Curriculum Vitae of Michael Langberg

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For personal information see footnote[1].

Research Interests:

My studies and research are in the fields of Theoretical Computer Science and Information Theory. My broad area of interest is in the design and analysis of algorithms for combinatorial problems. I have special interest in algorithmic and combinatorial aspects of Information Theory and in the study of approximation algorithms for NP-hard problems. Closely related interests of mine include computational and combinatorial geometry, probabilistic methods in combinatorics, the use of randomization in computation, coding theory and computational complexity.

Education:

1994-1996 : B.Sc. in Mathematics and Computer Science (Summa Cum Laude).
Tel-Aviv University (Tel-Aviv, Israel).

1997-1998 : M.Sc. in Computer Science.
Weizmann Institute of Science (Rehovot, Israel).
Adviser: Prof. Uriel Feige.
M.Sc. thesis: "Approximation Algorithms for Maximization Problems arising in Graph Partitioning".

1999-2003 : Ph.D. in Computer Science.
Weizmann Institute of Science (Rehovot, Israel).
Adviser: Prof. Uriel Feige.
Ph.D. Dissertation: "Coping with NP-hardness: Approximation algorithms based on semidefinite programming".

[1] Address : Nathan Alterman street 2, Gan Yavne, 70800.
Telephone : 077-213-1422.
Birthdate : 3 November 1968.
Marital status : Married + 2 children.
Military service : Served in Israel Air Force between 1987-1993. Current military rank of Major (reserve).

Positions:

Summer 2003	:	Research Scholar. Department of Computer Science, Tel-Aviv University (Tel-Aviv, Israel). Adviser: Prof. Uri Zwick.
2003 - 2006	:	Postdoctoral Scholar. Department of Computer Science, California Institute of Technology (Pasadena, CA).
2006 -	:	Senior Faculty, Senior Lecturer. Computer Science Division, The Open University of Israel (Raanana, Israel).

Awards:

1994	:	Dean's honor award for B.Sc. students, Tel-Aviv University.
1995	:	Dean's honor award for B.Sc. students, Tel-Aviv University.
1996	:	Dean's honor award for B.Sc. students, Tel-Aviv University.
2000	:	Fellowship of excellence for Ph.D. students, the Israeli Ministry of Education.
2001	:	Fellowship of excellence for Ph.D. students, the Israeli Ministry of Education.

Sponsored research:

2007	:	The Open University of Israel, "Internal grant A": 97,000 NIS. Title: Clustering of incomplete data.
2008	:	Cisco Collaborative Research Initiative (CCRI): 80,000 USD. Title: Protocol Oblivious (Behavioral) Internet Traffic Classification. Joint with Prof. David Peleg and Dr. Liam Roditty (Weizmann Institute of Science).
2009-2012	:	ISF grant 450/08: 98,000 NIS., annually. Title: Between Hamming and Shannon: merging perspectives from the fields of Information Theory and Theoretical Computer Science.
2010	:	The Open University of Israel, "Internal grant A": 54,000 NIS. Title: Coding for flash memories.

Teaching experience:

1998	:	Weizmann Institute of Science (Rehovot, Israel). Teaching assistant of the course "Advanced topics in automata and computability". Teacher: Prof. David Harel.
1998-2000	:	The Open University of Israel (Tel-Aviv, Israel). Teacher of the course "Discrete mathematics" (5 semesters).
2001-2002	:	The Open University of Israel (Tel-Aviv, Israel). Teacher of the graduate course "Selected topics in algorithms" (5 semesters).
2003	:	The Open University of Israel (Tel-Aviv, Israel). Teacher of the graduate course "Approximation algorithms" (1 semester).
2010	:	The Open University of Israel (Tel-Aviv, Israel). Teacher of the graduate course "Randomized algorithms" (1 semester).

Supervision for higher degrees:

M.Sc. thesis:

2007-2009 : Leah Nutman (M.Sc. student, thesis).
Topic: "*Adversarial Models and Resilient Schemes for Network Coding*".
Status: completed March 2009.

2007-2010 : Doron Goldstein (M.Sc. student, thesis).
Topic: "*The dense-k-subgraph problem*".
Status: completed March. 2010.

