

# Tamara Shapiro Ledley

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Senior Scientist

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Dr. Tamara Shapiro Ledley, a senior scientist and chair of the Center for Science Teaching and Learning at TERC, received her PhD from MIT in 1983. Early in her career she led a research program in Earth system science and climate change at Rice University. She joined TERC in 1997 to pursue her science education interests. She led the development of the award winning Earth Exploration Toolbook (<http://serc.carleton.edu/eet>). She is now leading the development of the Climate Literacy and Energy Awareness Network (CLEAN) Collection of rigorously reviewed climate and energy educational resources and is chairing the CLEAN Network, a professionally diverse community of climate and energy literacy stakeholders <http://cleanet.org>. She also leads the EarthLabs project <http://serc.carleton.edu/earthlabs> that focuses on development of curriculum materials, teacher professional development programs, and science education research focused on enabling the effective teaching and learning of climate science. She is the 2013 American Geophysical Union's Excellence in Geophysical Education Awardee for her work in bring Earth science data and tools to teachers and students and for her leadership in climate literacy.

## Honors and Awards

- Recipient of the 2013 American Geophysical Union's Excellence in Geophysical Education Award [http://honors.agu.org/awards-medals-prizes/Citation and Response](http://honors.agu.org/awards-medals-prizes/Citation%20and%20Response) published in EOS, January 14, 2014
- Journal of Geophysical Education Outstanding Paper of 2012 award for "A Model for Enabling an Effective Outcome-Oriented Communication Between the Scientific and Educational Communities" by Ledley, Taber, Lynds, Domenico, and Dahlman, <http://nagt-jge.org/doi/abs/10.5408/11-234.1>, August 2012.
- Federation of Earth Science Information Partners (ESIP Federation) Presidents Award for significant contributions to the ESIP Federation <http://www.esipfed.org/presidents-award>.
- Science Prize for Online Resource in Education (SPORE Award) from Science Magazine for the Earth Exploration Toolbook <http://serc.carleton.edu/eet>, [http://www.eurekaalert.org/pub\\_releases/2011-09/aaft-jg092311.php](http://www.eurekaalert.org/pub_releases/2011-09/aaft-jg092311.php), September 2011.

The focus of Dr. Ledley's research at Rice University was to understand the role of sea ice and continental ice sheets in shaping global climate. Using energy balance climate and dynamic ice flow models she examined the impact of sea ice on the exchange of energy between the ocean and the atmosphere, the implications of changes in the sea ice cover for local and global climate, and the mechanisms that produced the growth and decay of ice sheets that define the 100,000 year ice age cycle

Dr. Ledley's early work in Earth system science education included developing museum exhibits that bring near real time images of the Earth to the public, contributing science content to planetarium shows, directing teacher training programs in the Earth sciences, developing Earth system science learning activities for the GLOBE program and serving as lead author of the Earth as a System investigation in the [GLOBE Teachers Guide](#), and developing scientific research programs for the participation of students.

Dr. Ledley is a founding member and chair of the CLEAN Network (formerly Climate Literacy Network (<http://www.cleanet.org/cln>)). This work has led to a number of projects. The first is an NSF National Science Digital Library (NSDL, <http://www.nsdlib.org>) and Climate Change Education grant to develop the "Climate Literacy and Energy Awareness Network (CLEAN) Pathway" (<http://cleanet.org>), a stewarded collection of inquiry-based educational resources that will help learners understand the Essential Principles of Climate Science (<http://cleanet.org/cln/climateliteracy.html>). This work has received continuing funding for CLEAN Core services from NOAA. The second is an NSF DRK12 and Climate Change Education grant, "Confronting the Challenges of Climate Literacy" project to develop a set of three EarthLabs modules (<http://serc.carleton.edu/earthlabs>) on climate change that will serve as a laboratory component of a high-school capstone course in Earth and space science; and conduct a study, using those modules of the obstacles to student understanding of change over time and how to overcome those them. Others include the NASA Global Climate Change Education Program funded "Earth System Science: A Key to Climate Literacy" project, and the NSF funded project "Facilitating a Deeper Student Understanding of Change in the Earth System on Multiple Time Scales" project.

Dr. Ledley has also been involved in a spectrum of projects that focus on the facilitation of the use of Earth science data in educational contexts and leverage the national digital library efforts. She received NSF NSDL grants to develop the Earth Exploration Toolbook (EET, <http://serc.carleton.edu/eet>), an online resource that provides step-by-step instructions for the use of an Earth science dataset and data analysis tool by teachers in the classroom; and to run innovative professional development workshops focused on specific datasets and analysis tools in the EET (<http://serc.carleton.edu/eet/workshops.html>). She also received NSF grants to lead the Digital Library for Earth System Education (DLESE) Data Services and AccessData (<http://serc.carleton.edu/usingdata/accessdata>) projects that focused on bridging the communication gap scientific and educational communities to make more Earth science datasets accessible and available to teachers and students; and the Tools for Data Analysis in the Middle School Classroom (DataTools, <http://serc.carleton.edu/eet/msdatatools>) project that facilitates middle school teachers learning and adapting IT tools and Earth science data for use in the classroom.

