J. WALTER LARSON
CURRICULUM VITAE

Contact Information
Mail : Mathematics and Computer Science Division
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Research Interests
Climate modeling and weather forecasting, high-performance computing, computational statistics, chaos and dynamical systems.

Graduate Education
College of William and Mary, Williamsburg, Virginia, U.S.A.
Ph.D. Theoretical Plasma Physics, April, 1992
M.Sc. Physics, May, 1986

Undergraduate Education
Drake University, Des Moines, Iowa, U.S.A.
B.A. Physics and Mathematics, 1984

Citizenship : United States of America

Employment History
Assistant Computational Scientist, Mathematics and Computer Science Division, Argonne National Laboratory, December, 1999-present.

Research Associate, Department of Meteorology, Earth System Science Interdisciplinary Center (ESSIC), University of Maryland and NASA Data Assimilation Office (DAO), NASA Goddard Flight Center, October, 1996-December, 1999.

Consultant, Department of Earth and Atmospheric Sciences, Purdue University, June-October, 1996.

Postdoctoral Fellow, Centre for Resource and Environmental Studies, The Australian National University, June, 1994 - May, 1996.

Postdoctoral Fellow, School of Earth Sciences, Macquarie University, October, 1992 - June, 1994.

Research and Teaching Assistantships, Physics Department, College of William and Mary, 1984–1992.

Refereed Journal Articles

C. J. Anderson, R. W. Arritt, E. S. Takle, Z. Pan, W. J. Gutowski, Jr. , F. Otieno, R. da Silva, D. Caya, J. H. Christensen, D. Luethi, M. A. Gaertner, C. Gallarado, F. Giorgi, S-Y. Hong, C. Jones, H-M. H. Juang, J. J. Katzfey, W. M. Lapenta, R. Laprise, J. W. Larson, G. Liston, J. L. McGrgor, R. A. Pielke Sr., J. O. Roads, and J. A. Taylor, "Hydrological Processes in Regional Climate Simulations of the Central United States Flood of June-July 1993," accepted, *Journal of Hydrometeorology*.

D. P. Dee, L. Rukhovets, R. Todling, A. M. da Silva, and J. W. Larson, "An Adaptive Buddy Check for Observational Quality Control," *Q. J. R. Met. Soc.*, **127**, 2451-72 (2001).

J. Syktus, J. Chappell, R. Oglesby, J. Larson, S. Marshall, and B. Saltzman, "Signal-Noise Patterns from Two General Circulation Models with CO_2 Forcing : Implications for Recognition of Enhanced Greenhouse", *Climate Dynamics*, **13(5)** :293-302 (1997).

D. E. Hyman, D. R. Whitehouse, J. A. Taylor, J. W. Larson, and J. A. Lindesay, "The ANU Translator : Facilitating computer visualization and data analysis of climate model outputs," *Environmental Software*, **11**, 65-72 (1996).

S. Marshall, J. A. Taylor, S. D. Prager, R. J. Oglesby, J. W. Larson, and D. J. Erickson III, "Climatic effects of biomass burning," *Environmental Software*, **11**, 53-58 (1996).

S. Marshall, R .J. Oglesby, J. Larson, and B. Saltzman, "A Comparison of GCM Sensitivity to Changes in CO_2 and Solar Luminosity," *Geophysical Research Letters*, **21**, 2487-90 (1994).

J. W. Larson and E. R. Tracy, "Integrability Properties of Charged Particle Dynamics in Reconnection Regions," *Physics Letters* **182A**, 249 (1994).

E. R. Tracy, J. W. Larson, A. R. Osborne, and L. Bergamasco, "On the Nonlinear Schrödinger Limit of the Korteweg-de Vries Equation," *Physica*, **32D**, 83 (1988).

J. W. Larson and E. R. Tracy, "Spectral Averaging of Small-Amplitude Sine-Gordon Wavetrains," *Physical Review* **38A**, 4419 (1988).

Refereed Conference Proceedings

E. T. Ong, J. W. Larson, and R. L. Jacob "A Real Application of the Model Coupling Toolkit," in *Proceedings of the 2002 International Conference on Computational Science*, C. J. K. Tan, J. J. Dongarra, A. G. Hoekstra, and P. M. A. Sloot (Eds.), Lecture Notes in Computer Science, Volume 2330, Springer-Verlag , pp. 748-757.

