CURRICULUM VITAE

• Personal Details

Name: Assaf Shmerling
Date and place of birth: July 14, 1984, ISRAEL
Marital Status: Married + 2 children
Military service: 12/2002 – 12/2006 (Lieutenant commander in the C4I Corps)
Address and telephone number at work: Dept. of Civil and Environmental Engineering
Ben-Gurion University, PO Box 653
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• Education

B.Sc. – 2007-2011, Ben-Gurion University, Department of Structural Engineering (**summa cum laude**)

Ph.D. – 2011-2017, Ben-Gurion University, Department of Structural Engineering, **Direct Ph.D. Program**.
Name of advisor: Prof. Robert Levy

Title of thesis: Seismic Performance-Based Design of Structures with Mass, Damping and Stiffness Design Variables using Optimal Control Theory

• Employment History

2018-Present	Lecturer	Ben-Gurion University
2021-2022	Research Associate	Universität der Bundeswehr München
2016-2018	Post-Doctoral Fellow	Ben-Gurion University
2016-2018	Teaching Fellows	Ben-Gurion University
2011-2016	Teaching Assistant	Ben-Gurion University
2011	Civil Engineer	YSS. Consulting Engineers Ltd

• Professional Activities

(a) Professional functions outside universities/institutions

2017 Session Chairman, 16th World Conference on Earthquake Engineering, Santiago, Chile

2023 Referee, A call for research in the fields of earthquakes, Ministry of Innovation, Science and Technology, Israel

(b) Ad-hoc reviewer for journals
Nonlinear Dynamics (IF 5.1; Q1)

(c) Membership or affiliation in professional/scientific societies and boards

2023-Present	Israeli Association for Earthquake Engineering (IAEE)
2014-Present	Israel Association for Computational Methods in Mechanics (IACMM)
2010-Present	Israeli Association of Construction & Infrastructure Engineers (IACIE)

• **Educational activities**

(a) Courses taught

Graduate level courses taught at Ben-Gurion University of the Negev
Advanced Topics in Dynamics of Structures
Analytical Methods for Engineers
Earthquake Engineering

Undergraduate level courses taught at Ben-Gurion University of the Negev
Dynamics of Structures
Extreme Events and Practical Seismic Design

Undergraduate level courses tutored at Ben-Gurion University of the Negev
Concrete Structures 1
Concrete Structures 2
Dynamics of Structures
Introduction to Structural Design
Numerical Methods in Structural Engineering
Extreme Events and Practical Seismic Design
Steel Structures
Tall Buildings Design

(b) Research Students

Master of Science Degrees
Nissan Mulay, M.Sc., 2020 (Graduated)
Lior Meltzer, M.Sc., 2021 (Graduated)
Shir Parizat, M.Sc., 2021 (Graduated)
Yehezkel Shaked M.Sc. 2024
Snir Nisim M.Sc. 2025

Doctor of Philosophy Degrees
Shir Parizat, Ph.D., 2025 (Jointly supervised by Ronnie Kamai)

• **Awards, Citations, Honors, Fellowships**

(a) Honors, Citation Awards

2011 Israeli Association of Construction & Infrastructure Engineers (IACIE), **Prize-winning undergraduate project**
2012 **Dean's List** for excellence in undergraduate studies
2019 **Harold Schnitzer** Visiting Scholar Program at Portland State University
2022 **The Fund for Advancement of Education in Israel** Research scholarship

• **Scientific Publications**

H-index 4
Total number of citations of all articles: 39
Total number of citations without self-citation: 32

(a) Refereed articles and refereed letters in scientific journals, running numbers

1. Shmerling[S], A., Levy[PI], R., & Reinhorn, A. M. (2018). Seismic retrofit of frame structures using passive systems based on optimal control. *Structural Control and Health Monitoring*, *25*(1). https://doi.org/10.1002/stc.2038 (8 citations; IF 5.6; Q1)
2. Shmerling[S], A., & Levy[PI], R. (2018). Seismic upgrade of structures using the H ∞ control problem for a general system interconnection paradigm. *Structural Control and Health Monitoring*, *25*(6). https://doi.org/10.1002/stc.2162 (4 citations; IF 5.6; Q1)

