

Dr Eric Larour

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PROFESSIONAL EXPERIENCE:

2018–present: Sea Level and Ice Group Supervisor (329C), **Earth Science Section, Science Division, JPL.**

Line manager for 10 scientists and 20 affiliates. Responsible for hiring, funding and programmatic direction of the group, comprised of scientists involved in mission project science, data processing and modeling. Expertise represented includes Cryosphere, Ocean and solid-Earth. Synergized science projects towards improving our understanding of sea-level change in the next 100 years. Member of NASA Sea-Level Science Team (N-SLCT) from 2014 to present, first a co-I, then in 2017 as PI.

2013–present: Research Scientist (III-V) in Oceans and Ice Group (2013-2017) and Sea-Level and Ice Group (329C, 2018-present), **Earth Science Section, Science Division, JPL.**

Project/funding manager and co-developer for ISSM (Ice Sheet and Sea-Level System Model), the JPL/NASA software for projecting the evolution of polar ice caps and sea-level change. Co-developed the software (400,000 lines). Secured NASA and JPL funding for ISSM through competitive scientific grants for a total of \$12 Million starting 2008. First-authored 15 and co-authored 64 publications in Cryosphere, Solid-Earth, Computational and Sea-Level Science. Member of Operation IceBridge Science Team.

2010–2012: Scientific Applications Software Engineer (III) in the Applied Low Temperature Physics Group (353G, 2010-2012) of the **Mechanical Division**, which became 385J in the **Instruments Division, JPL.**

Project manager and co-author for ISSM. Leveraged JPL Finite Element Technologies and parallel computing from CIELO towards developing a state-of-the-art ice-sheet model for NASA.

2005–2009: Scientific Applications Software Engineer (I-III) in Advanced Optical Systems Group (355M, 2005-2008), Mission and Technology Development (3542, 2008-2009) and Applied Low Temperature Physics (353G), Thermal and Cryogenics Section, **Mechanical Division, JPL.**

Lead parallel code developer of CIELO, one of the JPL Mechanical/ Thermal/Optical finite element software for designing NASA's Large Aperture Telescopes such as Hubble and JWST.

EDUCATION:

2001–2005: Ph.D. in Mechanical Engineering, Cryosphere Science from Ecole Centrale Paris. Volunteer Assistant in the Radar Science and Engineering Section (334), JPL.

Dissertation title: Numerical modeling of the behavior of ice shelves, validated by remote sensing.

1998–2001: M. Sc., Mechanical Engineering, Ecole Centrale Paris.

PROFESSIONAL INTERESTS

- Cryospheric and Sea-Level Rise projections.
- Uncertainty quantification of Earth System Models.
- Data assimilation using 4DVAR approaches. Adjoint modeling.
- Interactions/coupling at the Ice/Ocean/Solid-Earth/Atmosphere interface.
- Outreach/Education using state-of-the-art modeling.
- DEI in Science and outreach to MSIs/HBCUs

- Management of science activities/groups/teams.

PROFESSIONAL ACTIVITIES

- Member of NASA Sea Level Rise Science Team (2014-present, Principal Investigator since 2017)
- Editor The Cryosphere (2011-Present)
- Co-Chair for WCRP ISMIP6 (Ice Sheet Model Intercomparison Project) modeling and intercomparison project for inclusion of ice sheet models in the next CMIP6 climate runs.
- Member of Steering Committee for The Polar Research Coordination Network (which aims to connect the Polar Science, Data and High-Performance and Distributed Computing (HPDC) polar sciences communities.
- Member of Operation IceBridge Science Team (2010-2015)
- Co-organizer of the annual Ice Sheet System Model (ISSM) workshop.
- Associate Project Scientist (II) at the Joint Institute for Regional Earth System Science and Engineering (JIFRESSE) at UCLA.
- Voluntary Research Associate Professor University of Buffalo, NY, 2011-2014
- Journal review: Nature Geoscience, Geophysical Research Letters, Journal of Geophysical Research, Journal of Glaciology, The Cryosphere, Proceedings of the National Academy of Sciences.
- Proposal review: NASA Earth and Space Science Fellowship.
- Member, American Geophysical Union

COMPUTER SKILLS:

- C/C++/FORTRAN/MPICH/BOOST
- Matlab (including C/C++ API), Python (including C/C++ API), IDL
- JavaScript (including C/C++ compilation/integration using Emscripten)
- HTML, PhP, Apache
- OSes: Linux/Unix/MacOSX/Windows
- Jenkins/SVN/CVS/Trac/Autotools/CMake/Petsc/Dakota
- QGIS/GDAL/KML
- Debugging with TotalView, gdb, valgrind.

AWARDS

- 2019 – NASA Honor Group Achievement Award for the Ice Sheet system Model.
- 2015 – NASA Early Career Achievement Medal for developing the Ice Sheet and Sea-Level System Model.
- 2015 – JPL Ed Stone Award for Outstanding Research Publication.
- 2014 – JPL Team Award for Earth Ventures Proposal.
- 2013 – JPL Research Poster Conference Award Winner for “a prototype coastal sea-level rise projection system for the next century.”
- 2012 – NASA Cryospheric Sciences Most Valuable Player
- 2012 – JPL Lew Allen Award for Excellence for “outstanding accomplishment in developing the Ice Sheet system Model that significantly contributes to our knowledge of Global Change.”
- 2011 – NASA Honor Group Achievement Award to Ice sheet System Model Team for “outstanding accomplishment in the development of the Ice Sheet System Model that models and simulates ice sheet systems flowing and melting in our warming environment”.

- 2011 – NASA Honor Group Achievement Award to IceBridge for “exceptional achievement in support of NASA’s IceBridge campaign.”

