Shai Revzen

✆ *+1-(215)-906-2556*
✉ shrevzen@umich.edu
http://www.birds.eecs.umich.edu
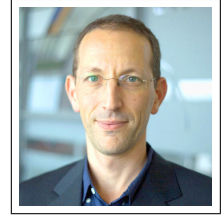
General Information

Nationality	**Israeli, Canadian**	*(dual citizenship)*
Languages	**English, Hebrew**	*native speaker*

Education

2003 Dec 2009	**Ph.D.**, *Univ. California*, Berkeley. Integrative Biology	
1994 Jun 2002	**M.Sc.**, *Hebrew Univ.*, Jerusalem. Computer Science (Optimization)	
1989 May 1993	**B.Sc.**, *Hebrew Univ.*, Jerusalem, *Magna cum laude*. Degree from honours program; Majors Computer Science, Math (extended); Minor Physics	

Doctoral thesis

title	Neuromechanical Control Architectures in Arthropod Locomotion
supervisor	Robert J. Full

Master thesis

title	Paging on Access Graphs of Minimal Degree 3
supervisor	Nati Linial

Work Experience

Academia

12–now	**Assistant Professor**, *U. Michigan (Ecology and Evolutionary Biology)*, Ann Arbor. Research, student supervision; biomechanics and mathematical biology
12–now	**Assistant Professor**, *U. Michigan (Electrical Engineering and Computer Science)*, Ann Arbor. Research, student supervision; robotics and control theory
11–12	**Visiting Assistant Professor**, *U. Michigan (Electrical Engineering and Computer Science)*.
09–12	**Postdoctoral Research Associate**, *U. Pennsylvania*, Philadelphia. Research, student supervision; robotics and control theory **Advisors** Mark Yim, Daniel E. Koditschek and George Pappas

06–09	**Graduate Student Researcher**, *U. California*, Berkeley.
	Funded Ph.D. research; biomechanics

Tech Industry

03–now	**Founding partner**, *Bio-Signal Analysis*, Tel-Aviv.
	Algorithms; Electrocardiology technology start-up
01–06	**Chief Architect, R&D**, *Harmonic, Inc.*, Sunnyvale.
	R&D, embedded programming, algorithms; Company develops digital video equipment for cable and satellite
98–01	**Chief Architect**, *Harmonic Data, Ltd.*, Tel-Aviv.
	Company-wide system architecture, basic research team manager, academic liaison; Company develops Internet over satellite solutions
96–98	**Instructor**, *John Bryce Training*, Ramat-Gan.
	Teaching Java, Javascript, HTML; Company trains IT professionals
97	**Software Engineer**, *Compedia, Ltd*, Ramat-Gan.
	Design and development of 3D video game engine; Company develops edutainment products for kids

Military Service (Israel)

96–now	**Reserve duty**, *IDF*.
93–96	**Mandatory service**, *IDF*.

Publications

Refereed Journal Publications

S Burden, S S Sastry, D E Koditschek, and **S Revzen**. Event-selected vector field discontinuities yield piecewise-differentiable flows *SIAM Journal of Applied Dynamical Systems*, 2016. (IN PRINT)

M Kaspari, N A Clay, J A Lucas, **S Revzen**, A D Kay, and S P Yanoviak. Thermal adaptation and phosphorus shape thermal performance in an assemblage of rainforest ants. *Ecology*, 97(4):1038–1047, 2016

S Burden, **S Revzen**, and S S Sastry. Model reduction near periodic orbits of hybrid dynamical systems. *IEEE Transactions on Automatic Control*, 60(10):2626–2639, 2015

H M Maus, **S Revzen**, J M Guckenheimer, C Ludwig, J Reger, and A Seyfarth. Constructing predictive models of human running. *Journal of the Royal Society of London - Interface*, 12 20140899, 2014

S Revzen, S A Burden, T Y Moore, J-M Mongeau, and R J Full. Instantaneous kinematic phase reflects neuromechanical response to lateral perturbations of running cockroaches. *Biological Cybernetics*, 107:179–200, 2013

S Sundaram, **S Revzen**, and G Pappas. Linear iterative strategies to identify and overcome malicious links in wireless networks. *Automatica*, 48(11):2894–2901, 2012

S Revzen and J M Guckenheimer. Finding the dimension of slow dynamics in a rhythmic system. *Journal of the Royal Society of London - Interface*, 9(70):957–971, 2012

