

JESSICA LUNDQUIST

Curriculum Vitae

Civil and Environmental Engineering
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EDUCATIONAL HISTORY

Scripps Institution of Oceanography, University of California, San Diego
Doctor of Philosophy in Oceanography, with an emphasis on Hydrology and Hydroclimatology
September 2004

Dissertation Title: *The Pulse of the Mountains: Diurnal Cycles in Western Streamflow*

Scripps Institution of Oceanography, University of California, San Diego
Masters of Science in Oceanography
June 2000

Thesis Title: *California and Oregon Humidity and Coastal Fog*

University of California, Davis
Bachelors of Science in Atmospheric Science
March 1999

EMPLOYMENT HISTORY

University of Washington
Seattle, WA, USA
Assistant Professor, 2006-present

CIRES – NOAA Climate Diagnostics Center, University of Colorado, Boulder
Boulder, CO, USA
Postdoctoral Fellow, 2004-2006

Scripps Institution of Oceanography, University of California, San Diego
La Jolla, CA, USA
Graduate Student Researcher, 1999-2004

Woods Hole Oceanographic Institution
Woods Hole, MA, USA
Undergraduate Researcher (NSF REU program), 1998

AWARDS AND HONORS

Cryosphere Young Investigator Award, 2008, American Geophysical Union (AGU).

Climate Science Paper Award for most interesting, useful and relevant recent scientific publication, 2008, California Department of Water Resources.

CIRES Postdoctoral Fellowship, 2004, Climate Diagnostics Center and University of Colorado in Boulder.

Frank Church Award for best student paper, 2004, Western Snow Conference.

Wagner Memorial Award for Women in Atmospheric Sciences, 2003, Desert Research Institute, University of Nevada, Reno.

Canon National Parks Scholarship, for research on snowmelt and streamflow in the western United States, with a focus on Yosemite National Park, 2002-2004, Canon.

Award for Sierra Nevada Fieldwork, 2003-2004, Sussman Foundation.

Cal-(IT)2 Graduate Student Fellowship, 2002-2004, University of California, San Diego.

National Defense Science and Engineering Graduate Student Fellowship, 1999-2002, Department of Defense.

Best Student Poster, 1999, American Society of Limnology and Oceanography.

College Medal for top rank in the college (first of 1700), 1999, University of California, Davis.

PUBLICATIONS

Refereed archival journal publications

(³ indicates student author)

1. Lundquist, J. D. and J. Roche, 2009. Climate change and water supply in western national parks, *Park Science*, 26 (1), Spring 2009, ISSN 1090-9966.
2. Loheide, S. P., II, and J. D. Lundquist, 2009. Snowmelt-induced diel fluxes through the hyporheic zone, *Water Resour. Res.*, 45, W07404, doi:10.1029/2008WR007329.
3. Lundquist, J. D., B. Huggett³, H. Roop³, and N. Low³, 2009. Use of spatially-distributed stream stage recorders to augment rain gages by identifying locations of thunderstorm precipitation and distinguishing rain from snow. *Water Resour. Res.*, 45, W00D25, doi:10.1029/2008WR006995.
4. Loheide, S. P., R. S. Deitchman³, D. J. Cooper, E. C. Wolf, C. T. Hammersmark, and J. D. Lundquist, 2009. Hydroecology of impacted wet meadows in the Sierra Nevada and Cascade Ranges, CA. *Hydrogeology Journal*, 17, 229–246, doi: 10.1007/s10040-008-0380-4.
5. Lundquist, J. D., N. Pepin, and C. Rochford³, 2008. Automated algorithm for mapping regions of cold-air pooling in complex terrain, *J. Geophys. Res.*, 113, D22107, doi:10.1029/2008JD009879.
6. Lundquist, J. D., and B. Huggett³, 2008. Evergreen trees as inexpensive radiation shields for temperature sensors, *Water Resour. Res.*, 44, W00D04, doi:10.1029/2008WR006979.
7. Lundquist, J. D., and F. Lott², 2008. Using inexpensive temperature sensors to monitor the duration and heterogeneity of snow-covered areas, *Water Resour. Res.*, 44, W00D16, doi:10.1029/2008WR007035.

