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### **Education**

1996-98 Post Doctoral Fellowship, Lamont Doherty Earth Observatory, Columbia Univ, NY  
1990-1996 PhD, MIT/WHOI Joint Program, Marine Geology & Geophysics, Cambridge, MA, USA  
1986-1989 BSc, Tel-Aviv Univ; Geophysics, Atmospheric & Planetary Sci.

### **Employment**

2016-now Full Professor, Institute of Earth Sciences, Hebrew Univ, Israel.  
2008-2016 Associate Prof, Institute of Earth Sciences, Hebrew Univ, Israel  
2000-now Adjunct Research Scientist, LDEO of Columbia University, NY, USA  
2000-2008 Senior scientist, Weizmann Institute of Science, Israel  
1999-2000 Storke-Doherty Lecturer, LDEO of Columbia University, NY, USA

### **Visiting Research Positions**

2019 Visiting Prof, Physics of Geological Processes, Oslo Univ, Norway.  
2014-2015 Visiting Prof, LDEO of Columbia University, NY, USA  
2006 Consultant, ExxonMobil Research & Engineering Company, NJ, USA  
1998 Visiting scientist, Rock mechanics lab, Stanford Univ., CA, USA

### **Awards and Fellowships**

2000 Alon Fellowship for young scientists  
1999 American Geophysical Union Award - Excellence in refereeing  
1998 Storke-Doherty Lectureship, LDEO, Columbia Univ, NY  
1996 Lamont Post-doctoral Fellowship, LDEO, Columbia Univ, NY  
1989 Magna cum Laude, Tel-Aviv University  
1989 Deans list, Tel-Aviv University.

### **Committee & board membership, and other tasks**

2005-present Vice-President, Mathematical Geophysics Section of the IUGG.  
2011-2013 Member of the Board of PGP (Physics of Geological Processes), a Norwegian Research Council Excellence Center, Oslo University, Norway.  
2012-2014 Member of the Israeli Ministry of Education committee on Earth Sciences education in Israeli high-schools.  
2012- present Founder and head of the Petroleum geology MSc direction, HUJI.  
2017- present Scientific committee of "Shomray Habayit", the civil movement to move Leviathan platform to sea.

### **Teaching & courses**

Structural geology; Intro to modeling in Earth sciences; Intro to petroleum geology (with K Karcz); Basin analysis (w. Z Gvirtzman); Intro to fluid dynamics (w. O Adam).

Head of the Petroleum Geology program.

Head of the Geophysics Unit.

## **Publications**

Over 60 scientific publications in refereed journals and book chapters, ~140 contributions to international conferences and seminars (including >30 invited & keynote talks).

## **Environmental and pro-bono tasks.**

- 2008-2013 Member of the board, and chair of the Academic planning committee, Arava Institute for Environmental Studies, Israel.
- 2017-2018 ~10 talks & seminars on “environmental and technological considerations in the positioning of the Leviathan platform”.
- 2018 Member & co-author of the recommendation document of the *Energy forum*, on “Economic, environmental and security considerations in the positioning of Leviathan gas field treatment platform”. Shmuel Neeman Institute for National Policy, The Technion, Haifa.
- 2018 Initiator and member of the organizing committee of a conference on “gas treatment platforms in Israel: community, health and environment”, The advanced school for environmental studies, Hebrew University of Jerusalem.
- 2019 submitted paper (jointly with D Broday, U Dayan, M Adel and D Laufer) on “Review of Gas Processing Platform Atmospheric Emissions - Case Studies versus Benchmarks”
- 2017-2019 Author of several newspaper articles (The Marker, Globes, Haaretz) regarding Israeli Energy Policy and the Gas Platforms.

## **Publication List, Einat Aharonov, 2018**

### **Doctoral Dissertation**

“Solid fluid interactions in porous media: processes that form rocks”, Advisors: D.H. Rothman and P.B. Kelemen, MIT, 1996.

