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Vincent E. Larson

Education

Feb 1999 **Ph.D. Dept of Earth, Atmospheric, and Planetary Science**, ***Massachusetts Institute of Technology***, Cambridge, MA.
Thesis title: The Effects of Thermal Radiation on Dry Convection. Advisor: Kerry Emanuel (member, National Academy of Sciences).

May 1992 **B.A. Physics**, ***Yale University***, New Haven, CT, *Magna Cum Laude, Distinction in the Major*.

Experience

Department of Mathematical Sciences, University of Wisconsin — Milwaukee

Full Professor (Sep 2012 —), Associate Professor (Sep 2006 — Aug 2012), Assistant Professor (Jan 2001 – Aug 2006), Numerical and theoretical research on clouds, microphysics, radiative transfer, CO_2 transport, computational methods, and climate.

CIRA, Colorado State University

Postdoctoral Fellow (Jan. 1999 — Dec. 2000), Theoretical studies of cloud modeling, and design and execution of field experiments on thin mid-level clouds. Co-advisors: Thomas Vonder Haar (member, National Academy of Engineering), William Cotton (fellow, Amer. Met. Soc. and Amer. Geophys. Union) .

Recognition

2016 **Research Stay for University Academics and Scientists** awarded by Deutscher Akademischer Austauschdienst (DAAD), Germany, Mar-May 2016. Worth $6,450.

2010–2015 **Lead PI of a Climate Process Team** grant from National Science Foundation, with more than 10 personnel. As a result of this project, our cloud parameterization, CLUBB, was selected as the default for the CAM climate model.

2001–2015 **Over $3 million in extramural funds** to my research group at UW — Milwaukee.

2010–2011 **Visiting Fellowship at the DTC at NCAR** in Boulder, CO. Worth $39,946.

2006–2009 **Four consecutive Research Growth Initiative Awards** awarded by University of Wisconsin — Milwaukee. Worth $310,000 in total.

2002–2003 **Graduate School Research Committee Award** awarded by University of Wisconsin — Milwaukee. Worth $14,863.

Funding

2016–2019: **Department of Energy**, "Use of remote sensing and in-situ observations to develop and evaluate improved representations of convection and clouds for the ACME model." Co-I: V. E. Larson. UWM's portion of budget: **$489,435**.

2016–2019: **Department of Energy**, "ACME-SM: A global climate model software modernization surge." Co-I: V. E. Larson. UWM's portion of budget: **$105,014**.

2016–2019: **National Science Foundation**, "Effects of Turbulent Dissipation and Pressure Perturbations on Clouds." Sole PI: V. E. Larson. **$354,628**.

2012–2017: **Department of Energy, SciDAC**, "Multiscale Methods for Accurate, Efficient, and Scale-Aware Models of the Earth System." Lead PI: William Collins. UWM's portion of budget: **$249,183**.

2010–2017: **National Science Foundation**, "Climate process team: Cloud macrophysical parameterization and its application to aerosol indirect effects." Lead PI: V. E. Larson. Collaborating institutions: GFDL, NCAR, U. Washington, Colorado State University, ESRL. UWM's portion of budget: **$894,105.**

2014–2016: **University of Wisconsin — Milwaukee**, Research Growth Initiative Award, "From cloud parameterization to subgrid variability parameterization." **$98,672**.

2012–2015: **Department of Energy**, "Reducing tropical precipitation biases in CESM — Tests of unified parameterizations with ARM observations." Lead PI: V. E. Larson. UWM's portion of budget: **$396,525**.

2012–2015: **Department of Energy**, "High-resolution global modeling of the effects of subgrid-scale clouds and turbulence on precipitating cloud systems." Lead PI: David A. Randall. UWM's portion of budget: **$198,637**.

2011–2014: **Department of Energy, SciDAC**, "Collaborative Project: Physics and dynamics coupling across scales in the next generation CESM: Meeting the challenge of high resolution." Lead PI: Julio T. Bacmeister. Co-PIs, V. E. Larson et al. Total budget: $939,000; UWM's portion of budget: **$306,897**.

2009–2012: **NOAA**, "Driving CCN activation with subgrid-scale forcings." Sole PI: V. E. Larson. **$298,905**.

2009–2012: **National Science Foundation**, "A physics coupler for climate models." Sole PI: V. E. Larson. **$366,409**.

