Ran Libeskind-Hadas

Kravis Professor of Integrated Sciences: Computational Biology
Founding Chair, Kravis Department of Integrated Sciences
Claremont McKenna College

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Education

Ph.D. Computer Science, University of Illinois at Urbana-Champaign, 1993

M.S. Computer Science, University of Illinois at Urbana-Champaign, 1989

B.A. Applied Mathematics *magna cum laude*, Harvard University, 1987

Research Interests

Computational Biology

Cophylogenetics

Design and Analysis of Algorithms

Employment

Claremont McKenna College, Full Professor, 2021-present

Harvey Mudd College, Full Professor, 2003-2021, R. Michael Shanahan Endowed Chair

Harvey Mudd College, Associate Professor, 1999-2003

Harvey Mudd College, Assistant Professor, 1993-1999

Administrative and Visiting Positions

Founding Chair, Department of Integrated Sciences, Claremont McKenna College, 2021-present

Department Chair, Computer Science, Harvey Mudd College, 2011-2016

Associate Dean of Faculty, Harvey Mudd College, 2009-2011

Visiting Professor, Caltech, Computing and Mathematical Sciences, Winter 2017 (Instructor for CS 2)

Visiting Professor, MIT, Department of EECS, 2013-2014 (co-Instructor for Algorithms course 6.046)

Visiting Scholar, University of Sydney School of Information Technology, 2007-2008

Visiting Researcher, University of Pittsburgh, Department of Computer Science, 2000

Visiting Scientist, Technion, Department of Computer Science 1999-2000

Awards

2015 Henry T. Mudd Prize
"Awarded annually to a member of the Harvey Mudd College community whose service to the College and its mission is exemplary"

2015 NCWIT EngageCSEdu Engagement Excellence Award
"Recognizing faculty who are making a difference in their introductory computer science classrooms through excellent and engaging curriculum"' (shared with C. Alvarado, Z. Dodds, and G. Kuenning)

2012 University of Illinois at Urbana-Champaign CS Distinguished Alumni Educator Award

Joseph B. Platt Endowed Chair, Harvey Mudd College 2005-2009
Senior faculty chair for effective teaching

Iris and Howard Critchell Assistant Professorship, Harvey Mudd College, 1996-1999
Junior faculty chair for teaching and mentoring

1991 C. William Gear Outstanding Graduate Student Award, Inaugural Award
"Awarded annually to a graduate student in the Department of Computer Science at the University of Illinois at Urbana-Champaign on the basis of demonstrated excellence in research and service"

GTE Graduate Fellowship, 1987-1993

Courses Taught or Developed

CMC: SCI 10L (The Codes of Life; developed with E. Wiley and Z. Dodds)

Harvey Mudd: Computer Science 5 (CS For All; developed with C. Alvarado, Z. Dodds, and G Kuenning), Computer Science 5 "Green" (developed with E. Bush), CS 60 (Principles of Computer Science), CS 81 (Logic and Computability), CS 140 (Algorithms), CS 145 (Advanced Topics in Algorithms), CS 181 (Computability and Complexity Theory), MCB 118b (Introduction to Computational Biology; developed with E. Bush and M. Donaldson-Matasci), Mathematics 55 (Discrete Mathematics), Mathematics 73 (Linear Algebra)

Caltech: CS 2 (Python version of second CS course)

MIT: CS 6.046 (Algorithms)

Grants

Finding Best Representative Phylogenetic Tree Reconciliations
National Science Foundation, September 2019 - August 2024
$498,458
Role: Sole Investigator

Algorithms and Tools for Phylogenetic Tree Reconciliation
National Science Foundation, July 2014 - June 2017
$328,658
Role: Sole Investigator

Workshops to Engage Junior Faculty in Undergraduate Research
National Science Foundation, October 2013 - September 2015
(PI with co-PI's Nancy Amato and Andrew Bernat)
$36,118
Role: Coauthor of proposal; led development and implementation of a number of workshops at major CS conferences.

