Marek Sokołowski

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Born: May 16, 1996 in Kolno, Poland

Education

2024–now Postdoctoral employee, Max Planck Institute of Informatics, Saarbrücken, Germany
Supervisor: Danupon Nanongkai. Group: Algorithms and Complexity

2020–2024 PhD student, Doctoral School of Exact and Natural Sciences, University of Warsaw, Poland
Advisor: Michał Pilipczuk. Thesis: *Efficient Data Structures and Graph Width Parameters*
Defended: Feb 2025

2017–2020 MSc student, Institute of Informatics, University of Warsaw, Poland
Advisor: Michał Pilipczuk. Thesis: *Bounds on semi-ladder orders in sparse graph classes*

Academic interests

Graph theory • Dynamic algorithms • Parameterized algorithms • Sparse graphs

Awards

Witold Lipski Award

2025 Witold Lipski Prize, Theoretical Computer Science track (awarded annually to an outstanding junior Polish computer scientist)

Open Mind Prize

2024 Open Mind Prize (awarded biennially to a junior Polish researcher for research in combinatorics, on Polish Combinatorial Conference)

Best Student Paper

2021 ESA 2021 Best Student Paper Award for the paper *Determining 4-Edge-Connected Components in Linear Time*, coauthored with Wojciech Nadara, Mateusz Radecki, and Marcin Smulewicz

Master Thesis Awards

All awards below awarded for the MSc thesis *Bounds on semi-ladder orders in sparse graph classes*.

2021 Ex aequo winner of the 64th edition of Józef Marcinkiewicz Award for the best student paper in the field of mathematics; organized by the Polish Mathematical Society

2021 Third prize in the 37th edition of Polish Information Processing Society Award for the best computer science Master thesis

2021 Honorable mention in the 5th edition of *Krok w przyszłość* award for the best student paper in the field of mathematics; organized by the mBank Foundation

Publications

2026 A. Karczmarz, W. Nadara, M. Sokołowski
Strongly Polynomial Parallel Work-Depth Tradeoffs for Directed SSSP
accepted to SODA 2026

2025 É. Bonnet, D. Neuen, M. Sokołowski
Treedepth Inapproximability and Exponential ETH Lower Bound
IPEC 2025

2025 J. Holm, W. Nadara, E. Rotenberg, M. Sokołowski
Fully Dynamic Biconnectivity in $\widetilde{O}(\log^2 n)$ Time
STOC 2025

2025 M. Bojańczyk, Mi. Pilipczuk, W. Przybyszewski, M. Sokołowski, G. Stamoulis
Low Rank MSO
preprint on arXiV

2024 T. Korhonen, M. Sokołowski
Almost-Linear Time Parameterized Algorithm for Rankwidth via Dynamic Rankwidth
STOC 2024

2024 J. Gajarský, Mi. Pilipczuk, Sz. Toruńczyk, G. Stamoulis, M. Sokołowski
Elementary First-Order Model Checking for Sparse Graphs
LICS 2024

2024 T. Korhonen, W. Nadara, Mi. Pilipczuk, M. Sokołowski
Fully Dynamic Approximation Schemes on Planar and Apex-Minor-Free Graphs
SODA 2024

2024 A. Karczmarz, W. Nadara, M. Sokołowski
Exact Shortest Paths with Rational Weights on the Word RAM
SODA 2024

2024 V. Chekan, C. Geniet, M. Hatzel, Mi. Pilipczuk, M. Sokołowski, M. Seweryn, M. Witkowski
Half-Integral Erdős-Pósa Property for Non-null S-T Paths
submitted

2024 Ł. Kowalik, A. Lassota, K. Majewski, Mi. Pilipczuk, M. Sokołowski
Detecting Points in Integer Cones of Polytopes is Double-Exponentially Hard
SOSA 2024

2023 T. Korhonen, K. Majewski, W. Nadara, Mi. Pilipczuk, M. Sokołowski
Dynamic Treewidth
FOCS 2023

2023 Mi. Pilipczuk, M. Sokołowski
Graphs of Bounded Twin-Width are Quasi-Polynomially χ-bounded
J. Comb. Theory, Ser. B

2023 B. Bergougnoux, J. Gajarský, G. Guśpiel, P. Hliněný, F. Pokrývka, M. Sokołowski
Sparse Graphs of Twin-Width 2 Have Bounded Tree-Width
ISAAC 2023

2023 J. Gajarský, N. Mählmann, R. McCarty, P. Ohlmann, Mi. Pilipczuk, W. Przybyszewski, S. Siebertz, M. Sokołowski, Sz. Toruńczyk
Flipper Games for Monadically Stable Graph Classes
ICALP 2023

2023 M. Hatzel, K. Majewski, Mi. Pilipczuk, M. Sokołowski
Simpler and Faster Algorithms for Detours in Planar Digraphs
SOSA 2023

2023 K. Majewski, Mi. Pilipczuk, M. Sokołowski
Maintaining CMSO_2 *Properties on Dynamic Structures With Bounded Feedback Vertex Number*
ACM Trans. Comp. Theory, STACS 2023

2022 K. Majewski, T. Masarík, J. Novotná, K. Okrasa, Ma. Pilipczuk, P. Rzążewski, M. Sokołowski
Max Weight Independent Set in Graphs With No Long Claws: An Analog of the Gyárfás' Path Argument
ICALP 2022

