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STACS '97

14th Symposium on Theoretical Aspects of Computer Science

February 27 – March 1, 1997
Hansestadt Lübeck, Germany

STACS'97

The Symposium on Theoretical Aspects of Computer Science is held annually, alternating between Germany and France. STACS is organized jointly by the Special Interest Group for Theoretical Computer Science of the German Gesellschaft für Informatik (GI) and the Special Interest Group for Fundamental Computer Science of the Association Française des Sciences et Technologies de l'Information et des Systemes (AFCET). STACS'97, the 14th conference in this series, will be held in Lübeck, February 27 – March 1, 1997.

The symposium will feature invited talks and the presentation of original research papers. The proceedings will be published by Springer in the series Lecture Notes in Computer Science.

139 papers have been submitted from all over the world, i.e. United States, Canada, Australia, Japan, India, Korea and most European countries. They address basic problems from many areas of computer science, including algorithms and data structures, computational complexity, automata and formal languages, structural complexity, parallel and distributed systems, parallel algorithms, semantics, specification and verification, logic, computational geometry, cryptography, learning and inductive inference.

46 submitted papers and 3 invited talks have been selected for presentation at this symposium, constituting a representative ensemble of excellent new research results in the fundamentals of computing. We encourage you to participate in what promises to be an exciting and important event.

Program

Thursday, February 27

9.00 **Welcome** *(R. Reischuk)*

9.05 **Invited Talk**
Unifying Models, *B. Steffen*

Session 1A: Algorithms I

10.15 Predecessor Queries in Dynamic Integer Sets, *G.S. Brodal*

10.45 Semi-Dynamic Shortest Paths and Breadth-First Search in Digraphs, *P.G. Franciosa, D. Frigioni, R. Giaccio*

Session 1B: Automata Theory I

10.15 Greibach Normal Form Transformation, Revisited, *R. Koch, N. Blum*

10.45 Translating Regular Expressions into Small ε-Free Nondeterministic Finite Automata, *J. Hromkovič, S. Seibert, T. Wilke*

11.15 **Coffee Break**

Session 2A: Algorithms II

11.45 Memory Management for Union-Find Algorithms, *C. Fiorio, J. Gustedt*

12.15 Fast Online Multiplication of Real Numbers, *M. Schröder*

Session 2B: Structural Complexity I

11.45 The Operators min and max on the Polynomial Hierarchy, *H. Hempel, G. Wechsung*

12.15 Resource-Bounded Kolmogorov Complexity Revisited, *H. Buhrman, L. Fortnow*

12.45 **Lunch**

Session 3A: Probabilism

14.30 Las Vegas Versus Determinism for One-way Communication Complexity, Finite Automata, and Polynomial-time Computations, *P. Ďuriš, J. Hromkovič, J.D.P. Rolim, G. Schnitger*

15.00 Interactive Proof Systems with Public Coin: Lower Space Bounds and Hierarchies of Complexity Classes, *M. Liśkiewicz*

15.30 MOD_p-tests, Almost Independence and Small Probability Spaces, *C. Bertram-Kretzberg, H. Lefmann*

Session 3B: Specification and Verification

14.30 Hybrid Diagrams: A Deductive-Algorithmic Approach to Hybrid System Verification, *L. de Alfaro, A. Kapur, Z. Manna*

15.00 Temporal Logics for the Specification of Performance and Reliability, *L. de Alfaro*

15.30 Efficient Scaling-Invariant Checking of Timed Bisimulation, *C. Weise, D. Lenzkes*

16.00 **Coffee Break**

Session 4A: Boolean Functions

16.30 Gossiping and Broadcasting versus Computing Functions in Networks, *M. Dietzfelbinger*

17.00 On the Descriptive and Algorithmic Power of Parity Ordered Binary Decision Diagrams, *S. Waack*

17.^{30} A Reducibility Concept for Problems Defined in Terms of Ordered Binary Decision Diagrams, *C. Meinel, A. Slobodová*

Session 4B: Logic and Learning

16.^{30} On the Classification of Computable Languages, *J. Case, E. Kinber, A. Sharma, F. Stephan*

17.^{00} A Conditional-Logical Approach to Minimum Cross-Entropy, *G. Kern-Isberner*

17.^{30} Undecidability Results on Two-Variable Logics, *E. Grädel, M. Otto, E. Rosen*

