

Curriculum Vitae

Miriam Zacksenhouse

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Academic Degrees:

- 1977 B.Sc. (with distinction), Mathematics and Physics,
The Hebrew University of Jerusalem, Israel.
- 1980 B.Sc. (Summa Cum Laude), Mechanical Engineering,
Technion - Israel Institute of Technology, Haifa, Israel.
- 1982 M.Sc., Mechanical Engineering,
Massachusetts Institute of Technology, Cambridge, Mass. USA.
Supervisor: Prof. D. Hardt
- 1993 Ph.D., Electrical & Computer Engineering,
Rice University, Houston, Texas USA.
Supervisor: Prof. D. Johnson

Academic Appointments

- 2007-Present Associate Professor, Faculty of Mechanical Engineering,
Technion – Israel Institute of Technology, Haifa, Israel.
- 2001-2007 Senior Lecturer with tenure, Faculty of Mechanical Engineering,
Technion – Israel Institute of Technology, Haifa, Israel.
- 2003-2004 Visiting research scientist, Center for Neuro-engineering, Dept of
Biomedical Engineering, Duke University, Durham, USA.
Host: Prof. M.A.L. Nicolelis, and Prof. C. Henriquez
- 1995-2001 Senior Lecturer, Faculty of Mechanical Engineering,
Technion – Israel Institute of Technology, Haifa, Israel.
- 1994-1995 Postdoctoral Research Associate, Center for Higher Brain Functions,
Weizmann Institute of Science, Rehovot, Israel.
Host: Prof. E. Ahissar
- 1993-1994 Postdoctoral Research Associate, Department of Electrical &
Computer Engineering, Rice University, Houston, Texas, USA.
Host: Prof. D. Johnson
- 1989-1993 Graduate Research Assistant, Department of Electrical & Computer
Engineering, Rice University, Houston, Texas, USA.
- 1980-1982 Graduate Research Assistant, Department of Mechanical Engineering,
Massachusetts Institute of Technology, Cambridge, Mass., USA.

PROFESSIONAL EXPERIENCE**Academic Experience**

- 1995-Present Faculty of Mechanical Engineering, Technion:
Computational motor control; Neural coding; Sensory-motor integration; Brain Machine Interfaces; Networks of coupled oscillators; Legged locomotion; Manipulative hand movements; Gesture recognition; Computer-Machine Interfaces. Neural Networks; Classification and Diagnostics.
- 2003-2004 Center for Neuro-engineering, Dept. of Biomedical Eng. Duke Univ.:
Neural coding, representation and control of arm movements. Brain-Machine Interface (BMI).
- 1994-1995 Center for Higher Brain Functions, Weizmann Institute of Science:
Decoding temporal patterns with oscillatory neural networks and phase-locked loops.
- 1989-1994 Department of Electrical & Computer Engineering, Rice University:
Point process analysis and modeling of neural spike trains.
Neural encoding of binaural cues for sound localization.
Dynamic and computational modeling of single neurons.
- 1980-1982 Department of Mechanical Engineering, MIT:
Measurement and control of pool size during automatic welding.

Industrial Experience

- 1989-1993 Principal engineer, Lockheed Engineering and Science Company,
part time Artificial Intelligence branch, Houston-Clear Lake, Texas, USA.
Neural Networks for dexterous anthropomorphic robot arm.
- 1987-1989 Project leader, Lockheed Engineering and Science Company,
Artificial Intelligence branch, Houston-Clear Lake, Texas, USA.
Directed the software development and integration of an autonomous space robot, the Extra-Vehicular-Activity Retriever (EVAR), resulting in a successful first ground demonstration that secured continued NASA funding and development.
- 1988 Consultant, Agar Engineering, Houston, Texas, USA.
part time Developed and implemented an automatic calibration algorithm for capacitive sensors measuring water/oil concentration.
- 1982-1986 Project leader and Engineer, NL - Industries/Technology Systems,
Houston Texas, USA.
Invented a new Measurement While Drilling (MWD) Near-Bit tool that measures the forces and accelerations at the bit. Established and supervised data acquisition during field tests. Analyzed field test measurements and modeled the drill-string dynamics at the bit identifying whirling and resonance modes.

TEACHING EXPERIENCE

- 1995-Present Faculty of Mechanical Engineering, Technion:
 Undergraduate Courses: Linear Systems, Introduction to Mechatronics, Sensors and Measurement Systems, Kinematics of Mechanisms, Experimental Methods, Signal Processing for Vibration Analysis and Diagnostics.
 Graduate Courses: Neural Networks for Control and Diagnostics; Reliability
- 1988-1992 Lockheed's Engineering and Science program training:
 (Summers) Introduction to Neural Networks.

Yearly Senior Projects**Sensory Motor Integration Laboratory (SMILe)**

- 1997-1998 PC-based interface to the Anthrobot-3 (3 students).
 1997-1998 CyberGlove based tele-operation of the Anthrobot-3 (2 groups).
 1997-1998 Graphical simulation of the Anthrobot-3 (2 students).
 1998-1999 Yoyo activation and tracking system (3 students)
 1998-1999 Calibration system for touch sensors (2 students)
 1999-2000 Gesture commanded mobile robot (4 students)
 1999-2000 FSR based touch sensors (2 students)
 2000-2001 Robo-tik: robotic buckle opening (3 students) – project award
 2002-2003 Gesture interface for Robo-tik (3 students)
 2002-2003 Robotic on-line path generation (3 students) – project award.
 2004-2005 Stand alone Yoyo control system (3 students) – project award
 2011-2012 Prototype robotic leg (2 students)
 2011-2012 Simulated biped locomotion (1 student)

Brain-Computer Interfaces for Rehabilitation (BCIRL)

- 2009-2010 EEG analysis for detecting error related potentials (2 students)
 2011-2012 Classification of EEG data for controlling wheelchair (2 students)
 2011-2012 EEG correlates of change blindness (2 students)
 2011-2012 EEG correlates of aiming (1 student)

Faculty RoboCup project

- 2004-2007 Academic supervision of the RoboCup undergraduate yearly project - and (12-20 students each semester) - Jointly with Prof. Halevi.
 2002-2003 Academic supervision of the RoboCup undergraduate yearly project.