CPATH-2: Modular CS 1 from the Inside Out: Computational Thinking for all STEM Students
National Science Foundation, September 2009 - August 2012
(co-PI with PI Christine Alvarado and co-PI's Zach Dodds, and Geoff Kuenning)
$797,692
Role: Coauthor of proposal. All four co-PIs contributed equally to the redesign, implementation, and assessment of a new set of introductory CS courses.

Computing Innovation Fellows Project
National Science Foundation, May 2009 - April 2013
co-PI with PI Peter Lee and co-PI's Anita Jones and Rangachar Kasturi
$14,988,394
Role: Edited proposal and participated in selection committees for CI Postdoctoral Fellows

REU Site: Harvey Mudd REU Site on Computer Systems
National Science Foundation May 2008 - April 2011
(with co-PI Melissa O'Neill)
$292,921
Role: Coauthor of proposal and co-director of the REU site

Preparing New Scientists and Engineers for the 21st Century
National Science Foundation, September 2007 - August 2012
co-PI with PI Peter Saeta and co-PI's David Asai, Robert Cave, Nancy Lape
$579,600
Role: Minimal role in this project

REU Site: Harvey Mudd REU Site on Artificial Intelligence, Systems, and Optical Networking
National Science Foundation, May 2005 - April 2008
$286,209
Role: Sole PI on the first REU Site in the HMC CS Department

Virtual Topologies for Multicast Communication in WDM Networks
National Science Foundation, June 2002 - May 2005
$170,500
Role: Sole Investigator

Efficient Collective Communication in Switch-Based Networks of Workstations
National Science Foundation, May 1999 - April 2002
$174,000
Role: Sole Investigator

Development of a Multimedia Course on the Geometry of Curves and Surfaces with Applications to Computer Aided Geometric Design
Mellon Foundation Small Grants Program, May 1997 - September 1997
co-PI with co-PI's W. Gu and M. Moody
$10,350
Role: Coauthor of proposal and developed curricular modules and resources

Scientific Visualization in the Introductory Computer Science and Mathematics Curricula
Mellon Foundation Small Grants Program, January 1996 - February 1997
co-PI with co-PI's R. Bull, B. Keller, M. Moody, and W. Tam
$16,600
Role: Coauthor of proposal and developed curricular modules and resources

Deadlock-Free Fault Tolerant Routing in Wormhole-Routed Multicomputers
National Science Foundation, March 1995 - April 1998
$98,000
Role: Sole Investigator

Recent Talks and Presentations

UCLA Department of Computer Science 2021, ACM-BCB September 2020 (tutorial), UC Riverside Center for Quantative Modeling in Biology 2018, SIAM Annual Meeting Microsymposium 2017, UCLA Bioinformatics Seminar Series 2017, Loyola Marymount University 2017, RECOMB Satellite Conference in Bioninformaics Education keynote address with Eliot Bush 2015, SXSW panel 2015, MIT CSAIL 2014, UC Berkeley EECS 2014, Boston University 2014, Wesleyan University 2014, Vassar College 2014, University of Connecticut 2013, Ecole Federale de Lausanne 2013

Service

Claremont McKenna College committees including: Curriculum Committee; Appointment, Promotion, and Tenure Committee; Admission and Financial Aid Committee; Academic Affairs Committee; Campus Planning and Facilities Committee

Harvey Mudd College committees including: Co-chair of the Core Revision Committee; Faculty Executive Committee (three terms); Reappointment, Promotion, and Tenure Committee (four terms, including one term as committee chair)

Harvey Mudd Computer Science Clinic Program co-Director, Academic Year 2021-22

Co-organized the Computing Research Association Virtual Conference, Summer 2020

National Science Foundation CISE (Computer and Information Science and Engineering) Advisory Committee, 2020-2023

Editorial Board CACM (Communications of the ACM) Research Highlights: 2019-2021

CRA Board member: Elected to two consecutive three-year terms from July 2018-2021 and 2021-2024; elected to two consecutive terms as Secretary of the Board and one term as as Vice Chair of the Board

Member of the Steering Committee, Caltech Schmidt Academy for Software Engineering, 2019-2021.

