

ROIY SAYAG

Department of Environmental Physics (BIDR)
Department of Mechanical Engineering
Ben-Gurion University of the Negev
URL: <http://www.bgu.ac.il/~roiy>
E-mail: roiy@bgu.ac.il
+972-8-6596846 (v) +972-8-6477109 (v)

Professional Experience

2014 - present Senior lecturer, Ben-Gurion University of the Negev, Israel,
Dept. of Environmental Physics (BIDR); Dept. of Physics; Dept. of Mechanical Engineering.
2013 Post-doctoral research fellow, University of Cambridge, U.K.,
Dept. of Applied Mathematics and Theoretical Physics. Host: Dr. J. Neufeld
2009-2012 Post-doctoral Fellow (NERC), University of Cambridge, U.K.,
Dept. of Applied Mathematics and Theoretical Physics. Host: Prof. M. G. Worster

Education

9/2003-7/2009 Ph.D., Harvard University, MA, USA.
Dept. of Earth and Planetary Sciences, Advisor: Prof. E. Tziperman
9/2000-6/2003 M.Sc., Weizmann Institute of Science, Israel,
Dept. of Physics, Advisor: Prof. E. Tziperman
9/1997-6/2000 B.Sc., Physics-Mathematics, Hebrew University of Jerusalem, Israel.

Awards and Honors

2011 APS-DFD Gallery of Fluid Motion, [Floating Extensional Flows](#)
2005-2007 Bertram J. Cohn Fund for Environmental Studies.
2001 Dr. Jacob Isler foundation.
2000 Fellow of the Undergraduate Summer Program, Weizmann Institute of Science, Israel

Grants

2021-2025 Israel Science Foundation (ISF, grant No. 3006/21, 4yr)
2020-2023 German-Israel Foundation (GIF regular), 3yr
2016-2020 Israel Science Foundation (ISF, grant No. 1368/16, 4yr)
2016 Israel Science Foundation (ISF, grant No. 2009/16, New faculty equipment)
2016 German-Israel Foundation (GIF young), 1yr
2009-2012 Post-doctoral fellowship, NERC, 3yr

Academic Activities

Course Lectured

2022-23 Physics 2A (Electricity & Magnetism) (*Undergraduate*)
2015-18, 2020 Non-Newtonian fluid mechanics, (*Graduate*)
2018-2019 Introduction to fluid mechanics, (*Undergraduate*)
2015-17, 2020 Introduction to viscous flows, (*Undergraduate*)

Teaching assistance

Cambridge, Natural Sciences Tripos IA, Mathematical Methods II, III
DAMTP, UK:
Harvard, SEAS, Physical Mathematics II (AM202), Ordinary & Partial Differential Eq. (AM105b), Introduction
USA: to fluid mechanics (ES123), Mathematical methods in the sciences (AM21a).

Other Activities

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| Reviewer(journals) | <i>J. Fluid Mech.</i> , <i>Ann. Glaciology</i> , <i>J. Glaciology</i> , <i>Proc. R. Soc. A</i> , <i>J. Geophys. Res.</i> , <i>European J. Mech. B/Fluids</i> , <i>Environmental Fluid Mechanics</i> , <i>Arch. Applied Mech.</i> , <i>Phys. Fluids</i> |
| Reviewer(Grants) | <i>Israel Science Foundation (ISF)</i> , <i>Pazy Research Foundation</i> |
| Organizer | DSEEP seminar – Department weekly seminar (co-organizer), 2017-2019, BIDR, BGU, Israel Drylands, Desert and Desertification conference – (co-organizer), 2017, BIDR, BGU, Israel GFDays – A yearly symposium on Geophysical Fluid Dynamics, 2015-2017, BIDR, BGU, Israel Physics of Ice journal club, 2006-2007, EPS/SEAS, Harvard University, MA, USA. Climate dynamics weekly seminar, 2006-2007, EPS, Harvard University, MA, USA. |
| Outreach | Instructor for junior-high/high-school youth., 2001-2003, Weizmann Inst. Sci., Israel DAMTP Fluids Laboratory open day, Cambridge Science Festival, 2011;2013, UK |
| Summer school | Instructor in FDSE Summer School, DAMTP, Univ. of Cambridge 2012. |