2009–2010: **University of Wisconsin — Milwaukee**, Research Growth Initiative Award, "A unified parameterization for stratiform clouds, turbulence, surface layer physics, and shallow convection." **$81,245**.

2008–2009: **University of Wisconsin — Milwaukee**, Research Growth Initiative Award, "Mixed-phase layer clouds in the Arctic and mid-latitudes." **$75,008**.

2007–2008: **University of Wisconsin — Milwaukee**, Research Growth Initiative Award, "A boundary-layer parameterization for weather forecast models." **$68,018**.

2007 – 2010: **NASA**, "Multiscale modeling of aerosol impacts on clouds and precipitation." PI Steven Ghan. Co-Is V. E. Larson et al. V. E. Larson's approximate budget: **$180,000**

2006 – 2010: **National Science Foundation**, "Connecting vertical velocity and microphysics at the subgrid scale in general circulation models." Sole PI: V. E. Larson. **$214,628**.

2006–2007: **University of Wisconsin — Milwaukee**, Research Growth Initiative Award, "Global climate and the carbon cycle." **$86,219**.

2005 – 2007: **National Science Foundation**, "Cloud Modeling and Probability Density Functions." Sole PI: V. E. Larson. **$284,568**.

2003 – 2006: **National Science Foundation**, "Dyn. of Altocumulus Clouds." Sole PI: V. E. Larson. **$240,311**.

2002–2007: **Colorado State University**, "A theoretical and numerical study of altocumulus clouds." **$247,586**.

2002–2003: **University of Wisconsin — Milwaukee**, Graduate School Research Committee Award, "Clouds and forecasts of weather and climate." **$14,863**.

2001–2002: **Colorado State University**, "A theoretical and numerical study of mid-level clouds." **$40,672**.

2001–2002: **Colorado State University**, "A numerical study of mid-level clouds." **$28,963**.

Publications

I have published 51 articles in the peer-reviewed literature:

2016: "Parameterizing microphysical effects on variances and covariances of moisture and heat content using a multivariate probability density function: a study with CLUBB (tag MVCS)." B. M. Griffin and V. E. Larson, *Geosci. Model Dev.*, **9**, 4273–4295.

2016: "Vertical overlap of probability density functions of cloud and precipitation hydrometeors." Ovchinnikov, M., K.-S. S. Lim, V. E. Larson, M. Wong, K. Thayer-Calder, and S. J. Ghan (2016), *J. Geophys. Res. Atmos.*, **121**, doi:10.1002/2016JD025158.

2016: "Assessment of marine boundary layer cloud simulations in the CAM with CLUBB and updated microphysics scheme based on ARM observations from the Azores." Zheng, X., S. A. Klein, H.-Y. Ma, P. Bogenschutz, A. Gettelman, and V. E. Larson, *J. Geophys. Res. Atmos.*, **121**, 8472–8492.

2016: "A new subgrid-scale representation of hydrometeor fields using a multivariate PDF." B. M. Griffin and V. E. Larson, *Geosci. Model Dev.*, **9**, 2031–2053.

2016: "A flexible importance sampling method for integrating subgrid processes." E. K. Raut and V. E. Larson, *Geosci. Model Dev.*, **9**, 413–429.

2015: "A unified parameterization of clouds and turbulence using CLUBB and subcolumns in the Community Atmosphere Model." K. Thayer-Calder, A. Gettelman, C. Craig, S. Goldhaber, P. A. Bogenschutz, C.-C. Chen, H. Morrison, J. Höft, E. Raut, B. M. Griffin, J. K. Weber, V. E. Larson, M. C. Wyant, M. Wang, Z. Guo, and S. J. Ghan, *Geosci. Model Dev.*, **8**, 3801-3821.

2015: "Parametric behaviors of CLUBB in simulations of low clouds in the Community Atmosphere Model (CAM)." , Z. Guo, M. Wang, Y. Qian, V. E. Larson, S. Ghan, M. Ovchinnikov, P. A. Bogenschutz, A. Gettelman, and T. Zhou. *J. Adv. Model. Earth Syst.*, **7**, 1005–1025.

2015: "Parameterization of rain rate variability for large-scale models." Z. J. Lebo, C. R. Williams, G. Feingold, and V. E. Larson, *J. Appl. Meteor. Climatol.*, **54**, 2027–2046.