### **Chapters in Collections:**

- 1) Kelemen P. and E. Aharonov (1998), “Periodic formation of magma fractures and generation of layered gabbros in the lower crust beneath oceanic spreading centers”, in *Faulting and Magmatism at Mid-Ocean Ridges*, Geophysical Monograph v. 106, *AGU Monographs*.
- 2) Sparks D. and E. Aharonov (2002), “Anatomy of a slip event in an idealized fault gouge”, *Proceedings of The 2nd ACES workshop on Earthquake simulations*, ed. M Matsuura, K Nakajima, and P Mora, APEC corporation of Earthquake simulations.
- 3) Aharonov E. and D. Sparks (2002), “Simulations of Shear in Gouge zones”, *Proceedings of The 2nd ACES workshop on Earthquake simulations*, ed. M Matsuura, K Nakajima, and P Mora, APEC corporation of Earthquake simulations.
- 4) Aharonov, E. (2003) “What controls the rheology of granular material?”, *Continuum Models and Discrete Systems*, ed. D.J. Bergman and E. Inan, NATO science series II. Mathematics, Physics and Chemistry.

- 5) Karcz Z., Polizzotti, R.S., Ertas D., Laronne Ben-Itzhak L., and Aharonov E. (2008) "Dissolution of a Stressed Calcite Crystal– High Resolution Strain Measurements and Interface Observations", in *Proceedings of the American Rock Mechanics Association Symposium*. ISBN 9781605604510, Curran Associates, Inc.
- 6) Makedonska N, L. Goren, D. Sparks, and E. Aharonov (2009) "What Controls the Effective Friction of Shearing Granular Media?" in a book titled *Meso-Scale Shear Physics in Earthquake and Landslide Mechanics*. Edt. Y. Hatzor, J. Sulem and I. Vardoulakis. ISBN: 9780415475587, CRC Press.
- 7) Goren L, E. Aharonov, and M. H. Anders (2009), "Thermo-poro-mechanical effects in landslides dynamics". In a book titled *Meso-Scale Shear Physics in Earthquake and Landslide Mechanics*. Ed. Y. Hatzor, J. Sulem and I. Vardoulakis. ISBN: 9780415475587, CRC Press.
- 8) Goren L, R. Toussaint, E. Aharonov, David Sparks, and Eirik Flekkoy, (2013) "A general criterion for liquefaction in granular layers with heterogeneous pore pressure". *Poromechanics V*: pp. 415-424, doi: 10.1061/9780784412992.049, Edited by C Hellmach, B Pichler, and D Adam. Publisher: American Society of Civil Engineers.
- 9) Aharonov E, Goren, L., Sparks, D. , and Toussaint, R (2013), "Localization of Shear in Saturated Granular Media: Insights from a Multi-Scaled Granular-Fluid Model". *Poromechanics V*: pp. 471-480. doi: 10.1061/9780784412992.056. Edited by C Hellmach, B Pichler, and D Adam. Publisher: Amer. Soc. of Civil Engineers.
- 10) Katz, O., Reuven, E., Elfassi, Y., Paldor, A., Gvirtzman, Z., & Aharonov, E. (2016). "Spatial and temporal relation of submarine landslides and faults along the Israeli continental slope, eastern Mediterranean". In *Submarine Mass Movements and their Consequences* (pp. 351-359). Springer International Publishing.
- 11) Zeev, S. B., Goren, L., Perez, S., Toussaint, R., Clement, C., & Aharonov, E. (2017). The Combined Effect of Buoyancy and Excess Pore Pressure in Facilitating Soil Liquefaction. In *Poromechanics VI* (pp. 107-116).

