CURRICULUM VITA

W. Tad Pfeffer
Professor, Department of Civil, Environmental, and Architectural Engineering *and*
Fellow, Institute of Arctic and Alpine Research, University of Colorado at Boulder, USA

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Education:

1987	Ph.D. (Geophysics)	University of Washington
1981	M.A. (Geology)	University of Maine
1976	B.A. (Geology)	University of Vermont

Employment:

Professor, Department of Civil, Environmental, and Architectural Engineering, University of Colorado (since 1999)

Fellow of the Institute of Arctic and Alpine Research (INSTAAR), University of Colorado (since 1988)

Consulting:

President, **W.T. Pfeffer Geophysical Consultants LLC**, Nederland Colorado, USA. *contact*: wtpfeffer@gmail.com /+(01)720-530-5455 /skype: wtpfeffer

Research Interests:

Natural Hazards; global assessment of hydrology and water resources, sea level rise, and glacier and ice sheet mass balance; glacier dynamics; field and experimental methods in ice dynamics, snow physics and hydrology; heat and mass transfer in snow, ice, and porous media; mechanics and thermodynamics of continuous media; ice/ocean and ice/atmosphere interactions; fluid mechanics; numerical methods in analysis of mechanics of continuous media and heat transfer. Documentary photography and photogrammetry (aerial and terrestrial), architectural photography and architectural history.

Consulting Services:

W.T.Pfeffer Geophysical Consultants, LLC, was formed in 2012 to provide contract advice, reviewing, and specific task assignments for Government and private entities concerning sea level assessment and projections, glacier mechanics and dynamics analyses, and glacier/environmental interaction, including field investigations, modeling, and evaluation and review of glaciological and sea level rise models and analytic/projection methods. Clients

include the Prince William Sound Citizen's Advisory Council, Anchorage, AK, RTI International, and Department of Energy.

Service:

Visiting positions:

Jefferson Science Fellow, US Dept. of State/USAID, Washington DC (2015-16)

National/International Professional Activities:

Committee member and contributor: Arctic Synthesis Workshop (Washington DC, 17-20 April, 2017)

Founding Editor, Oxford University Press *Oxford Research Review/Natural Hazard Science*, 2013-present

Committee Member, National Academy of Sciences, National Committee for the International Union of Geodesy and Geophysics, 2012 – present.

Lead Author, IPCC AR5 WGI, Chapter 13 (Sea Level Change); 2010 – 2013.

Panel Member, National Academy of Sciences/National Research Council Committee on Sea Level Rise in California, Oregon, and Washington (2010-2011)

Sigma Xi Distinguished Lecturer (2011-2012)

Member, Climate Science Rapid Response Team (2010 – Present). See http://www.climaterapidresponse.org/

Lead Author, Arctic Monitoring and Assessment Program (AMAP) Snow Water Ice and Permafrost Assessment, Module 3C, Chapter 5 (2008-2010)

Contributor and reviewer, UNEP Climate Change Science Compendium, 2009 - Present.

National Science Foundation, Office of Polar Programs, Antarctic Division, Review Panel Member, 2010

National Science Foundation, Office of Polar Programs Arctic Section Committee of Visitors, November 2006.

Cryosphere Section Executive Committee, American Geophysical Union (2004 - present)

American Geophysical Union Fall Meeting Planning Committee, 2012, 2013

Session Convener, American Geophysical Union Fall Meeting, 2001, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2011, 2012, 2013

Invited Speaker, Polar Research Board (National Academies), November 2006; Arctic Climate Impact Assessment, 2005, 2012

Associate Editor, Journal of Geophysical Research, Earth Surface Processes (2003-2006)
Associate Editor, Journal of Geophysical Research, Solid Earth (1998-2003)
Publications Committee, International Glaciological Society.
Scientific Coordinator, National Ice Core Laboratory. 1991-1993.

Proposal and manuscript reviews (approximately 30/yr total).

Various Invited Scientific Lectures: 15-20 per year, 2008 – Present.
Other Public Lectures: 10-15 per year, 2008 - Present.

Administrative Experience:
INSTAAR Associate Director, 1997 - 2005

- Duties included serving as Acting Director for extended periods (up to 4 months), hiring decisions, personnel management, annual evaluations, and budgeting during a doubling of the Institute's size.
- AD oversaw space allocations and logistics during expansion into a new building on CU-Boulder campus (1999-2000).
- Worked with Director and CU Foundation on developing funding for new hostel at CU INSTAAR's Mountain Research Station; this work culminated in completion of the Moores-Collins Family Lodge at the MRS (2004).

University Professional Activities:
Faculty Council Grievance Committee (formerly Privilege and Tenure Committee) (2019-2022)
Budget and Finance Committee, Boulder Faculty Assembly (2018)
Academic Affairs Committee, Boulder Faculty Assembly (2007-2012)
Secretary, Boulder Faculty Assembly (2006 – 2007)
Search Committee member, CU Graduate School Dean/Vice Chancellor for Research (2007)
CEAE Committee Work:
Facilities Committee (2000-2006)
CEAE Curriculum Committee (2011)
INSTAAR Executive Committee, 1996 - 2005.
INSTAAR Geophysics Group Leader, 1997 - 1999.
INSTAAR Committee work:
Computer Committee (past Chair)
Space Committee (Chair)
Biennial Report Committee
Outreach Committee
Self-Study Committee
INSTAAR Representative, Program Plan, Grandview Site Environmental Building
Boulder Faculty Assembly, CEAE Representative (2004 - 2007)
Speaker, UCB Faculty Research Opportunities Seminar, 'Basic Principles of Writing Proposals', 2001, 2004.
ARC Building Tenant's Committee (Chair, 2000-2004)
INSTAAR/ITS Y2K liaison, 1998-1999.
Contributor to *Report on Stresses on the Conduct and Support of Research and Education*, prepared for National Science Board by the Office of the Associate Vice Chancellor for Research, University of Colorado, 1996.
Convener/Principal Investigator, Annual Arctic Workshop (2004 – 2012)

Awards

Jefferson Science Fellowship. National Academy of Sciences, in residence at US Dept. of State/USAID, Washington DC, 2015-2016.

