

## Ioana Oriana Bercea

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### Positions

- 1/10/2023– **Assistant Professor (tenure-track)**,  
present DIVISION OF THEORETICAL COMPUTER SCIENCE  
Department of Computer Science, School of Electrical Engineering and Computer Science  
KTH ROYAL INSTITUTE OF TECHNOLOGY, Stockholm, Sweden
- 1/05/2021– **Postdoc**,  
30/09/2023 BASIC ALGORITHMS RESEARCH COPENHAGEN (BARC)  
Department of Computer Science  
IT UNIVERSITY OF COPENHAGEN, Copenhagen, Denmark  
Host: Thore Husfeldt
- 1/09/2018– **Postdoc**,  
30/04/2021 School of Electrical Engineering  
TEL AVIV UNIVERSITY, Tel Aviv, Israel  
Host: Guy Even

### Education

- 03/09/2013– **Ph.D. in Computer Science**,  
17/08/2018 UNIVERSITY OF MARYLAND, College Park, MD, USA  
Thesis: *Approximation Algorithms for Geometric Clustering and Touring Problems*  
Advisor: Samir Khuller
- 30/08/2010– **M.Sc. in Computer Science**,  
19/05/2013 UNIVERSITY OF MARYLAND, College Park, MD, USA  
Advisor: Aravind Srinivasan
- 25/09/2006– **B.Sc. in Mathematics (Honors) and B.Sc. in Computer Science**,  
12/06/2010 UNIVERSITY OF CHICAGO, Chicago, IL, USA  
Four-year scholarship

### Research Interests

**Data Structures, Computational Geometry, Randomized and Approximation Algorithms**

### Refereed Conference Articles (Author Order Alphabetical)

- VLDB'24 **Aleph Filter: To Infinity in Constant Time**  
Niv Dayan, Ioana O. Bercea, Rasmus Pagh (*authors in order of contribution*)  
In: *Very Large Data Bases Conference*, (VLDB)
- SWAT'24 **Daisy Bloom Filters**  
Ioana O. Bercea, Jakob Bæk Tejs Houen, Rasmus Pagh  
In: *19th Scandinavian Symposium and Workshops on Algorithm Theory*, (SWAT)
- FOCS'23 **Locally Uniform Hashing**  
Ioana O. Bercea, Lorenzo Beretta, Jonas Klausen, Jakob Bæk Tejs Houen, Mikkel Thorup  
In: *64th IEEE Symposium on Foundations of Computer Science*, (FOCS)

- SIGMOD'23 **InfiniFilter: Expanding Filters to Infinity and Beyond**  
 Niv Dayan, Ioana O. Bercea, Pedro Reviriego, Rasmus Pagh (*authors in order of contribution*)  
 In: *International Conference on Management of Data*, (**SIGMOD**)  
 Awarded *Best Artifact of ACM SIGMOD 2023*
- STOC'22 **An Extendable Data Structure for Incremental Stable Perfect Hashing**  
 Ioana O. Bercea, Guy Even  
 In: *54th Annual ACM Symposium on Theory of Computing*, (**STOC**)
- WADS'21 **Dynamic Dictionaries for Multisets and Counting Filters with Constant Time Operations**  
 Ioana O. Bercea, Guy Even  
 In: *17th Algorithms and Data Structures Symposium*, (**WADS**)  
 Invited to the special issue of *Algorithmica*
- CIAC'21 **Upper Tail Analysis of Bucket Sort and Random Tries**  
 Ioana O. Bercea, Guy Even  
 In: *12th International Conference on Algorithms and Complexity*, (**CIAC**)  
 Invited to the special issue of *Theoretical Computer Science*
- SWAT'20 **A Dynamic Space-Efficient Filter with Constant Time Operations**  
 Ioana O. Bercea, Guy Even  
 In: *17th Scandinavian Symposium and Workshops on Algorithm Theory*, (**SWAT**), pp. 11:1-11:17
- APPROX'19 **On the cost of essentially fair clusterings**  
 Ioana O. Bercea, Martin Groß, Samir Khuller, Aounon Kumar, Clemens Rösner, Daniel R. Schmidt, Melanie Schmidt  
 In: *22nd International Workshop on Approximation Algorithms for Combinatorial Optimization Problems*, (**APPROX**), pp. 18:1-18:22
- CCCG'18 **Improved Bounds for the Traveling Salesman Problem with Neighborhoods on Uniform Disks**  
 Ioana O. Bercea  
 In: *30th Canadian Conference on Computational Geometry*, (**CCCG**), pp.129-141
- CCCG'16 **Minimizing Uncertainty through Sensor Placement with Angle Constraints**  
 Ioana O. Bercea, Volkan Isler, Samir Khuller  
 In: *28th Canadian Conference on Computational Geometry*, (**CCCG**), pp. 287-294
- SPAA'14 **On Computing Maximal Independent Sets of Hypergraphs in Parallel**  
 Ioana O. Bercea, Navin Goyal, David G. Harris, Aravind Srinivasan  
 In: *26th ACM Symposium on Parallelism in Algorithms and Architectures*, (**SPAA**), pp. 42-50  
 Invited to the special issue of *TOPC*