3. Shmerling[PD], A., & Levy, R[PI]. (2019). Seismic structural design methodology for inelastic shear buildings that regulates floor accelerations. *Engineering Structures*, *187*, 428–443. https://doi.org/10.1016/j.engstruct.2019.02.062 (4 citations; IF 5.8; Q1)*
4. Shmerling[PI], A. (2019). Seismic retrofit of two-way unsymmetric-plan buildings with added masses. *Engineering Structures*, *198*, 109522. https://doi.org/10.1016/j.engstruct.2019.109522 (2 citations; IF 5.8; Q1)*
5. Nissan[S] M., Shmerling[PI], A. (2021). Analytical approach for the design and optimal allocation of shape memory alloy dampers in three-dimensional nonlinear structures. *Computers & Structures*, *249*, 106518. https://doi.org/10.1016/j.compstruc.2021.106518 (10 citations; IF 4.6; Q1)*
6. Shmerling[PI], A. (2022). Reversed optimal control approach for seismic retrofitting of inelastic lateral load resisting systems. *International Journal of Dynamics and Control*, 1-19. https://doi.org/10.1007/s40435-022-00939-z (1 citations; IF 1.0; Q2)*
7. Shmerling[PI], A., & Gerdts[C], M. (2022). Optimization of inelastic multistory structures under seismic vibrations using shape-memory-alloy material. *Scientific Reports*, 12(1), 1-17. https://doi.org/10.1038/s41598-022-20537-5 (2 citations; IF 4.9; Q1)*
8. Shmerling[PI], A., & Gerdts[C], M. (2022). A Design Methodology for the Seismic Retrofitting of Existing Frame Structures Post-Earthquake Incident Using Nonlinear Control Systems. *Buildings*, 12(11), 1886. https://doi.org/10.3390/buildings12111886 (0 citations; IF 3.8; Q1)*
9. Shmerling[PI], A. (2023). Matrix equations models for nonlinear dynamic analysis of two-dimensional and three-dimensional RC structures with lateral load resisting cantilever elements. *Nonlinear Dynamics*, 111(1), 493-528. https://doi.org/10.1007/s11071-022-07852-2 (0 citations; IF 5.1; Q1)*
10. Shmerling[PI], A., & Gerdts[C], M. (2023). Short-horizon acceleration-predictive control for reducing lateral seismic inertia forces of inelastic frame structures using semi-active fluid viscous dampers. *Computers & Structures*, 281, 107032. https://doi.org/10.1016/j.compstruc.2023.107032 (1 citations; IF 4.6; Q1)*

(b) Published scientific reports and technical papers

1. Upgrading for Blast and Strong Ground Motions Resistance of Infrastructures, *Ministry of National Infrastructures*, State of Israel, 2012
2. Combined Novel Engineering Methods for Upgrading the Protection and Safety in Ammunition and Explosive Facilities, *Ministry of Economy*, State of Israel, 2014
3. Development of Small Shock Isolators for Small Devices, *Ministry of Defense*, State of Israel, 2016
4. A Methodology of Risk Assessment, Management and Coping Actions for Nuclear Power Plant Hit By High Explosive Warheads, *Ministry of National Infrastructures, Energy and Water resources*, State of Israel, 2018
5. Earthquake shake table tests for two types of motorized valves, *Rotem Industries*, BGU-EEL-2020-001, 2020
6. The response of a typical cooperative housing building to earthquake loading as a function of seismic fault proximity, *Ministry of National Infrastructures, Energy and Water resources*, State of Israel, 2023

• **Lectures and Presentations at Meetings and Invited Seminars**

(a) Presentation of papers at conferences/meetings (oral or poster)

1. Shmerling A., Levy R, Reinhorn A.M. "A Methodology for Seismic Retrofit Using Optimal Control." *In: Proceedings of the 16th World Conference on Earthquake Engineering*, January 9-13, 2017, Santiago, Chile, Paper 328.
2. Shmerling A, Levy R. "Optimal Gains in Mass, Stiffness and Added Damping for Seismic Upgrade of Frame Structures." *In: Proceedings of the 16th World*

Conference on Earthquake Engineering, January 9-13, 2017, Santiago, Chile, Paper 329.

3. Shmerling A., and Levy R. "Seismic Retrofit of Frame Structures using Single-Input-Multiple-Output Generalized System Paradigm Configuration." *In: Proceedings of the 16th European Conference on Earthquake Engineering*, June 18-21, 2018, Thessaloniki, Greece, Paper 10879.
4. Shmerling A., and Levy R. "Methodology for Obtaining Equivalent Linear-Elastic to Inelastic Shear-type Models and Vise-Versa." *In: Proceedings of the 16th European Conference on Earthquake Engineering*, June 18-21, 2018, Thessaloniki, Greece, Paper 10892.
5. Shmerling A, Levy R. "Improving the seismic performance of structures by assigning changes in mass, stiffness and added damping." *In: Proceedings of the 17th World Conference on Earthquake Engineering*, September 13-18, 2020, Sendai, Japan, Paper 46.
6. Shmerling A. "Matrix Equations Models for Solving The Dynamic Response of Inelastic Cantilever Structures" *In Proceedings of 9th ECCOMAS Thematic Conference on Computational Methods in Structural Dynamics and Earthquake Engineering*, June 12-14, 2023, Athens, Greece.

