

Iverson Publications

- Schohn, C.M., N.R. Iverson, L.K. Zoet, J.R. Fowler, and N. Morgan-Witts, 2025. Linear-viscous flow of temperate ice. *Science*, 387(6730), 182-185. doi: 10.1126/science.adp7708.
- Fowler, J.R., and N.R. Iverson, 2025. Permeability anisotropy of foliated glacier ice. *Journal of Geophysical Research-Earth Surface*, 130(3), e2024JF007835. doi.org/10.1029/2024JF007835.
- Iverson, N.R., S.E. Kruger, and C. Harding, 2023. Absent drumlins beneath southern lobes of the Laurentide Ice Sheet: A new hypothesis based on Des Moines Lobe dynamics inferred from landforms. *Earth Surface Processes and Landforms*, 48, 3181-3198. doi.org/10.1002/esp.5690.
- Fowler, J.R., and N.R. Iverson, 2023. The relationship between the permeability and liquid water content of polycrystalline temperate ice. *Journal of Glaciology*, 69(278), 2154-2162. doi:10.1017/jog.2023.91.
- Woodard, J.B., L.K. Zoet, N.R. Iverson, and C. Helanow, 2023. Inferring forms of glacier slip laws from estimates of ice-bed separation during glacier slip. *Journal of Glaciology*, 69(274), 324-332. doi.org/10.1017/jog.2022.63.
- Fowler, J.R., and N.R. Iverson, 2022. A permeameter for temperate ice: first results on permeability sensitivity to grain size. *Journal of Glaciology*, 68(270), 764-774. doi.org/10.1017/jog.2021.136.
- Zoet, L.K., N.R. Iverson, L. Andrews, and C. Helanow, 2022. Transient evolution of basal drag during glacier slip. *Journal of Glaciology*, 68(270), 741-750. doi.org/10.1017/jog.2021.131.
- Adams, C.J.C., N.R. Iverson, C. Helanow, L.K. Zoet and C.E. Bate, 2021. Softening of temperate ice by interstitial water. *Frontiers of Earth Science*, 9:702761, doi: 10.3389/feart.2021.702761.
- Woodard, J.B., J.K. Zoet, N.R. Iverson, and C. Helanow, 2021. Variations in hard-bedded topography beneath glaciers. *Journal of Geophysical Research-Earth Surface*, 126, e2021JF006326. doi: 10.1029/2021JF006326.
- Helanow, C., N.R. Iverson, L.K. Zoet and J.B. Woodard, 2021. A slip law for hard-bedded glaciers derived from observed bed topography. *Science Advances*, 7(20), eabe7798, doi: 10.1126/sciadv.abe7798.
- Zoet, L.K., and N.R. Iverson, 2020. A slip law for glaciers on deformable beds. *Science*, 368(6486), 76-78, doi: 10.1126/science.aaz1183.
- Warbritton, M.J., N.R. Iverson, N.R., F. Lagroix, and A. Schomacker, 2020. Strain patterns in glaciotectonically thrust sediments and conditions during thrusting. *Journal of Structural Geology*, 137, doi: 10.1016/j.jsg.2020.104064.
- Woodard, J.B., J.K. Zoet, Í.Ö. Benediktsson, N.R. Iverson, and A. Finlayson, 2020. Insights into drumlin development from ground-penetrating radar at Múlajökull, Iceland, a surge-type glacier. *Journal of Glaciology*, 66(259), 822-830. doi.org/ 10.1017/jog.2020.50

- Thompson, A.C., N.R. Iverson, and L.K. Zoet, 2020. Controls on subglacial rock friction: experiments with debris in temperate ice. *Journal of Geophysical Research-Earth Surface*, 125, doi.org/10.1029/2020JF005718.
- Helanow, C., N.R. Iverson, L.K. Zoet and O. Gagliardini, 2020. Sliding relations for glacier slip with cavities over three-dimensional beds. *Geophysical Research Letters*, 47, e2019GL084924, doi.org/10.1029/2019GL084924.
- Iverson, N.R., C. Helanow, and L.K. Zoet, 2020. Debris-bed friction during glacier sliding with ice-bed separation. *Annals of Glaciology*, 60(80), 30-36, doi.org/ 10.1017/aog.2019.46.