TECHNION ACTIVITIES

- 2011 – Present Graduate school award committee, Technion IIT
- 2011 – Present Co-Head, Brain-Computer Interfaces for Rehabilitation laboratory, Faculty of Mechanical Engineering, Technion IIT. Established the Laboratory to investigate EEG correlated of motor control and learning and develop Brain-computer interfaces to enhance robot-assisted upper and lower limb rehabilitation.
- 1996-Present Head, Sensory-Motor Integration Laboratory (SMILe), Faculty of Mechanical Engineering, Technion IIT. Established the Laboratory to

investigate human sensori-motor control and develop biologically inspired robots.

- 2008 Vice dean for undergraduate affairs, Faculty of Mechanical Engineering.
- 2007 Coordinator of undergraduate studies, Faculty of Mechanical Engineering.
- 2004-2006 Contact person, department of Youth Activities and Graduate Studies.
and 2002-2003
- 2001-2003 Head, Mechatronics-Robotics course of study (MEGAMA) and Bio-engineering course of study at the Faculty of Mechanical Engineering.
- 1998-2000 Member, Judicial panel, Faculty Disciplinary Court, Technion IIT.
- 1999 Head, Mechatronics discipline, responsible for developing the Mechatronics program, teaching duties and student projects, Faculty of Mechanical Engineering, Technion IIT.
- 1996-1998 Head, Opto-mechanics chain in undergraduate studies, Faculty of Mechanical Engineering, Technion IIT.
- 1996-1998 Participated in formulating the new undergraduate disciplines of Opto-mechanics, and Mechatronics and Robotics for the Faculty new undergraduate program.

HONORS & AWARDS

- 2002 Best Poster Award, Int. Joint Conf on Neural Networks, World Congress on Intelligent Computation (IJCNN-WCCI'02), Hawaii.
- 2000 Research Award from the Miriam and Aaron Gutwirth Science – Based Industries Center, Technion.
- 1997 Annie and Charles Corrin Academic Lectureship Award, Technion.
- 1996 Samuel and Esther August Academic Lectureship Award, Technion.
- 1988 The National Aeronautics and Space Administration (NASA) Group Achievement Award; Extra-vehicular Activity Retriever (EVAR) Development Team.
- 1977-1979 Technion - Israel Institute of Technology, Student Honorary Awards.
- 1977 The Hebrew University of Jerusalem Honorariums for Academic Achievements.

GRADUATE STUDENTS**Master Students:****Theses in progress**

Ms. Miri Biniamini Since Oct 2011
 Title: Optimal Feedback control of novel motor tasks and Brain-Machine Interfaces

Ms. Alexandrina Evstrachi Since March 2012
 Title: Biped locomotion using central pattern generators with feedback

Completed Master Theses

1998 Mr. Gil Abramovich, (**MSc**)
 Characterization of turbulent flow in a flume by thermal image processing.
 Secondary supervisor: Prof. G. Hetsroni.

1998 Mr. Ilan Gutman, (**ME**)
 Neural Networks for Automatic Target Recognition

1999 Mr. Tomer Valency, (**MSc**)
 Instantaneous Model Impedance Control for Robots.

2002 Mr. Paul Marcovici, (**MSc**)
 Automatic Recognition of Manipulative Hand Movements.
 Secondary Supervisor: Prof. M. Shpitalni.
Student Award from the Miriam and Aaron Gutwirth Fund (2000)

2003 Mr. Hod Katan, (**MSc**)
 Visual Tracking and Characterization of Finger Movements.

2005 Mr. Ohad Snir, (**ME**)
 Noise cancellation in Trucks
 Main Supervisor: Prof. S. Braun

2008 Ms. Yana Lelchuck, (**MSc**)
 Gesture programming for Virtual Reality
 Co-supervisor: Prof. M. Shpitalni

2009 Ms. Carmit Keren, (**MSc**)
 Co-supervisor: Prof. Y. Ben-Haim
 Title: Info-gap Bayesian Classification
Student Award from the Jacobs Fund (2006)

2009 Ms. Simona Nemets, (**MSc**)
 Info-gap Approach to Regularization

2011 Mr. Mark Shamsonov
 Co-supervisor: Prof. Y. Ben-Haim
 Estimating Uncertain Probability Distributions using Info-Gap Theory

- 2011 Mr. Koren Beizer
Title: Adaptive motor control during experiments with Brain Machine Interfaces
- 2011 Mr. Boris Yazmir Transferred to Direct PhD
Title: Error related potentials in planar continuous motion
Co-supervisor: Assoc. Prof. M. Reiner, Education of Technology and Science
- 2012 Mr. Jonathan Spitz Transferred to Direct PhD
Title: Legged goal-oriented autonomous robot with integrated low level sensory feedback

Ph.D. Students:**Theses in progress**

- Mr. Jonathan Spitz Direct PhD program, March 2012
Title: Legged goal-oriented autonomous robot with integrated low level sensory feedback

Completed PhD Thesis

- 2003 Dr. Jin Huiliang,
Modeling and Control of Robotic Yoyo.
Currently: Assoc Prof., School of Mechanical Engineering, Shanghai Jiaotong University, China
- 2004 Dr. Ran Peled
Blind Source Separation of vibrations for fault detection in rotating machines.
Co-Supervisor: Prof. S. Braun
- 2006 Dr. Tomer Valency,
Biologically inspired motion patterns generator for robotic task planning and control.
- 2007 Dr. Iris Dejmal,
Characterization and Recognition of Manipulative Hand Movements

Post-Doctoral fellows:

- Dr. Sheng Zhang October –March 2000
Ph.D. Machinery Eng. College of Northeastern University, China
Subject: Real time implementation of yoyo control
- Dr. Sara Rosenblum November 2002 – June 2003
Ph.D. The Hebrew University of Jerusalem
Subject: Hand Gesturing for Human Command Interface

RESEARCH GRANTS

1. Source: DARPA (Grant FA8655-12-1-2143)
Title: *ROBIL – Robot Israel*
PIs: M. Zacksenhouse, A. Wolf, E. Rivlin and D. Wheis
Part of an Israeli group including BGU, BIU, Cogniteam and IAI.
Technion budget: \$45K; Nov. 2012 – July 2013.

