
PROFESSIONAL EXPERIENCE

Discipline Program Manager, Project Scientist, Level-V Research Scientist, Sea Level and Ice, Earth Science Section

Jet Propulsion Laboratory/California Institute of Technology (2014-present)

Assistant Professor, Graduate School of Geography

Clark University (2012-2014)

NSERC Research Fellow, Department of Atmospheric, Oceanic and Space Sciences

University of Michigan (2010-2012)

EDUCATION

Ph.D. (August 2010)

Department of Earth and Atmospheric Sciences, University of Alberta

Dissertation title: *Surface mass balance of Arctic glaciers: Climate influences and modelling approaches*

B. Eng., Great Distinction (May 2005)

Department of Civil Engineering, University of Saskatchewan

Awarded the Civil Engineering Alumni Medal for graduating first in class.

AWARDS (SELECTED)

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| 2022 | <ul style="list-style-type: none">• NASA Exceptional Scientific Achievement Medal• JPL Team Award for first-of-a-kind robotics system that could enable icy world exploration. |
| 2021 | <ul style="list-style-type: none">• JPL Division Team Award• JPL Section Team Award• JPL NISAR Science Team Award |
| 2020 | <ul style="list-style-type: none">• NASA Group Achievement Award for the ICESat-2 Team |
| 2019 | <ul style="list-style-type: none">• JPL Team Award for Deployable Antarctic Sheet Explorer Rovers (DASHER) |
| 2018 | <ul style="list-style-type: none">• JPL Lew Allen Award for Excellence |
| 2017 | <ul style="list-style-type: none">• NASA Early Career Achievement Medal |
| 2009 | <ul style="list-style-type: none">• NSERC Postdoctoral Fellowship |
| 2008 | <ul style="list-style-type: none">• A. Stewart Memorial Graduate Prize
(Awarded to top 25 University of Alberta PhD candidates) |
| 2006 | <ul style="list-style-type: none">• NSERC Alexander Graham Bell Canada Graduate Scholarship D• Alberta Ingenuity Student Scholarship |
| 2005 | <ul style="list-style-type: none">• NSERC Canada Graduate Scholarship M• Walter H Johns Graduate Fellowship |
| 2004 | <ul style="list-style-type: none">• Civil Engineering Alumni Medal
(Top Civil Engineering Graduate) |

- J. Zhang, Y. Lei, L. Charrier, A. Dehecq and **A. S. Gardner**, "Validation of the Surface Velocity Field of Mountain Glaciers from ITS_LIVE V2 with in Situ GPS Data," *IGARSS 2024 - 2024 IEEE International Geoscience and Remote Sensing Symposium*, Athens, Greece, 2024, pp. 9-13, doi: 10.1109/IGARSS53475.2024.10642917.
- Paton, M., Rieber, R., Cruz, S., Gildner, M., Abma, C., Abma, K., Aghli, S., Ambrose, E., Archanian, A., Bagshaw, E. A., Baroco, C., Blackstock, A., Bowkett, J., Cable, M. L., Cartaya, E., Daddi, G., Drevinskas, T., Etheredge, R., Gall, T., **Gardner, A.S.** ... Ono, M. (2024). 2023 EELS Field Tests at Athabasca Glacier as an Icy Moon Analogue Environment. *2024 IEEE Aerospace Conference*, 1–18. <https://doi.org/10.1109/AERO58975.2024.10521174>
- López, L. A., **Gardner**, A. S., Greene, C. A., Kennedy, J. H., Liukis, M., Fahnstock, M. A., Scambos, T., & Fahnstock, J. R. (2023). ITS_LIVE: A Cloud-Native Approach to Monitoring Glaciers From Space. *Computing in Science & Engineering*, 25(6), 49–56. <https://doi.org/10.1109/MCSE.2023.3341335> [**Cover Article**]
- Vaquero, T. S., Daddi, G., Thakker, R., Paton, M., ... **Gardner, A.**, ... Ono, M. (2024). EELS: Autonomous snake-like robot with task and motion planning capabilities for ice world exploration. *Science Robotics*, 9(88), eadh8332. <https://doi.org/10.1126/scirobotics.adh8332>
- Menounos, B., **Gardner, A.S.**, Forentine, C., and Fountain, A. (2024). Brief communication: Recent estimates of glacier mass loss for western North America from laser altimetry, *The Cryosphere*, 18, 889–894, <https://doi.org/10.5194/tc-18-889-2024>.
- Greene, C. A., **Gardner, A. S.**, Wood, M., & Cuzzone, J. K. (2024). Ubiquitous acceleration in calving of the Greenland Ice Sheet, 1985-2022. *Nature* 625, 523–528. <https://doi.org/10.1038/s41586-023-06863-2>
- Choi, Y., Seroussi, H., Morlighem, M., Schlegel, N.-J., & **Gardner, A.** (2023). Impact of time-dependent data assimilation on ice flow model initialization and projections: a case study of Kjer Glacier, Greenland. *The Cryosphere*, 17(12), 5499–5517. <https://doi.org/10.5194/tc-17-5499-2023>
- Berthier, E., Floriciou, D., **Gardner, A. S.**, Gourmelen, N., Jakob, L., Paul, F., Treichler, D., Wouters, B., Belart, J. M. C., Dehecq, A., Dussillant, I., Hugonnet, R., Käab, A., Krieger, L., Pálsson, F., & Zemp, M. (2023). Measuring glacier mass changes from space—a review. *Reports on Progress in Physics*, 86(3), 36801. <https://doi.org/10.1088/1361-6633/acaf8e>
- Kacimi, S., Vaze, P., Brown, S., Markus, T., **Gardner, A.**, Colliander, A., & Nilsson, J. (2023). Using mm-wave observations to maximize the CRISTAL mission cryosphere science applications. *2023 IEEE Aerospace Conference*, 1–8. <https://doi.org/10.1109/AERO55745.2023.10115924>
- Paolo, F. ***, **Gardner, A.**, **Greene, C. ***, Nilsson, J. N., Schodlok, M. P., & Schlegel, N. (2023). Recent slowdown in rates of West Antarctic ice shelf thinning. *The Cryosphere*, 17(8), 3409–3433. <https://doi.org/https://doi.org/10.5194/tc-17-3409-2023>
- Gardner, A. S.**, Schlegel, N.-J., & Larour, E. (2023). Glacier Energy and Mass Balance (GEMB): A model of firn processes for cryosphere research. *Geoscientific Model Development*, 16(8), 2277–2023. <https://doi.org/https://doi.org/10.5194/gmd-16-2277-2023>
- Choi, Y., Seroussi, H., **Gardner, A.**, & Schlegel, N.-J. (2022). Uncovering Basal Friction in Northwest Greenland Using an Ice Flow Model and Observations of the Past Decade.

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<https://doi.org/https://doi.org/10.1029/2022JF006710>

Dehecq, A., Altena, B., **Gardner, A. S.**, Trouvé, E., & Leinss, S. (2022). Remote Sensing of Glacier Motion. In *Surface Displacement Measurement from Remote Sensing Images* (pp. 339–372). <https://doi.org/https://doi.org/10.1002/9781119986843.ch11>

Greene, C.A. *, **Gardner, A.S.**, Schlegel, N.J. & Fraser, A. D. Antarctic calving loss rivals ice-shelf thinning. *Nature* (2022). <https://doi.org/10.1038/s41586-022-05037-w>

Nilsson, J. *, **Gardner, A. S.**, and **Paolo, F. S. ***: Elevation change of the Antarctic Ice Sheet: 1985 to 2020, *Earth Syst. Sci. Data*, 14, 3573–3598, <https://doi.org/10.5194/essd-14-3573-2022>, 2022.