Co-chair Computing Research Association Education (CRA-E), 2011-2017

Council member of the Computing Community Consortium (CCC), 2009-2015

Computing Research Association Undergraduate Research Award Committee, 2017-2020 (co-chair 2017, 2019, 2020)

Member of the Editorial Board of the IEEE Transactions on Computers (two terms, 2001-2005)

Member of 21 Program and Organizing Committees including ISMB, RECOMB-BE, and ICPP

Served on departmental external visiting committees at Amherst College, Chapman University, Middlebury College, Smith College, and the University of British Columbia.

Publications

Books and Chapters

1. C. Alvarado, Z. Dodds, G. Kuenning, and R. Libeskind-Hadas. *CS For All.* Franklin, Beedle, and Associates, 2020.
2. R. Libeskind-Hadas and E. Bush. *Computing For Biologists.* Cambridge University Press, 2014.
3. M. Charleston and R. Libeskind-Hadas, "Cophylogenetic Comparative Analysis," in *Modern Phylogenetic Comparative Methods and their Application in Evolutionary Biology*, László Szolt Garamszegi editor. Springer-Verlag, 2014.
4. R. Libeskind-Hadas, "Figs, Wasps, Gophers, and Lice: A Computational Exploration of Coevolution," in *Bioinformatics for Biologists*, P. Pevzner and R. Shamir, editors. Cambridge University Press, 2010.
5. R. Libeskind-Hadas, N. Hasan, J. Cong, P. McKinley, and C. L. Liu. *Fault Covering Problems in Reconfigurable VLSI Systems.* Kluwer Academic Publishers, Boston, 1992.

Peer Reviewed Journal and Conference Papers

Student co-authors in italics

1. R. Libeskind-Hadas, "Pairwise Distances and the Problem of Multiple Optima", *Journal of Computational Biology*, July 2024, DOI: 10.1089/cmb.2023.0382
2. *N. Liu*, *T. Gonzalez*, *J. Fischer*, *C. Hong*, *R. Mawhorter*, *F. Mugnatto*, *R. Soh*, *S. Somji*, J. Wirth, R. Libeskind-Hadas, Eliot Bush, "xenoGI 3: Using the DTLOR model to reconstruct the evolution of gene families in clades of microbes," *BMC Bioinformatics*, July 2023, https://bmcbioinformatics.biomedcentral.com/articles/10.1186/s12859-023-05410-0
3. *J. Liu*, *I. Duan*, *S. Santichaivekin*, R. Libeskind-Hadas, "Distance Profiles of Optimal RNA Foldings," ISBRA 2022, Springer Lecture Notes in Computer Science, November 2022.
4. R. Libeskind-Hadas, "Tree reconciliation methods for host-symbiont cophylogenetic analyses," *Life*, (special issue on Untangling Host-Symbiont Coevolutionary History in the High Throughput Sequencing Era), March 2022, DOI: 10.3390/life12030443.
5. *M. LeMay*, R. Libeskind-Hadas, Y-C Wu, "A Polynomial-Time Algorithm for Minimizing the Deep Coalescence Cost for Level-1 Species Networks,", *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, August 2021, DOI: 10.1109/TCBB.2021.3105922
6. *M. LeMay*, R. Libeskind-Hadas, Y-C Wu, "The Most Parsimonious Reconciliation Problem in the Presence of Incomplete Lineage Sorting and Hybridization is NP-Hard," WABI 2021, *LIPIcs: Leibniz International Proceedings in Informatics*, DOI: 10.4230/LIPIcs.WABI.2021.1.
7. *J. Liu*, *R. Mawhorter*, *N. Liu*, *S. Santichaivekin*, E. Bush, R. Libeskind-Hadas, "Maximum Parsimony Reconciliation in the DTLOR Model," APBC 2021, *BMC Bioinformatics*, August 2021, https://rdcu.be/csd3I.

