Date: 2/4/2024

R E S U M E

1. PERSONAL DETAILS

Full Name: Yaniv Edery

Identity No: 040184509

Date and place of birth: Israel, 10.09.1980

Marital status: Married +3

Phone numbers: +972509603739

E-mail: yanivedery@technion.ac.il, yanivedery@gmail.com

Website: www.pmvlab.com

2. ACADEMIC DEGREES

2007 - 2014 **Ph.D. (Direct track)**, Earth and Planetary Sciences, Weizmann Institute of Science.

2003 – 2007 **B.A. in Physics**, Hebrew University of Jerusalem.

3. ACADEMIC APPOINTMENTS

2018 - **Senior lecturer,** Civil and Environmental Engineering, Technion, Israel

2015 - 2018 **Post-Doctoral Fellow,** Applied Science and Engineering, Harvard University

4. RESEARCH INTERESTS

My current interest is in the field of flow in porous media, it is a fascinating field that has implications ranging from fuel cell batteries to membrane and oil recovery. By training I am a physicist with keen interests in statistical and fluid mechanics; these interests are utilized to address fundamental physical problems that have real-world implications.

5. TEACHING EXPERIENCE

2016. Introduction to Fluid Mechanics and Transport course, Harvard, Teaching Assistant.

2018 -2019. Fluid Mechanics, undergraduate course (014214), Technion.

2019 – On. Hydraulics, undergraduate course (014205), Technion.

2019 – On. Introduction to soil physics, undergraduate course (014977), Technion.

2019 – On. Environmental Engineering Seminar, undergraduate course (014300), Technion.

2023 – On. GTEP Course - Technologies for Clean Energy (518001), Technion.

6. TECHNION ACTIVITIES

Organizer of the Young Researchers' meetings in the Technion

Technion Sustainability Council member

7. DEPARTMENTAL ACTIVITIES

Department secretary (2019 - present)

Faculty representative in the GTEP Council (2023 - present)

Member in the department teaching committee (2024 - present)

8. PUBLIC PROFESSIONAL ACTIVITIES

Member of the AGU Global Engagement Committee

Founding member of the Carbon Sequestration Forum IL (2023-present)

Chair of the Israeli InterPore chapter (2021-present)

Reviewer for the following journals: PNAS, Water Resources Research, Transport in Porous Media, Advances in Water Resources, Journal of Contaminant Hydrology, Soil Science Society of America Journal, Physical Review Letters E., Physical Review Letters, Hydrology and Earth System Sciences Discussions.

Grant reviewer for: NSF, ISF, PAZY

9. MEMBERSHIP IN PROFESSIONAL SOCIETIES

American Geophysical Society. 2012, 2013, 2017

American Physical Society. 2017 - On

European Geophysical Society 2019 - On

Interpore 2017 - On

10. FELLOWSHIPS, AWARDS AND HONORS

2009 Dean’s Award, Faculty of Chemistry, Weizmann Institute of Science.

2010-2011 Rieger Foundation Fellowship for advancing the field of Environmental Sciences.

2012, 2013 Israel Water Authority (IWA) PhD research Fellowship

2013 Best lecture award in waterconf2013 conference, Hebrew University.

2014 Valedictorian, Ph.D. graduation ceremony, Weizmann Institute of Science.

2015 Awarded the Israel Ministry of Energy and Water post-doctorate fellowship.

2015 Awarded the BARD post-doctorate fellowship (declined due to conflicting fellowship).

2017 Postdoctoral Award for Professional Development, Harvard.

2017 Travel Grant, Division of Fluid Dynamics of the American Physical Society.

11. GRADUATE STUDENTS

Completed MSc theses

A. Bachrach, GTEP, Technion. "On the Coupling of Flow and Elastic Expansion of Porous Media."

M. Stolar, Technion. "Hydraulic Fracture in Porous Media Induced by Pore Pressure Rise"

Y. Elyahou-Yakir, Technion. "Investigating pore-scale mechanism of miscible phase flow in 2D porous media"

Ph.D theses in progress (All students are mentored solely by me if not clearly stated)

2021 E. Shavelzon, Technion. Expected completion, 2026.
"Shannon Entropy of Transport Self-Organization Due to Dissolution/Precipitation Reaction at Varying Peclet Number in an Initially Homogeneous Porous Media."