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### Journal Articles-

- 12) Kelemen P., Whitehead J., Aharonov E, and Jordahl K., (1995), "Experiments on flow focusing in soluble porous media: application to melt extraction from the mantle", *J Geophys Res.*, 100, 475-496,
- 13) Aharonov E, Whitehead, J., Kelemen, P., and Spiegelman M. (1995), "Channeling instability of upwelling melt in the mantle", *J Geophys Res*, 100, 20,433-20,450.
- 14) Aharonov E and Rothman, D., (1996), "Growth of correlated pore-scale structures in sedimentary rocks", *J Geophys Res.*, 101, 2973-2987.
- 15) Aharonov E, A. Thompson, and D. H. Rothman, (1997), "Transport properties and diagenesis in sedimentary rocks: the role of micro-scale geometry", *Geology*, 25, 547-550.
- 16) Aharonov E, M. Speigelman, and P. Kelemen, (1997), "Three-dimensional flow and reaction in porous media: Implications for the Earth's mantle and sedimentary basins", *J. Geophys. Res*, 102, 14821-833.
- 17) Gal D., A. Nur, and E. Aharonov, (1998) "Stability of pressure solution surfaces", *Geophys Res Lett*, 25, 1237-1240.
- 18) Tenthroy E., C. Scholz, E. Aharonov, and A. Leger , (1998) "Precipitation sealing and digenesis: 1.Experimental results", *J Geophys Res*, 103, 23,951-23,968.
- 19) Aharonov E, E. Tenthroy, and C. Scholz, (1998) "Precipitation sealing and digenesis: 2.Theoretical analysis", *J Geophys Res*, 103, 23,969-23,981.

- 20) Aharonov E., and D. Sparks, (1999), "Rigidity Phase Transition in Granular Packings", *Physical Review E*, 60, 6890-6896.
- 21) Anders M., Aharonov E., and Walsh J, (2000) "Stratified granular media beneath large slide blocks: Implications for mode of emplacement", *Geology*, 28, 11, pg. 971-974.
- 22) Spiegelman M., P. Kelemen, and E. Aharonov (2001), "Causes and consequences of flow organization during melt transport: the reaction infiltration instability in compactable media", *J Geophys Res*, 106 (B2), 2061-2077.
- 23) Aharonov E. and D. Sparks (2002), "Shear profiles and localization in simulations of granular material ", *Physical Rev. E*, vol 65, art. 051302.
- 24) Aharonov E. and D. Sparks, (2004). "Stick-slip in granular material", *J. Geophys. Res.*, v 109, B09306, DOI:10.1029/2003JB002597.
- 25) Mart Y, Aharonov E, Mulugeta G, Ryan W, Tentler T, and Goren L. (2005), "Analog modeling of the initiation of subduction", *Geophys. J. Int*, 160, 1081-1091
- 26) Katsman R, Aharonov E, and Scher H (2005) "Numerical simulations of compaction bands in high porosity sedimentary rocks", *Mech. of Materials*, V 37/1, 371-390
- 27) Katz O and Aharonov E (2006) "Landslides in a vibrating sand-box: what controls types of slope-failure and frequency magnitude relations?", *Earth Planet. Sci. Lett.*, 247 (3-4), 280-294.
- 28) Katsman R, Aharonov E, and Scher H (2006) "Localized compaction in rocks: Eshelby's inclusion and the Spring Network Model," *Geophys. Res. Lett.*, 33, L10311, 10.1029/2005GL025628.
- 29) Katsman R and Aharonov E (2006) "A study of compaction bands originating from cracks, notches and compacted defects", *J Structural Geology*, vol. 28, 508-518
- 30) Katsman R, Aharonov E, and Scher H (2006) "A numerical study on localized volume reduction in elastic media: some insights on the mechanics of anticracks", *J. Geophys. Res*, Vol. 111, No. B3, B03204, 10.1029/2004JB003607
- 31) Aharonov E and Anders M (2006) "Hot water: a solution to the Heart Mountain detachment problem?", *Geology*, Vol. 34 no. 3, 165-168.
- 32) Karcz Z, Aharonov E, Ertas D, Polizzotti R, and Scholz C (2006), "Stability of a sodium chloride indenter contact undergoing pressure solution", *Geology*, Vol. 34, No.1, pp. 61-63.
- 33) Goren L and Aharonov E (2007), "Long runout landslides: the role of frictional heating and hydraulic diffusivity", *Geophys. Res. Lett.*, 4, L07301, doi:10.1029/2006GL028895
- 34) Aharonov E, Bouchbinder E, Ilyin V, Makedonska N, Procaccia I, and Schupper N (2007), "Direct identification of the glass transition, growing length scales and the onset of plasticity ", *Europhysics Lett*, 77, Art# 56002.
- 35) Goren L. and Aharonov E (2008) "On the Stability of Landslides: A thermo-poro-elastic approach", *Earth Planet. Sci. Lett.*, doi:10.1016/j.epsl.2008.11.002.
- 36) Karcz Z., Aharonov E, Ertas D, Polizzotti R, and Scholz C (2008) "Deformation by dissolution and plastic flow of a single crystal sodium chloride indenter: An experimental study under the confocal microscope" *J. Geophys. Res.*, 113, B04205, doi:10.1029/2006JB004630,
- 37) Goren L., Aharonov E, Mulugeta G, H A Koyi, and Mart Y(2008), "Ductile Deformation of passive margins: a new mechanism for subduction initiation ", *J. Geophys. Res.*, 113, B08411, doi:10.1029/2005JB004179, (*highlighted by Nature Geosciences, October 2008*)
- 38) Aharonov E. and Katsman, R (2009) "Interaction between pressure solution and clays in stylolite development: insights from modeling", *American J of Science*, 309, 7,607-632