2015: "A Multi-scale Modelling Framework model (Superparameterized CAM5) with a higher-order turbulence closure: model description and low-cloud simulations." M. Wang, V. E. Larson, S. Ghan, M. Ovchinnikov, D. P. Schanen, H. Xiao, X. Liu, P. Rasch, and Z. Guo. *J. Adv. Model. Earth Syst.*, **7**, 484–509.

2015: "Quadrature methods for the calculation of subgrid microphysics moments." K. Chowdhary, M. Salloum, B. Debusschere, and V. E. Larson, *Mon. Wea. Rev.*, **143**, 2955–2972.

2015: "Regional Assessments of Low Clouds Against Large-Scale Stability in CAM5 and CAM-CLUBB Using MODIS and ECMWF-Interim Reanalysis Data." T. L. Kubar, G. L. Stephens, M. Lebsock, V. E. Larson, P. A. Bogenschutz. *J. Climate*, **28**, 1685–1706.

2015: "Parameterizing deep convection using the assumed probability density function method." R. L. Storer, B. M. Griffin, J. Höft, J. K. Weber, E. Raut, V. E. Larson, M. Wang, and P. J. Rasch, *Geosci. Model Dev.*, **8**, 1–19.

2014: "A Sensitivity Analysis of Cloud Properties to CLUBB Parameters in the Single Column Community Atmosphere Model (SCAM5)." , Z. Guo, M. Wang, Y. Qian, V. E. Larson, S. Ghan, M. Ovchinnikov, P. A. Bogenschutz, C. Zhao, G. Lin, and T. Zhou. *J. Adv. Model. Earth Syst.*, **6**, 829–858.

2014: "The third GABLS intercomparison case for evaluation studies of boundary-layer models: Part B: results and process understanding." F. C. Bosveld et al. (including V. E. Larson),*Bound. Layer Met.*, **152**, 157–187.

2013: "Higher-order turbulence closure and its impact on climate simulations in the Community Atmosphere Model." P. A. Bogenschutz, A. Gettelman, H. Morrison, V. E. Larson, C. Craig, and D. P. Schanen, *J. Climate*, **26**, 9655–9676.

2013: "The Subgrid Importance Latin Hypercube Sampler (SILHS): a multivariate subcolumn generator." V. E. Larson and D. P. Schanen, *Geosci. Model Dev.*, **6**, 1813–1829.

2013: "A single column model ensemble approach applied to the TWP-ICE experiment." L. Davies et al. (including V. E. Larson), *J. Geophys. Res.*, **118**, 6544–6563.

2013: "CGILS: Results from the first phase of an international project to understand the physical mechanisms of low cloud feedbacks in single column models." M. Zhang et al. (including V. E. Larson), *J. Adv. Model. Earth Syst.*, **5**, 826–842.

2013: "Analytic upscaling of local microphysics parameterizations, Part I: Theory." V. E. Larson and B. M. Griffin, *Quart. J. Royal Met. Soc.*, **139**, 46–57.

2013: "Analytic upscaling of local microphysics parameterizations, Part II: Simulations." B. M. Griffin and V. E. Larson, *Quart. J. Royal Met. Soc.*, **139**, 58–69.

2012: "Unified parameterization of the planetary boundary layer and shallow convection with a higher-order turbulence closure in the community atmosphere model: single column experiments." P. A. Bogenschutz, A. Gettelman, H. Morrison, V. E. Larson, D. P. Schanen, N. R. Meyer, and C. Craig, *Geosci. Model Dev.*, **5**, 1407–1423, doi:10.5194/gmd-5-1407-2012.

2012: "PDF parameterization of boundary layer clouds in models with horizontal grid spacings from 2 to 16 km." V. E. Larson, D. P. Schanen, M. Wang, M. Ovchinnikov, and S. Ghan, *Mon. Wea. Rev.*, **140**, 285–306, doi: http://dx.doi.org/10.1175/MWR-D-10-05059.1.

2011: "Parameterizing correlations between hydrometeor species in mixed-phase Arctic clouds." V. E. Larson, B. J. Nielsen, J. Fan, and M. Ovchinnikov, *J. Geophys. Res.*, **116**, D00T02, doi:10.1029/2010JD015570.