8. Z. Dodds, *M. Morgan*, *L. Popowski*, *H. Coxe*, *C. Coxe*, *K. Zhou*, E. Bush, R. Libeskind-Hadas, "Biology-based CS1: Results and Reflections, Ten Years In," *Proceedings of SIGCSE 2021*, March 2021.

9. *S. Santichaivekin*, *Q. Yang*, *J. Liu*, *R. Mawhorter*, *J.Jiang*, *T. Wesley*, Y-C Wu, R. Libeskind-Hadas, "eMPRess: A Systematic Cophylogeny Reconciliation Tool," *Bioinformatics*, November 2020, https://doi.org/10.1093/bioinformatics/btaa978.

10. *S. Santichaivekin*, *R. Mawhorter*, R. Libeskind-Hadas, "An Efficient Exact Algorithm for Computing All Pairwise Distances between Reconciliations in theDuplication-Transfer-Loss Mode," *BMC Bioinformatics* 20, 636 (2019), Special issue for RECOMB-CB 2019. DOI: 10.1186/s12859-019-3203-9.

11. *R. Mawhorter*, *N. Liu*, R. Libeskind-Hadas, Y-C Wu, "Inferring Pareto-Optimal Reconciliations across Multiple Event Costs under the Duplication-Loss-Coalescence Model," *BMC Bioinformatics* 20, 636 (2019), Special issue for RECOMB-CB 2019. DOI: 10.1186/s12859-019-3206-6.

12. *R. Mawhorter* and R. Libeskind-Hadas, "Hierarchical Clustering of Maximum Parsimony Reconcilations," *BMC Bioinformatics* 20, 612 (2019). DOI: 10.1186/s12859-019-3223-5.

13. *M. Grueter*, *K. Duran*, *R. Ramalingam*, R. Libeskind-Hadas, "Reconciliation Reconsidered: In Search of a Most Representative Reconciliation in the Duplication-Transfer-Loss Model," *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, September 2019, Special issue for the 17^{th} Asia Pacific Bioinformatics Conference, 2019. DOI: 10.1109/TCBB.2019.2942015.

14. *H. Du*, *Y-S Ong*, *R. Mawhorter*, *N. Liu*, *G. Gross*, *R. Tojo*, R. Libeskind-Hadas, Y-C Wu, "Multiple Optimal Reconciliations under the Duplication-Loss-Coalescence Model," *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, September 2019, Special issue for the "Proceedings of the 17^{th} Asian Pacific Bioinformatics Conference, Wuhan, China, 2019. DOI: 10.1109/TCBB.2019.2922337.

15. *R. Cheng*, *M. Dohlen*, *C. Pekker*, *G. Quiroz*, *J. Wang*, R. Libeskind-Hadas, Y-C Wu, "Reconciliation Feasibility of Non-Binary Gene Trees under a Duplication-Loss-Coalescence Model," Proceedings of the 5th International Conference on Algorithms for Computational Biology (AlCoB 2018), Hong Kong, June 2018.

16. K. Dahlquist, J. Dionisio, R. Libeskind-Hadas, A. Bargagliotti, "Breaking Boundaries in Computing in Undergraduate Courses," *Journal of STEM Education*, Vol. 4, No. 1, 2018.

17. *J. Haack*, *E. Zupke*, *A. Ramirez*, Y-C Wu, and R. Libeskind-Hadas, "Computing the Diameter of the Space of Maximum Parsimony Reconciliations in the Duplication-Transfer-Loss Model," *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, June 2018, Special issue for the 16^{th} Asia Pacific Bioinformatics Conference, 2018. (Best student paper award at APBC 2018.)