REFEREED PUBLICATIONS

- Castleman, B., Schlegel, N.-J., Caron, L., Larour, E., & Khazendar, A. (2022). Derivation of bedrock topography measurement requirements for the reduction of uncertainty in ice-sheet model projections of Thwaites Glacier. *The Cryosphere*, 16(3), 761-778. <https://doi.org/10.5194/tc-16-761-2022>
- Bulthuis, K., & Larour, E. (2022). Implementation of a Gaussian Markov random field sampler for forward uncertainty quantification in the Ice-sheet and Sea-level System Model v4.19. *Geoscientific Model Development*, 15(3), 1195–1217. <https://doi.org/10.5194/gmd-15-1195-2022>
- Adhikari, S., Milne, G. A., Caron, L., Khan, S. A., Kjeldsen, K. K., Nilsson, J., et al. (2021). Decadal to Centennial Timescale Mantle Viscosity Inferred from Modern Crustal Uplift Rates in Greenland. *Geophysical Research Letters*, 48(19). <https://doi.org/10.1029/2021GL094040>
- Payne, A. J., Nowicki, S., Abe-Ouchi, A., Agosta, C., Alexander, P., Albrecht, T., et al. (2021). Future Sea Level Change Under Coupled Model Intercomparison Project Phase 5 and Phase 6 Scenarios from the Greenland and Antarctic Ice Sheets. *Geophysical Research Letters*, 48(16). <https://doi.org/10.1029/2020GL091741>
- Payne, A. J., Nowicki, S., Abe-Ouchi, A., Agosta, C., Alexander, P., Albrecht, T., et al. (2021). Future Sea Level Change Under Coupled Model Intercomparison Project Phase 5 and Phase 6 Scenarios from the Greenland and Antarctic Ice Sheets. *Geophysical Research Letters*, 48(16). <https://doi.org/10.1029/2020GL091741>
- Edwards, T. L., Nowicki, S., Marzeion, B., Hock, R., Goelzer, H., Seroussi, H., et al. (2021). Projected land ice contributions to twenty-first-century sea level rise. *Nature*, 593(7857), 74–82. <https://doi.org/10.1038/s41586-021-03302-y>
- E. Larour, E. Rignot, M. Poinelli and B. Scheuchl, Physical processes controlling the rifting of Larsen C Ice Shelf, Antarctica, prior to the calving of iceberg A68, *PNAS*, 11/, 2021 118 (40), <https://doi.org/10.1073/pnas.2105080118>
- E. Larour, L. Caron, M. Morlighem, S. Adhikari, T. Frederikse, N.-J. Schlegel, E. Ivins, B. Hamlington, R. Kopp, and S. Nowicki, ISSM-SLPS: geodetically compliant Sea-Level Projection System for the Ice-sheet and Sea-level System Model v4.17, *Geosci. Model Dev.*, 13, 4925–4941, <https://doi.org/10.5194/gmd-13-4925-2020>, 2020.J.P. Briner, J.K. Cuzzone, J.A. Badgeley, N.E. Young, E.J. Steig, M. Morlighem, N.J. Schlegel, G.J. Hakim, J. Schaefer, J.V. Johnson, A.J. Lesnek, E. K. Thomas, E. Allan, O. Bennike, A.A. Cluett, B. Csatho, A. de Vernal, J. Downs, E. Larour, and S. Nowicki, 2020, Rate of mass loss from the Greenland Ice Sheet will exceed Holocene values this century, *Nature*, 586, 70–74, <https://doi.org/10.1038/s41586-020-2742-6>, 2020.
- H. Seroussi, S. Nowicki, A. J. Payne, H. Goelzer, W. H. Lipscomb, A. Abe-Ouchi, C. Agosta, T. Albrecht, X. Asay-Davis, A. Barthel, R. Calov, R., Cullather, C. Dumas, B. K. Galton-Fenzi, R. Gladstone, N. R. Golledge, J. M., Gregory, R. Greve, T. Hattermann, M. J. Hoffman, A. Humbert, P. Huybrechts, N. C. Jourdain, T. Kleiner, E. Larour, G. R. Leguy, D. P. Lowry, C. M., Little, M. Morlighem, F. Pattyn, T. Pelle, S. F. Price, A. Quiquet, R. Reese, N.-J. Schlegel, A. Shepherd, E. Simon, R. S. Smith, F. Straneo, S. Sun, L. D. Trusel, J. Van Breedam, R. S. W. van de Wal, R. Winkelmann, C. Zhao, T. Zhang, and T. Zwinger, ISMIP6 Antarctica: a multi-model ensemble of the Antarctic ice sheet evolution over the 21st century, *The Cryosphere*, 14, 3033–3070, doi:10.5194/tc-14-3033-2020, 2020.
- H. Goelzer, S. Nowicki, A. Payne, E. Larour, H. Seroussi, W. H. Lipscomb, J. Gregory, A. Abe-Ouchi, A. Shepherd, E. Simon, C. Agosta, P. Alexander, A. Aschwanden, A. Barthel, R. Calov, C. Chambers, Y. Choi, J. Cuzzone, C. Dumas, T. Edwards, D. Felikson, X. Fettweis, N. R. Golledge, R. Greve, A. Humbert, P. Huybrechts, S. Le clec'h, V. Lee, G. Leguy, C. Little, D. P. Lowry, M. Morlighem, I. Nias, A. Quiquet, M. Rückamp, N.-J. Schlegel, D. A. Slater, R. S. Smith, F. Straneo, L.

Tarasov, R. van de Wal, and M. van den Broeke, The future sea-level contribution of the Greenland ice sheet: a multi-model ensemble study of ISMIP6, *The Cryosphere*, 14, 3071–3096, doi:10.5194/tc-14-3071-2020, 2020.