Joughin I, Forster R, **Gardner A**, Holt B, Rignot E, Scheuchl B. Cryosphere Sciences with NISAR. In 2021 IEEE International Geoscience and Remote Sensing Symposium IGARSS 2021 Jul 11 (pp. 550-553). IEEE.

Adusumilli, S., **Gardner, A. S.**, & Fricker, H. A. (2022). Ice sheet changes from satellite observations [in “State of the Climate in 2021”]. *Bulletin of the American Meteorological Society* 102, no. 8 (2021): S317-S356.

Lei, Y. *, **Gardner, A. S.**, & Agram, P. (2022). Processing methodology for the ITS_LIVE Sentinel-1 ice velocity products. *Earth Syst. Sci. Data*, 14(11), 5111–5137. <https://doi.org/10.5194/essd-14-5111-2022>

Goliber, S., Black, T., Catania, G., Lea, J. M., Olsen, H., Cheng, D., Bevan, S., Bjørk, A., Bunce, C., Brough, S., Carr, J. R., Cowton, T., **Gardner, A.**, Fahrner, D., Hill, E., Joughin, I., Korsgaard, N. J., Luckman, A., Moon, T., ... Zhang, E. (2022). TermPicks: a century of Greenland glacier terminus data for use in scientific and machine learning applications. *The Cryosphere*, 16(8), 3215–3233. <https://doi.org/10.5194/tc-16-3215-2022>

Whicker, C. A., Flanner, M. G., Dang, C., Zender, C. S., Cook, J. M., & **Gardner, A. S.** (2022). SNICAR-ADv4: a physically based radiative transfer model to represent the spectral albedo of glacier ice. *The Cryosphere*, 16(4), 1197–1220. <https://doi.org/10.5194/tc-16-1197-2022>

Gardner, A. S., Adusumilli, S., & Fricker, H. A. (2021). Ice sheet changes from satellite observations [in “State of the Climate in 2020”]. *Bulletin of the American Meteorological Society*, 102(8), S334–S336. <https://doi.org/https://doi.org/10.1175/BAMS-D-21-0081.1>

Tsai, V. C., Smith, L. C., **Gardner, A. S.**, & Seroussi, H. (2021). A Unified Model for Transient Subglacial Water Pressure and Basal Sliding. *Journal of Glaciology*, 1–11. <https://doi.org/doi:10.1017/jog.2021.103>

Buzzanga, B., Heijkoop, E., Hamlington, B. D., Nerem, R. S., & **Gardner, A.** (2021). An Assessment of Regional ICESat-2 Sea-Level Trends. *Geophysical Research Letters*, 48(9), e2020GL092327. <https://doi.org/https://doi.org/10.1029/2020GL092327>

Lei, Y. *, **Gardner, A.**, & Agram, P. (2021). Autonomous Repeat Image Feature Tracking (autoRIFT) and Its Application for Tracking Ice Displacement. In *Remote Sensing* (Vol. 13, Issue 4). <https://doi.org/10.3390/rs13040749>

Luthcke, S. B., Thomas, T. C., Pennington, T. A., Rebold, T. W., Nicholas, J. B., Rowlands, D. D., **Gardner, A. S.**, & Bae, S. (2021). ICESat-2 Pointing Calibration and Geolocation Performance. *Earth and Space Science*, 8(e2020EA001494). <https://doi.org/https://doi.org/10.1029/2020EA001494>

Greene, C. A. *, **Gardner, A. S.**, & Andrews, L. C. (2020). Detecting seasonal ice dynamics in satellite images. *The Cryosphere Discuss.*, 2020, 1–21. <https://doi.org/10.5194/tc-2020-122>

Fair, Z., Flanner, M., Brunt, K., Fricker, H. A., & **Gardner, A.** (2020). ICESat-2 and Operation IceBridge altimetry for supraglacial lake depth retrievals. *The Cryosphere*.

Moon, T. A., **Gardner, A. S.**, Csatho, B. M., Parmuzin, I., & Fahnestock, M. A. (2020). Rapid reconfiguration of the Greenland Ice Sheet coastal margin. *Journal of Geophysical Research: Earth Surface*, 125(e2020JF005585). <https://doi.org/10.1029/2020JF005585>

- Dehecq, A.***, **Gardner, A. S.**, Alexandrov, O., McMichael, S., Hugonnet, R., Shean, D., & Marty, M. (2020). Automated Processing of Declassified KH-9 Hexagon Satellite Images for Global Elevation Change Analysis Since the 1970s. In *Frontiers in Earth Science* (Vol. 8, p. 516). <https://www.frontiersin.org/article/10.3389/feart.2020.566802>
- Sasgen, I., Wouters, B., **Gardner, A. S.**, King, M. D., Tedesco, M., Landerer, F. W., et al. (2020). Return to rapid ice loss in Greenland and record loss in 2019 detected by the GRACE-FO satellites. *Communications Earth & Environment*, 1(1), 8. <https://doi.org/10.1038/s43247-020-0010-1>
- Fricker, H. A., **Gardner, A. S.** (2020): Recent Changes in the Antarctic Ice Sheet [in "State of the Climate in 2019"]. *Bull. Amer. Meteor. Soc.*, 101 (8), S 304–S306, <https://doi.org/10.1175/BAMS-D-20-0090.1>.
- Behrangi, A., **Gardner, A. S.**, & Wiese, D. N. (2020). Comparative Analysis of Snowfall Accumulation over Antarctica in Light of Ice Discharge and Gravity Observations from Space. *Environmental Research Letters*, 15. <https://doi.org/10.1088/1748-9326/ab9926>
- B. D. Hamlington, **A. S. Gardner**, 49 Others, Understanding of contemporary regional sea-level change and the implications for the future. *Rev. Geophys.* (2020), doi:10.1029/2019RG000672.
- A. Shepherd, E. Ivins, E. Rignot, B. Smith, M. van den Broeke, I. Velicogna, P. Whitehouse, K. Briggs, I. Joughin, G. Krinner, S. Nowicki, T. Payne, T. Scambos, N. Schlegel, G. A. C. Agosta, A. Ahlstrøm, G. Babonis, V. R. Barletta, A. A. Bjørk, A. Blazquez, J. Bonin, W. Colgan, B. Csatho, R. Cullather, M. E. Engdahl, D. Felikson, X. Fettweis, R. Forsberg, A. E. Hogg, H. Gallee, **A. Gardner**, L. Gilbert, N. Gourmelen, A. Groh, B. Gunter, E. Hanna, C. Harig, V. Helm, A. Horvath, M. Horwath, S. Khan, K. K. Kjeldsen, H. Konrad, P. L. Langen, B. Lecavalier, B. Loomis, S. Luthcke, M. McMillan, D. Melini, S. Mernild, Y. Mohajerani, P. Moore, R. Mottram, J. Mouginot, G. Moyano, A. Muir, T. Nagler, G. Nield, **J. Nilsson***, B. Noël, I. Otosaka, M. E. Pattle, W. R. Peltier, N. Pie, R. Rietbroek, H. Rott, L. Sandberg Sørensen, I. Sasgen, H. Save, B. Scheuchl, E. Schrama, L. Schröder, K.-W. Seo, S. B. Simonsen, T. Slater, G. Spada, T. Sutterley, M. Talpe, L. Tarasov, W. J. van de Berg, W. van der Wal, M. van Wessem, B. D. Vishwakarma, D. Wiese, D. Wilton, T. Wagner, B. Wouters, J. Wuite, T. I. Team, Mass balance of the Greenland Ice Sheet from 1992 to 2018. *Nature*. **579**, 233–239 (2020).
- Smith, B., Fricker, H. A., **Gardner, A. S.**, Medley, B., **Nilsson, J.***, **Paolo, F. S.***, Holschuh, N., Adusumilli, S., Brunt, K., Csatho, B., Harbeck, K., Markus, T., Neumann, T., Siegfried, M. R., & Zwally, H. J. (2020). Pervasive ice sheet mass loss reflects competing ocean and atmosphere processes. *Science*, 368. <https://doi.org/10.1126/science.aaz5845>
- Smith, B., Fricker, H. A., Holschuh, N., **Gardner, A. S.**, Adusumilli, S., Brunt, K. M., B. Csatho, K. Harbeck, A. Huth, T. Neumann, **J. Nilsson***, M. R. Siegfried. (2019). Land ice height-retrieval algorithm for NASA's ICESat-2 photon-counting laser altimeter. *Remote Sensing of Environment*, 111352. <https://doi.org/https://doi.org/10.1016/j.rse.2019.111352>
- Walker, C. C.***, & **Gardner, A. S.** (2019). Evolution of ice shelf rifts: Implications for formation mechanics and morphological controls. *Earth and Planetary Science Letters*, 526, 115764. <https://doi.org/https://doi.org/10.1016/j.epsl.2019.115764>
- St. Pierre, K. A., St. Louis, V. L., Schiff, S. L., Lehnherr, I., Dainard, P. G., **Gardner, A. S.**, Aukes, P. J. K., Sharp, M. J. (2019). Proglacial freshwaters are significant and previously unrecognized sinks of atmospheric CO₂; Proceedings of the National Academy of

