (National Cheng Kung University, Taiwan)  
Wen-Lian Hsu (Academia Sinica, Taiwan, Co-Chair)  
Zhiyi Huang (The University of Hong Kong, Hong Kong)  
Giuseppe F. Italiano (University of Rome Tor Vergata, Italy)  
Naonori Kakimura (Keio University, Japan)  
Ralf Klasing (Universite de Bordeaux, France)  
Dieter Kratsch (University of Lorraine - Metz, France)  
Minming Li (City University of Hong Kong, Hong Kong)  
Yi Li (Nanyang Technological University, Singapore)  
Chung-Shou Liao (National Tsing Hua University, Taiwan, Co-Chair)  
Pinyan Lu (Shanghai University of Finance and Economics, China)  
Kazuhisa Makino (Kyoto University, Japan)  
Petra Mutzel (Technical University of Dortmund, Germany)  
Jesper Nederlof (Technische Universiteit Eindhoven, Netherlands)  
Evanthia Papadopoulou (University of Lugano (USI), Switzerland)  
Kunsoo Park (Seoul National University, Korea)  
Seth Pettie (University of Michigan, USA)  
Marcin Pilipczuk (University of Warsaw, Poland)  
Kunihiko Sadakane (The University of Tokyo, Japan)  
Tetsuo Shibuya (The University of Tokyo, Japan)  
Xiaoming Sun (Chinese Academy of Sciences, China)  
Shin-ichi Tanigawa (The University of Tokyo, Japan)  
Takeshi Tokuyama (Tohoku University, Japan)  
Rob van Stee (University of Siegen, Germany)  
Dorothea Wagner (Karlsruhe Institute of Technology, Germany)  
Haitao Wang (Utah State University, USA)  
Gerhard Woeginger (RWTH Aachen University, Germany)  
Prudence Wong (The University of Liverpool, UK)  
Hsu-Chun Yen (National Taiwan University, Taiwan)  
Huacheng Yu (Harvard University, USA)  
Christos Zaroliagis (University of Patras, Greece)  
Guochuan Zhang (Zhejiang University, China)





## ■ List of External Reviewers

Divesh Aggarwal  
Hee-Kap Ahn  
Eugenio Angriman  
Diego Arroyuelo  
Shi Bai  
János Balogh  
Evangelos Bampas  
Soheil Behnezhad  
Djamal Belazzougui  
Rémy Belmonte  
Kristóf Bérczi  
Sebastian Berndt  
Anup Bhattacharya  
Binay Bhattacharya  
Sujoy Bhore  
Davide Bilò  
Andreas Björklund  
Hans L. Bodlaender  
Marthe Bonamy  
Vincenzo Bonifaci  
Edouard Bonnet  
Flavia Bonomo  
Nicolas Bousquet  
Cornelius Brand  
Ulrik Brandes  
Andreas Brandstädt  
Robert Brederick  
Karl Bringmann  
Guido Brückner  
Valentin Buchhold  
Maïke Buchin  
Laurent Bulteau  
Xavier Bultel  
Yixin Cao  
Florent Capelli  
Chun-Hsiang Chan  
Timothy Chan  
Panagiotis Charalampopoulos  
Vincent Chau  
Yanlin Chen  
Hua Chen  
Hwann-Tzong Chen  
Lijie Chen  
Po-An Chen  
Xue Chen  
Chih-Hong Cheng  
Man Kwun Chiu  
Janka Chlebikova  
Rezaul Chowdhury  
Mahsa Derakhshan  
Gabriele Di Stefano  
Nishanth Dikkala  
Hu Ding  
György Dósa  
Andre Droschinsky  
Ran Duan  
Katharina Eggenberger  
Thorsten Ehlers  
Robert Elsässer  
David Eppstein  
Thomas Erlebach  
Hossein Esfandiari  
Chenglin Fan  
Alireza Farhadi  
Lene Favrholdt  
Henning Fernau

29th International Symposium on Algorithms and Computation (ISAAC 2018).  
Editors: Wen-Lian Hsu, Der-Tsai Lee, and Chung-Shou Liao



Leibniz International Proceedings in Informatics  
Schloss Dagstuhl – Leibniz-Zentrum für Informatik, Dagstuhl Publishing, Germany

