

## **Gideon Dror**

### **EDUCATION**

- 1985 *B.Sc.* Physics (cum laude) Tel Aviv University, Tel Aviv, Israel.
- 1991 *Ph.D.* High energy Physics (direct Ph.D. program for outstanding B.Sc. graduates) Tel Aviv University, Tel Aviv, Israel. Title of Doctoral dissertation: Calculation of glueball masses on the Lattice.
- 1993 *Diplome*, School of Education, Tel Aviv University, Tel Aviv, Israel. (two year program for science education).

### **ACADEMIC POSITIONS**

- 1987-1991: Teaching Assistant, Physics, Tel Aviv University, Tel Aviv, Israel.
- 1991-1993: Investigator, Nuclear Physics dept., Tel Aviv University, Tel Aviv, Israel.
- 1995-1999: Lecturer, The Academic College of Tel Aviv Yaffo, Tel Aviv, Israel.
- 1999-2005 Senior Lecturer, The Academic College of Tel Aviv Yaffo, Tel Aviv, Israel.
- 2006- Associate Professor, The Academic College of Tel Aviv Yaffo, Tel Aviv, Israel.
- 2006- Head of Artificial Intelligence program, The Academic College of Tel Aviv Yaffo, Tel Aviv, Israel.
- 2007-2008 Visiting Academic, NICTA, Canberra, Australia.
- 2009–2010 Head of excellence program of The Academic College of Tel Aviv Yaffo, Tel Aviv, Israel.

### **INDUSTRIAL EXPERIENCE**

- 1995-1996 Manager of “Science and Art, Ltd.”. Managing the logistics and personnel of the company as well as supervising the scientific syllabus and educational program. At 1996 I negotiated with competing companies and sold the company’s equipment, program and activity.
- 2000-2001 Senior algorithm team member at “Zapper Technologies, Ltd”. I lead efforts related to document categorization and news filtering for commercial applications.
- 2002-2003 Head of Algorithms team at “Rosetta Genomics, Ltd”. I designed and supervised the implementation of an end-to-end system for identifying novel genes belonging to the MiRNA family, based on state of the art Machine Learning methods. Based on this system, several hundred MiRNAs were predicted, validated in the laboratory and patented.
- 2004 Advisor to “Biological Signal Processing, Ltd”. I supervised the algorithm team in producing an automatic tool for diagnosis of ischemic heart diseases from high frequency components of the QRS complex. The technology has been recently approved by the FDA.
- 2005-2007 Chief Scientist of “Massive Impact, Ltd”. I lead the algorithms team in using inference methods, specifically supervised classification, feature selection/extraction and model selection in the area of application promotion for the cellular market. I further used sophisticated statistical models to model

user behavior and promotion characteristics for risk management and for optimization of revenues. I invented and implemented Bayesian methods for sampling, aimed at robust estimation while minimizing sample size. The technology is currently being used in several markets, totaling in more than 150 million users.

## **CURRENT RESEARCH INTERESTS**

- Machine learning problems in bioinformatics, activity recognition, marketing, medicine, and computer vision.
- Machine learning techniques for attacking physical unclonable functions (PUF).
- Techniques of feature selection and model selection for classification problems.
- Statistical methods in Natural Language Processing: text categorization and clustering.
- Applications of artificial neural networks to data analysis and triggering in high energy physics experiments.
- Theory of artificial neural networks.

## **TEACHING EXPERIENCE**

- 1987-1991: Optics and waves, modern physics, introductory mathematics for physicists, Tel Aviv University, Tel Aviv, Israel.
- 1990-1996: Modern physics, astrophysics and medical physics for high school gifted students, School of Education, Tel Aviv University, Tel Aviv, Israel.
- 1992-1997: “Science and Art”: Development of an extensive 3 year course in science and technology for elementary school gifted programs. (including demonstrations, hands on activities etc.)
- 1996-1997: Fundamentals of rocketry”: Development and testing of a course about rockets for middle and high school programs for gifted students. The course is taught in about ten centers for gifted children since 1997.
- 1995 - : Machine learning, database management systems, neural networks, artificial intelligence, natural language processing, astronomy and astrophysics, Calculus and other mathematical courses, workshop for software development. The Academic College of Tel Aviv Yaffo, Israel and Tel Aviv University, Israel.

