IRIS STEWART-FREY
Associate Professor

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Education

2001 **Ph.D., Hydrogeology**, **Stanford University**
Department of Geological and Environmental Sciences.
Thesis title: *Development of a Type Transfer Function Approach for Modeling Non-Point-Source Pesticide Leaching at the Regional Scale*

1994 **B.S., Geology and Geophysics, University of Hawai'i**
School of Ocean and Earth Science and Technology

Professional Development

09/13–present	**Associate Professor**, Department of Environmental Studies and Sciences, Santa Clara University, Santa Clara, CA
06/14–6/17	**Department Chair,** Department of Environmental Studies and Sciences, Santa Clara University, Santa Clara, CA
09/06–08/13	**Assistant Professor**, Environmental Studies Institute, Santa Clara University, Santa Clara, CA (on parental leave 09/06 – 08/07)
12/04–05/06	**Visiting Scientist, U.S. Geological Survey**, Water Resources Division, Menlo Park, CA.
03/05–06/05	**Adjunct Lecturer**, Department of Civil Engineering, Santa Clara University, Santa Clara, CA.
07/02–06/03	**Program Director**, International Ph.D. Program Environment and Water (ENWAT), Universität Stuttgart, Department of Civil and Environmental Engineering, Germany.
12/00–07/04	**Postdoctoral Researcher and NOAA visiting scientist**, Scripps Institution of Oceanography, Climate Research Division, La Jolla, CA.

Research Grants and Fellowships

External Grants

09/15 – 12/18 **NSF RUI Research Grant** ($272,555, PI: C Bacon, co-PIs I Stewart. E Maurer, W Sundstrom), *Coping with Food and Water Insecurity: Producing Vulnerability or Resilient Responses to the Coffee Leaf Rust Outbreak and Mesoamerican Drought?*

09/09 – 09/12 **U.S. EPA STAR Research Grant** ($325,000, PI: Stewart, co-PI E Maurer) *Impact of climate change on stream water quantity and quality in the Western U.S.*

Internal Grants

06/15 – present Thriving Neighbors Grant ($6,520).*The Distribution of Environmental Pollution near Santa Clara County Schools: Patterns in Exposure and Community-Based Response.* Co-PIs Bacon and Stewart-Frey.

06/14 – 06/16 Provost's Grant ($3,000) *Developing tools to detect changes in shade grown coffee areas using remotely sensed databases*. *Using Google Earth for a geopatial analysis of shade-grown coffee in northwestern Nicaragua* (with C Bacon)

06/13 – 06/15 Roelandt Grant. *What factors strengthen food security and resilience to global climate change among Nicaragua's small scale farmers?* ($8600) With C Bacon, E Maurer, W Sundstrom

01/11 – 06/12 Center for Science Technology and Society grant ($4,000) *Spatial analysis of environmental burdens in Santa Clara County*. With C Bacon.

06/13 - present Provosts' Sustainability Research Initiative Grant ($20,000) Funded 3 projects, our portion involves the *geospatial mapping and analysis of development patterns surrounding the Santa Clara Mission*. With L Kealhofer, and L Panich, other projects by M Bezanson, J Farnsworth, and V Matzek

06/11 – 06/13 Provosts' Sustainability Research Initiative Grant ($30,000) *An action research partnership for Environmental and Food Justice in San Jose*. With L Gray, C Bacon, L Kealhofer, G Gullette)

Fellowships and Awards

09/16-06/18 Bannan Institute Fellow
09/07-08-12 Clare Booth Luce Professor
12/00-12/03 NOAA/UCAR Postdoctoral Research Fellowship
09/98-09/00 EPA STAR Doctoral Student Fellowship
09/98-09/00 NSF Student Fellowship
09/98-09/99 Theresa Heinz Fellowship for Environmental Research
09/96-09/97 National Science Foundation Doctoral Student Fellowship
09/93-09/96 Society of Exploration Geophysicists Student Fellowship

Peer-Reviewed Publications

*designates student authors

Maurer EP, *Roby N, Stewart IT, and Bacon CM, 2017. Projected twenty-first-century changes in the Central-American mid-summer drought using statistically downscaled climate projections. *Regional Environmental Change*, https://doi.org/10.1007/s1011.

Bacon CM, Sundstrom W, **Stewart IT**, and *Beezer D, 2017. Vulnerability to Cumulative Hazards: Coping with the Coffee Leaf Rust Outbreak, Drought, and Food Insecurity in Nicaragua, *World Development* (93): 136-152.

Ayers J, Ficklin DL, Letsinger SL, **Stewart IT**, Strunk M, 2016. Comparison of CMIP3 and CMIP5 projected hydrologic conditions over the Upper Colorado River Basin. *International Journal of Climatology*, doi:10.1002/joc.2015.4594

Ficklin DL, Letsinger SL, **Stewart IT**, Maurer EP, 2016. Assessing differences in snowmelt-dependent hydrologic projections using CMIP3 and CMIP5 climate forcing data for the western United States. Hydrology Research, doi:10.2166/nh.2015.101

Stewart IT, Ficklin, DL, *Carrillo CA, *McIntosh R., 2015. 21st century increases in the likelihood of extreme hydrologic conditions for the mountainous basins of the Southwestern United States. *Journal of Hydrology*, *529*, 340-353.