2011: "Evaluation of the diurnal cycle in the atmospheric boundary layer over land as represented by a variety of single column models — the second GABLS experiment." G. Svensson, A.A.M. Holtslag, V. Kumar, T. Mauritsen, G. J. Steeneveld, W. M. Angevine, E. Bazile, A. Beljaars, E.I.F. de Bruijn, A. Cheng, L. Conangla, J. Cuxart, M. Ek, M. J. Falk, F. Freedman, H. Kitagawa, V. E. Larson, A. Lock, J. Mailhot, V. Masson, S. Park, J. Pleim, S. Soderberg, M. Zampieri, and W. Weng, *Bound. Layer Met.*, **140**, 177–206.

2011: "The multi-scale aerosol-climate model PNNL-MMF: model description and evaluation." M. Wang, S. Ghan, R. Easter, M. Ovchinnikov, X. Liu, E. Kassianov, Y. Qian, W. Gustafson, V. E. Larson, D. P. Schanen, M. Khairoutdinov, and H. Morrison, *Geosci. Model Dev.*, **4**, 137–168.

2010: "Multi-variate probability density functions with dynamics for cloud droplet activation in large-scale models: single column tests." H. Guo, J.-C. Golaz, L. J. Donner, V. E. Larson, D. P. Schanen, and B. M. Griffin, *Geosci. Model Dev.*, **3**, 475–486.

2009: "An analytic scaling law for glaciation rate in mixed-phase layer clouds." V. E. Larson and A. J. Smith, *J. Atmos. Sci.*, **66**, 2620–2639.

2009: "Processes that generate and deplete liquid water and snow in midlevel, mixed-phase clouds." A. J. Smith, V. E. Larson, J. Niu, J. A. Kankiewicz, and L. D. Carey, *J. Geophys. Res.*, **114**, D12203, doi:10.1029/2008JD011531.

2009: "Intercomparison of model simulations of mixed-phase clouds observed during the ARM Mixed-Phase Arctic Cloud Experiment. Part I: Single layer cloud." S. A. Klein, R. B. McCoy, H. Morrison, A. S. Ackerman, A. Avramov, G. de Boer, M. Chen, J. N. S. Cole, A. D. Del Genio, M. Falk, M. J. Foster, A. Fridlind, J.-C. Golaz, T. Hashino, J. Y. Harrington, C. Hoose, M. F. Khairoutdinov, V. E. Larson, X. Liu, Y. Luo, G. M. McFarquhar, S. Menon, R. A. J. Neggers, S. Park, M. R. Poellot, J. M. Schmidt, I. Sednev, B. J. Shipway, M. D. Shupe, D. A. Spangenberg, Y. C. Sud, D. D. Turner, D. E. Veron, K. von Salzen, G. K. Walker, Z. Wang, A. B. Wolf, S. Xie, K.-M. Xu, F. Yang, G. Zhang. *Quart. J. Royal Met. Soc.*, **135**, 979–1002.

2009: "Intercomparison of model simulations of mixed-phase clouds observed during the ARM Mixed-Phase Arctic Cloud Experiment, Part II: Multilayered cloud." H. Morrison, R. B. McCoy, S. A. Klein, S. Xie, Y. Luo, A. Avramov, M. Chen, J. N. S. Cole, M. Falk, M. J. Foster, A. D. Del Genio, J. Y. Harrington, C. Hoose, M. F. Khairoutdinov, V. E. Larson, X. Liu, G. M. McFarquhar, M. R. Poellot, K. von Salzen, B. J. Shipway, M. D. Shupe, Y. C. Sud, D. D. Turner, D. E. Veron, G. K. Walker, Z. Wang, A. B. Wolf, K.-M. Xu, F. Yang, and G. Zhang. *Quart. J. Royal Met. Soc.*, **135**, 1003–1019.

2008: "The vertical profile of liquid and ice water content in mid-latitude mixed-phase altocumulus clouds." L. D. Carey, J. Niu, P. Yang, J. A. Kankiewicz, V. E. Larson, and T. H. Vonder Haar. *J. Appl. Met. and Clim.*, **47**, 2487–2495

2008: "An idealized model of the one-dimensional carbon dioxide rectifier effect." V. E. Larson and H. Volkmer, *Tellus B*, **60B**, 525-536.

2007: "Elucidating model inadequacies in a cloud parameterization by use of an ensemble-based calibration framework." J.-C. Golaz, V. E. Larson, J. A. Hansen, D. P. Schanen, and B. M. Griffin. *Mon. Wea. Rev.*, **135**, 4077–4096.

