

Annual Report 2006
Work Group
Theoretical Computer Science

Prof. Dr. Helmut Alt – Prof. Dr. Christian Knauer – Prof. Dr. Günter Rote

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1. Members of the Group

(a) Professors

Alt, Helmut, Dr.
Rote, Günter, Dr.
Knauer, Christian, Dr.

(b) Assistants, scientific personnel, scholarship holders

Abdo, Hosam (Egyptian government fellowship)
Buchin, Kevin (graduate program *Combinatorics, Geometry, and Computation*, FU since May 8th)
Buchin, Maike (graduate program *Combinatorics, Geometry, and Computation*, FU since June 15th)
Denner-Broser, Britta (Freie Universität Berlin)
Dimitrov, Darko
Hoffmann, Frank, Dr. (Freie Universität Berlin)
Klein, Oliver (graduate program *Combinatorics, Geometry, and Computation*)
Klost, Claudia (Freie Universität Berlin)
Kriegel, Klaus, Priv.-Doz., Dr. (Freie Universität Berlin)
Lenz, Tobias (Freie Universität Berlin)
Mulzer, Wolfgang (Freie Universität Berlin)
Scharf, Ludmila (Freie Universität Berlin, EU)
Scherfenberg, Marc (DFG since October 15th)
Scholz, Sven (Freie Universität Berlin, EU)
Schulz, André (DFG, Freie Universität Berlin)
Schymura, Daria (EU since December 15th)
Stehn, Fabian (DFG since April 1st)
Sturm, Astrid (EU)

(c) Guests

Eyal Ackerman (Marie-Curie-Program until January 27th, July 16th–23rd)
Clemens Huemer (May 15th–July 14th)
Trung Nguyen (June 1st–September 15th)
Peter Braß (January 2nd–6th, August 14th–23rd)
Andreas Spillner (March 21st–22nd)
Hyo-Sil Kim (January 2nd–February 3rd)
Rom Pinchasi (July 17th–27th, October 9th–12th)
Carola Wenk (July 24th–28th)
Sue Whitesides (September 20th–25th)
Vida Dujmovic (September 21st–October 5th)
Hee-Kap Ahn (August 13th–20th)
Chan-Su Shin (August 13th–20th)
Hyeon-Suk Na (August 13th–20th)

Xavier Goaoc (December 7th–19th)
Michiel Smid (December 3rd–16th)
Joachim Gudmundsson (December 2nd–8th)

(d) Secretary

Knoll, Tamara (Freie Universität Berlin)

(e) Student assistants

Driemel, Anne (EU, since October 1st)
Hartmann, Robert (DFG since April 12th)
Jachan, Felix (EU, since March 15th)

2. Guests and Lectures

IGOR PAK

Massachusetts Institute of Technology (January 16th)

Combinatorics and geometry of convex polyhedra

EMO WELZL

ETH Zurich (November 11th)

Lattice Triangulations

VOLKMAR WELKER

Universität Marburg (November 27th)

Barycentric Subdivisions (joint work with Francesco Brenti)

3. Projects supported by external grants

- European graduate program COMBINATORICS, GEOMETRY, AND COMPUTATION financially supported by the the German Science Foundation (DFG)

Participating scientists: Helmut Alt, Günter Rote

Coordination: Andrea Hoffkamp

Scholarship holders: Kevin Buchin

Maike Buchin

Oliver Klein

Duration of the program: January 2000 - December 2005

(final financing until Dezember 2006)

This European graduate program, which exists since January 2000, is a joint initiative with scientists from the Departments of Computer Science and Mathematics at ETH Zurich, Switzerland. The existing cooperation between the main partners Berlin and Zurich will be enhanced by other partner institutes in Belgium, Great Britain, the Netherlands, Poland, the Czech Republic, and Hungary. In Berlin the participating institutions are the three universities in Berlin - Free University, Humboldt University, Technical University - and the Konrad Zuse Center for Scientific Computing.

Discrete mathematics and theoretical computer science are the main research fields in the program. In particular, geometrical aspects will play an important role. The major scientific goal of the program is to intensify the cooperation and interaction between discrete mathematics, algorithmics, and application areas. Therefore, especially at the partner institute in Zurich, faculty members working in application areas like geographic information systems, computer graphics, computer vision, and operations research, are participating. The program is subdivided into four basic research areas: combinatorics, geometry, optimization, and algorithms and computation. In each of these areas at least one of the partners in the program is an internationally renowned center of expertise.

- European graduate program MARIE CURIE TRAINING SITE financially supported by the European Commission

Participating scientists: Helmut Alt, Günter Rote
 Coordination: Andrea Hoffkamp
 Scholarship holders: Eyal Ackerman (until January 27th)
 Duration of the program: 2002 - January 2006

The Marie Curie Training Site is connected with the former European Graduate Program COMBINATORICS, GEOMETRY, AND COMPUTATION. Young researchers pursuing doctoral studies can be supported. They are provided with the possibility of undertaking part of their doctoral studies in a country other than their own. Applicants must already have an advisor and a dissertation project in mathematics, computer science, or a related area at their home university.

The Marie Curie Training Site is a joint initiative of the three universities of Berlin - Free University, Technical University, Humboldt-University - and the Konrad-Zuse-Research Center.

The scientific program ranges from theoretical fundamentals to applications. The areas of research are combinatorics, geometry, optimization, algorithms and computation.

- Research Training Group (Graduiertenkolleg) METHODS FOR DISCRETE STRUCTURES financially supported by the the German Science Foundation (DFG)

Participating scientists: Helmut Alt, Günter Rote
 Coordination: Technische Universität Berlin
 Duration of the program: October 2006 - December 2010

The scientific program treats combinatorics and discrete mathematics broadly — with an emphasis on methods, particularly,

- * Geometric Methods
- * Algorithmic Methods
- * Graph Methods
- * Topological Methods
- * Enumeration Methods
- * Probabilistic Methods.

The course program will consist of the Monday Afternoon Colloquium lectures, block courses, summer schools, regular predoc programs.

The participating institutions are the three universities in Berlin - Free University, Humboldt University, Technical University - and the Konrad Zuse Center for Scientific Computing.

Partners:

* ETH Zürich, Theoretical Computer Science

o Komei Fukuda

o Angelika Steger

o Emo Welzl

* Eötvös Loránd University and Rényi Mathematical Institute of the Hungarian Academy of Sciences

o Imre Bárány

o András Frank

o László Lovász

• RESEARCH TRAINING NETWORK “COMBINATORIAL STRUCTURE OF INTRACTABLE PROBLEMS”

financially supported by the European Community within the 5th framework programme

Participating scientists: Helmut Alt (subproject leader)

Stefan Felsner

Günter Rote

Scholarship holder: Johan Nilsson (February 13th – August 12th)

Duration of the project: September 1st 2002 - August 31st 2006

This project is an international network aiming for improved mobility and cooperation between member sites in: Barcelona, Berlin, Bielefeld, Bordeaux, Budapest, Oxford, Patras, Pisa and Prague.

