

# Siddharth Gupta

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Assistant Professor  
Department of Computer Science & Information Systems  
BITS Pilani, K K Birla Goa Campus, India

+91-8971693867  
[siddharthg@goa.bits-pilani.ac.in](mailto:siddharthg@goa.bits-pilani.ac.in)  
<https://guptasid.bitbucket.io/>

## Research Interests

Graph Algorithms and Computational Geometry, more specifically in Graph Drawing, Parameterized Complexity, Approximation Algorithms, Fine-Grained Complexity and Combinatorial Reconfiguration.

## Education

### University of California, Irvine, USA

- Ph.D. in Computer Science, GPA 3.87/4.0 Aug 2018  
Advisor: Prof. David Eppstein & Prof. Michael T. Goodrich
- M.S. in Computer Science, GPA 3.87/4.0 Dec 2017

### BITS Pilani, K K Birla Goa Campus, India

- M.Sc. in Mathematics, GPA 8.73/10.0 Jun 2014  
Advisor: Prof. Ankit Agrawal & Prof. Tarkeshwar Singh
- B.E. in Computer Science, GPA 8.73/10.0 Jun 2014

## Professional Experience

- **BITS Pilani, K K Birla Goa Campus, India** Oct 2023 - Present  
Assistant Professor
- **University of Warwick, UK** Oct 2021 - Oct 2023  
Postdoctoral Researcher (Advisor: Prof. Ramanujan Sridharan)
- **Ben-Gurion University, Israel** Oct 2018 - Oct 2021  
Postdoctoral Researcher (Advisor: Prof. Meirav Zehavi)
- **INRIA, France** Jun - Jul 2017  
Visiting Student Researcher (Host: Dr Laurent Viennot)
- **Northwestern University, USA** Jun - Dec 2013  
Research Intern (Advisor: Prof. Ankit Agrawal)
- **Indian Institute of Science, India** May - Jul 2012  
Research Intern (Advisor: Prof. L. Sunil Chandran)

## Teaching Experience

### BITS Pilani, K K Birla Goa Campus, India

- Discrete Structures for Computer Science Fall 2024
- Computational Geometry Spring 2024

## Grants, Awards & Honors

- New Faculty Seed Grant (awarded by BITS Pilani) for the year 2024-2026.
- Outstanding Potential for Excellence in Research and Academics (OPERA) Award (awarded by BITS Pilani) for the year 2024-2027.
- Zuckerman Postdoctoral Fellowship (awarded by Mortimer B. Zuckerman STEM Leadership Program) for the year 2018-2021.
- NSF Student Travel Grant for ACM SIGSPATIAL, 2016.
- Ranked 2nd in Department of Mathematics, BITS Pilani, K K Birla Goa Campus, India within a class of 33 students.
- Inspire Scholarship (awarded by Human Resource Department, Government of India) for the year 2009-2014.
- Financial Assistance for Paper Publication (2012), a scholarship given by BITSAA (BITS Alumni Affair Division) to 3 students per year for Paper Publication.

## Academic Services

- Reviewed zyBook (an interactive web-based textbook replacement) on Discrete Mathematics by Prof. Sandy Irani.
- **Program Committee Member:** EuroCG 2024.
- **Conference Reviews** (excluding reviews as a PC member): ICALP 2024, WG 2024, SoCG 2024, SODA 2024, WAOA 2023, IPEC 2023, GD 2023 (2), SOFSEM 2023, GD 2022, ICTCS 2022, WG 2022, SWAT 2022, EuroCG 2022, WALCOM 2022, FCT 2021, ESA 2020, ISAAC 2019, GD 2019, MFCS 2019, GD 2018.
- **Journal Reviews:** International Journal of Foundations of Computer Science (IJFCS) 2023; Journal of Artificial Intelligence Research (JAIR) 2022; Information Processing Letters (IPL) 2021, 2022; Theoretical Computer Science (TCS) 2021; Journal of the ACM (JACM) 2021; Journal of Graph Algorithms and Applications (JGAA) 2020, 2022 (2), 2023, 2024 (2).