Nye Lecture, American Geophysical Union, December 2011.

University of Colorado Council on Research and Creative Work, Sabbatical year support for 2007-2008.

Graham Foundation for Advanced Studies in the Fine Arts, Chicago, Illinois. Grant support for research and photography for *The Hand of the Small Town Builder*, 2003

American Geophysical Union Editor's Citation for Excellence in Refereeing (JGR Solid Earth), 1999

Science Activities:

Data as of February 2023

Career Total Citations	Total Citations last 5 years	Top-Cited Paper* (# of citations)	h-index Career (ISI/Google)	h-index Last 5 Years
2885	5522	3017	34/39	23

*Church et al, Sea Level Change, *PM Cambridge University Press* (2013).

In Review:

Błaszczyk, M, M. Moskalik, M. Grabiec, J. Jania, W. Walczowski, T. Wawrzyniak, A. Strzelewicz, E. Malnes, T. Rune Lauknes, W.T. Pfeffer, Seasonal Response of Tidewater Glacier Termini Positions in Hornsund (Svalbard) to Climate and Environmental Forcing, 1992-2020 (in review) **JGR Earth Surface**

Peer-reviewed publications:

(Co-authors: †Supervised student; *Supervised post-doc; **Mentored visiting scientist, post-grad or post-doc, ***Advised student)

1. MacFerrin M, Machguth H, As DV, et al. Rapid expansion of Greenland's low-permeability ice slabs. Nature. 2019 Sep;573(7774):403-407. DOI: 10.1038/s41586-019-1550-3. PMID: 31534244.

2. van de Wal, R. S. W., Nicholls, R. J., Behar, D., McInnes, K., Stammer, D., Lowe, J. A., et al. (2022). A high-end estimate of sea level rise for practitioners. Earth's Future, 10, e2022EF002751. https://doi.org/10.1029/2022EF002751

3. Machguth, H., Box, J. E., Fausto, R. S., & Pfeffer, W. T. (2018). Melt Water Retention Processes in Snow and Firn on Ice Sheets and Glaciers: Observations and Modelling. **Frontiers in Earth Science**, 6, 105.

4. Bahr†, D. B., W. T. Pfeffer (2016), Crossover Scaling Phenomena for Glaciers and Ice Caps, **Journal of Glaciology,** 62(232), pp. 299-309. doi:10.11017/jog2-16.6

5. Bahr†, D. B., W. T. Pfeffer, and G. Kaser (2015), A Review of Volume-Area Scaling of Glaciers, **Reviews of Geophysics**, 52, doi:10.1002/2014RG000470.

6. Bahr†, D.B., W.T. Pfeffer, and G. Kaser. (2014) Glacier volume estimation as an ill-posed inversion. **Journal of Glaciology**, 60(223), doi: 10.3189/2014JoG14J062

7. Arcone, S., Campbell, S., & Pfeffer, W.T. (2014). GPR profiles of glacial till and its transition to bedrock: interpretation of water content, depth and signal loss from diffractions. **Journal of Environmental and Engineering Geophysics**, 19(4), 207-228.

8. Pfeffer, W.T., A.A. Arendt; A. Bliss; T. Bolch; J.G. Cogley; A.S. Gardner; J-O Hagen; R. Hock; G. Kaser; C. Kleinholz; E.S.Miles; G. Moholdt; N.Mölg; F.Paul; V. Radić; P. Rastner; B.H. Raup†; J. Rich; M.J. Sharp; and the Randolph Consortium. (2014) The Randolph Glacier Inventory: A globally complete inventory of glaciers. **Journal of Glaciology**.

9. Gregory, J.M., J.A. Church, P.U. Clark, A.J. Payne, M.A. Merrifield, R.S. Nerem, P.D. Nunn, W.T. Pfeffer, D. Stammer, (2014). Comment on "Expert assessment of sea-level rise by AD 2100 and AD 2300", by Horton et al. (2014), **Quat. Sci. Rev**., 97 pp. 193-194, 10.1016/j.quascirev.2014.05.24

10. Straneo, F., P. Heimbach, O. Sergienko, G. Hamilton, G. Catania, S. Griffies, R. Hallberg, A. Jenkins, I. Joughin, R. Motyka, W.T. Pfeffer, S.F. Price, E. Rignot, T. Scambos, M. Truffer, A. Vieli, (2013). **Bull. Amer. Met. Soc**. 94(8), pp. 1131-1144, DOI 10.1175/BAMS-D-12-00100.1

11. Church, J.A., P.U. Clark, 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, (2013). Sea Level Rise by 2100. **Science**, 342(6165), p. 1445-1445.

12. Welty†, E. Z., Bartholomaus, T. C., O'Neel†, S., & Pfeffer, W. T. (2013). Instruments and Methods Cameras as clocks. *Journal of Glaciology*, *59*(214), 275.

