Tomer Hertz

Vaccine and Infectious Disease Institute
Fred Hutchinson Cancer Research Center
1100 Fairview Ave. N
Seattle, WA, 98109

thertz@fhcrc.org
http://www.cs.huji.ac.il/~hertz
Phone: (206) 667-2310
Fax: (206) 667-4378

Citizenship: Israeli

Research Interests

Computational immunology - Development and application of computational tools for immunology, both for large-scale data analysis and for the discovery of novel biological findings.

Co-evolution of the immune system and pathogens - Developing computational approaches to study the co-evolution of the adaptive immune system and the pathogens that it encounters.

Next generation sequencing techniques - using new short read sequencing techniques to study viral evolution dynamics and viral escape.

Transfer learning - Machine learning algorithms for transferring knowledge between related tasks.

Distance functions - Algorithms for learning distance functions and their applications.

Education

Postdoctoral Researcher, Microsoft Research Oct. 2006 - present
eScience group (formerly the Machine Learning and Applied Statistics group)
manager: David Heckerman

Ph.D. Computational Neuroscience, The Hebrew University of Jerusalem, Israel, 2007.
Title: *Learning Distance Functions: Algorithms and Applications.*
Advisor: Prof. Daphna Weinshall.

B.Sc.. Computer Science and "Amirim" interdisciplinary program for outstanding students in the humanities, The Hebrew University of Jerusalem, Israel, 1999.

Awards

2008 IBM Research Pat Goldberg Memorial Best Paper Award in Computer Science, Electrical Engineering and Math.

2008 Best paper award, 6th USENIX Conference on File and Storage Technologies.

1999-2006 Ph.D. fellowship, Interdisciplinary Center for Neural Computation, The Hebrew university of Jerusalem

1996-1999 B.Sc. fellowship, The Amirim Interdisciplinary program for outstanding students, The Hebrew university of Jerusalem

Tomer Hertz

Peer-reviewed Publications

1. Rubi Hammer, **Tomer Hertz**, Shaul Hochstein and Daphna Weinshall. Category Learning from Equivalence Constraints., *Cognitive Processing*, 10, 211-232, 2009.
2. Dan Tsafrir, **Tomer Hertz**, Dilma Da Silva and David Wagner. Portably solving file races with hardness amplification, *ACM Transactions on Storage (TOS)*, 4, 2008.
3. R. Hammer, A. Bar-Hillel, **T. Hertz**, D. Weinshall and S. Hochstein. Comparison Processes in Category Learning: From Theory to Behavior, *Brain Research*, 2008. [1 citation]
4. Vladimir Jojic, **Tomer Hertz** and Nebojsa Jojic. Population Sequencing Using Short Reads: HIV as a Case Study, *Pacific Symposium on Biocomputing (PSB)*, 2008.
5. Dan Tsafrir, **Tomer Hertz**, David Wagner and Dilma Da Silva. Portably Solving File TOCTTOU Races with Hardness Amplication, *6th USENIX Conference on File and Storage Technologies*, 2008. [4 citations] [***Best Paper Award***]
6. Rubi Hammer, **Tomer Hertz**, Shaul Hochstein and Daphna Weinshall. Classification with Positive and Negative Equivalence onstraints: Theory, Computation and Human Experiments, *BVAI*, 264-276, 2007. [4 citations]
7. **Tomer Hertz** and Chen Yanover. Identifying HLA Supertypes by Learning Distance Functions, *European Conference on Computational Biology (ECCB)*, 2006. [11 citations]
8. **Tomer Hertz**, Aharon Bar Hillel and Daphna Weinshall. Learning a kernel function for classification with small training samples, *International Conference on Machine Learning (ICML)*, 2006. [28 citations]
9. **Tomer Hertz** and Chen Yanover. PepDist: A New Framework for Protein-Peptide Binding Prediction based on Learning Peptide Distance Functions, *BMC Bioinformatics*, 7(Suppl 1):S3, 2006. [19 citations]
10. Inna Weiner, **Tomer Hertz**, Israel Nelken and Daphna Weinshall. Analyzing Auditory Neurons by Learning Distance Functions, *Advances in Neural Information Processing Systems (NIPS)*, 2005.
11. Chen Yanover and **Tomer Hertz**. Predicting Protein-Peptide Binding Affinity by Learning Peptide-Peptide Distance Functions, *The Ninth Annual Conference on Research in Computational Biology (RECOMB)*, 2005. [7 citations]
12. A. Bar-Hillel, **T. Hertz** and D. Weinshall. Object Class Recognition by Boosting a Part-Based Model, *Conf. on Computer Vision and Pattern Recognition (CVPR)*, 2005. [24 citations]
13. Aharon Bar-Hillel, **Tomer Hertz**, Noam Shental and Daphna Weinshall. Learning a Mahalanobis Metric from Equivalence Constraints, *Journal of Machine Learning Research*, 6, 937–965, 2005. [93 citations]
14. A. Bar-Hillel, **T. Hertz** and D. Weinshall. Efficient learning of relational object class models, *International Conference on Computer Vision (ICCV)*, 2005.
15. R. Hammer, **T. Hertz**, S. Hochstein and D. Weinshall. Category Learning from Equivalence Constraints, *XXVII Anuual Meeting of the Cognitive Science Society, Stresa Italy*, 2005. [8 citations]