2021 D. Bhattacharjee, Technion. Expected completion, 2025. Co-advising with Prof. Guy Ramon
"Dynamic coupling of flow and surfactant adsorption at interfaces in a heterogeneous pore network."

2022 A. Bachrach, GTEP, Technion. Expected completion, 2026.
"Visualizing high pressure flow and deformation in heterogenous porous media."

MSc theses in progress (All students are mentored solely by me if not clearly stated)

2023 T.Gan, Environmental Engineering, Technion. Expected completion, 2025.
"The coupling between pH and mixing of miscible phase displacement in porous media."

2023 N.Frank, Environmental Engineering, Technion. Expected completion, 2025.
"Simulating the coupling of desorption, buoyancy and transport in indexed match porous media."

12. SPONSORED LONG-TERM VISITORS AND POST-DOCTORAL ASSOCIATES

2021- 2022 N. Niloy, Technion. "The effect of miscibility ratio on mixing and reaction of miscible phases in porous media."

13. RESEARCH GRANTS

Competitive

2020, German Israel Foundation – GIF (Young Scientist), EUR 23,000. Visualizing flow, mixing, and reaction in 3D porous media: how mixing controls reaction from pore to core scale. P.I. Yaniv Edery.

2019 - 2022, Natural Science Foundation of China and Israel Science Foundation – NSFC-ISF, $300,000 (Israel side), Experimental Study of Fracture Dynamics in a Designed Porous Media, Israeli PI: Yaniv Edery, Chinese PI: Shouceng Tian.

2020 - 2024, Israel Science Foundation –ISF, $300,000, Investigating the pore scale mechanism of miscible phases mixing and reaction in porous media. P.I. Yaniv Edery.

2024 - 2026, Ministry of Energy Israel–MoEI, Nis 300,000. Impact of porous medium wettability, heterogeneity, and liquid phase-type on fluid displacement and trapping: implications for Hydrogen storage. P.I's: Dr. Oshri Borgman, (MIGAL) & Yaniv Edery.

Travel Grants

2020 – 2022, Royal society exchange grant for collaborating with Prof. Martin J Blunt at Imperial College, London, UK.

Technion Grants

2019, Nevet – Technion, $40000, Understanding curli mediated bacteria-nanoclay interactions: From macro-scale experiments to micro-fluidics. P.I's: Adi Radian and Yaniv Edery.

14. PUBLICATIONS

Theses

Transport and Reactivity in Porous Media – Yaniv Edery

On the Deformation of Porous Medium by Pressurized Flow - Arnold Bachrach

Hydraulic Fracture in Porous Media Induced by Pore Pressure Rise - Martin Stolar

Investigating pore-scale mechanism of miscible phase flow in 2D porous media - Yahel Elyahou-Yakir

Refereed papers in professional journals

Published papers (include all co-authors in the order they appear on the paper, title of paper, journal, volume, first and last pages, and year of publication)

Accepted (or in press) papers.

(1) *Edery, Y.*; Scher, H.; Berkowitz, B. Modeling Bimolecular Reactions and Transport in Porous Media. *Geophysical Research Letters* **2009**, *36* (2).

(2) *Edery, Y.*; Scher, H.; Berkowitz, B. Particle Tracking Model of Bimolecular Reactive Transport in Porous Media. *Water Resources Research* **2010**, *46* (7).

(3) *Edery, Y.*; Scher, H.; Berkowitz, B. Dissolution and Precipitation Dynamics during Dedolomitization. *Water Resources Research* **2011**, *47* (8).

