

# DR. OSHRI BORGMAN



Photo: Camilla K. Elmar / Centre for Advanced Study (CAS)

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- » **Personal website:** Flow and Transport in Porous Media Group
- » **ResearchGate:** [www.researchgate.net/profile/Oshri\\_Borgman](http://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 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
  - » **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 | <b>ISF - Israel Science Foundation</b>   | <b>Total grant amount: NIS 960,000</b>  |
|           | » <b>Project title:</b> Solute transport, mixing, and chemical reactions in porous media: coupled effects of structural heterogeneity and fluid displacement   |   |
| 2024–2027 | <b>BARD: US - Israel Binational Agricultural R&amp;D Fund</b>  | <b>Total grant amount: US\$ 300,000</b> |
|           | » <b>Project title:</b> Tillage-induced soil structure and water saturation impact on porewater oxygen and redox conditions: Controls for nutrient availability and water quality<br>» Collaborator: Prof. Verónica Morales, UC Davis, California, USA |   |
| 2024–2026 | <b>Israeli Ministry of Energy and Infrastructure</b>   | <b>Total grant amount: NIS 314,123</b>  |
|           | » <b>Project title:</b> Fluid Displacement in Porous Media: Factors Affecting Hydrogen Storage<br>» Collaborator: Dr. Yaniv Edery, Technion, Israel  |   |
| 2024–2026 | <b>MIGAL internal call 2024</b>  | <b>Total grant amount: NIS 200,000</b>  |

- » **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

2026

- » Levakov, I, Khoshtarash, H., Musa, S., Morales, V., and **Borgman, O.**  
Investigating pore-scale oxygen dynamics and redox potential in unsaturated porous media using microfluidic soil-on-chip technology  
» InterPore 2026, Nantes, France *Poster presentation*
- » Stokelman, O., Tzipilevich, E., and **Borgman, O.**  
The impact of heterogeneity on bacterial biofilm growth dynamics in microfluidic porous media  
» InterPore 2026, Nantes, France *Poster presentation*

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

- 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**

- 2025      2nd Brittany workshop on flow and transport in porous media, Île Grande, France
- 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

2026 » Co-organizer of mini-symposium (MS06) *Interfacial phenomena across scales*, InterPore 2026, Nantes, France

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

### Membership in scientific committees

2026 » Israel Science Foundation (ISF)