MADALGO
CENTER FOR MASSIVE DATA ALGORITHMICS

AARHUS UNIVERSITY

Danmarks Grundforskningsfond Danish National Research Foundation

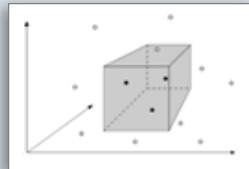## 2010 Highlights

Research team

At the end of 2010 the center research team consisted of six senior researchers (2 at AU), five Postdocs (4 at AU) and eighteen PhD students (10 at AU). Additionally, three further Postdocs and two PhD students (one of which obtained PhD degree during the year) were part of the center in 2010. All center Postdocs are internationals and so are a good deal of the PhD students.

Research collaboration and results

In 2010 MADALGO researchers published 53 peer reviewed research paper within the center research areas. Several of these papers have appeared in highly ranked journals and conference proceedings. Some of the results in the papers have been obtained with the many international researchers that have visited MADALGO in 2010. The center also has extensive multi-disciplinary and industry collaboration.

Orthogonal range reporting is a very fundamental data structure problem. It consists of storing a set of *d*-dimensional points such that all points in an axis-parallel query box can be found efficiently (fast). Developing optimal orthogonal range reporting structures in higher dimensions than two is a classical and longstanding open research problem.

In 2010 MADALGO researchers developed optimal three-dimensional othogonal range reporting structures and proved for the first time that the query time has to increase with the number of dimensions.

Center events

Apart from a large number of smaller research seminars and workshops, as well as a retreat for center employees, MADALGO organized a four day international summer school on Geometric Data Structures in 2010, where four international experts lectured for around 50 participants (mostly PhD students) from 26 institutions in 14 nations.

The center also organized the Second Workshop on Massive Data Algorithmics (MASSIVE 2010), in connection with Symposium on Computational Geometry in Snowbird, USA. The goal is to eventually make the workshop a full-fledged annual conference co-located with one of the major broad algorithms conferences.

In 2010 center researchers also gave numerous presentations at international research conferences, as well as more than 35 invited presentations at research conferences, workshops and seminars.

Awards and acknowledgments

Center researchers received a number of awards and acknowledgments in 2010.

Center Director Arge received the prestigious Danish Minister of Research Elite Research Award ("Videnskabsministerens EliteForsk-Pris") and center senior research Mehlhorn the European Association of Theoretical Computer Science (EATCS) award. Senior researcher Indyk was appointed Associate Editor of the journal *IEEE Transactions on Signal Processing.*

Center PhD student Larsen received a Google European Doctoral Fellowship and center Postdoc Afshani a postdoctoral fellowship from the Natural Sciences and Engineering Research Council of Canada. Center PhD student Nelson received the best paper award at the 2010 *Symposium on Principles of Database Systems.*