13. Gardner, A. S., G. Moholdt, J. G. Cogley, B. Wouters, A. A. Arendt, J. Wahr, E. Berthier, R. Hock, W. T. Pfeffer, G. Kaser, S. R. M. Ligtenberg, T. Bolch, M. J. Sharp, J. O. Hagen, M. R. van den Broeke & F. Paul, A Reconciled Estimate of Glacier Contributions to Sea Level Rise: 2003 to 2009. **Science**, 340, 852-857, 2013

14. Jacob, T; J. Wahr; W.T. Pfeffer, and S. Swenson, Recent contributions of glaciers and ice caps to sea level rise, **Nature**, doi:10.1038/nature10847, 2012

15. Harper, J.T.*, N.F. Humphrey, J. Brown, J, and X. Fettweis, Greenland ice-sheet contribution to sea-level rise buffered by meltwater storage in firn, **Nature Geosciences**, doi:10.1038/nature11566, 2012

16. Humphrey, N. F., J. T. Harper*, and W. T. Pfeffer, Thermal Tracking of Meltwater Retention In Greenland's Accumulation Area, **Journal of Geophysical Research***,* 117, F1, doi:10.1029/2011JF002083, 2012

17. Brown, J., Bradford, J., Harper*, J., W. Tad Pfeffer, Humphrey, N., Mosley-Thompson, E., Georadar-derived estimates of firn density in the percolation zone, western Greenland ice sheet. **Journal of Geophysical Research - Earth Surface**, 117: F01011. doi:10.1029/2011JF002089, 2012

18. McNabb, R.W.; R. Hock; S. O'Neel†; L.A. Rasmussen; Y. Ahn; M. Braun; H. Conway; S. Herreid; I. Joughin; W.T. Pfeffer, B. Smith; and M. Truffer, Using Surface Velocities to Calculate Ice Thickness and Bed Topography: A Case Study at Columbia Glacier, Alaska," **Journal of Glaciology***,* Vol 58 No 212, doi: 10.3189/2012JoG11j249

19. Colgan et al, Monte Carlo ice flow modeling projects a new stable configuration for Columbia Glacier, Alaska, by c. 2020, **The Cryosphere Discussions**, 6, 1395-1409, doi: 10.5194/tc-6-1395-2012

20. National Research Council, Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future, **The National Academies Press**, Washington, D.C., 2012

21. Pfeffer, W.T., Adaptation to a Non-steady Coastal Environment: Designing Infrastructure in a Non-Steady World, **The International Journal of the Constructed Environment**, V 2, No. 3, pp. 81-92, 2012

22. Winkler, M, W.T. Pfeffer, and K. Hanke, Kilimanjaro Ice Cliff Monitoring with Close Range Photogrammetry. ***International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences****,* Volume XXXIX-B5, 2012

23. Arcone, S. A., and Pfeffer, W. T., 2012, GPR profiles of partially to completely unstratified geologic formations: **Proc. 14th Inter. Conf. on Ground Penetrating Radar**, IEEE Conf. Pub. DOI: 10.1109/IGPR.2012.6254823, 7–12.

24. Pfeffer, W.T., Land Ice and Sea Level Rise: A Thirty-Year Perspective, **Oceanography** 24(2): 94–111, http://dx.doi.org/10.5670/oceanog.2011.30, 2011

25. Sharp, M., M. Ananicheva, A. Arendt, J-O Hagen, R. Hock, E. Josberger, R. Dan Moore, W. Tad Pfeffer, and G.J. Wolken, Mountain Glaciers and Ice Caps: **Snow, Water, Ice and Permafrost in the Arctic (SWIPA), Arctic Monitoring and Assessment Program (AMAP)**. Oslo. 149 ms. 2011

26. Winkler, M, G. Kaser; N. J. Culler; T. Mölg; D.R. Hardy; W.T. Pfeffer, Land-based ice cliffs: Focus on Kilimanjaro. **Erkunde**, 64(2), pp. 179-193, 2010.

27. Walter†, F.; S. O'Neel†, D. McNamara, W.T. Pfeffer; J. Bassis, H.A. Fricker, Iceberg Calving During Transition from Grounded to Floating Ice, Columbia Glacier, Alaska, **Geophysical Research Letters**, Vol. 37, L15501, doi:10.1029/2010GL043201, 2010

28. Haugen†, B.D.; T.A. Scambos; W.T. Pfeffer; and R.S. Anderson. Twentieth-Century Changes in the Thickness and Extent of Arapaho Glacier, Front Range, Colorado. **Arctic, Antarctic, and Alpine Research**, 2(2), p. 198-209, 2010

29. Pfeffer, W.T., People and Place in the Far North: The Vision of Life, Community, and Change in the Circumpolar Arctic, and its Public Perception. in *Images of the North: Histories-Identities-Ideas,* (S. Jakobsen, Ed), **Studia Imagologica** No. 14, Amsterdam, 2009

30. Owen LA, Thackray GD, Anderson RS, Briner J, Kaufman D, Roe G, Pfeffer W, Yi C. 2008a. Integrated mountain glacier research: current status, priorities and future prospects. **Geomorphology**, V. 103, Issue 2, 15 January 2009, pg. 158-171

31. Fudge, T. J., J. T. Harper, N. F. Humphrey, and W. T. Pfeffer (2009), Rapid Glacier Sliding, Reverse Ice Motion, and Subglacial Water Pressure During an Autumn Rainstorm**, Annals of Glaciology**, 50(51), 1-9.

32. Pfeffer, W.T., J.T. Harper*, and S. O'Neel I†, Kinematic constraints on glacier contributions to 21st-Century sea-level rise. **Science** 321, 1340 (2008); DOI: 10.1126/science. 1159099. (2008)

33. O'Neel† S. and W.T. Pfeffer, Source mechanics for monochromatic icequakes produced during iceberg calving at Columbia Glacier, AK, **Geophysical Research Letters**, VOL. 34, L22502, doi:10.1029/2007GL031370. (2007)

34. Pfeffer, W.T., A Simple Mechanism for Irreversible Tidewater Glacier Retreat, ***J.*** **Journal of Geophysical Research Earth Surface**, Vol. 112, No. F3, F03S2 10.1029/2006JF000590, 2007

35. O'Neel† S., Marshall†, H., McNamara, D., and Pfeffer, W.T., Detection and analysis of icequakes at Columbia glacier, AK , **Journal of Geophysical Research Earth Surface**, Vol. 112, No. F2, F03S23 10.1029/2006JF000531, 2007

36. Harper*, J.T., N.F. Humphrey, W.T. Pfeffer, and B. Lazar†, Two Modes of Accelerated Glacier Sliding related to Water, **Geophysical Research Letters** Vol. 34, L12503, doi:1029/2007GL030233, 2007

37. Meier, M.F., M. B. Dyurgerov, U. K. Rick†, S. O'Neel†, W. T. Pfeffer, R. S. Anderson, S. P. Anderson, and A. F. Glazovsky, Glaciers Dominate Eustatic Sea-Level Rise in the 21st Century, **Science** 24 August 2007: 1064-1067.