- S. Adhikari, E. R. Ivins, E. Larour, L. Caron, and H. Seroussi, A kinematic formalism for tracking ice–ocean mass exchange on the Earth’s surface and estimating sea-level change. *The Cryosphere*, 14:2819–2833, doi:/10.5194/tc-14-2819-2020, 2020.
- N.-J. Schlegel and E. Y. Larour, Quantification of surface forcing requirements for a Greenland Ice Sheet model using uncertainty analyses. *Geophys. Res. Lett.*, 46. <https://doi.org/10.1029/2019GL083532>.
- H. Seroussi, S. Nowicki, E. Simon, A. Abe-Ouchi, T. Albrecht, J. Brondex, S. Cornford, C. Dumas, F. Gillet-Chaulet, H. Goelzer, N.R. Golledge, J.M. Gregory, R. Greve, M. J. Hoffman, A. Humbert, P. Huybrechts, T. Kleiner, E. Larour, G. Leguy, W.H. Lipscomb, D. Lowry, M. Mengel, M. Morlighem, F. Pattyn, A.J. Payne, D. Pollard, S.F. Price, A. Quiquet, T.J. Reerink, R. Reese, C.B. Rodehacke, N.-J. Schlegel, A. Shepherd, S. Sun, J. Sutter, J. Van Breedam, R.S.W. van de Wal, R. Winkelmann, and T. Zhang, initMIP-Antarctica: an ice sheet model initialization experiment of ISMIP6, *The Cryosphere*, 13, 1441-1471, doi:10.5194/tc-13-1441-2019.
- C. Dai, I. Howat, E. Larour and E. Husby, Coastline extraction from repeat high resolution satellite imagery, *Remote Sensing of the Environment*, doi.org/10.1016/j.rse.2019.04.010
- E. Larour, H. Seroussi, S. Adhikari, E. Ivins, L. Caron, M. Morlighem and N. Schlegel, Slowdown in Antarctic mass loss from solid Earth and sea-level feedbacks, *Science*, doi:10.1126/science.aav7908
- J. K. Cuzzzone, N.-J. Schlegel, M. Morlighem, E. Larour, J. P. Briner, H. Seroussi, and L. Caron, The impact of model resolution on the simulated Holocene retreat of the southwestern Greenland ice sheet using the Ice Sheet System Model (ISSM), *The Cryosphere*, 13, 879-893, doi:10.5194/tc-13-879-2019.
- N.-J. Schlegel, H. Seroussi, M. P. Schodlok, E. Y. Larour, C. Boening, D. Limonadi, M. M. Watkins, M. Morlighem, and M. R. van den Broeke, Exploration of Antarctic Ice Sheet 100-year contribution to sea level rise and associated model uncertainties using the ISSM framework, *The Cryosphere*, 12, 3511-3534, <https://doi.org/10.5194/tc-12-3511-2018>.
- D.J. Lampkin, B. Parizek, E.Y. Larour, H. Seroussi, C. Joseph, and J.P. Cavanagh P, Toward Improved Understanding of Changes in Greenland Outlet Glacier Shear Margin Dynamics in a Warming Climate, *Front. Earth Sci.*, 6(156), doi: 10.3389/feart.2018.00156.
- S. Adhikari, L. Caron, B. Steinberger, J.T. Reager, K.K. Kjeldsen, B. Marzeion, E. Larour, E.R. Ivins, What drives 20th century polar motion?, *Earth and Planetary Science Letters*, 502, 126-132, doi: 10.1016/j.epsl.2018.08.059
- J.K. Cuzzzone, M. Morlighem, E. Larour, N. Schlegel, and H. Seroussi, Implementation of higher-order vertical finite elements in ISSM v4.13 for improved ice sheet flow modeling over paleoclimate timescales, *Geosci. Model Dev.*, 11, 1683-1694, <https://doi.org/10.5194/gmd-11-1683-2018>.
- K. Haubner, J.E. Box, N.J. Schlegel, E.Y. Larour, M. Morlighem, A.M. Solgaard, K.K. Kjeldsen, S.H. Larsen, E. Rignot, T.K. Dupont, and K.H. Kjær, K. H., Simulating ice thickness and velocity evolution of Upernavik Isstrøm 1849–2012 by forcing prescribed terminus positions in ISSM, *The Cryosphere*, 12, 1511-1522, <https://doi.org/10.5194/tc-12-1511-2018>.
- H. Goelzer, S. Nowicki, T. Edwards, M. Beckley, A. Abe-Ouchi, A. Aschwanden, R. Calov, O. Gagliardini, F. Gillet-Chaulet, N.R. Golledge, J. Gregory, R. Greve, A. Humbert, P. Huybrechts, J.H. Kennedy, E. Larour, W.H. Lipscomb, S. Le clec’h, V. Lee, M. Morlighem, F. Pattyn, A.J. Payne, C. Rodehacke, M. Rückamp, F. Saito, N. Schlegel, H. Seroussi, A. Shepherd, S. Sun, R. van de Wal, and F.A. Ziemann, Design and results of the ice sheet model initialisation initMIP-Greenland: an ISMIP6 intercomparison, *The Cryosphere*, 12, 1433-1460, <https://doi.org/10.5194/tc-12-1433-2018>

