Jesse V. Johnson

Full Curricula Vitae

Professional Preparation

1997–2002 **Ph.D. Physics**, *University of Maine*, Orono
2001–2003 **M.S. Computer Science**, *University of Maine*, Orono
1989–1994 **B.S. Physics**, *University of Minnesota*, Minneapolis

Ph.D. thesis

title *A basal water model for ice sheets*
supervisors James L. Fastook and Terrence J. Hughes

Appointments

2012– **Professor**, *The University of Montana*, Missoula
2023–2024 **Visiting Professor**, *The United States Military Academy, West Point*
2017–2023 **Chair**, *The University of Montana Computer Science Department*
2015– **Adjunct Professor**, *The State University of New York*, Buffalo
2016–2017 **Fulbright Scholar**, *Namibian University of Science and Technology*
2010–2011 **Visiting Professor**, *The University of Cape Town*, South Africa
2007–2012 **Associate Professor**, *The University of Montana*, Missoula
2002–2007 **Assistant Professor**, *The University of Montana*, Missoula
1999–2002 **Research Assistant**, *The University of Maine*, Orono
1997–1999 **Teaching Assistant**, *The University of Maine*, Orono
1994–1997 **Secondary School Teacher**, *The United States Peace Corps*, Malawi

Courses Taught

- Geospatial Data Science
- Introduction to Computer Science I and II
- Computer Architecture
- Scientific Data Visualization
- Computer Simulation and Modeling
- Introduction to Python Programming for Scientists
- Data Structures
- The Internet of Things
- Algorithms

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- Computer Graphics
- C++ Programming for Engineers
- Introduction to the Finite Element Method
- Statistical, Dynamical, and Computational Modeling
- Programming Languages

Peer-Reviewed Publications

- Saad Lahrichi, Jake Bova, **Jesse Johnson**, Jordan Malof;"Improved Wildfire Spread Prediction with Time-Series Data and the WSTS+ Benchmark"; Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), 2026, pp. 2890-2900
- L Wiard-Greene, **J Johnson**, J Hogland, F Bunt, J Bova. "Investigating the Impact of Aerial Firefighting on Rate of Wildfire Spread" Fire, 2025
- Matthew P. Thompson, David E. Calkin, Donald M. MacGregor, and Jesse V. Johnson, "Wildfires have created instability within risk transfer markets. Here's a path forward" Proc. Natl. Acad. Sci. U.S.A. 122 (46) e2530050122 (2025).
- Marcozzi, Anthony A., **Jesse V. Johnson**, Russell A. Parsons, Sarah J. Flanary, Carl A. Seielstad, and Jacob Z. Downs. 2023. "Application of LiDAR Derived Fuel Cells to Wildfire Modeling at Laboratory Scale." Fire 6 (10): 394.
- Donahue, Kellen, John S. Kimball, Jinyang Du, Fredrick Bunt, Andreas Colliander, Mahta Moghaddam, **Jesse Johnson**, Youngwook Kim, and Michael A. Rawlins. 2023. "Deep Learning Estimation of Northern Hemisphere Soil Freeze-Thaw Dynamics Using Satellite Multi-Frequency Microwave Brightness Temperature Observations." Frontiers in Big Data 6 (November): 1243559.
- Downs, Jacob, and **Jesse V. Johnson**. 2022. "A Rapidly Retreating, Marine-Terminating Glacier's Modeled Response to Perturbations in Basal Traction." Journal of Glaciology 68 (271): 891–900.
- Stansberry, Aidan, Joel Harper, **Jesse V. Johnson**, and Toby Meierbachtol. 2022. "Millennial-Scale Migration of the Frozen/melted Basal Boundary, Western Greenland Ice Sheet." Journal of Glaciology 68 (270): 775–84.
- Kimball, John S., Jinyang Du, Toby W. Meierbachtol, Youngwook Kim, and **Jesse V. Johnson**. 2021. "Comparing Greenland Ice Sheet Melt Variability From Different Satellite Passive Microwave Remote Sensing Products Over a Common 5-Year Record." Frontiers of Earth Science in China 9. https://doi.org/10.3389/feart.2021.654220.
- Rate of mass loss from the Greenland Ice Sheet will exceed Holocene values this century JP Briner, JK Cuzzone, JA Badgeley, NE Young, EJ Steig, M Morlighem, **JV Johnson**, ... (2020) Nature 586 (7827), 70-74
- Western Greenland ice sheet retreat history reveals elevated precipitation during the Holocene thermal maximum J Downs, **J Johnson**, J Briner, N Young, A Lesnek, J Cuzzone (2020) The Cryosphere 14 (3), 1121-1137
- Blasen D.J., **Johnson J.V.** (2018) Quantifying effects on fire propagation in woody fuel models using the thin fuels assumption. VIII International Conference on Forest Fire Research, Coimbra Portugal