16. **Tomer Hertz**, Aharon Bar-Hillel and Daphna Weinshall. Boosting Margin Based Distance Functions for Clustering, *International Conference on Machine Learning (ICML)*, 2004. [37 citations]
17. **Tomer Hertz**, Aharon Bar-Hillel and Daphna Weinshall. Learning Distance Functions for Image Retrieval, *Conf. on Computer Vision and Pattern Recognition (CVPR)*, 2004. [44 citations]
18. N. Shental, A. Zomet, **T. Hertz** and Y. Weiss. Pairwise clustering and graphical models, *Advances in Neural Information Processing Systems (NIPS)*, 185–192, 2004. [16 citations]
19. N. Shental, A. Bar-Hillel, **T. Hertz** and D. Weinshall. Computing Gaussian mixture models with EM using equivalence constraints, *Advances in Neural Information Processing Systems (NIPS)*, 465–472, 2004. [90 citations]
20. **T. Hertz**, N. Shental, A. Bar-Hillel and D. Weinshall. Enhancing image and video retrieval: learning via equivalence constraints, *Conf. on Computer Vision and Pattern Recognition (CVPR)*, 668–674, 2003. [38 citations]
21. Aharon Bar-Hillel, **Tomer Hertz**, Noam Shental and Daphna Weinshall. Learning distance functions using equivalence relations, *International Conference on Machine Learning (ICML)*, 11–18, 2003. [152 citations]
22. N. Shental, A. Zomet, **T. Hertz** and Y. Weiss. Learning and inferring image segmentations using the GBP Typical Cut, *International Conference on Computer Vision (ICCV)*, 1243–1250, 2003. [28 citations]
23. N. Shental, **T. Hertz**, D. Weinshall and M. Pavel. Adjustment learning and relevant component analysis, *European Conf. on Computer Vision (ECCV)*, 2002. [64 citations]

Professional Experience

Staff Scientist Feb 2009 - present
Vaccine and Infectious Disease Institute, Seattle, Washington
Fred Hutch Cancer Research Center
Development of computational tools for immunology research, with specific focus on applications for rational vaccine design, of HIV and HSV.

Postdoctoral Researcher October 2006 - January 2009
Microsoft Research, eScience group Redmond, Washington
Development of computational tools for immunology research, with specific focus on applications for HIV rational vaccine design. Projects: (1) Evolution of the MHC system - a study based on computational binding prediction models. (2) Classification of MHC alleles into supertypes.

Visiting student summer 2001, summer 2002
Prof. Misha Pavel's lab Oregon Graduate Institute (OGI)
Developing and using algorithms that learn from equivalence constraints.

Tomer Hertz

Programming Languages Instructor 1999-2001
and Consultant
John Bryce Ramat Gan, Israel
Taught high level programming courses for software engineers and introductory courses in programming in java, C++, C, javascript and HTML. Qualified Sun Java instructor. Provided consulting for clients on advanced web programming in Java.

Programming Languages Instructor 1999-2000
I.B.M Tel-Aviv, Israel
Taught introductory courses in Java and C++.