## **SUPERVISING GRADUATE STUDENTS**

- *Gabi Sheiner* M.Sc. Automatic Generation of Class Hierarchies for Document Categorization (completed 03/05)
- *Yael Eisenthal* M.Sc. Computational Learning of Facial Attractiveness (completed 06/04)
- *Shay Cohen* M.Sc. A Feature Selection Method Using Shapley Values (completed 06/04)
- *Amit Kagian* M.Sc. A Machine Learning Predictor of Facial Attractiveness Revealing Human-

like Psychophysical Biases (completed 10/06)

- *Michael Gutkin* M.Sc. Feature Selection Methods for Classification of Gene Expression Profiles (completed 05/08).
- *Ishai Barlev* M.Sc. Regularizing TAN networks (completed 09/09).
- *Ori Raz* M.Sc. Sampling Graphlet Kernels (completed 11/09).
- *Ofer Lavi* M.Sc. Prior Knowledge Integration of Gene Networks data into Gene Expression Analysis .
- *Dani Wolbe* M.Sc. Segmentation and prediction of swimming sessions using SMM
- *Amnon Ahronson* M.Sc. Online handwritten data for identification of dysfunctions and brain diseases.
- *Alona Sukachev* M.Sc. Online analysis of MiRNA from deep sequencing data.

## **AWARDS**

- Wolf scholarship for excellence - 1987.
- Ben Gurion scholarship – 1991
- Fund for research promotion, the Academic College of Tel Aviv Yaffo – 2006-2007

## **PATENTS**

- United States Patent 6255793 (July 3, 2001) Navigation method and system for autonomous machines with markers defining the working area.

## JOURNAL PUBLICATIONS

### published

- [1]D. Horn, G. Lana\* and D. Schreiber (1988). Scaling in Periodic QED. *Phys. Rev. D* **36**, 3218.
- [2]G. Lana\* (1988). Masses in Periodic QED. *Phys. Rev. D* **38**, 1954.
- [3]D. Horn, and G. Lana\* (1991). t-Expansion Calculation of the SU(3) Axial and Tensor Glueballs. *Phys. Rev. D* **44**, 2846.
- [4]M. Hasenbuch, G. Lana\*, M. Marcu and K. Pinn (1992). Cluster algorithm for a solid-on-solid model with constraints. *Phys. Rev. B* **285**, 251.
- [5]G. Lana\* and B. Svetitsky (1992). Instability of bubbles in the quark-gluon-plasma. *Phys. Rev. Lett.* **67**, 254.
- [6]H.G. Evertz, G. Lana\* and M. Marcu (1993). Cluster algorithm for vertex models. *Phys. Rev. Lett.* **70**, 875.
- [7]G. Dror, M. Tsodyks (1999). Analysis and modeling of population dynamics in the visual cortex. *Neurocomputing* **26**, 361 .
- [8]G. Dror, M. Tsodyks , (2000). Chaos in neural networks with dynamic synapses. *Neurocomputing* **32-33**, 365.
- [9]G. Dror, M. Tsodyks , (2000) Activity of coupled excitatory and inhibitory neural populations with dynamic synapses. *Neurocomputing* **32-33**, 359.
- [10]G. Dror, A. Lev, Y. Roditty, (2004) A note: Some results in step domination of trees. *Discrete Mathematics* **289**, 137-144.
- [11]D. Horn, G. Dror, B. Quenet (2004) Dynamic Proximity of Spatiotemporal Sequences, *IEEE trans. on neural networks* **15**, 1002 .
- [12]D. Horn, B. Quenet, G. Dror, O. Kliper,(2003) Modeling Neural Spatiotemporal Behavior, *Neurocomputing*, **52-54** 799-804.
- [13]O. Kliper, D. Horn, B. Quenet, G. Dror (2004) Analysis of Spatiotemporal Patterns in a Model of Olfaction. *Neurocomputing*, **58-60**, 1027-1032.
- [14]E. Etzion, H. Abramowicz, Y. Benhammou, G. Dror, D. Horn, L. Levinson , R. Livneh (2004) Using a neural network approach for muon reconstruction triggering. *Nuclear Instruments and Methods in Physics Research*, **A217**, 265, 223.
- [15]Y. Eishental, G. Dror, E. Ruppin (2006). Facial Attractiveness: Beauty and the Machine. *Neural Computation* **18**(1), 119 - 142 .
- [16]G. Dror, R. Sorek, R. Shamir (2005) Accurate identification of alternatively spliced exons using support vector machine. *Bioinformatics*, **21**(7), 897-901.
- [17]R. Sorek, G. Dror, R. Shamir (2006) Assessing the fraction of alternatively spliced exons in the human genome. *BMC Genomics* **7**, 273.
- [18]S. Cohen, G. Dror, E. Ruppin (2007). Playing the Game of Feature Selection. *Neural Computation*, **19**, 1939-1961
- [19]A. Kaufman, G. Dror, E. Ruppin, Isaac Malechson (2006) The Genetic Properties of Neurons Carry Significant Information on their Synaptic Connectivity in the C. elegans Nervous System. *PLoS Comput Biol* **2**(12).