38. Fudge***, T.J., J. T. Harper*, N. F. Humphrey, and W. T. Pfeffer, Diurnal Water Pressure Fluctuations: Timing and Pattern of Termination Below Bench Glacier, Alaska. **Annals of Glaciology**, 40, pp. 102-106, 2005

39. Harper*, J.T., N. F. Humphrey, W. T. Pfeffer, T.J. Fudge***, S. O'Neel†, Evolution of Subglacial Water Pressure along a Glacier's Length. **Annals of Glaciology***,* 40, pp. 31-36, 2005.

40. Meier, M.F., D.B. Bahr, M.B. Dyurgerov, and W.T. Pfeffer, Comment on "The potential for sea level rise: New estimates from Glacier and ice cap area and volume distribution"

by S.C. Raper and R.J. Braithwaite. **Geophysical Research Letters,** V. 23, L17501, doi:10.1029/2005GL023319, 2005.

41. O'Neel†, S., W.T. Pfeffer, R.M. Krimmel, and M.F. Meier, Force Balance Analysis at Columbia Glacier, Alaska, During its Rapid Retreat. **Journal of Geophysical Research Earth Surface**, V. 110, F03012, doi: 10.1029/2005JF000292, 2005

42. Pfeffer, W.T., and Mrugala†, R., Temperature gradient and initial snow density as controlling factors in the formation of hard depth hoar. **Journal of Glaciology**, Vol. 48, No. 163, p. 485–494, 2002.

43. Marshall†, H.P., J.T. Harper*, W.T. Pfeffer, and N.F. Humphrey, Depth-Varying Constitutive Properties Observed in an Isothermal Glacier. **Geophysical Research Letters**, 29(3), 61-1:61-4, 2002

44. Harper*, J.T., N. F. Humphrey, W.T. Pfeffer, S. V. Huzurbazar, D.B. Bahr***, and B.C. Welch†, 2001, Spatial variability in the flow of a valley glacier: deformation of a large array of boreholes: **Journal of Geophysical Research Solid Earth**, v. 106, n. B5, p. 8547-8562.

45. Pfeffer, W.T., Ice dynamics modeling of the Hudson Strait region at late glacial time; *in* **Marine Geology of Hudson Strait and Ungava Bay, Eastern Arctic Canada: Late Quaternary Sediments, Depositional Environments, and late Glacial-Deglacial History Derived from Marine and Terrestrial Studies**, (ed.) B. MacLean. Geological Survey of Canada, Bulletin 566. 2001.

46. MacLean, B., Andrews, J.T., Gray, J. T., Hall, F.R., Hardy, I., Jennings, A.E., Manly, W.F., Pfeffer, W.T., and Vilks, G., 2001. **Hudson Strait Quaternary sediments and late glacial and deglaciation history: a discussion and summary in Marine Geology of Hudson Strait and Ungava Bay, Eastern Arctic Canada: Late Quaternary Sediments, Depositional Environments, and late Glacial-Deglacial History Derived from Marine and Terrestrial Studies**, (ed.) B. MacLean. Geological Survey of Canada, Bulletin 566. 2001

47. Pfeffer, W.T., J.Cohn†, M.F. Meier, and R.M. Krimmel, Alaskan glacier beats a rapid retreat. **EOS** V. 81 No. 48, 28 November, 2000

48. Pfeffer, W.T., N.F. Humphrey, B. Amadei, J. Harper*, J. Wegmann†, In-situ stress tensor measured in an Alaska Glacier, **Annals of Glaciology**, Vol.31, pp. 229-235. 2000.

49. Williams, M,W., M.R. Rikkers***, and W.T. Pfeffer, Ice columns and frozen rills in a warm snowpack, Green Lakes Valley, Colorado, USA, **Nordic Hydrology** 31(3), p. 169-186, 2000.

50. Kaplan***, M., W.T. Pfeffer, C. Sassolas**, and G.H. Miller, Numerical modeling of the Laurentide Ice Sheet in the Baffin Island region: The role of a Cumberland Sound ice stream*,* **Canadian Journal of Earth Sciences (36)** 1315-1326, 1999.

51. Konrad***, S.K., N.F. Humphrey, E.J. Steig, D.H. Clark, N. Potter Jr., and W.T. Pfeffer, Rock glacier dynamics and paleoclimatic implications, **Geology** *27(12)*, 1131-1134, 1999.

52. Harper*, J.T., N.F. Humphrey, and W.T. Pfeffer, Three-dimensional deformation measured in an Alaskan glacier, **Science** *(281),* 1340-1342, 1998.

53. Harper*, J.T., N.F. Humphrey, and W.T. Pfeffer, Crevasse patterns and the strain rate tensor: A high-resolution comparison, **Journal of Glaciology** *(146),* 68-76, 1998.

54. Welch†, B.C., W.T. Pfeffer, J.T. Harper*, N.F. Humphrey, Mapping subglacial surfaces below temperate valley glaciers using 3-dimensional radio-echo sounding techniques, **Journal of Glaciology***, (146)*, 164-170, 1998.