- L. Caron., E.R. Ivins, E. Larour, S. Adhikari, J. Nilsson and G. Blewitt, GIA model statistics for GRACE hydrology, cryosphere and ocean science, *Geophys. Res. Lett.*, 45, doi:10.1002/2017GL076644.
- E. Larour, D. Cheng, G. Perez, J. Quinn, M. Morlighem, B. Duong, L. Nguyen, K. Petrie, S. Harounian, D. Halkides, and W. Hayes, A JavaScript API for the Ice Sheet System Model (ISSM) 4.11: towards an online interactive model for the cryosphere community, *Geosci. Model Dev.*, 10, 4393-4403, doi:10.5194/gmd-10-4393-2017..
- E. Larour, E. Ivins, S. Adhikari, Should coastal planners have concern over where land ice is melting?, *Sci. Adv.*, 3(11), doi:10.1126/sciadv.1700537.
- A. Hüek, C. Bischof, M. Sagebaum, N. Gauger, B. Jurgelucks, E. Larour and G. Perez, A Usability Case Study of Algorithmic Differentiation Tools on the ISSM Ice Sheet Model, *Optim. Methods Softw.*, doi:10.1080/10556788.2017.1396602.
- S. Adhikari, E.R. Ivins, E. Larour, 2017, Mass transport waves amplified by intense Greenland melt and detected in solid Earth deformation, *Geophys. Res. Lett.*, 44, doi:10.1002/2016GL070552
- J.H. Bondzio, M. Morlighem, H. Seroussi, T. Kleiner, M. Rückamp, J. Mouginot, T. Moon, E. Y. Larour, and A. Humbert, The mechanisms behind Jakobshavn Isbræ's acceleration and mass loss: A 3-D thermomechanical model study, *Geophys. Res. Lett.*, 44, doi:10.1002/2017GL073309.
- H. Seroussi, Y. Nakayama, E. Larour, D. Menemenlis, M. Morlighem, E. Rignot, and A. Khazendar, Continued retreat of Thwaites Glacier, West Antarctica, controlled by bed topography and ocean circulation, *Geophys. Res. Lett.*, 44, doi:10.1002/2017GL072910.
- F. Habbal, E. Larour, M. Morlighem, H. Seroussi, C.P. Borstad and E. Rignot, Optimal numerical solvers for transient simulations of ice flow using the Ice Sheet System Model (ISSM versions 4.2.5 and 4.11), *Geosci. Model Dev.*, 10, 155-168, doi:10.5194/gmd-10-155-2017.
- E. Larour, J. Utke, A. Bovin, M. Morlighem, and G. Perez, An approach to computing discrete adjoints for MPI-parallelized models applied to Ice Sheet System Model 4.11, *Geosci. Model. Dev.*, 9, 3907-3918, doi:10.5194/gmd-9-3907-2016.
- N.-J. Schlegel, D.N. Wiese, E.Y. Larour, M.M. Watkins, J.E. Box, X. Fettweis, and M.R. van den Broeke, Application of GRACE to the assessment of model-based estimates of monthly Greenland Ice Sheet mass balance (2003-2012), *The Cryosphere*, 10, 1965-1989, doi:10.5194/tc-10-1965-2016.
- E. Larour and N. Schlegel, On ISSM and leveraging the Cloud towards faster quantification of the uncertainty in ice-sheet mass balance projections, *Computers and Geosciences.*, 96, <http://dx.doi.org/10.1016/j.cageo.2016.08.007>.
- P. M. Alexander, M. Tedesco, N.-J. Schlegel, S. B. Luthcke, X. Fettweis, and E. Larour, Greenland Ice Sheet seasonal and spatial mass variability from model simulations and GRACE (2003-2012), *The Cryosphere*, 10, 1259-1277, doi:10.5194/tc-10-1259-2016.
- M. Morlighem, J. Bondzio, H. Seroussi, E. Rignot, E. Larour, A. Humbert and S. Rebuffi, Modeling of Store Gletscher's calving dynamics, West Greenland, in response to ocean thermal forcing, *Geophys. Res. Lett.*, 43, doi:10.1002/20116GL067695.
- S. Adhikari, E.R. Ivins, and E. Larour, ISSM-SESAW v1.0: mesh-based computation of gravitationally consistent sea-level and geodetic signatures caused by cryosphere and climate driven mass change, *Geosci. Model Dev.*, 9, 1087-1109, doi:10.5194/gmd-9-1087-2016.
- B. Minchew, M. Simons, H. Bjornsson, F. Palsson, M. Morlighem, H. Seroussi, E. Larour, and S. Hensley, Plastic bed beneath Hofsjökull Ice Cap, central Iceland, and the sensitivity of ice flow to surface meltwater flux, *J. Glaciol.*, doi:10.1017/jog.2016.26
- J.H. Bondzio, H. Seroussi, M. Morlighem, T. Kleiner, M. Rückamp, A. Humbert and E.Y. Larour, Modelling calving front dynamics using a level-set method: application to Jakobshavn Isbræ, West Greenland, *The Cryosphere*, 10, 497-510, doi:10.5194/tc-10-497-2016.