- Woodard, J.B., L.K. Zoet, N.R. Iverson, and C. Helanow, 2019. Linking bedrock discontinuities to glacial quarrying. *Annals of Glaciology*, 60(80), 66-72, doi.org/ 10.1017/aog.2019.36
- Ives, L.R.W., and N.R. Iverson, 2019. Genesis of glacial flutes inferred from observations at Múlajökull, Iceland. *Geology*, 47(5), 387-390, doi.org/10.1130/G45714.1.
- Minchew, B.M., C.R. Meyer, S.S. Pegler, B.P. Lipovsky, A.W. Rempel, G.H. Gudmundsson, and N.R. Iverson, 2019. Comment on: "Friction at the bed does not control fast glacier flow" by L.A. Stearns and C.J. van der Veen. *Science*, 363(6427), eaau6055, doi: 10.1126/science.aau6055.
- Ugelvig, S.V., D.L. Egholm, R.S. Anderson, and N.R. Iverson, 2018. Glacial erosion driven by variations in melt-water discharge. *Journal of Geophysical Research-Earth Surface*, 123, 2863-2877, doi: 10.1029/2018JF004680.
- Zoet, L.K., and N.R. Iverson, 2018. A healing mechanism for stick-slip of glaciers. *Geology*, 46, 807-810.
- Finlayson, A., Phillips, E., Í.Ö. Benediktsson, Zoet, L.K., N.R. Iverson and J. Everest, 2018. Subglacial drumlins and englacial fractures at the surge-type glacier, Múlajökull, Iceland. *Earth Surface Processes and Landforms*, doi: 10.1002/esp.4485.
- Iverson, N.R., McCracken, R.G., Zoet, L.K., Í.Ö. Benediktsson, A. Schomacker, M.D. Johnson, and J. Woodard, 2017. A theoretical model of drumlin formation based on observations at Múlajökull, Iceland. *Journal of Geophysical Research-Earth Surface*, 122, 2302-2323. doi: 10.1002/2017JF004354.
- Iverson, N.R., 2017. Determining glacier flow direction from till fabrics. *Geomorphology*, 299, 124-130.
- Benediktsson, Í.Ö., S.A. Jónsson, A. Schomacker, M.D. Johnson, Ó. Ingólfsson, L.K. Zoet, N.R. Iverson, and J. Stötter, 2016. Progressive formation of modern drumlins at Múlajökull, Iceland: stratigraphical and morphological evidence. *Boreas*, 45(4), 567-583.
- McCracken, R.G., N.R. Iverson, Í.Ö. Benediktsson, A. Schomacker, L.K. Zoet, M.D. Johnson, T.S. Hooyer, and Ó. Ingólfsson, 2016. Origin of the active drumlin field at Múlajökull, Iceland: New insights from till shear and consolidation patterns. *Quaternary Science Reviews*, 148, 243-260.

- Ugelvig, S. V., D. L. Egholm, and N.R. Iverson, 2016. Glacial landscape evolution by subglacial quarrying: A multiscale computational approach. *Journal of Geophysical Research: Earth Surface*, 121(11), 2042-2068.
- Zoet, L. K. and N.R. Iverson, 2016. Rate-weakening drag during glacier sliding. *Journal of Geophysical Research: Earth Surface*, 121(7), 1206-1217.
- Ankerstjerne, S., N.R. Iverson, and F. Lacroix, 2015. Origin of a washboard moraine of the Des Moines Lobe inferred from sediment properties. *Geomorphology*, 248, 452-463.
- Cline, M.D., N.R. Iverson, and C. Harding, 2015. Origin of washboard moraines of the Des Moines Lobe: I. Spatial analysis of LiDAR data. *Geomorphology*, 246, 570-578.
- Iverson, N.R. and L.K. Zoet, 2015. Experiments on the dynamics and sedimentary products of glacier slip. *Geomorphology*, 244, 121-134.
- Vreeland, N.P., N.R. Iverson, M. Graesch, and T.S. Hooyer, 2015. Magnetic fabrics of drumlins of the Green Bay Lobe. *Quaternary Science Reviews*, 112, 33-44.
- Zoet, L.K. and N.R. Iverson, 2015. A double-valued drag relationship for basal sliding. *Journal of Glaciology*, 61(225), 1-7.
- Becker, R.A., B. Tikoff, P.R. Riley, and N.R. Iverson, 2015. Reply to “comment on ‘Preexisting fractures and the formation of an iconic American landscape: Tuolumne Meadows, Yosemite National Park, USA,’ by Jeffrey P. Schaffer”, *GSA Today*, 25(3), e34.