18. *D. Bork*, *R. Cheng*, *J. Wang*, *J. Sung*, and R. Libeskind-Hadas, "On the Computational Complexity of the Maximum Parsimony Reconciliation Problem in the Duplication-Loss-Coalescence Model," *Algorithms for Molecular Biology*, 12:6, March 2017.

19. *W. Ma*, *D. Smirnov*, R. Libeskind-Hadas, "DTL Reconciliation Repair," *BMC Bioinformatics*, Vol. 18, Supplement 3, Special issue for the Fifteenth Asia Pacific Bioinformatics Conference, 2017.

20. K. O'Donnell, R. Libeskind-Hadas, J. Hulcr, C. Bateman, M. T. Kasson, R. C. Ploetz, J. L. Konkol, J. N. Ploetz, D. Carillo, A. Campbell, R. E. Duncan, P. N. H. Liyanage, A. Eskalan, S. C. Lynch, D. M. Geiser, S. Freeman, Z. Mendel, M. Sharon, T. Aoki, A. A. Cosse, A. P. Rooney, "Invasive Asian Fusarium: Euwallacea ambrosia beetle mutualists pose a serious threat to forests, urban landscapes and the avocado industry," *Phytoparasitica*, Vol. 45, No. 1, 2017.

21. *A. Ozdemir*, *M. Sheely*, *D. Bork*, *R. Cheng*, *R. Hulett*, *J. Sung*, *J. Wang*, R. Libeskind-Hadas, "Clustering the Space of Maximum Parsimony Reconciliations in the Duplication-Transfer-Loss Model," Proceedings of the 4th International Conference on Algorithms for Computational Biology, Aveiro, Portugal, June 5-6, 2017.

22. *W. Ma*, *D. Smirnov*, *J. Forman*, *A. Schweickart*, *C. Slocum*, *S. Srinivasan*, R. Libeskind-Hadas, "DTL-RnB: Algorithms and Tools for Summarizing the Space of DTL Reconciliations," *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, March 2018, Vol. 15, No. 2, pp. 411-421. (Also appeared in proceedings of the Fourteenth Asia Pacific Bioinformatics Conference, 2016.)

23. K. O'Donnell, S. Sink, R. Libeskind-Hadas, J. Hulcr, M. T. Kasson, R. C. Ploetz, J. L. Konkol, J. N. Ploetz, D. Carillo, A. Campbell, R. E. Duncan, P. N. H. Liyanage, A. Eskalan, F. Na, D. M. Geiser, C. Bateman, S. Freeman, Z. Mendel, M. Sharon, T. Aoki, A. A. Cosse, A. P. Rooney, "Discordant phylogenies suggest repeated host shifts in the Fusarium - Euwallacea ambrosia beetle mutualism", *Fungal Genetics and Biology*, September 2015, 62, pp. 277-290.

24. R. Libeskind-Hadas, Y-C Wu, M. Bansal, M. Kellis, "Pareto-Optimal Phylogenetic Tree Reconciliation," in *Proceedings of the 22nd Annual International Conference on Intelligent Systems for Molecular Biology (ISMB 2014)*, July 2014, Boston, Massachusetts. Also appeared in *Bioinformatics* 2014 30 (12): i87-i95 DOI: 10.1093/bioinformatics/btu289

25. R. Libeskind-Hadas and E. Bush, "A First Course in Computing with Applications to Biology," *Briefings in Bioinformatics*, 2013, DOI: 10.1093/bib/bbt005.

26. R. Libeskind-Hadas, "A Derivation-First Approach to Teaching Algorithms," *Proceedings of SIGCSE 2013*, March 2013, Denver, Colorado

27. A. Cruaud, N. Ronsted, B. Chantarasuwan, L.S. Chou, W. Clement, A. Couloux, *B. Cousins*, G. Genson, R. Harrison, P. Hanson, M. Hossaert-McKey, R. Jabbour-Zahab, E. Jousselin, C. Kerdelhue, F. Kjellberg, C. Lopez-Vaamonde, *J. Peebles*, Y-Q. Peng, R. Periera, *T. Schramm*, R. Ubaidillah, S. Van Noort, G. Weiblen, D-R. Yang, *A. Yodpinyanee*, R. Libeskind-Hadas, J. Cook, J-Y. Rasplus, V. Savolainen, "An Extreme Case of Plant-Insect Co-Diversification: Figs and Fig-Pollinating Wasps," *Systematic Biology*, December 2012, 61(6), pp. 1029-1047.