2. Source: MAFAT
Title: *Robot Israel for disaster response based on DARPA challenge*
PIs: M. Zacksenhouse, A. Wolf, E. Rivlin and D. Wheis
Part of an Israeli group including BGU, BIU, Cogniteam and IAI.
Technion budget: 360K ILS; Aug 2012 – July 2013.

3. Agency: TASP - Technion Autonomous Systems Program
Title: *Reinforcement Learning of Dynamically Stable Locomotion for Biped Robots*
PIs: M. Zacksenhouse, and R. Meir; Budget: \$35K, July 2012 – July 2013

4. Agency: TASP - Technion Autonomous Systems Program
Title: *Error Related Potentials for Machine Learning in Autonomous Systems*
PIs: M. Zacksenhouse, R. Meir, H. Pratt and R. Katz;
Budget: \$25K, July 2012 – July 2013

5. Source: CSST – Center for Security Science and Technology.
Title: Brain-Computer Interfaces for improving observers' performance and soldiers' aiming capabilities
PIs: Miriam Zacksenhouse, Reuven Katz and Hillel Pratt; Budget 180,000 NIS

6. Intel Corporation – Technology Manufacturing Group
Title: System identification and rapid failure detection
PIs: Y. Ben-Haim and Miriam Zacksenhouse
Budget: 169,000 NIS. Jan 2012 – Dec. 2012.

7. Agency: TASP - Technion Autonomous Systems Program
Title: *Control of Bipedal Robotic Locomotion*
PIs: Y. Or, M. Zacksenhouse and P.O. Gultman
Budget: \$50K, Oct. 2011 – July. 2013

8. Agency: TASP - Technion Autonomous Systems Program
Title: *Motor-errors Related Potentials for Autonomous Brain-Computer Interface*
PIs: M. Zacksenhouse, H. Pratt and M. Reiner;
Budget: \$43,103, Oct. 2010 – Aug. 2012

9. Agency: TASP - Technion Autonomous Systems Program
Title: *Robo-roach: a six legged goal-directed autonomous robot*
PIs: M. Zacksenhouse and R. Meir
Budget: \$20K, Oct. 2009 – Aug. 2010

10. Agency: Abramson Center, Methodist Hospital

Title: *Robust classification of Heart Failure Conditions*
PI: Prof. Yakov Ben-Haim and Prof. M. Zacksenhouse
Budget: \$32,930, May 2007 – April 2008.

11. Agency: National Natural Science Foundation of China (NSFC)
Title: *Yo-yo Playing: Control of Unstable Recurrent Non-prehensile Dynamic Manipulation*;
PI: Dr. Jin Hui-Liang, Shanghai Jiao Tong University, China, and Dr. Miriam Zacksenhouse, Technion.
Budget: \$30K for three years, Jan. 2005- Dec. 2007.

12. Agency: European Community
Title: *Virtual Research Lab. for Knowledge Community in Production (VRL-KCiP) – Network of Excellence (NoE)*.
PIs: Prof. M. Shpitalni and Prof. A. Fisher, Co-PI: Dr. M. Zacksenhouse.
Budget: 192KEU, June 2004 – Nov. 2005

13. Agency: MAFAT;
Title: *VRTO: Virtual Reality Tele-Operation*
PI: Dr. Miriam Zacksenhouse
Budget: 200,000 IS per year for three years, March, 2001 – April 2004.
Part of a group grant with Prof. Flash from the Weizmann Institute of Science, Prof. Shoham from the Technion, and Prof. Stern and Prof. Idan from BGU.

14. Agency: BSF;
Title: *Discrimination between serial and parallel processing schemes in the rat vibrissal system*.
PIs: Dr. E. Ahissar, Weizmann Institute of Sciences, Rehovot; Dr. M. Zacksenhouse, Technion; Prof. M.A.L. Nicolelis, Duke University, NC, USA
Budget: \$50,000 total per year for three years, Sep. 2001 – Aug 2004.

15. Company: RSL- Electronics;
Title: *Diagnostic of a Start-up Engine by learning from examples*
PI: Dr. Miriam Zacksenhouse ; Budget: \$11,500, 2001

16. Agency: BSF;
Title: *Role of thalamocortical oscillations in processing of vibrissal information*;
PIs: Dr. E. Ahissar, Weizmann Institute of Sciences, Rehovot; Dr. M. Zacksenhouse, Technion; Prof. M.A.L. Nicolelis, Duke University, NC, USA
Budget: \$50,000 per year for three years: Sep. 1998 – Aug 2001.

17. Agency: BRITE-EURAM III;
Title: *Diagnostics of Machining Processes*;
PI: Prof. S. Braun and Dr. M. Zacksenhouse;
Budget: 30KEU, for three years, Jan 1998 – Dec 2000.

18. Agency: The Wolfson Family Charitable Trust;
Title: *Sensory-motor control in biological and robotic systems*;
PI: M. Zacksenhouse;
Budget: 60,000 pounds; 1998.

PUBLICATIONS***Theses**

1. **Zacksenhouse M.** *Point-process modeling of excitatory/inhibitory interactions in LSO neurons*. Ph.D. Thesis, Dept. Elec. & Comp. Eng., Rice University, Houston, TX. May 1993. Supervised by: Prof. D. Johnson.
2. **Zacksenhouse M.** *Control of penetration in Gas-Tungsten-Arc welding*. M.Sc. Thesis, Dept. Mech. Eng., MIT, Cambridge, MA. June 1982. Supervised by: Prof. D. Hardt.