- C. Borstad, A. Khazendar, B. Scheuchl, M. Morlighem, E. Larour, and E. Rignot, A constitutive frame-work for predicting weakening and reduced buttressing of ice shelves based on observations of the progressive deterioration of the remnant Larsen B Ice Shelf, *Geophys. Res. Lett.*, 43, doi:10.1002/2015GL067365.
- T.J. Bracegirdle, N. Bertler, A.M. Carleton, Q. Ding, C.J. Fogwill, J.C. Fyfe, H.H. Hellmer, A. Y. Karpechko, K. Kushara, E. Larour, P.A. Mayewski, W.N. Meier, L.M. Polvani, J.L. Russell, S.L. Stevenson, J. Turner, J.M. van Wessem, W.J. van de Berg, I. Wainer, A multi-disciplinary perspective on climate model evaluation for Antarctica, *Bull. Amer. Meteor. Soc.*, doi: 10.1175/BAMS-D-15-00108.1.
- N.-J. Schlegel, E. Larour, H. Seroussi, M. Morlighem and J.E. Box, Ice discharge uncertainties in Northeast Greenland from boundary conditions and climate forcing of an ice flow model, *J. Geophys. Res.*, 120, 29-54, doi:10.1002/2014JF003359.
- E. Larour, J. Utke, B. Csatho, A. Schenk, H. Seroussi, M. Morlighem, E. Rignot, N. Schlegel, and A. Khazendar, Inferred basal friction and surface mass balance of the Northeast Greenland Ice Stream using data assimilation of ICESat (Ice Cloud and land Elevation Satellite) surface altimetry and ISSM (Ice Sheet System Model), *The Cryosphere*, 8, 2335-2351, doi:10.5194/tc-8-2335-2014.
- E. Larour, N. Schlegel and M. Morlighem, Modeling the Evolution of Polar Ice Sheets, *Eos Trans. AGU*, 95(45), 411, doi:10.1002/2014EO450005.
- H. Seroussi, M. Morlighem, E. Larour, E. Rignot and A. Khazendar, Hydrostatic grounding line parameterization in ice sheet models, *The Cryosphere*, 8, 2075-2087, doi:10.5194/tc-8-2075-2014.
- E. Larour, A. Khazendar, C. P. Borstad, H. Seroussi, M. Morlighem, and E. Rignot, Representation of sharp rifts and faults mechanics in modeling ice shelf flow dynamics: Application to Brunt/Stancomb-Wills Ice Shelf, Antarctica, *J. Geophys. Res.*, 119, doi:10.1002/2014JF003157.
- H. Seroussi, M. Morlighem, E. Rignot, J. Mouginit, E. Larour, M. Schodlok, and A. Khazendar, Sensitivity of the dynamics of Pine Island Glacier, West Antarctica, to climate forcing for the next 50 years, *The Cryosphere*, 8, 1699-1710, doi:10.5194/tc-8-1-2014.
- M. Morlighem, E. Rignot, J Mouginit, H. Seroussi, and E. Larour, Deeply incised submarine glacial valleys beneath the Greenland Ice Sheet. *Nat. Geosci.*, 7, 418-422, doi:10.1038/ngeo2167.
- S. Adhikari, E. Ivins, E. Larour, H. Seroussi, M. Morlighem and S. Nowicki, Future Antarctic bed topography and its implications for ice sheet dynamics, *Solid Earth*, 5, 569-584, doi:10.5194/se-5-569-2014
- M. Morlighem, E. Rignot, J. Mouginit, H. Seroussi and E. Larour, High resolution ice thickness mapping in South Greenland, *Ann. Glaciol.*, 55(67), doi: 10.3189/2014AoG67A088.
- M. Morlighem, E. Rignot, J. Mouginit, X. Wu, H. Seroussi, E. Larour and J. Paden, High-resolution bed topography mapping of Russell Glacier, Greenland, inferred from Operation IceBridge data, *J. Glaciol.*, 59(218), doi:10.3189/2013JoG12J235
- H. Seroussi, M. Morlighem, E. Rignot, A. Khazendar, E. Larour, and J. Mouginit, Dependence of greenland ice sheet projections on its thermal regime, *J. Glaciol.*, 59(218), doi:10.3189/2013JoG13J054
- M. Morlighem, H. Seroussi, E. Larour and E. Rignot, Inversion of basal friction in Antarctica using exact and incomplete adjoints of a higher-order model, *J. Geophys. Res.*, 118, doi:10.1002/jgrf.20125.
- S. Nowicki, R.A. Bindshadler, A. Abe-Ouchi, A. Aschwanden, E. Bueler, H. Choi, J. Fastook, G. Granzow, R. Greve, G. Gutowski, U. Herzfeld, C. Jackson, J. Johnson, C. Khroulev, E. Larour, A. Levermann, W.H. Lipscomb, M.A. Martin, M. Morlighem, B.R. Parizek, D. Pollard, S.F. Price, D. Ren, E. Rignot, F. Saito, T. Sato, H. Seddik, H. Seroussi, K. Takahashi, R. Walker, and W.L. Wang, Insights into spatial sensitivities of ice mass response to environmental change from the SeaRISE ice sheet modeling project II: Greenland. *J. Geophys. Res.*, 118, doi:10.1002/jgrf.20076.