2009 : Slava Vaisman (M.Sc. student, thesis).
Jointly advised with Prof. Reuven Rubinstein from the Technion.
Topic: "*Monte-Carlo Algorithms with Splitting: How to Improve the Classic Randomized Algorithms*".
Status: completed Jan. 2010.

2007-2011 : Tomer Peretz (M.Sc. student, thesis).
Topic: "*Clustering of lines*".
Status: thesis submitted Jan. 2011 - currently under external review.

2008- : Yossi Berliner (M.Sc. student, thesis).
Thesis topic: "*Index coding on planar graphs*".
Status: in final stages of writing thesis.
Conference paper submitted Feb. 2011.

2009- : Maty Siman (M.Sc. student, thesis).
Topic: "*Coding for Write Efficient Memories*".
Status: currently writing proposal.

2010- : Sasha Meltser (M.Sc. student, thesis).
Jointly advised with Prof. Reuven Rubinstein from the Technion.
Topic: "*Stochastic Enumeration and Splitting Methods*".
Status: currently writing proposal.

2010- : Yuvalal Liron (M.Sc. student, thesis).
Topic: "*Deletion channels*".
Status: initial stages of study.

2010- : Ilia Levi (M.Sc. student, thesis).
Topic: "*Zero vs. epsilon error interference channels*".
Status: initial stages of study.

2010- : Hanna Feldman (M.Sc. student, thesis).
Topic: "*Multiple unicast via Network Coding*".
Status: initial stages of study.

M.Sc. final project:

2008-2009 : Ofer Ohayon (M.Sc. student, final project).
Topic: "*An introductory course in quantum computation*".
Status: completed Feb. 2010.

2009- : Ofer Schreiber (M.Sc. student, final project).
Topic: "*The Li-Li Multiple Unicast conjecture in undirected Network Coding*".
Status: proposal approved.

Research assintants:

2007-2008	: Dr. Liam Roditty (part time, during postdoctoral studies at the Weizmann Institute). Funded by Cisco Collaborative Research Initiative and Internal Grant A of the Open University.
2007-2009	: Dan Feldman (part time, during PhD studies at Tel-Aviv University). Funded by Cisco Collaborative Research Initiative and Internal Grant A of the Open University.
2010	: Dr. Noam Solomon (part time, during postdoctoral studies at the Hebrew Univ. of Jer.). Funded by ISF grant 450/08.
2009-	: Ishay Haviv (part time, during PhD studies at Tel-Aviv University). Funded by ISF grant 450/08 and Internal Grant A of the Open University.
2010-	: Dr. Mira Gonen (part time, during postdoctoral studies at Bar-Ilan University). Funded by ISF grant 450/08 and Internal Grant A of the Open University.

Consulting experience:

1995-1997	: Mercury Interactive. R&D of algorithms for automated software quality assurance.
2001-2002	: Optivera Technologies. Research consultant for the design of optical networking algorithms.

Professional activities:

On Technical Program Committee:

- IEEE International Symposium on Information Theory (ISIT), Cambridge MA, USA, 2012.
- Workshop on Network Coding (NetCod), Beijing, China, July 2011.
- IEEE Information Theory Workshop, Dublin (ITW) 2010. Also organized invited session on "Channel uncertainty"(jointly with Navin Kashyap).
- The 19th International Conference on Computer Communications and Networks (ICCCN), Zurich, Switzerland , August 2010.
- Workshop on the Application of Communication Theory to Emerging Memory Technologies (ACTEMT), Miami, FL, 2010 (held in conjunction with IEEE Globecom 2010).
- Workshop on Network Coding (NetCod), Lausanne, Switzerland, June 2009.
- The 18th International Conference on Computer Communications and Networks (ICCCN), San Francisco, CA, August 2009.
- Annual CS Theory Day at the Open University (initiator and organizer of the first theory day that took place in 2008 and acted as co-organizer in theory day of 2009).

Reviewer for:

- Journals:
  - ACM Transactions on Algorithms.
  - Algorithmica.
  - Designs, Codes and Cryptography.
  - Discrete Applied Mathematics.