(4) *Edery, Y.*; Kostinski, A.; Berkowitz, B. Record Setting during Dispersive Transport in Porous Media. *Geophysical Research Letters* **2011**, *38* (16).

(5) *Edery, Y.*; Guadagnini, A.; Scher, H.; Berkowitz, B. Reactive Transport in Disordered Media: Role of Fluctuations in Interpretation of Laboratory Experiments. *Advances in water resources* **2013**, *51*, 86–103.

(6) *Edery, Y.*; Kostinski, A. B.; Majumdar, S. N.; Berkowitz, B. Record-Breaking Statistics for Random Walks in the Presence of Measurement Error and Noise. *Phys. Rev. Lett.* **2013**, *110* (18), 180602.

(7) Berkowitz, Y.; *Edery, Y.*; Scher, H.; Berkowitz, B. Fickian and Non-Fickian Diffusion with Bimolecular Reactions. *Physical Review E* **2013**, *87* (3), 032812.

(8) Ciriello, V.; Guadagnini, A.; Di Federico, V.; *Edery, Y.*; Berkowitz, B. Comparative Analysis of Formulations for Conservative Transport in Porous Media through Sensitivity-based Parameter Calibration. *Water Resources Research* **2013**, *49* (9), 5206–5220.

(9) *Edery, Y.*; Guadagnini, A.; Scher, H.; Berkowitz, B. Origins of Anomalous Transport in Heterogeneous Media: Structural and Dynamic Controls. *Water Resources Research* **2014**, *50* (2), 1490–1505.

(10) Edery, Y.; Dror, I.; Scher, H.; Berkowitz, B. Anomalous Reactive Transport in Porous Media: Experiments and Modeling. *Physical Review E* **2015**, *91* (5), 052130.

(11) Ciriello, V.; Edery, Y.; Guadagnini, A.; Berkowitz, B. Multimodel Framework for Characterization of Transport in Porous Media. *Water Resources Research* **2015**, *51* (5), 3384–3402.

(12) Raveh-Rubin, S.; *Edery, Y.*; Dror, I.; Berkowitz, B. Nickel Migration and Retention Dynamics in Natural Soil Columns. *Water Resources Research* **2015**, *51* (9), 7702–7722.

(13) Naftaly, A.; *Edery, Y.*; Dror, I.; Berkowitz, B. Visualization and Analysis of Nanoparticle Transport and Ageing in Reactive Porous Media. *Journal of hazardous materials* **2015**, *299*, 513–519.

(14) *Edery, Y.*; Geiger, S.; Berkowitz, B. Structural Controls on Anomalous Transport in Fractured Porous Rock. *Water Resources Research* **2016**, *52* (7), 5634–5643.

(15) *Edery, Y.*; Porta, G. M.; Guadagnini, A.; Scher, H.; Berkowitz, B. Characterization of Bimolecular Reactive Transport in Heterogeneous Porous Media. *Transport in Porous Media* **2016**, *115* (2), 291–310.

(16) *Edery, Y.*; Weitz, D.; Berg, S. Surfactant Variations in Porous Media Localize Capillary Instabilities during Haines Jumps. *Physical review letters* **2018**, *120* (2), 028005.

(17) *Edery, Y.* The Effect of Varying Correlation Lengths on Anomalous Transport. *Transport in Porous Media* **2021**, *137* (2), 345–364.

(18) *Edery, Y.*; Stolar, M.; Porta, G.; Guadagnini, A. Feedback Mechanisms between Precipitation and Dissolution Reactions across Randomly Heterogeneous Conductivity Fields. *Hydrology and Earth System Sciences Discussions* **2021**, 1–14.

(19) Zehe, E.; Loritz, R.; *Edery, Y.*; Berkowitz, B. Preferential Pathways for Fluid and Solutes in Heterogeneous Groundwater Systems: Self-Organization, Entropy, Work. *Hydrology and Earth System Sciences Discussions* **2021**, 1–28.