- Becker, R.A., B. Tikoff, P.R. Riley, and N.R. Iverson, 2014. Pre-existing fractures and the formation of an iconic American landscape: Tuolumne Meadows, Yosemite National Park, USA. *GSA Today*, 24(11), 4-10.
- Moore, P.L., J.P. Winberry, N.R. Iverson, K.A. Christianson, S. Anandakrishnan, M. Jackson, M.E. Mathison, and D. Cohen, 2013. Glacier slip and seismicity induced by surface melt. *Geology*, 41(12), 1247-1250.
- Byers, J., D. Cohen, and N.R. Iverson, 2012. Subglacial clast-bed contact forces. *Journal of Glaciology*, 207, 89-98.
- Gentoso, M.J., E.B. Evenson, K.P. Kodama, N.R. Iverson, R.B. Alley, C. Berti, and A. Kozlowski, 2012. Exploring till- bed kinematics using magnetic and pebble fabrics: North-central, New York. *Boreas*, 41, 31-41.
- Hooyer, T.S., D. Cohen, and N.R. Iverson, 2012. Control of glacial quarrying by bedrock joints. *Geomorphology*, 153, 91-101.
- Iverson, N.R., 2012. A theory of glacial quarrying for landscape evolution models. *Geology*, 40(8), 679–682.

- Iverson, N.R., and M. Person, 2012. Glacier-bed geomorphic processes and hydrological conditions relevant to nuclear waste disposal. *Geofluids*, 12(1), 38-57.
- Person, M., J. McIntosh, N.R. Iverson, C.E. Neuzil, and V. Bense, 2012. Geologic isolation of nuclear waste at high latitudes: the role of ice sheets. *Geofluids*, 12(1), 1-6.
- Iverson, N.R., and B.B. Petersen, 2011. A new laboratory device for study of subglacial processes: first results on ice- bed separation during sliding. *Journal of Glaciology*, 57(206), 1135-1146.
- Iverson, N.R., 2010. Shear resistance and continuity of till at glacier beds: hydrology rules. *Journal of Glaciology*, 56(200), 1104-1114.
- Iverson, N.R., J.E. Mann, and R.M. Iverson, 2010. Effects of soil aggregates on debris-flow mobilization: results from ring-shear experiments. *Engineering Geology*, 114, 84-92.
- Reid, M., T. Keith, R. Kayan, N.R. Iverson, R.M. Iverson, and D. Brien, 2010. Volcano collapse promoted by progressive strength reduction: new data from Mount St. Helens. *Bulletin of Volcanology*, 72, 761-766.
- Moore, P.L., N.R. Iverson, and D. Cohen, 2010. Conditions for thrust faulting in glaciers. *Journal of Geophysical Research-Earth Surface*, 115, F02005, doi:10.1029/2009JF001307.
- Moore, P.L., N.R. Iverson, and D. Cohen, 2009. Ice flow across a warm-based/cold-based transition at a glacier margin. *Annals of Glaciology*, 50(52), 1-8.
- Shumway, J.R., and N.R. Iverson, 2009. Magnetic fabrics of the Douglas Till of the Superior lobe: exploring bed- deformation kinematics. *Quaternary Science Reviews*, 28, 107-119.
- Thomason, J.F., and N.R. Iverson, 2009. Deformation of the Batestown Till of the Lake Michigan Lobe. *Journal of Glaciology*, 55(189), 131-146.
- Thomas, J.T., N.R. Iverson, and M.R. Burkart, 2009. Bank-collapse processes in a gully. *Earth Surface Processes and Landforms*, 34, 109-122.
- Moore, P.L., N.R. Iverson, and R.M. Iverson, 2008. Frictional properties of the Mount St. Helens gouge. In Sherrod, D.R., W.E. Scott, and P.H. Stauffer, eds., *A Volcano Rekindled: the first year of the renewed eruption of Mount St. Helens, 2004-2006*. U.S. Geological Survey Professional Paper, 425-424.
- Iverson, N.R., T.S. Hooyer, J.F. Thomason, M. Graesch, and J.R. Shumway, 2008. The experimental basis for interpreting particle and magnetic fabrics of sheared till, for a special issue of *Earth Surface Processes and Landforms: Reconstructing Ice-Sheet Dynamics from Subglacial Sediments and Landforms*, edited by C.R. Stokes and C. O'Cofaigh, 33, 627-645.