  - IEEE Transactions on Information Theory.
  - IEEE Journal on Selected Areas in Communications.
  - Joint special issue of IEEE Trans. on Information Theory & IEEE/ACM Trans. on Networking on Networking and Information Theory.
  - Journal of Algorithms.
  - Journal of Combinatorial Optimization.
  - Journal of Computer Science and Technology.
  - Operations Research Letters.
  - Optimization Methods and Software.
  - SIAM Journal on Computing.
  - SIAM Journal on Discrete Mathematics.
  - 4OR.

- Conferences:
  - ACM Symposium on Theory of Computing (STOC).
  - ACM-SIAM Symposium on Discrete Algorithms (SODA).
  - IEEE Information Theory Workshop (ITW).
  - IEEE International Conference on Communications (ICC).
  - IEEE International Symposium on Information Theory (ISIT).
  - IEEE Symposium on Foundations of Computer Science (FOCS).
  - International Colloquium on Automata, Languages and Programming (ICALP).
  - International Conference on Computer Communications and Networks (ICCCN).
  - International Conference on Information Theoretic Security (ICITS).
  - International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX).
  - Latin American Theoretical Informatics Symposium (LATIN).
  - Theory of Cryptography Conference (TCC).
  - Workshop on Approximation and Online Algorithms (WAOA).
  - Workshop on Network Coding (NetCod).

Talks given at official scientific gatherings:

- *Improved approximation of Max-Cut on graphs of bounded degree.*
  - Dagstuhl Seminar 41/2000 on Linear, Semidefinite Programming and Randomization Methods for Combinatorial Optimization Problems (2000).

- *On the hardness of approximating NP witnesses.*
  - 3rd International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX 2000).

- *The RPR^2 rounding technique for semidefinite programming.*
  - 28th International Colloquium on Automata, Languages and Programming (ICALP 2001).
  - Dagstuhl Seminar 1231/2001 on Design and Analysis of Randomized and Approximation Algorithms (2001).

- *Graphs with tiny vector chromatic numbers and huge chromatic numbers.*
  - 43rd Annual IEEE Symposium on Foundations of Computer Science (FOCS 2002).

  - Presented in Computer Science seminars in the following institutions (2002/3): Carnegie Mellon University, Center for Discrete Mathematics and Theoretical Computer Science (DIMACS), Hebrew University of Jerusalem, IBM Almaden Research Center, Institute for Advanced Study (Princeton), Massachusetts Institute of Technology, Stanford University, Tel-Aviv University, University of California at Berkeley, University of Chicago, University of Toronto, Weizmann Institute of Science.

- *Testing the independence number of hypergraphs.*
  - 8th International Workshop on Randomization and Computation (RANDOM 2004).
  - Theory seminar, Caltech (2004).

- *The Multi-Multiway Cut Problem.*
  - Oberwolfach seminar on Approximation Algorithms for NP-Hard Problems (2004).

- *Private codes or Succinct random codes that are (almost) perfect.*
  - 45th Annual IEEE Symposium on Foundations of Computer Science (FOCS 2004).
  - Center for Mathematics of Information at Caltech (2004).
  - Presented in Computer Science/Electrical Engineering seminars in the following institutions (2004): Bar-Ilan University, Ben-Gurion University of the Negev, Caltech, University of Haifa, Hebrew University of Jerusalem, Humboldt University of Berlin, The Open University of Israel, Technion, Tel-Aviv University.

- *The encoding complexity of network coding.*
  - IEEE International Symposium on Information Theory (ISIT 2005).
  - INFORMS Annual Meeting (2005).
  - Dagstuhl Seminar 05201 on Design and Analysis of Randomized and Approximation Algorithms (2005).
  - Presented in Computer Science/Electrical Engineering seminars in the following institutions (2004): Bar-Ilan University, Ben-Gurion University of the Negev, University of Haifa, Hebrew University of Jerusalem, The Open University of Israel, Technion, Tel-Aviv University.

- *Analysis of Incomplete Data and an Intrinsic-Dimension Helly Theorem.*
  - Center for Mathematics of Information at Caltech (2005).

- *Staleness vs. Waiting Time in Universal Discrete Broadcast.*
  - IEEE International Symposium on Information Theory (ISIT 2006).
  - Presented in Computer Science seminars in the following institutions (2004): Ben-Gurion University of the Negev, University of Haifa.