- Downs J.Z., **Johnson J.V.**, Harper J.T., Meierbachtol T. and Werder M.A. (2018) Dynamic Hydraulic Conductivity Reconciles Mismatch Between Modeled and Observed Winter Subglacial Water Pressure. J. Geophys. Res. Earth Surf. 123(4), 818–836 (doi:10.1002/2017JF004522)
- M.J. Hoffman, M. Perego, L.C. Andrews, S.F. Price, T.A. Neumann, **J. Johnson**, G. Catania, M.P. Lüthi (2018) Widespread moulin formation during supraglacial lake drainages in Greenland. Geophysical Research Letters, 45, 778-788, doi:10.1002/2017GL075659
- Florentine C., Harper J., **Johnson J.** and Meierbachtol T. (2018) Radiostratigraphy reflects the presentday, internal ice flow field in the ablation zone of western Greenland. Front. Earth Sci. 6(44), 1–11 (doi:10.3389/feart.2018.00044)
- Hills B.H., Harper J.T., Meierbachtol T.W., **Johnson J.V.**, Humphrey N.F. and Wright P.J. (2018) Processes influencing near-surface heat transfer in Greenland's ablation zone. Cryosph. 12, 3215–3227 (doi:10.5194/tc-12-3215-2018)
- Meierbachtol T., Harper J. and **Johnson J.** (2016) Force Balance along Isunnguata Sermia, West Greenland. Front. Earth Sci. 4(September), 1–9 (doi:10.3389/feart.2016.00087)
- **J.V. Johnson**, M. Abia, and R. Quest (2016) A comparison of blended and traditional approaches to computing and informatics instruction in Namibia Outcomes and consequences for a developing nation 7th Annual Conference on Computer Science Education: Innovation and Technology (CSEIT), Singapore doi:10.5176/2251-2195_CSEIT16.41
- Rogozhina, I., A.G. Petrunin, A.P.N. Vaughan, B. Steinberger, **J.V. Johnson**, M. Kaban, R. Calov, F. Rickers,M. Thomas, and I. Koulakov (2016), "Melting at the base of the Greenland ice sheet explained by Iceland hotspot history", *Nature Geoscience* 9, 366–369 doi:10.1038/ngeo2689
- O.P. Layeni and **J.V. Johnson** (2016), "Exact closed-form solutions of some Stefan problems in thermally heterogeneous cylinders" *Mechanics Reseach Communications* doi:10.1016/j.mechrescom.2015.09.012
- Brinkerhoff, D. and **Johnson, J.V.** (2015), "A stabilized finite element method for calculating balance velocities in ice sheets", *Geosci. Model Dev.*, 8, 1275-1283, doi:10.5194/gmd-8-1275-2015, 2015.
- Brinkerhoff, D. J., and **J. V. Johnson** (2015), "Dynamics of thermally induced ice streams simulated with a higher-order flow model", *J. Geophys. Res. Earth Surf.*, 120, doi:10.1002/2015JF003499.
- van der Veen, C.J., L.A. Stearns, **J.V. Johnson**, B. Csatho (2014) "Flow Dynamics of Byrd Glacier, East Antarctica", *Journal of Glaciology*, vol. 60 (224), doi: 10.3189/2014JoG14J052
- Brinkerhoff, D.J and **J.V. Johnson** (2013) "Data assimilation and prognostic whole ice-sheet modelling with the variationally derived, higher-order, open source, and fully parallel ice sheet model VarGlaS", *The Cryosphere*, 7, 1161-1184, 2013 (www.the-cryosphere.net/7/1161/2013/) doi:10.5194/tc-7-1161-2013