19.^{00} **Reception** in the "Audienzsaal", Rathaus (Town Hall)

Friday, February 28

9.^{00} **Invited Talk**
Methods and Applications of (MAX,+) Linear Algebra, *S. Gaubert*

Session 5A: Automata Theory II

10.^{15} Regular Expressions and Context-Free Grammars for Picture Languages, *O. Matz*

10.^{45} Measuring Nondeterminism in Pushdown Automata, *J. Goldstine, H. Leung, D. Wotschke*

Session 5B: Structural Complexity II

10.^{15} On Polynomially D-Verbose Sets, *A. Nickelsen*

10.^{45} A Downward Translation in the Polynomial Hierarchy, *E. Hemaspaandra, L.A. Hemaspaandra, H. Hempel*

11.^{15} **Coffee Break**

Session 6A: Complexity Theory I

11.^{45} Strict Sequential P-completeness, *K. Reinhardt*

12.^{15} An Unambiguous Class Possessing a Complete Set, *K.-J. Lange*

Session 6B: Parallel and Distributed Systems I

11.^{45} Deadlock-Free Interval Routing Schemes, *M. Flammini*

12.^{15} Power Consumption in Packet Radio Networks, *L.M. Kirousis, E. Kranakis, D. Krizanc, A. Pelc*

12.^{45} **Lunch**

Session 7A: Complexity Theory II

14.^{30} The Complexity of Generating Test Instances, *C. Karg, J. Köbler, R. Schuler*

15.^{00} Efficient Construction of Hitting Sets for Systems of Linear Functions, *A.E. Andreev, A.E.F. Clementi, J.D.P. Rolim*

15.^{30} Protocols for Collusion-Secure Asymmetric Fingerprinting, *I. Biehl, B. Meyer*

Session 7B: Parallel and Distributed Systems II

14.^{30} Minimal Transition Systems for History-Preserving Bisimulation, *U. Montanari, M. Pistore*

15.^{00} On Ergodic Linear Cellular Automata over Z_m, *G. Cattaneo, E. Formenti, G. Manzini, L. Margara*

15.^{30} Intrinsic Universality of a 1-Dimensional Reversible Cellular Automaton, *J.O. Durand-Lose*

16.^{00} **Coffee Break**

Session 8A: Complexity Theory III

16.^{30} The Computational Complexity of Some Problems of Linear Algebra, *J.F. Buss, G.S. Frandsen, J.O. Shallit*

17.^{00} Algebraic and Logical Characterizations of Deterministic Linear Time Classes, *T. Schwentick*

Session 8B: Parallel Algorithms

16.^{30} Finding the k Shortest Paths in Parallel, *E. Ruppert*

17.^{00} Sequential and Parallel Algorithms on Compactly Represented Chordal and Strongly Chordal Graphs, *E. Dahlhaus*

Social Event

17.^{45} Guided tour of the "Old Town" (optional)

19.^{00} Organ concert, Prof. Schoof, Jakobikirche: D. Buxtehude, J.S. Bach, Improvisation

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20.^{00} **Conference Dinner**

Saturday, March 1

Session 9A: Algorithms III

9.^{15} Distance Approximating Spanning Trees, *E. Prisner*

9.^{45} A Better Upper Bound on the Bisection Width of de Bruijn Networks, *R. Feldmann, B. Monien, P. Mysliwietz, S. Tschöke*

Session 9B: Structural Complexity III

9.^{15} An Information-Theoretic Treatment of Random-Self-Reducibility, *J. Feigenbaum, M. Strauss*

9.^{45} Equivalence of Measures of Complexity Classes, *J.M. Breutzmann, J.H. Lutz*

10.^{15} **Coffee Break**

Session 10A: Algorithms IV

10.^{45} Better Algorithms for Minimum Weight Vertex-Connectivity Problems, *V. Auletta, M. Parente*

11.^{15} RNC-Approximation Algorithms for the Steiner Problem, *H.J. Prömel, A. Steger*

Session 10B: Automata Theory III

10.^{45} Pattern Matching in Trace Monoids, *J. Messner*

11.^{15} Removing ε-Transitions in Timed Automata, *V. Diekert, P. Gastin, A. Petit*

11.^{50} **Invited Talk**
Probabilistic Proof Systems – A Survey, *O. Goldreich*

General Information

Location

Hansestadt Lübeck (218000 inhabitants) is located in Germany, only 20 km away from the Baltic Sea with direct connection by the Trave delta. Lübeck was founded in the 12^{th} century. In the Middle Ages, it became the leader of the Hanseatic League. Since 1987 the old part of Lübeck is included in the list of "Cultural and Historical Heritage of the World" by the UNESCO. All technical sessions of the conference will take place at the Mövenpick Hotel which is conventiently located between the main station and the old part of Lübeck.