- Hooyer, T.S., N.R. Iverson, F. Lagroix, and J. F. Thomason, 2008. Magnetic fabric of sheared till: A strain indicator for evaluating the bed deformation model of glacier flow. *Journal of Geophysical Research-Earth Surface*, 113, F02002, doi: 10.1029/2007JF000757.

- Thomason, J.F. and N.R. Iverson, 2008. A laboratory study of particle ploughing and pore-pressure feedback: A velocity-weakening mechanism for soft glacier beds. *Journal of Glaciology*, 54, 169-181.
- Iverson, N.R., T. S. Hooyer, U. H. Fischer, D. Cohen, P. L. Moore, M. Jackson, G. Lappegard, and J. Kohler, 2007. Soft-bed experiments beneath Engabreen, Norway: Regelation infiltration, basal slip, and bed deformation, *Journal of Glaciology*, 53, 323-341.
- Cohen, D., T.S. Hooyer, N.R. Iverson, J.F. Thomason, and M. Jackson, 2006. Role of transient water pressure in quarrying: a subglacial experiment using acoustic emissions. *Journal of Geophysical Research-Earth Surface*, 111, F03006, doi: 10.1029/2005JF000439.
- Amundson, J.M., and N.R. Iverson, 2006. Testing a glacial erosion rule using hang heights of hanging valleys, Jasper National Park, Alberta, Canada. *Journal of Geophysical Research-Earth Surface*, 111, doi: 10.1029/2005JF000359 (8 pages).
- Thomason, J.F. and N.R. Iverson, 2006. Microfabric and microshear evolution in deformed till. *Quaternary Science Reviews*, 25, 1027-1038.
- Cohen, D., N.R. Iverson, T.S. Hooyer, U.H Fischer, M. Jackson, and P.L. Moore, 2005. Debris-bed friction of hard- bedded glaciers. *Journal of Geophysical Research-Earth Surface*. doi: 10.1029/2004JF000228.
- Scherer, R.P., C.M Sjunneskog, N.R. Iverson, and T.S. Hooyer, 2005. Frustules to fragments, diatoms to dust: how degradation of microfossil shape and microstructures can teach us how ice sheets work. *Journal of Nanoscience and Nanotechnology*, 5, 96-99.
- Iverson, N.R., and T.S. Hooyer, 2004. Estimating the sliding velocity of a Pleistocene ice sheet from plowing structures in the geologic record. *Journal of Geophysical Research-Earth Surface*, 109, doi: 1029/2004JF000132.
- Scherer, R.P., C.M Sjunneskog, N.R. Iverson, and T.S. Hooyer, 2004. Assessing subglacial processes from diatom fragmentation patterns. *Geology*, 32, 557-560.
- Thomas, J.T., N.R. Iverson, M.R. Burkart, and L.A. Kramer, 2004. Long-term growth of a valley-bottom gully. *Earth Surface Processes and Landforms*, 29, 995-1009.
- Iverson, N.R., D. Cohen, T.S. Hooyer, U.H. Fischer, M. Jackson, P.L. Moore, G. Lappegard, and J. Kohler, 2003. Effects of basal debris on glacier flow. *Science* 301, 81-83.
- Hooyer, T.S., and N.R. Iverson, 2002. Flow mechanism of the Des Moines lobe of the Laurentide ice sheet, *J. Glaciol.*, 48, 575-586.
- Moore, P.L., and N.R. Iverson, 2002. Slow episodic shear of granular materials regulated by dilatant strengthening. *Geology*, 30, 843-846.
- Iverson, N.R., 2002. Processes of glacial erosion, in Menzies, J., ed., *Modern and Past Glacial Environments: Revised Student Edition*, Butterworth/Heinemann, Oxford, 131-146.

- Iverson, N.R. and T.S. Hooyer, 2002. Clast-fabric development in a shearing granular material: implications for subglacial till and fault gouge: Reply to discussion of D. I. Benn. *Geological Society of America Bulletin*, 114, 383-384.
- Iverson, N.R., and R.M. Iverson, 2001. Distributed shear of subglacial till due to Coulomb slip. *Journal of Glaciology*, 47, 481-488.
- Hooyer, T.S. and N.R. Iverson, 2000. Diffusive mixing between shearing granular materials: constraints on bed deformation from till contacts. *Journal of Glaciology*, 46, 641-651.
- Cohen, D., R. LeB. Hooke, N.R. Iverson, and J. Kohler, 2000. Sliding of ice past an obstacle at Engabreen, Norway. *Journal of Glaciology*, 46, 599-610.