Refereed papers in professional journals – Published

1. **Zacksenhouse M.**, D. Hardt, Well pool impedance identification for size measurement and control. *J. Dynamic Systems, Measurement, and Control*, 105:179-184, 1983.
2. **Zacksenhouse M.**, D.H. Johnson, C. Tsuchitani, Excitatory/inhibitory interaction in the LSO revealed by point process modeling. *Hearing Res.*, 62:105-123, 1992.
3. **Zacksenhouse M.**, D.H. Johnson, C. Tsuchitani, Excitation effects on LSO unit sustained responses: Point process characterization. *Hearing Res.*, 68:202-216, 1993.
4. **Zacksenhouse M.**, D.H. Johnson, C. Tsuchitani, Transient effects during the chopping response of LSO neurons. *J. Acoust. Soc. Am.*, 93(3):1410-1422, 1995.
5. Ahissar, E., S. Haidarliu, M. **Zacksenhouse**, Decoding temporally encoded sensory input by cortical oscillations and thalamic phase-comparators. *Proc. Natl Acad. Sci. (USA)* 94: 11633-11638, 1997.
6. **Zacksenhouse M.**, D.H. Johnson, J. Williams, and C. Tsuchitani, Single-neuron modeling of LSO unit responses. *J. Neurophysiol.* 79(6):3098-3110, 1998.
7. **Zacksenhouse M.**, Detecting and segmenting coordinated patterns in manipulative hand movements. *IJIM Special issue on Intelligent Manipulators* 4(1):69-88, 1999.
8. **Zacksenhouse M.**, S. Braun, M. Feldman and M. Sidahmed, Toward helicopter gearbox diagnostics from a small number of examples. *MSSP special issue on Helicopter Health Monitoring* 14(4):523-543, 2000.
9. **Zacksenhouse M.** and P. Marcovici, Real time segmentation of manipulative hand movements. *Mechatronics Journal* 11(4): 389-407, 2001.
10. **Zacksenhouse M.**, G. Abramovich and G. Hetsroni, Automatic Spatial Characterization of Low-Speed Streaks from Thermal Images. *Experiments in Fluids*, 31(2):229-239, 2001.
11. **Zacksenhouse M.**, Sensitivity of Basic Oscillatory Mechanisms for Pattern Generation and Detection. *Biol. Cybernetics*, 85(4):301-311, 2001.

* Contributions by Zacksenhouse's students are underlined

12. Ahissar E. and M. **Zacksenhouse**, Temporal and Spatial Coding in Rat Vibrissal System. *Prog. Brain Res.*, 130:75-87, 2001.
13. Jin H.L., and M. **Zacksenhouse**, Yoyo Dynamics: Sequence of Collisions Captured by a Restitution Effect. *ASME J. Dyn. Sys., Meas. and Control*, **124**:390-397, 2002.
14. Jin H.L., and M. **Zacksenhouse**, Oscillatory Neural Control of Dynamic Systems, *IEEE Trans. on Neural Networks* **14**(2):317-325, 2003.
15. Valency T. and M. **Zacksenhouse**, Accuracy / robustness dilemma in Impedance Control, *ASME J. Dyn. Sys., Meas. and Control*. **125**:310-319, 2003.
16. Jin H.L., and M. **Zacksenhouse**, Robotic Yoyo Playing with Visual Feedback, *IEEE Trans Robotics*. **20**(4):736-744, 2004.
17. Lebedev, M.A., J.M. Carmena, J.E. O'Doherty, M. **Zacksenhouse**, C.S. Henriquez, J.C. Principe and M.A.L. Nicolelis, Cortical Ensemble Adaptation to Represent Velocity of An Artificial Actuator Controlled by Brain Machine Interface, *J. Neuroscience*, **25**(19): 4681-4693, 2005.
18. Peled R., S. Braun and M. **Zacksenhouse**, A Blind De-convolution Separation of Multiple Sources with Applications to Bearing Diagnostics, *Mechanical Systems and Signal Processing*, **19**(6):1181-1195, 2005.
19. **Zacksenhouse** M., and E. Ahissar, Temporal Decoding by Phase-Locked-Loops – unique features of circuit level implementations and their significance for vibrissal information processing. *Neural Computation*, **18**(7): 1611-1636, 2006.
20. Dejmal I., and M. **Zacksenhouse**, Coordinative Structure of Simultaneous Hand-movements Facilitates their Recognition. *IEEE Trans. Biomed. Eng.* **53**(12):2455-2463, 2006.
21. **Zacksenhouse** M., M.A. Lebedev, J.M. Carmena, J.E. O'Doherty, C.S. Henriquez, J.C. Principe and M.A.L. Nicolelis, Cortical Modulations increase during early sessions with Brain-Machine Interfaces, *PLoS-ONE*, **2**(7):e629, 2007.
22. **Zacksenhouse** M., S. Nemets, M.A. Lebedev, and M.A.L. Nicolelis, Robust satisficing linear regression: Performance/ robustness trade-off and consistency criterion, *Mechanical Systems and Signal Processing*, Special issue on Inverse Problems. Doi 10.1016/j.ymsp.2008.09.008, **23**(6):1954-1964, 2009.
23. Jin H.L., Q. Ye, and M. **Zacksenhouse**, Return-maps, characterization and cycle-wise planning of yoyo playing. *IEEE Trans Robotics* **25**(2):438-444, 2009.
24. Ben-Haim Y., M. **Zacksenhouse**, C. Keren, and C.C. Dasco, Do we know how to set decision thresholds for diabetes? *Medical Hypothesis*, **73**:189-193, 2009.
25. **Zacksenhouse** M., R. Bogacz and P. Holmes, Robust versus optimal strategies for two-alternative forced choice tasks, *J Math. Psychology*, 54:230-246, Doi:10/1016/j.jmp.2009.12.004, 2010.