## Publications (Alphabetical order of author's last name, except when marked with \*)

### Journal Publications

- J5.** M. Balko, S. Chaplick, R. Galian, S. Gupta, M. Hoffmann, P. Valtr, and A. Wolff, “Bounding and Computing Obstacle Numbers of Graphs”, SIAM Journal on Discrete Mathematics, vol. 38, 2024.
- J4.** S. Gupta, G. Sa’ar, and M. Zehavi, “Grid Recognition: Classical and Parameterized Computational Perspectives”, Journal of Computer and System Sciences (JCSS), vol. 136, 2023.
- J3.** P. Choudhary, M. T. Goodrich, S. Gupta, H. Khodabandeh, P. Matias, and V. Raman, “Improved Kernels for Tracking Paths”, Information Processing Letters (IPL), vol. 181, 2023.
- J2.** G. Da Lozzo, D. Eppstein, M. T. Goodrich, and S. Gupta, “C-Planarity Testing of Embedded Clustered Graphs with Bounded Dual Carving-Width”, Algorithmica, vol. 83, 2021. [**Special issue on IPEC 2019**]
- J1.** S. Gupta, G. Sa’ar, and M. Zehavi, “Parameterized Complexity of Motion Planning for Snake-Like Robots”, Journal of Artificial Intelligence Research (JAIR), vol. 69, 2020. [**Invited to the Journal Track of IJCAI 2021**]

## Conference and Workshop Publications

- C24.** G. Da Lozzo, R. Ganian, S. Gupta, B. Mohar, S. Ordyniak, and M. Zehavi, “Exact Algorithms for Clustered Planarity with Linear Saturators”, 35th International Symposium on Algorithms and Computation (ISAAC 2024).
- C23.** N. Almalki, S. Gupta, and O. Michail, “On the Exponential Growth of Geometric Shapes”, 20th International Symposium on Algorithmics of Wireless Networks (ALGOWIN 2024). [**Best Student Paper Award**]
- C22.** S. Gupta, M. J. V. Kreveld, O. Michail, and A. Padalkin, “Collision Detection for Modular Robots - it is easy to cause collisions and hard to avoid them”, 20th International Symposium on Algorithmics of Wireless Networks (ALGOWIN 2024).
- C21.** M. Bekos, G. Da Lozzo, F. Frati, S. Gupta, P. Kindermann, G. Liotta, I. Rutter, and I. Tollis, “Weakly Leveled Planarity with Bounded Span”, 32nd International Symposium on Graph Drawing and Network Visualization (GD 2024).
- C20.** N. Almalki, S. Gupta, and O. Michail, “Brief Announcement: On the Exponential Growth of Geometric Shapes”, 3rd Symposium on Algorithmic Foundations of Dynamic Networks (SAND 2024).
- C19.** S. Gupta, M. J. V. Kreveld, O. Michail, and A. Padalkin, “Brief Announcement: Collision Detection for Modular Robots - it is easy to cause collisions and hard to avoid them”, 3rd Symposium on Algorithmic Foundations of Dynamic Networks (SAND 2024).
- C18.** S. Gupta, G. Sa’ar, and M. Zehavi, “Drawn Tree Decomposition: New Approach for Graph Drawing Problems”, 18th International Symposium on Parameterized and Exact Computation (IPEC 2023).
- C17.** S. Gupta, G. Sa’ar, and M. Zehavi, “Collective Graph Exploration Parameterized by Vertex Cover”, 18th International Symposium on Parameterized and Exact Computation (IPEC 2023).
- C16.** S. Cornelsen, G. Da Lozzo, L. Grilli, S. Gupta, J. Kratochvil, and A. Wolff, “The Parametrized Complexity of the Segment Number”, 31st International Symposium on Graph Drawing and Network Visualization (GD 2023).
- C15.** W. Didimo, S. Gupta, P. Kindermann, G. Liotta, A. Wolff, and M. Zehavi, “Parameterized Approaches to Orthogonal Compaction”, 48th International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM 2023).
- C14.** J. Blum, Y. Disser, A. Feldmann, S. Gupta, and A. Zych-Pawlewicz, “On Sparse Hitting Sets: from Fair Vertex Cover to Highway Dimension”, 17th International Symposium on Parameterized and Exact Computation (IPEC 2022).
- C13.** M. Balko, S. Chaplick, R. Ganian, S. Gupta, M. Hoffmann, P. Valtr, and A. Wolff, “Bounding and Computing Obstacle Numbers of Graphs”, 30th European Symposium on Algorithms (ESA 2022).
- C12.** S. Gupta, M. Kumar, and S. Pai, “Brief Announcement: Distributed Reconfiguration of Spanning Trees”, 24th International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS 2022).
- C11.** S. Gupta, G. Sa’ar, and M. Zehavi, “Grid Recognition: Classical and Parameterized Computational Perspectives”, 32nd International Symposium on Algorithms and Computation (ISAAC 2021).
- C10.** D. Eppstein, S. Gupta, and E. Havvaei, “Parameterized Complexity of Finding Subgraphs with Hereditary Properties on Hereditary Graph Classes”, 23rd International Symposium on Fundamentals of Computation Theory (FCT 2021).