J. W. Larson, R. L. Jacob, I. T. Foster, and J. Guo, "The Model Coupling Toolkit," in *Proceedings of the International Conference on Computational Science (ICCS) 2001*, V. N. Alexandrov, J. J. Dongarra, B. A. Juliano, R. S. Renner, and C. J. K. Tan (eds.), Springer-Verlag Lecture Notes in Computer Science Volume 2073, pp 185-194 (2001).

J. A. Taylor and J. W. Larson, "Resolution Dependence in Modeling Extreme Weather Events," in *Proceedings of the International Conference on Computational Science (ICCS) 2001*, V. N. Alexandrov, J. J. Dongarra, B. A. Juliano, R. S. Renner, and C. J. K. Tan (eds.), Springer-Verlag Lecture Notes in Computer Science Volume 2073, pp 204-211 (2001).

C. H. Q. Ding, P. M. Lyster, J. W. Larson, J. Guo, and A. da Silva, "Atmospheric Data Assimilation on Distributed-Memory Parallel Computers," in *International Conference and Exhibition on High-Performance Computing and Networking (HPCN Europe '98)*, Springer-Verlag, Lecture Notes in Computer Science, (1998)

W. Sawyer, R. Lucchesi, P. M. Lyster, L. L. Takacs, A. Molod, J. Larson, S. Nebuda, and C. Pabon-Ortiz, "Parallelization of DAO Atmospheric General Circulation Model," in *Proceedings of the Fourth International Workshop on Applied Parallel Computing (PARA98)*, Springer-Verlag, Lecture Notes in Computer Science, (1998).

P. M. Lyster, J. W. Larson, J. Guo, W. Sawyer, A. da Silva, and I. Stajner, "Progress in the Parallel Implementation of the Physical-space Statistical Analysis System (PSAS)," in *Making its Mark : Proc. Seventh ECMWF Workshop on the Use of Parallel Processors in Meteorology*, Eds. G-R. Hoffmann and N. Kreitz, pp. 382-393, World Scientific (1998).

W. Sawyer, R. Lucchesi, P. M. Lyster, L. L. Takacs, A. Molod, J. Larson, S. Nebuda, and C. Pabon-Ortiz, "Parallelization Aspects of an Atmospheric General Circulation Model for Data Assimilation," in *Proceedings of the 1998 Advanced Simulation Technologies Conference, High Performance Computing Symposium*, Ed. A. Tentner, Society for Computer Simulation International (1998).

P. M. Lyster, J. W. Larson, W. Sawyer, C. H. Q. Ding, J. Guo, A. M. da Silva, and L. L. Takacs, "Parallel Computing at the NASA Data Assimilation Office (DAO)," *Proc. Supercomputing97*, San Jose, November (1997).

J. W. Larson, P. M. Lyster, W. Sawyer, C. H. Q. Ding, J. Guo, A. M. da Silva, and L. L. Takacs, "Progress in the Design and Optimization of the Parallel Goddard Data Assimilation System (DAS)," in *Proceedings of High Performance Computing 1997 : Grand Challenges in Computer Simulation*, Ed. A. Tentner, p. 52., Society for Computer Simulation International (1997).

E. R. Tracy, J. W. Larson, A. R. Osborne, and L. Bergamasco, "On the Relationship Between the Spectral Theories for the Periodic Korteweg-de Vries and Nonlinear Schrödinger Equations," in *Proceedings of the 1988 Enrico Fermi School*, A. R. Osborne and L. Bergamasco, Eds. Elsevier, Amsterdam (1989).

E. R. Tracy, J. W. Larson, A. R. Osborne, and L. Bergamasco, "On the Nonlinear Schrödinger Theory as an Averaging Theory," in *Proceedings of the Fourth International Conference on Nonlinear Evolution Equations and Dynamical Systems*, J.Léon, ed., pp. 593-602, World Scientific (1988).

Other Refereed Publications

J. W. Larson, "Painlevé Singularity Analysis Applied to Charged Particle Dynamics During Reconnection," PhD Thesis, College of William and Mary, (1992).

