Dr. Oshri Borgman

- Email: oshrib@migal.org.il
- MIGAL website: www.migal.org.il/en/oshri-borgman
- Tel Hai researcher page: www.telhai.ac.il/en/dr-oshri-borgman-0
- Personal website: Flow and Transport in Porous Media Group
- ResearchGate: www.researchgate.net/profile/Oshri_Borgman



Academic appointments

2023 – **Senior lecturer** — Tel-Hai College

2022 – **Research group leader** — Migal - Galilee Research Institute

Professional experience

2019 – 2022 **Postdoctoral researcher** — Géosciences Rennes, Université de Rennes

- **Project title:** Impact of structural heterogeneity on solute transport and mixing in unsaturated porous media
- Supervisors: Dr. Yves Méheust and Dr. Tanguy Le Borgne

2018 – 2019 **Postdoctoral researcher** — Zuckerberg Institute for Water Research, Ben-Gurion University of the Negev

- **Project title:** Colloid facilitated transport of radionuclides through fractures in carbonate rocks: A micro-scale study
- Supervisors: Prof. Noam Weisbrod and Prof. Avraham Be'er

Education

2012 – 2018 **Ph.D.** — The Hebrew University of Jerusalem

- Thesis title: A pore-scale study of the effects of heterogeneity and deformation on fluid displacement in granular media
- Supervisor: Dr. Ran Holtzman

2009 – 2012 **M.Sc.Agr. *magna cum laude*** — Soil and Water Sciences, The Hebrew University of Jerusalem

- Thesis title: Mobility of pharmaceutical compounds in an agricultural soil: Effects of biosolids application and solution chemistry
- Supervisor: Prof. Benny Chefetz

2006 – 2009 **B.Sc.Agr. *magna cum laude*** — Soil and Water Sciences, The Hebrew University of Jerusalem

Publications

2023
- Borgman, O., Turuban, R., Géraud, B., Le Borgne, T., & Méheust, Y. (2023). Solute Front Shear and Coalescence Control Concentration Gradient Dynamics in Porous Micromodel. Geophysical Research Letters, 50(5), e2022GL101407. https://doi.org/10.1029/2022gl101407

2022
- Borgman, O., Be'er, A., & Weisbrod, N. (2022). Direct visualization of colloid transport over natural heterogeneous and artificial smooth rock surfaces. Journal of Contaminant Hydrology, 251, 104067. https://doi.org/10.1016/j.jconhyd.2022.104067

2020
- Borgman, O., & Holtzman, R. (2020). Impact of matrix deformations on drying of granular materials. International Journal of Heat and Mass Transfer, 153, 119634. https://doi.org/10.1016/j.ijheatmasstransfer.2020.119634

2019
- Borgman, O., Darwent, T., Segre, E., Goehring, L., & Holtzman, R. (2019). Immiscible fluid displacement in porous media with spatially correlated particle sizes. Advances in Water Resources, 128, 158–167. https://doi.org/10.1016/j.advwatres.2019.04.015

2018
- Biswas, S., Fantinel, P., Borgman, O., Holtzman, R., & Goehring, L. (2018). Drying and percolation in correlated porous media. Physical Review Fluids, 3, 1–11. https://doi.org/10.1103/physrevfluids.3.124307

2017
- Borgman, O., Fantinel, P., Lühder, W., Goehring, L., & Holtzman, R. (2017). Impact of spatially correlated pore-scale heterogeneity on drying porous media. Water Resources Research, 53(7), 5645–5658. https://doi.org/10.1002/2016wr020260

- Fantinel, P., Borgman, O., Holtzman, R., & Goehring, L. (2017). Drying in a microfluidic chip: Experiments and simulations. Scientific Reports, 7, 15572. https://doi.org/10.1038/s41598-017-15718-6

2013
- Borgman, O., & Chefetz, B. (2013). Combined effects of biosolids application and irrigation with reclaimed wastewater on transport of pharmaceutical compounds in arable soils. Water Research, 47, 3431–3443. https://doi.org/10.1016/j.watres.2013.03.045

Research grants

2024–2028 **ISF - Israel Science Foundation** Total grant amount: NIS 960,000

- **Project title:** Solute transport, mixing, and chemical reactions in porous media: coupled effects of structural heterogeneity and fluid displacement

2024–2027 **BARD: US - Israel Binational Agricultural R&D Fund** Total grant amount: US$ 300,000

- **Project title:** Tillage-induced soil structure and water saturation impact on porewater oxygen and redox conditions: Controls for nutrient availability and water quality
- Collaborator: Prof. Verónica Morales, UC Davis, California, USA

2024–2026 **Israeli Ministry of Energy and Infrastructure** Total grant amount: NIS 314,123

- **Project title:** Fluid Displacement in Porous Media: Factors Affecting Hydrogen Storage
- Collaborator: Dr. Yaniv Edery, Technion, Israel