- C9. M. T. Goodrich, S. Gupta, H. Khodabandeh, and P. Matias, “How to Catch Marathon Cheaters: New Approximation Algorithms for Tracking Paths”, 17th Algorithms and Data Structures Symposium (WADS 2021).
- C8. S. Gupta and M. Zehavi, “Multivariate Analysis of Scheduling Fair Competitions”, 20th International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2021).
- C7. G. Da Lozzo, D. Eppstein, M. T. Goodrich, and S. Gupta, “C-Planarity Testing of Embedded Clustered Graphs with Bounded Dual Carving-Width”, 14th International Symposium on Parameterized and Exact Computation (IPEC 2019). [**Best Paper Award**]
- C6. S. Gupta, G. Sa’ar, and M. Zehavi, “Parameterized Complexity of Motion Planning for Snake-Like Robots”, 28th International Joint Conference on Artificial Intelligence (IJCAI 2019).
- C5. S. Gupta, A. Kosowski, and L. Viennot, “Exploiting Hopsets: Improved Distance Oracles for Graphs of Constant Highway Dimension and Beyond”, 46th International Colloquium on Automata, Languages and Programming (ICALP 2019).
- C4. G. Da Lozzo, D. Eppstein, M. T. Goodrich, and S. Gupta, “Subexponential-Time and FPT Algorithms for Embedded Flat Clustered Planarity”, 44th International Workshop on Graph-Theoretic Concepts in Computer Science (WG 2018).
- C3. D. Eppstein and S. Gupta, “Crossing Patterns in Nonplanar Road Networks”, 25th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL 2017).
- C2. M. T. Goodrich, S. Gupta, and M. R. Torres, “A Topological Algorithm for Determining How Road Networks Evolve Over Time”, 24th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL 2016).
- \*C1. S. Gupta, D. Palsetia, M. Patwary, A. Agrawal, and A. Choudhary, “A New Parallel Algorithm for Two-Pass Connected Component Labeling”, IEEE IPDPS Workshop on Multithreaded Architectures and Applications (MTAAP), 2014.

## Workshops Attended

- Summer Workshop on Graph Drawing, 2024, Grosseto, Italy. [**Invitation based**]
- Graph and Network Visualization, 2024, Heiligkreuztal, Germany. [**Invitation based**]
- Bertinoro Workshop on Graph Drawing, 2024, Bertinoro, Italy. [**Invitation based**]
- Summer Workshop on Graph Drawing, 2023, Grosseto, Italy. [**Invitation based**]
- European Research Week on Geometric Graphs, 2023, Alcalá de Henares, Spain. [**Invitation based**]
- Computational Geometry of Earth System Analysis, 2023, Schloss Dagstuhl, Germany. [**Invitation based**]
- Graph and Network Visualization, 2023, Chania, Greece. [**Invitation based**]
- New Frontiers of Parameterized Complexity in Graph Drawing, 2023, Schloss Dagstuhl, Germany. [**Invitation based**]
- Bertinoro Workshop on Graph Drawing, 2023, Bertinoro, Italy. [**Invitation based**]
- Summer Workshop on Graph Drawing, 2022, Grosseto, Italy. [**Invitation based**]

- Algorithms Postdocs in Europe and Israel (AlgPiE), 2022, Bedlewo, Poland. [**Invitation based**]
- Bertinoro Workshop on Distributed Geometric Algorithms, 2022, Bertinoro, Italy. [**Invitation based**]
- Advanced Optimization for Social Choice, 2022, Lorentz Center - Snellius, Netherlands. [**Invitation based**]
- Combinatorial Reconfiguration, 2022, BIRS, Canada. [**Invitation based**]
- Bertinoro Workshop on Graph Drawing, 2022, Bertinoro, Italy. [**Invitation based**]
- Parameterized Complexity in Graph Drawing, 2021, Schloss Dagstuhl, Germany. [**Invitation based**]
- Algorithms Postdocs in Europe and Israel (AlgPiE), 2019, Bedlewo, Poland.
- Workshop on Kernelization (Worker), 2019, Bergen, Norway.
- Recent Advances in Parameterized Complexity, 2017, Tel Aviv, Israel.
- Research Promotion Workshop on Graph and Geometric Algorithms, 2013, Goa, India.
- Research Promotion Workshop on Graph and Geometric Algorithms, 2012, Surathkal, India.

## Research Visits

- Visited Prof. Arindam Khan at Indian Institute of Science, Bengaluru, India (Sept 26, 2022 - Jan 25, 2023).
- Visited Prof. Giordano Da Lozzo at Roma Tre University, Rome, Italy (Mar 17-28, 2022).
- Visited Prof. Giuseppe Francesco Italiano at LUISS Guido Carli University, Rome, Italy (Mar 22, 2022).
- Visited Prof. Nicola Prezza at Ca' Foscari University of Venice, Venice, Italy (Mar 14-15, 2022).