The general objective of the project is to build up a framework for the analysis of intractable combinatorial problems focused on the structural aspects of the problems. Toward this goal, we will merge techniques from algebra, logic, geometry, probability and statistical physics. The purpose of such a merging is to gain deeper insight on the intrinsic algorithmic difficulty for the solution of many classical problems in Combinatorics and Graph Theory. As a major breakthrough, the use of high-level mathematical techniques will provide the means to overcome complexity issues by finding approximate solutions based on the structural knowledge of the problems.

Scientific objectives:

- Identifying occurrences of hard instances of combinatorial problems
- Development of structural approaches for the analysis of hard instances of combinatorial problems
- Development of approximate algorithms based on structural knowledge
- Applications to particular hard problems in combinatorics and graph theory

The subproject implemented at our site is entitled “Geometry and order”

To find or to improve a structure on (large) point sets is a general problem which comes up in various applications. A deeper understanding of the combinatorial structure of point sets, geometric graphs and triangulations carries the potential of opening

such problems for further investigations with the powerful tools provided by other areas of mathematics.

- RESEARCH PROJECT ACS (ALGORITHMS FOR COMPLEX SHAPES WITH CERTIFIED TOPOLOGY AND NUMERICS)

financially supported by the European Community within the 6th framework IST-Programm by communicating with INRIA Sophia Antipolis, ETH Zürich, Universität Groningen, MPI für Informatik, Saarbrücken, National Kapodistrian University of Athens (NUA), Universität Tel-Aviv, The GeometryFactory (GF)

Participating scientists: Günter Rote (project leader)
 Astrid Sturm
 Kevin Buchin
 Felix Jachan

Duration of the program: May 2005 - April 2008

The ACS project aims at advancing the state of the art in computing with complex shapes. Current technology can cope well with curves in the plane and smooth surfaces in three-dimensional space. We want to address a larger class of shapes, including piecewise smooth surfaces, surfaces with singularities, as well as manifolds of codimension larger than one in moderately high dimension.

Increasingly demanding applications require efficient and robust algorithms for complex shapes. Topics that arise and that we address are shape approximation (including meshing and simplification), shape learning (including reconstruction and feature extraction), as well as robust modeling (including boolean operations). Our work on these topics will be closely intertwined with basic research on shape representations. A unique and ambitious feature of our approach is the guaranteed quality of all data structures and algorithms we plan to develop. Through certified topology and numerics, we will be able to prove that the output is topologically and numerically consistent, according to prespecified criteria. A software prototype, dealing with a restricted class of complex shapes, will demonstrate the feasibility of our techniques in practice.

- RESEARCH PROJECT PROFI (PERCEPTUALLY-RELEVANT RETRIEVAL OF FIGURATIVE IMAGES)

financially supported by the European Community within the 6th framework IST-Program in cooperation with Utrecht University, University of York, and Actor Knowledge Technology

Participating scientists: Helmut Alt (project leader)
 Ludmila Scharf
 Anne Driemel
 Sven Scholz
 Daria Schymura

Duration of the program: January 2005 - December 2007

Perceptually-relevant Retrieval of Figurative Images

In this collaborative project we aim to invent and develop new techniques for the retrieval of figurative images (such as clip art, logos, signs) from large databases. Our techniques will be based on the extraction and matching of perceptually relevant shape features, thereby overcoming many of the limitations of existing methods. This project will develop new algorithms and systems for:

Perceptual segmentation of raw images, and grouping of shape elements. (Responsible partner: University of York.)

Matching of geometrical patterns representing shape features. (Responsible partner: Free University Berlin.)

Indexing shape features in large databases of figurative images. (Responsible partner: Utrecht University.)

Indexing the relative spatial layout of shape features within these images. (Responsible partner: Utrecht University.)

Experimental verification in a prototype system, and performing rigorous evaluations on databases with an independently validated ground truth. (Responsible partner: Aktor Knowledge Technology.)

The Profi project is funded by the European Commission, meeting the objectives of the Future and Emerging Technologies programme:

The proposed research is inherently innovative, high-risk and long-term and holds the promise of major advances at a foundational level.

- RESEARCH PROJECT MATCHING-ALGORITHMEN ZUR REGISTRIERUNG VOM PUNKTMENGEN IN FLÄCHEN UND ANWENDUNGEN ZUR MEDIZINISCHEN NAVIGATION MIT TRACKINGSYSTEMEN (Matching algorithms for the registration of point sets in surfaces and applications to the medical navigation with tracking systems)
financially supported by the German Science Foundation (DFG)

Participating scientists: Christian Knauer
Klaus Kriegel
Fabian Stehn
Robert Hartmann
Darko Dimitrov

Duration of the program: August 2005 - February 2008

An increasing number of neurosurgical operations depend on electromagnetic or optical tracking systems. They are developed to determine the relative accurate position of instruments during an operation. These systems allow the navigation in a 3D-model, which is generated based on information taken from a CT or a MRT device. This implies that the transformation from real-world coordinates to the coordinate system of the model is known. This problem can be solved by using so-called landmarks which explicitly describe a correlation between points in the operation-field

and the model. But this method is limited and can not be applied in all cases e.g. for spinal surgeries. The aim of this project is to determine the rigid transformation that is needed to navigate in the model without using these landmarks. The task can be reduced to the following matching problem: Given a point set in 3D-space (taken from the operation-field) and a surface (the model) one has to compute the rigid transformation that brings the point set as close as possible to the surface. All known solutions to these problems are based on heuristics (e.g. ICP, simulated annealing). These methods work quite well in practice, but they can't guarantee any quality of the result. But in medical applications guarantees are especially needed and critical. For that reason a heuristic-free solution, using methods taken from the discipline of computational geometry, is desired to solve this challenging problem. The focus of this project lies especially on the following aspects of this problem:

- (a) **preprocessing:** generally the transformation shall be computed using geometric hashing. While preprocessing the model, which is not time critical, data structures are built to support this method.
- (b) **additional information:** special characteristic points on the surface will be computed while preprocessing the model. The explicit determination of one or more characteristic points significantly reduces the complexity of the problem.
- (c) **ambiguity:** if the sampled information is not sufficient to determine a unique transformation, a list of all possible transformations will be computed.
- (d) **inconsistency:** if no consistent transformation can be computed based on the sampled data (within a predefined degree of clutter), it'll be tested whether a single error in measurement is responsible for that.

Cases in which three or more characteristic points are measured can easily be solved using methods based on the landmark approach. For that reason the first phase of the project concentrates on cases with two characteristic points.

- RESEARCH PROJECT SUCHSTRUKTUREN FÜR GEOMETRISCHE MUSTER (Search-structures for geometric patterns)
financially supported by the German Science Foundation (DFG)

Participating scientists: Helmut Alt
Christian Knauer
Marc Scherfenberg

Duration of the program: October 2005 - September 2007

The main problem of geometric pattern recognition can be formalized in the following way: given two geometric objects (like, e.g., polygonal chains) called patterns, we wish to determine how similar they are. Here, the similarity of these patterns is measured with an adequate distance function (like, e.g., the Hausdorff-distance). Moreover, it usually is allowed that one of the objects undergoes a transformation from some class of geometric mappings (e.g., translations, or rotations) to make it as similar to the other object as possible.

