

ROIY SAYAG

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Professional Experience

2014 - present Senior lecturer, Ben-Gurion University of the Negev, Israel,
Dept. of Environmental Physics (BIDR) & 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

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, 233,617£ / 3yr

Academic Activities

Course Lecturs

2015-2018 Non-Newtonian fluid mechanics, (*Graduate*)
2018-2019 Introduction to fluid mechanics, (*Undergraduate*)
2015-2017 Introduction to viscous flows, (*Undergraduate*)

Postdoctoral fellows

2018-2019 Pankaj Kumar Shaw (with E. Meron)
2016 Pramoda Kumar

Ph.D. & M.Sc. students

2018- L. Stern (Ph.D.)
2018- A. Gyllenberg (M.Sc.)

Other Research Supervisions

Undergrad. L. Shamir (2019), A. Gyllenberg (2017), S. Zuri (2017)
projects
Summer projects *BIDR internship, BGU*: L. Shamir (2019) , R. Cohen (2018), L. Abrams (2017)
DAMTP, Univ. of Cambridge, U.K. (2012)

Teaching assistance

Department of Applied Mathematics and Theoretical Physics, Univ. of Cambridge, U.K.:

2010 Natural Sciences Tripos IA, Mathematical Methods II, III.

School of Engineering and Applied Sciences, Harvard Univ., MA, USA:

Spring 2008 Applied Mathematics 202: Physical Mathematics II.

Spring 2007 Applied Mathematics 105b: Ordinary & Partial Differential Eq.

Spring 2006 Engineering Sciences 123: Introduction to fluid mechanics.

Fall 2005 Applied Mathematics 21a: Mathematical methods in the sciences.

Other Activities

Reviewer(journals) *J. Fluid Mech., Ann. Glaciology, J. Glaciology, Proc. R. Soc. A, J. Geophys. Res., European J. Mech. B/Fluids, Environmental Fluid Mechanics, Arch. Applied Mech., Phys. Fluids*

Reviewer(Grants) *Israel Science Foundation (ISF), Pazy Research Foundation*

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

- [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]

In Preparation

- [4] **Sayag, R.**, and M.G. Worster, Floating extensional flows with moving contact line
- [3] Kumar, P., S. Zuri and **Sayag, R.**, Axisymmetric lubricated gravity currents of power-law fluids. Part I: Experimental analysis
- [2] Gyllenberg, A. and **Sayag, R.**, Axisymmetric lubricated gravity currents of power-law fluids. Part II: Theoretical analysis
- [1] **Sayag, R.**, Floating two-dimensional flows of power-law fluids,

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, Oral

2019	ISTAM (69th), Israel (12/19) invited
2019	APS-Div. of Fluid Dynamics (72th), USA (11/19) (Abstract 1, Abstract 2)
2019	Climate and Wave Dynamics Workshop, Israel
2018	Ice, oceans and atmospheres on Earth and elsewhere , Italy
2018	Annual European Rheology Conference (AERC2018) , Italy
2017	APS-Div. of Fluid Dynamics (70th) , USA
2017	Ice fracture and cracks , Issac Newton Institute, UK
2016	Geophysical Fluid Dynamics, BGU, Israel
2015	APS-Div. of Fluid Dynamics (68th), USA
2015	International Glaciological Society, U.K.
2014	APS-Div. of Fluid Dynamics (67th), USA
2014	European Geosciences Union, Austria
2014	Geophysical Fluid Dynamics, BGU, Israel
2011	American Geophysical Union, USA
2011	APS-Div. of Fluid Dynamics (64th), USA (Gallery of Fluid Motion award)
2011	International Glaciological Society, France
2011	International Glaciological Society, USA
2010	APS-Div. of Fluid Dynamics (63rd), USA
2010	European Geosciences Union, Austria
2008	APS-Div. of Fluid Dynamics (61st), USA
2008	International Glaciological Society, Ireland
2007	European Geosciences Union, Austria

Conferences, Poster

2019	Geophysical Fluid Dynamics, BGU, Israel
2017	American Geophysical Union , USA
2017	Mechanical Instabilities in Solids and Fluids , HUJI, Israel
2017	Geophysical Fluid Dynamics, BGU, Israel
2015	Geophysical Fluid Dynamics, BGU, Israel
2011	American Geophysical Union, USA
2007	American Geophysical Union, USA