

DR. OSHRI BORGMAN



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- » **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

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|--------|------------------------------|------------------------------------|
| 2023 – | Senior lecturer | Tel-Hai College |
| 2022 – | Research group leader | Migal - Galilee Research Institute |

»»» Professional experience

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| 2019 – 2022 | Postdoctoral researcher | Géosciences Rennes, Université de Rennes |
| <ul style="list-style-type: none"> » Project title: Impact of structural heterogeneity on solute transport and mixing in un-saturated 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 |
| <ul style="list-style-type: none"> » 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

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|--|---|---|
| 2012 – 2018 | Ph.D. | The Hebrew University of Jerusalem |
| <ul style="list-style-type: none"> » 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. <i>magna cum laude</i> | Soil and Water Sciences, The Hebrew University of Jerusalem |
| <ul style="list-style-type: none"> » 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. <i>magna cum laude</i> | 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 sciences
- 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