8. Lundquist, J. D., P. J. Neiman, B. Martner, A. B. White, D. J. Gattas, and F. M. Ralph, 2008. Rain versus Snow in the Sierra Nevada, California: Comparing radar and surface observations of melting level. *J. Hydrometeorology*, 9, 194-211.
*Selected to receive California Department of Water Resources Climate Paper Award for most interesting, useful and relevant recent publication.
9. Pepin, N. C, and J. D. Lundquist, 2008. Temperature trends at high elevations: Patterns across the globe, *Geophysical Research Letters*, 35, L14701, doi:10.1029/2008GL034026. *Featured in AGU Journal Highlights, 12 August, 2008.
10. Neiman, P. J., F. M. Ralph, G. A. Wick, J. D. Lundquist, and M. D. Dettinger, 2008. Meteorological characteristics and overland precipitation impacts of atmospheric rivers affecting the west coast of North America based on eight years of SSM/I satellite observations. *J. Hydrometeorology*, 9, 22-47.
11. Lyon, S., F. Dominguez, D. Gochis, N. Brunzell, C. Castro, F. Chow, D. Fuka, Y. Hong, P. Kucera, S. Nesbitt, Y. Fan, N. Salzmann, J. Schmidli, P. Snyder, A. Teuling, T. Twine, G. Lee, S. Levis, J. Lundquist, G. Salvucci, A. Sealy, T. Walter, 2008. Coupling terrestrial and atmospheric water dynamics to improve prediction in a changing environment. *Bull. Am. Met. Soc.*, 89, 1275-1279, doi: 10.1175/2008BAMS2547.1
12. Lundquist, J. D. and D. R. Cayan, 2007. Surface temperature patterns in complex terrain: daily variations and long-term change in the central Sierra Nevada, California. *J. Geophys. Res.*, 112, D11124, doi:10.1029/2006JD007561.
13. Lundquist, J. and A. Flint, 2006. Onset of snowmelt and streamflow in 2004 in the Western United States: How shading may affect spring streamflow timing in a warmer world. *J. Hydrometeorology*, 7, 1199-1217.
14. Lundquist, J., M. Dettinger, and D. Cayan, 2005. Snow-fed streamflow timing at different basin scales: Case study of the Tuolumne River above Hetch Hetchy, Yosemite, California. *Water Resour. Res.*, 41, W07005, doi:10.1029/2004WR003933.
15. Lundquist, J. and M. Dettinger, 2005. How snowpack heterogeneity affects diurnal streamflow timing. *Water Resour. Res.*, 41, W05007, doi:10.1029/2004WR0003649.
16. Lundquist, J., D. Cayan, and M. Dettinger, 2004. Spring onset in the Sierra Nevada: When is snowmelt independent of elevation? *J. Hydromet.*, 5, 325-340.
*Paper selected to receive Wagner Memorial Award for Women in Atmospheric Science, 2003.
17. Lundquist, J.D., D.R. Cayan and M.D. Dettinger, 2003. Meteorology and hydrology in Yosemite National Park: A sensor network application. In *Information Processing in Sensor Networks*, F. Zhao and L. Guibas (eds.): IPSN 2003, LNCS 2634, 518-528.

18. Lundquist, J. and D. Cayan, 2002. Seasonal and spatial patterns in diurnal cycles in streamflow in the Western United States. *J. Hydromet.*, **3**, 591-603.* Featured as Paper of Note in *Bulletin of the American Meteorological Society*, January 2003.
19. Deems, J. S., F. Lott, S. Loheide, and J. D. Lundquist, 2009, Spatially-explicit snowmelt simulation in small Sierra Nevada basins for ecological applications, *submitted to Water Resources Research June 2009*.

Conference proceedings and other non-journal articles

- ***Fully refereed publications***

Lott, F. and J. Lundquist, 2008. Modeling spatial differences in snowmelt runoff timing. *Proc. of the Western Snow Conference*, April 14-17, 2008, Hood River, OR, 76th meeting.

Lundquist J.D. and C. Rochford, 2007. Distributed temperatures in the snow zone: Spatial patterns and innovative measurement techniques, *Proc. of the Western Snow Conference*, April 16-19, 2007, Kailua-Kona, HI, 75th meeting.

Lundquist, J. and M. Dettinger, 2004. The effect of basin scale on diurnal streamflow timing. *Proceedings, Western Snow Conference*. Vancouver, British Columbia. *Best student paper award.