In many applications we are faced with a variant of this problem, where we want to find one pattern out of a (possibly huge) set of geometric patterns (called the database) which is most similar to a given query pattern (again the query pattern may be allowed to undergo transformations to match the entries of the database). If the database is big, it is not feasible to compare the query pattern with all entries of the database separately. Instead we want to preprocess the patterns of the database and build a search structure to answer a query quickly.

The importance of this problem has spawned a multitude of commercial and academic so-called “Image-Retrieval-Systems” (IRS) which were developed in the last 10 years, like, e.g., the QBIC System from IBM, the Princeton 3D Models Search Engine, PicHunter, Blobworld, or the ASSERT System. Unfortunately, none of these systems solves the problem satisfactorily, let alone is it able to imitate, or compete with human perception. One of the reasons for this seems to be the fact that none of these systems directly uses the geometric shape of the objects to assess their similarity. Instead, most of them use simpler properties like color, texture, area, etc., and apply attribute based shape retrieval techniques.

In this project we investigate how methods from computational geometry and geometric pattern recognition can be applied to design efficient search structures for geometric patterns. The main focus is to design efficient algorithms for the problems at hand. It is also planned to implement some of these algorithms and to test them on real data. In particular, the new methods will be compared to each other and with already existing systems and solutions.

- MEASURING THE SIMILARITY OF GEOMETRIC GRAPHS

This is a joint project with Professor Otfried Cheong from the Korea Advanced Institute of Science and Technology (KAIST) in Daejeon, South Korea, financially supported by the German Science Foundation (DFG) and Korea Science & Engineering Foundation (KOSEF).

Participating scientists: Helmut Alt
Christian Knauer
Otfried Cheong (KAIST)

Computational geometry has studied the matching and analysis of geometric shapes from a theoretical perspective, and developed efficient algorithms measuring the *similarity* of geometric objects. Two objects are similar if they do not differ much geometrically.

We propose to extend and generalize this work to a model where patterns are considered geometric graphs (= planar graphs together with a straight line embedding), and to develop algorithms measuring the similarity of geometric graphs. This will have to take into account not only the geometry of the shapes, but also their topological or combinatorial structure. Such a model captures some practical pattern recognition problems better than a purely geometric definition—recognizing logos, Egyptian

hieroglyphics, Chinese characters, or electronic components in a circuit diagram are typical examples where this is the case.

The goal of the proposed research is to give suitable definitions for the similarity of geometric graphs and to find asymptotically efficient algorithms measuring the similarity of two given geometric graphs. A long term perspective is to also design data structures for storing large sets of geometric graphs such that the one most closely matching a given graph can be retrieved quickly.

4. Publications and Lectures

(a) Publications in Journals (with a selection procedure)

I. BÁRÁNY, G. ROTE. *Strictly convex drawings of planar graphs*. Documenta Mathematica 11, Pages 369–391, 2006.

G. BAREQUET, M. MOFFIE, A. RIBO MOR, G. ROTE. *Counting polyominoes on twisted cylinders*. INTEGERS: The Electronic Journal of Combinatorial Number Theory 6, article #A22, 2006.

A. DUMITRESCU, A. EBBERS-BAUMANN, A. GRÜNE, R. KLEIN, G. ROTE. *On the geometric dilation of closed curves, graphs, and point sets*. Computational Geometry, Theory and Applications 36, Pages 16–38, 2006.

C. KNAUER, E. MOET, K.-Y. CHWA, B.-C. JO, R. VAN OOSTRUM, C.-S. SHIN. *Guarding art galleries by guarding witnesses*. International Journal of Computational Geometry and Applications, Special Issue: Selected Papers from the 15th Annual International Symposium on Algorithms and Computation (ISAAC), Volume 16 (2-3), Pages 205–226, HKUST, Hong Kong, China, 2006.

G. ROTE, A. SCHULZ. *Threshold arrangements and the knapsack problem*. Applied Mathematics Letters, Volume 19, Issue 1, Pages 108–112, January 2006.

(b) Publications in Conference Proceedings (with a selection procedure)

E. ACKERMAN, K. BUCHIN, C. KNAUER, G. ROTE. *Acyclic Orientations of Drawings*. Proc. 10th Scandinavian Workshop on Algorithm Theory, Lecture Notes in Computer Science, vol. 4059, Springer Verlag, Pages 268–279, 2006.

H. ALT, J. ERICKSON, C. KNAUER, K. WHITTLESEY, E. M. ARKIN, H. BRÖNNMANN, S. P. FEKETE, L. LENCHNER, J. S. B. MITCHELL. *Minimum-Cost Coverage of Point Sets by Disks*. Proc. 22nd Annual ACM Symposium on Computational Geometry, Pages 449–458, Sedona (Arizona), USA, 2006.

B. ARONOV, S. HAR-PELED, C. KNAUER, Y. WANG, C. WENK. *Fréchet distance for curves, revisited*. Proceedings of the 14th Annual European Symposium on Algorithms (ESA), Pages 53–63, Zurich, Switzerland, 2006.

M. BENKERT, J. GUDMUNDSSON, C. KNAUER, E. MOET, R. VAN OOSTRUM, A. WOLFF. *A polynomial-time approximation algorithm for a geometre dispersion problem*. Proceedings of the 12th Annual International Computing and Combinatorics Conference (COCOON), Pages 166–175, Taipe, Taiwan, 2006.

- K. BUCHIN, M. BUCHIN, C. WENK. *Computing the Fréchet Distance between Simple Polygons in Polynomial Time*. Proc. 22nd Annual ACM Symposium on Computational Geometry, Pages 80–87, ACM Press, 2006.
- S. CABELLO, P. GIANNOPOULOS, C. KNAUER. *On the parameterized complexity of d -dimensional point set pattern matching*. Proceedings of the 2nd International Workshop on Parametrized and Exact Computation (IWPEC), Pages 175–183, Zurich, Switzerland, 2006.
- R. CONNELLY, E. D. DEMAINE, M. L. DEMAINE, S. P. FEKETE, S. LANGERMAN, J. S. B. MITCHELL, A. RIBO MOR, G. ROTE. *Locked and unlocked chains of planar shapes*. Proceedings of the 22nd Annual Symposium on Computational Geometry, Pages 61–70, Sedona, USA, June 2006.
- B. DENNER-BROSER. *On the Decidability of Tracing Problems in Dynamic Geometry*. Lecture Notes in Computer Science, vol. ??? Springer Verlag, Pages 111–129, 2006.
- D. DIMITROV, C. KNAUER, K. KRIEGEL. *Registration of 3D - Patterns and Shapes with Characteristic Points*. Proceedings of International Conference on Computer Vision Theory and Applications - VISAPP 2006, Pages 393–400, Setúbal, Portugal, 2006.
- G. FRIEDLAND, K. JANTZ, T. LENZ, F. WIESEL, R. ROJAS. *A Practical Approach to Boundary Accurate Multi-Object Extraction from Still Images and Videos*. 8th IEEE International Symposium on Multimedia, Pages 307–314, San Diego, California, December 2006.
- C. KNAUER, A. SPILLNER. *Approximation algorithms for the minimum convex partition problem*. Proceedings of the 10th Scandinavian Workshop in Algorithm Theory (SWAT), Lecture Notes in Computer Science, vol. ???, Springer Verlag, Pages 232–241, Riga, Latvia, 2006.
- C. KNAUER, A. SPILLNER. *A fixed-parameter algorithm for the minimum weight triangulation problem based on small graph separators*. Proceedings of The 32nd International Workshop on Graph-Theoretic Concepts in Computer Science (WG), Pages 49–57, Bergen, Norway, 2006.
- C. KNAUER, M. VAN KREVELD, E. MOET. *Visibility maps of segments and triangles in 3d*. Proceedings of the 6th Annual International Workshop on Computational Geometry and Applications (CGA) (in conjunction with the 6th International Conference on Computer Science and its Applications (ICCSA)), Pages 20–29, Glasgow, United Kingdom, 2006.
- T. LENZ. *Deterministic Splitter Finding in a Stream with Constant Storage and Guarantees*. 17th International Symposium on Algorithms and Computation, Pages 26–35, Kolkata, India, December 2006.