- *Oblivious channels.*
  - Theory seminar, Caltech (2005).
  - IEEE International Symposium on Information Theory (ISIT 2006).
  - Mathematics of Communications Department, Math Center, Bell Labs. (2006).
  - The Chinese University of Hong Kong (2008).
  - Indian Institute of Technology - Bombay (2008).

- *Network Coding: A Computational Perspective.*
  - 40'th Annual Conference on Information Sciences and Systems (CISS 2006).

- *Approximation Algorithms for Graph Homomorphism Problems.*
  - 9th International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX 2006).

- *Clustering of incomplete data.*
  - Computer Science seminar at Caltech - "lunch bunch" (2006).
  - Tel-Aviv University (2006).
- *Error-correction for Byzantine Adversaries in Networks: A Distributed Network Coding Approach.*
  - 3rd Workshop on Network Coding, Theory, and Applications (NetCod 2007).
  - Ben-Gurion University of the Negev (2007).
  - Bar-Ilan University (2008).
- *Approximating Maximum Subgraphs Without Short Cycles.*
  - Dagstuhl Seminar 08201 on Design and Analysis of Randomized and Approximation Algorithms (2008).
- *Adversarial Models and Resilient Schemes for Network Coding.*
  - IEEE International Symposium on Information Theory (ISIT 2008).
- *On the Hardness of Approximating the Network Coding Capacity.*
  - IEEE International Symposium on Information Theory (ISIT 2008).
  - As part of a tutorial on the "Algorithmic Complexity of Network Coding", in the 2009 Workshop on Network Coding, Theory and Applications (NetCod 2009).
  - BIRS Workshop [09w5103] on "Applications of Matroid Theory and Combinatorial Optimization to Information and Coding Theory", 2009.
  - Workshop on "Facets of Coding Theory: from Algorithms to Networks", Allerton 2010.
- *Universal Rewriting in Constrained Memories.*
  - Information Theory and Applications Workshop (ITA 2009), UCSD.
- *Coding for online channels.*
  - Center for Mathematics of Information, workshop (2009), Caltech.
  - University of California, San Diego, (2009).
  - Ben-Gurion University of the Negev (2010).
  - Texas A & M (2010).
  - Bar-Ilan University (2010).
- *Succinct Network Representations.*
  - IEEE Information Theory Workshop (ITW 2010).
  - 18'th Annual European Symposium on Algorithms (ESA 2010).
- *Beating the Gilbert-Varshamov Bound for Online Channels.*
  - IEEE 26'th Convention of Electrical and Electronics Engineers in Israel (2010).
- *On the Index Coding problem.*
  - Information Theory and Applications Workshop (ITA 2011).

Open University course development:

2007-2009 : "Randomized algorithms" (M.Sc. course).
Academic adviser: Prof. Seffi Naor.

2010- : Internal adviser of "Computational Complexity" (M.Sc. course).
Academic adviser: Prof. Noam Nisan.
Course writer: Dr. Assaf Nussbaum.

2010- : "Advanced topics in algorithms" (M.Sc. course).
Together with: Prof. Zeev Nutov and Dr. Manor Mendel.

Open University course supervision:

2007-2011 : Academic adviser of "Randomized algorithms" (M.Sc. course).

2007-2011 : Academic adviser of "Computational Geometry" (M.Sc. course).

2007-2011 : Academic adviser of "Automata and formal languages" (B.Sc. course).

2007-2011 : Academic adviser of "Coding Theory" (B.Sc. course).

Michael Langberg: list of publications.

Remark 1: Each paper appears in a single entry below (journal and conference versions of the same paper appear in the same entry).

Remark 2: In the Theoretical Computer Science community it is common that co-authors appear in alphabetical order. In the Information Theory community it is common that the order in which the co-authors appear is related to their contribution and seniority. I have added the sign ' (adjacent the number associated with each paper) marking the entries of papers in the field of Information Theory.

Journal papers

1. U. Feige and M. Langberg.
   Approximation algorithms for maximization problems arising in graph partitioning.
   Journal of Algorithms 41(2), 174-211, 2001.