Other Conference Proceedings

J. W. Larson, J. A. Taylor, J. L. Kesteven, and M. F. Hutchinson, "Regional-scale climate studies of Australia using RegCM2," in *Proceedings of the International Congress on Modeling and Simulation*, Newcastle, 27-30 November, Vol. II, 15-20 (1995).

J. W. Larson and R. J. Oglesby, "Various Approaches to the Problem of Model-Reality Comparison," in *Proceedings of the International Congress on Modeling and Simulation*, Newcastle, 27-30 November, Vol. II, 274-283 (1995).

D. E. Hyman, D. R. Whitehouse, J. A. Taylor, J. W. Larson and J. A. Lindesay "The ANU Translator : Facilitating computer visualization and data analysis of climate model outputs," in *Proceedings of the International Congress on Modeling and Simulation*, Newcastle, 27-30 November, Vol. II, 221-226 (1995).

D. Hansen, J. W. Larson and J. A. Taylor "The NCAR CCM2 (Community Climate Model 2) on the ANU Fujitsu VP2200," in *Proceedings of the International Congress on Modeling and Simulation*, Newcastle, 27-30 November, Vol. II, 269-274 (1995).

S. Marshall, J. A. Taylor, S. D. Prager, R. J. Oglesby, J. W. Larson, and D. J. Erickson III, "Climatic effects of biomass burning," in *Proceedings of the International Congress on Modeling and Simulation*, Newcastle, 27-30 November, Vol. II, 56-60 (1995).

S. Marshall, J. A. Taylor, S. D. Prager, R. J. Oglesby, J. W. Larson, and D. J. Erickson III, "Climatic effects of biomass burning," in *Proceedings of Global Analysis, Interpretation, and Modeling : the First Conference*, IGBP, Garmisch-Partenkirchen, Germany, 25-29 September, 1995.

R. J. Oglesby, A. J. Jakeman, D. A. Post, S. Schreider, Z. Fan, D. P. Hansen, J. A. Taylor, and J. W. Larson, "Coupling a regional precipitation runoff model to global and regional climate models," in *Proceedings of Global Analysis, Interpretation, and Modeling : the First Conference*, IGBP, Garmisch-Partenkirchen, Germany, 25-29 September, 1995.

A. J. Jakeman, R. J. Oglesby, D. P. Hansen, D. A. Post, S. Schreider, J. A. Taylor, J. W. Larson, and G. M. Hornberger, "Modeling land surface-atmosphere interactions and water resource impacts : Alternative approaches," in *Proceedings of Second International Study Conference on GEWEX in Asia and GAME, National Research Council of Thailand*, Bangkok, Thailand, March 6-10, 1995.

G. Michael and J. W. Larson, "CCM1 on The AP1000," in *Proceedings of the Third Parallel Computing Workshop*, Kawasaki, Japan, 1994.

J. W. Larson, J. A. Taylor, and R. J. Oglesby, (1994) "Atmospheric modeling on the AP1000," in *Proceedings of the Third Parallel Computing Workshop*, Kawasaki, Japan, pp. P2-T-1,5.

Monographs and Technical Reports

Cecelia Deluca, J. Walter Larson, Lawrence Buja, Anthony Craig, and John Drake, *Community Climate System Model Software Engineering Plan 2000-2005*, CCSM Software Engineering Working Group Report, National Center For Atmospheric Research (2000, updated 2002).

J. Guo, J. W. Larson, P. M. Lyster, and G. Gaspari, *Documentation of the Physical-space Statistical Analysis System (PSAS) : The Factored Operator Error Covariance Model Formulation*, DAO Office Note 98-04, Data Assimilation Office, Goddard Space Flight Center, Greenbelt, MD 20771 (1998).

J. Larson, J. Guo, P. M. Lyster, and G. Gaspari, *Documentation of the Physical-space Statistical Analysis System (PSAS) : The Software Implementation of the PSAS*, DAO Office Note 98-05, Data Assimilation Office, Goddard Space Flight Center, Greenbelt, MD 20771 (1998).