## Journal Articles

- 2022 **Dynamic Dictionaries for Multisets and Counting Filters with Constant Time Operations**  
 Ioana O. Bercea, Guy Even  
 In: *Algorithmica*, Special issue on WADS 2021
- 2021 **Upper Tail Analysis of Bucket Sort and Random Tries**  
 Ioana O. Bercea, Guy Even  
 In: *Theoretical Computer Science*, Special issue on CIAC 2021
- 2016 **On Computing Maximal Independent Sets of Hypergraphs in Parallel**  
 Ioana O. Bercea, Navin Goyal, David G. Harris, Aravind Srinivasan  
 In: *ACM Transactions on Parallel Computing*, Special issue on SPAA 2014

## Invited Workshops

- May 2025 DAGSTUHL SEMINAR: *Adaptive and Scalable Data Structures*
- May 2025 DAGSTUHL SEMINAR: *Learned Predictions for Data Structures and Running Time*

July 2024 NU SINGAPORE: *Algorithms and Data Structures Today*  
 May 2023 DAGSTUHL SEMINAR: *Scalable Data Structures*  
 March 2023 NII SHONAN MEETING: *New Frontiers in Locality in Computation*  
 Feb. 2021 DAGSTUHL SEMINAR: *Scalable Data Structures*  
 Oct. 2019 IGAFIT: *Workshop for Postdoctoral Researchers in Algorithms*  
 Sept. 2019 GI-DAGSTUHL SEMINAR: *Algorithms for Big Data*  
 March 2019 DAGSTUHL SEMINAR: *Theoretical Foundations of Storage Systems*  
 Jan. 2019 DAGSTUHL SEMINAR: *Data Structures for the Cloud and External Memory Data*  
 Oct. 2018 7th French-Israeli Workshop on Foundations of Computer Science

## Invited Talks

Dec 2024 AUSTRALASIAN SUMMER SCHOOL ON RECENT TRENDS IN ALGORITHMS, Sydney, Australia  
 July 2023 ROMANIAN ALGORITHMS DAYS, online

## Mentoring

Summer 2024 **Brandy Rydberg Paltser**  
 Digital Futures Internship, KTH  
 Summer 2024 **Eira Larsson**  
 Digital Futures Internship, KTH  
 Spring 2023 **Jens Birk Andersen, Malthe Mathias Mølgaard Larsen**  
 BSc Thesis, IT UNIVERSITY OF COPENHAGEN  
 co-supervised with Martin Aumüller  
 2021- **Jonas Østergaard Klausen**  
 PhD, UNIVERSITY OF COPENHAGEN  
 co-supervised with Mikkel Thorup, Jacob Holm

## Teaching

Fall 2023 – **Course Responsible, Teacher for DD2440 Advanced Algorithms, MsC,**  
 KTH ROYAL INSTITUTE OF TECHNOLOGY, Department of Computer Science  
 Summer 2022 **Co-Instructor for Algorithms and Data Structures BSc, MSc,**  
 & 2023 IT UNIVERSITY OF COPENHAGEN, Department of Computer Science  
 Spring 2016 **Co-Instructor for CMSC 122: Intro to Computer Programming via the Web,**  
 UNIVERSITY OF MARYLAND, Department of Computer Science  
 2010–2018 **Graduate Teaching Assistant,**  
 UNIVERSITY OF MARYLAND, Department of Computer Science  
 D = Leading discussion sections, presenting new material, reviewing, quizzes, grading, office hours; G =  
 Grading and office hours  
**CMSC 250: Discrete Structures,**  
 Fall 2011(D), Spring 2014(D), Spring 2015(D), Fall 2015(D), Fall 2016(D), Spring 2017(G)  
**CMSC 131/132: Object Oriented Programming I, II,**  
 Fall 2010 (D), Fall 2013(D), Spring 2018(G)  
**CMSC 216: Introduction to Computer Systems,**  
 Spring 2011(G), Summer 2011(D)  
**CMSC 351: Introduction to Algorithms,**  
 Spring 2012(G)  
**CMSC 122: Intro to Computer Programming via the Web,**  
 Fall 2017(G)

2009–2010 **Junior Tutor for Elementary Functions and Analysis 1,2,3**,  
UNIVERSITY OF CHICAGO, Mathematics Department