Sciences, 201904241. <https://doi.org/10.1073/pnas.1904241116> (**Awarded 2020 Robert Peters Award by Society of Canadian Limnologists**)

- Greene, C.A.***, K. Thirumalai, K.A. Kearney, J.M. Delgado, W. Schwanghart, N.S. Wolfenbarger, K.M. Thyng, D.E. Gwyther, **A.S. Gardner**, and D.D. Blankenship. The Climate Data Toolbox for MATLAB. *Geochemistry, G*, and D. D. B. (2019). The Climate Data Toolbox for MATLAB. *Geochemistry, Geophysics, Geosystems*. <https://doi.org/doi:0.1029/2019GC008392>.
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- Tapley, B., M. M. Warkins, F. Flechtner, C. Reigber, S. Bettadpur, M. Rodell, I. Sasgen, J. Famiglietti, F. Landerer, D. Chambers, J. Reager, **A. S. Gardner**, H. Save, imanshu , E. Ivins, S. Swenson, C. Boening, C. Dahle, D. Wiese, H. Dobslaw, M. Tamisiea and I. Velicogna (2019). Contributions of GRACE to understanding climate change. *Nature Climate Change*.
- Khazendar, A., I. G. Fenty, D. Carroll, **A. S. Gardner**, C. M. Lee, I. Fukumori, O. Wang, H. Zhang, H. Seroussi, D. Moller, B. P. Y. Noël, M. R. van den Broeke, S. Dinardo and J. Willis (2019). Interruption of two decades of Jakobshavn Isbrae acceleration and thinning as regional ocean cools. *Nature Geoscience*.
- St. Pierre, K. A., V. L. St. Louis, I. Lehnerr, S. L. Schiff, D. C. G. Muir, A. J. Poulain, J. P. Smol, C. Talbot, M. Ma, D. L. Findlay, W. J. Findlay, S. E. Arnott and **A. S. Gardner** (2019). Contemporary limnology of the rapidly changing glacierized watershed of the world's largest High Arctic lake. *Scientific Reports* 9(1): 4447.
- St. Pierre, K. A., V. L. St. Louis, I. Lehnerr, **A. S. Gardner**, J. A. Serbu, C. A. Mortimer, D. C. G. Muir, J. A. Wiklund, D. Lemire, L. Szostek and C. Talbot (2019), Drivers of Mercury Cycling in the Rapidly Changing Glacierized Watershed of the High Arctic's Largest Lake by Volume (Lake Hazen, Nunavut, Canada), *Environmental Science & Technology*, 53(3), 1175-1185, doi:10.1021/acs.est.8b05926.
- Menounos, B., R. Hugonnet, D. Shean, **A. Gardner**, I. Howat, E. Berthier, B. Pelto, C. Tennant, J. Shea, M.-J. Noh, F. Brun and A. Dehecq (2019). Heterogeneous Changes in Western North American Glaciers Linked to Decadal Variability in Zonal Wind Strength. *Geophysical Research Letters* 46(1): 200-209.
- Dehecq, A.***, N. Gourmelen, **A. S. Gardner**, F. Brun, D. Goldberg, P. W. Nienow, E. Berthier, C. Vincent, P. Wagnon, and E. Trouvé (2018), Twenty-first century glacier slowdown driven by mass loss in High Mountain Asia, *Nature Geosci.*, doi:10.1038/s41561-018-0271-9. (**among top 1% of all papers with similar publication date**)
- Smith, B. E., **A. S. Gardner**, A. Schneider, and M. Flanner (2018), Modeling biases in laser-altimetry measurements caused by scattering of green light in snow, *Remote Sensing of the Environment*, 215, 398-410, doi:<https://doi.org/10.1016/j.rse.2018.06.012>.
- Behrangi, A., **A. Gardner**, J. T. Reager, J. B. Fisher, D. Yang, G. J. Huffman, and R. F. Adler Using GRACE to estimate snowfall accumulation and assess gauge undercatch corrections in high latitudes, *Journal of Climate*, doi:10.1175/jcli-d-18-0163.1.
- WCRP Global Sea Level Budget Group (2018). Global sea-level budget 1993–present. *Earth System Science Data* 10(3): 1551-1590.