P. M. Lyster, J. W. Larson, C. H. Q. Ding, J. Guo, W. Sawyer, A. M. da Silva, and I. Stajner, *Design of the Goddard Earth Observing System (GEOS) Parallel Physical-space Statistical Analysis System (PSAS)*, DAO Office Note 97-05, NASA Goddard Space Flight Center, Greenbelt, Maryland 20771 (1997).

D. E. Hyman, D. R. Whitehouse, J. W. Larson, and J. A. Taylor, *A visualization package for the atmospheric modeling project on the AP1000*. Report to Fujitsu Ltd., Tokyo, Japan (1995).

J. W. Larson, J. A. Taylor, D. Sitsky, and J. Michalakes, *Establishment of the Penn State/NCAR Mesoscale Model 5 on the AP1000*. Report to Fujitsu Ltd., Tokyo, Japan (1995).

J. W. Larson, J. A. Taylor, D. Sitsky, and J. Michalakes, *Status of MPMM on the AP1000*. Report to Fujitsu Ltd., Tokyo, Japan (1995).

J. W. Larson, *Visualization Issues Related to the Atmospheric Modeling Project on the AP1000*. Report to Fujitsu Ltd., Tokyo, Japan (1994).

J. A. Taylor, J. W. Larson, and R. J. Oglesby, *Simulating the urban heat island effect using the NCAR/PSU MM4/MM5 regional Climate Models*. Report to Fujitsu Ltd., Tokyo, Japan (1994).

J. W. Larson, G. Michael, and P. Wielopolski, *NCAR Community Climate Model (CCM1) on the AP1000 : Towards a Research Tool*. Report to Fujitsu, Ltd., Tokyo, Japan (1994).

J. Larson and I. Mokhov, *An Intercomparison of Total Cloud Among Six MECCA Phase I Models*. Report to the Model Evaluation Consortium for Climate Assessment (MECCA) (1994).

J. Larson and A. Henderson-Sellers, *Tropical Cyclones and Climate Change : Preliminary Study of Formation and Potential Impacts*. Report to the Model Evaluation Consortium for Climate Assessment (MECCA) (1994).

Invited Talks

"A Component Programming Model for the Model Coupling Toolkit," invited talk, Joint SWMF-ESMF Interoperability and Model Coupling Workshop, University of Michigan, Ann Arbor, MI February 25-26, 2003.

"The MxN Problem," invited talk, Joint SWMF-ESMF Interoperability and Model Coupling Workshop, University of Michigan, Ann Arbor, MI February 25-26, 2003.

"MCT : What's Going On...," invited talk, Fourth International Workshop on Next Generation Climate Models for Advanced High Performance Computing Facilities, NCAR, Boulder, Colorado, March 12-14, 2002.

"The Model Coupling Toolkit," Invited Talk, Workshop on Space Environment Model Interfaces, University of Michigan, Ann Arbor, MI, July 17-18, 2001.

"Proposal for standard diagnostics and data interchange modules in PIRCS," Project to Intercompare Regional Climate Simulations (PIRCS) Review and Planning Workshop, Copenhagen, Denmark, 22-23 May 2000.

"Software Implementation of the Physical-space Statistical Analysis System (PSAS)," PSAS Workshop, NASA Goddard Space Flight Center, October 26, 1998.

"Parallelization of the Physical-space Statistical Analysis System (PSAS)," NASA Computational Aerosciences (CAS) Workshop '98, NASA Ames Research Center, Mountain View, CA, August 25-27, 1998.

"Analysis of GCM Output on the Annual, Seasonal, Monthly, and Daily Time-scales," Intergovernmental Panel on Climate Change (IPCC) Meeting, Sydney, Australia, February 7-9, 1994.

Panels

Moderator, "The Earth System Modeling Framework (ESMF) Superstructure," The first ESMF Community Meeting, Washington, DC, May 30, 2002.

J. Fedchak and W. Cummings, and J. W. Larson, "Physics and the Creative Process," Forum with the Psychology of Creativity course at Columbia College, Chicago, December 12, 1995.

Seminars and Colloquia

"From Parallel Models to Parallel 'Super Models' Using The Model Coupling Toolkit," Seminar, Sandia National Laboratory, February 26, 2002.

"The Model Coupling Toolkit : Building Blocks for Parallel Earth System Models," Seminar, Atmospheric Science Division, Lawrence Livermore National Laboratory, February 25, 2002.