Submitted

26. Yazmir, B., M. Reiner, H. Pratt, and **M. Zacksenhouse**, Error-related potentials due to visuo-motor disturbances during continuous reaching movements, *under revision, IEEE Trans. Neural Systems and Rehabilitation Engineering*.
27. Spitz J., and M. Zacksenhouse, Minimal feedback to a rhythm generator improves the robustness to slope variations of a compass biped, *Submitted, IEEE Trans Robotics*.

Chapters in books

28. **Zacksenhouse M.**, Diagnostics; Neural Networks, Applications. In: Braun S. (ed) *Encyclopedia of Vibration*, Academic Press. 2001.
29. **Zacksenhouse M.** Strategies for neural ensemble data analysis, in Nicoletis MAL. (ed) *Methods for Neural Ensemble Recordings, 2nd edition*, CRC Press. 2007.

Patent Applications

30. M. Zacksenhouse, and J. Spitz, Robot, Device and a Method for Central Pattern Generator (CPG) based Control of a Movement of the Robot, Provisional Patent application, #61585260, 2011.

CONFERENCES**Invited Lectures**

1. Johnson D.H., J. Williams, M. **Zacksenhouse**, C. Tsuchitani, Single-neuron modeling constrained by spike train measurements. *Invited talk, Computational Neuroscience CNS94*, CA. USA. 1994.
2. **Zacksenhouse M.**, How Blind Can Neural Network Based Diagnostics Be? Invited paper, *4th Int. conf. Acoustical and Vibratory Surveillance Methods and Diagnostic Techniques*. 85-99, France, October 2001.
3. **Zacksenhouse M.**, A. Yaffe, S. Nemets, and Y. Ben-Haim, Info-gap approach to linear regression with severe uncertainties, *Invited talk, Workshop on Info-gap analysis of engineering systems: decisions under severe uncertainty*, University of Newcastle-upon Tyne, Sep. 2005.

Refereed Papers in Conference Proceedings

1. Wolf S.F., M. **Zacksenhouse**, A. Arian, Field measurement of down-hole drilling vibrations. *Proc. Society of Petroleum Engineering*, SPE 14330, 1-12, Las-Vegas, Nevada, Sep. 1985.
2. **Zacksenhouse M.**, R. deFigueiredo, D.H. Johnson, A neural network architecture for cue based motion planning. *Proc. 27th IEEE conf. Decision and Control*. 324-327, Austin, TX. Oct. 1988.
3. **Zacksenhouse**, M. G. Abramovich, and G. Hetsroni, Characterization of One Dimensional Texture---A Point Process Approach. *Int. Conf. Acoustic Speech*

- and Signal Processing, ICASSP98* 5:2709-2712, Seattle, Washington, May 1998.
4. **Zacksenhouse**, M. and M. Dvorjetski, Construction of an Anthropomorphic Robot Teaching System. *27th Israel Conf. on Mech. Eng.* 577-579, Haifa, Israel. May 1998.
 5. **Zacksenhouse** M., G. Abramovich and G. Hetsroni, Image Processing for Characterization of Turbulent Flow in a Flume. *27th Israel conf. on Mech. Eng.* 318-320, Haifa, Israel. May 1998.
 6. Braun S., M. Feldman, M. Sidahmed and M. **Zacksenhouse**, Vibration Based Gear Diagnostics with application to Westland helicopter data. *3rd Int. Conf. Acoustical and Vibratory Surveillance Methods and Diagnostic Techniques.* 129-144, Senlis, France, October 1998.
 7. Braun S., M. Feldman, M. Sidahmed and M. **Zacksenhouse**, Vibration signal processing for the Westland helicopter data. *IMAC-XVII*, 1347-1358, Kissimmee, Florida, February 1999.
 8. **Zacksenhouse**, M. and T. Moestl, Segmenting manipulative hand movements by dividing phase plane trajectories. *IEEE Intl. conf. Robotics and Autom. (ICRA)*, 3:1910-1916, Detroit, Michigan, May 1999.
 9. **Zacksenhouse**, M. and E. Konstantino, Point Process Texture Generation Model: Implications to Multiple Resolution Analysis. *IEEE Signal Processing Workshop on Higher Order Statistics*, 195-198, Hertzelia, Israel, June 1999.
 10. **Zacksenhouse** M. and P. Marcovici, Real time segmentation of manipulative hand movements. *Sixth Intl. conf. Mechatronics and Machine Vision in practice*, 1-4, September 1999.
 11. **Zacksenhouse** M., and P. Marcovici, Recognizing Simultaneous Manipulations Hand Movements with an ART based Classifier, *International CIRP Design Seminar; Design with Manufacturing: Intelligent Design Concepts Methods and Algorithms*, 307-312, Haifa, Israel. May 2000.
 12. Valency T. and M. **Zacksenhouse**, Instantaneous Model Impedance Control for Robotics. *28th Israel Conf. on Mech. Eng.* 122-124, Beer-Sheva, Israel. June 2000.
 13. **Zacksenhouse** M. and P. Marcovici, Coordination based Recognition of Simultaneous Manipulative Hand Movements, *4th World Multi-conference on Systemics, Cybernetics and Informatics (SCI00)*, paper 20595, 1-7, Orlando Florida, July 2000.
 14. **Zacksenhouse** M. and P. Marcovici, Inherent Structure of Manipulative Hand Movements, *Intl. conf. on Intelligent Robotics and Systems (IROS00)*, 1:312-323, Takamatsu, Japan, Nov. 2000.
 15. Valency T. and M. **Zacksenhouse**, Instantaneous Model Impedance Control for Robots, *Intl. conf. on Intelligent Robotics and Systems (IROS00)*, 1:757-762, Takamatsu, Japan, Nov. 2000.
 16. **Zacksenhouse** M., How Blind Can Neural Network Based Diagnostics Be? *Invited paper, 4th Int. conf. Acoustical and Vibratory Surveillance Methods and Diagnostic Techniques.* 85-99, France, October 2001.