55. Pfeffer, W.T., and N.F. Humphrey, Formation of ice layers by infiltration and refreezing of meltwater, **Annals of Glaciology** *(26),* 83-91, 1998

56. Bahr***, D.B., W.T. Pfeffer, C. Sassolas**, and M.F. Meier, Response time of glaciers as a function of size and mass balance: I. Theory, **Journal of Geophysical Research** 103(B5), 9777-9782, 1998.

57. Pfeffer, W.T., D.B. Bahr***, C. Sassolas**, and M.F. Meier, Response time of Glaciers as a function of size and mass balance: II: Numerical experiments, **Journal of Geophysical Research**, 103(B5)*,* 9783-9789, 1998.

58. Pfeffer, W.T., M. Dyurgerov, M. Kaplan***, J. Dwyer**, C. Sassolas**, A. Jennings, B. Raup†, and W. Manley, Numerical Modeling of late Glacial Laurentide advance of ice across Hudson Strait: Insights into terrestrial and marine geology, mass balance, and calving flux. **Paleoceanography***, 12(1)*, 97-110, 1997.

59. Dwyer**, J. F., B. Amadei, C.T. Lin,. and W.T. Pfeffer, Edge function analysis of glacier mechanics problems, **Int. J. Solids Structures***, 34(8)*, 991-1005, 1997.

60. Pan**, E., C. Sassolas**, B. Amadei, and W.T. Pfeffer, A 3-D boundary element formulation of viscoelastic media with gravity, **Computational Mechanics***, 19(4)*, 308-316, 1997.

61. Pfeffer, W.T. and N.F. Humphrey, Determination of timing and location of water movement and ice layer formation by temperature measurements in subfreezing snow. **Journal of Glaciology,** *42(141)*, 292-304. 1996

62. Sassolas**, C., W.T. Pfeffer, and B. Amadei, Stress interaction between multiple crevasses in glacier ice. **Cold Regions Science and Technology** (24), 107-116. 1996

63. Bahr***, D. B., W. T. Pfeffer, and M. F. Meier. Theoretical limits to englacial stress calculations, **Journal of Glaciology***, 40(136),* 509-518. 1995.

64. Braithwaite, R.J., M. Laternser, and W. T. Pfeffer. Variations of Near-Surface Firn Density in the Lower Accumulation Area of the Greenland Ice Sheet, Pakitsoq, West Greenland. **Journal of Glaciology***, 40(136)*, 477-485. 1995

65. Pfeffer, W. T., Stress-Induced Foliation in the Terminus of Variegated Glacier, Alaska, Formed During the 1982/83 Surge. **Journal of Glaciology***, 38(129)*, 213-222. 1992.

66. Pfeffer, W. T., M. F. Meier, and T.H. Illangasekare, Retention of Greenland Runoff by Refreezing: Implications for Projected Future Sea-level Change, **Journal of Geophysical Research** *96(C12)*, 22,117-22,124, 1991

67. Pfeffer, W.T., T.H. Illangasekare, and M.F. Meier, Analysis and Modeling of Meltwater Refreezing in Dry Snow. **Journal of Glaciology***,* 36(123), 238-246 1990.

68. Illangasekare, T.H., Walter, R.J., M.F. Meier, and Pfeffer, W.T., Modeling of Meltwater Infiltration in Subfreezing Snow. **Water Resources Research** *26(5)*, 1001-1012, May, 1990.

69. Pfeffer, W.T., and C.S. Bretherton, The Effect of Crevasses on the Solar Heating of a Glacier Surface. **The Physical Basis of Ice Sheet Modeling.** (Proceedings of the IUGG Vancouver Symposium), IAHS publication no. 170 , 191-206, 1987

70. Raymond, C.F., T. Johannesson, T. Pfeffer, M. Sharp, Propagation of a Surge Front into Stagnant Ice. **Journal of Geophysical Research***, 92(B9)*, 9037-9049. 1987

71. Kamb, W.B., C.F. Raymond, W.D. Harrison, Herman Engelhardt, K.A. Echelmeyer, N. Humphrey, M.M. Brugman, T. Pfeffer, Glacier Surge Mechanism: 1982-83 Surge of Variegated Glacier, Alaska. **Science**, *227(4686),* 469-474, 1985.

Books:

Pfeffer, W.T., **Columbia Glacier at Mid-Retreat: the Opening of a New Landscape**. Book, Published by American Geophysical Union, Washington DC, December 2007.

Pfeffer, W.T. **The Hand of the Small-Town Builder**. David R. Godine, Boston, 2014.

Other Publications:

Pfeffer, W.T., Glaciology Needs To Come Out Of The Ivory Tower, ***EARTH*** **Magazine**, November 2012

Non-refereed conference proceedings:

J.T. Harper, N.F. Humphrey, W.T. Pfeffer, B.C. Welch, Short wavelength variations in the horizontal velocity field of a glacier. Glaciers, Ice Sheets, and Volcanoes: A tribute to Mark F. Meier. *US Army Cold Regions Research and Engineering Special Report 96-27*, 41-48 (S.C. Colbeck, ed). 1996

B.C. Welch, W. T. Pfeffer, J.T. Harper, N.F. Humphrey, A maximum resolution glacier-bed surface obtained by radio-echo sounding. Glaciers, Ice Sheets, and Volcanoes: A tribute to Mark F. Meier. *US Army Cold Regions Research and Engineering Special Report 96-27*, 105-110 (S.C. Colbeck, ed). 1996

Funded Proposals:

Soil Structure Interaction in Geothermal Foundations NSF CMMI Geotechnical Engineering 5/15/2009 – 5/15/2013 $498,642

Collaborative Research: Greenland Ice Sheet Basal Hydrology and Sliding Dynamics – The Proof of the Drill (collaborative with U. Montana and U. Wyoming). NSF OPP Arctic Natural Sciences 10/1/2009 – 9/30/2012 $100,000

IPY: Collaborative Research: Dynamic controls on tidewater glacier retreat, NSF/OPP/IPY W.T. Pfeffer, P.I., 21/4/08 – 20/4/11, $615,449