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## Honors and Awards

2023 **Future Digileader**, DIGITAL FUTURES  
2014–2015 **Outstanding Graduate Assistant Award**, UNIVERSITY OF MARYLAND  
Top 2% of all UMD Graduate Assistants  
2010–2012 **Dean's Fellowship**, UNIVERSITY OF MARYLAND  
2006–2008, **Dean's List**, UNIVERSITY OF CHICAGO  
2009–2010  
2006–2010 **Scholarship**, UNIVERSITY OF CHICAGO  
Tuition, housing and stipend (unconditioned on GPA)  
2001–2006 **Romanian National Mathematics Olympiad**  
Bronze medals in the National Olympiad, Top 3 prizes in national and regional contests

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## Service

**Program Committee co-chair** SOSA 2025 (*with Rasmus Pagh*)  
**Program Committee** RANDOM 2024, ISAAC 2024, SOSA 2024, ICDCN 2020  
**Session Chair** HALG 2022  
**Journal Reviewer** *TheoretiCS*, *Journal of Computer Science and Technology*, *Transactions on Computers*, *European Journal of Operational Research*, *Theoretical Computer Science*, *Networks*, *ACM Transactions on Sensor Networks*, *The Visual Computer*  
**Conference Reviewer**  
2024 FOCS, STOC, SODA, ICALP, ITCS, SWAT, SPAA, ESA, MFCS  
2023 FOCS, SODA, ICALP, ISAAC, FCT, SOSA, ALENEX  
2022 FOCS, STOC, APPROX  
2021–2020 WAOA'21, ESA'21, SPAA'21, WADS'21, SODA'20, STACS'20  
< 2020 ICALP '24, SWAT'24, SPAA'24, STOC'24, ITCS'24, SODA'24  
2015–2016 **Graduate Student Representative**,  
UNIVERSITY OF MARYLAND, Computer Science Department Council  
2012–2014 **Graduate Student Representative**,  
UNIVERSITY OF MARYLAND, Computer Science Department Education Committee

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## Talks

**Locally Uniform Hashing**  
July 2023 ROMANIAN ALGORITHMS DAYS  
**Locality in Data Structures**  
May 2023 AARHUS UNIVERSITY, *Algorithms and Complexity Theory Seminar*  
March 2023 NII SHONAN MEETING: *New Frontiers in Locality in Computation*  
**Daisy Bloom Filters**  
Nov. 2022 ALGORITHMIC RESEARCH COOPERATION AROUND ØRESUND (ARCO)  
**An Extendable Data Structure for Incremental Stable Perfect Hashing**  
May 2023 DAGSTUHL SEMINAR: *Scalable Data Structures*  
July 2022 STOC  
June 2022 HIGHLIGHTS OF ALGORITHMS (HALG) (short)

### **Dictionaries et al.**

- Sept. 2021 DIGITAL RESEARCH CENTER DENMARK (DIREC)  
May 2021 BARC, *Seminar*  
March 2021 BAR-ILAN UNIVERSITY, *Computer Science Department Colloquium*  
Feb. 2021 DAGSTUHL SEMINAR: *Scalable Data Structures*

### **Upper Tail Analysis of Bucket Sort and Random Tries**

- June 2020 20TH HAIFA WORKSHOP ON GRAPH THEORY, COMBINATORICS AND ALGORITHMS

### **Dynamic Dictionaries for Multisets and Counting Filters with Constant Time Operations**

- Aug. 2021 WADS

### **A Dynamic Space-Efficient Filter with Constant Time Operations**

- June 2020 SWAT  
Dec. 2019 UTRECHT UNIVERSITY, Algorithms Seminar  
Sept. 2019 GI-DAGSTUHL SEMINAR: Algorithms for Big Data  
July 2019 WORKSHOP ON LOCAL ALGORITHMS (WOLA)

### **The Descent of Cuckoos, and Selection in Relation to Nests**

- June 2019 HIGHLIGHTS OF ALGORITHMS (HALG) (short)  
June 2019 19TH HAIFA WORKSHOP ON GRAPH THEORY, COMBINATORICS AND ALGORITHMS  
May 2019 ISRAELI NETWORKING DAY  
March 2019 MAX PLANCK INSTITUTE FOR INFORMATICS, Theory Seminar  
Jan. 2019 DAGSTUHL SEMINAR: *Data Structures for the Cloud and External Memory Data*

### **Improved Bounds for the Traveling Salesman Problem with Neighborhoods on Uniform Disks**

- Nov. 2018 TEL AVIV UNIVERSITY, Computational Geometry Seminar  
Oct. 2018 *7th French-Israeli Workshop on Foundations of Computer Science*  
Aug. 2018 CCCG  
April 2018 CENTRA DE RECERCA MATEMATICA, IRP Program

### **Minimizing Uncertainty through Sensor Placement with Angle Constraints**

- Aug. 2016 CCCG

### **On Computing Maximal Independent Sets of Hypergraphs in Parallel**

- June 2014 SPAA