17. Peled R. and M. **Zacksenhouse**, Blind Source Separation of Bearing Vibrations, *42nd Israel Annual Conf. on Aerospace Sciences*, 1-8, Israel, Feb. 2002.
18. Jin H.-L. and M. **Zacksenhouse**, Necessary Condition for Simple Oscillatory Neural Control of Robotic Yoyo, *Int. Joint Conf on Neural Networks part of the World Congress on Intelligent Computation (IJCNN-WCCI'02)*, **Best Poster Award**, 1427-1432, Honolulu, Hawaii USA, May 2002.
19. Peled R., S. Braun and M. **Zacksenhouse**, A Blind Deconvolution Separation of Multiple Sources with Applications to Bearing Diagnostics, *Int. conf. Acoustical and Vibratory Surveillance Methods and Diagnostic Techniques*. France, October 2004
20. Jin H.-L. and M. **Zacksenhouse**, Oscillator-based versus Model-based Control of Open-loop Unstable Periodic Systems: Yoyo example, *Int. Conf. on Advanced Robotics., ICAR-05*. Seattle, Washington, July 2005.
21. **Zacksenhouse M.**, M.A. Lebedev, J.E. O'Doherty, J.M. Carmena, C.S. Henriquez, and M.A.L. Nicolelis, Correlated ensemble activity increased when operating a brain machine interface, *Comp. Neuro-Science CNS-2005*.
22. **Zacksenhouse M.**, A. Yaffe, S. Nemets, Y. Ben-Haim, M.A. Lebedev and M.A.L. Nicolelis, An Info-gap approach to linear regression, *Int Conf on Acoustic, Speech and Signal Processing, Proc. Vol 3: 800-803. ICASSP-2006*.
23. Ben-Haim Y., M. **Zacksenhouse** and A. Yaffe, Info-gap Modeling: Why Less is More, *Non-deterministic Methods in Applied Mechanics and Engineering NDM08*, Leuven, April, 2008.
24. Beiser, K., and M. **Zacksenhouse**, Adaptive motor control during experiments with Brain Machine Interface, *Proc. ASME ESDA 2008*.
25. Keren, C., Y. Ben-Haim, and M. **Zacksenhouse**, Info-gap Bayesian classification, *Proc. ASME ESDA 2008*.
26. **Zacksenhouse M.**, K. Beiser, M.A. Lebedev, J.E. O'Doherty, and M.A.L. Nicolelis, Optimal control framework successfully explains changes in neural modulations during experiments with Brain Machine Interfaces, *Advances in Computational Motor Control, 1-2, Symposium at the Soc. for Neuroscience conf. SfN; Chicago, USA, Oct. 2009*.
27. Holmes P., P. Eckhoff, K.F. Wong-Lin, R. Bogacz, M. **Zacksenhouse**, and J.P. Cohen, The Physics of Decision Making: Stochastic differential equations as models for neural dynamics and evidence accumulation in cortical circuits, Plenary lecture at the *XVIth International Congress on Mathematical Physics*, Prague, Czech Republic, Aug 3-8, 2009; pp 123-142 in Proc.volume, ed. P. Exner, World Scientific, 2010.
28. **Zacksenhouse M.**, and S. Nemets, Info-gap approach to regression, *Joint conf. 5th Int Symposium on Uncertainty Modeling and Analysis (ISUMA) and 1st Int.conf. Vulnerability and risk analysis and management (ICVRM)*, Washington, April 2011.
29. Spitz J., Y. Or, and **Zacksenhouse M.**, Toward a Biologically-inspired Open Loop Controller for Dynamic Biped Locomotion. *IEEE Robotics and Biomimetics, IEEE-ROBIO*, 2011.

Abstract of Lectures and Conference Participation

1. **Zacksenhouse M.**, EVA Retriever: Architecture of a free flying robot. *Annual Workshop on parallel computing*, Portland, Oregon, April 1988.
2. **Zacksenhouse M.**, D.H. Johnson, C. Tsuchitani, Shunting Inhibition in Lateral Superior Olive Units: point process and spike initiation approaches, *ARO Midwinter Conference*, Florida, Feb. 1991.
3. **Zacksenhouse M.**, D.H. Johnson, C. Tsuchitani, Excitatory/ inhibitory mechanisms in Lateral Superior Olive units. 122nd *Meeting of the Acoustic Society of America*, Houston, TX. Nov. 1991.
4. **Zacksenhouse M.**, D.H. Johnson, C. Tsuchitani, Spatial Tuning Revealed by Point Process Model of Lateral Superior Olive Units, *ARO Midwinter Conference*, St. Petersburg, Florida, Feb. 1992.
5. **Zacksenhouse M.**, What can single neuron spike train analysis reveal? *Cortical Dynamics in Jerusalem*, Eilat, Israel. June 1995.
6. **Zacksenhouse M.**, Unified Dynamics underlying Networks of Oscillatory Units for Pattern Decoding and Generation. *J.H. Belfer Memorial Symp. on Nonlinear Mechanics*, Haifa, Israel, June 1997.
7. Ahissar, E., M. **Zacksenhouse**, R. Sosnik, and S. Haidarliu, Coding of vibrissal information: arc-based spatial and row-based temporal encoding/decoding schemes. *Neurosci. Lett. Suppl.* 54: S1, *iSfN conf.*, Eilat, Israel, 1999.
8. **Zacksenhouse M.**, Neural Networks for Control, *IAAC – Israel Association for Automatic Control*, Hertzelia, Israel. June 2000.
9. Jin H. and M. **Zacksenhouse**, Oscillatory Neural Networks for Yoyo Control, *IAAC – Israel Assoc. for Automatic Control*, Hertzelia, June 2000.
10. **Zacksenhouse M.**, Representation and Recognition of Manipulative Hand Movements. *28th Israel Conf. on Mech. Eng.* Beer-Sheva, June 2000.
11. Jin H. and M. **Zacksenhouse**, On Modeling of a Robotic-Yo-yo. *28th Israel Conf. on Mech. Eng.* Beer-Sheva, Israel. June 2000.
12. Valency T. and M. **Zacksenhouse**, Impedance Control for Robotics, *IAAC – Israel Assoc. for Automatic Control*, Hertzelia, Israel. Feb. 2001.
13. **Zacksenhouse M.**, T. Valency and I. Dejmal, Characterization and recognition of manipulative hand movements. *Progress in Motion Control III*, Montreal, Canada, August 2001.
14. **Zacksenhouse M.**, Control Challenges in Brain Machine Interfaces, *Invited talk, IAAC – Israel Assoc. for Automatic Control, Workshop on Control and Biological Systems*, Hertzelia, Israel. May 2003.
15. **Zacksenhouse M.**, M.A. Lebedev, J.E. O'Doherty, J.M. Carmena C.S. Henriquez, and M.A.L. Nicolelis, Operation of Brain Machine Interface increases the variance and correlation in Fronto-Parietal Cortical Neurons, *ICCNs - Int. Conf. Cognitive and Neural Systems*, Boston, MA. USA, April 2004.