Dr. Ledley was a member of the National Research Council Roundtable on Climate Change Education. She has served as chair of the Standing Committee for Education, and as Vice-President for the Federation of Earth Science Information Partners (ESIP Federation, <http://www.esipfed.org>), and is a member of the Board of Trustees of the Foundation of Earth Science for the ESIP Federation. She is also a member of the External Advisory Board for the Byrd Polar Research Center at the Ohio State University. In her role as chair of the CLEAN Network she has coordinated multiple interdisciplinary and transdisciplinary sessions for the AGU and GSA annual meetings. She has also served as the chair of the Committee on Global and Environmental Change of the American Geophysical Union (AGU) and chair of the panel to develop the original AGU position statement on Climate Change and Greenhouse Gases in 1998; and as chair of the panel for GSA to develop a position statement titled Promoting Earth Science Literacy for Public Decision Making in 2012.

## Positions

- TERC, Cambridge, Massachusetts, Senior Scientist, 1997-present, Center for Science Teaching and Learning: Chair 2011-present, Co-Director 2006-present.
- Adjunct Professor, University of Massachusetts Dartmouth, 2008-2009

- Department of Earth, Atmospheric and Planetary Sciences, Massachusetts Institute of Technology, Cambridge, Massachusetts, Visiting Scientist, 1997-98
- Department of Space Physics and Astronomy and the Earth Systems and The Energy and Environmental Systems Institute, Rice University, Houston, Texas, 1983-98, Senior Faculty Fellow (1990-98), Assistant Research Scientist (1985-1990), Research Associate (1983-1985), Lecturer on Space Physics & Astro. (Spring 1990 & 1991)
- Department of Mathematics and Sciences, Babson College, Babson Park, Massachusetts, Lecturer, Spring 1997
- Department of Meteorology, Texas A&M University, College Station, Texas, Associate Research Scientist, 1995-1996
- Department of Geology and Geophysics, Rice University, Houston, Texas Spring 1993, Visiting Lecturer in Geology and Geophysics

## Editorships and Associations

- Journal of Geophysical Research-Atmospheres, 1993-1996, Associate Editor
- American Association for the Advancement of Science (AAAS)

Electorate Nominating Committee 1995-1998  
Member-at-large, Education Section 2014-2018

- Climate Literacy Network, 2008-present, chair
- Chair of GSA Panel on Promoting Earth Science Literacy for Public Decision Making: 2011-2012
- Counselor-at-Large, NAGT, 2011-present
- Byrd Polar Research Center External Advisory Board Member - 2012-present
- AGU, Member 1983-present

Committee on Global Environmental Change: 1993-2000, Chair 1996-2000  
Chair of AGU Panel for Global Change and Greenhouse Gases Position Statement: 1998-1999  
Public Information Committee: 2000-2002  
Cowen Award Committee: 2008-2010  
Coordinator of Climate Literacy sessions at Fall AGU meetings - 2011-present

- Federation of Earth Science Information Partners (ESIP Federation): 1998-present

Foundation of Earth Science Board of Directors - 2004-present  
Chair, Constitutions and ByLaws Committee, 2013-2014  
Vice President, 2004-2006  
Chair, Standing Committee for Education, 2002-2004, 2006-2009  
Application Partners (Type III) Representative, 2009-2010  
Vice Chair, Standing Committee on Community Engagement, 2000-2002  
Lead, Education Cluster, 2000-2002

- Digital Library for Earth System Education (DLESE): 2000—2007

DLESE Management Council—Member—2003-2006  
DLESE Data Services and AccessData PI, 2003-2011  
Planning Committee for DLESE Annual Meeting  
Chair 2002-2003, Program sub-committee chair 2001-2002, Member 2003-2004  
Data Access Working Group—member: 2001, facilitator: 2003-2006

## Current Major Projects

[Climate Literacy and Energy Awareness Network \(CLEAN\) Core, NOAA](#) - Climate Program Office, Principle Investigator

[Confronting the Challenges of Climate Literacy](#), NSF-DR-K12/Climate Change Education/Antarctic Education, Principle Investigator

[Climate Change Education: Science, Solutions, and Education in an Age of Media](#), NASA Innovations in Climate Education, co-Principle Investigator

## Selected Publications

[Click here for full list of publications](#)

Ledley, T.S., Promoting Climate Literacy, Public Gardens, Journal of the American Public Garden Association, v.27, 39-40, <http://www.publicgardens.org/files/images/2012Vol2-3/index.html>, Summer/Fall 2012.

Ledley, T.S., N. Haddad, E Bardar, K. Ellins, K. McNeal, J. Libarkin, EarthLabs – An Earth System Science Laboratory Module to Facilitate Teaching About Climate Change, *The Earth Scientist*, v.28, n.3, p19-24, <https://www.nestanet.org/cms/content/publications/tes>, September 2012.

Gold, Anne U., T.S. Ledley, S.M Buhr, S. Fox, M. McCaffrey, F. Niepold, S. Lynds, Peer-Review of Digital Educational Resources: A Rigorous Review Process Developed by the Climate Literacy and Energy Awareness Network (CLEAN), *Journal of Geoscience Education*, v.60, 295-308, <http://dx.doi.org/10.5408/12-324.1>, 2012.