W. MULZER, G. ROTE. *Minimum weight triangulation is NP-hard*. Proceedings of the 22nd Annual Symposium on Computational Geometry, Pages 1–10, Sedona, USA, June 2006.

(c) Other Publications

E. ACKERMAN, K. BUCHIN, C. KNAUER, G. ROTE. *Acyclic Orientations of Drawings*. Proc. 22nd European Workshop on Computational Geometry (EWCG), Pages 207–210, Delphi, Greece, 2006.

H. ALT, L. SCHARF, S. SCHOLZ. *Probabilistic matching of sets of Polygonal curves*. Proceedings of the 22nd European Workshop on Computational Geometry (EWCG), Pages 107–110, Delphi, Greece, March 2006.

M. BENKERT, J. GUDMUNDSSON, C. KNAUER, E. MOET, R. VAN OOSTRUM, A. WOLFF. *A slow approximation algorithm for a geometric dispersion problem*. Proceedings of the 22nd European Workshop on Computational Geometry (EWCG), Pages 141–144, Delphi, Greece, 2006.

J.-D. BOISSONNAT, D. COHEN-STEINER, B. MOURRAIN, G. ROTE, G. VEGTER. *Meshing of surfaces*. Effective Computational Geometry for Curves and Surfaces, Chapter Chapter 5. Mathematics and Visualization, Pages 181–229, ed. J.-D. Boissonnat and M. Teillaud, Springer Verlag, 2006.

J.-D. BOISSONNAT, P. BLANC, F. FALZON, C. KNAUER, T. NGUYEN, E. THOMAS. *A disk-covering problem with application in optical interferometry*. Technical Report cs/0612026, arXiv.org Computer Science Preprint, 2006.

K. BUCHIN, M. BUCHIN, C. WENK. *Computing the Fréchet Distance between Simple Polygons*. Proc. 22nd European Workshop on Computational Geometry, Pages 103–106, 2006.

D. DIMITROV, C. KNAUER, K. KRIEGEL, G. ROTE. *On the Bounding Boxes Obtained by Principal Component Analysis*. Proc. 22nd European Workshop on Computational Geometry, Pages 193–196, Delphi, Greece, 2006.

S. DRYSDALE, G. ROTE, A. STURM. *Approximation of an open polygonal curve with a minimum number of circular arcs*. Abstracts of the 22nd European Workshop on Computational Geometry, Pages 25–28, Delphi, Greece, March 2006.

S. DRYSDALE, G. ROTE, A. STURM. *Approximation of polygonal curves with minimum number of circular arcs - prototype software*. Technical Report ACS-TR-122202-01, Freie Universität Berlin, May 2006.

C. KNAUER, A. SPILLNER. *Fixed-parameter algorithms for finding crossing-free spanning trees in geometric graphs*. Technical Report 06-07, Friedrich-Schiller-Universität Jena, 2006.

T. LENZ. *How to Sample and Reconstruct Curves With Unusual Features*. Proceedings of the 22nd European Workshop on Computational Geometry (EWCG), Delphi, Greece, March 2006.

G. ROTE, G. VEGTER. *Computational topology: an introduction*. Effective Computa-

tional Geometry for Curves and Surfaces, Chapter 7, Mathematics and Visualization, Pages 277–312, ed. J.-D. Boissonnat and M. Teillaud, Springer-Verlag, 2006.

G. ROTE, F. SANTOS, I. STREINU. *Pseudotriangulation a survey*. Technical Report arXiv:math:CO—0612672, 66 pages, December 2006.

A. SCHULZ. *The Existence of a Pseudo-triangulation in a given Geometric Graph*. Proc. 22nd European Workshop on Computational Geometry, Pages 17–20, March 2006.

(d) Technical Reports

B-06-06, T. LENZ, G. FRIEDLAND, K. JANTZ, R. ROJAS. *Extending the SIOX Algorithm: Alternative Clustering Methods, Sub-pixel Accurate Object Extraction from Still Images, and Generic Video Segmentation*.

B 06-10 D. DIMITROV, C. KNAUER, K. KRIEGEL, G. ROTE. *Upper and Lower Bounds on the Quality of the PCA Bounding Boxes*.

(e) Lectures/Talks

HELMUT ALT

- *Probabilistische Algorithmen zum Vergleich von Bildern (Probabilistic Algorithms for Comparing Images)*, Colloquium des Institut für Informatik und Praktische Mathematik, Universität Kiel, January 20th.
- *Effiziente Algorithmen: Theorie oder Praxis?*, graduation ceremony, winter semester 2005/2006, Institut für Informatik, Universität Augsburg, January 26th.
- *Probabilistic Matching of Shapes*, COMBSTRU semi-final workshop, Charles University Prague, Czech Republic March 11th.
- *Probabilistic Algorithms for Shape Matching*, Colloquium, Computer Science Department, TU Eindhoven, April 6th.
- *Probabilistic Matching of Shapes*, Annual Review Meeting, Project PROFI Antwerpen, June 9th.
- *Can we Compute the Similarity Between Surfaces?*, Seminar, Theory of Computation Laboratory, Korea Advanced Institute of Science and Technology, Daejeon, South Korea, September 8th.

KEVIN BUCHIN

- *Acyclic Orientation of Drawings*, COMBSTRU semi-final workshop, Charles University Prague, Czech Republic, March 11th.
- *Acyclic Orientation of Drawings*, 22nd European Workshop on Computational Geometry, Delphi, Greece, March 29th.
- *Acyclic Orientation of Drawings*, Colloquium of the graduate program *Combinatorics, Geometry, and Computation*, Freie Universität Berlin, May 15th.