- [20] A. Kagian, G. Dror, T. Leyvand, D. CohenOr, E. Ruppin, (2008) A Machine Learning Predictor of Facial Attractiveness Revealing Human-like Psychophysical Biases. *Vision Research* 48-235-243.
- [21]I. Guyon, A. Saffari, G. Dror and G. Cawley (2007) Analysis of the IJCNN 2007 agnostic learning vs. prior knowledge challenge. *Neural Networks* 21(2) 544-550.
- [22]Q. Shi , J. Petterson, G. Dror, J. Langford, A. Smola and S.V.N. Vishwanathan (2009) Hash Kernels for Structured Data. *Journal of Machine Learning Research - Special Topic on Large Scale Learning*.
- [23]M. Gutkin, R. Shamir, G. Dror (2009) SlimPLS: a method for feature selection in gene expression-based disease classification. *PLoS ONE* 4(7): e6416. doi:10.1371/journal.pone.0006416.
- [24]Isabelle Guyon, Vincent Lemaire, Marc Boulle, Gideon Dror, and David Vogel. (2009) Analysis of the KDD Cup 2009: Fast Scoring on a Large Orange Customer Database. Accepted for publication in *JMLR*.
- [25] I. Guyon, A. Saffari, G. Dror and G. Cawley (2009) Model Selection: Beyond the Bayesian/Frequentist Divide. Accepted for publication in *JMLR*.
- [26]O. Thomas, P. Sunehag, G. Dror, S. Yun, S. Kim, M. Robards, A. Smola, D. Greene, P. Saunders (2010) Wearable-Sensor Activity Analysis Using Semi-Markov Models with a Grammar. *Pervasive and Mobile Computing* 6(3), 342-350.

## **Submitted**

- [1] R. Ronen, A. Sukachev, G. Dror, E. Halperin and N. Shomron (2010) miRNAkey: a software pipeline for the analysis of microRNA Deep Sequencing data

## **In preparation.**

- [1]G. Dror (2009) Regularization of Tree Augmented Network (TAN) classifiers.
- [2]G. Dror, O. Raz Graphlets for SAT problems.
- [3]G. Dror, A. Lev, J. Rodity (2010) Rainbow coloring of 2-connected and 2-edge connected graphs

## **BOOK CHAPTERS**

- [1] G. Dror (2010) Machine Learning for Digital Face Beautification. *Computational photography: methods and applications*, Ed. Ratislav Lukac, to be published by CRC Press / Taylor & Francis.

## BOOKS

### published

- [1] G. Lana (1990) Problems in waves and optics for physics and engineering, Dyonon publications. (in Hebrew) (תרגילים באופטיקה וגלים לתלמידי פיסיקה והנדסה).
- [2] Guyon, S. Gunn, A. Ben Hur, and G. Dror (2005) Design and Analysis of the NIPS2003 Challenge, in Feature Extraction: Foundations and Applications, Eds. I. Guyon, S. Gunn, M. Nikravesh, L. Zadeh, Springer Verlag.
- [3] G. Dror, M. Boule, I. Guyon, V. Lemaire, D. Vogel (2010). Proceedings of the KDD2009 competition. Published as a special issue of JMLR.