(20) Bachrach, A.; *Edery, Y.* Technique for Studying in High Resolution Poromechanical Deformation of a Rocklike Medium. *Physical Review E* **2023**, *108*, L022901.

(21) Zang, Y.; Wang, Q.; Wang, H.; Wang, B.; Tian, K.; Wang, T.; Li, J.; Zhang, Z.; Tian, S.; Stanchits, S.; Cheremisin, A.; *Edery, Y.* Laboratory Visualization of Supercritical CO2 Fracturing in Tight Sandstone Using Digital Image Correlation Method. *Geoenergy Science and Engineering* **2023**, *225*, 211556.

(22) Shavelzon, E.; *Edery, Y.* Shannon Entropy of Transport Self-Organization Due to Dissolution/Precipitation Reaction at Varying Peclet Number in an Initially Homogeneous Porous Media. *Hydrology and Earth System Sciences Discussions* **2023**, *2023*, 1–35.

(23) Dagan, A.; *Edery, Y.* Bifurcating Paths: The Relation between Preferential Pathways, Channel Splitting, under Sampled Regions, and Tortuosity on the Darcy Scale. *Advances in Water Resources* **2024**, 104622.

Submitted papers.

1) Sulieman S., M. Stolar., Abezgauz L., Tian, S., *Edery, Y.,* Investigating the Permeability Evolution of Artificial Rock During Ductile and Brittle Deformation Under Pressurized Flow.
2) *Y. Edery*, Sorek S., On the scaling of transport phenomena at a monotonously changing permeability field.
3) Elyahou-Yakir, Y., *Edery, Y.,* From mixing to displacement of miscible phases in porous media: The role of heterogeneity and inlet pressures.

15. CONFERENCES

Plenary, keynote or invited talks

Contributed Talks (Students in italic, presenter in underline)

International

Edery, Y., S. Rubin, Dror. I and Berkowitz, B., (2012), Experimental and particle-tracking model analysis of anomalous transport and sorption of nickel in natural soil columns, American Geophysical Union Fall Meeting, Dec. 3-7, San Francisco, 2012

Edery, Y., H. Scher, A. Guadagnini and B. Berkowitz (2013), Origins of anomalous transport in disordered media: structural and dynamic controls, American Geophysical Union Fall Meeting, Dec. 913, San Francisco, 2013

Edery, Y., D. Weitz (2016), Instability in micromodel porous media two phase flow due to interfacial drag, 8th International Interpore Conference, May 9-12, 2016, Cincinnati, OH.

Edery, Y., S. Berg., D. Weitz (2017), Surfactant variations in porous media localize capillary instabilities during Haines jump. Featured lecture at the 9th Interpore conference May 8-12, 2017, Rotterdam, the Netherlands.

Edery, Y., S. Berg., D. Weitz (2017), Thin film dynamics and its effect on two phase flows in porous media. 70th Annual Meeting of the APS Division of Fluid Dynamics November 19 - 21, 2017, Denver, Colorado.

Edery, Y., S. Berg., D. Weitz (2017), Thin film dynamics and its effect on two phase flows in porous media. 2017 AGU Fall Meeting, 11-15 December, New Orleans, Louisiana.

Edery, Y., S. Berg., L. Xiao., D. Weitz (2018), Anomalous Transport Through Thin Films in Porous Media. Society of Exploration Geophysics (SEG) Rock Physics and Digital Rock Applications Workshop, 20-23 may, Beijing, China.

Iwalewa, TM., GH, Lin., L, Kareem., U, Mok., Y, Edery (2019). Experimental Modeling and Simulation of Fluid Injection Near a Dormant Fault: Effect of Fault Structure on Fluid Pressurization in the Subsurface. 2019 AGU Fall Meeting, 9-13 December, San Francisco.