"What is the Model Coupling Toolkit ?" Seminar, NASA Center for Computational Sciences (NCCS), NASA Goddard Space Flight Center, November 9, 2001.

"A Fortran90 Model Coupling Toolkit," Seminar, Southwest Research Institute, San Antonio, TX, October 5, 2001.

"The Model Coupling Toolkit," Seminar, Naval Postgraduate School, Monterrey, CA, May 31, 2001.

J. W. Larson and R. L. Jacob, "The Model Coupling Toolkit," Brown Bag Seminar, Mathematics and Computer Science Division, Argonne National Laboratory, January 11, 2001.

"The Physical-space Statistical Analysis System (PSAS)–A Parallel Framework for Atmospheric Data Analysis ?," ALICE Brown Bag Seminar, Mathematics and Computer Science Division, Argonne National Laboratory, March 23, 2000.

"The Physical-space Statistical Analysis System (PSAS)," Seminar, Mathematics and Computer Science Division, Argonne National Laboratory, July 30, 1999.

"A few Remarks on Numerical Model Validation and Sensitivity Analysis," ANU Advanced Computation Seminar, The Australian National University, April 29, 1996.

"Regional and Global Atmospheric Models on the AP1000," CAP Technical Group Seminar, The Australian National University, July 13, 1995.

" Analysis and Packaging of GCM Output," Centre for Resource and Environmental Studies (CRES) Seminar, The Australian National University, May 12, 1994.

Contributed Talks and Other Conference Papers

T. Bettge, A. Craig, B. Kauffman, J. Larson, R. Jacob, and E. Ong, "The CCSM Next Generation Coupler–The CPL6 Instantiation," The Seventh Community Climate System Model Workshop, Breckenridge, CO, June 25-27, 2002.

R. W. Arritt, C. J. Anderson, W. J. Gutowski, E. S. Takle, Z. Pan, F. Otieno, M. de Castro, D. Caya, S-C. Chen, J. H. Christensen, O. B. Christensen, M. Fox-Rabinovitz, M. A. Gaertner, F. Giorgi, G. Grell, S-Y . Hong, H-M. H. Juang, J. J. Katzfey, W. M. Lapenta, R. Laprise, J. W. Larson, G. Liston, D. Luethi, P. Marbaix, J. L. McGregor, R. A. Pielke Sr., J. O. Roads, M. Rummukainen, and J. A. Taylor, "Multi-Model Ensemble and Intercomparison for the 1993 Flood Over the Central U.S.A.," XXVI Meeting of the European Geophysical Society (2001).

J. W. Larson and R. .J. Oglesby, "Determining Large versus Small-Scale Atmospheric Variations Through the Application of Statistical Polishing," American Geophysical Union Fall Meeting, December 14-19, 2000.

J. A. Taylor and J. W. Larson, "High Resolution Regional Climate Modeling for the Midwest and Great Plains using MM5v3," American Geophysical Union Fall Meeting, December 14-19, 2000.

J. Larson, R. Jacob, and J. Guo, "Under Construction : The Model Coupling Toolkit," Chattaqua Workshop on Lake Superior, Two Harbors MN, Nov 3-5, 2000.

J. A. Taylor and J. W. Larson, and I. T. Foster, "Regional Climate Simulations for the U.S. Midwest Using MM5v3," MM5 Users' Workshop, Boulder, Colorado, June 22-25, 2000.

J. W. Larson, "A Set of File and Diagnostic Utilities for MM5v3," MM5 Users' Workshop, Boulder, Colorado, June 22-25, 2000.

J. Taylor, J. Larson, and I. Foster, "Bridging the Climate Information Gap : A Case Study for the U.S. Midwest," Climate Change Prediction Program Workshop, Bethesda, MD March 27-29, 2000.

"Tropical Cyclones and Climate Change," MECCA Technical Committee Meeting, Sydney, Australia, February 10-11, 1994.

"Total Cloud Amount as Represented by GCMs," MECCA Technical Committee Meeting, Sydney, Australia, February 10-11, 1994.

"Phase-Space Methods Applied to Climate Model Output," Tripartite Meeting on Climate Model Validation and Regional Scenarios, Melbourne, Victoria, April 4-7, 1993.