### in preparation

- [1]I. Guyon, A. Saffari, G. Dror and G. Cawley . Hands-on pattern recognition - challenges in data representation, model selection and performance prediction.

## ORGANIZING MACHINE LEARNING COMPETITIONS

- [1]I. Guyon, S. Gunn, A. Ben Hur, A. Elisseeff, and G. Dror. Feature selection challenge (2003)
- [2]I. Guyon, A. Saffari, G. Dror and. O. Guyon. Performance prediction challenge (2006).
- [3]I. Guyon, G. Cawley, A. Reza Saffari, G. Dror. Model selection game.(2006)
- [4] I. Guyon, G. Cawley, A. Reza Saffari, G. Dror, O. Guyon. Agnostic learning vs. prior knowledge challenge .(2007).
- [5] Isabelle Guyon, Vincent Lemaire, Marc Boule, Gideon Dror, and David Vogel. KDDcup 2009 competition. (2009).
- [6]I . Guyon, G. Dror, G. Cawley, A. Reza Saffari. Active learning challenge.

## ORGANIZING COMMITEES - WORKSHOPS AND SPECIAL SESSIONS

- [1] WCCI 2010 special session on Active and Autonomous Learning.

## REFEREED CONFERENCE PRESENTATIONS

- [1]G. Lana and B. Svetitsky (1993). Instability of bubbles near the hadron quark-gluon-plasma phase transition. In B. Muller and M. Fried, Editors, Proceedings of the workshop on QCD vacuum structure and its applications.
- [2]G. Dror, M. Tsodyks (1998). Analysis and modeling of population dynamics in the visual cortex. Presented at CNS98.
- [3]G. Dror, H. Abramowicz, D. Horn (1999). Vertex identification in high energy experiments. Appeared in the *proceedings to NIPS98*, Eds. S. Solla., M. Kearns.
- [4]G. Dror, H. Abramowicz, D. Horn (1999). Vertex reconstruction of  $ep$  interactions with the ZEUS

Central Tracking Detector. Presented at *AIHENP99*.