Outreach and Educational Support for Continued Research at Columbia Glacier, Alaska. NSF/HER/DRL (Communicating Research to Public Audiences), W.T. Pfeffer, P.I., 8/1/2008 – 7/31/2009. $75,000

Support for participation of graduate students in the annual Arctic Workshop. NSF OPP (Arctic Natural Sciences), W.T. Pfeffer, P.I., 6/01/2007- 5/31/2010, $163,735

Collaborative Research: A Field Validated Model for Meltwater Infiltration and Runoff from the Greenland Ice Sheet. NSF OPP (Arctic Natural Sciences), W.T. Pfeffer, P.I., 9/1/2006 – 8/31/2009 $157,584

Support for participation of graduate students in the annual Arctic Workshop. NSF OPP (Arctic Natural Sciences), W.T. Pfeffer, P.I., 1/1/05 - 12/31/07, $95,597

SGER: Photogrammetric/Media Camera Support for Alaska Glacier Observations. NSF EAR/Geomorphology, W.T. Pfeffer, P.I. 06/01/07 – 06/01/08. $74,954.

Seismological investigation of Columbia Glacier calving mechanics. NSF OPP (Arctic Natural Sciences), W.T. Pfeffer, P.I., 3/1/04-2/28/07, $381,856

Continued Photogrammetric Observations of the Terminus of Columbia Glacier NSF SGER (Arctic Natural Sciences), W.T. Pfeffer, P.I. 7/01/02 - 6/30/03, $44,147

Collaborative Research: Linking subglacial hydrology and sliding dynamics through variations along the glacial length. NSF OPP (Arctic Natural Sciences), W.T. Pfeffer, P.I. 1/1/2002 - 12/31/2004, $156,916.

Photogrammetric observations of the terminus of Columbia Glacier, NSF SGER (Arctic Natural Sciences), W.T. Pfeffer, P.I. 6/1/01 -5/31/02, $43,218

Supplement to Observations and modeling of flow and fracture processes leading to iceberg calving. NSF OPP (Arctic Natural Sciences). W. T. Pfeffer, M. F. Meier, and B. Amadei, P.I.s, 6/1/00 - 5/31/01, $36,000.

Environmental computational and imaging facility, Department of Defense DURIP-ONR, J.P. Syvitski, W.T. Pfeffer, P.I.s, 3/31/2000 – 3/30/2001, $591,853.

REU Supplement to: Direct measurement of the in-situ stress tensor at depth in glacier ice. NSF OPP Arctic Natural Sciences. W.T. Pfeffer, P.I., 9/1/98 - 5/31/99. $2000.

Ice core analysis and physical glaciology of the Galena Creek Rock Glacier, Wyoming. NSF Earth Sciences. E. Steig, W. T. Pfeffer, P.I.s., 3/1/97-2/28/00. $349,797.

Observations and modeling of flow and fracture processes leading to iceberg calving. NSF OPP Arctic Natural Sciences. W. T. Pfeffer, M. F. Meier, and B. Amadei, P.I.s, 3/1/97-2/28/00. $476,707.

Meltwater flow through snow from plot to basin scales. NSF Earth Sciences Hydrology. M. Williams, W. T. Pfeffer, P.I.s, 6/1/96-5/31/99. $120,000.

Meltwater flow through snow from plot to basin scales. Army Research Office. M. Williams, W. T. Pfeffer, P.I.s 6/1/96-5/31/99. $100,000.

Direct measurement of the in-situ stress tensor in glacier ice: a collaborative study. NSF OPP Arctic Natural Sciences. W.T. Pfeffer, B. Amadei, P.I.s, 6/1/96-5/31/99. $444,864.

Late Quaternary Dynamics of the Labrador/Foxe Sectors of the Laurentide Ice Sheet, Eastern Canadian Arctic. NSF Earth System History Program - EAR. G.H. Miller, W.T. Pfeffer, P.I.s. 9/1/95-11/30/98, $279,749.

Glacier Calving, Dynamics, and Sea-Level Rise. DOE Carbon Dioxide Research Division. M.F. Meier, W. T. Pfeffer, and B. Amadei, P.I.s 9/1/93 - 8/31/96 $634,181

Improvement and Validation of Glacier Dynamics: A Collaborative Study. NSF DPP Glaciology. W.T. Pfeffer, M.F. Meier, P.I.s. 6/1/92 - 9/30/95 $350,000

National Ice Core Curatorial Facility. National Science Foundation. NSF DPP. M.F. Meier and W.T. Pfeffer, P.I.s (jointly with U.S. Geological Survey.) 01/01/91 - 01/01/96 $1,486,429

Field, Laboratory, and Modeling Studies of Water Infiltration and Runoff in Subfreezing Snow on Regional Scales to Estimate Future Greenhouse-Induced Changes in Sea Level. DOE Carbon Dioxide Research Division. M.F. Meier, T.H. Illangasekare, W.T. Pfeffer, P.I.s 9/15/90 - 9/14/93 $552,125

Late Quaternary Dynamics of the Labrador/Foxe Sectors of the Laurentide Ice Sheet and Ice-Sheet/Ocean Interaction in the North Atlantic. NSF Surficial Processes Program, Division of Earth Sciences. G.H. Miller, J.T. Andrews, D.S. Kaufman, W.T. Pfeffer, P.I.s. 5/1/90 - 4/30/93 $306,006

Art Activities:

Exhibitions:

The House, The Road, and The Valley: Occupation and Change in the Landscape of the American West. National Center for Atmospheric Research, April, 2005; Boulder Public Library, September – November, 2005; Auraria Library, Denver, December 2005 – January 2006.

The Texture of History: Abandonment and Rediscovery in the American West (with photographer R. S. Anderson), March-April, 2004, University of Colorado Andrew J. Macky Gallery.