- 39) Katsman R., E. Aharonov and B. Haimson (2009) "Compaction bands induced by borehole drilling", *Acta Geotechnica*, 4, 163-176.
- 40) Goren L., E. Aharonov, D. Sparks, and R. Toussaint (2010) "Pore pressure evolution in deforming granular material: A general formulation and the infinitely stiff approximation". *J. Geophys. Res. Solid Earth*, 115, B09216, doi:10.1029/2009JB007191.
- 41) Goren L., E. Aharonov, M. Anders (2010) "The long runout of the Heart Mountain landslide: Heating, pressurization, and carbonate decomposition". *J. Geophys. Res.*, 115, B10210, doi:10.1029/2009JB007113
- 42) Klar, A., E. Aharonov, B. Kalderon-Asael, and O. Katz (2011) "Analytical and observational relations between landslide volume and surface area", *J. Geophys. Res. Earth Surface*, doi:10.1029/2009JF001604
- 43) Goren L, E. Aharonov, D. Sparks, and R. Toussaint (2011) "The Mechanical Coupling of Fluid-Filled Granular Material Under Shear", in special issue on "Brittle deformation of solid and granular materials with applications to mechanics of earthquakes and faults", *Pure and Applied Geophysics*, 168, 2289–2323
- 44) Makedonska N, D. W. Sparks, E. Aharonov, L. Goren (2011) "Friction versus dilation revisited: insights from theoretical and numerical models", *J. Geophys. Res.*, 116, B09302, DOI: 10.1029/2010JB008139.
- 45) Ben-Itzhak LL, Aharonov E, Toussaint R, Sagy A (2012), "Upper bound on stylolite roughness as indicator for amount of dissolution", *Earth Planet. Sci. Lett.*, pp. 186-196; 10.1016/j.epsl.2012.05.026
- 46) Angheluta, L; Mathiesen, J; Aharonov, E (2012). "Compaction of Porous Rocks by dissolution on discrete stylolites: A one dimensional model", *J. Geophys. Res.*, v. 117, Article # B08203, DOI: 10.1029/2012JB009245
- 47) Siman-Tov S, Aharonov E, Sagy A, Emmanuel S (2013) "Nano grains Form Carbonate Fault Mirrors". *Geology*, 41, pp. 703-706, doi: 10.1130/G34087.1 (Reviewed by a *Research Focus Article* in *Geology*)
- 48) Ben-Itzhak LL, Aharonov E, Karcz Z; Kaduri M; Toussaint R (2014), "Sedimentary stylolite networks and connectivity in Limestone: Large-scale field observations and implications for structure evolution", *Journal of Structural Geology*, 63: 106-123
- 49) Katz O, Morgan J, Aharonov E, Dugen B (2014) "Controls on the size and geometry of landslides: Insights from DEM computer simulations", *Geomorpholgy*, vol. 220, pp. 104–113
- 50) Siman-Tov, S., Aharonov, E., Boneh, Y., & Reches, Z. (2015). "Fault mirrors along carbonate faults: Formation and destruction during shear experiments". *Earth and Planetary Science Letters*, 430, 367-376.
- 51) Perez, S., and Aharonov, E. (2015). "Long runout landslides: a solution from granular mechanics". *Frontiers in Physics*, 3, 80.
- 52) Katz, O., Reuven, E., and Aharonov, E. (2015). "Submarine landslides and fault scarps along the eastern Mediterranean Israeli continental-slope". *Marine Geology*, 369, 100-115.
- 53) Ben-Itzhak, L. L., Erez, J., & Aharonov, E. (2016). Precipitation of CaCO<sub>3</sub> in pressure solution experiments: The importance of damage and stress. *Earth and Planetary Science Letters*, 434, 30-41.
- 54) Siman-Tov, S., Affek, H. P., Matthews, A., Aharonov, E., & Reches, Z. E. (2016). Shear heating and clumped isotope reordering in carbonate faults. *Earth and Planetary Science Letters*, 445, 136-145.