- Bindschadler, R. A., S. Nowicki, A. Abe-Ouchi, A. Aschwanden, H. Choi, J. Fastook, G. Granzow, R. Greve, G. Gutowski, U. Herzfeld, C. Jackson, **J.V. Johnson**, C. Kroulev, A. Levermann, W. Lipsomb, M. Martin, M. Morlighem, B. Parizek, D. Pollard, S. Price, D. Ren, F. Saito, T Sato, H. Seddik, H. Seroussi, K. Takahashi, R. Walker and W. Wang, (2013) "Ice-sheet model sensitivities to environmental forcing and their use in projecting future sea-level (the SeaRISE project)", *Journal of Glaciology* Vol. 59, No.214, doi:10.3189/2013JoG12J125
- Nowicki, S., R. Bindschadler, A. Abe-Ouchi, A. Aschwanden, E. Bueler, H. Choi, J. Fastook, G. Granzow, R. Greve, G. Gutowski, U. Herzfeld, C. Jackson, **J.V. Johnson**, C. Kroulev, E. Larour, A. Levermann, W. Lipsomb, M. Martin, M. Morlighem, B. Parizek, D. Pollard, S. Price, E. Rignot, D. Ren, F. Saito, T Sato, H. Seddik, H. Seroussi, K. Takahashi, R. Walker and W. Wang (2013) "Insights into spatial sensitivities of ice mass response to environmental change from the SeaRISE ice sheet modeling project I. Antarctica", *Journal of Geophysical Research - Earth Surface* doi: 10.1002/jgrf.20081.
- Nowicki, S., R. Bindschadler, A. Abe-Ouchi, A. Aschwanden, E. Bueler, H. Choi, J. Fastook, G. Granzow, R. Greve, G. Gutowski, U. Herzfeld, C. Jackson, **J.V. Johnson**, C. Kroulev, E. Larour, A. Levermann, W. Lipsomb, M. Martin, M. Morlighem, B. Parizek, D. Pollard, S. Price, E. Rignot, D. Ren, F. Saito, T Sato, H. Seddik, H. Seroussi, K. Takahashi, R. Walker and W. Wang. (2013) "Insights into spatial sensitivities of ice mass response to environmental change from the SeaRISE ice sheet modeling project II. Greenland", *Journal of Geophysical Research* - Earth Surface doi: 10.1002/jgrf.20076.
- O.P. Layeni, **J.V. Johnson**, (2012) "Hybrids of the heat balance integral method", *Applied Mathematics and Computation*, Volume 218, Issue 14, Pages 7431-7444, ISSN 0096-3003, 10.1016/j.amc.2012.01.001. (http://www.sciencedirect.com/science/article/pii/S0096300312000069)
- S.P. Carter, H.A. Fricker, D.D. Blankenship, **J.V. Johnson**, W. Lipscomb, S.F. Price, D.A. Young, (2011) "Modeling five years of subglacial lake activity in the MacAyeal Ice Stream catchment through assimilation of ICESat laser altimety", *Journal of Glaciology*, vol. 57 (206) pp. 1098-1112
- D.J. Brinkerhoff, T.W. Meierbachtol, **J.V. Johnson**, J.T. Harper, (2011) "Sensitivity of the frozen-melted basal boundary to perturbations of basal traction and geothermal heat flux: Isunnguata Sermia, western Greenland", *Annals of Glaciology*, 52(59) pp. 42-50
- R. Calov, R. Greve, A. Abe-Ouchi, E. Bueler, P. Huybrechts, **J.V. Johnson**, F. Pattyn, D. Pollard, C. Ritz, F. Saito, L. Tarasov (2010) "Results from the Ice-Sheet Model Intercomparison Project–Heinrich Event INtercOmparison (ISMIP HEINO)", *Journal of Glaciology* vol. 56 (197) pp. 371-383
- S. E. Morales, T.F. Cosart, **J.V. Johnson**, W.E. Holben (2009) "Extensive Phylogenetic Analysis of a Soil Bacterial Community Illustrates Extreme Taxon Evenness and the Effects of Amplicon Length, Degree of Coverage, and DNA Fractionation on Classification and Ecological Parameters", *Appl Environ Microb* 75(3) 668-675