Teaching Experience

Lecturer, Introduction to Object Oriented Programming (Computer Science), The Hebrew University of Jerusalem, Spring 2006

Teaching Assistant, Introduction to Computer Science (Computer Science), The Hebrew University of Jerusalem, Fall 01-05

Teaching Assistant, Introduction to Logic (B.Sc. Amirim program), The Hebrew University of Jerusalem, Spring 2005

Teaching Assistant, Languages of Art (B.Sc. Amirim program), The Hebrew University of Jerusalem, 2005

Teaching Assistant, Game Theory (B.Sc. Amirim program), The Hebrew University of Jerusalem, Fall 2003

Teaching Assistant, History and Philosophy of Science (B.Sc. Amirim program), The Hebrew University of Jerusalem, Fall 2002

Teacher, Leyada High School, Computer Science, and Home Room teacher in the 12th grade. Social coordinator of student school, 1999-2001 council.

Teacher, Mevaseret Zion Junior High school - Social counselor and teacher, 1995-1999

Scientific Software

Relevant Component Analysis (RCA) [matlab code] - An algorithm for learning Mahalanobis distance functions from equivalence constraints.

DistBoost [matlab code] - An algorithm for learning non-linear distance functions from equivalence constraints.

Invited Talks

Department of immunology, Weizmann Institute, Israel, July 2009, *Mapping the landscape of host-pathogen co-evolution: HLA class I-peptide interactions correlate with conservation in human and viral proteins.*

Bioinformatics unit, Hadassah School of Medicine, The Hebrew University of Jerusalem, Israel, June 2009, *Mapping the landscape of host-pathogen co-evolution: HLA class I-peptide interactions correlate with conservation in human and viral proteins.*

Departments of Biochemistry and Immunology, Tel Aviv University, Israel, June 2009, *Mapping the landscape of host-pathogen co-evolution: HLA class I-peptide interactions correlate with conservation in human and viral proteins.*

Center for computational biology, University of California Los Angeles (UCLA), Mar. 2008, *Evolutionary optimization of MHC class I allele repertoire for the recognition of functionally important, evolutionarily conserved elements.*

La Jolla Institute for Allergy and Immunology, San Diego CA, Mar. 2008, Evolutionary optimization of MHC class I allele repertoire for the recognition of functionally important, evolutionarily conserved elements

La Jolla Institute for Allergy and Immunology, San Diego CA, Feb. 2007, *Identifying HLA Supertypes by Learning Distance Functions.*

Microsoft Research, Redmond WA, June 2006, *Immunoinformatics and Distance Learning.*

Center for Neural Computation (ICNC) The Hebrew University of Jerusalem, Israel, Mar. 2006, *Analyzing Auditory Neurons by Learning Distance Functions.*

La Jolla Institute for Allergy and Immunology, San Diego CA, Mar. 2005, *Predicting Protein-Peptide Binding Affinity by Learning Peptide-Peptide Distance Functions.*

Oregon Graduate Institute, Dec. 2004, *Learning a Gaussian Mixture Model from Equivalence Constraints.*

Professional Refereeing

Journal of Machine Learning Research (JMLR)

Immunogenetics

Bioinformatics

Machine Learning

Annual Conference on Intelligent Systems for Molecular Biology (ISMB)

ACM Transactions on Knowledge Discovery from Data

Journal of Chemical Information and Modeling

ACM Transactions on Knowledge and Discovery of Data

IEEE/ACM Transactions on Computational Biology

Transactions on Neural Networks

Neural Information processing Systems (NIPS)

International Conference on Machine Learning (ICML)

Programming Languages

Matlab, Java, C++, Perl

References

Prof. Daphna Weinshall (Phd Advisor)
School of Computer Science and Engineering, The Hebrew University, Jerusalem, Israel.
homepage: http://www.cs.huji.ac.il/~daphna
email: daphna@cs.huji.ac.il

Dr. Ora Furman (Schueler)
Dept. of Molecular Genetics and Biotechnology, The Hebrew University Hadassah Medical School, Jerusalem, Israel.
email: oraf@ekmd.huji.ac.il

Nebojsa Jojic (postdoctoral supervisor)
Microsoft Research, Redmond, WA, USA
homepage: http://research.microsoft.com/users/jojic/jojic.htm
email: jojic@microsoft.com