(b) Presentations at informal international seminars and workshops

1. Shmerling A, Levy R, and Reinhorn AM. "Seismic Performance-Based Retrofit with Damping and Stiffness as Design Variables Using Optimal Control Theory". *The 38th Israel Symposium on Computational Mechanics*, March 12, 2015, Beer-Sheva, Israel.
2. Shmerling A. "Design of Buildings to Withstand Strong Earthquakes using Control Theory". *Seminar lecture at the Institute of Applied Mathematics and Scientific Computing, Universität der Bundeswehr München*, June 21, 2022, Neubibeg, Germany.

• **Research Grants**

Israel Ministry of Energy. 1/2024-12/2024, R. Tadmor[PI], A., Peled[PI], J., Baraban[PI], D., Katoshevski[PI], A., Shmerling[PI], **Turning plastic waste from the sea into hydrogen and building materials**, annual amount 25,000$, total amount 25,000$.

Israel Ministry of Energy. 1/2020-12/2022, A., Shmerling[PI], R. Kamai[PI] **The response of a typical cooperative housing building to earthquake loading as a function of seismic fault proximity**, annual amount 36,000$, total amount 108,000$.

• **Present Academic Activities**

Research in progress

1. Non-destructive test and optimal control methodology for seismic structural health monitoring, Dr. Alex Brodsky, 2024
2. Optimizing the earthquake response of near-fault civil structures to protect nonstructural components sensitive to large inertia forces and accelerations, Shir Parizat, 2025.
3. Development of Capacity Curves of representative building types in Israel, Snir Nisim, 2025.
4. New topology for the optimization of friction-based dampers allocation to inelastic frame systems
5. Semi-active pendulum vibration absorber for inelastic reinforced concrete structures under seismic and wind loads

Books and articles to be published

In preparations:

Parizat[S], S., Kamai, R., **Shmerling**[PI], A. "An empirical study to predict the seismic acceleration of reinforced concrete moment-resisting-frames concerning earthquake characteristics."

Shaked[S], Y., **Shmerling**[PI], A. "Optimization of Adaptive Negative Stiffness Device for Inelastic Frame Structures"

Shmerling[PI], A. "New topology for the optimization of friction-based dampers allocation to inelastic frame systems "

Shmerling[PI], A. "Short Horizon Acceleration-Predictive Control for The Application of Semi-Active Control Systems"

Submitted for publication:

Parizat[S], S., Kamai[SI], R., Shaked[S], Y., **Shmerling**[PI], A." Seismic vulnerability of a vintage Eastern Europe apartment block building under near-fault proximity effects." (Submitted to Earthquake Spectra IF 4.3; Q1)

• **Synopsis of research, including reference to publications and grants in the above lists**

My primary research interest is upgrading and improving buildings' seismic resilience under severe loading types using passive and active energy dissipation technologies. Using my experience and knowledge in structural engineering, dynamics of structures, optimization, and control systems, I can tackle every aspect of applying energy dissipation technologies to civil structures and allocate them optimally. I am also familiar with the activation of Laboratory control systems, which allows me to conduct theoretical simulations and practical experiments.

Another high research interest of mine is the preparedness of Israel's buildings for future earthquakes. The building types in Israel are very complex, and the construction methods and regulations saw many significant changes from 1963 until the present day. Hence, Israel has many building types that must be analyzed and addressed differently when examining its seismic damage capacity. Therefore, the HAZUS manual is less suitable for Israeli construction. My research is concerned with developing methods and paradigms to assess and quantify the probability of collapse for most of the building types in Israel.

• **Teaching statement**

Today, I teach three theoretical courses and one structural design course. Academic courses provide structural engineering students with analytical knowledge implemented in structural design topics (e.g., concrete structures, steel structures, seismic design) and later in their engineering careers.

I know that each student has different capabilities in understanding and catching up on the material presented in class. Therefore, each lesson includes ample examples of various difficulty levels to support all students in better understanding the material. In addition, tutoring classes are given – providing additional help (the same applies to graduate courses).
Students go through various topics during the semester and sometimes have difficulty keeping track. Accordingly, the courses that I ran are organized as book chapters where each topic is regarded as a different chapter, and each sub-topic is a sub-section. This approach allows students to track their progress during the course.

My courses utilize ODE, PDE, and variational mathematical equations unfamiliar to most civil engineering students. Hence, the mathematical development in class is presented to a limited extent – as much as possible.