- S. E. Morales, T.F. Cosart, **J.V. Johnson**, W. E. Holben (2008) "Supplemental programs for enhanced recovery of data from the DOTUR application.", *J Microbiol Meth* vol. 75 (3) 572-575
- A. R. Lewis, D. R. Marchant, A. C. Ashworth, L. Hedenäs, S. R. Hemming, **J.V. Johnson**, M. J. Leng, M. L. Machlus, A. E. Newton, J. I. Raine, J. K. Willenbring, M. Williams, A. P. Wolfe (2008) "Mid-Miocene cooling and the extinction of tundra in continental Antarctica", *PNAS* 105:10676-10680; 2008, doi:10.1073/pnas.0802501105
- Pattyn, F., Perichon, L., Aschwanden, A., Breuer, B., de Smedt, B., Gagliardini, O., Gudmundsson, G. H., Hindmarsh, R. C. A., Hubbard, A., **Johnson, J.V**., Kleiner, T., Konovalov, Y., Martin, C., Payne, A. J., Pollard, D., Price, S., Rückamp, M., Saito, F., Souček, O., Sugiyama, S., and Zwinger, T. (2008) "Benchmark experiments for higher-order and full-Stokes ice sheet models (ISMIP–HOM)", *The Cryosphere*, 2, 95-108, 2008
- J.V. Johnson and J.W. Staiger (2007), "Modeling Long-term Stability of the Ferrar Glacier, East Antarctica: Implications for Interpreting Cosmogenic Nuclide Inheritance", *Journal of Geophysical Research*, 112, F03S30 doi:10.1029/2006JF000599
- Staiger, J.W., Gosse, J.C., Little, E.C., Utting, D.J., Finkel, R., **Johnson, J.V.**, Fastook, J. (2006) "Glacial Erosion and Sediment Dispersion from Detrital Cosmogenic Nuclide Analyses of Till", *Quaternary Geochronology* 1(1): 29-42
- J. W. Staiger, J. C. Gosse, R. Toracinta, R. Oglesby, J. L. Fastook, **J.V. Johnson** (2006) "Atmospheric scaling of cosmogenic nuclide production: the climate effect.", *Journal of Geophysical Research* 112(B2), B02205 doi: 10.1029/2005JB003811
- Staiger, J.W., Gosse J.C, **Johnson, J.V.**, Fastook J., Gray J.T., Stockli D.F., Stockli L., and Finkel R."Relief generation by polythermal glacier ice", *Earth Surface Processes and Landforms* (2005) 30 (9): 1145-1159
- Staiger, J.W., Marchant, D.R., Oberholzer, P., Schaefer, J.M., **Johnson, J.V.**, Lewis, A.R. "Late Miocene-Pleistocene history of Ferrar Glacier, Antarctica: Implications for climate and ice sheet stability", *Earth and Planetary Science Letters* (2005) 243 (3-4): 489–503
- Johnson, J.V., Prescott P.R. and Hughes T.H. "Ice dynamics preceding catastrophic disintegration of the floating part of Jababshavn Isbræ", *Journal of Glaciology* (2004) 50 (171): 492-504
- Naslund, J.O., P. Jansson, J.L. Fastook, and **J. Johnson**, (2004) "Modeling ice-sheet basal meltwater production using realistic geothermal heat flow data", *Annals of Glaciology* **(40)** 047
- Johnson, J.V. and Fastook, J.L. (2002) "Northern Hemisphere glaciation and its sensitivity to basal melt water", *Quaternary International.* **(95)**, 65-74