Boulder Open Studios Tour, October 2003, 2004

Arctic and Alpine: Visions of a Landscape (with painter M.F. Meier), April-May, 2002, University of Colorado Andrew J. Macky Gallery.

Art/Architecture Publications:

W. T. Pfeffer, People and Place in the Far North: A Plan to Present the Vision of Life, Community, and Change in the Circumpolar Arctic. 2010. Reykjavik Academy, Iceland.

Columbia Glacier at Mid-Retreat: The Opening of a New Landscape. Publisher: American Geophysical Union, Washington DC. 2007.

The Hand of the Small Town Builder: Small Summer Cottages of Northern New England. Publisher: David R. Godine, Boston, MA. *In press*. Planned release data March 2014

Art Funding:

Graham Foundation for Advanced Studies in the Fine Arts, Chicago, Illinois. Grant provided to support photography for *The Hand of the Small Town Builder*. $4900 (2003)

Teaching Experience:

Course Taught (since Fall 1999):

Classes taught in Department of Civil, Environmental Engineering: (negotiated teaching load reduction for IPCC work, AY 2010/11 and 2011/12)

Geomatics/Surveying (CVEN 2012), Sp14, Sp 15, Sp17, F18
Mechanics and Dynamics of Glaciers (CVEN 4838/5838), Sp99, Sp00, Sp03, Sp05, Sp09, Sp10, Sp 11, Sp12, Sp13
Engineering Computing (AREN 2300) Sp07
Analytical Mechanics (CVEN 2121), F00, F01, F02, Sp06
Engineering Geology (CVEN 3698), F99, Sp00, Sp01, Sp02, Sp03, Sp04, Sp05, Sp06, F06, F07, Sp09, Sp10, Sp11, Sp17
Finite Element Methods (CVEN 4511/5511), F01, F04
Rock Mechanics (CVEN 5768), Sp04
Guest lectures, Energy Fundamentals (AREN 2020).

Visiting Lecturer in Glaciology:
McCarthy (Alaska) Glaciology Summer School, 2012
Workshop on Studies of Tidewater Glaciers (Polish Academy of Sciences), Svalbard, 2012
UNIS Glaciology Program (Svalbard), 2013

Photogrammetry Workshops:
Terrestrial Photogrammetry Boulder, Summer workshop, Boulder, Colorado, August 2004, May 2006, Innsbruck, Austria, February 2009.

Architectural Photography:
Architectural Photography Short Course (Rome, Italy; UCD School of International Studies Rome Program), July 2002, 2003

Teaching Prior to 1999:

Glaciology: Graduate/Undergraduate course in physics of ice and snow, with emphasis on mechanics and dynamics of large ice masses. (CU Department of Geological Sciences GEOL 4640/5640: Sp90 and Sp98)

Global Change: Undergraduate two-semester course for non-science majors covering quantitative aspects of circulation systems in the solid earth, oceans, and atmosphere, and the role of these earth systems in such topics as sea level change, long-term climate change, ENSO, ozone depletion, atmospheric pollution, environmental issues of water and soil degradation, waste management, resource management. (CU Department of Geological Sciences GEOL 1060/1070: F91, Sp91, F92, F93, F94.)

Other teaching interests: General mechanics of geomaterials, Mathematical methods in Earth Sciences and Geophysics (advanced undergraduate and graduate level), Fluid mechanics, Thermodynamics, Heat transfer, Photogrammetry, Architectural Photography

Student Supervision:

Supervisor:
Bruce Raup, (M.S. Geological Sciences, 1995)
Brian Welch (M.S. Geological Sciences, 1996)
Randy Mrugala (M.S. Geological Sciences, 1997)
Jake Wegmann (M.S. Geological Sciences, 2000)
Josh Cohn (M.S. Geological Sciences, 2001)
Dan Costello (M.S. Geological Sciences, 2000)
Karen Lewis (Ph.D. Geological Sciences, 2001)
Brian Lazar (M.S. CEAE, May 2004)
Fabian Walter (M.S. Physics, December 2004)
HP Marshall (Ph.D. 2005, CEAE)
Shad O'Neel (Ph.D. 2006, Geophysics)
Chandler Engel (M.S., CEAE, 2008)
Ursula Rick (Ph.D., PAOS, 2008)
Megan O'Sadnick (CVEN, 2010)
Ethan Welty (Ph.D., ENVS, 2018)

Committee member (University of Colorado unless otherwise noted):
Peng-Hsiang Tseng (Ph. D. CEAE, 1991)
Jianhua Zhou (Ph.D. CEAE, 1993)
David Bahr (Ph.D. Geological Sciences, 1993)
Mathieu Duvall (M.S. Geological Sciences, 1993)
C.T. Lin (Ph. D. Civil, Environmental, and Architectural Engineering, 1995)
Joel Harper (Ph.D. Geology and Geophysics, University of Wyoming, 1997)
Andrew Fox (M.A. Geography, 1999)
Mike Kaplan (PhD, Geological Sciences, 1999)
Mark Morehead (Ph.D. Geophysics, 1999)
Nicolas Cullen (Ph.D. Geography)
Sarah Konrad (PhD, Geology and Geophysics, University of Wyoming, 2001)
Jason Box (Ph.D. Geography, 2001)
Donald Barber (Ph.D. Geological Sciences, 2001)
Seung-Cheol Lee (Ph. D. CEAE, 2002)
Rory Peterson (Ph.D. Chem. Eng)
Brian Welch (PhD, University of Wyoming, 2002)
Jason Janke (Ph.D., Geography, 2003)
Jason Briner (Ph.D., Geology, 2003)
Todd Albert (Ph.D. Candidate, Geography)
Mark Greenwood (Ph.D., University of Wyoming, 2003)
Kaj Williams (Ph.D. Candidate, LASP, 2004)
Yu Bao (Ph.D. Candidate, CEAE, 2004)
Chris Senseny (M.S. CEAE, 2004)
Michelle Harwood (M.S. CEAE, 2004)
Quong Vu (M.S. CEAE, 2004)
Karen Cozzetto (Ph.D. Candidate, CEAE)
Kai Williams (Ph.D. Candidate, APAS)
Dahmnait Gleeson (Ph.D. Candidate, Geological Sciences)
Phil March (MS CEAE 2006)
Atsuhiro Muto (Ph.D., Geography, 2010)
Kathleen Stynes (PhD. Mechanical Engineering, 2012)
William Colgan (Ph.D. Geography, 2012)
Thomas Phillips (Ph.D. Geography, 2012)
Alia Kahn (Ph.D. Civil Engineering, 2016)