2007: "A single-column model intercomparison of a heavily drizzling stratocumulus-topped boundary layer." M. C. Wyant, C. S. Bretherton, A. Chlond, B. M. Griffin, H. Kitagawa, C.-L. Lappen, V. E. Larson, A. Lock, S. Park, S. R. de Roode, J. Uchida, M. Zhao, and A. S. Ackerman. *J. Geophys. Res.*, **112**, D24204, doi:10.1029/2007JD008536.

2007: "From cloud overlap to PDF overlap." V. E. Larson. *Quart. J. Royal Met. Soc.*, **133**, 1877-1891, doi:10.1002/qj.165.

2007: "What causes partial cloudiness to form in multilayered midlevel clouds? A simulated case study." M. J. Falk and V. E. Larson. *J. Geophys. Res.*, **112**, D12206, doi:10.1029/2006JD007666.

2007: "An analytic longwave radiation formula for liquid layer clouds." V. E. Larson, K. E. Kotenberg, and N. B. Wood. *Mon. Wea. Rev.*, **135**, 689-699.

2006: "What determines altocumulus dissipation time?" V. E. Larson, A. J. Smith, M. J. Falk, K. E. Kotenberg, and J.-C. Golaz. *J. Geophys. Res.*, **111**, D19207, doi:10.1029/2005JD007002.

2005: "Supplying Local Microphysics Parameterizations with Information about Subgrid Variability: Latin Hypercube Sampling." V. E. Larson, J.-C. Golaz, H. Jiang, and W. R. Cotton. *J. Atmos. Sci.*, **62**, 4010–4026.

2005: "Using probability density functions to derive consistent closure relationships among higher-order moments." V. E. Larson and J.-C. Golaz. *Mon. Wea. Rev.*, **133**, 1023–1042.

2004: "Prognostic equations for cloud fraction and liquid water, and their relation to filtered density functions." V. E. Larson. *J. Atmos. Sci.*, **61**, 338–351.

2002: "Small-scale and mesoscale variability in cloudy boundary layers: Joint three-dimensional probability density functions." V. E. Larson, J.-C. Golaz, and W. R. Cotton. *J. Atmos. Sci.*, **59**, 3519–3539.

2002: "A PDF-based model for boundary layer clouds. Part I: Method and model description." J.-C. Golaz, V. E. Larson, and W. R. Cotton. *J. Atmos. Sci.*, **59**, 3540–3551.

2002: "A PDF-based model for boundary layer clouds. Part II: Model results." J.-C. Golaz, V. E. Larson, and W. R. Cotton. *J. Atmos. Sci.*, **59**, 3552–3571.

2002: "Observed Microphysical Structure of Mid-level, Mixed-Phase Clouds." R. P. Fleishauer, V. E. Larson, and T. H. Vonder Haar. *J.* Atmos. Sci., **59**, 1779–1804.

2001: "The Effects of Thermal Radiation on Dry Convective Instability." V. E. Larson. *D*ynamics of Atmospheres and Oceans, **3**4, 45–71.

2001: "The Death of an Altocumulus Cloud." V. E. Larson, R. P. Fleishauer, J. A. Kankiewicz, D. L. Reinke, and T. H. Vonder Haar. *G*eophys. Res. Lett., **2**8, 2609–2612.

2001: "Small-scale and Mesoscale Variability of Scalars in Cloudy Boundary Layers: One-dimensional Probability Density Functions." V. E. Larson, R. Wood, P. R. Field, J.-C. Golaz, and T. H. Vonder Haar. *J.* Atmos. Sci., **5**8, 1978–1994.

2001: "Systematic Biases in the Microphysics and Thermodynamics of Numerical Models that Ignore Subgrid-scale Variability." V. E. Larson, R. Wood, P. R. Field, J.-C. Golaz, and T. H. Vonder Haar. *J.* Atmos. Sci., **5**8, 1117–1128.

2000: "Stability Properties of and Scaling Laws for a Dry Radiative-Convective Atmosphere." V. E. Larson. *Q*. J. R. Meteorol. Soc., **1**26, 145–171.

1999: "The Relationship Between the Transilient Matrix and the Green's Function for the Advection-Diffusion Equation." V. E. Larson. *J.* Atmos. Sci., **5**6, 2447–2453.

Invited Talks

"Parameterizing subgrid-scale variability in microphysical processes." Invited by Professor Roel Neggers to give an hour-long seminar at Koeln Universität in Cologne, Germany, 10 May 2016.