2024–2026 **MIGAL internal call 2024** Total grant amount: NIS 200,000

- **Project title:** Impact of bacterial biofilm matrix on water retention in heterogeneous porous media and its implication for plant growth under water-limited conditions
- Collaborator: Dr. Elhanan Tzipilevich, MIGAL, Israel

2019–2021 **Marie Skłodowska-Curie Actions IF** Total grant amount: €196,707.84

- **Project title:** Impact of structural heterogeneity on solute transport and mixing in unsaturated porous media (UnsatPorMix – 843594)
- Supervisor: Yves Méheust | Mentor: Tanguy Le Borgne

Selected conference presentations

2025

Oren, L., Tzipilevich, E., and **Borgman, O.**
- The interplay between porous medium structure and bacterial biofilms in a microfluidic flow cell
- EGU General Assembly 2025, Vienna, Austria, 27 Apr–2 May 2025, EGU25-10887, https://doi.org/10.5194/egusphere-egu25-10887. *Poster presentation*

Aquino, T., Sole-Mari, G., **Borgman, O.**, Delouche, N., Hanna, K., and Le Borgne, T.
- Fluid-solid reaction in partially-saturated media at the pore scale
- EGU General Assembly 2025, Vienna, Austria, 27 Apr–2 May 2025, EGU25-11393, https://doi.org/10.5194/egusphere-egu25-11393. *Poster presentation*

Arnal, J., Sole-Mari, G., **Borgman, O.**, Le Borgne, T., and Aquino, T.
- Pore-scale shear distributions in unsaturated porous media and their role in transport and mixing
- EGU General Assembly 2025, Vienna, Austria, 27 Apr–2 May 2025, EGU25-6197, https://doi.org/10.5194/egusphere-egu25-6197. *Poster presentation*

2024

Oshri Borgman, Francesco Gomez, Tanguy Le Borgne, and Yves Méheust
- Mixing-induced reactive transport experiments in heterogeneous and variably saturated porous media
- EGU General Assembly 2024, Vienna, Austria, *Oral presentation (online)*

2023

Borgman, O., Gomez, F., Le Borgne, T., and Méheust, Y.
- Impact of structural heterogeneity on fluid phase patterns in two-phase flow through two-dimensional porous micromodels
- InterPore 2023, Edinburgh, Scotland, UK, *Poster presentation*

Borgman, O., Gomez, F., Le Borgne, T., and Méheust, Y.
- Impact of structural heterogeneity on solute transport and mixing in unsaturated porous media: An experimental study
- EGU General Assembly 2023, Vienna, Austria, *Poster presentation*

2022

Oshri Borgman, Francesco Gomez, Tanguy Le Borgne, and Yves Méheust
- Impact of structural heterogeneity on solute transport and mixing in unsaturated porous media: An experimental study
- Israel Society of Soil Science Conference 2022, Rehovot, Israel, *Oral presentation*

Oshri Borgman, Francesco Gomez, Tanguy Le Borgne, and Yves Méheust
- Impact of structural heterogeneity on solute transport and mixing in unsaturated porous media: An experimental study
- EGU General Assembly 2022, Vienna, Austria, *Oral presentation*

2021

Oshri Borgman, Francesco Gomez, Tanguy Le Borgne, Yves Méheust

- Impact of heterogeneity on solute transport and mixing in unsaturated porous media: Experimental design and preliminary results
- 2021 Cargèse summer school on Flow and Transport in Porous and Fractured Media, Cargèse, France, *Poster presentation*

2020

Oshri Borgman, Avraham Be'er, and Noam Weisbrod
- Impact of surface heterogeneity on colloid transport over a natural fractured rock
- AGU Fall Meeting (virtual meeting), *Poster presentation (online)*

Oshri Borgman and Ran Holtzman
- Impact of matrix deformation on drying of granular materials
- Israel Society of Soil Science Annual Conference (virtual meeting), *Oral presentation (online)*

2019

Oshri Borgman, Avraham Be'er, and Noam Weisbrod
- Direct visualization of colloid transport and deposition in fractures of carbonate rock using fluorescent microscopy
- EGU General Assembly, Vienna, Austria, *Poster presentation*

2017

Oshri Borgman and Ran Holtzman
- Impact of matrix deformations on drying of granular materials
- Interpore–9th International Conference on Porous Media, Rotterdam, The Netherlands, *Poster presentation*

2016

Oshri Borgman, Paolo Fantinel, Lucas Goehring, and Ran Holtzman
- Impact of spatial correlation and matrix deformation on drying granular material
- Gordon Research Conference on Flow and Transport in Permeable media, Girona, Spain, *Poster presentation*

Oshri Borgman, Paolo Fantinel, Lucas Goehring, and Ran Holtzman
- Impact of spatial correlation and matrix deformation on drying granular material
- Gordon Research Seminar on Flow and Transport in Permeable media, Girona, Spain, *Oral presentation*