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- Lehnherr, I., V. L. St. Louis, M. Sharp, **A. S. Gardner**, J. P. Smol, S. L. Schiff, D. C. G. Muir, C. A. Mortimer, N. Michelutti, C. Tarnocai, K. A. St. Pierre, C. A. Emmerton, J. A. Wiklund, G. Köck, S. F. Lamoureux and C. H. Talbot (2018), The world's largest High Arctic lake responds rapidly to climate warming, *Nature Communications*, 9(1), 1290, doi:10.1038/s41467-018-03685-z.
- Shepherd, A., E. Ivins, E. Rignot, B. Smith, M. van den Broeke, I. Velicogna, P. Whitehouse, K. Briggs, I. Joughin, G. Krinner, S. Nowicki, T. Payne, T. Scambos, N. Schlegel, G. A. C. Agosta, A. Ahlstrøm, G. Babonis, V. Barletta, A. Blazquez, J. Bonin, B. Csatho, R. Cullather, D. Felikson, X. Fettweis, R. Forsberg, H. Gallee, **A. S. Gardner**, L. Gilbert, A. Groh, B. Gunter, E. Hanna, C. Harig, V. Helm, A. Horvath, M. Horwath, S. Khan, K. K. Kjeldsen, H. Konrad, P. Langen, B. Lecavalier, B. Loomis, S. Luthcke, M. McMillan, D. Melini, S. Mernild, Y. Mohajerani, P. Moore, J. Mouginot, G. Moyano, A. Muir, T. Nagler, G. Nield, J. Nilsson, B. Noel, I. Ootaka, M. E. Pattle, W. R. Peltier, N. Pie, R. Rietbroek, H. Rott, L. Sandberg-Sørensen, I. Sasgen, H. Save, B. Scheuchl, E. Schrama, L. Schröder, K.-W. Seo, S. Simonsen, T. Slater, G. Spada, T. Sutterley, M. Talpe, L. Tarasov, W. J. van de Berg, W. van der Wal, M. van Wessem, B. D. Vishwakarma, D. Wiese and B. Wouters (2018). "Mass balance of the Antarctic Ice Sheet from 1992 to 2017." *Nature* 558(7709): 219-222.
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- IPCC. 2013. Working Group 1 Contribution to the IPCC Fifth Assessment Report (AR5), Climate Change 2013: The Physical Science Basis. Chapter 4: Observations: Cryosphere. Co-ordinating Lead Authors: D.G. Vaughan, J.C. Comiso; Lead Authors: I. Allison, J. Carrasco, G. Kaser, R. Kwok, P. Mote, T. Murray, F. Paul, J. Ren, E. Rignot, O. Solomina, K. Steffen, T. Zhang; Contributing Authors: A.A. Arendt, D.B. Bahr, M. van den Broeke, R. Brown, J.G. Cogley, **A.S. Gardner**, S. Gerland, S. Gruber, C. Haas, J-O. Hagen, R. Hock, D. Holland, M. Huss, T. Markus, B. Marzeion, R. Massom, G. Moholdt, P.P. Overduin, A. Payne, W.T. Pfeffer, T. Prowse, V. Radic, D. Robinson, M. Sharp, K. Shiklomanov, S. Smith, S. Stammerjohn, I. Velicogna, P. Wadhams, A. Worby, L. Zhao. 102pp.
- IPCC. 2013. Working Group 1 Contribution to the IPCC Fifth Assessment Report (AR5), Climate Change 2013: The Physical Science Basis. Chapter 13: Sea Level Rise. Co-ordinating Lead Authors: J. A. Church, P.U. Clark; Lead Authors: A. Cazenave, J.M.

Gregory, S. Jevrejeva, A. Levermann, M.A. Merrifield, G.A. Milne, R.S. Nerem, P.D. Nunn, A.J. Payne, W.T. Pfeffer, D. Stammer, A.S. Unnikrishnan; Contributing Authors: D. Bahr, J.E. Box, D.H. Bromwich, M. Carson, W. Collins, X. Fettweis, P. Forster, **A.S. Gardner**, W.R. Gehrels, R. Giesen, P.J. Gleckler, P. Good, R.G. Graversen, R. Greve, S. Griffies, E. Hanna, M. Hemer, R. Hock, S.J. Holgate, J. Hunter, P. Huybrechts, G. Johnson, I. Joughin, G. Kaser, C. Katsman, L. Konikow, G. Krinner, A. Le Brocq, J. Lenaerts, S. Ligtenberg, C.M. Little, B. Marzeion, K.L. McInnes, S.H. Mernild, D. Monselesan, R. Mottram, T. Murray, G. Myhre, J.P. Nicholas, F. Nick, M. Perrette, D. Pollard, V. Radić, J. Rae, M. Rummukainen, C. Schoof, A. Slangen, J.H. van Angelen, W.J. van de Berg, M. van den Broeke, M. Vizcaíno, Y. Wada, N.J. White, R. Winkelmann, J. Yin, M. Yoshimori, K. Zickfeld. 124pp.

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Kuipers Munneke, P., M.R. van den Broeke, J.T.M. Lenaerts, M. G. Flanner, **A.S. Gardner**, and W.J. van de Berg (2011). A new albedo parameterization for use in climate models over the Antarctic ice sheet. *Journal of Geophysical Research*, 116, D05114.

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Gardner, A.S. and M.J. Sharp (2010). A review of snow and ice albedo and the development of a new physically based broadband albedo parameterization. *Journal of Geophysical Research*, 115, F01009.

Gardner, A.S., M.J. Sharp, R. M. Koerner, C. Labine, S. Boon, S. J. Marshall, D. O. Burgess, and D. Lewis (2009). Near-surface temperature lapse rates over Arctic glaciers and their implications for temperature downscaling. *Journal of Climate*, 22, 4281-4298.

Gardner, A.S. and M.J. Sharp (2009). Sensitivity of net mass balance estimates to near-surface temperature lapse rates when employing the degree-day method to estimate glacier melt. *Annals of Glaciology*, 50, 80-86.

Gardner, A.S. and M. Sharp (2007). Influence of the Arctic Circumpolar Vortex on the mass balance of Canadian High Arctic glaciers. *Journal of Climate*, 20, 4586-4598.

PUBLICATIONS (OTHER)

Gardner, A.S., J.G. Cogley, E. Berthier, G. Kaser (2013). Comment: Take more care over glacier facts. *Nature*, 504. 33-33.

Arendt, A., Bolch, T., Cogley, J. G., **Gardner, A.S.**, Hagen, J.-O., Hock, R., Kaser, et al. (2012). Randolph Glacier Inventory: A Dataset of Global Glacier Outlines Version: 2.0, Global Land Ice Measurements from Space, Boulder Colorado, USA. Digital Media.

SOFTWARE

GEMB: Glacier Energy and Mass Balance. A model of firn processes for cryosphere research. [<https://github.com/alex-s-gardner/GEMB>]

autoRIFT: autonomous Repeat Image Feature Tracking. A Python module of a fast and intelligent algorithm for finding the pixel displacement between two images [<https://github.com/nasa-jpl/autoRIFT>].

captoolkit: Cryosphere Altimetry Processing Toolkit. Set of Python tools for processing and integrating satellite and airborne (radar and laser) altimetry data [<https://github.com/nasa-jpl/captoolkit>].

binStatistics.jl: Highly flexible and efficient computation of n-dimensional binned statistic(s) for n-variable(s) in Julia [<https://github.com/alex-s-gardner/BinStatistics.jl>]

ItsLive.jl: Julia package for working with NASA ITS_LIVE data [<https://github.com/alex-s-gardner/ItsLive.jl>]

SOFTWARE CONTRIBUTIONS

Accepted PRs to Zarr.jl, Tyler.jl, OpenAI.jl, SpaceLiDAR.jl, GeoJSON.jl, Makie.jl, Rasters.jl, Extents.jl

GRANTS (FUNDED)

NASA MEaSURES (2023-2028) \$3.0M

HOMAGE – Heat and Ocean Mass from Gravity ESDR: with Felix Landerer (PI, JPL), **Alex Gardner (co-I, JPL)**, Johan Nilsson (co-I, JPL), David Wiese (co-I, JPL), Donald Argus (co-I, JPL), Nicole Schlegel (co-I, JPL), Athina Peidou (co-I, JPL), Matthias Ellmer (co-I, JPL)

NASA MEaSURES (2023-2028) \$4.4M

Next Generation - Inter-mission Time Series of Land Ice Velocity and Elevation (ITS LIVE): with **Alex Gardner** (PI, JPL), Chad Greene (co-I, JPL), Johan Nilsson (co-I, JPL), Maria Liukis (co-I, JPL), Ted Scambos (co-I, U. Colorado, Boulder), Luis Lopez Espinosa (co-I, U. Colorado, Boulder), Mark Fahnestock (co-I, U. Alaska, Fairbanks), Joseph Kennedy (co-I, U. Alaska, Fairbanks)

NASA Sea Level Change Team (2020-2024) \$2.5M

Global land ice contributions to sea level: 2003-present with Eric Larour (PI, JPL), Surendra Adhikari (co-I, JPL), Lambert Caron (co-I, JPL), Chunli Dai (co-I, OSU), **Alex Gardner** (co-I, JPL), Ian Howat (OSU), Erik Ivins (co-I, JPL), Dimitris Menemenlis (co-I, JPL), Justin Quinn, Nicole-Jeanne Schlegel (co-I, JPL), Helene Seroussi (co-I, JPL), Sophie Nowicki (co-I, GSFC), Thomas Frederikse (co-I, JPL)

