

# Jesse V. Johnson

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## *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

- 2017– **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*.  
2012– **Professor**, *The University of Montana*, Missoula.  
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

- 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
- Computer Graphics
- C++ Programming for Engineers

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- Introduction to the Finite Element Method
- Statistical, Dynamical, and Computational Modeling
- Programming Languages

## Peer-Reviewed Publications

- Rate of mass loss from the Greenland Ice Sheet will exceed Holocene values this century JP Briner, JK Cuzzone, JA Badgley, 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 Isunguata 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 Research Communications* doi:10.1016/j.mechrescom.2015.09.012

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- 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/](http://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 altimetry", *Journal of Glaciology*, vol. 57 (206) pp. 1098-1112

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- 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. Bueller, 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

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- 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. Bindshadler, 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

- “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 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

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- “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: 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.

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- “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.

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