2015

Oshri Borgman, Paolo Fantinel, Lucas Goehring, and Ran Holtzman
- The Impact of Pore-Scale Heterogeneity on Drying Porous Media
- EGU General Assembly, Vienna, Austria, *Oral presentation*

2011

Oshri Borgman and Benny Chefetz
- Effects of compost application and solution chemistry on leaching of pharmaceutical compounds in soil columns
- Israel Soil Science Society Annual Conference, BIDR, Sde Boker, Israel, *Oral presentation*

2010

Oshri Borgman and Benny Chefetz
- Behavior of pharmaceutical compounds in soils: effects of biosolids application
- Israel Soil Science Society Annual Conference, Beit Dagan, Israel, *Poster presentation*

Teaching

The Faculty of Sciences and Technology, Tel-Hai College

2024– Soil and water (with Dr. Oren Reichman)

2024– Numerical methods for water sciecnes

2024– Hydrogeology of water resources in Israel

L3 Sciences de la Terre, OSUR Rennes

2022 Mesures Hydrologiques et Géochimiques (with Dr. Maria Klepikova)

Cargèse summer school on Flow and Transport in Porous and Fractured Media

2021 ◗ Practical course on millifluidic solute transport experiments (with Dr. Joaquín Jiménez-Martínez and Dr. Yves Méheust)

Soil and Water Sciences, The Hebrew University of Jerusalem

2015, 2017 ◗ Advanced Soil Physics (Teaching assistant)
2014–2018 ◗ Hydraulic Laboratory on Flow in Conduits and Soil (Teaching assistant)
2013–2018 ◗ Physics of Soil Water (Teaching assistant)
2010–2012 ◗ Fundamentals of Soil Science (Teaching assistant)
2009–2011 ◗ Undergraduate physics courses (Teaching assistant)

◗◗◗ Invited seminars

2024 Soil & Water Sciences, The Robert H. Smith Faculty of Agriculture, Food and Environment, The Hebrew University of Jerusalem, Rehovot, Israel

Civil & environmental engineering, Technion, Haifa, Israel

Institute of Soil, Water & Environmental Sciences, Agricultural Research Organization, Beit Dagan, Israel

PoreLab lecture series, University of Oslo, Oslo, Norway

Zuckerberg Institute for Water Research, Jacob Blaustein Institutes for Desert Research, Ben-Gurion University of the Negev, Midreshet Ben-Gurion, Israel

2021 Soil & Water Sciences, The Robert H. Smith Faculty of Agriculture, Food and Environment, The Hebrew University of Jerusalem, Rehovot, Israel

MIGAL – Galilee Research Institute

2021 Porous Medium Tea Time Talk (YouTube link)

2020 Environmental Physics & Irrigation, Institute of Soil, Water & Environmental Sciences, Agricultural Research Organization, Beit Dagan, Israel

2018 Géosciences Rennes, Université de Rennes 1, Rennes, France

Department of Civil, Environmental & Geomatic Engineering, ETH Zürich, Zürich, Switzerland

School of Chemical Engineering & Analytical Science, The University of Manchester, Manchester, United Kingdom

◗◗◗ Awards and fellowships

2018–2019 **Marcus Postdoctoral Fellowships in Water Sciences, Ben-Gurion University of the Negev**

◗ Fellowship amount: 105,000 ILS

2014–2016 **The Robert H. Smith Prizes for Excellence in Agriculture**

◗ Awarded amount: 30,000 ILS over three years

2014 **Israel Ministry of Science, Technology and Space grant for international training for PhD students**

- Granted amount: 7300 ILS

2010 **Israel Soil Science Society Annual Conference, Agricultural Research Organization, Beit Dagan**

- Winner of students' poster competition

Other activities

Organization of scientific meetings

2025
- Co-organizer of mini-symposium (MS06-B) *Interfacial phenomena across scales*, Interpore 2025, Albuquerque, New Mexico, USA

2024
- Co-organizer of mini-symposium (MS06-B) *Interfacial phenomena across scales*, Interpore 2024, Qingdao, China

2024
- Co-convener of session HS 8.1.2 *Coupled transport, reactive processes and biological activity in soils, the vadose zone, and below*, EGU General Assembly, Vienna, Austria

2023
- Co-organizer of mini-symposium (MS06-B) *Interfacial phenomena across scales*, Interpore 2023, Edinburgh, Scotland

2023
- Co-convener of session HS 8.2.1 *Innovative methods and new advances for understanding subsurface processes that couple fluid dynamics, solute transport, geochemical reactions and biological activity*, EGU General Assembly, Vienna, Austria

2022
- Co-convener of session HS 8.1.2 *Advances in coupled fluid dynamics, heat and solute transport, and (bio-)geochemical reactions in subsurface fractured and porous media: experiments, models and field observations*, EGU General Assembly, Vienna, Austria

Reviewer for journals

- Advances in Water Resources, Water Resources Research, Proceedings of the Royal Society A, Drying Technology, Plant and Soil

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