28. C. Alvarado, Z. Dodds, and R. Libeskind-Hadas, "Increasing Women's Participation in Computing at Harvey Mudd College," *ACM Inroads*, Volume 3 Issue 4, December 2012, pp. 55-64.

29. Z. Dodds, R. Libeskind-Hadas, E. Bush, "Bio1 as CS1: Evaluating a Crossdisciplinary CS Context," *Proceedings of ITiCSE 2012*, 17th Annual Conference on Innovation and Technology in Computer Science Education, Haifa, Israel, July 2012, ACM Press.

30. *Y. Ovadia*, *D. Fielder*, *C. Conow*, and R. Libeskind-Hadas, "The Cophylogeny Reconstruction Problem is NP-Complete," *Journal of Computational Biology*, Vol. 18, No. 1, January 2011, pp. 59-65.

31. *C. Conow*, *D. Fielder*, *Y. Ovadia*, and R. Libeskind-Hadas, "Jane: A New Tool for the Cophylogeny Reconstruction Problem," *Algorithms for Molecular Biology*, Vol. 5, No. 16, February 2010.

32. Z. Dodds, R. Libeskind-Hadas, E. Bush, "When CS1 is Biology1: Crossdisciplinary Collaboration as CS Context," *Proceedings of ITiCSE 2010*, 15th Annual Conference on Innovation and Technology in Computer Science Education, Bilikent, Turkey, June 2010, ACM Press.

33. R. Libeskind-Hadas and M. Charleston, "On the Computational Complexity of the Reticulate Cophylogeny Reconstruction Problem," *Journal of Computational Biology*, Vol. 16, No. 1, January 2009, pp. 105-117.

34. *K. Corcoran*, *S. Flaxman*, *M. Neyer*, *P. Scherpelz*, and Ran Libeskind-Hadas, "Approximation Algorithms for Traffic Grooming in WDM Rings," *Proceedings of the IEEE International Conference on Communications*, June 2009, Dresden, Germany.

35. *K. Benson*, *B. Birnbaum*, *E. Estolano-Molina*, and R. Libeskind-Hadas, "Competitive Analysis of Online Traffic Grooming in WDM Rings," *IEEE/ACM Transactions on Networking*, Vol. 16, No. 4, August 2008, pp. 984-997.

36. *J. Crouser*, *B. Rice*, *A. Simpson*, and Ran Libeskind-Hadas, "On-line Distributed Traffic Grooming," *Proceedings of the IEEE International Conference on Communications*, May 2008, Beijing, China.

37. Z. Dodds, R. Libeskind-Hadas, C. Alvarado, and G. Kuenning, "Evaluating Breadth-First CS 1 for Scientists," *Proceedings of SIGCSE 2008*, March 2008, Portland, Oregon.

38. Z. Dodds, C. Alvarado, G. Kuenning, and R. Libeskind-Hadas, "Breadth-first CS 1 for Scientists: Curriculum and Assessment," *Proceedings of the 12th Annual Conference on Innovation and Technology in Computer Science Education (ITiCSE)*, June 2007, Dundee Scotland.

39. *I. Ferrel*, *E. Miller*, *A. Mettler*, and R. Libeskind-Hadas, "Virtual Topologies for Multicasting with Multiple Originators in WDM Networks," *IEEE/ACM Transactions on Networking*, Vol. 14, No. 1, February 2006, pp. 183-190.