"Monte Carlo integration of microphysical processes in a climate model." Invited by Professor George Craig to give an hour-long seminar at Ludwig-Maximilians-Universität in Munich, Germany, 19 Apr 2016.

"Behavior of the CLUBB-SILHS parameterization in idealized simulations and global climate simulations." Invited by Dr. Dmitrii Mironov to give an hour-long talk at the German Weather Service in Offenbach, Germany, 29 Feb 2016.

"A subcolumn sampler for driving subgrid-scale microphysics." Invited by Dr. Dmitrii Mironov to give an hour-long talk at the German Weather Service in Offenbach, Germany, 25 Feb 2016.

"A PDF parameterization for stratiform cloud, shallow cumulus, and (optionally) deep cumulus." Invited by Dr. Dmitrii Mironov to give an hour-long talk at the German Weather Service in Offenbach, Germany, 23 Feb 2016.

"Don't forget the equations!" Invited by Dr. Samson Hagos to give a quarter-hour talk at the ASR Workshop on Convection in Richland, WA, 4 Feb 2016.

"Monte Carlo modeling of clouds and precipitation." Invited by Prof. David Mechem to give a half-hour invited talk at the Midwest Mathematics and Climate Conference in Lawrence, KS, Apr 2015.

"Incentivizing research on model development: Experiences from a Climate Process Team project on cloud macrophysics and aerosol indirect effects." Invited by Dr. Gad Levy to give a presentation at the Clivar Summit, 10 Jul 2014.

"Atmospheric modeling from cloud to global scale." Invited by Dr. Dorothy Koch to give a presentation at the DOE Biological and Environmental Research Seminar Series, 20 Nov 2013.

"What do process modelers want in a testbed?" Invited by Dr. Sally McFarlane to give a 20-min presentation at the DOE CESD Testbed Workshop in Germantown, MD, 5 Aug 2013.

"A climate process team to improve parameterization of cloud macrophysics and aerosol indirect effects." Invited by Dr. Joao Teixeira to give a presentation at the AGU Fall Meeting in San Francisco, CA, Dec 2012.

"Behavior of two climate models that include a PDF-based cloud parameterization." Invited by Dr. Richard Forbes to give a half-hour talk at ECMWF in Reading, U.K., 6 Nov 2012.

"An alternative framework for parameterizing clouds and turbulence in climate models." Invited by Dr. Robert Jacob to give a seminar at Argonne National Laboratory in Lemont, IL, 19 Mar 2012.

"CLUBB: A generalized parameterization for clouds and turbulence in WRF." Invited by Dr. Louisa Nance to speak at a monthly staff meeting of the Developmental Testbed Center at NCAR, Boulder, CO, 13 Oct 2011.

"Use of the PDF method to parameterize subgrid variability and drive microphysical schemes." Invited by Dr. Leo Donner to speak at a special session of the AGU Fall Meeting in San Francisco, CA, 14 Dec 2010.

"West coast and east coast parameterizations." Invited by Dr. Leo Donner to speak at an informal seminar at GFDL, Princeton, NJ, 20 May 2010.

"Simulations of CGILS clouds using CLUBB." Invited by Prof. Minghua Zhang to speak at the CGILS workshop, Stony Brook, NY, 2 Mar 2010.

"A process coupler for cloud models and parameterizations." Invited by Dr. Mikhail Ovchinnikov to speak at the Pacific Northwest National Laboratory seminar series, 10 Nov 2009.

"Parameterizing the joint overlap of moisture and temperature." Invited by Dr. Phil Rasch, NCAR, to speak at the CGD seminar series, Boulder, CO, 4 Dec 2007.

"The forgotten clouds." Invited by Mark Kulie, University of Wisconsin — Madison, to speak at the colloquium series in the Dept. of Atmospheric and Oceanic Sciences, 5 Nov 2007.

"Figuring out why your model is wrong." Invited by Prof. Richard Johnson, Colorado State University, to speak at the weekly seminar in the Dept. of Atmospheric Science, 19 Apr 2007.

"Multiscale modeling, clouds, and climate." Invited by Professor Noboru Nakamura, U. of Chicago, to speak at the Dept. of Geosciences seminar series, Chicago, IL, 2 Feb 2007.

"Parameterizing cloud layers and their microphysics." Invited by Dr. Phil Rasch, NCAR, to speak at the CGD seminar series, Boulder, CO, 21 Mar 2006.