- 55) Beaudoin, N., Koehn, D., Lacombe, O., Lecouty, A., Billi, A., Aharonov, E., & Parlangeau, C. (2016). Fingerprinting stress: Stylolite and calcite twinning paleopiezometry revealing the complexity of progressive stress patterns during folding—The case of the Monte Nero anticline in the Apennines, Italy. *Tectonics*, 35(7), 1687-1712.
- 56) Aharonov, E., Katz, O., Morgan, J. K., & Dugan, B. (2016). Reply to comment by Chen et al. on “Controls on the size and geometry of landslides: Insights from discrete element numerical simulations”. *Geomorphology*, 253, 551-552.
- 57) Perez, S., Aharonov, E., & Toussaint, R. (2016). Unsteady granular flows down an inclined plane. *Physical Review E*, 93(4), 042902.
- 58) Sandnes, B., Koehn, D., Toussaint, R., Szymczak, P., & Aharonov, E. (2016). Editorial: Flow and Transformation in Porous Media. *Frontiers in Physics*, 4, 42.
- 59) Clément, Cécile, Renaud Toussaint, Menka Stojanova, and Einat Aharonov. (2018) "Sinking during earthquakes: Critical acceleration criteria control drained soil liquefaction." *Physical Review E* 97, no. 2 (2018): 022905.
- 60) Clément, C., Toussaint, R., & Aharonov, E. (2018). Shake and sink: liquefaction without pressurization. *arXiv preprint arXiv:1802.04391*.
- 61) Toussaint, R., Aharonov, E., Koehn, D., Gratier, J. P., Ebner, M., Baud, P., ... & Renard, F. (2018). Stylolites: A review. *Journal of Structural Geology*.
- 62) Aharonov, E., & Scholz, C. H. (2018). A Physics-Based Rock Friction Constitutive Law: Steady State Friction. *Journal of Geophysical Research: Solid Earth*, 123(2), 1591-1614
- 63) Aharonov, E., & Karcz, Z. (2019). How stylolite tips crack rocks. *Journal of Structural Geology*, 118, 299-307.
- 64) Aharonov E & Scholz C H (2019) The Brittle-Ductile Transition Predicted by a Physics-based Friction Law, *Journal of Geophysical Research: Solid Earth*
- 65) Paldor, A., Shalev, E., Katz, O., & Aharonov, E. (2019). Dynamics of saltwater intrusion and submarine groundwater discharge in confined coastal aquifers: a case study in northern Israel. *Hydrogeology Journal*, 1-15.
- 66) Elfassi, Y., Gvirtzman, Z., Katz, O., & Aharonov, E. (2019). Chronology of post-Messinian faulting along the Levant continental margin and its implications for salt tectonics. *Marine and Petroleum Geology*.