BAR ORYAN

Institute of Geophysics and Planetary Physics, Scripps Institution of Oceanography,

9500 Gilman Drive, La Jolla, CA 92093

bar.oryan@columbia.edu & boryan@ucsd.edu

https://baroryan.github.io/

Education and Work Experience

Green Postdoctoral Fellow: *Jan 2024 - Current*
Institute of Geophysics and Planetary Physics, Scripps Institution of Oceanography, La Jolla, California, USA.
Advisor: Prof. Alice Gabriel

Postdoctoral Research Scientist: *Mar 2022– Dec 2023*
École Normale Supérieure, Paris, France.
Advisor: Dr. Jean-Arthur Olive
Prof. Romain Jolivet

Doctor of Philosophy in Geophysics: *Sep 2016 – Feb 2022*
Lamont-Doherty Earth Observatory, Columbia University, New York, USA.
Advisors: Prof Roger W. Buck.
Prof. Michael Steckler.

Master of Science in Geophysics: *Jul 2014 - Jul 2016*
Tel Aviv University, Tel Aviv, Israel.
Advisor: Prof. Zvi Ben-Avraham.

Bachelor of Science in Physics and Geosciences: *Oct 2010- Jun 2014*
Tel Aviv University, Tel Aviv, Israel.

Publications

- **Oryan**, B., Olive, J. A., Jolivet, R., Malatesta, L. C., Gailleton, B., & Bruhat, L. (2024). Megathrust locking encoded in subduction landscapes. *Science Advances*, *10*(17), eadl4286.
- Steckler, M. S., Jaman, M. H., Grall, C. J., Goodbred, S. L., Wilson, C. A., & **Oryan**, B. (2024). Contribution of campaign GNSS toward parsing subsidence rates by time and depth in coastal Bangladesh. *Frontiers in Earth Science*, *12*, 1354686.
- **Oryan, B**., et al., (2023), New GNSS and geological data from the Indo-Burman subduction zone indicate active convergence on both a locked megathrust and the Kabaw Fault, *JGR solid earth, 128*(4), e2022JB025550.
- Steckler, M. S., **Oryan, B**., et al., (2022). Synthesis of the distribution of subsidence of the lower Ganges-Brahmaputra Delta, Bangladesh. *Earth-Science Reviews*, 224, 103887.
- **Oryan, B.,** & Savage, H., (2021) Regional heat flow analysis reveals frictionally weak Dead Sea fault. *Geochemistry, Geophysics, Geosystems*, *22*(12), e2021GC010115.
- **Oryan, B**., & Buck, W. R. (2020). Larger tsunamis from megathrust earthquakes where slab dip is reduced. *Nature Geoscience*, 1-6.

- **Oryan, B**., Villinger, H., Lazar, M., Schwab, M. J., Neugebauer, I., & Ben-Avraham, Z. (2019). Heat flow in the Dead Sea from the ICDP boreholes and its implication for the structure of the basin. *Quaternary Science Reviews*, 210, 103-112.
- Malinverno, A., Cook, A. E., Daigle, H., & **Oryan, B**. (2018). Glacial cycles influence marine methane hydrate formation. *Geophysical Research Letters*, 45(2), 724-732.

Under review and in preparation:

- Chong, J.-H., **Oryan, B.**, Steckler, M. S., & Lindsey, E. O. (2024, in review). Interseismic uplift of anticlines above the Rakhine-Bangladesh Megathrust from ALOS-2 InSAR (DOI:10.22541/au.170967819.93108577/v1).
- Kutschera F.,Jia Z.,**Oryan, B.**, et al., (2024, in review) Rapid earthquake-tsunami modeling: The multi-event,multi-segment complexity of the 2024 MW7.5 Noto Peninsula Earthquake governs tsunami generation (https://doi.org/10.31223/X5ZX1S).
- **Oryan, B.**, Olive, J.-A., Jolivet, R., Malatesta, L., & Gailleton, B. (2024, in prep.). Decoding Uplift Patterns from Inversion of River Incised Landscapes.