MAIKE BUCHIN

- *On the Computability of the Frechet Distance between Triangulated Surfaces*, COMBSTRU semi-final workshop, Charles University Prague, Czech Republic, March 11th.

- *Computing the Fréchet Distance between Simple Polygons*, 22nd European Workshop on Computational Geometry, Delphi, Greece, March 29th.
- *Computing the Frechet Distance between Simple Polygons* Colloquium of the graduate program *Combinatorics, Geometry, and Computation*, Humboldt-Universität zu Berlin, May 8th.
- *Computing the Fréchet Distance between Simple Polygons in Polynomial Time*, 22nd Annual ACM Symposium on Computational Geometry, Sedona, Arizona, USA, June 6th.

DARKO DIMITROV

- *Registration of 3D - Patterns and Shapes with Characteristic Points*, Conference on Computer Vision Theory and Applications - VISAPP 2006, Setúbal, Portugal, February 27th.
- *Registration of 3D - Patterns and Shapes with Characteristic Points*, Seminar on graph theory and algorithms, Faculty of Mathematics, University of Ljubljana, Slovenia, March 9th.
- *On the Bounding Boxes Obtained by Principal Component Analysis*, 22nd European Workshop on Computational Geometry, Delphi, Greece, March 29th.
- *The Number of Perfect Matchings in a Hypercube*, Lecture Discrete Mathematics II , Faculty of Mathematics, University of Ljubljana, Slovenia, December 27th.

FRANK HOFFMANN

- *The Number of Vertex Guards for Orthogonal Polygons with Holes*, Conference: Horizon of Combinatorics, Balatonalmadi July 16th–22nd.
- *Guarding Orthogonal Polygons by Coloring Quadrilateralization Graphs*, Final COMBSTRU Meeting, Barcelona, September 25th–27th.

CHRISTIAN KNAUER

- *A Fixed-Parameter Algorithm for the Minimum Weight Triangulation Problem Based on Small Graph Separators*, Lecture of the graduate program *Methods for Discrete Structures*, Freie Universität Berlin, .
- *Entwurf und Bewertung geometrischer Netzwerke (design and evaluation of geometric networks)*, GIBU annual meetin, Schloss Dagstuhl, Wadern, Germany,.
- *Computing minimum weight triangulations for point sets with few inner points*, Theory Seminar, University of Ljubljana, Slovenia.
- *Dilation minimal edge deltion in polygonal cycles*, Seminar on Geomtric Networks and Metric Space Embeddings, Schloss Dagstuhl, Wadern, Germany, November.

TOBIAS LENZ

- *How to Sample and Reconstruct Curves With Unusual Features*, 22th European Workshop on Computational Geometry Delphi, Greece, March 27th–29th.
- *Deterministic Splitter Finding in a Stream with Constant Storage and Guarantees*, 17th International Symposium on Algorithms and Computation (ISAAC) Kolkata, India, December 18th–20th.

GÜNTER ROTE

- *The algebraic path problem*, Universität Bielefeld, January 23rd.
- *Pseudotriangulations and the expansion polytope*, Department of Mathematics,

- Ljubljana University, February 21st.
- *Strictly convex drawings of planar graphs*, Department of Mathematics, Ljubljana University, February 23rd.
 - *Piecewise-linear Morse theory*, Discrete Differential Geometry, Oberwolfach, March 6th–10th.
 - *Die Mathematik des Sudoku*, Lange Nacht der Wissenschaften, (Science Night), Freie Universität Berlin, May 13th.
 - *Minimum-Weight Triangulation is NP-hard, Combinatorics, Geometry, and Computation*, Freie Universität Berlin, May 15th.
 - *Proportional elections, network flows, and matrix scaling*, Lecture of the graduate program *Combinatorics, Geometry, and Computation*, Freie Universität Berlin, July 3rd.
 - *Sudoku*, Studentenkolloquium, (student colloquium), Freie Universität Berlin, July 6th.
 - *Die Berechnung der kürzesten Triangulierung ist NP-schwer (Computing the shortest triangulation is NP-hard)*, Technische Universität Graz, Department of Computer Science, October 31st.
 - *Obnoxious facility location*, Seminarvortrag, Technische Universität Graz, November 2nd.
 - *Network flows and proportional matrix scaling*, Festkolloquium anlässlich des 60. Geburtstages von Professor Dr. Franz Rendl (celebrating the 60th birthday of Professor Dr. Franz Rendl), Technische Universität Graz, November 3rd.
 - *Die Berechnung der kürzesten Triangulierung ist NP-schwer (Computing the shortest triangulation is NP-hard)*, Universität Klagenfurt, Department of Mathematics, November 16th.
 - *The geometric dilation for 3 points*, Geometric Networks and Metric Space Embeddings, Internationales Begegnungs- und Forschungszentrum für Informatik, Schloss Dagstuhl, November 27th–December 1st.
 - *Computational methods*, Lecture of the graduate program *Methods for Discrete Structures*, Freie Universität Berlin, December 18th.

LUDMILA SCHARF

- *Probabilistic matching of sets of polygonal curves*, 22th European Workshop on Computational Geometry Delphi, Greece, March 27th–29th.
- *Probabilistic Algorithms for Matching Images*, Dagstuhl Seminar Content-Based Retrieval, April 23rd–28th.

SVEN SCHOLZ

- *Algorithm Engineering—Implementation and Software Engineering Aspects*, GI Research Seminar on Algorithm Engineering, Schloss Dagstuhl, September 11th–15th.
- *Probabilistic Shape Matching and Resemblance Evaluation in Trademark Images*, AKTOR Knowledge Technology NV, Belgium, October 9th–10th.

ANDRE SCHULZ

- *The Existence of a Pseudo-triangulation in a given Geometric Graph*, 22nd European Workshop on Computational Geometry, Delphi, Greece, March 27th.
- *Embedding 3-Polytopes on a small Grid*, Workshop on Geometric and Topological Combinatorics, Alcalá de Henares, Spain, September 3rd.

FABIAN STEHN

- *Absolute error matching of points to surfaces using characteristic points*, Seminar, Theoretical Computer Science Lab, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Korea, September 22st.

ASTRID STURM

- *Approximation of an open polygonal curve with minimal number of circular arcs*, ACS General Workshop Athens, Greece, January 23rd.

(f) Posters

ARES RIBÓ MOR, GÜNTER ROTE AND ANDRÉ SCHULZ

- poster presentation: *Embedding 3-Polytopes on a small Grid*. Workshop on Geometric and Topological Combinatorics, Alcalá de Henares, Spain, August 31st–September 5th.

5. Courses, Seminars, Exercises and Laboratories (WS 05/06 and SS 06)

G. ROTE, AND OTHER LECTURERS OF THE GRADUATE PROGRAM, *Lectures of the graduate program* Combinatorics, Geometry, and Computation, (winter semester 05/06).

H. ALT, *Geometric Methods in Shape and Pattern Recognition* at the University of Utrecht, Feb. - April 2006 course and exercises, (winter semester 05/06).