NASA Sea Level Change Team (2020-2024) \$2.5M

Global land ice contributions to sea level: 2003-present with Tong Lee (PI, JPL), Ian Fenty (co-I, JPL), Thomas Frederikse (co-I, JPL), **Alex Gardner** (co-I, JPL), John T. Reager (co-I, JPL), Ou Wang (co-I, JPL), Hong Zhang (co-I, JPL), Patrick Heimbach (co-I, UT-Austin), Christopher Piecuch (co-I, WHOI), Rui Ponte (co-I, AER)

NASA MAP (2020-2024) \$1.0M

Mass transport driven coastal sea level with Tong Lee (PI, JPL), Eric Larour (PI, JPL), Surendra Adhikari (co-I, JPL), Lambert Caron (co-I, JPL), **Alex Gardner** (co-I, JPL), Erik Ivins (co-I, JPL), Dimitris Menemenlis (co-I, JPL), Sophie Nowicki (co-I, GSFC)

NASA ICESat-2 Science Team (2020-2023) \$0.6M

Global land ice contributions to sea level: 2003-present with **Alex Gardner** (PI, JPL), David Wiese (co-I, JPL), Nicole-Jeanne Schlegel (co-I, JPL), and Johan Nilsson (co-I, JPL)

NASA DS Surface Topography and Vegetation (2020-2021) \$0.1M

Topography Measurements Required to Advance Ice Sheet, Ice Shelf and Glacier Science Over the Coming Decades with **Alex Gardner** (PI, JPL), Fernando Paolo (co-I, JPL) and Johan Nilsson (co-I, JPL)

NASA GRACE-FO Science Team (2019-2023) \$0.8M

Geodetic Data Combination for Increased Spatial Resolution in Earth System Mass Flux with David Wiese (PI, JPL), **Alex Gardner** (co-I, JPL), Nicole-Jeanne Schlegel (co-I, JPL), and Johan Nilsson (co-I, JPL)

NASA NISAR Science Team (2019-2022) \$0.4M

Improving NISAR ice sheet, ice shelf and glacier velocities with **Alex Gardner** (PI, JPL), Piyush Agram (co-I, JPL)

NASA MEaSURES (2018-2023) \$4.2M

Inter-mission Time Series of Land Ice Velocity and Elevation (ITS LIVE): with **Alex Gardner** (PI, JPL), Piyush Agram (co-I, JPL), Hook Hua (co-I, JPL), Justin Linick (co-I, JPL), Johan Nilsson (co-I, JPL), Catherine Walker (co-I, JPL), Ted Scambos (co-I, U. Colorado, Boulder), Mark Fahnestock (co-I, U. Alaska, Fairbanks), Franz Meyer (co-I, U. Alaska, Fairbanks)

NASA Sea Level Team (2017-2020) \$4.0M

Global interconnections of Cryosphere and Solid Earth, Sea-level Change and Ice Mass Balance with Erik Ivins (PI, JPL), Eric Larour (co-I, JPL), Surendra Adhikari (co-I, JPL), Helene Seroussi (co-I, JPL), Dimitris Menemenlis (co-I, JPL), **Alex Gardner** (co-I, JPL), Nicole-Jeanne Schlegel (co-I, JPL), David Wiese (co-I, JPL), Johan Nilsson^[SEP] (co-I, JPL), Bill Hammond (co-I, U. Nevada), Geoff Blewitt (co-I, U. Nevada).

NASA Cryospheric Sciences (2017-2019) \$0.8M

Constraining Mass Balance Uncertainties in East Antarctica from 2003 to the Present with Laser and Radar Altimetry Observations with Ala Khazendar (PI, JPL), **Alex Gardner** (co-I, JPL), Nicole Schlegel (co-I, JPL)

JPL President's and Director's Fund Proposal (2016-2017) \$0.3M

“Ice-shelf and ice stream dynamics” with Ala Khazendar (PI, JPL), Mark Simons (PI, Caltech), Victor Tsai (co-I, Caltech), Piyush Agram (co-I, JPL), **Alex Gardner** (co-I, JPL), Helene Seroussi (co-I, JPL)

NASA Cryospheric Sciences (2015-2018) \$0.6M

“Contributions of glaciers to sea level rise over the past half-century” with **Alex Gardner** (PI, JPL), Michael Willis (co-I, Cornell), (co-I, AMES), Oleg Alexandrov, (co-I, AMES)

NASA Cryospheric Sciences (2015-2018) \$1.0M

“Global Land Ice Velocity Extraction from Landsat (GoLIVE): A robust, comprehensive, and near-real-time record of global glacier flow” with Ted Scambos (PI, UC Boulder), **Alex Gardner** (I-PI, JPL), Mark Fahnestock (I-PI, UA Fairbanks)

NASA Cryospheric Sciences (2015-2018) \$1.1M

“Data assimilation of NASA altimetry into reconstructions of present-day state of the ice” with Eric Larour (PI, JPL), **Alex Gardner** (co-I, JPL), Beata Csatho (co-I, UNY Buffalo), Ala Khazendar (co-I, JPL), Nicole-Jeanne Schlegel (co-I, JPL), Helene Seroussi (co-I, JPL)

NASA MAP (2015-2018) \$1.0M

“A peek at the past of the Greenland ice sheet using radar layers and modeling” with Eric Larour (PI, JPL), **Alex Gardner** (co-I, JPL), Indrani Das (co-I, Lamont-Doherty Earth Observatory / Columbia U.), Joseph MacGregor (co-I, UT Austin)

NASA Earth Surface and Interior (2015-2018) \$0.4M

“Geodetic Responses to Little Ice Age and Anthropocene Loading of the Mantle” with Erik Ivins (PI, JPL), **Alex Gardner** (co-I, JPL), Surendra Adhikari (co-I, JPL), Gregory Lyzenga (co-I, JPL), David Wiese (co-I, JPL)

GRACE SCIENCE TEAM (2015-2017) \$0.4M

“Using GRACE to advance precipitation analysis in cold regions” with Ali Behrangi (PI, JPL), **Alex Gardner** (co-PI, JPL), JT Reager (co-I, JPL), Josh Fisher (co-I, JPL)

ICESAT2 SCIENCE DEFINITION TEAM (2015-2017) \$0.2M

“Improved interpretation of ICESat-2 data through characterization of multiple scattering of the laser micropulse” with **Alex Gardner** (PI, JPL)

JPL TOPIC AREA PROPOSAL FOR THE RESEARCH AND TECH. DEV. FUND (2015-2016) \$0.3M

“Land Ice Changes using CryoSat-2 Data” with **Alex Gardner** (PI, JPL), Erik Ivins (co-I, JPL), Eric Larour (co-I, JPL)

NASA Cryospheric Sciences (2014-2017) \$0.9M

“Glaciology and Sea Level Rise Research” with **Alex Gardner** (PI, JPL)

NASA Studies with ICESAT and CryoSat-2 (2013-2016) \$0.3M

“Multiple Scattering Within Snow, Ice, Firn and Water and Its Impact on Elevation Retrievals from ICESat-2 Data” with **Alex Gardner** (PI, Clark University) and Mark Flanner (co-PI, University of Michigan)

TEACHING EXPERIENCE (SPRING/FALL YEAR: UNDERGRADUATE/GRADUATE ENROLMENT)

REMOTE SENSING OF THE CRYOSPHERE (S14: 3/17)

Graduate School of Geography, Clark University

Undergraduate/graduate course covering satellite observation methods and analysis for cryosphere monitoring including laser altimetry, gravimetry, multi-spectral imagery, microwave radiometry, and radar.