Awards & Grants

- CRESCENT seed grant ($30,000). *2024*
  Synergizing megathrust Seismo-Geodetic coupling and slip models using Optimal Transport and Machine Learning Frameworks to mitigate earthquake hazard in Cascadia. **Oryan, B**., Gabriel, AA.
- IGPP Green Postdoctoral Fellowship ($149,000) *2023*
- NASA Earth Surface and Interior grant ($650,000). *2022*
  GNSS and InSAR Surface Deformation Constraints on a 3-D Geodetic Model of the IndoBurma Subduction Zone. Steckler M., Lindsey E, **Oryan B**., et al.
- AGU 2020 Outstanding Student Presentation Award. *2021*
- Lamont-Doherty Earth Observatory Climate Center ($10,000). *2021*
  Temporal dynamics of tree-growth and photosynthesis and their environmental drivers in the Lamont Sanctuary Forest Preserve. Rao M., Pacheco-Solana B., **Oryan, B**., et al.
- Chevron Student Incentive Fund ($3,200). *2020*
  Developing the LDEO PhenoCam network to track the fate of forest carbon from photosynthesis to growth. **Oryan, B**. and Rao M.
- Chateaubriand Fellowship ($6,000). *2020*
  Finical support to work with Dr. Jean-Arthur Olive at the Laboratoire de Géologie de l'Ecole Normale Supérieure (ENS).
- Stork Fund ($12,500). *2019*
  Dept. of Earth and Environmental Sciences graduate student fieldtrip to Peru. **Oryan, B**. and Myers, E.
- Dean's fellow, Department of Earth and Environmental Sciences, Columbia University. *2016*
- M.Sc. Excellence Scholarship, Tel Aviv University ($1,000). *2015*

Recent Presentations

- Numerical Modeling of Earthquake Motions (poster): June 2024
  The role of off-fault permanent deformation on earthquake cycles

- CRESCENT Kickoff meeting (poster): Oct 2023
  Subduction landscapes sculpting when megathrust earthquake sleep –
  How interseismic upper plate yield shapes the forearc one seismic cycle at a time
- AGU 2022 (talk): Dec 2022
  Spatial patterns of long-term forearc uplift inferred from river profiles, and their comparison with short-term deformation
- AGU 2022 (talk): Dec 2022
  New GNSS and geological data from the Indo-Burman subduction zone indicate active convergence on both a locked megathrust and the Kabaw Fault
- JpGU 2022 (invited talk): May 2022
  Recorded shallow upper plate earthquakes during the interseismic period indicate non-recoverable forearc deformation and produce long-term coastal uplift
- EGU 2022 (talk): May 2022
  Long-term coastal uplift due to non-recoverable forearc deformation during the interseismic phase of the subduction earthquake cycle
- AGU Fall 2021 (invited union talk): Dec 2021
  Using InSAR and GNSS velocities to constrain the Indo-Burma Detachment Geometry.
- AGU Fall 2021 (poster): Dec 2021
  Non-recoverable deformation during the interseismic phase of the subduction earthquake cycle.
- Caltech Seismo Lab Seminar (invited talk): Oct 2021
  Permanent deformation across various time scales: Accounting for subduction upper plate failure over "purely elastic" seismic cycles.

Teaching Experience

- Co-Mentor, Heat advection experiment, École Normale Supérieure. *Fall 2022*
  Guided students in conducting and analyzing a heat advection experiment.
- Instructor, Field Trip to Peru, Department of Earth and Environmental Sciences, Columbia university. *Spring-Summer 2019*
  Led and organized a geological field trip to Peru.
- Mentor, Lamont-Doherty Earth Observatory Summer intern program. *Summer 2019*
  Served as mentor for a group of low-income high school students.
- Teaching assistant, Life Systems, Department of Earth and Environmental Sciences, Columbia University. *Spring 2019*
- Teaching assistant, Geodynamics, Department of Earth and Environmental Sciences, Columbia University. *Fall 2018*
- Teaching assistant, Lab in Geosciences, Tel Aviv University. *Fall 2015*
  Designed and developed a lab experiment emulating the heat flow of the Earth for an undergrad class.
- AP calculus and electromagnetism tutor, undergrad students, Tel Aviv University. *Fall 2014*

Field Work

- HT-RESIST EM research cruise, New Zealand. *Winter 2019*
  Deployment and recovery of 120 EM receivers as well as 500 line-km of EM source.
- Borehole temperature profile measurements, Dead Sea, Israel. *Summer 2015*
  ICDP Dead Sea borehole temperature measurement.

- Thermal conductivity measurements, IODP core repository, Bremen, Germany. *Summer 2014*
  Thermal conductivity measurements of the ICDP Dead Sea cores using KD2 pro probe and optical apparatus.

Outreach

- Science writer at the Little Big Science NGO. *2018 - 2023*
- Lamont Doherty research as art committee. *2018*
- Lamont Doherty open house. *2016 - 2021*
- Earth-Sun Day at the American Museum of Natural History. *2017*

Computational Skills

Programming languages:

- Python.
- Matlab.
- Arduino.
- C++.
- Fortran.
- GPU CUDA Fortran.

Operating systems:

- Linux.
- Windows.
- Mac.

Languages

- Hebrew (native).
- English (proficient).