Climate

The weather at the end of February may be cold, wet or windy. Day heights vary from 5 to 10 degrees Celsius, night lows vary from 0 to -5 degrees Celsius. Rain or snow is likely.

Transportation

There are several ways to reach Lübeck. For traveling by car, use the motorway A1/E22 which runs from Hamburg and Bremen to Oldenburg/Holstein. The airport at Hamburg offers various connections to international airports. From the airport, a bus shuttle is going to Hamburg main railway station. The Deutsche Bahn offers trains from Hamburg to the main station in Lübeck every hour. Besides, Hamburg and Lübeck can be reached by ICE and IC/EC trains. The conference venue is located close to the main railway station within a five minutes walk.

Registration

The registration desk will be open from 18.^{00} until 21.^{00} on Wednesday, February 26, and during the day on Thursday and Friday.

Conference Events

A reception will be held on Thursday at 19.^{00} in the Audienzsaal at the Town Hall. On Friday afternoon, a guided tour of the Old Town, an organ concert in the Jakobikirche, and the conference dinner in the "Historischer Weinkeller unter dem Heiligen-Geist-Hospital" will give a taste of the culture of Lübeck. A lunch buffet will be served in the Mövenpick hotel on Thursday and Friday.

Proceedings

Additional copies of the proceedings will be sold during the conference at the registration desk.

Points of Interest

The city of Lübeck looks back on over 850 years of history. It was originally founded in 1143 by Earl Adolf II. von Schauenburg and newly founded in 1159 by Duke Heinrich dem Löwen after the town was destroyed by a great fire. In the Middle Ages, Lübeck developed to become the political and financial centre of Northern Europe due to its economically and geographically advantageous position. It became the leader of the Hanseatic League, a seafaring rights-and-trading alliance of over 200 towns. Lübecks influence is documented in its appearance which is dominated by five monumental churches, namely the Dom, St. Jakobi, St. Petri, St. Marien and St. Aegidien, all built from the 12th to the 14th century. Their seven steeples can still be seen today, climbing high above the brick Gothic buildings which form the shape of the Old Town nowadays. There are over 1000 protected historical buildings in Lübeck. The Old Town is completely surrounded by water and can conveniently be explored by feet. Not far from the conference venue, there lies the Holstentor (look at the STACS'97 poster!), somehow the "entrance" to the Old Town. The centre of the town is the market place with the Town Hall, built in the 13th and 14th centuries. Other interesting sights are the Salzspeicher (salt lofts), the Schiffergesellschaft (assembly hall of sailors), the Heiligen-Geist-Hospital (former hospital for ill and old people), the Burgkloster (monastery belonging to the castle) and the Alte Seefahrtschule (former merchant navy training college, now part of the Computer Science Department). Apart from these famous historical buildings, there are a lot of narrow alleyways stretching from the front of the buildings and leading to romantic courtyards, giving the Old Town a very characteristic and charming appearance.

Organization

Organizing Committee

G. Buntrock, G. Claasen, K. Genther, J. Heinrichs, A. Jakoby, R. Reischuk, C. Schindelhauer, S. Weis.

Program Committee

J.-P. Allouche, J. Dassow, A. Ferreira, J.L. Fiadeiro, R. Freivalds, M. Kummer, M. Kutylowski, C. Lengauer, M. Morvan (co-chair), L. Puel, P. Ragde, R. Reischuk (chair), M. Santha, V. Tannen, D. Wagner.

Sponsoring

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Further Information

Please contact:

Rüdiger Reischuk
c/o STACS'97, Universität Lübeck
Institut für Theoretische Informatik
Wallstraße 40
D–23560 Lübeck, Germany

Phone: (+49) 451 7030-418
FAX: (+49) 451 7030-438
Email: `stacs97@informatik.mu-luebeck.de`

For up to date information see WWW at URL:
`http://www.itheoi.mu-luebeck.de/stacs97/`