Undergraduate:
Supervised undergraduate student (Ben Haugen, Geological Sciences) in Ground Penetrating Radar study at Arapaho Glacier, applicant for UROP funding (2006-2007). Co-authored paper on Arapaho Glacier work in 2010.

Supervised undergraduate student (Arie Opdahl, CEAE) in terrestrial photogrammetric analysis for geophysical and architectural applications (2002-2003).

Supervised undergraduate student (Drew Reynolds, Geography) in snow physics lab experiments (1999).

Supervised 1 undergraduate student (Elliott Larsen, Geological Sciences) supported under UROP/SMART funding (1999-2000).

Other Mentoring:

Frank Burkholder and Jennifer Crawford (NREL). Technical support for photogrammetric analysis of non-imaging solar collectors (2007-present)

Christophe Sassolas, Visiting Researcher. Supervised glaciological and numerical modeling research, 1995 – 1996. Collaboration resulted in 6 coauthored papers with Sassolas.

Joel Harper, Post-Doctoral Scholar, 2002-2003. Supervised work in glacial hydrology.

Outreach Activities:

Featured in documentary film *Chasing Ice*, 2012

Appearance at screenings of *Chasing Ice* for Q&A, January 2012 – November 2013, Warsaw, Poland (COP-19), Park City Utah (Sundance Film Festival), Denver, San Francisco, Washington DC, United Nations (NYC), Hartford CT, and other locations.

Science Team member, Extreme Ice Survey (www.extremeicesurvey.org) 2006-Present.

Team Member, Climate Science Rapid Response Team (http://www.climaterapidresponse.org/)

Arts Mentor (photography) for New Vista High School (Boulder, CO) student (Fall 2004).

Science Mentor for Nederland High School student senior project (Fall 2002).

Originated (1999) CU Mountain Research Station's 'TundraCam', user-controllable web camera and science education/outreach website receiving ~600,000 visits/year.

Invited review of 1998 and 1999 international glaciological research for Geotimes 'Geoscience Highlights', February 1998, July 1999.

Conducted snow science and avalanche awareness class for Nederland Elementary School Outdoor Education Program, March 1997.

Provided information on glacier and snow topics on several occasions for University of Northern Colorado MAST (Mathematics and Science Teaching) Center.

Organized and conducted snow science program for Nederland Elementary School 4th Grade Outdoor Education program.

Judge, Nederland High School Science Fair.

Interviews/News Reports/Photographs in various media, including: New York Times, Boulder (Colorado) Daily Camera; Denver (Colorado) Post; Anchorage (Alaska) Daily News; Washington (DC) Post; American Scientist; Boulder Magazine; Discovery Channel (Special on Avalanches); KMGH-TV Channel 7 (Denver, Colorado) GEO Magazine (Germany).

Collaborators

A. Payne, University of Bristol, UK
J. Church, CSIRO, Australia
P. U. Clark, Oregon State University, USA
J. Gregory, University of Reading, UK
A. Levermann, PIK, Germany
G. Milne, University of Ottowa, Canada
A. Cazenave, LEGOS, France
S. Nerem, University of Colorado, USA
S. O'Neel, USGS, Anchorage Alaska, USA
N.F. Humphrey, University of Wyoming, USA
J. T. Harper, Univ. of Montana at Missoula, USA
G. Kaser, Univ. of Innsbruck
A. Arendt, Univ of Alaska at Fairbanks, USA
R. Hock, Univ of Alaska at Fairbanks, USA
V. Radić, University of British Columbia
A. Gardner, JPL/NASA, USA
G. Cogley, Trent University, Peterborough, Ontario, Canada.
J. Jania, University of Silesia, Poland
M. Sharp, University of Alberta, Canada
M. Truffer, University of Alaska, Fairbanks, USA
G. Wolken, University of Alaska, Fairbanks, USA
B. Amadei, University of Colorado, USA
Maria Ananicheva, Institute of Geography, Russian Academy of Sciences, Moscow, Russia
J.T. Andrews, University of Colorado, USA
J. Bradford, Boise State University, USA
R.J. Braithwaite, Geological Survey of Greenland
H. H. Thomsen, Geological Survey of Greenland
Niels Reeh, Geological Survey of Greenland
M. Dyurgerov, University of Colorado, USA
A. Glazovsky, Russian Academy of Sciences, Moscow, Russia
J.-O. Hagen, University of Oslo, Norway
R. Hock, University of Alaska, Fairbanks, USA
T. Illangasekare, University of Colorado, USA
E. Josberger, USGS, Tacoma Washington, USA
Alexander Klepikov, Arctic and Antarctic Research Institute, St. Petersburg, Russia
B. MacLean, Geological Survey of Canada
H.P. Marshall, Boise State University, USA
G.H. Miller, University of Colorado, USA
R.D. Moore, University of British Columbia, Canada
M.F. Meier, University of Colorado, USA **(Post-Doctoral Advisor)**
C.F. Raymond, University of Washington, USA **(Ph.D. Supervisor)**
T.J. Hughes, University of Maine, USA **(M.A. Supervisor)**