F. HOFFMANN, *Brückenkurs Mathematische Grundlagen für Informatik, Bioinformatik und Nebenfach Informatik (block-course Mathematical foundations for Computer Science, Bioinformatics and Computer Science Minors)*, course and exercises, (winter semester 05/06).

F. HOFFMANN, *Mathematik für Informatiker I (Mathematics for computer scientists I)*, course and exercises, (winter semester 05/06).

F. HOFFMANN, *Informatik A*, course and exercises, (winter semester 05/06).

C. KNAUER, *Datenstrukturen (Data Structures)*, course and exercises, (winter semester 05/06).

K. KRIEGEL, *Mathematik für Informatiker III (mathematics for computer scientists III)*, course and exercises, (winter semester 05/06).

G. ROTE, *Darstellung und Einbettung von Graphen (Blockveranstaltung) (design and embedding of graphs [block-course])*, course and exercises, (winter semester 05/06).

G. ROTE, *Entwurf und Analyse von Algorithmen (design and analysis of algorithms)*, course and exercises, (winter semester 05/06).

C. KNAUER, K. KRIEGEL, G. ROTE, *Diplomanden- und Doktorandenseminar der Theoretischen Informatik (Seminar for M.S. and Ph.D. students in theoretical computer science)*, seminar, (winter semester 05/06).

R. ROTE, *Seminar über Algorithmen (algorithms)*, seminar, (winter semester 05/06).

C. KNAUER, *Theoretische Informatik (theoretical computer science)* seminar, (winter semester 05/06).

T. LENZ, R. ROTE, *Praktikum Effiziente Algorithmen (efficient algorithms)*, seminar, (winter semester 05/06).

G. ROTE, AND OTHER LECTURERS OF THE GRADUATE PROGRAM, *Colloquium of the graduate program* Combinatorics, Geometry, and Computation, colloquium, (winter semester 05/06).

K. KRIEGEL, *Algorithmen und Programmierung I (Schülerkurs: Vorlesung und Übung) (algorithms and programming I [pupil course: lectures and exercises])*, course, (winter semester 05/06).

H. ALT, G. ROTE, AND OTHER LECTURERS OF THE GRADUATE PROGRAM, *Lectures of the graduate program* Combinatorics, Geometry, and Computation, (summer semester 06).

H. ALT, *Computergrafik*, course and exercises, (summer semester 06).

F. HOFFMANN, *Informatik B*, course and exercises, (summer semester 06).

C. KNAUER, *Grundlagen der Theoretischen Informatik (foundations of theoretical computer science)*, course and exercises, (summer semester 06).

K. KRIEGEL, *Mathematik für Informatiker II (mathematics for computer scientists II)*, course and exercises, (summer semester 06).

R. ROTE, *Algorithmen für Fortgeschrittene: Auswählen und Entscheiden, Teilen und Messen (algorithms for advanced: select and decide, devide and measure)*, course and exercises, (summer semester 06).

H. ALT, C. KNAUER, K. KRIEGEL, G. ROTE, *Diplomanden- und Doktorandenseminar der Theoretischen Informatik (Seminar for M.S. and Ph.D. students in theoretical computer science)*, seminar, (summer semester 06).

H. ALT, *Seminar über Algorithmen (seminar about algorithms)*, seminar, (summer semester 06).

F. HOFFMANN, K. KRIEGEL, *Algorithmische und kombinatorische Aspekte von Sichtbarkeitsproblemen*, seminar, (summer semester 06).

G. ROTE, *Praktikum Effiziente Algorithmen (laboratory efficient algorithms)*, (summer semester 06).

H. ALT, G. ROTE, AND OTHER LECTURERS OF THE GRADUATE PROGRAM, *Colloquium of the graduate program Combinatorics, Geometry, and Computation*, colloquium, (summer semester 06).

6. Organisation of scientific events

3RD EUROPEAN WORKSHOP ON PSEUDO-TRIANGULATIONS, Freie Universität Berlin, March 17th - 23rd.

Organization: G. Rote, A. Schulz

7. Doctoral Graduations

ARES RIBÓ MOR:

Realization and Counting,

Disputation (February 15th) on: *Problems for Planar Structures: Trees and Linkages, Polytopes and Polyominoes*

Supervisor: Günter Rote.

8. Diplomas

SIMON ALBROSCHT.

Ein Algorithmus zur Konstruktion gegebener 3-zusammenhängender Graphen
(An algorithm for the construction of a given 3-connected graph)

Supervisor: Günter Rote.

KATHRIN HOLWEGER.

Kontrollpolygone als geometrische Filter
(Control Polygons as Geometric Filters)

Supervisor: Christian Knauer.

ROBERT GÜNZLER.

Phantom-basierte Navigation in intra-operativ akquirierten Fluoroskopiebildern
(Phantom-based navigation in fluorescence images acquired during surgery)
Supervisor: Christian Knauer.

SOPHIE JESCHKE.

Planare Graphen kleiner Dilatation
(Planar Graphs of Small Dilatation)
Supervisor: Christian Knauer.

CHRISTIAN PAUL.

Numerische Experimente zum Kreisproblem von Gauß
(Numerical experiments on the circle problem by Gauß)
Supervisor: Günter Rote.

YVONNE SCHINDLER.

EMD
(Earth Mover's Distance)
Supervisor: Christian Knauer.

MARC SCHERFENBERG.

Probabilistische Anpassung von Formen unter affinen Abbildungen
(Probabilistic Matching of Shapes Under Affine Maps)
Supervisor: Helmut Alt.

FABIAN STEHN.

Analyse und Implementierung von Beleuchtungsalgorithmen in interaktiver Geometriesoftware
(Analysis and Implementation of Illumination Algorithms in Interactive Geometry Software)
Supervisor: Christian Knauer.

9. Miscellaneous

HELMUT ALT

- Guest professor (F. C. Donders-Leerstool), University of Utrecht, The Netherlands, February–April.
- Speaker of the graduate program *Combinatorics, Geometry, and Computation*.
- Speaker of the *Section Theoretical Informatics* (Fachausschuss Theoretische Informatik) of Gesellschaft für Informatik (GI).
- Speaker of the Research Training Network *Combstru* in Berlin.
- Chairman of the teaching assistant selection committee at the Computer Science Institute, Freie Universität Berlin.
- Member of the directorial board of *GIBU* (GI council of university professors).
- Member of the Ph.D. committees of:
 - Max Wardetzky, Freie Universität Berlin
 - Frahad Musaeekh, IIT Kharagpur, India

- Member of the program committee *International Conference on Shape Modeling and Applications (SMI 06)*.
- Referee for the diploma thesis of
 - Sophie Jeschke, Freie Universität Berlin
 - Yvonne Friedland geb. Schindler, Freie Universität Berlin
 - Marc Scherfenberg, Freie Universität Berlin
- Referee for DFG - Deutsche Forschungsgemeinschaft (German Science Foundation).
- Referee for various journals, conferences, and faculty search committees.
- Author and editor of “Algorithmus der Woche” (algorithm of the week) of the German council of computer science institutes (Fakultätentag Informatik).

