

Oriel Shoshani

PERSONAL INFORMATION

Date and place of birth: December 13, 1980, Israel
Marital status: Married+3
Home address: 4060 Springer Way, East Lansing, MI 48823, USA.
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EDUCATION

- 2009-2014** Ph.D. *direct program*, Mechanical Engineering, Technion–Israel Institute of Technology, Haifa, Israel.
Thesis: Fluid-structure interaction and orbital stability of elastically tethered bluff bodies. Advisor- Prof. Oded Gottlieb.
- 2004-2008** B.Sc., *cum laude*, Mechanical Engineering, Ben-Gurion University of the Negev, Beer-Sheva, Israel.

RESEARCH INTERESTS

Micro\Nano-Electro-Mechanical Systems, Random Perturbations of Nonlinear Dynamical Systems, Bifurcation Theory, Singular Perturbation Methods, Fluid-Structure Interaction, Vortex-Induced Vibration, Fluid Dynamics, Hydrodynamic Stability.

RESEARCH EXPERIENCE

- 2016-present** Postdoctoral Fellow, Fluctuating Nonlinear Vibrational Systems and Applications to Micro/Nano-Electro-Mechanical Systems, Department of Mechanical and Aerospace Engineering, Florida Institute of Technology, Melbourne, USA.
Visiting Scholar, Theory of Fluctuation and Dissipation in Nonlinear Oscillators, Department of Physics and Astronomy, Michigan State University, East Lansing, USA.
- 2014-2016** Postdoctoral Fellow, Fluctuating Nonlinear Vibrational Systems and Applications to Micro/Nano-Electro-Mechanical Systems, Department of Mechanical Engineering, Michigan State University, East Lansing, USA.
- 2009-2014** Research Assistant, Nonlinear and Chaotic Dynamical System Group, Faculty of Mechanical Engineering, Technion, Haifa, Israel.
Specialization in nonlinear dynamical systems, fluid-structure interaction.

TEACHING

2009-2014

Technion – Israel Institute of Technology, Faculty of Mechanical Engineering

Instructor Fluid Mechanics Spring 2010; Fall 2010;
Spring 2011; Fall 2011;
Spring 2012; Fall 2012;
Spring 2013; Fall 2013

Instructor Theory of Vibration Fall 2009; Fall 2010;
Fall 2011; Spring 2013;
Fall 2013; Spring 2014

2011-2012

Technion – Israel Institute of Technology, Unit of Science Ori
Youth, The President of Israel program for nurturing future scientists
inventors of Israel

Lecturer Introduction to Math Fall 2011; Spring 2012

2008-2009

Tutor of high-school seniors in physics and mathematics.

2006-2008

Tutor of undergraduate students, Dean of Students, Ben-Gurion
University, Beer Sheva, Israel. Courses included solid and fluid
mechanics for ME students, and math courses for students from
other faculties.

2005-2006

Tutor in the Perach Program for Support of Challenged Youth,
Ben-Gurion University, Beer-Sheva, Israel. Trainee was a teenager
with a learning disability

HONORS AND AWARDS

2015

Pnueli prize for Ph.D. thesis.

2013

Technion Graduate School Irwin and Joan Jacobs Fellowship for
excellence in studies.

2011

Technion Graduate School Irwin and Joan Jacobs Fellowship for
excellence in studies.

2011

Technion Graduate School Travel Grant to present research in
EUROMECH conference.

2009

Technion Graduate School Sherman Interdisciplinary Fellowship
for high academic achievements.

2008

B.Sc. in Mechanical Engineering with honors (Cum Laude), Ben-
Gurion University of the Negev, Israel.

2008

Excellence award for academic achievements on the fourth year of
undergraduate studies, Ben-Gurion University of the Negev, Israel.

PUBLICATIONS

Refereed papers in Professional Journals:

- Shoshani O., Heywood D., Yang Y., Kenny T.W., Shaw S.W. Phase noise reduction in a MEMS oscillator using a nonlinearly enhanced synchronization domain. *Journal of Micromechanical Systems*, in press.
- Shoshani O., Shaw S.W. Generalized parametric resonance. *SIAM Journal on Applied Dynamical Systems*, 2016.
- Shoshani O., Shaw S.W. Phase noise reduction and optimal operating conditions for a pair of synchronized oscillators. *IEEE Transactions on Circuits and Systems I*, 2015.
- Shoshani O., Gottlieb O. Non-linear stability of a perturbed Orr–Sommerfeld solution for the wake of a stationary cylinder at low Reynolds numbers. *International Journal of Non-Linear Mechanics*, 2013.