P J White, **S Revzen**, C E Thorne, and M Yim. A general stiffness model for programmable matter and modular robotic structures. *Robotica*, 29:103-121, 2011

A J Spence, **S Revzen**, J Seipel, C Mullens, and R J Full. Insects running on elastic surfaces. *Journal of Experimental Biology*, 213(11):1907, 2010

S Revzen and J M Guckenheimer. Estimating the phase of synchronized oscillators. *Physical Review E*, 78(5):051907, Nov 2008

A Jusufi, D I Goldman, **S Revzen**, and R J Full. Active tails enhance arboreal acrobatics in geckos. *Proceedings of the National Academy of Sciences*, 105(11):4215–4219, 2008

Conferences (refereed with published proceedings)

S Revzen and M Kvalheim. Data driven models of legged locomotion. In *International Society for Optics and Photonics SPIE Defense+ Security*, 2015.

D Miller, I Fitzner, SB Fuller, and **S Revzen**. Focused modularity: Rapid iteration of design and fabrication of a meter-scale hexapedal robot. In *Assistive Robotics: Proceedings of the 18th International Conference on CLAWAR*, 2015

G Council, S Yang, and **S Revzen**. Deadbeat control with (almost) no sensing in a hybrid model of legged locomotion. In *IEEE International Conference on Advanced Mechatronic Systems (ICAMechS)*, 2014

M Piccoli, **S Revzen**, and M Yim SEAL Pack: Versatile, Portable, and Rapidly Deployable SEa, Air, and Land Vehicle. In *IEEE International Symposium on Safety Security and Rescue Robotics (SSRR)*, 2013

J Sastra, **S Revzen**, and M Yim Softer legs allow a modular hexapod to run faster In *Climbing and Walking Robotics (CLAWAR)*, 2012

S Revzen, B D Ilhan, and D E Koditschek. Dynamical trajectory replanning for uncertain environments. In *IEEE Conference on Decision and Control (CDC)*, 2012

S Revzen, M Bhoite, J A Macasieb, and M Yim. Structure synthesis on-the-fly in a modular robot. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 4797 – 4802, 2011

S Burden, **S Revzen**, and S S Sastry. Dimension reduction near periodic orbits of hybrid systems. *IEEE Conference on Decision and Control and European Control Conference (CDC-ECC)*, 6116–6121, 2011

Conferences (abstract / poster / video)

D Zhao, and **S Revzen**. Slipping helps steering in a multilegged robot In *Dynamic Walking*, Ann Arbor, 2016

G Council, and **S Revzen**. Recovering a gait using energy and phase In *Dynamic Walking*, Ann Arbor, 2016

M-Y Yu, A Liedtk, and **S Revzen**. Trotting horses synchronize their legs during the second half of stance In *Integrative and Comparative Biology*, 2016

D Zhao, C Schaffer, and **S Revzen**. Steering hexapedal robots In *IEEE Robotics Science and Systems conference, Miniature Legged Robots Workshop*, Rome, 2015

M Kvalheim and **S Revzen**. Better models of rhythmic systems: predicting locomotion from phase alone. In *Integrative and Comparative Biology*, 55:E103–E103, 2015

G Council and **S Revzen** Running with certainty on uncertain terrain requires little to no neural feedback in *Integrative and Comparative Biology*, 55:E36–E36, 2015

S Revzen. Lessons from animal locomotion: extending floquet theory to hybrid limit cycle oscillators. In *Locomotion in Terrestrial and Granular Environments*. SIAM, 2014.

S Revzen, SA Burden, and MD Kvalheim. Why the trot? In *Society Integrative and Comparative Biology*, 54:E174, 2014.

S Wilshin and **S Revzen**. Phase driven models of unperturbed locomotion. In *Society Integrative and Comparative Biology*, 54:E226, 2014.

S Revzen, S A Burden, D E Koditschek, and S S Sastry. Pinned equilibria provide robustly stable multilegged locomotion. In *Dynamic Walking*, Pittsburgh, 2013.

S A Burden, **S Revzen**, and S S Sastry. From anchors to templates: Exact and approximate reduction in models of legged locomotion. In *Dynamic Walking*, Pittsburgh, 2013.

S Revzen. Facing the Unknown Challenge: Structure and Modularity in Morphological Computation. In *Soft Robotics & Morphological Computation*, Ascona, 2013.