2. U. Feige, M. Karpinski and M. Langberg.
   A Note on Approximating MAX-BISECTION on Regular Graphs.
   Information Processing Letters 79, 181-188, 2001.

3. U. Feige, M. Karpinski and M. Langberg.
   Improved approximation of Max-Cut on graphs of bounded degree.
   Journal of Algorithm 43(2), 201-219, 2002.

4. U. Feige, M. Langberg and G. Schechtman.
   Graphs with tiny vector chromatic numbers and huge chromatic numbers.
   SIAM Journal on Computing 33(6), 1338–1368, 2004.
   Also appeared in proceedings of the 43rd Annual IEEE Symposium on Foundations of Computer Science (FOCS), 283-292, 2002.

5. U. Feige and M. Langberg.
   The RPR^2 rounding technique for semidefinite programs.
   Journal of Algorithms 60(1), 1-23, 2006.
   Also appeared in proceedings of 28th International Colloquium on Automata, Languages and Programming (ICALP), 213-224, 2001.

6'. M. Langberg, A. Sprintson and J. Bruck.
   The encoding complexity of network coding.
   IEEE Transactions on Information Theory 52(6), 2386-2397, 2006 (a joint special issue with IEEE/ACM Transactions on Networking on Networking and Information Theory).
   Also appeared in proceedings of IEEE International Symposium on Information Theory (ISIT) 2005, 1987-1991.

7. A. Avidor and M. Langberg.
   The Multi-Multiway Cut Problem.
   Theoretical Computer Science 377(1-3), 35-42, 2007.
   Also appeared in proceedings of 9th Scandinavian Workshop on Algorithm Theory (SWAT), 273-284, 2004.

8'. M. Langberg.
   Oblivious channels and their capacity.
   IEEE Transactions on Information Theory, 54(1), 424-429, 2008.
   A previous version under the name "Oblivious channels" appeared in IEEE International Symposium on Information Theory (ISIT) 2006, 2739-2743.

9'. S. Jaggi, M. Langberg, S. Katti, T. Ho, D. Katabi, M. Médard and M. Effros.
Error-correction for Byzantine Adversaries in Networks: A Distributed Network Coding Approach.
IEEE Transactions on Information Theory (special issue on information-theoretic security) 54(6), 2008, 2596 - 2603.
Also appeared in proceedings of 26th Annual IEEE Conference on Computer Communications (INFOCOM), 616-624, 2007; and in 3rd Workshop on Network Coding, Theory, and Applications (NetCod) 2007 (invited talk).

10'. M. Langberg, A. Sprintson and J. Bruck.
Optimal Universal Schedules for Discrete Broadcast.
IEEE Transactions on Information Theory 54(9): 4365-4372, 2008.
Also in proceedings of IEEE International Symposium on Information Theory (ISIT) 2004, p. 111.

11. J. Gao, M. Langberg and L. Schulman.
Analysis of Incomplete Data and an Intrinsic-Dimension Helly Theorem.
Discrete & Computational Geometry 40(4): 537-560, 2008.
Also in proceedings of 17th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA), 464-473, 2006.

12'. M. Langberg, A. Sprintson and J. Bruck.
Network Coding: A Computational Perspective.
IEEE Transactions on Information Theory 55(1): 147-157, 2009.
Also in 40'th Annual Conference on Information Sciences and Systems (CISS) 2006 (invited paper).

13. M. Langberg and L. Schulman.
Contraction and expansion of convex sets.
Discrete & Computational Geometry 42(4): 594-614, 2009.
Also in 19th Canadian Conference on Computational Geometry (CCCG), 25-28, 2007.

14. G. Kortsarz, M. Langberg and Z. Nutov.
Approximating Maximum Subgraphs Without Short Cycles.
SIAM J. on Discrete Math 24(1), 255-269, 2010.
Also in proceedings of 11th International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX), 2008, 118-131.

15. S. Chechik, M. Langberg, D. Peleg and L. Roditty.
Fault-Tolerant Spanners for General Graphs.
SIAM Journal on Computing (SICOMP) 39(7), 3403-3423, 2010.
Also in proceedings of 41st ACM Symposium on Theory of Computing (STOC), 435-444, 2009.