FRANK HOFFMANN

- Member of the committee for curriculum and examinations in computer science at the FU Berlin.
- Member of the committee for curriculum and examinations in computer science and bioinformatics at the FU Berlin.
- Member of the joint committee for bioinformatics at the FU Berlin.

DARKO DIMITROV

- Research stay at the Department of Mathematics, University of Ljubljana, with Dr. Riste Skrekovski, March 1st-13th, July 2nd-14th, December 27th-31st.
- Research stay at the Department of Theoretical Computer Science, Charles University Prague, with Dr. Riste Skrekovski, August 7th-14th.

CLAUDIA KLOST

- Referee for “Algorithmus der Woche” (algorithm of the week) of the German council of computer science institutes (Fakultätentag Informatik).

CHRISTIAN KNAUER

- Member of the departmental council (Fachbereichssrat) of mathematics and computer science, Freie Universität Berlin.
- Member of the institute council (Institutsrat) of computer science, Freie Universität Berlin.
- Managing director of the institute of computer science, Freie Universität Berlin.
- Project leader of the research project “Punktregistrierung in Flächen (Point registration in surfaces)” (together with Klaus Kriegel).
- Project leader of the research project “Strukturen für geometrische Muster (Structures for geometric patterns)” (together with Helmut Alt).
- Project leader of the research project “Measuring the similarity of geometric graphs”.
- Junior faculty in the research training Group *Methods for Discrete Structures*, since October 1st.
- Referee for the diploma theses of
 - Kathrin Holweger, Freie Universität Berlin
 - Sophie Jeschke, Freie Universität Berlin
 - Yvonne Friedland geb. Schindler, Freie Universität Berlin
 - Marc Scherfenberg, Freie Universität Berlin

Fabian Stehn, Freie Universität Berlin

- Referee for *STACS 2006*.
- Referee for *SoCG 2006*.
- Referee for *COCOON 2006*.
- Referee for *WABI 2006*
- Referee for *ISAAC 2006*
- Referee for *ACM TALG*
- Referee for *JDA*
- Referee for *IJCGA*.
- Referee for *IEE Proc. Comm.*
- Referee for *STACS 2007*.
- Research stay at Korean Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea, (with Prof. Dr. Otfried Cheong), September.

KLAUS KRIEGEL

- Member of the teaching assistant selection committee.
- Member of the library committee and person in charge for the library of the institute.
- Project leader of the research project “Punktregistrierung in Flächen (Point registration in surfaces)” (together with Christian Knauer).
- Referee for the diploma thesis of
 - Robert Günzler
 - Fabian Stehn
- Referee for the bachelor thesis of Elena Reiffel.
- Supervisor and referee for 4 special learning activities within the examination at Berlin high schools.

TOBIAS LENZ

- Member of the teaching assistant selection committee.
- Member of EDV committee.

GÜNTER ROTE

- Coordinator of the Erasmus/Socrates student exchange program for the departments of mathematics and computer science.
- Supervisor and reviewer of the Ph.D. thesis of for Ares Ribó, chairman of the committee.
- Member of selection and examination committee for *Sélection internationale*, École Normale Supérieure, Paris, (scholarships awarded to outstanding students from abroad).
- Member of examination committee for Computer Science, deputy chairman in charge of M.Sc. admissions.
- Member of the programm committee “Workshop on Geometric and Topological Combinatorics, August 31st–September 5th, Alcalá de Henares, Spain”.
- Member of the programm committee 4OSME, 4th International Conference on Origami in Science, Mathematics, and Education, September 8th–10th, Pasadena, USA.

- Site leader of the Berlin part of the research project “ACS (Algorithms for Complex Shapes with certified topology and numerics)”.
- Coreviewer for the Ph.D. dissertation of
 - Sarah Kappes, Technische Universität Berlin
 - Simon Plantinga, Groningen University
- Coreviewer for the diploma theses of Sophie Jeschke.
- Supervisor and reviewer of the diploma thesis of
 - Simon Albroscheit
 - Christian Paul
- Referee for the Conferences:
 - ICCSA 2006*, International Conference on Computational Science and its Applications.
 - SoCG 2006*, 22nd Annual Symposium on Computational Geometry, June 2006, Sedona.
 - MFCS 2006*, Mathematical Foundations of Computer Science.
 - STACS 2006*, Symposium on Theoretical Aspects of Computer Science.
 - IPCO 2007*, Integer Programming and Combinatorial Optimization.
- Referee for the journals:
 - Algorithmica, Computer-Aided Geometric Design, Discrete and Computational Geometry, SIAM Journal on Optimization, Computational Geometry - Theory and Applications, Journal of Combinatorial Theory, Series A.

LUDMILA SCHARF

- Referee for *Pattern Recognition*.

ANDRE SCHULZ

- Referee for *SoCG 2007*.

FABIAN STEHN

- Research stay at the Division of Computer Science, Korea Advanced Institute of Science and Technology (KAIST), with Prof. Dr. Otfried Cheong, Sep 5th - 23th.

ASTRID STURM

- Research stay at the University of Groningen with Prof. Gert Vegter, January 15th–26th.

Appendix:

Talks in the *Noon Seminar* 12.00 a.m.

January 5: FRANK HOFFMANN
Orthogonal Graphs and Polyhedra (II)

January 10: TOBIAS LENZ
Splitters in Streams - Part 2

January 12: HELMUT ALT
Constructing Optimal Highways

January 17: HYO-SIL KIM
Hierarchical Decompositions and Circular Ray Shooting in Simple Polygons. By Otfried Cheong et al.

January 19: OLIVER KLEIN
Stacking and Bundling Two Convex Polygons

January 24: LUDMILA SCHARF
Geo-Routing

January 26: HOSAM ABDO
Planar subgraph polytope

January 31: MAIKE BUCHIN
Weaker variants of the Fréchet distance

February 2: SVEN SCHOLZ
Comparing Sets of Line Segments

February 7: GÜNTER ROTE
Homotopy-equivalence and puzzles

February 9: BRITTA DENNER-BROSER
Predictor Corrector Methods and the Tracing Problem

February 14: KLAUS KRIEGEL
On the number of cycles in planar graphs

February 16: KEVIN BUCHIN
Incremental Construction of a Delaunay Triangulation with Lawson's Oriented Walk

February 23: ANDRÉ SCHULZ
Coordinate Representation of Order Types

February 28: KATHRIN HOLWEGGER
Filterung von Schnittpunkten bei Bezierkurven mit Hilfe von Envelopes (Diplomvortrag)

March 2: ASTRID STURM
Approximation of an open polygonal curve with min. number of circular arcs

March 3: PANOS GIANNOPOULOS
Fixed-parameter intractability of the subset congruence and related problems