Publications Other

- Harper J, Hubbard A, Ruskeeniemi T, Claesson Liljedahl L, Kontula A, Bougamont M, Brown J, Dirkson A, Dow C, Doyle S, Drake H, Engström J, Fitzpatrick A, Follin S, Frape S, Graly J, Hansson K, Harrington J, Henkemans E, Hirschorn S, Hobbs M, Humphrey N, Jansson P, **Johnson J**, Jones G, Kinnbom P, Kennell L, Klint K E S, Liimatainen J, Lindbäck K, Meierbachtol T, Pere T, Pettersson R, Tullborg E-L, van As D, 2016. The Greenland Analogue Project: Data and Processes. SKB R-14-13, Svensk Kärnbränslehantering AB.
- Korolev Y., Yagola A., **Johnson J.V.**, Brinkerhoff D. (2013), "Methods of error estimation in inverse problems on compacts sets in Banach lattices – theory and applications in ice sheet modeling", *IPDO 2013 : 4th Inverse problems, design and optimization symposium*, Albi, ed. by O. Fudym, J.-L. Battaglia, G.S. Dulikravich et al., Albi ; Ecole des Mines d'Albi-Carmaux, 2013 (ISBN 979-10-91526-01-2)
- O.P. Layeni and **J.V. Johnson** (2012), "Some explicit solutions for a class of one-phase Stefan problems", *AIP Conf. Proc.* 1479, 2379, DOI:10.1063/1.4756673
- W. Lipscomb, R. Bindschadler, E. Bueler, D. Holland, **J. Johnson**, S. Price, (2009) "A Community Ice Sheet Model for Sea Level Prediction." *Eos Trans.* 90(3) doi:10.1029/2009EO030004
- C. Little, S. Jacobs, **J.V. Johnson**, A. J. Payne, R. Hallberg, C. L. Hulbe, H. Levy, G. A. Schmidt, M. Winton, V. Balaji, T. L. Delworth, D. G. Vaughan, W. H. Lipscomb, G. K. C. Clarke, S. J. Marshall, R. B. Alley, D. M. Holland, R. J. Stouffer, M. Oppenheimer, B. R. Parizek (2007), "Toward a New Generation of Ice Sheet Models", *Eos Trans.* 88(52), 578, 10.1029/2007EO520002.
- SKB, 2006: Climate and climate related issues for the safety assessment SR-Can. SKB TR-06-23, Swedish Nuclear Waste Management Company. 186 pp.

Grants Awarded

- "Fire behavior modeling; next generation", **USDA Rocky Mountain Research Station, $133,514**, awarded January 2024 over one year, all to UM CS, I am PI.
- "SMART FIRES: Sensors, Machine Learning, and Artificial Intelligence in Real Time Fire Science" awarded August 2023, **National Science Foundation 2242802, $20,000,000** over five years, ∼$100,000 per year to me and UM CS, I am a co-I.
- "Cyber Research Center Appointment", **United States Military Academy $111,178** over one year, awarded June 2023, salary and benefits for my sabbatical.
- "Raster Tools Expansion", awarded August 2022, **USDA Rocky Mountain Research Station $400,015** over five years, all to UM CS, I am PI.
- "SMART Forestry" awarded September 2022, **Economic Development Agency, $198,888** over four years to UM CS, I am a co-I.
- "Smart Forestry: Paving the Way from Forest Restoration to Mass Timber", awarded August 2022, **Economic Development Agency $198,895** over three years
- "Natural Resource Supply Chain Optimization using Aerial Imagery Interpreted with Machine Learning Methods" awarded February 2022, **National Science Foundation $3,914,106** over four years
- "JVA: Investigating Cost Revenue Streams" awarded August 2022, **US Department of Agriculture $150,000** in one year