- Iverson, R.M., M.E. Reid, N.R. Iverson, R.G. LaHusen, M. Logan, J.E. Mann, and D.L. Brien, 2000. Acute sensitivity of landslide rates to initial soil porosity. *Science*, 290, 513-516.
- Iverson, N.R., 2000. Sediment entrainment by a soft-bedded glacier: a model based on regelation into the bed. *Earth Surface Processes and Landforms*, 25, 881-893.
- Hooyer, T.S., and N.R. Iverson, 2000. Clast-fabric development in a shearing granular material: implications for subglacial till and fault gouge. *Geological Society of America Bulletin*, 112, 683-692.
- Iverson, N.R., R.W. Baker, R. LeB. Hooke, B. Hanson, and P. Jansson, 1999. Coupling between a glacier and a soft bed: I. A relation between water pressure and local shear stress determined from till elasticity. *Journal of Glaciology*, 44, 41-53.
- Iverson, N.R., 1999. Coupling between a glacier and a soft bed: II. Model results. *Journal of Glaciology*, 44, 31-40.
- Iverson, N.R., R.W. Baker, and T.S. Hooyer, 1998. Ring-shear studies of till deformation: Coulomb-plastic behavior and distributed strain in glacier beds. *Journal of Glaciology*, 44, 634-642.
- Fischer, U.H., N.R. Iverson, B. Hanson, P. Jansson, and R. LeB. Hooke, 1998. Estimation of hydraulic properties of a subglacial till layer from ploughmeter measurements. *Journal of Glaciology*, 44, 517-522.
- Iverson, N.R., R.W. Baker, and T. Hooyer, 1997. A ring-shear device for the study of sediment deformation: Tests on tills with contrasting clay contents. *Quaternary Science Reviews*, 16, 1057-1066.
- Hooke, R. LeB., B. Hanson, N. R. Iverson, P. Jansson, and U. Fischer, 1997. Rheology of subglacial till, Storglaciaren, Sweden. *Journal of Glaciology*, 43, 172-179.
- Iverson, N.R., and R. Souchez, 1996. Isotopic signature of debris-rich ice formed by regelation into a subglacial sediment bed. *Geophysical Research Letters*, 23, 1151-1153.

- Iverson, N.R., T. Hooyer, and R. LeB. Hooke, 1996. A laboratory study of sediment deformation: Stress heterogeneity and grain-size evolution. *Annals of Glaciology*, 22, 167-175.
- Iverson, N.R., B. Hanson, R. LeB. Hooke, and P. Jansson, 1995. Flow mechanism of glaciers on soft beds. *Science*, 267, 80-81.
- Iverson, N.R., 1995. Processes of erosion. In *Glacial environments processes, sediments, and landforms*, v. 1, ed. J. Menzies, Butterworth Heinemann, Oxford, 241-259.
- Iverson, N.R. and Semmens, D., 1995. Intrusion of ice into porous media by regelation: A mechanism of sediment entrainment by glaciers. *Journal of Geophysical Research*, 100, 10219-10230.
- Hooke, R. LeB. and N.R. Iverson, 1995. Grain-size distribution in deforming subglacial tills: Role of grain fracture. *Geology*, 23, 57-60.
- Iverson, N.R., P. Jansson, and R. LeB. Hooke, 1994. In situ measurement of the strength of deforming subglacial sediment. *Journal of Glaciology*, 40, 497-503.
- Iverson, N.R., 1993. Regelation of ice through debris at glacier beds: implications for sediment transport. *Geology*, 21, 559-562.
- Iverson, N.R., 1991. Potential effects of of subglacial water-pressure fluctuations on quarrying. *Journal of Glaciology*, 37, 27-36.
- Iverson, N.R., 1991. Morphology of glacial striae: implications for abrasion of glacier beds and fault surfaces. *Geological Society of America Bulletin*, 103, 1308-1316.
- Iverson, N.R., 1990. Laboratory simulations of glacial abrasion: comparison with theory. *Journal of Glaciology*, 36, 304-314.
- Hooke, R., LeB., P. Holmlund, and N.R. Iverson, 1987. Extrusion flow demonstrated by borehole deformation measurements over a riegel, Storglaciären, Sweden. *Journal of Glaciology*, 33, 72-78.
- Hooke, R., LeB., and N.R. Iverson, 1985. Experimental study of ice flow around a bump: comparison with theory. *Geografiska Annaler*, 67A, 187-198.