Lundquist, J. and M. Dettinger, 2003. Linking diurnal cycles in river discharge to interannual variations in climate. *Proceedings, AMS 17th Conference on Hydrology*. Long Beach, California.

Lundquist, J., N. Knowles, M. Dettinger and D. Cayan, 2002. Snow, topography, and the diurnal cycle in streamflow. *Proceedings, Western Snow Conference*. Granby, Colorado.

Lundquist, J. D. and T. B. Bourcy, 2000. California and Oregon humidity and coastal fog. *Proceedings, 14th Conference on Boundary Layers and Turbulence*. Aspen, Colorado.

- ***Refereed by abstract only***

Lundquist, J., R. Dole, M. Dettinger, and D. Cayan, 2005. Surface Temperature Patterns and Lapse Rates: Implications for Water Resources and Studies of Mountain Climate Change. *Proceedings, MTNCLIM Meeting*, Chico Hot Springs, Montana.

Parts of books (chapters in edited books)

Lundquist, J. D., I. Stewart, M. D. Dettinger, and D. C. Cayan, 2009. Variability and trends in spring runoff in the western United States, Chapter 5 in *Climate Warming in Western North America: Evidence and Environmental Effects*, Ed: F. Wagner, University of Utah Press, *in press*.

Abstracts, letters, non-refereed papers, technical reports

Cooper, D., J. Lundquist, J. King, A. Flint, L. Flint, E. Wolf, F. Lott, 2006. Effects of the Tioga Road on hydrologic processes and Lodgepole Pine invasion into Tuolumne Meadows, Yosemite National Park, Report prepared for Yosemite National Park. 146 pp. Available at: <http://faculty.washington.edu/jdlund/home/publications.shtml>

Hutto, L., R. Weller, J. Lord, J. Smith, P. Bouchard, C. Fairall, S. Pezoa, L. Bariteau, J. Lundquist, V. Ghate, R. Castro, C. Cisternas, (2006), Stratus Ocean Reference Station (20°S, 85°W), mooring recovery and deployment cruise R/V Ronald H. Brown cruise 05-05, September 26, 2005–October 21, 2005, WHOI Technical Reports, WHOI-2006-06, Upper Ocean Processes Group, UOP-2006-01. Available at: <http://hdl.handle.net/1912/1072>

Lundquist, J. 1999. *California and Oregon humidity and coastal fog: A study of summer 1996*. Technical Report. SIO Reference Number: 99-17. 89 pp.

Lundquist, J., 2005. Onset of snowmelt and streamflow in a warmer world. *Bull. Am. Met. Soc.*, **86**, 480-481.

Other significant research dissemination (web sites, software, Wikis, etc.)

Temperature Toolbox, 2008, Guidelines for deploying inexpensive temperature sensors. <http://faculty.washington.edu/jdlund/Ttoolbox/>

Lundquist, J. 2004. When is the best time to cross a mountain stream? *Sierra Nature Notes*. <http://www.yosemite.org/naturenotes/StreamFlow.htm>

Lundquist, J. 2003. Synchronous snowmelt and streamflow in the Sierra. *Sierra Nature Notes*. http://www.yosemite.org/naturenotes/naturenotes_synchsnow.htm

Lundquist, J., 2002. Monitoring snow from the beach in San Diego: Automatic snow sensors in the Sierra. *Sierra Nature Notes*. <http://www.yosemite.org/naturenotes/snowsurvey.htm>

OTHER SCHOLARLY ACTIVITY

Invited lectures and seminars.

1. University of Utah, Departments of Biology and Meteorology, *Hydroclimatology at Ecosystem Scales*, March 2009
2. University of Arizona, Department of Hydrology, *Mapping temperature across complex terrain*, December 2008
3. University of Washington, Atmospheric Science Seminar, *Spatial temperature patterns in the snow zone and innovative measurement techniques*, February 2008
4. University of Washington, Water Center Seminar, *Using diurnal cycles in streamflow to interpret surface and subsurface flow paths in mountain environments*, May 2007
5. University of Washington, Atmospheric Science Seminar, *Rain vs. snow in the Sierra Nevada, California*, November 2006

6. University of Washington, Climate Impacts Group Seminar, *Surface temperature patterns and lapse rates*, October 2006
7. University of Washington, Civil and Environmental Engineering Seminar, *Surface temperature patterns and lapse rates: Implications for water resources and studies of mountain climate change*, April 2006

Presentations given at conferences.