16. O'Doherty, J.E., D.S. Won, M. **Zacksenhouse**, M.A. Lebedev, J.M. Carmena, M.A.L. Nicolelis, Wolf, and C.S. Henriquez, Data Reduction of Simultaneous Multi-Electrode Neural Recordings Using Principal Components Analysis, *BMES - Biomedical Eng. Soc.*, Philadelphia, PA. USA. Oct 2004.
17. **Zacksenhouse** M., M.A. Lebedev, J.E. O'Doherty, J.M. Carmena, C.S. Henriquez, and M.A.L. Nicolelis, Cortical Neurons Tuning to Multiple Spatio-Temporal Patterns of Movement, *Soc. for Neurosc.* #190.11, San-Diego, CA. USA. Oct. 2004.
18. Lebedev M.A., J.E. O'Doherty, **Zacksenhouse** M , J.M. Carmena, C.S. Henriquez, and M.A.L. Nicolelis, Directional Tuning in Neuronal Assemblies, *Soc. for Neurosc.* #884.5, San-Diego, CA. USA. Oct. 2004.
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20. **Zacksenhouse** M. Rate Modulations of cortical neurons during arm movements and operation of Brain Machine Interfaces, *Computational Motor Control Workshop*, Ben-Gurion University, May 2005.
21. **Zacksenhouse** M., Control Challenges in Brain Machine Interfaces, *IAAC – Israel Assoc. for Automatic Control, Workshop on soft computing*, Hertzelia, Israel. June 2005.
22. **Zacksenhouse** M., A. Yaffe, S. Nemets, and Y. Ben-Haim, Info-gap approach to linear regression with severe uncertainties, *Workshop on Info-gap analysis of engineering systems: decisions under severe uncertainty*, University of Newcastle-upon Tyne, Sep. 2005.
23. **Zacksenhouse** M., M.A. Lebedev, J.E. O'Doherty, J.M. Carmena, C.S. Henriquez, and M.A.L. Nicolelis, Trends in firing rate statistics mirroring changes in task performance during training with Brain Machine Interfaces, *Soc. for Neurosc.*, Washington DC. USA. Nov. 2005.
24. **Zacksenhouse** M. Signal Processing Challenges in Brain Machine Interfaces, *Applied Materials Conference, Comp Vision, Image Process. & Machine Learning*, Rehovot, Israel, January 2006.
25. **Zacksenhouse** M. Rate Modulations of cortical neurons during arm movements and operation of Brain Machine Interfaces, *Int. Center for Neural Computation*, Hebrew Univ., Israel, April 2006.
26. **Zacksenhouse** M. Rate Modulations of cortical neurons during arm movements and operation of Brain Machine Interfaces, *Neuroscience Seminar Series*, Rambam, Technion., Israel, May 2006.
27. **Zacksenhouse** M. Computational Challenges in Brain machine Interfaces, *21-Umbrella-Symposium: Brain-behavior relationship of emotion and cognition: from gene to pathology*. Forschungszentrum, Julich, Germany. Sep. 2006.
28. **Zacksenhouse** M. Modeling and control of reaching movements. *Int Workshop on Info-gap applications in the Life Sciences*, Univ. of Houston and Methodist Hospital Research Institute, Houston, TX.. Sep. 2006.

29. **Zacksenhouse** M. and K. Beiser, Adaptive motor control during experiments with Brain Machine Interface, *Computational Motor Control Workshop*, Ben-Gurion University, 2007.
30. **Zacksenhouse** M. and K. Beiser, Adaptive motor control during experiments with Brain Machine Interface, *Israel Neuroscience conference, iSFN conf*, Eilat, Dec., 2007.
31. **Zacksenhouse** M. Capacity of binned neural channels during experiments with Brain-Machine Interfaces, *Israel Neuroscience Conference, iSFN conf.*, Eilat Dec., 2007.
32. **Zacksenhouse** M., M.A. Lebedev, K. Beiser, and M.A.L. Nicolelis, Potential origin of enhanced neural activity during BMI experiments, *Research in Encoding and Decoding of Neural Ensembles, AREADNE08*, Santorini, Greece, June 2008.
33. **Zacksenhouse** M. Bin-rate selected for Brain-Machine-Interfaces optimizes rate decoding, *BMC Neuroscience* 2008, **9**(Suppl 1):O2doi:10.1186/1471-2202-9-S1-O2, *Computational Neuroscience Conference, CNS08*, Portland, Oregon, USA, July 2008.
34. **Zacksenhouse** M., Enhanced neural modulations and their potential interpretation in the context of optimal control. *France-Israel Workshop on Neuro-Robotics*, Jerusalem, Israel, 2008.
35. **Zacksenhouse** M. Neural Dynamics under novel and uncertain conditions, Belfer Symposium on Neuro-mechanics, dynamics and decision-making, Technion, Haifa, Feb. 15-16, 2009.
36. **Zacksenhouse** M., K. Beiser, M.A. Lebedev, J.E. O'Doherty, and M.A.L. Nicolelis, Enhanced neural modulations during BMI experiments: control perspective, *BMC Neuroscience* 2009, **10**(Suppl 1):P342 doi:10.1186/1471-2202-10-S1-P342, *Computational Neuroscience Conference, CNS09*, Berlin, Germany, July 2009.
37. Holmes P., M. Zacksenhouse and R. Bogacz, Robust versus optimal strategies for two-alternative forced-choice tasks. *MathPsych* 2009, University of Amsterdam, Aug 1-4, 2009.
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40. **Zacksenhouse** M., M.A. Lebedev, J.E. O'Doherty, and M.A.L. Nicolelis, Signal-to-noise ratio of binned spike-counts and the timescales of neural coding, *J Mol Neurosci* (2009) **39** (Suppl 1):S129, , *iSFN*, Eilat, Israel, 2009.
41. **Zacksenhouse** M., Quantifying and interpreting changes in neural modulations during experiments with Brain Machine Interfaces. *France-Israel Workshop on Neuro-Robotics*, Paris, 2010.