EARTH SYSTEM SCIENCE (S14: 75/0)

Graduate School of Geography, Clark University

Undergraduate course introducing the structure and function of the Earth System. Topics covered included weather, climate, atmosphere and ocean circulation, hydrologic cycle, water resources, tectonics, and land-surface processes.

INTRODUCTION TO REMOTE SENSING (F12: 15/21, F13: 19/26)

Graduate School of Geography, Clark University

Undergraduate/graduate course covering the principles and analytical methods of satellite remote sensing as applied to environmental systems.

INTRODUCTION TO QUANTITATIVE METHODS (S13: 22/2)

Graduate School of Geography, Clark University

Undergraduate/graduate course focused on statistical methods.

DIRECTED STUDY: ADVANCED TOPICS IN CRYOSPHERIC SCIENCES (S12: 1/1, F13: 1/1, S14: 2/1)

Graduate School of Geography, Clark University

Undergraduate/graduate directed study covering a wide range of advanced cryosphere and earth system science topics.

INVITED INSTRUCTOR: INTERNATIONAL SUMMER SCHOOL IN GLACIOLOGY (S12: 0/27)

Geophysical Institute, University of Alaska, Fairbanks

Graduate seminar on methods for determining glacier mass change from space.

GUEST LECTURER: ATMOSPHERIC MODELING (S10)

Department of Earth and Atmospheric Sciences, University of Alberta

Three undergraduate/graduate lectures introducing scientific computing for climate research.

GUEST LECTURER: ICE DYNAMICS & GLACIER HYDROLOGY (F09)

Department of Earth and Atmospheric Sciences, University of Alberta

Three graduate lectures covering glacier surface mass and energy exchanges

TEACHING ASSISTANT: PLANET EARTH (F09)

Department of Earth and Atmospheric Sciences, University of Alberta

Instruction and grading of 10 labs introducing the origins and evolution of the Earth and the solar system.

SERVICE

CONTRIBUTING AUTHOR TO CHAPTER 4 (OBSERVATIONS: CRYOSPHERE) AND CHAPTER 13 (SEA LEVEL CHANGE) OF THE IPCC WORKING GROUP 1, FIFTH ASSESSMENT REPORT

Contributed to the synthesis of global glacier mass change estimates and to the evaluation of projections of glacier change.

Unlearning Racism in Geoscience, program facilitator. (2021-2022)

BOARDS

Advisory board member of the International Association of Cryospheric Sciences (IASC) Global Terrestrial Network - for Glaciers (GTN-G) (2014-present)

Advisory board member for Global Land Ice Measurements from Space (GLIMS) (2014-present)

MISSION REVIEW

NASA NISAR pre-CDR / pre-PDR Peer Review (2016/2018)
NASA Europa Clipper REASON performance review (2017)
NASA ICESat-2 Algorithm Theoretical Basis Documents (2014-2015)
NASA Operation Ice Bridge mission review (2013-2014)

SCIENCE TEAMS

NASA ICESat-2 Science / Science Definition Team, P.I. (2014-2023)
NASA NISAR Science Team, P.I. (2019-present)
NASA DS Surface Topography and Vegetation Team, P.I. (2020-2023)
NASA GRACE/GRACE-FO Science Team, co-I. (2015-present)
NASA Sea Level Change Team, P.I./co-I. (2014-2017/2017-present)

MISSION PROPOSALS/CONCEPTS

Orbiting Arid Subsurfaces and Ice Sheet Sounder (OASIS), (Project Scientists, 2021-)
Exobiology Extant Life Surveyor (EELS), Earth Science Lead (2020-2024)
DeepIce, EV-M3 Mission Concept (Co-I, 2019-2023)
Deployable Antarctic SHEET Exploration Rovers (DASHER), Terrestrial Robot Concept (Science PI, 2017-2020)
Radar Orbital Sounder for Ice Exploration (ROSIE), Mission Concept (Co-I, 2017-2019)
Gates of Antarctica (GoA), Suborbital Concept (PI, 2016-2017)
Snow and Ice Radiative-Forcing Albedo (SIRFA), Mission Concept (Deputy-Scientist, 2014-2017)
Spatially Enhanced Glacier Altimetry (SEGA), Mission Concept (PI, 2014-2015)
Mission to Understand Ice Retreat (MUIR), Instrument Concept, Team Member (Team Member, 2014-2015)

EDITORIAL DUTIES

PLOS ONE - Member of Editor Board (2018 – present)
Remote Sensing – Special Issue - Remote Sensing of Glaciers at Global and Regional Scales (2018 – 2020)

REVIEWER FOR SCIENTIFIC JOURNALS

Reviewer for Nature, Science, Nature Climate Change, Nature Communications, Nature Geoscience, Nature Scientific Reports, Climate and Atmospheric Science – Nature, Geophysical Research Letters, Environmental Research Letters, Journal of Geophysical Research (Earth Surface and Atmospheres), Geology, Geochemistry Geophysics Geosystems (G-cube), Geology, Water Resources Research, The Cryosphere, PLOS ONE, Journal of Applied Meteorology and Climatology, IEEE Transactions on Geoscience and Remote Sensing, International Journal of Climatology, Journal of Glaciology, Polar Research, Water Science and Technology, Remote Sensing, and Arctic, Antarctic, and Alpine Research.

REVIEWER OF GRANTS APPLICATIONS

NASA Panelist (Earth and Space Science Fellowship Program; Modeling, Analysis and Prediction program, Cryosphere Program), and reviewer for the National Science Foundation (Arctic Natural Sciences Program; Antarctic Integrated System Science;

Geography and Spatial Sciences Program), Netherlands Space Office (NSO), Icelandic Centre for Research, Netherlands Organization for Scientific Research: Earth and Life sciences, French Polar Institute (IPEV, Arctic Program), and the Swiss National Science Foundation (Div. Mathematics, Physical and Engineering Sciences).

UNIVERSITY COMMITTEES

Web Committee Chair, Graduate School of Geography, Clark University, (2013/14)

Undergraduate Student Committee Member, Graduate School of Geography, Clark University, (2012/14)

WORKING GROUPS

NASA Surface Deformation and Change designated observable working group (cryo lead)

International Association of Cryosphere Science Working Group on Regional Assessments of Glacier Mass Change (RAGMAC, co-lead)

IACS Working group Randolph Glacier Inventory^[1] and^[2] infrastructure for glacier monitoring (2014-present)

NASA Cryospheric Sciences Program's SURface Mass Balance and snow on sea ice (SUMup) Working Group (2012-2016)

NASA Snow Working Group (2013-2015)

CONVENER OF AMERICAN GEOPHYSICAL UNION (AGU) FALL MEETING SCIENTIFIC SESSIONS

Observations and Models of Glacier Change (December 2020, 2021, 2022, 2023, 2024)

Remote Sensing of Glaciers (December 2014, 2015, 2016)

The Changing Cryosphere (December 2012)

Cryosphere-Atmosphere Energy Exchanges: Advances in Modeling and Observation. (December 2011)

MEDIA INTERVIEWS AND RESEARCH COVERAGE

TV interview with Al Jazeera English. Radio interviews with the Canadian Broadcasting Corporation (CBC) program "Quirks and Quarks", CBC national news, Germany's Deutschlandfunk radio, and CKLB (NT, Canada) program "Ends of the Earth". Print interviews with the New York Times, Washington Post, Wall Street Journal, British Broadcasting Corporation (BBC), Los Angeles Times, MSNBC, Physics Today, Space.com, Science News (USA), The Christian Science Monitor (USA), New Scientist, Postmedia News (Canada), American Geophysical Union, and LiveScience (USA). My research has been featured as NASA's Earth Observatory Image of the Day multiple times and by more than 100 media outlets across the globe including BBC News, New York Times, The Guardian, Reuters, Bloomberg, Nature News, Newsweek, Earth & Space Science News, MSNBC, USA Today, the Vancouver Sun, Discovery News, Huffington Post, and New Scientist.