1. **Deems, J.**, F. Lott, and J. D. Lundquist, "Refining Distributed Snowmelt Models in a Mountain Environment," AGU, San Francisco, California, December 2008.
2. **Raleigh, M.**, F. Lott, and J. D. Lundquist, "Most Critical Surface Meteorological Measurements for Modeling Distributed Snowmelt in the Sierra Nevada, California", AGU, San Francisco, California, December 2008.
3. **Lundquist, J. D.**, "Variations in Spatial Precipitation Patterns in the Sierra Nevada, California: Implications for Hydrologic Modeling and Water Resource Planning." AGU, San Francisco, California, December 2008, Invited presentation.
4. **Lundquist, J. D.**, "Mountain hydroclimatology at ecosystem scales: What do we need to know?" *Climate Ecosystems and Resources of Eastern California (CEREC) Conference*, Bishop, California, November 2008, Invited presentation.
5. **Lundquist, J. D.**, "Mapping mountain temperatures", *MtnClim 2008*, Silverton, Colorado, June 2008.
6. Lundquist, J. D., "Evapotranspiration in wet vs. dry years in the Sierra Nevada", *Western Snow Conference*, Portland, Oregon, April 2008.
7. Lundquist, J. and **P. Mote**, "Microclimate studies with microsensors", *EGU General Assembly 2008*, Vienna, Austria, April 2008.
8. **Lundquist, J. D.**, "Runoff Efficiency of Sierra Snowmelt: Evaporative Water Losses in Wet vs. Dry Years", AGU, San Francisco, California, December 2007.
9. **Lott, F.** and J. D. Lundquist, "Modeling spatial differences in snowmelt runoff timing", AGU, San Francisco, California, December 2007.
10. **Lundquist, J. D.**, "Wet vs. dry years in the Sierra Nevada: implications beyond the obvious less snow to start with." *Yosemite Hydroclimate Conference*, Yosemite, California, October 2007.
11. **Lundquist, J. D.**, "Distributed temperatures in the snow zone: spatial patterns and innovative measurement techniques." *Western Snow Conference*, Kailua, Hawaii, April 2007.
12. **Lundquist, J. D.**, M. Dettinger, D. Cayan, "Hydrology and climate in the Sierra Nevada: Disproving the myth of linear gradients with elevation." AGU, San Francisco, California, December 2006, invited presentation.
13. **Roop, H.**, Huggett, B., Lundquist, J., Clow, D., Roche, J., "Wilderness Stream Gauging: the application of new technology and techniques in Yosemite National Park." AGU, San Francisco, California, December 2006.
14. **Lundquist, J.**, D. Reynolds, R. Bales, D. Cline, D. Lettenmaier, K. Redmond, P. Restrepo, and E. Strem, "Hydrologic Aspects of the Hydrometeorological Testbed –West – the North Fork American River." *USA PUB workshop*, Corvallis, Oregon, October 2006.
15. **Lundquist, J. D.**, P. J. Neiman, B. Martner, A. B. White, D. J. Gottas, F. M. Ralph, "Rain vs. snow in the Sierra Nevada, California, Comparing free-air observations of melting-level with surface measurements." *USA Precipitation in Ungauged Basins (PUB) Workshop*, Corvallis, Oregon, October 2006.
16. **Lundquist, J. D.**, P. J. Neiman, B. Martner, A. B. White, D. J. Gottas, F. M. Ralph, "Rain vs. snow in the Sierra Nevada, California, Comparing free-air observations of melting-level with surface measurements." *MtnClim*, Mt. Hood, Oregon. September 2006.