42. **Zacksenhouse M.**, Signal-to-noise ratio of binned spike-counts and the timescales of neural coding, *3rd France-Israel Bi-national conf on Neuroscience. Neurology and Psychiatry*, Haifa, Israel, 2010.
43. **Zacksenhouse M.**, Neural rate modulations during experiments with Brain Machine Interfaces: implications for neural encoding and motor control, Columbia Univ – Technion Workshop on Neuro-engineering of Biological Networks, New-York, USA, March 16-17, 2010.
44. **Zacksenhouse M.**, Optimal control framework successfully explains changes in neural modulations during BMI experiments, Workshop on Computational model for movement control and adaptation during BMI operation, CNS, 2010, San-Antonio, TX, 2010.
45. **Zacksenhouse M.**, Enhanced neural modulations during experiments with BMIs: interpretation within the context of optimal theories, Workshop on Emerging System Theories in BMI Neuroscience, Computational and System Neuroscience (COSYNE) 2011, Utah, USA, Feb. 2011.
46. **Zacksenhouse M.**, M.A. Lebedev, J.M. Carmena and M.A.L. Nicolelis, Spike-count analysis reveals the relevant timescales in experiments with BMIs, Poster, Computational and System Neuroscience (COSYNE) 2011, Utah, USA, Feb. 2011

Tutorials:

1. **Zacksenhouse M.**, Introduction to Neural Networks, *3rd Int. Symp. on Intelligent Control*, Washington DC, Nov. 1988.

Organizational Activities in Conferences

1. **Member:** International Program Committee, *International Conference on Mechatronics and Machine Vision in Practice (M2Vip)*, Ankara, Turkey, September 1999.
2. **Organizer:** Workshop on Neural Networks for Control. *IAAC – Israel Association for Automatic Control*, Israel, June 2000.
3. **Co-organizer:** two special sessions on Biologically Inspired Grasping and Manipulations at the *Intl. conf. on Intelligent Robotics and Systems (IROS00)*, Japan, November 2000.
4. **Co-organizer:** Workshop on Neuro-Robotics, *France-Israel council for Science and Technology Research*, Jerusalem, Israel, Nov. 2008.
5. **Member:** Organizing committee for Computational Neuroscience Conference
 - **CNS 2009:** Berlin, Germany, July 2009
 - **CNS 2010:** San-Antonio, Texas, USA; July 2010;
 - **CNS 2011:** Stockholm, Sweden, July 2011;
6. **Organizer:** **Belfer Symposium** on Neuro-Mechanics, Dynamics and Decision Making, Technion, Feb 15-16, 2009.
7. **Co-organizer:** Workshop on Neuro-Robotics, *France-Israel council for Science and Technology Research*, Paris, France, Jan. 2010.

8. **Organizer:** Workshop on Computational models for movement control and adaptation during BMI operation, *CNS 2010*, San-Antonio, TX.

SPECIAL PROFESSIONAL ACTIVITIES

Committee Computational Neuroscience – Bi-national France Israeli Research
Member Project – organized by the Ministry of Science; Since 2011.

Committee Neuroscience and Robotics – Bi-national France Israeli Research
Member Project – organized by the Ministry of Science; 2006 - 2010.

Guest editor - International Journal of Intelligent Mechatronics (IJIM), Special issue on Intelligent Manipulators. Vol. 4, No. 1, January 1999

Reviewer for Scientific Journals and Conferences

IEEE Trans. on Signal Processing;

IEEE Trans. on Automatic Control

IEEE Trans. on Robotics and Automation; IEEE Transactions on Robotics

IJRA - International Journal of Robotics and Automation

NECO – Neural Computation;

JNE – Journal of Neural Engineering

IJHR – International Journal on Humanoid Robotics

JTB – Journal of Theoretical Biology

JN – Journal of Neurophysiology;

CN – Computational Neuroscience

EBR – Experimental Brain Research;

NSL – Neuroscience Letters

EURASIP Journal on Advances in Signal Processing

IJIM - International Journal of Intelligent Mechatronics

MSSP - Mechanical Systems and Signal Processing

ICRA - International conference on Robotics and Automation

IROS - International conference on Intelligent Robotics and Systems

M2Vip - International Conference on Mechatronics and Machine Vision in Practice

IJSS - International Journal of Systems Science

Reviewer for Research Proposals:

GIF - German Israel Foundation

DIP – German Israel Program

ISF – Israel Science Foundation

BSF – Binational Science Foundation

BARD – Binational Agricultural Research and Development Fund

Japan Israel Joint Research Cooperation

Bi-national French Israeli Research Project on Neuroscience and Robotics, and on Computational Neuroscience.

Membership in Professional Societies: IEEE, SfN (Soc. for Neuroscience)