"Parameterizing cloud layers and their microphysics." Invited by Prof. Robert Rauber, U. of Illinois, to speak at the departmental seminar series, Urbana-Champaign, IL, 16 Mar 2006.

"Higher-order closures and cloud parameterizations." Invited by Dr. João Teixeira, Naval Research Laboratory, to speak at the Workshop on the Parameterization of the Atmospheric Boundary Layer, Lake Arrowhead, CA, 15 Jun 2005.

"Some thoughts on cloud parameterization." Invited by Professor Michael Montgomery, Colorado State University, to speak at the weekly seminar series at Colorado State University, 3 Mar 2005.

"How Convexity affects the Physics and Simulation of Fluid Dynamics."
Invited by Professor Raymond Shaw to speak at the Physics Department seminar series at Michigan Technological University, 15 Mar 2001.

Conference Papers

"SILHS: A Monte Carlo interface between clouds and microphysics." V. E. Larson, C. Harlass, and J. Höft, 2013. Preprints, *F*ourteenth Annual WRF Users' Workshop, Boulder, CO, Natl. Cent. for Atmos. Res.

"Implementation and early tests of a PDF parameterization in WRF." V. E. Larson, C. Harlass, and J. Höft, 2012. Preprints, *T*hirteenth Annual WRF Users' Workshop, Boulder, CO, Natl. Cent. for Atmos. Res.

"Using the assumed PDF method to build a subgrid-scale parameterization." J.-C. Golaz and V. E. Larson, 2010. Preprints, *F*irst International Workshop on Nonhydrostatic Numerical Models, Kyoto, Japan, Japan Meteorological Society.

"PDF parameterization of boundary layer clouds and turbulence at resolutions that permit deep convection." V. E. Larson, D. P. Schanen, M. Wang, M. Ovtchinnikov, and S. Ghan, 2010. Preprints, *T*hirteenth Conference on Cloud Physics, Portland, OR, American Meteorological Society.

"Upscaling microphysical process rates to the grid box size." V. E. Larson and B. M. Griffin, 2010. Preprints, *T*hirteenth Conference on Cloud Physics, Portland, OR, American Meteorological Society.

"An analytic model of the vertical carbon dioxide rectifier effect." V. E. Larson and H. Volkmer, 2009. Preprints, *E*leventh Conference on Atmospheric Chemistry, Phoenix, Arizona, American Meteorological Society.

"Diagnosing structural errors in climate model parameterizations." V. E. Larson and J.-C. Golaz, J. A. Hansen, D. P. Schanen, and B. M. Griffin, 2008. Preprints, *T*wentieth Conference on Climate Variability and Change, New Orleans, Louisiana, American Meteorological Society.

"Coupling microphysics parameterizations to cloud parameterizations." V. E. Larson and B. M. Griffin, 2006. Preprints, *T*welfth Conference on Cloud Physics, Madison, Wisconsin, American Meteorological Society.

"A simulation of partial cloudiness in multilayered altocumuli." M. J. Falk and V. E. Larson, 2006. Preprints, *T*welfth Conference on Cloud Physics, Madison, Wisconsin, American Meteorological Society.

"Comparison of large-eddy simulations with a single-column model: Implications for mid-level cloud parameterization." A. J. Smith, B. M. Griffin, J.-C. Golaz, and V. E. Larson, 2006. Preprints, *T*welfth Conference on Cloud Physics, Madison, Wisconsin, American Meteorological Society.

"Derivation and tests of the GCSS analytic longwave radiation formula." K. E. Kotenberg, N. B. Wood, and V. E. Larson, 2006. Preprints, *T*welfth Conference on Atmospheric Radiation, Madison, Wisconsin, American Meteorological Society.

"Deriving prognostic equations for cloud fraction and liquid water content." V. E. Larson, 2004. Preprints, *F*ourteenth International Conference on Clouds and Precipitation, Bologna, Italy, International Commission on Clouds and Precipitation.

"Subgrid-scale CCN activation." J.-C. Golaz, S. Wang, and V. E. Larson, 2004. Preprints, *F*ourteenth International Conference on Clouds and Precipitation, Bologna, Italy, International Commission on Clouds and Precipitation.

"Turbulent and radiative structure of altocumulus clouds." V. E. Larson, C. M. Sears, and J-Ch. Golaz, 2002. Preprints, *E*leventh Conference on Cloud Physics, Ogden, Utah, American Meteorological Society.

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