40. *D. Buchfuhrer*, *T. Carnes*, *B. Tagiku*, *L. Celis*, and R. Libeskind-Hadas, "Traffic Grooming for Single-Source Multicast Communication in WDM Rings," *Proceedings of the IEEE International Conference on Communications*, May 2005, Seoul, South Korea.

41. *E. Miller*, R. Libeskind-Hadas, *D. Barnard*, *W. Chang*, *K. Dresner*, *W. Turner*, and *J. R. Hartline*, "On the Complexity of Virtual Topology Design for Multicasting in WDM Trees with Tap-and-Continue and Multicast Capable Switches," *IEEE Journal on Selected Areas in Communications, Optical Communications and Networking Series*, Vol. 22, No. 9, November 2004, pp. 1601-1612.

42. *J. R. Hartline*, R. Libeskind-Hadas, *K. Dresner*, *E. Drucker*, and *K. Ray*, "Optimal Virtual Topologies for One-To-Many Communication in WDM Paths and Rings," *IEEE/ACM Transactions on Networking*, Vol. 12, No. 2, April 2004, pp. 375-383.

43. *J. R. Hartline* and R. Libeskind-Hadas, "The Computational Complexity of Motion Planning," *SIAM Review*, Vol. 45, No. 3, October 2003, pp. 543-557.

44. R. Libeskind-Hadas and R. Melhem, "Multicast Routing and Wavelength Assignment in Multi-Hop Optical Networks," *IEEE/ACM Transactions on Networking*, Vol. 10, Issue 5, October 2002, pp. 621-629.

45. R. Libeskind-Hadas, *J. Hartline*, *K. Dresner*, *E. Drucker*, and *K. Ray*, "Multicast Virtual Topologies in WDM Paths and Rings with Splitting Loss," *Proceedings of the Eleventh IEEE International Conference on Computer Communications and Networks*, October 2002, Miami, Florida, pp. 318-321.

46. R. Libeskind-Hadas, *J. R. Hartline*, *P. Boothe*, *G. Rae*, and *J. Swisher*, "On Multicast Algorithms for Heterogeneous Networks of Workstations," *Journal of Parallel and Distributed Computing*, (special issue on cluster and network-based computing), Vol. 61, No. 11, November 2001, pp. 1665-1679.

47. R. Libeskind-Hadas and R. Melhem, "Multicast Routing and Wavelength Assignment in Multi-Hop Optical Networks," *Proceedings IEEE International Conference on Networking*, July 2001, Colmar, France. Available as Springer-Verlag Lecture Notes in Computer Science, Volume 2093, Pascal Lorenz (Editor), pp. 508-519.

48. R. Libeskind-Hadas and R. Melhem, "Multicast Communication in Circuit-Switched Optical Networks," *Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA 2001)*, June 2001, Las Vegas, Nevada, pp. 1862-1868. *(Invited Paper)*

49. R. Libeskind-Hadas, "Efficient Collective Communication in WDM Networks with a Power Budget," *Proceedings IEEE Ninth International Conference on Computer Communications and Networks*, October 2000, Las Vegas, Nevada, pp. 612-616.

50. R. Libeskind-Hadas and *J. Hartline*, "Efficient Multicast in Heterogeneous Networks of Workstations," *Proceedings of the International Conference on Parallel Processing Workshop on Network-Based Computing*, August 2000, Toronto, Canada, pp. 403-410.

51. *C. Jones* and R. Libeskind-Hadas, "Matroids: The Theory and Practice of Greed," *The UMAP Journal*, Vol. 21, No. 2, Summer 2000, pp. 179-202.

52. *B. Barden*, *J. Davis*, R. Libeskind-Hadas, and *W. Williams*, "On Edge-Disjoint Spanning Trees in Hypercubes," *Information Processing Letters*, Vol. 70, Issue 1, April 16, 1999, pp. 13-16.

53. R. Libeskind-Hadas, "A Tight Lower Bound on the Number of Channels Required for Deadlock-Free Wormhole Routing," *IEEE Transactions on Computers*, Vol. 47, No. 10, October 1998, pp. 1158 -1160.