16. J. Gao, M. Langberg and L. Schulman.
Clustering lines: classification of incomplete data.
ACM Transactions on Algorithms, 7(1): 8, 2010.

17'. M. Langberg and A. Sprintson.
On the Hardness of Approximating the Network Coding Capacity.
IEEE Transactions on Information Theory 57(2): 1008-1014, 2011.
Also in proceedings of IEEE International Symposium on Information Theory (ISIT) 2008, 315-319.

Submitted for journal publication

18'. "Real" Slepian-Wolf coding using Random (1,-1) Matrices.
S. Shengvi, S. Jaggi, B. K. Dey and M. Langberg.
In proceedings of IEEE International Symposium on Information Theory (ISIT) 2008.
Submitted for journal publication.

19. S. Chechik, M. Langberg, D. Peleg and L. Roditty.
f-Sensitivity Distance Oracles and Routing Schemes.
In proceedings of 18th Annual European Symposium on Algorithms (ESA) 2010, 84-96
Invited to special issue of Algorithmica (currently under review).

20'. E. En Gad, M. Langberg, M. Schwartz, and J. Bruck.
Constant-Weight Gray Codes for Local Rank Modulation.
Submitted for journal publication.

21'. A. Jiang, M. Langberg, M. Schwartz and J. Bruck.
Universal Rewriting in Constrained Memories.
In proceedings of IEEE International Symposium on Information Theory (ISIT) 2009.
Submitted for journal publication.

22'. B. K. Dey, S. Jaggi and M. Langberg.
Codes against Online Adversaries.
In proceedings of the Forty-Seventh Annual Allerton Conference on Communication, Control, and Computing, 2009, 1169-1176.
Submitted for journal publication.
Authors in alphabetical order due to equal contribution.

Conferences papers

23. U. Feige, M. Langberg and K. Nissim.
On the hardness of approximating NP witnesses.
In proceedings of 3rd International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX), 120-131, 2000.

24. M. Langberg, A. Pnueli and Y. Rodeh.
The ROBDD size of simple CNF formulas.
In proceedings of 12th Advanced Research Working Conference on Correct Hardware Design and Verification Methods (CHARME), 363-377, 2003.

25. M. Langberg.
Testing the independence number of hypergraphs.
In proceedings of 8th International Workshop on Randomization and Computation (RANDOM), 405-416, 2004.

26. M. Langberg.
Private codes or Succinct random codes that are (almost) perfect.
In proceedings of 45th Annual IEEE Symposium on Foundations of Computer Science (FOCS), 325-334, 2004.

27'. M. Langberg, A. Sprintson and J. Bruck.
Staleness vs. Waiting Time in Universal Discrete Broadcast.
In proceedings of IEEE International Symposium on Information Theory (ISIT) 2005, 2124-2128.
A previous version under the name "Optimal Schedules for Asynchronous Transmission of Discrete Packets" appeared as ETR062 at http://www.paradise.caltech.edu/ETR.html.

28'. S. Jaggi, M. Langberg, T. Ho and M. Effros.
Correction of Adversarial Errors in Networks.
In proceedings of IEEE International Symposium on Information Theory (ISIT) 2005, 1455-1459.

29. M. Langberg, Y. Rabani and C. Swamy.
Approximation Algorithms for Graph Homomorphism Problems.
In proceedings of 9th International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX), 176-187, 2006.

30'. S. Jaggi and M. Langberg.
Resilient network codes in the presence of eavesdropping Byzantine adversaries.
In proceedings of IEEE International Symposium on Information Theory (ISIT) 2007, 541-545.

31'. L. Nutman and M. Langberg.
Adversarial Models and Resilient Schemes for Network Coding.
In proceedings of IEEE International Symposium on Information Theory (ISIT) 2008, 171-175.

32'. M. Langberg, S. Jaggi and B. K. Dey.
Binary Causal-Adversary Channels.
In proceedings of IEEE International Symposium on Information Theory (ISIT) 2009, 2723 - 2727.

33' M. Langberg and A. Ramamoorthy.
Communicating the sum of sources in a 3-sources/3-terminals network.
In proceedings of IEEE International Symposium on Information Theory (ISIT) 2009, 2121-2125.