Ledley, T.S, M.R. Taber, S. Lynds, B. Domenico, L. Dahlman, A Model for Enabling an Effective Outcome-Oriented Communication Between the Scientific and Educational Communities, *Journal of Geoscience Education*, v.60, no. 3, pp 257-267, doi: 10.5408/11-234.1, <http://nagt-jge.org/doi/abs/10.5408/11-234.1>, August 2012.

- Taber, M.R., T.S. Ledley, S. Lynds, B. Domenico, L. Dahlman, Geoscience Data for Educational Use: Recommendations from Scientific/Technical and Educational Communities, *Journal of Geoscience Education*, v 60, no. 3, pp249-256, doi: 10.5408/12-297.1, <http://nagt-jge.org/doi/abs/10.5408/12-297.1>, August 2012.
- Ledley, T.S., N. Haddad, E. Bardar, K. Ellins, K. McNeal, J. Libarkin, EarthLabs – An Earth System Science Laboratory Module to Facilitate Teaching About Climate Change, *The Earth Scientist*, v.28, n.3, p19-24, <https://www.nestanet.org/cms/content/publications/tes>, September 2012.
- Gold, Anne U., T.S. Ledley, S.M Buhr, S. Fox, M. McCaffrey, F. Niepold, S. Lynds, Peer-Review of Digital Educational Resources: A Rigorous Review Process Developed by the Climate Literacy and Energy Awareness Network (CLEAN), *Journal of Geoscience Education*, v.60, 295-308, <http://dx.doi.org/10.5408/12-324.1>, 2012.
- Ledley, T.S., Promoting Climate Literacy, Public Gardens, *Journal of the American Public Garden Association*, v.27, 39-40, <http://www.publicgardens.org/files/images/2012Vol2-3/index.html>, Summer/Fall 2012.
- Ledley, T.S., L. Dahlman, C. McAuliffe, N. Haddad, M. Taber, B. Domenico, S. Lynds, M. Grogan, Making Earth Science Data Accessible and Usable in Education, *Science*, vol 333 no. 6051 pp1838-1839, DOI: 10.1126/science.1199348, <http://www.sciencemag.org/content/333/6051/1838.summary>, September 30, 2011.
- Ledley, T.S., A. Prakash, C.A. Manduca, and S. Fox, "Recommendations for Making Geoscience Data Accessible and Usable in Education" *EOS*, v89, n32, p291, August 5, 2008, (DOI: 10.1029/2008EO2003) <http://onlinelibrary.wiley.com/doi/10.1029/2008EO320003/abstract>.
- Ledley, T.S., L. Dahlman, C. McAuliffe, N. Haddad, The Earth Exploration Toolkit: Facilitating Access to Scientific Data and Tools, *Journal of Geoscience Education*, 54 n.3, 223-229, 2006.
- Ledley, T.S., L. Dahlman, B. Domenico, and M.R. Taber, "Facilitating the Effective Use of Earth Science Data in Education through Digital Libraries: Bridging the Gap between Scientists and Educators" , *IEEE Technical Committee on Digital Libraries Bulletin*, v 2, no 1, <http://www.ieee-tcdl.org/Bulletin/v2n1/ledley/ledley.html>, 2005.
- Ledley, T.S., C. McAuliffe, L. Dahlman, Earth Exploration Toolkit: Educational Uses of Earth System Science Datasets and Tools, ), *Focus on Earth Science; NSDL as a Research Tool, Project Kaleidoscope Volume IV: What Works, What Matters, What Lasts*, [http://www.pkal.org/template2.cfm?c\\_id=1413](http://www.pkal.org/template2.cfm?c_id=1413), August 27, 2004.
- Ledley, T.S., N. Haddad, J. Lockwood, D. Brooks, Developing Meaningful Student-Teacher-Scientist Partnerships, *Journal of Geoscience Education*, 51, 91-95, 2003.
- Ledley, T.S., Energy Balance Model: Surface, *Encyclopedia of Atmospheric Sciences*, Elsevier Science Ltd, London, 747-754, 2003.
- Ledley, T.S., E.T. Sundquist, S.E. Schwartz, D.K. Hall, T.L. Killeen, and J.D. Fellows, Climate Change and Greenhouse Gases, *EOS*, 80, 453-454 & 457-458, 1999.
- Ledley, T.S. and Z. Huang, A Possible ENSO Signal in the Ross Sea, *Geophysical Research Letters*, 24, 3253-3256, 1997.
- Ledley, T.S. & S. Chu, The Initiation of Ice Sheet Growth, Milankovitch Solar Radiation Variations, and the 100 KYR Ice Age Cycle, *Climate Dynamics*, 11, 439-445, 1995.
- Ledley, T.S., Summer Solstice Solar Radiation, the 100 KYR Ice Age Cycle, and the Next Ice Age, *Geophysical Research Letters*, 22, 2745-2748, 1995.
- Ledley, T.S. and S. Chu, Global Warming and the Growth of Ice Sheets, *Climate Dynamics*, 9, 213-219, 1994.