Stollar, M., Edery, Y. (2020), Measuring the deformation of porous media in response to hydraulic pressure., 11th Interpore conference September, 2020, Qingdao, China

Edery, Y.(2020), The topological origin of anomalous transport: Persistence of β in the face of varying correlation length, European Geophysical Society Conference.

Bachrach, A., Edery, Y. (2022), On the deformation of porous medium by pressurized flow., 13th Interpore conference., 13th Interpore conference, 2022, Abu-Dhabi.

Elyahou-Yakir, Y., Edery, Y. (2022), Investigating pore-scale mechanism of miscible phase flow in 2D porous media., 13th Interpore conference, 2022, Abu-Dhabi.

Dagan A., Edery, Y. (2022), Bifurcating-Paths: the relation between preferential flow bifurcations, void, and tortuosity on the Darcy scale.13th Interpore conference, 2022, Abu-Dhabi.

Shavelzon, E., Edery, Y. (2022), Modeling of Reactive Transport in Porous Rock: Influence of Peclet Number., European Geophysical Society Conference, 2022, Viena.

Bachrach, A., Edery, Y. (2022), On the deformation of porous medium by pressurized flow., 13th Interpore conference. European Geophysical Society Conference, 2022, Viena.

Elyahou-Yakir, Y., Edery, Y. (2022), Investigating pore-scale mechanism of miscible phase flow in 2D porous media. European Geophysical Society Conference, 2022, Viena.

Dagan A., Edery, Y. (2022), Bifurcating-Paths: the relation between preferential flow bifurcations, void, and tortuosity on the Darcy scale., European Geophysical Society Conference, 2022, Viena.

Elyahou-Yakir, Y., Edery, Y. (2023), Investigating pore-scale mechanism of miscible phase flow in 2D porous media. 14th Interpore conference, 2023, Edinburgh, UK.

Poster presentations

Edery, Y., H. Scher and B. Berkowitz (2010), Particle tracking model of bimolecular reactive transport in porous media, Gordon Research Conference (GRC) on Flow & Transport in Permeable Media, Nov. 1116, Bates College, Lewiston, ME, 2010

Edery, Y., H. Scher and B. Berkowitz (2012), Particle tracking model of bimolecular reactive transport in porous media, Gordon Research Conference (GRC) on Flow & Transport in Permeable Media, June 23-29, Les Diablerets, Switzerland 2012

Edery, Y., S. Berg., D. Weitz (2017), Thin film dynamics and its effect on two phase flows in porous media. Gordon Research Conference (GRC) on Soft Condensed Matter Physics, August 13-18, Colby-Sawyer College, New London, NH.

Edery, Y., S. Berg., D. Weitz (2018), Thin film dynamics and its effect on two phase flows in porous media. Gordon Research Conference (GRC) on Flow & Transport in Permeable Media, July 08-13, Newry, ME United States.

Edery, Y.(2020), The topological origin of anomalous transport: Persistence of β in the face of varying correlation length, 11th Interpore conference May 25-28, 2020, Qingdao, China

Edery, Y., *M. Stolar*, G. Porta, and A. Guadagnini (2021), Feedback mechanisms between precipitation and dissolution reactions across randomly heterogeneous conductivity fields., 12th Interpore conference, 2021 May, Online

Participation in organizing conferences

Organizing committee of the Israeli CARESS conference. Conference organizer, 2011, 2013.

Organizer of the Mini-Symposium on Physics of multi-phase flow in diverse porous media in the Interpore conference, 2019, 2020, 2023. Main organizer – 2021, 2022

Organizing committee of the Israeli InterPore chapter conference. Conference organizer, 2021, 2022, 2023.

Member, Fellowship committee, Interpore conference, 2019, 2021- on.

Best poster committee at the interpore conference. Judging the posters, 2016 - 2022.

Session Chair, Division of Fluid Dynamics of the American Physical Society, 2017.