S A Burden, **S Revzen**, T Y Moore, S S Sastry, and R J Full. Using reduced-order models to study dynamic legged locomotion: Parameter identification and model validation. In *Society for Integrative and Comparative Biology*, San Francisco, 2013.

M Daley, **S Revzen**, and S D Wilshin. Towards a unified notion of gaits. In *Animal Abstracts*. Society for Experimental Biology, 2012.

M Maus, **S Revzen**, and J M Guckenheimer. Drift and deadbeat control in the floquet structure of human running. In *Dynamic Walking*, Jena, 2012.

S Wilshin, G C Haynes, M Reeve, **S Revzen**, and A J Spence. How is dog gait affected by natural rough terrain? In *Integrative and Comparative Biology*, 2012.

M Maus and **S Revzen**. Linear structure in human treadmill running? In *Dynamic Walking*, 2011.

S Revzen, J M Guckenheimer, and R J Full. Subtle differences in gaits: the perspective of data driven floquet analysis. In *Integrative and Comparative Biology*, 2011

S Revzen, J Sastra, N Eckenstein, and Yim. CKbot platform for the ICRA 2010 planetary challenge. In *IEEE International Conference on Robotics and Automation (ICRA), Workshop "Modular Robots: The State of the Art"*, , 11–12, 2010.

T Y Moore, **S Revzen**, S Burden, and R J Full. Adding inertia and mass to test stability predictions in rapid running insects. In *Integrative and Comparative Biology*, 2010.

S Revzen, J M Guckenheimer, and R J Full. Study of the neuromechanical control of rhythmic behaviors by floquet analysis. In *Integrative and Comparative Biology*, 2009.

A Frimerman, **S Revzen**, and B Shani. Spatial relation of qrs-t vectorcardiogram is a good predictor of coronary disease in patients with normal rest 12-leads ecg (poster). In *55th Annual Conference of the Israel Heart Society and the Israel Society of Cardiothoracic Surgery*, 2008.

S Revzen and J M Guckenheimer. A dynamical systems analysis of running cockroaches. In *Mathematical Biosciences Institute, Workshop 4*, 2008.

S Revzen, M S Berns, D E Koditschek, and R J Full. Determining neuromechanical control architecture using kinematic phase response to perturbations. In *Integrative and Comparative Biology*, 2008.

S Revzen, J Bishop-Moser, A J Spence, and R J Full. Testing control models in rapid running insects using lateral ground translation. In *Integrative and Comparative Biology*, 47(suppl 1):e1–152, 2007.

S Revzen, D E Koditschek, and R J Full. Selecting among neuromechnical control architectures using kinematic phase and perturbation experiments. In American Society of Biomechanics, 2007. (poster)

A J Spence, **S Revzen**, K Yeates, C Mullens, and R J Full. Insects running on compliant surfaces. In *Integrative and Comparative Biology*, 47(suppl 1):e1–152, 2007.

S Revzen, D E Koditschek, and R J Full. Testing feedforward control models in rapid running insects using large perturbations. In *Integrative and Comparative Biology*, 46(suppl 1):e1–162, 2006. (abstract online)

Invited Papers, Tutorials, Book Chapters, Theses

S Revzen. *Neuromechanical control architectures in arthropod locomotion*. PhD thesis, Univeristy of California, Berkeley, 2009.

S Revzen. Paging on access graphs of minimal degree 3. Master's thesis, Hebrew University, Jerusalem, October 2001.

S Revzen, D E Koditschek, and R J Full. *Progress in Motor Control - A Multidisciplinary Perspective*, chapter Towards Testable Neuromechanical Control Architectures for Running, pages 25–56. Springer Science and Business Media, LLC - NY, 2008.

S Revzen. Templates and Anchors for analysis and synthesis of control. Tutorial, Workshop 4, Mathematical Biosciences Institute, March 2008.

S Revzen. Phase estimation from kinematic data. Tutorial, Workshop 4, Mathematical Biosciences Institute, March 2008.

S Revzen Facing the Unknown, with Robots, TEDx UofM, April 2015 https://youtu.be/W1isc7PRrdY

Patents

B Shani, **S Revzen**, and A Frimerman. Analysis of electrocardiogram signals, January 13 2015. US Patent 8,934,964.

B Shani, **S Revzen**, and A Frimerman. Analysis of electrocardiogram signals. (WO/2006/123334), May 2005.

E Frachtenberg and **S Revzen**. Lossless data compression. (09/849,316), May 2001.