- [5]G. Dror, H. Abramowicz, D. Horn (1999). Momentum reconstruction of particles in the forward muon trigger system of the ATLAS detector. Presented at *AIHENP99*.
- [6]G. Dror, M. Tsodyks , (1999). Chaotic phenomena in neural populations with dynamic synapses, Presented at *CNS99*. .
- [7]G. Dror, M. Tsodyks , (1999) Activity of coupled excitatory and inhibitory neural populations with dynamic synapses. Presented at *CNS99*.
- [8]G. Dror, E. Etzion, (2000). Momentum reconstruction and triggering for the ATLAS detector, *Advanced Computing and Analysis Techniques in Physics Research*, Eds. P. C. Bhat & M. Kasemann, AIP Conference proceedings 2001, p. 67 (TAUP 2647 [hep-ex/0011061])
- [9]G. Dror, E. Etzion, (2000). Vertex reconstructing neural network at the ZEUS central tracking detector. *Advanced Computing and Analysis Techniques in Physics Research* Eds. P. C. Bhat & M. Kasemann AIP Conference proceedings 2001, p. 95 (TAUP-2648 [hep-ex/0011062]).
- [10]E. Etzion, H. Abramowicz, Y. Benhammou , G. Dror, D. Horn, L. Levinson , R. Livneh (2003). Using a neural network approach for muon reconstruction triggering, presented at *ACAT2003*.
- [11]U. Bogomolov, G. Dror, S. Lepchev, E. Rivlin, M. Rudzsky (2003). Classification of Moving Targets Based on Motion and Appearance. *British Machine Vision Conference 2003*, vol. 2, pp. 429-438, Norwich, UK, September 2003
- [12]I. Guyon, S. Gunn, A. Ben Hur, G. Dror (2004). Result Analysis of the NIPS 2003 Feature Selection Challenge. Presented at *NIPS 2004*.
- [13]S. Cohen, G. Dror, E. Ruppin (2005). Playing the Game of Feature Selection. Presented at the International Joint Conference on Artificial Intelligence, *IJCAI05*.
- [14]I. Guyon, A. R. Saffari, G. Dror and J. Buhmann (2006) Performance Prediction Challenge (IJCNN2006).
- [15]T. Leyvand,, D. Cohen-Or, G. Dror, , D. Lischinski, (2006) Digital Face Beautification (ACM SIGGRAPH2006)
- [16]A. Kaufman, G. Dror, E. Ruppin, (2006) Gene Expression of *C. elegans* Neurons Carries Significant Information on Their Synaptic Connectivity (ISMB 2006)
- [17]A. Kaufman, G. Dror, E. Ruppin, (2006) Gene Expression of *C. elegans* Neurons Carries Significant Information on Their Synaptic Connectivity (CSHL 2006).
- [18]A. Kagian, G. Dror, T. Leyvand, D. Cohen Or, E. Ruppin, (2006) A Humanlike Predictor of Facial Attractiveness. Presented at *NIPS2006*.
- [19]I. Guyon, A. Saffari, G. Dror, G. Cawley, O. Guyon , (2006) Benchmark datasets and game result summary, presented at the Multi-level Inference workshop, *NIPS2006*.
- [20] D. Gill, Y. Ritov, G. Dror (2007) Is Pinocchio's Nose Long or His Head Small? Learning Shape Distances for Classification. Best paper award at *ISVC 2007*.
- [21]T. Stern, G. Dror, D. Shweiki (2008) A possible effect of NMD on terminal intron position: a cross-species transcriptome analysis. Presented at *GCB 2007*.
- [22]H. Fu, G. Dror, E. Sheffer, D. Cohen Or. Upright orientation of man-made objects. (2008) *ACM*

SIGGRAPH 2008)

- [23]T. Leyvand, G. Dror, D. Cohen-Or, D. Lischinski. Data-Driven Enhancement of Facial Attractiveness. (2008) ACM SIGGRAPH2008.
- [24]Q. Shi, J. Paterson, G. Dror, A. Smola, J. Langford , SVN Vishwanathan, (2008) Hash kernels. Presented at AISTATS 2009.
- [25]O. Lavi, M. Gutkin, G. Dror and R. Shmair (2009), Selecting Gene Expression Markers for Cancer Prognosis and Treatment. ISCR 2009
- [26]G. Dror, Graphlet sampling kernels (2009). Best research paper award, DMIN 2009.
- [27]O. Thomas, G. Dror, M. Robards, A. Smola, P. Sunehag (2008). Wearable-Sensor Activity Analysis Using Semi-Markov Models with a Grammar. presented at AISTATS 2009.
- [28]U. Ruhrmair, F. Sehnke, J. Solter, G. Dror, V. Stoyanova and J. Schmidhuber (2010) Machine Learning Attacks on Physical Unclonable Functions. Accepted for presentation at ACM Conference on Computer and Communications Security 2010.
- [29]I. Guyon, G. Cawley ,G. Dror, V. Lemaire Results of the Active Learning Challenge, presented at AISTATS 2010.
- [30]I. Guyon, G. Cawley ,G. Dror, V. Lemaire (2010) Design and Analysis of the WCCI 2010 Active Learning Challenge, accepted for presentation at the International Joint Conference on Neural Networks the 2010.

## **JOURNAL REVIEWING & EDITORIAL ACTIVITIES**

- [1] Journal of Machine learning Research (JMLR).
- [2] Bioinformatics.
- [3] Data and Knowledge Engineering (DKE).
- [4] IEEE trans. on Neural Networks.
- [5] IEEE trans. on Knowledge and Data Engineering (TKDE).
- [6] IEEE trans. on Pattern Analysis and Machine Intelligence (TPAMI).
- [7] Graphical models (GMOD).
- [8]The Journal of Computers (JCP).
- [9] The Open Applied Informatics Journal - Editorial Board Member.
- [10] The Journal of Computers - Editorial Board Member.