- S. Nowicki, R.A. Bindshadler, A. Abe-Ouchi, A. Aschwanden, E. Bueler, H. Choi, J. Fastook, G. Granzow, R. Greve, G. Gutowski, U. Herzfeld, C. Jackson, J. Johnson, C. Khroulev, E. Larour, A. Levermann, W.H. Lipscomb, M.A. Martin, M. Morlighem, B.R. Parizek, D. Pollard, S.F. Price, D. Ren, E. Rignot, F. Saito, T. Sato, H. Seddik, H. Seroussi, K. Takahashi, R. Walker, and W.L. Wang, Insights into spatial sensitivities of ice mass response to environmental change from the SeaRISE ice sheet modeling project I: Antarctica. *J. Geophys. Res.*, 118, doi:10.1002/jgrf.20081.
- N-J. Schlegel, E Larour, H Seroussi, M. Morlighem, and J. E. Box, Decadal-scale sensitivity of northeast Greenland ice flow to errors in surface mass balance using ISSM *J. Geophys. Res. - Earth Surface*, 118, doi: 10.1002/jgrf.20062.
- F. Pattyn, L. Perichon, G. Durand, L. Favier, O. Gagliardini, R. C. A. Hindmarsh, T. Zwinger, T. Albrecht, S. Cornford, D. Docquier, J. Fuerst, D. Goldberg, H. Gudmundsson, A. Humbert, M. Hutten, P. Huybrecht, G. Jouvett, T. Kleiner, E. Larour, D. Martin, M. Morlighem, A. Payne, D. Pollard, M. Ruckamp, O. Rybak, H. Seroussi, M. Thoma, and N. Wilkens. Grounding-line migration in plan-view marine ice-sheet models: results of the ice2sea MISMIP3d intercomparison. *J. Glaciol.*, 59(215):410-422, doi:10.3189/2013JoG12J129.
- E. Larour, M. Morlighem, H. Seroussi, J. Schiermeier and E. Rignot (2012), Ice flow sensitivity to geothermal heat flux of Pine Island Glacier, Antarctica, *J. Geophys. Res.*, 117, F04023, doi:10.1029/2012JF002371.
- C. P. Borstad, A. Khazendar, E. Y. Larour, M. Morlighem, E. Rignot, M. P. Schodlok, and H. Seroussi (2012), A damage mechanics assessment of the Larsen B ice shelf prior to collapse: toward a physically-based calving law, *Geophys. Res. Lett.*, 39, L18502, doi:10.1029/2012GL053317.
- E. Larour, J. Schiermeier, E. Rignot, H. Seroussi, and M. Morlighem, Sensitivity Analysis of Pine Island Glacier ice flow using ISSM and DAKOTA, *J. Geophys. Res.*, 117, F02009, doi:10.1029/2011JF002146.
- H. Seroussi, H. Ben Dhia, M. Morlighem, E. Larour, E. Rignot, and D. Aubry, Coupling ice flow models of varying orders of complexity with the Tiling method, *J. Glaciol.*, 58(210), doi:10.3189/2012JoG11J195.
- E. Larour, H. Seroussi, M. Morlighem, and E. Rignot (2012), Continental scale, high order, high spatial resolution, ice sheet modeling using the Ice Sheet System Model, *J. Geophys. Res.*, 117, F01022, doi:10.1029/2011JF002140.
- M. Morlighem, E. Rignot, H. Seroussi, E. Larour, H. Ben Dhia, and D. Aubry (2011), A mass conservation approach for mapping glacier ice thickness, *Geophys. Res. Lett.*, 38, L19503, doi:10.1029/2011GL048659.
- Seroussi, H., M. Morlighem, E. Rignot, E. Larour, D. Aubry, H. Ben Dhia, and S. S. Kristensen (2011), Ice flux divergence anomalies on 79north Glacier, Greenland, *Geophys. Res. Lett.*, 38, L09501, doi:10.1029/2011GL047338.
- Khazendar, A., E. Rignot, and E. Larour (2011), Acceleration and spatial rheology of Larsen C Ice Shelf, Antarctic Peninsula, *Geophys. Res. Lett.*, 38, L09502, doi:10.1029/2011GL046775.
- Morlighem, M., E. Rignot, H. Seroussi, E. Larour, H. Ben Dhia, and D. Aubry (2010) Spatial patterns of basal drag inferred using control methods from a full-Stokes and simpler models for Pine Island Glacier, West Antarctica *Geophys. Res. Lett.*, 37, L14502, doi:10.1029/2010GL043853.
- Khazendar, A., E. Rignot, and E. Larour (2009), Roles of marine ice, rheology, and fracture in the flow and stability of the Brunt/Stancomb-Wills Ice Shelf, *J. Geophys. Res.*, 114, F04007, doi:10.1029/2008JF001124.
- Khazendar, A., E. Rignot, and E. Larour (2007), Larsen B Ice Shelf rheology preceding its disintegration inferred by a control method, *J. Geophys. Res.*, 34, L19503, doi:10.1029/2008JF001124.
- Larour, E., E. Rignot, I. Joughin and D. Aubry (2005) Rheology of the Ronne Ice Shelf, Antarctica, inferred from satellite radar interferometry data using an inverse control method., *Geophys. Res. Lett.*, 32, L05503, doi: 10.1029/2004GL021693.

- Larour, E., E. Rignot and D. Aubry (2004) Processes involved in the propagation of rifts near Hemmen Ice Rise, Ronne Ice Shelf, Antarctica, *J. Glaciol.*, 50, 0022-1430.
- Larour, E., E. Rignot and D. Aubry (2004) Modelling of rift propagatoin on Ronne Ice Shelf, Antarctica, and sensitivity to climate change . *Geophys. Res. Lett.*, 31, 0094-8276, doi: 10.1029/2004GL020077.

GRANTS (Selected, Principal Investigator Eric Larour)

Year	Grant Title	Program	Funding
2023/24	Advanced Solid Earth Structure Modeling for Satellite Gravimetry, Altimetry and InSAR observations.	JPL PDRDF	\$500K/2 yrs
2022/24	Facilitating dynamic adaptive pathways for coastal decision-makers through land ice and water projections. PI CMU, David Rounce, co-PI JPL, E. Larour	NASEM Gulf of Mexico Program	\$860K/3 yrs
2020/23	The Grate Project: Past versus future rates of Greenland Ice Sheet mass loss. PI J. Briner, JPL co-PI E. Larour.	NSF-ARCSS	\$360K/3 yrs
2020/24	From grounding lines to coastlines: an integrated approach to barystatic sea-level projections	NASA Sea-Level Change Science Team	\$2.5M/4 yrs
2020/23	Mass transport driven coastal sea level.	NASA Modeling Analysis and Prediction	\$1M/4 yrs
2019/21	“Ice Sheet Collapse and Soft Mantle Rheological Response”	NASA Earth Surface and Interior.	\$525K/3yrs
2017/19	“Data assimilation of altimetry signals using the Ice Sheet System Model”	NASA IceSat-2	\$664K/3 yrs
2017/20	“Data assimilation of altimetry/gravity/InSAR/GPS.”	NASA Modeling Analysis and Prediction	\$925K/4 yrs
2015/18	“A peek at the past of the Greenland ice sheet using radar layers and modeling”	NASA Cryosphere Research	\$970K/ 3 yrs
2015/18	“Assimilation of altimetry data in North-East Greenland using ISSM”.	NASA IceBridge Research	\$300K/ 3 yrs
2013/17	“Informing 100-year sea level rise projections using a coupled ModelE-ISSM”	NASA Modeling Analysis and	\$912K/ 4 yrs