17. **Dettinger, M.,** J. Lundquist, and D. Cayan, "The 16 May 2005 flood in Yosemite: a glimpse into high-country flood generation in the Sierra Nevada." *MtnClim*, Mt. Hood, Oregon. September 2006.
18. **Lundquist, J. D.,** P. J. Neiman, B. Martner, A. B. White, D. J. Gattas, F. M. Ralph, "Rain vs. snow in the Sierra Nevada, California, Comparing radar observations of melting-level with surface measurements." *Quantitative Precipitation Forecasting and Hydrology Symposium*. Boulder, Colorado, June 2006.
19. **Lundquist, J.,** F. M. Ralph, P. Nieman, D. Kingsmill, A. White, D. Gattas 2005. Recipe for Flood: Rainstorms falling on the Sierra Nevada Snowpack. AGU Fall Meeting, San Francisco, California. December 2005.
20. **Lundquist, J.,** R. Dole, M. Dettinger, and D. Cayan, "Surface temperature patterns and lapse rates: Implications for water resources and studies of mountain climate change", *MTNCLIM 2005*, Chico, Montana, March 2005.
21. Lundquist, J., "How snowmelt onset varies with elevation." *American Meteorological Society Forum: Living with a Limited Water Supply*, San Diego, California, February 2005.
22. **Lundquist, J.,** A. Flint, M. Dettinger, and D. Cayan, "How the 2004 onset of snowmelt and streamflow varied with elevation," *American Geophysical Union Fall Meeting*. San Francisco, California, December 2004.
23. **Lundquist, J.** and D. Cayan, "Yosemite National Park: Hydroclimate observatory and educational opportunity." *American Geophysical Union Fall Meeting*. San Francisco, California, December 2004.
24. **Lundquist, J.,** D. Cayan, and M. Dettinger, "Variability and trends in spring runoff in the Western United States." *American Association for the Advancement of Science Western Regional Conference*. Logan, Utah, June 2004, Invited presentation.
25. **Lundquist, J.** and M. Dettinger, "How snow heterogeneity affects streamflow timing." *21st Annual PACLIM Workshop*. Pacific Grove, California, March 2004.
26. **Lundquist, J.** and M. Dettinger, "The effect of basin scale on diurnal streamflow timing." *American Geophysical Union Fall Meeting*, San Francisco, California, December 2003.
27. **Lundquist, J.,** "Research and monitoring in Yosemite National Park," *California Cooperative Snow Surveys Meeting*, Folsom, California, October 2003, Invited presentation.
28. **Lundquist, J.,** M. Dettinger, and D. Cayan, "Meteorology and hydrology in Yosemite National Park: a sensor network application," *ISPN Conference*. Palo Alto, California, May 2003.
29. **Lundquist, J.,** M. Dettinger, and D. Cayan, "Is Sierra Nevada snowmelt independent of elevation?" *20th Annual PACLIM Workshop*. Pacific Grove, California, April 2003.
30. **Lundquist, J.** and M. Dettinger, "Linking diurnal cycles in river discharge to interannual variations in climate." *83rd AMS Annual Meeting, 17th Conference on Hydrology*. Long Beach, California, February 2003.
31. **Lundquist, J.,** M. Dettinger, and D. Cayan, "Is snowmelt independent of elevation?" *American Geophysical Union Fall Meeting*. San Francisco, California, December 2002.
32. **Lundquist, J.,** N. Knowles, M. Dettinger and D. Cayan, "Snow, topography, and the diurnal cycle in streamflow." *Western Snow Conference*, Granby, Colorado, April 2002.
33. **Lundquist, J.,** N. Knowles, M. Dettinger and D. Cayan, "Snow, topography, and the diurnal cycle in streamflow." *Sierra Nevada Science Symposium*, Lake Tahoe, California, May 2002.
34. **Lundquist, J.,** "Diurnal cycles in river discharge: a key to understanding snowmelt, evapotranspiration, and infiltration." *82nd AMS Annual Meeting, 16th Conference on Hydrology*. Orlando, Florida, January 2002.
35. **Lundquist, J.** and A. Leydecker, "Pathways to the gauge: the diurnal cycle as an indicator of snowmelt rates and transport." *American Geophysical Union Fall Meeting*. San Francisco, California, December 2001.

36. **Lundquist, J.**, M. Dettinger, and D. Cayan, "Diurnal cycles in streamflow in the Western United States: a new tool for understanding snowmelt." *American Geophysical Union Fall Meeting*. San Francisco, California, December, 2000.
37. **Lundquist, J. D.** and T. B. Bourcy, "California and Oregon humidity and coastal fog." *14th Conference on Boundary Layers and Turbulence*. Aspen, Colorado, August 2000.
38. **Lundquist, J.**, "Surface drag and momentum exchange in hurricane conditions." *American Society of Limnology and Oceanography Annual Meeting*. Santa Fe, New Mexico, February 1999.