34'. M. Langberg and M. Médard.
On the Multiple Unicast Network Coding Conjecture.
In proceedings of the Forty-Seventh Annual Allerton Conference on Communication, Control, and Computing, 2009, 222 - 227.

35'. A. Jiang, M. Langberg, R. Mateescu and J. Bruck.
Data Movement in Flash Memories.
In proceedings of the Forty-Seventh Annual Allerton Conference on Communication, Control, and Computing, 2009, 1031 - 1038.

36. M. Langberg and L. Schulmann.
Universal ϵ-approximators for integrals.
In proceedings of ACM-SIAM Symposium on Discrete Algorithms (SODA) 2010, 598-607.

37'. H. Yao, D. Silva, S. Jaggi, M. Langberg.
Network Codes Resilient to Jamming and Eavesdropping.
In proceedings of IEEE International Symposium on Network Coding (NetCod) 2010.

38. R. Bar-Yanai, M. Langberg, D. Peleg and L. Roditty.
Realtime Classification for Encrypted traffic.
In proceedings of 9th International Symposium on Experimental Algorithms (SEA) 2010, 373-385.

39'. A. Jiang, M. Langberg, R. Mateescu and J. Bruck.
Data movement and aggregation in flash memories.
In proceedings of IEEE International Symposium on Information Theory (ISIT) 2010, 1918 - 1922.

40'. B. K. Dey, S. Jaggi, M. Langberg, and A. Sarwate
Codes against Delayed Adversaries.
In proceedings of IEEE International Symposium on Information Theory (ISIT) 2010, 285 - 289.
Authors in alphabetical order due to equal contribution.

41'. R. A. Costa, M. Langberg, and J. Barros
One-Shot Capacity of Discrete Channels.
In proceedings of IEEE International Symposium on Information Theory (ISIT) 2010, 211 - 215.

42'. A. Ramamoorthy and M. Langberg.
Communicating the sum of sources in a 3-sources/3-terminals network; revisited.
In proceedings of IEEE International Symposium on Information Theory (ISIT) 2010, 1853 - 1857.

43. D. Feldman and M. Langberg.
A Unified Framework for Approximating and Clustering Data.
To appear in 43rd ACM Symposium on Theory of Computing (STOC), 2011.

Short papers and posters

1. J. Bruck, M. Langberg and M. Schwartz.
Broadcast and Label Assignment in Directed Anonymous Networks.
In proceedings of 26th Annual ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (PODC), 382-383, 2007 as a brief 2 page announcement.

2'. M. A. R. Chaudhry, Z.Asad, A. Sprintson and M. Langberg.
An Efcient Algorithm for Complimentary Index Coding Problem (poster).
Poster at IEEE International Symposium on Information Theory (ISIT) 2010.

Book Chapters and Tutorials

1. M. Langberg.
Graph Coloring, (1994, 1998; Karger, Motwani, Sudan).
Chapter in Encyclopedia of Algorithms, Springer publications (2008).

2. S. Jaggi and M. Langberg.
Reliable and Secure Communication using Network Coding.
Chapter to appear in: Network Coding: Fundamentals and Applications, M. Medard (Editor), A. Sprintson (Editor), Academic Press (2011).

3. M. Langberg and A. Sprintson.
Recent Results on the Algorithmic Complexity of Network Coding.
Tutorial appearing in proceedings of 2009 Workshop on Network Coding, Theory, and Applications (NetCod 2009).

Patents

1. J. Bruck, M. Langberg and A. Sprintson.
Data Transmission System and Method.
U.S. Patent Number: US 7,680,147 B2. Filing date: August 31 2005. Issued: March 16 2010.

Manuscripts

1. C. Dwork, M. Langberg, M. Naor, K. Nissim and O. Reingold.
Succinct proofs for NP and Spooky Interactions.
Manuscript.

2. D. Goldstein and M. Langberg.
The Dense-k-Subgraph problem.
Manuscript: http://arxiv.org/abs/0912.5327.

3'. M. Langberg and M. Effros.
Network Coding: Is zero error always possible?
Manuscript: http://arxiv.org/abs/1102.3162.