

# Ioana Oriana Bercea

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## Positions

- 1/05/2021–**Postdoc**,  
present BASIC ALGORITHMS RESEARCH COPENHAGEN (BARC)  
Dept 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)

- FOCS'23 **Locally Uniform Hashing**  
(to appear) Ioana O. Bercea, Lorenzo Beretta, Jonas Klausen, Jonas, 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)*
- 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*

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## In Submission

- 2022 **Daisy Bloom Filters**  
Ioana O. Bercea, Jakob Bæk Tejs Houen, Rasmus Pagh  
url: <https://arxiv.org/abs/2205.14894>

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## 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

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## Manuscripts

- 2019 **Polynomial Time Algorithms for Euclidean Maximum TSP and Maximum Scatter TSP**  
Ioana O. Bercea, Tobias Mömke
- 2018 **Counting Small Cliques and Four Node Subgraphs in Bounded Degeneracy Graphs**  
Saba Ahmadi, Ioana O. Bercea, Samir Khuller, Sheng Yang
- 2014 **New Approximations for the Graph Vertex Pricing Problem**  
Ioana O. Bercea, David Harris

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## Long-term Research Visits

- Spring 2018 **Research Program**, CENTRE DE RECERCA MATEMATICA, Barcelona, Spain, *Intensive Research Program in Discrete, Combinatorial and Computational Geometry*
- Summer 2017 **Research Internship**, MAX PLANCK INSTITUTE FOR INFORMATICS, Saarbrücken, Germany, w. Tobias Mömke
- Summer 2016 **Research Internship**, MAX PLANCK INSTITUTE FOR INFORMATICS, Saarbrücken, Germany, w. Parinya Chalermsook
- Summer 2012 **Research Internship**, MICROSOFT RESEARCH INDIA, Bangalore, India, w. Navin Goyal

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## Invited Workshops

- May 2023 DAGSTUHL SEMINAR: *Scalable Data Structures*
- Mar. 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*

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## Talks

### **Daisy Bloom Filters**

- Nov. 2022 ALGORITHMIC RESEARCH COOPERATION AROUND ØRESUND (ARCO)

### **An Extendable Data Structure for Incremental Stable Perfect Hashing**

- 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

## Mentoring

- Spring 2023 **Jens Birk Andersen, Malthe Mathias Mølgaard Larsen**  
 BSc Thesis, IT UNIVERSITY OF COPENHAGEN  
 co-supervised with Martin Aumüller

## Teaching

- 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.

## Honors and Awards

- 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**, SOSA 2024, ICDCN 2020.

**Session Chair**, HALG 2022.

**Journal Reviewer**, *Transactions on Computers*, *European Journal of Operational Research*, *Theoretical Computer Science*, *Networks*, *ACM Transactions on Sensor Networks*, *The Visual Computer*.

**Conference Reviewer**, FCT 2023, FOCS 2023, ICALP'23, SODA'23, SOSA'23, ALENEX'23, APPROX'22, FOCS'22, STOC'22, WAOA'21, ESA'21, SPAA'21, WADS'21, SODA'20, STACS'20, SoCG'18, FC'18, SoCG'18, SPAA'17.

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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## References

### Prof. Samir Khuller

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### Prof. Guy Even

Tel Aviv University  
Dept. of Electrical Engineering - Systems  
Computer and Software Eng. Bldg., Room 208  
Tel Aviv, IL, 68878  
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Email: guy@eng.tau.ac.il

### Prof. Rasmus Pagh

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### Prof. Thore Husfeldt

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