CONFERENCE COORDINATOR

CliMA (Climate Modeling Alliance) Polar Climates Workshop, Caltech, Pasadena, Co-Organizer (2018)

International Coordination for Spaceborne Synthetic Aperture Radar Data Acquisition, Processing and Analysis for Earth Science and Applications, Co-Chair (2018)

Host, ICESat-2 Science Team Meeting, JPL, Pasadena, CA (2016 & 2018)

Organizer, Workshop on Arctic Glaciers, Kananaskis, Alberta (2009)

FIELD RESEARCH EXPERIENCE

11 weeks of research experience conducting scientific measurements in remote and extreme Arctic environments. Through these research expeditions I acquired invaluable collaboration, leadership, and logistical planning skills that I could not have learned elsewhere. I also gained technical expertise in erecting satellite transmitting weather stations, conducting dynamic and static GPS surveys, logging snow stratigraphies and ice cores, monitoring firn compaction rates, setting up time lapse camera networks, drilling shallow ice cores, and carrying out dye tracing experiments.

RESEARCH AND ACADEMIC ADVISING

- James Townend, PhD Committee, UNBC [2020-2023]
- Chad Greene, Advisor JPL/NASA (Postdoc, 2019-2022) [Research Scientist, NASA JPL, 2022-]
- Fernando Paolo, Advisor, JPL/NASA (Postdoc, 2017-2020) [Data Scientist, Global Fishing Watch]
- Amuary Dehecq, Advisor, JPL/NASA (Postdoc, 2016-2019) [Scientist, French National Centre for Scientific Research]
- Catherine Walker, Advisor, JPL/NASA (Postdoc, 2015-2018) [Assistant Scientist, Woods Hole Oceanographic Institution]
- Johan Nilsson, Advisor, JPL/NASA (Postdoc, 2015-2018) [Research Scientist, NASA JPL, 2018-2020], [Technologist, NASA JPL, 2020-]
- Arthur Elmes, Committee, Clark University (Ph.D., 2017) [Element 84]
- Lucas Earl, Chair, Clark University (BA/M.Sc., 2014/15) [The Institute for Health Metrics and Evaluation]
- Christopher Ferraro, Chair, Clark University (M.Sc., 2014) [Now at Dito]
- Emily Sturdivant, Honors Committee 2013, Clark University (B.A., 2013) [USGS]
- Aku Riihelä, External Examiner, Aalto University, Finland (Ph.D. 2013) [Finnish Meteorological Institute]

Visiting Students

- Natalia Andersen, DTU Space (Ph.D., 2018)
- Jelte van Oostveen, Norwegian Polar Institute (Ph.D., 2017)
- Joseph Cook, University of Sheffield (Postdoc, 2016)

PRESENTATIONS (INVITED)

Gardner, A.S. The key to understanding sea level rise lies deep below the surface, 2024. Network for Ocean Worlds (NOW) Quarterly Lecture Series. Virtual.

Gardner, A.S. RINGing in a new era of satellite observation, 2022. Keynote lecture. Antarctic RINGS first international workshop. Tromsø, Norway.

Gardner, A.S., Fahnestock, M., Greene, C., Johnston, A., Kennedy, J., Liukis, M., Lopez, L., Nilsson, J., Paolo, F., Scambos, T., and Lei, Y. The NASA MEaSUREs ITS_LIVE project: Accelerating glacier science through satellite data synthesis, 2002. American Geophysical Union Fall Meeting, New Orleans, Louisiana, USA. Invited Oral Presentation.

Gardner, A.S., and 18 others.: Surface Topography Observations Needed to Advance Cryosphere Science in the Coming Decades, 2022. American Geophysical Union Fall Meeting, New Orleans, Louisiana, USA. Invited Oral Presentation.

Gardner, A. S. Science on Ice: What Ice Says About Past, Present, and Future Climate, 2021. The von Kármán Lecture Series, Pasadena, California, USA. Invited Oral Presentation.

- Gardner, A. S.** Global glacier contributions to sea level rise: What's happened and where are we headed, 2021. Goddard Institute for Space Studies Sea Level seminar series. New York City, New York, USA. Invited Oral Presentation.
- Gardner, A. S.** In Hot Water: Glacier Change and Sea Level Rise, 2017. The von Kármán Lecture Series, Pasadena, California, USA. Invited Oral Presentation.
- Gardner, A. S.** G. Moholdt, T. Scambos, M. Fahnestock, A. Dehecq, 2016. A global dataset of glacier and ice sheet surface velocities derived from the Landsat archive. American Geophysical Union Fall Meeting, San Francisco, California, USA. Invited Oral Presentation.
- Gardner, A. S.**, 2016. Glaciers Contributions to Sea Level Rise. 3rd Sea-Level Rise Summit: Connected Futures from Alaska to Florida, Fort Lauderdale, Florida. **Invited Keynote Presentation.**
- Gardner, A. S.**, C. Boening, 2016. Glaciers and Sea Level Rise. Briefing for Congressman John Culberson, JPL-NASA, Pasadena, California, USA.
- Gardner, A. S.** J. G. Cogley, G. Moholdt, D. Wiese, B. Wouters, 2015. Glaciers Contributions to Sea Level Rise. American Geophysical Union Fall Meeting, San Francisco, California, USA. Invited Oral Presentation.
- Gardner, A. S.**, 2015. Out of equilibrium in a warming world. Caltech, Pasadena, CA, USA. Invited Oral Presentation.
- Gardner, A. S.**, 2015. Out of equilibrium in a warming world. York University, Toronto, ON, Canada. Invited Oral Presentation.
- Gardner, A. S.**, 2014. Glacier wastage and sea level rise. Ohio State, Columbus, OH, USA. Invited Oral Presentation.
- Gardner, A. S.**, 2014. Glaciers and sea level rise. University of Innsbruck. Innsbruck, Austria. Invited Oral Presentation.
- Gardner, A. S.**, G. Moholdt, J. G. Cogley, B. Wouters, J. Wahr, 2014. Improved estimates of the global glacier contribution to sea level rise, European Geophysical Union. Vienna, Austria. Invited Oral Presentation.
- Gardner, A. S.**, 2013. Out of Equilibrium in a Warming World: Glacier Wastage and Sea Level Rise, Bromery Lecture, Johns Hopkins University. Baltimore, MD, USA. Invited Oral Presentation.
- Gardner, A. S.**, 2013. Global glacier contributions to sea level rise, NASA Goddard Space Flight Center, Greenbelt, MD, USA. Invited Oral Presentation.
- Gardner, A. S.**, 2013. Out of equilibrium in a warming world: using ICESat, GRACE and in situ observations to quantify global glacier contributions to sea level rise, Science Visitor and Colloquium Program, NASA's Jet Propulsion Laboratory. Pasadena, CA, USA. Invited Oral Presentation.
- Gardner, A. S.**, 2013. Observing glacier change from space, New England - Saint Lawrence Valley Geographical Society, Clark University. Worcester, MA, USA. Invited Oral Presentation.
- Gardner, A. S.**, 2013. Global glacier contributions to sea level rise. Sherbrook University, Sherbrook, Quebec, Canada. Invited Oral Presentation.
- Gardner, A. S.**, 2013: Surface mass budget of Canadian Arctic Glaciers. SURface Mass Balance and snow on sea ice (SUMup) Working Group meeting, NASA Goddard Space Flight Center, Greenbelt, MD, USA. Invited Oral Presentation.