- March 7: TOBIAS LENZ
Fun-Sort or How to Abuse Binary Search Properly
- March 9: KEVIN BUCHIN
Acyclic Orientation of Drawings
- March 14: CLAUDIA KLOST
Analysing Friezes Using the Discrete Fourier Transform
- March 16: GÜNTER ROTE
Recognizing the unknot
- March 21: DARKO DIMITROV
On the PCA Bounding Boxes
- March 23: FABIAN STEHN
Analyse und Implementierung von Beleuchtungsalgorithmen in interaktiver Geometriesoftware
- March 28: FRANK HOFFMANN
Convex Quadrilateralizations and Nante's Problem
- March 30: OLIVER KLEIN
Approximation Techniques for Indexing the Earth Mover's Distance in Multimedia Databases
- April 6: MAIKE BUCHIN
On the Complexity of Terrains
- April 11: KLAUS KRIEGEL
Kasteleyn's Theorem and Pfaff Orientations
- April 13: ANDRÉ SCHULZ
Hamiltonicity in Flip-graphs
- April 18: YVONNE SCHINDLER
Diplomvortrag: Realisierung und Vergleich von Algorithmen zur Berechnung des Earth Mover's Abstands
- April 20: SVEN SCHOLZ
Gestalt-based feature similarity measure in trademark database
- April 25: TOBIAS LENZ
Existence of an Equipartition for Algebraic Curves
- April 27: CLAUDIA KLOST
Symmetry in Chaos
- May 2: GÜNTER ROTE
Obnoxious Centers in Graphs of Bounded Tree Width
- May 4: KEVIN BUCHIN
Incremental construction with space-filling curves on normally distributed points
- May 9: CHRISTIAN KNAUER
Computing the largest rectangle in a convex polygon

- May 11: HELMUT ALT
Packing Chains into Boxes
- May 16: FABIAN STEHN
How to get (k-)connected
- May 18: LUDMILA SCHARF
Polygonal Approximation of Laser Range Data Based on Perceptual Grouping and EM
- May 23: ASTRID STURM
Approximation with Biarcs
- May 30: OLIVER KLEIN
On Reference Points and Applications
- June 1: ROBERT GÜNZLER
Registrierung zwischen Patient und Intraoperativ akquirierten Flurososkopiebildern
(Diplomvortrag)
- June 8: KLAUS KRIEGEL
Equitable Subdivisions within Polygonal Regions
- June 13: CLEMENS HUEMER
Connecting Colored Point Sets
- June 15: DARKO DIMITROV
On PCA bounding boxes - lower bounds
- June 20: ANDRÉ SCHULZ
Flipping within degree bounds
- June 22: TRUNG NGUYEN
Covering a disk by the Minkowski difference of a set of disks
- June 27: SVEN SCHOLZ
Matching Hierarchical Structures using Association Graphs
- June 29: CLAUDIA KLOST
Triangulated polygons and frieze patterns
- July 4: TOBIAS LENZ
One hundred prisoners and a lightbulb
- July 6: MAIKE BUCHIN
Finding Shortest Paths in a Simple Polygon with Small Frechet Distance to a Diagonal
- July 11: CHRISTIAN KNAUER
A variation on the vertex cover problem
- July 13: KEVIN BUCHIN
Transforming Spanning Trees: A Lower Bound Construction
- July 18: GÜNTER ROTE
Obnoxious centers in graphs of bounded tree-width
- July 20: EYAL ACKERMAN
Counting rectangulations

- July 25: HELMUT ALT
Approximation Bounds for Planar Point Pattern Matching
- July 27: CAROLA WENK
Fréchet distance for curves - revisited
- August 1: TRUNG NGUYEN
Covering a disk by the Minkowski difference of a set of disks II
- August 3: FABIAN STEHN
Finding nearest neighbour in expected logarithmic time using modified KD-trees
- August 8: HELMUT ALT
Packing Chains into Boxes II
- August 10: OLIVER KLEIN
A 1.5-Approximation of the Minimal Manhattan Network Problem
- August 15: ANDRÉ SCHULZ
Embedding 3-Polytopes in the Grid
- August 17: LUDMILA SCHARF
Pose Clustering with Density Estimation and Structural Constraints
- August 22: WOLFGANG MULZER
Data Structures on Markov Chains
- August 24: SVEN SCHOLZ
A Spatial Similarity Algorithm
- August 29: FRANK HOFFMANN
Prüfer codes
- August 31: ASTRID STURM
Linear time approximation of 3D convex polytopes
- September 5: KLAUS KRIEGEL
Partitions of complete geometric graphs into plane trees
- September 7: DARKO DIMITROV
The number of perfect matchings in a hypercube
- September 12: CLAUDIA KLOST
The 17 Wallpaper Groups
- September 14: KEVIN BUCHIN
Magic Configurations
- September 19: ANDRE SCHULZ
A New Upper Bound for the Number of Cycles in Planar Graphs
- September 21: GÜNTER ROTE
The juicebox problem - how to increase the volume of a rectangular box by deforming its surface (including a practical demonstration)
- September 26: MAIKE BUCHIN
Weak Fréchet distance of triangulated Surfaces

- September 28: MARC SCHERFENBERG
Probabilistische Anpassung von Formen unter affinen Abbildungen (Diplomvortrag)
- October 5: TOBIAS LENZ
Carpenter's Rule Packings - A Lower Bound
- October 10: CHRISTIAN KNAUER
How to break a cycle
- October 12: HELMUT ALT
The Radon transform and the Hough transform
- October 17: FABIAN STEHN
Robust point matching for non-rigid shapes: a relaxation labeling based approach
- October 19: OLIVER KLEIN
Minimizing the Bottleneck Distance Under Rotations
- October 24: LUDMILA SCHARF
Probability density estimation, an overview
- October 26: GÜNTER ROTE
Vertex enumeration for polyhedra is NP-hard
- October 31: KLAUS KRIEGEL
Vertex Guards I
- November 2: FRANK HOFFMANN
Vertex Guards II
- November 7: SVEN SCHOLZ
Similarity Retrieval based on Image Primitives
- November 9: LEIF HARRAS
The Rogers - Ramanujan Identities
- November 14: KLAUS KRIEGEL
PCA Bounding Boxes I: Bounds on the variance with the mean value theorem
- November 16: DARKO DIMITROV
PCA Bounding Boxes II: The 3-dimensional case
- November 21: ASTRID STURM
Convex Approximation by Spherical Patches
- November 23: KEVIN BUCHIN
Algorithms for the Space-filling Curve Heuristic for the Euclidean Traveling Salesperson Problem
- November 28: CLAUDIA KLOST
Partial and Approximate Symmetry Detection for 3D Geometry
- November 30: ANDRÉ SCHULZ
The Kakeya Problem
- December 5: MAIKE BUCHIN
Parametric Search for Computing the Weak Frechet Distance

December 7: TOBIAS LENZ

Trivial extensions of my algorithms for medians in streams

December 12: OLIVER KLEIN

Manhattan Networks with $O(n \log n)$ Edges and Applications for the Earth Mover's Distance

December 14: MARC SCHERFENBERG

Hausdorff Distance under Translation for Points and Balls

December 19: HELMUT ALT

Analysis of the ICP-Algorithm

December 21: FABIAN STEHN

Fast gift delivery, APSP in $O(n^3/\log n)$