54. R. Libeskind-Hadas, *D. Mazzoni*, and *R. Rajagopalan*, "Optimal Contention-Free Unicast-Based Multicasting in Switch-Based Networks of Workstations," *Proceedings of the Merged 12th International Parallel Processing Symposium and the 9th Symposium on Parallel and Distributed Processing*, April 1998, Orlando, Florida, pp. 358-364.

55. R. Libeskind-Hadas, *D. Mazzoni*, and *R. Rajagopalan*, "Tree-Based Multicasting in Wormhole-Routed Irregular Topologies," *Proceedings of the Merged 12th International Parallel Processing Symposium and the 9th Symposium on Parallel and Distributed Processing*, April 1998, Orlando, Florida, pp. 244-249.

56. R. Libeskind-Hadas, "Sorting in Parallel," *The American Mathematical Monthly*, Vol. 105, No. 3, March 1998, pp. 238-245.

57. R. Libeskind-Hadas, *T. Hehre*, *A. Hutchings*, *M. Reyes*, and *K. Watkins*, "Adaptive Multicast Routing in Wormhole Networks," *Proceedings of the Ninth IASTED International Conference on Parallel and Distributed Computing and Systems,* October 1997, Washington D.C, pp. 513-522.

58. R. Libeskind-Hadas, *K. Watkins*, and *T. Hehre*, "Fault Tolerant Multicast Routing in the Mesh with No Virtual Channels," *Proceedings of the 1996 International Symposium on High-Performance Computer Architecture (HPCA '96)*, February 1996, San Jose, California, pp. 180-190.

59. R. Libeskind-Hadas and *E. Brandt*, "Origin-Based Fault Tolerant Routing in the Mesh," *Future Generation Computer Systems*, Vol. 11, No. 6, October 1995, pp. 603-615.

60. R. Libeskind-Hadas, "A Tight Bound on the Number of Channel Faults in Wormhole-Routed Multicomputers," *Proceedings of the 1995 Pacific Rim International Symposium on Fault Tolerant Systems (PRFTS '95)*, December 1995, Newport Beach, California, pp. 14-18.

61. R. Libeskind-Hadas and *E. Brandt*, "Origin-Based Fault Tolerant Routing in the Mesh," *Proceedings of the 1995 International Symposium on High-Performance Computer Architecture (HPCA '95)*, January 1995, Raleigh-Durham, North Carolina, pp. 102-111.

62. R. Libeskind-Hadas, N. Shrivastava, R. G. Melhem, and C. L. Liu, "Optimal Reconfiguration Algorithms for Real-Time Fault Tolerant Processor Arrays," *IEEE Transactions on Parallel and Distributed Systems*, Vol. 6, No. 5, May 1995, pp. 498-510.

63. R. Libeskind-Hadas, "Approximation Algorithms: Good Solutions to Hard Problems," *The American Mathematical Monthly*, Vol. 102, No. 1, January 1995, pp. 57-61.

64. R. Libeskind-Hadas, "Distributed Algorithms for the Reconfiguration of Fault Tolerant Multicomputers," *Proceedings of the Seventh International Conference on Parallel and Distributed Computing Systems (PDCS '94)*, October 1994, Las Vegas, Nevada, pp. 490-496.

65. R. Libeskind-Hadas and C. L. Liu, "Reconfigurable Multipipelines with Minimum Interprocessor Delay," *Proceedings of the Fifth International Conference on Parallel and Distributed Computing and Systems (PDCS '92)*, October 1992, Pittsburgh, Pennsylvania, pp. 377-382.

66. R. Libeskind-Hadas, N. Shrivastava, R. G. Melhem, and C. L. Liu, "Efficient Bi-Level Reconfiguration Algorithms for Fault Tolerant Arrays," *Proceedings of the 1992 IEEE International Workshop on Defect and Fault Tolerance in VLSI Systems*, November 1992, Dallas, Texas.

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