Publications

Peer-reviewed Journals

- [16] Gyllenberg, A. and **Sayag R.**, (2022), Lubricated axisymmetric gravity currents of power-law fluids, *J. Fluid Mech.*, 949, A40 [PDF]
- [15] P. Kumar, S. Zuri, D. Kogan, M. Gottlieb, and **Sayag, R.**, (2021), Lubricated gravity currents of power-law fluids, *J. Fluid Mech.*, 916, A33, 1-16 [PDF]
- [14] **Sayag, R.** (2019), Rifting of extensional flows on a sphere, *Phys. Rev. Lett.*, 123, 214502 [PDF] [SupMat]
- [13] **Sayag, R.**, and M. G. Worster (2019b), Instability of radially spreading extensional flows Part II: Theoretical analysis, *J. Fluid Mech.*, 881, 739-771 [PDF]
- [12] **Sayag, R.** and M. G. Worster (2019a), Instability of radially spreading extensional flows Part I: Experimental analysis, *J. Fluid Mech.*, 881, 722-738. [PDF] [Cover] 
- [11] Y. Ashkenazy, **Sayag, R.**, and E. Tziperman (2017), Dynamics of the global meridional ice flow of Europa's icy shell, *Nature Astronomy*, 2, 43-49, doi: 10.1038/s41550-017-0326-7 [PDF]
- [10] **Sayag, R.** and J. A. Neufeld (2016), Propagation of viscous currents on a porous substrate with finite entry pressure, *J. Fluid Mech.*, 801, 65-90. [PDF] [Cover] 
- [9] **Sayag, R.**, and M. G. Worster (2013), Elastic dynamics and tidal migration of ice-sheet grounding lines modify sub-glacial lubrication and melting, *Geophys. Res. Lett.*, 40, doi:10.1002/2013GL057942. [PDF]
- [8] **Sayag, R.**, and M. G. Worster (2013), Axisymmetric gravity currents of power-law fluids over a rigid horizontal surface, *J. Fluid Mech.*, 716, R5. [PDF]
- [7] **Sayag, R.**, S. S. Pegler, and M. G. Worster (2012), Floating Extensional Flows, *Phys. Fluids*, 24, 091111. **APS-DFD Gallery of Fluid Motion Award** [PDF]
- [6] **Sayag, R.**, and M. G. Worster (2011), Elastic response of a grounded ice sheet coupled to a floating ice shelf, *Phys. Rev. E*, 84, 3, 1-10. [PDF]
- [5] **Sayag, R.**, and E. Tziperman (2011), Interaction and variability of ice streams under a triple-valued sliding law and a non-Newtonian rheology, *J. Geophys. Res.*, 116, F01009, 1-17. [PDF]
- [4] **Sayag, R.**, and E. Tziperman (2009), Spatiotemporal dynamics of ice streams due to a triple-valued sliding law, *J. Fluid Mech.*, 640, 483-505. [PDF]
- [3] **Sayag, R.**, and E. Tziperman (2008), Spontaneous generation of pure ice-streams via flow instability: Role of longitudinal shear stresses and subglacial till, *J. Geophys. Res.*, 113, B05411, 1-17. [PDF]
- [2] Kaspi Y., **R. Sayag** and E. Tziperman (2004), A 'triple sea-ice state' mechanism for the abrupt warming and synchronous ice sheet collapses during Heinrich events, *Paleoceanography*, 19, 1-12. [PDF]
- [1] **Sayag, R.**, E. Tziperman and M. Ghil (2004), Rapid switch-like sea ice growth and land ice - sea ice hysteresis, *Paleoceanography*, 19, 1-13. [PDF]

Not Peer reviewed

- [1] Sayag, R. Dynamics and Spatiotemporal variability of ice streams. Ph.D. Thesis, Harvard University, 2009. URL: <http://gradworks.umi.com/3385547.pdf>

Presentations

Invited talks

- 2019 *Instability of extensional flows*, HUJI (Physics), BGU (DSEEP), TAU (*Geophysics*, 16/12/19)
- 2018 *Instability of extensional flows*, WI (Physics/complex systems)
- 2017 *On the instability of non-Newtonian extensional flows and ice rifts* HUJI (Earth Science)
- 2016-2017 *Buoyancy-Driven flows: On creeping ice sheets and the propagation of drops over porous surfaces*, BGU (BIDR/ZIWR); UH (Marine Geosci.).
- 2016 *Floating extensional flows*, Cambridge (DAMTP/ITG)
- 2015 *Propagation of viscous gravity currents on porous substrate*, Technion (DEWAE); TAU (GAPS); TAU (ME); BGU (ME)
- 2014 *Mechanics of ice sheets*, BGU (ME)
- 2013 *Dynamics of ice sheets*, TAU (GAPS)
- 2012 *Dynamics and stability of ice sheets*
Cambridge (Earth Science), U.K.; Technion (Physics); WI (EPS); BGU (DSEEP)
- 2011 *Dynamics of marine ice sheets*, Univ. of Chicago (Geophysics), USA
Dynamics of ice sheets, Cambridge (DAMTP/AFD), U.K.
Elastic response of an ice sheet-ice shelf system near the grounding line
Cambridge (DAMTP/ITG), U.K.; BAS, U.K.
- 2009-2010 *Dynamics and spatiotemporal variability of ice streams*
Cambridge (DAMTP/ITG), U.K.; Oxford (OCIAM), U.K.; TAU (ME); BGU (DSEEP); WI (EPS); HUJI (Physics)

Conferences

- IGS=International Glaciological Society ; APS=American Physics Society ; AGU=American Geophysical Union ; EGU=European Geosciences Union ; GFDays=Geophysical Fluid Dynamics Days; P= poster
- 2022 IGS, Iceland ; IGS^P, Iceland
- 2021 [SIAM MS](#), virtual, [invited](#)
- 2020 [SIAM MS](#), Spain, [invited](#), [canceled](#) (Covid19)
- 2019 *ISTAM (69th)*, Israel, [invited](#) ; APS Fluid Dynamics (72th), USA ([Abstract 1](#), [Abstract 2](#)) ; Climate and Wave Dynamics Workshop, Israel ; GFDays^P, BGU, Israel
- 2018 *Ice, oceans and atmospheres on Earth and elsewhere*, Italy ; [Annual European Rheology Conference \(AERC2018\)](#), Italy
- 2017 [APS Fluid Dynamics \(70th\)](#), USA ; [Ice fracture and cracks](#), Issac Newton Institute, UK; [AGU^P](#), USA ; [Mechanical Instabilities in Solids and Fluids^P](#), HUJI, Israel ; GFDays^P, BGU, Israel
- 2016 GFDays, BGU, Israel
- 2015 APS Fluid Dynamics (68th), USA ; IGS, U.K. ; GFDays^P, BGU, Israel
- 2014 APS Fluid Dynamics (67th), USA ; EGU, Austria ; GFDays, BGU, Israel
- 2011 AGU, USA ; [AGU^P](#), USA; APS Fluid Dynamics (64th), USA ; IGS, France ; IGS, USA
- 2010 APS Fluid Dynamics (63rd), USA ; EGU, Austria
- 2008 APS Fluid Dynamics (61st), USA ; IGS, Ireland
- 2007 EGU, Austria ; [AGU^P](#), USA