- "JVA: The impact of resolution on fuels descriptions in fire models" awarded August 2022, **US Department of Agriculture $90,000** in one year
- "JVA: Investigating Cost Revenue Streams" awarded July 2021, **US Department of Agriculture $150,000** in one year
- "JVA: The impact of resolution on fuels descriptions in fire models" awarded June 2021, **US Department of Agriculture $90,000** in one year
- "JVA: Advancing fire behavior modeling and next generation training for firefighters" awarded July 2019, **US Department of Agriculture $30,000** in one year
- "JVA: Numerical Modeling Heat Transfer in Coarse Woody Debris" awarded May 2018, **US Department of Agriculture $39,678** in one year
- "MEaSUREs: Continuity and Enhancement of the Freeze/Thaw Earth System Data Record" awarded March, 2019 **NASA $2,064,816** over five years
- "Development of Web Based Models for Simulation of Ice Dynamics" **NSF $37,665** over two years
- "Collaborative Research: Response of the Greenland Ice Sheet" awarded August 2021 **National Science Foundation 2107605 $364,234** over four years, all funds to UM, full overhead, I am a co-I.
- "Collaborative Research: Stability and Dynamics of Antarctic Marine Outlet Glaciers" awarded May, 2016 **NSF $214,702** over three years
- "Collaborative Research: Ice sheet sensitivity in a changing Arctic system - using geologic data and modeling to test the stable Greenland Ice Sheet hypothesis" awarded August 2015, **NSF $259,030** over four years.
- 'A MOOC blended approach to training IT and computing professionals", awarded June 2015, **U.S. Department of State $80,810** over 11 months.
- 'Model inversion efforts in support of the SeaRISE II initiative" PI: **J.V. Johnson** awarded August 2014, **NASA $32,500** over three months.
- "Land Unknown: Assessing Data Requirements for Modeling Change in the Antarctic Ice Sheet with an Emphasis on the Subglacial Bed" Co-Is: Charles Jackson and **J.V. Johnson**, awarded June 2013, $565,480 total funding, U. Montana Share **NSF $289,181** over 3 years
- "Activation of high elevation alluvial fans in the Trans-Antarctic Mountains" PI: **J.V. Johnson** awarded June 2013, **NSF sub-award from NDSU $9,904** over one semester
- "Partitioning ice sheet surface elevation changes into dynamic, surface mass balance, and firn components" PI: **J.V. Johnson** awarded May 2013, **NASA $20,045** over one semester
- "Beyond Backstress: data driven assessment of outlet glacier dynamics" PI: Leigh Stearns (KU) Co-Is: C.J. Vander Veen **J.V. Johnson**, B. Csatho, awarded July 2011, $826,301 total funding, U. Montana Share **NASA $226,900** over 3 years.
- "Enhancement of NASA's Polar Research Missions: Adjoint Data Assimilation Into Numerical Models To Reveal Physical Properties Of The Greenland Ice Sheet" NASA EPSCoR, Co-Is **J.V. Johnson** and J. Harper, awarded August 2011, **NASA $1.08 million, plus $500,000 from state in match** over 3 years.
- MSU Space Grant Fellowship for advisee Douglas Brinkerhoff (2011), **NASA $11,000**, one semester.

- MSU Space Grant Fellowship for advisee Douglas Brinkerhoff (2010-2011), **NASA $22,000**, one year
- 2010-2011 UM Exchange program award for **J.V. Johnson** to South Africa, **UM Exchange $25,000**, one year
- "Collaborations in Mathematics and Geosciences: Enabling ice sheet sensitivity and stability analysis with a large-scale higher-order ice sheet model's adjoint to support sea level change assessment" PI Jesse Johnson, awarded in 2009; **NSF $184,000**, over 3 years.
- "Collaborative Research: Greenland Ice Sheet Basal Hydrology and Sliding Dynamics - The Proof of the Drill" NSF, PI Joel Harper, Co-Is T. Pfeffer, **J.V. Johnson**, N. Humphry; awarded in 2009 **NSF $475,000** over 4 years.
- "GAP, the Greenland Analog Project" SKB (Swedish Nuclear Waste Management Company), PI Joel Harper, Co-I **J.V. Johnson** awarded in 2009; **SKB $289,314** over 3 years.
- "Data preparation and simulation studies in support of seaRISE efforts" NASA, PI: **J.V. Johnson**, awarded in 2009; **NASA $119,883** over 1 year.
- "Collaborative Research: IPY, The Next Generation: A Community Ice Sheet Model for scientists and educators" PI: **J.V. Johnson**, CO-I J. Henry plus partners at 4 other institutions, awarded in 2007; **NSF $315,000** over 2 years.
- Howard Hughes Medical Institute Award, PI Bill Holben, Co-Is J. Graham, **J.V. Johnson**; awarded in 2005 **HHMI $1.5 million** over 4 years.
- Montana Ecology of Infectious Disease, NSF IGERT, PI W. Holben, Co-Is **J.V. Johnson**, C. Bruener, G. Luikadt, J. Bardsley, awarded in 2005; **NSF $3,260,729** over 5 years.
- Hewlett Packard Educational Technology Grant Grant PI J. Herny, co-I Y. Riemer, **J.V. Johnson**, Awarded in 2003; **HP $15,500 cash plus $58,000 dollars of equipment** over one year.