		Prediction	
2014/17	“Modeling the dynamic evolution of the Greenland Ice Sheet”.	NASA Cryosphere Science	\$300K/ 3 yrs
2014/16	Towards improving IceBridge data collection using ISSM and FLAIM.	NASA IceBridge Science Team	\$150K/ 3 yrs
2013/16	“Identifying key processes controlling ice flow dynamics in West Antarctica using IceBridge data.”	NASA Cryosphere Science	\$300K/ 3 yrs
2011/13	Scientific Guidance for IceBridge using ISSM	NASA IceBridge Science Team	\$370K/ 3 yrs
2011/13	“Improving ice flow models in Antarctica and Greenland using ISSM and new IceBridge datasets”	NASA Cryosphere Science	\$462K/ 3 yrs
2011/12	“Coupling ISSM and MITgcm ocean model to study sensitivity of Pine Island Glacier ice flow to ocean warming.”	JPL R&D	\$200K/ 2 yrs
2012/14	“A prototype coastal sea level rise projection system for the next century.”	JPL R&D	\$600K/ 3 yrs
2010/12	“Using ISSM and CASPER to generate flight requirements for ‘ice’ related missions. “	JPL R&D	\$600K/ 3 yrs
2008/09	“Sensitivity analysis of ice flow models using ISSM and DAKOTA “	JPL R&D	\$600K/ 3 yrs

INVITED PRESENTATIONS:

1/2023 : **Art Palm Beach 2023, DIVERSEartPB**, Florida, Art/Science of Sea Level, Host: Marisa Caichiolo, Curator

5/2022: **ENSAM**, Paris, Rencontres Franciliennes de Mécanique 2022, Title: “« Stabilité des calottes glaciaires : un enjeu climatique”, Translation : « Stability of polar ice caps : a climate challenge », Host : O. Castelnaud.

10/2021: **IPGP**, Paris, Geodesy Seminar, Title: “Cryosphere/Sea-level/Solid-Earth Feedbacks using the Ice Sheet and Sea Level System Model”. Host: Pr. Laurent Metivier.

10/2021: **LSCE-IPSL**, Paris, Lab Seminar, Title: “Cryosphere and Sea-Level Science from numerical modeling with the Ice Sheet and Sea-Level System Model”, Host: Dr. Cecile Agosta.

04/2021: **Hampton University**, Atmospheric Department, Virtual Seminar, Title: “New

NASA/JPL Science /Technology for projecting sea-level change”, Host: Pr. Loughman.

9/2020: **ESA EO Phi-Week**, Virtual Conference. Keynote address for session “Digital Twins Experiences in the world”. Title: “VESL: a Virtual Earth System Laboratory for Ice-Sheet and Sea-Level Modeling and Visualization”.

2/2018: **ILMF/ASPRS Forum**, Denver, Colorado. Keynote address. Title: “A new tool from NASA for Coastal Planners: Anticipating Sea-Level Rise.

12/2014: **AGU Fall Meeting**, San Francisco, USA. Session C025, Monitoring changes in polar ice sheets and sea ice using airborne and satellite remote sensing. Presentation title: “Coupled ice-flow/ocean circulation modeling in the Amundsen Sea Embayment using ISSM and MITgcm.”

12/2014: **AGU Fall Meeting**, San Francisco, USA. Session C026, Linking Cryospheric Observations and Modeling. Presentation title: “Inferring unknown boundary conditions of the Greenland Ice Sheet by assimilating ICESat-1 and IceBridge altimetry into the Ice Sheet System Model.”

11/2014: Polar Seminar, **Scripps Institution of Oceanography**, La Jolla, California, USA. Presentation title: “Towards better projections of global mean sea level rise, challenges and perspectives.”

9/2014: **GNSS+R Colloquium, UCAR**, Boulder, CO, USA. Presentation title: “Data assimilation of altimetry signals in North-East Greenland.”

5/2014: Uncertainty and Sensitivity in Surface Dynamics Modeling, **CSDMS 2014**, Colorado, Boulder, USA. Presentation title: “Towards better quantification of the uncertainty in polar ice-sheet projections using the open source framework ISSM.”

6/2014: **Bjerknes/GFI Weekly Seminar, Bjerknes Center for Climate Research** at the University of Bergen, Bergen, Norway. Presentation title: “Cryosphere science using the Ice Sheet System Model: capabilities, results and perspectives.”

2/2014: **WCRP Scientific Steering Group Meeting**, Geneva, Switzerland. Presentation title: “Ice Sheet Modeling.”

12/2013: **AGU Fall Meeting**, San Francisco, USA. Session C016, Modeling of the Cryosphere : Glaciers and Ice Sheets. Presentation title: “Assimilation of surface altimetry data on 79 North glacier using automatic differentiation and ISSM.”

5/2013: **Seminar Day – Caltech Alumni Association, CalTech**, USA. Presentation title: “Towards modeling the contribution of polar ice sheets to sea level rise”

4/2013: **Department of Earth and Space Sciences Colloquium, UCLA**, USA. Presentation title: “Towards modeling the contribution of polar ice sheets to sea level rise”

2/2013: **Center for Computational Engineering, Seminar Series, MIT**, Boston, USA. Presentation title: “Uncertainty quantification of polar-ice sheets contribution to sea-level rise using Automatic Differentiation and Sampling Methods.”

2/2013: **WCRP CLIC Scientific Steering Group Meeting**, Potsdam, Germany. Presentation title: “Towards an Intercomparison framework for Ice Sheet Models.”

12/2012: **AGU Fall Meeting**, San Francisco, USA. Session CC014, Geological Controls on ice dynamics. Presentation title: “The ice flow sensitivity to geothermal heat flux of Pine Island Glacier, Antarctica.”