2022 Mi. Pilipczuk, A. Zych-Pawlewicz, M. Sokołowski
Compact Representation for Matrices of Bounded Twin-Width
STACS 2022

2021 W. Nadara, M. Radecki, M. Smulewicz, M. Sokołowski
Determining 4-Edge-Connected Components in Linear Time
ESA 2021 best student paper

2021 M. Sokołowski
Bounds on Half Graph Orders in Powers of Sparse Graphs
Electron. J. Comb., EUROCOMB 2021

Talks (selection)

Invited and seminar talks

Mar 2025 Talk *Low Rank MSO* at Bordeaux graph theory seminar (Bordeaux, France)

Jun 2023 Talk *Compact Representation for Matrices of Bounded Twin-Width* at twin-width mini-symposium at FPT Fest 2023 in the Honour of Mike Fellows (Bergen, Norway)

May 2023 Invited talk *Mixed Minors, Compact Representations, and* χ*-Boundedness* at 1st Workshop on Twin-Width (Aussois, France)

Apr 2023 Seminar talk *Simpler and Faster Algorithms for Detours in Planar Digraphs* at Algorithms seminar in Bergen (Bergen, Norway)

Jun 2022 Invited talk *Graphs of Bounded Twin-Width Are Quasi-Polynomially* χ*-Bounded* at Structural Graph Theory Workshop (Gułtowy, Poland)

Jan 2022 Seminar talk *Graphs of Bounded Twin-Width Are Quasi-Polynomially* χ*-Bounded* at Bordeaux graph theory seminar (online)

Contributed talks

Jun 2025 *Fully Dynamic Biconnectivity in* $\widetilde{O}(\log^2 n)$ *Time* at STOC 2025 (Prague, Czechia)

Jun 2024 *Almost-Linear Time Parameterized Algorithm for Rankwidth via Dynamic Rankwidth* at STOC 2024 (Vancouver, Canada)

Jan 2024 *Approximation Schemes on Planar and Apex-Minor-Free Graphs* at SODA 2024 (Alexandria, USA)

Jan 2024 *Detecting Points in Integer Cones of Polytopes is Double-Exponentially Hard* at SOSA 2024 (Alexandria, USA)

Mar 2022 *Compact Representation for Matrices of Bounded Twin-Width* at STACS 2022 (online)

Sep 2021 *Bounds on Half-Graph Orders in Powers of Sparse Graphs* at EUROCOMB 2021 (online)

Competition achievements

Username `mnbvmar` in most sports programming websites: [[Codeforces]], [[AtCoder]], [[Topcoder]]

2023 12th place at 2022 AtCoder World Tour finals (Tokyo, Japan)

2022 5th place at Google Code Jam finals (online)

2022 3rd place at Meta Hacker Cup finals (online)

2021 10th place at Meta Hacker Cup finals (online)

2019 3rd place at Topcoder Open Algorithm finals (Houston, USA)
2019 4th place at Google Code Jam finals (San Francisco, USA)
2018 2nd place (gold medal) at ICPC World Finals (Rapid City, USA)
2017 5th place (silver medal) at ICPC World Finals (Phuket, Thailand)
2016 6th place at Google Code Jam finals (New York, USA)
2015 21st place at Facebook Hacker Cup finals (Menlo Park, USA)
2013 Bronze medal at the International Mathematical Olympiad (Santa Marta, Colombia)

Community service

Aug 2025 Organized the 25th Max Planck Advanced Course on the Foundations of Computer Science (ADFOCS'25)
International summer school for PhD students. Held in Saarbrücken, Germany.
Topic: Graph Decompositions and Efficient Algorithms. Website: [[link]]

2022–2024 Coordinated the Algorithms research seminar at University of Warsaw (with Michał Pilipczuk)

Courses taught (selection)

2022/2023 *Selected topics in graph theory*, summer semester, tutorial group
2021/2022 *Sparsity*, summer semester, tutorial group
2021/2022 *Operating systems*, summer semester, lab group
2020/2021 *Computational complexity*, winter semester, tutorial group
2019/2020 *Languages, automata and computations*, summer semester, tutorial group

Sports programming organization

2014–now Jury member of Polish Olympiad in Informatics
Since 2022, also a member of the Task Committee responsible for task selection for the olympiad
Also authored some problems: e.g. [[Bytemon collector]], [[Social network]], [[Nim with a twist]]

2017, 2019–21, 2024 Jury member of Algorithmic Engagements
Inventing tasks for the largest Polish open sports programming contest. Jury lead in 2017

2019–2023 Coach of ICPC teams at the University of Warsaw
Creating and running training sessions for teams preparing for sports programming competitions
Our teams took 1st and 2nd place in Central European Programming Contest (CERC) 2019, 4th at CERC 2020 and 2021, and 2nd at CERC 2022
Our teams qualified for World Finals 2020 (Moscow, Russia), 2021 (Dhaka, Bangladesh), 2022 and 2023 (Luxor, Egypt)

2020 Polish task translator at International Olympiad in Informatics (Singapore → online)
2020 Polish team leader at Baltic Olympiad in Informatics (Latvia → online/Polish local site)
2015, 2016 Coach at the Polish Olympiad in Informatics camp

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