- Gardner, A. S.**, 2013. Out of Equilibrium in a Warming World: Glacier Wastage and Sea Level Rise, Marsh Lecture Series, Clark University. Worcester, MA, USA. Invited Oral Presentation.
- Gardner, A. S.**, G. Moholdt, J. G. Cogley, B. Wouters and J. Wahr, 2013: Global contribution of glacier wastage to sea level rise. Ice2sea North/South glacier workshop. Copenhagen, Denmark. Invited Oral Presentation.
- Gardner, A. S.**, 2013: Global contribution of glacier wastage to sea level rise. Ice2sea North/South glacier workshop. Copenhagen, Denmark. Invited Oral Presentation.
- Gardner, A. S.**, 2012: Surface mass budget of Canadian Arctic Glaciers. SURface Mass Balance and snow on sea ice (SUMup) Working Group meeting, NASA Goddard Space Flight Center in Greenbelt, MD, USA. Invited Oral Presentation.
- Gardner, A. S.**, 2012: Glaciers and Sea Level Rise, Department of Atmospheric & Environmental Sciences, University at Albany, SUNY, NY, USA. Invited Oral Presentation.
- Gardner, A. S.**, 2011: How much are glaciers contributing to Sea Level, Clark Graduate School of Geography, Clark University, Worcester, MA, USA. Invited Oral Presentation.
- Gardner, A. S.**, 2010: Melting of Glaciers and Ice Sheets: Towards Improved Estimates. Atmospheric, Oceanic, and Space Science Department Winter Seminar Series, University of Michigan, Ann Arbor, Michigan, USA. Invited Oral Presentation.

PRESENTATIONS

- Gardner, A.S.**, D. Wiese, J. Nilsson, F. Paolo. ICESat-2: Next generation estimates of glacier mass change, 2019. American Geophysical Union Fall Meeting, San Francisco, USA. Oral Presentation.
- Gardner, A.S.**, M.A. Fahnestock, P.S. Agram, T. Scambos, J. Nilsson, F.S. Paolo, C.C. Walker, F.J. Meyer, A. Dehecq. ITS_LIVE: A new NASA MEaSUREs initiative to track the movement of the world's ice, 2018. American Geophysical Union Fall Meeting, Washington, DC, USA. Oral Presentation.
- Gardner, A. S.**, 2015. Observing Glacier Changes in High Mountain Asia from Space. 3rd CAS-NASA Workshop on High Mountain Asia Glaciers Change and Associated Hazards. Sanya, China. Oral Presentation.
- Gardner, A. S.**, G. Moholdt, T. Scambos, M. Fahnestock, 2015. What can we learn about glaciers and ice sheets from 30 years of Landsat imagery? American Geophysical Union Fall Meeting, San Francisco, California, USA. Poster.
- Gardner, A. S.**, G. Moholdt, J. G. Cogley, B. Wouters and J. Wahr, 2013: Glacier Contributions to Sea Level Rise: 2003-2009, NASA Program for Arctic Regional Climate Assessment annual meeting, Greenbelt, MD, USA. Oral Presentation.
- Gardner, A. S.**, G. Moholdt, J. G. Cogley, A. A. Arendt, J. Wahr: Narrowing the gap: A consensus estimate of glacier mass wastage for 2003-09. 2012 American Geophysical Union Fall Meeting, San Francisco, California, USA. Poster Presentation.
- Gardner, A. S.**, G. Moholdt, B. Wouters, A. Arendt, 2011: Canadian Arctic Archipelago Glacier Contributions to Sea Level: 1950-2011. 2011 American Geophysical Union Fall Meeting, San Francisco, California, USA. Oral Presentation.
- Gardner, A. S.**, G. Moholdt, J. G. Cogley, B. Wouters and J. Wahr, 2013: Glacier Contributions to Sea Level Rise: 2003-2009, NASA Program for Arctic Regional Climate Assessment annual meeting, Greenbelt, MD, USA. Oral Presentation.

- Gardner, A. S.** and M. G. Flanner. The need for improving the simulation of glacier surface energy and mass budgets within CESM. 2011: Community Earth Systems Model Annual Workshop, Breckenridge, Colorado, USA. Oral Presentation.
- Gardner, A. S.**, G. J. Wolken, M. J. Sharp, G. Moholdt, B. Wouters, D. O. Burgess, J. G. Cogley: Estimating the mass change of Canadian High Arctic glaciers (1949-2010). 2010 American Geophysical Union Fall Meeting, San Francisco, California, USA. Oral Presentation.
- Gardner, A. S.** and M. Sharp, 2009: Parameterization of Shortwave Absorption and Reflection by Snow and Ice. 2009 American Geophysical Union Fall Meeting, San Francisco, California, USA. Oral Presentation.
- Gardner, A. S.**, 2009: Snow Albedo. ATLAS Symposium, Edmonton, AB, Canada. Oral Presentation.
- Gardner, A. S.**, 2009: Parameterization of Shortwave Absorption and Reflection in Snow and Ice. IASC Workshop on the dynamics and mass budget of Arctic glaciers, Kananaskis Country, AB, Canada. Oral Presentation.
- Gardner, A. S.**, and M. Sharp, 2008: The importance of including variable near-surface temperature lapse rates when employing the degree-day method to estimate glacier melt. Workshop on Mass Balance Measurements and Modelling, Skeikampen, Norway. Oral Presentation.
- Gardner, A. S.**, 2007: Meteorological and climatic influences on Canadian high Arctic glacier surface melt. CSA-CCI Northern Research Day, Edmonton, AB. Oral Presentation.
- Gardner, A. S.**, and M. Sharp, 2006: Influence of Variability in the Circumpolar Vortex on the Mass Balance of Canadian High Arctic Glaciers. Geological Association of Canada - First Open Scientific Meeting of the Polar Climate Stability Network, Montréal, QC. Oral Presentation. **(Honorable Mention from the Geological Association of Canada)**
- Gardner, A. S.**, and M. Sharp, 2006: Influence of the Arctic Circumpolar Vortex on the Mass Balance of Canadian high Arctic Glaciers. Eighth Symposium on Research in Geosciences, Edmonton, AB. Oral Presentation.
- Gardner, A. S.**, M. Sharp, 2006: Can Stratospheric Ozone Loss Influence Arctic Glacier Surface Mass Balance? CSA-CCI Northern Research Day, Edmonton, AB. Oral Presentation.
- Gardner, A. S.**, M. Sharp, 2006: Synoptic-Scale Climatic Variability and Glacier Mass Balance of the Queen Elizabeth Islands. Canadian Geophysical Union Hydrology Section Fourth Annual Student Meeting, Edmonton, AB. Oral Presentation.
- Gardner, A. S.**, and M. Sharp, 2005: Influence of Atmospheric Circulation Changes on Canadian High Arctic Glaciers. Second ArcticNet Annual Scientific Meeting, Banff, AB. Poster Presentation.
- Gardner, A. S.**, and M. Sharp, 2005: Climatic Influences on the Mass Balance of Canadian high Arctic Glaciers. Seventh Symposium on Research in Geosciences, Edmonton, AB. Oral Presentation.