Professional society memberships.

- American Geophysical Union, 1999 – present
- American Meteorological Society, 1999 – present
- International Association of Hydrologic Sciences, 2002 - present

Review of Papers and Proposals:

- National Science Foundation (~6 per year)
- Water Resources Research (~6 per year)
- Journal of Hydrology (~2 per year)
- Geophysical Research Letters (~5 per year)
- Journal of Geophysical Research (~2 per year)
- Hydrologic Processes (~1 per year)
- Hydrology and Earth System Sciences Discussions (~1 per year)
- Journal of Glaciology (~1 per year)
- IEEE Transactions on Geoscience and Remote Sensing (~1 per year)

Research Cruises:

- Hawaii Ocean Mixing Experiment, September 2000. R/V Roger Revelle. PI: Dan Rudnick. Assisted with Seasoar deployment and monitoring.
- Pacific Ocean Seafloor Mapping, May 2001. R/V Roger Revelle. PI: Peter Lonsdale. Assisted with sonic depth probe collection of seafloor bathymetry.
- Stratus Ocean Reference Station mooring recovery and deployment cruise, September-October 2005. R/V Ronald H. Brown. PI: Bob Weller. Worked with Chris Fairall to deploy radiosondes and study atmospheric structure.

TEACHING

Courses Taught

- | | |
|--------------------------|---------------------------------------|
| CEE 342: Fluid Mechanics | Winter 2007, Winter 2008 |
| CEE 345: Hydraulics | Winter 2009, Spring 2009 |
| CEE 599: Snow Hydrology | Spring 2007, Spring 2008, Spring 2009 |

List of other teaching contributions

- Helped CELT develop teaching workshop for professors based on research done by Center for Advancement of Engineering Education (CAEE), April 2009
- Attended National Engineering Teaching Institute (NETI) Workshop, June 2007.
- Teaching evaluated by CELT (Jim Borgford-Parnell, Center for Engineering Learning and Teaching), February 2007; February 2008, March 2009, June 2009.
- Faculty Fellows Teaching Workshop, September 2006.

Nominations for Teaching Awards

Nominated for College of Engineering Community of Innovators Awards: Faculty Innovator for Teaching, for Fluid Mechanics, 2008.

SERVICE

Departmental service

Department-wide search committee, August 2008-present

Undergraduate committee, August 2008-present

Hiring Committee: Research asst. professor position in env. microbiology, Summer 2007

Emeretis Professor Space Allocation Committee: June 2008-present

University service

University of Washington Program on Climate Change (PCC) Board of Directors, July 2008-present

Keynote speaker, University of Washington Program on Climate Change Annual Public Lecture, Seattle, WA, April 2009.

Keynote speaker, University of Washington Graduate Student Climate Conference, Pack Forest, WA, April 2009.

Professional society and other service

American Geophysical Union, chaired sessions at 2006 and 2008 fall meetings

Community service

Interpretive Park Ranger Meeting, Tuolumne Meadows, Yosemite, CA, June 2009.

Interpretive Park Ranger Meeting, Tuolumne Meadows, Yosemite, CA, June 2008.

Panelist and speaker, WISE conference, Seattle, Washington, February 2008.

Keynote speaker, ASWR meeting, Seattle, Washington, October 2006.

Invited speaker, Parson's Lodge Summer Series, Tuolumne Meadows, Yosemite, CA, August 2006.

Invited participant, National Park Service Alpine Monitoring Workshop, Nederland, Colorado, September 2005.

Invited speaker, Canon Envirothon, High School Environmental Competition. Buckhannon, WV, July 2004.

Invited speaker, Parson's Lodge Summer Series, Tuolumne Meadows, Yosemite, CA, July 2004.

Invited presenter, Yosemite Forum. Yosemite, CA. February 2004.

Keynote speaker, American Association of University Women Annual Math and Science Recognition Breakfast for Junior High students. Fallbrook, CA. May 2003.

Invited presenter, E.W. Scripps Associates Science Series. La Jolla, CA. April 2003.

Boulder High School student intern program mentor, 2005.

Mar Vista Poseidon Academy: mentor for low-income high school students, 2002-2004.

Northern California Scholarship Foundation: mentor for high achieving yet economically disadvantaged undergraduate students, 2001-2005.