**0:xvi External Reviewers**

Dimitris Fotakis	Panagiotis Kanellopoulos
Daniel Freund	Ning Kang
Takuro Fukunaga	Mong-Jen Kao
Travis Gagie	Aikaterini Karanasiou
Jinxiang Gan	Dominik Kempa
Arnab Ganguly	Shahbaz Khan
Loukas Georgiadis	Elena Arseneva Khramtcova
Beat Gfeller	Sang-Sub Kim
Mohammad Amin Ghiasi	Kei Kimura
Panos Giannopoulos	Masashi Kiyomi
Petr Golovach	Rolf Klein
Daniel Gonçalves	Linda Kleist
Lars Gottesbueren	Peter Kling
Petr Gregor	Fabian Klute
Sascha Gritzbach	Sang-Ki Ko
Luciano Gualà	Yusuke Kobayashi
Michel Habib	Tomasz Kociumaka
Magnus M. Halldorsson	Atsushi Koike
Yo-Sub Han	Alexander Kononov
Tim Adrian Hartmann	Matias Korman
Ishay Haviv	Jan Kratochvil
Meng He	Stefan Kratsch
Yuya Higashikawa	Nils Kriege
Dawei Huang	Thijs Laarhoven
Juinn-Dar Huang	Elmar Langetepe
Xin Huang	Alexandra Lassota
Zengfeng Huang	Van Bang Le
Toshimasa Ishii	Stefano Leucci
Takehiro Ito	Bo Li
Taisuke Izumi	Jerry Li
Kai Jin	Min Li
Yaonan Jin	Shi Li
Matthew Johnson	Zhibin Liang
Naoyuki Kamiyama	Chao Liao
Frank Kammer	Jyun-Jie Liao



Bingkai Lin	Alexandru Popa
Guohui Lin	Youming Qiao
Chih-Hung Liu	Marcel Radermacher
Hsiang-Hsuan Liu	Ramanujan M. S.
Jingcheng Liu	Marcel Roeloffzen
Jinyan Liu	Andrei Romashchenko
Quanquan Liu	Paweł Rzażewski
Zhenming Liu	Mahdi Safarnezhad
Takanori Maehara	Yuta Sakai
Lili Mei	Hamed Saleh
Othon Michail	Piotr Sankowski
Christopher Morris	Jayalal Sarma
Mikhail Moshkov	Nicolas Schabanel
Moritz Muehlenthaler	Christian Scheffer
Wolfgang Mulzer	Lena Schlipf
Yakov Nekrich	Miriam Schloeter
Aleksandar Nikolov	Chris Schwiegelshohn
Harumichi Nishimura	Masoud Seddighin
Lutz Oettershagen	Saeed Seddighin
Eunjin Oh	Igor Semaev
Shunhao Oh	C. Seshadhri
Yoshio Okamoto	Mudassir Shabbir
Dennis Olivetti	Xiaohan Shan
Taku Onodera	Michiel Smid
Christian Ortolf	Tasuku Soma
Yota Otachi	Christiane Spisla
Kenta Ozeki	Georgios Stamoulis
Dominik Pajak	Michalis Stefanidakis
Debmalya Panigrahi	Fabian Stehn
Denis Pankratov	Thomas Steinke
Nikos Parotsidis	Bintao Sun
Daniel Paulusma	Xiaorui Sun
Lehilton L. C. Pedrosa	Akira Suzuki
Alexander Pilz	Kenjiro Takazawa
Sheung-Hung Poon	Yuki Takeuchi

**0:xviii External Reviewers**

Suguru Tamaki	Hadi Yami
Xuehou Tan	Feidiao Yang
Pingzhong Tang	Guang Yang
Zihao Gavin Tang	Deshi Ye
Seiichiro Tani	Yu Yokoi
Sharma V. Thankachan	Hung-I Yu
Guojing Tian	Tim Zeitz
Sophie Toulouse	Bernd Zey
Charalampos Tsourakakis	Chihao Zhang
Torsten Ueckerdt	Jia Zhang
Seeun William Umboh	Jialin Zhang
André van Renssen	Peng Zhang
Sofya Vorotnikova	Qin Zhang
Alexandros Voudouris	Yong Zhang
Bow-Yaw Wang	Yuhao Zhang
Kai Wang	Zhao Zhang
Yuyi Wang	Da Zhao
Zhengyu Wang	Yingchao Zhao
Roger Wattenhofer	Chaodong Zheng
Franziska Wegner	Yuan Zhou
Zhaohui Wei	Tobias Zündorf
Angelika Wiegele	
Andrew Winslow	
Matthias Wolf	
Marcin Wrochna	
Weiwei Wu	
Xiaowei Wu	
Mingyu Xiao	
Tao Xiao	
Bojian Xu	
Easton Li Xu	
Jinhui Xu	
Yao Xu	
Jie Xue	
Yutaro Yamaguchi	