"Painlevé Analysis Applied to Particle Dynamics in Magnetic and Electric Fields Associated with Reconnection," Sherwood Plasma Theory Conference, Santa Fe, New Mexico, April 6–8, 1992.

"Integrability Properties of Particle Dynamics During Reconnection," Spring Meeting of the American Geophysical Union, Montréal, May 11–15, 1992.

"Painlevé Analysis of Reconnection Fields," Thirty-third Annual Meeting of the American Physical Society, Division of Plasma Physics, Tampa, Florida, November 4–8, 1991.

"Particle Dynamics in the Neighborhood of a Magnetic Null," American Geophysical Union Spring Meeting, Baltimore, Maryland, May 28–31, 1991.

"A Simulation of Interactions Between a Wave Packet and Particles Trapped in a Magnetic Mirror Field," First General Meeting of the APS Topical Group in Computational Physics, Boston, Massachusetts, June 5–8, 1989.

"Averaging of Nonlinear Wavetrains," Sherwood Plasma Theory Conference, Gatlinburg, Tennessee, April 18–20, 1988.

Grants and Contracts

"Collaborative Design and Development of the Community Climate System Model for Terascale Computers," DOE/BER Scientific Discovery through Advanced Computing (SciDAC) / Climate Change Prediction Program (CCPP) (funded FY2002-FY2006), R. Malone and J. Drake (PIs), co-I's : C. Ding, P. Duffy, D. Erickson, I. Foster, S. Ghan, R. Jacob, P. Jones, J. Larson, A. Mirin, D. Rotman, J. Taylor, P. Worley, T. Bettge, M. Blackmon, T. Craig, C. Deluca, S-J. Lin, W. Washington, and D. Williamson. ANL funding $700,000 (FY2002), $700,000 (FY2003).

"A High-Performance Software Framework and Interoperable Applications for the Rapid Advancement of Earth System Science : Part I : Core Earth System Modeling Framework Development," NASA Earth System Technology Office/Computational Technology (ESTO/CT) program (funded 2002-2004), Timothy Killeen (PI), co-I's : Jeffery Anderson, Byron A. Boville, Cecelia Deluca, Arlindo da Silva, Roberta Johnson, Philip W. Jones, J. Walter Larson, Stephen J. Lord, John Marshall, Barry F. Smith, Quentin F. Stout, and Max J. Suarez. Total ANL funding 2002-2004 : $338,700.

"Climate Applications of the Common Component Architecture CCA and the Terascale Simulation Tools and Technologies," DOE/MICS Scientific Discovery through Advanced Computing program, MICS matching funds (funded FY2002-FY2006). ANL funding : $110,000 (FY2002), $115,000 (FY2003).

"Development of a Modular, Performance-Portable Climate System Model," United States Department of Energy BER project, Ian Foster (PI), DOE and NCAR co-I's : Chris Ding , John Drake, Phil Jones, Jay Larson, Doug Rotman, Thomas Bettge, Maurice Blackmon, Byron Boville, Cecelia Deluca, David Williamson. Argonne funding : $240,000 (FY2000) and $480,000 (FY2001).

"Delivering High-Resolution Regional Climate Data and Analysis Tools via the Web," ANL Cooperative Research and Development Agreement (CRADA) with Research Systems, Inc, John Taylor (PI), Jay Larson, and Ian Foster : $25,000 (FY 2000).

"The Penn State/NCAR MM5 on the AP1000," Contract with Fujitsu Corporation Ltd Japan, J. W. Larson and J. A. Taylor, 1995 $23,000

Consultancy in phase-space methods and timeseries analysis (with E. R. Tracy), Allied Signal, May-October, 1992, $10,000.

NSF NATO Summer School Travel Grant, 1992 $1,000.

Teaching Experience

Astronomy Laboratory Instructor, Virginia Governor's School, summer, 1990.

Four semesters teaching Introductory Astronomy Laboratory courses, College of William and Mary.

Two semesters teaching Introductory Physics Laboratory courses, College of William and Mary.

Professional Society Memberships

American Geophysical Union

American Meteorological Society

Association for Computing Machinery

IEEE Computer Society