12/2011: **AGU Fall Meeting**, San Francisco, USA. Session C21: Monitoring Changes in Polar Ice Sheets and Sea Ice Using Airborne and Satellite Remote Sensing. Presentation title: “Sensitivity analysis of Pine Island Glacier ice flow to increased melting rates, computed from the ECCO2 project and new IceBridge bathymetry data.”

11/2011: **UCI Computer Science Department Weekly Seminar**, UCI, Irvine, USA. Presentation title: “Ice Sheet System Model: towards improving projections of future sea level rise.”

6/2011: **Sea Level Rise Workshop, Jet Propulsion Laboratory**. Session 3, Sea Level and the Cryosphere. Presentation title: “Toward decadal ice sheet mass balance projections with ISSM”.

4/2011: **Dix Seismo Laboratory Weekly Seminar, CalTech**, USA. Presentation title: “Data assimilation of ice flow models in Antarctica and Greenland”.

5/2010: **European Geophysical Union**, Vienna, Austria, Session CR5.1: Modeling Glaciers and Ice Sheets. Presentation title: “Higher order data assimilation of bedrock friction and ice rheology in Antarctica using ISSM.”

12/2009: **AGU Fall Meeting**, San Francisco, USA. Session C12: Constraining and Improving Models of Glacier Dynamics Using Observations. Presentation title: “Thermal-mechanical constraining of large scale ice flow models in Antarctica. “

12/2009: **NICE Winter School**, Aussois, France. Presentation title: “Constraining a large scale ice flow model of Antarctica using lower and higher order finite elements and InSAR data. “

SESSION CHAIRING:

12/2019: AGU Meeting, San Francisco, CA, USA. **Primary-convener** for ISSM Town Hall.

3/2019: AGU Meeting, Portland, WA, USA. **Primary-convener** for ISSM Town Hall.

12/2018: AGU Meeting, Washington DC, USA. **Primary-convener** for ISSM Town Hall.

12/2017: AGU Meeting, San Francisco, CA, USA. **Primary-convener** for ISSM Town Hall.

12/2014: AGU Fall Meeting, San Francisco, CA, USA. **Primary-convener** on C51A session “Improving Projections of Ice Sheet Change through Innovative Model Development and Ice Sheet Model/Climate Model Coupling”

4/2014: EGU Meeting, Vienna, Austria. **Primary-convener** on CR7.1 session “Ice-flow model sensitivity and data assimilation studies.” Merged with CR7.2 session “Modeling ice sheets and glaciers.”

4/2013: EGU Meeting, Vienna, Austria. **Primary-convener** on CR7.2 session “Ice-flow model

sensitivity and data assimilation studies.” Merged with CR7.1 session “Modeling ice sheets and glaciers.”

4/2012: EGU Meeting, Vienna, Austria. **Primary-convenor** on CR5.21 session “Ice-flow model sensitivity and data assimilation studies.” Merged with CR5.20 session “Modeling ice sheets and glaciers.”

4/2011: EGU Meeting, Vienna, Austria. **Primary-convenor** on CR5.40 session “Quantification of uncertainties and sensitivities in ice sheet modeling.” Merged with CR5.10 session “Modeling ice sheets and glaciers.”

12/2009: AGU Fall Meeting, San Francisco, CA, USA. **Co-convenor** on C05 session “Outlet glaciers and ice shelf changes - observations and modeling”

COLLABORATORS

Eric Rignot, University of California Irvine
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Lambert Caron, JPL
Surendra Adhikari, JPL
Erik Ivins, JPL
Josh Cuzzone, UCLA JIFRESSE
Daria Halkides, Earth and Space Research, Washington

RESEARCH AND ACADEMIC ADVISING

JIFRESSE Scientists supervised (Total =3):

Daria Halkides, UCLA
Nicole Schlegel, UCLA
Lambert Caron, UCLA

Postdoctoral scholars supervised (Total=9):

Christopher Borstad, JPL
Feras Habbal, University of California Irvine
Nicole Schlegel, JPL
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Surendra Adhikari, JPL
Josh Cuzzone, UC Irvine
Kevin Bulthuis, NASA NPP
Daniel Cheng, JPL
Salma Barkaoui, JPL

Graduate students supervised (Total=6):

Helene Seroussi, Jet Propulsion Laboratory

Mathieu Morlighem, University of California, Irvine
Charlotte Lang, University of Liege
Konstanze Haubner, GEUS (Denmark)
Signe Larsen-Hillerup, GEUS (Denmark)
Mattia Poinelli, Delft University, Netherlands.

Advancement committee (Total =2):

Seneca Lindsey, University of California at Irvine
Xin Li, University of California at Irvine

Under-graduate students supervised (4 month to year long internships at JPL, Total=19):

Mikai Davis, Howard University, MSP Intern, Jan-May 2023
Nadine Ordaz, Berkeley, JPL Summer Intern, 2022
Luc Houriez, Stanford and Ecole Centrale Paris, Year Round Intern, fall 2022-present.
Frankie Modell, JPL Summer Intern, 2022
Kyla Swanson, CalTech, 2021
Sarah Abdallah, Stanford, 2021
Sean Zheng, Portland University, 2021 to fall 2022.
Daniel Cheng, University of California at Irvine
Justin Quinn, University of California at Irvine
Andy Feng, University of California at Irvine
Gilberto Perez, University of Southern California
Lan Nguyen, CalPoly Pomona
Bao Duong, CalPoly Pomona
Steve Nham, CalPoly Pomona
Victor Romero, CalPoly Pomona
John Faxas-Mendez, Santa Monica College
Silva Harounian, CalPoly Pomona
Kit Petrie, CalPoly Pomona
Lam Nguyen, CalPoly Pomona

High-School students supervised (summer internships at JPL)

Madeleine Maker, CalPoly Pomona