Submitted papers:

- Shoshani O., Gottlieb O. An asymptotic analysis of the vortex-induced vibration of nonlinear elastically restrained circular cylinder in two dimensional uniform flow. In preparation for submission to the *Journal of Fluid Mechanics*, 2016.
- Shoshani O., Gottlieb O. Nonlinear dynamics and orbital stability of a wake oscillator model for self-excited vortex-induced vibration of a spherical pendulum: comparison of theory and experiments. Submitted to *Physics of Fluids*, 2016.

In preparation:

- Shoshani O., Gottlieb O. Model-based estimation for heavy tethered cylinder subject to vortex-induced vibrations. In preparation for submission to the *Journal of Fluids and Structures*, 2016.

Chapters in Books

- Shaw S.W., Shoshani O., Polunin P.M. The Art of Modeling Mechanical Systems. Editor: Freidrich Pfeiffer, Chapter title: Modeling for non-linear vibrational response of mechanical systems. CISM International Centre for Mechanical Sciences, Springer, 2016.

CONFERENCES

Refereed papers in Conference Proceedings:

Li L.L., Polunin P.M., Dou S., Shoshani O., Strachan B.S., Jensen J.S., Shaw S.W., Turner K.L. Systematic design of MEMS resonators for optimal nonlinear dynamic response. Proc. Hilton Head Workshop 2016, A Solid-State Sensors, Actuators and Microsystems Workshop, Hilton Head Island, South Carolina, USA, June 5-9, 2016

Polunin P., Yang Y., Atalaya J., Ng E., Strachan B.S., Shoshani O., Dykman M.I., Shaw S.W., Kenny T.W. Characterization MEMS nonlinearities directly: the ring-down measurements. Proc. IEEE, Transducers 2015, Anchorage, Alaska, USA, June 21-25, 2015.

Yang Y., Ng E., Polunin P., Chen Y., Strachan B.S., Vu H., Ahn C.H., Shoshani O., Shaw S.W., Dykman M.I., Kenny T.W. Experimental investigation on mode coupling of bulk mode silicon MEMS resonators. Proc. IEEE, Transducers 2015, Anchorage, Alaska, USA, June 21-25, 2015.

Shoshani O., Ioffe L., Gottlieb O. Self-excited vortex-induced-vibrations of a wake-oscillator model for a whirling spherical pendulum in steady flow. IUTAM 6th Symposium on Bluff Body Wakes and Vortex-Induced Vibrations, Capri, Italy, June 22-25, 2010.

Contributed Abstracts in Conferences:

Li L.L., Polunin P.M., Dou S., Shoshani O., Strachan B.S., Jensen J.S., Shaw S.W., Turner K.L. Geometric Optimization of MEMS Resonator for Targeted Nonlinear Dynamic Response. The 13th International Workshop on Nanomechanical Sensing, Delft, the Netherlands, June 22-24, 2016.

Shoshani O., Heywood D., Yang Y., Kenny T.W., Shaw S.W. Phase noise reduction in a MEMS oscillator using a nonlinearly enhanced synchronization domain. Hilton Head Workshop 2016, A Solid-State Sensors, Actuators and Microsystems Workshop, Hilton Head Island, South Carolina, USA, June 5-9, 2016

Shoshani O., Strachan B.S., Polunin P.M., Czaplewski D.A., Chen C., Dykman M.I., López D., Shaw S.W. Amplitude and frequency saturation from mode coupling in MEMS resonators. Hilton Head Workshop 2016, A Solid-State Sensors, Actuators and Microsystems Workshop, Hilton Head Island, South Carolina, USA, June 5-9, 2016

- Shoshani O., Gottlieb O. An asymptotic analysis of the vortex-induced vibration of a geometrically nonlinear elastically restrained circular cylinder in two-dimensional uniform flow. EUROMECH 8th European Nonlinear Dynamics Conference, Vienna, Austria, July 6-11, 2014.
- Shoshani O., Gottlieb, O. Nonlinear stability of a perturbed Orr-Sommerfeld solution for the wake of stationary and moving cylinders at low Reynolds numbers. BIFD-5th International Symposium Instabilities and Bifurcations in Fluid Dynamics, Haifa, Israel, July 8-11, 2013.
- Shoshani O., Gottlieb, O. Vortex-induced vibration and orbital stability of a tethered light sphere in steady fluid flow. ICME-The 32nd Israeli Conference on Mechanical Engineering, Tel-Aviv, Israel, October 17-18, 2012.
- Shoshani O., Gottlieb, O. Vortex-induced vibration and orbital stability of a tethered light sphere in steady fluid flow. ISTAM-The Israel Society for Theoretical and Applied Mechanics, Annual Symposium, Tel-Aviv, Israel, December 25, 2011.
- Shoshani O., Gottlieb, O. The bifurcation structure of a nonlinear wake oscillator model for self-excited vortex-induced vibration of a spherical pendulum. EUROMECH 7th European Nonlinear Dynamics Conference, Rome, Italy, July 24-29, 2011.