Stewart IT, Bacon CM, *Burke WD, 2014. The uneven distribution of environmental burdens and benefits in Silicon Valley's backyard, *Applied Geography* 55, 1-12

Ficklin, DL, Barnhart BL, Knouft JH, **Stewart IT**, Maurer EP, Letsinger LP, and Whittaker GW, 2014.Climate change and stream temperature projections in the Columbia River Basins: biological implications of spatial variation in hydrologic drivers. *Hydrology and Earth System Sciences*, *18*(1), 4897-4912, 2014, www.hydrol-earth-syst-sci.net/18/4897/2014/

Ficklin DL, **Stewart IT**, Maurer EP, 2013. Climate change impacts on streamflow and subbasin-scale hydrology in the Upper Colorado River Basin. *PLoS ONE* 8(8): e71297. doi:10.1371/journal.pone.0071297

Stewart IT, 2013. Connecting physical watershed characteristics to climate sensitivity for California mountain streams. *Climatic Change*, 116:133–148, doi:10.1007/s10584-012-0567-5.

Stewart IT, *Purner EE, *Guzman PD, 2013. Socioeconomic disparities in the provision of school gardens in Santa Clara County, California. *Children, Youth and Environments* 23(2) 127-153.

Ficklin, DL, **Stewart IT**, Maurer EP, 2013. Effects of climate change on water quality in the Sierra Nevada mountain range in California. *Wat. Resour. Res*. 49:2765-2782, doi:10.1002/wrcr.20248

Ficklin DL, **Stewart IT**, Maurer EP, 2012. Projections of 21st century Sierra Nevada local hydrologic flow components using an ensemble of General Circulation Models. Jour. Am. Water Res. Assoc. (JAWRA), 1-21. doi: 10.1111/j.1752-1688.2012.00675.x

Ficklin DL, **Stewart IT**, Maurer EP, 2012. Effects of projected climate change on the hydrology in the Mono Lake Basin, California. *Climatic Change*, doi: 10.1007/s10584-012-0566-6

Ficklin DL, Luo Y, **Stewart IT,** Maurer EP, 2012. Development and application of a hydroclimatological stream temperature model within SWAT. Water Resources Research. *Vol 48, W01511, doi:10.1029/2011WR011256.*

*Fritze H, **Stewart IT**, Pebesma EJ, 2011. Shifts in Western North American snowmelt runoff regimes for the recent warm decades. *J. Hydromet.* doi: 10.1175/2011JHM1360.1

Stewart IT, 2009. Changes in snowpack and snowmelt runoff for key mountain regions. *Hydrologic Processes* 23:78-94.

Lundquist JD, **Stewart IT**, Dettinger MD, Cayan DR. 2008. 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.

Peterson DH**, Stewart IT**, Murphy F. 2008. Principal hydrologic responses to climatic and geologic variability in the Sierra Nevada, California. *Estuary and Watershed Science*, 6(1) (February 2008), Article 1113.

Maurer EP**, Stewart IT**, Bonfils C, Duffy PB, Cayan DR, 2007. Detection, attribution, and sensitivity of trends towards earlier streamflow in the Sierra Nevada, *J. Geophys. Res.*, 112, D11118, doi:10.1029/2006JD008088.

Cayan DR, Dettinger MD, **Stewart IT**, Knowles N, 2005. Recent changes toward earlier springs – Early sings of climate warming in western North America: *Watershed Management Council Newsletter*, Spring 2005, 13 p.

Peterson DH, Smith R, **Stewart IT**, Knowles N, Soulard C, Hager S, 2005. Snowmelt discharge characteristics, Sierra Nevada, California. *USGS Scientific Investigations Report 2005-5056*, http://pubs.water.usgs.gov/sir2005-5056/.

Stewart IT, Cayan DR, Dettinger MD, 2005. Changes towards earlier streamflow timing across western North America, *J. Climate*,18:1136-1155.

Stewart IT, Cayan DR, Dettinger MD, 2004. Changes in snowmelt runoff timing in western North America under a 'Business as Usual' climate change scenario, Climatic Change, 62:217-232.

Stewart IT, Loague K, 2004. Assessing groundwater vulnerability in the San Joaquin Valley (CA) with the type transfer function model, J. Environm. Qual., 33:1487-1498.

Stewart IT., Loague K, 2003. Development of type transfer functions for regional-scale non-point-source groundwater vulnerability assessments, Water Resour. Res., 39(12):1359.

Stewart IT, Loague K, 1999. A type transfer function approach for regional-scale pesticide leaching assessments. J. Environ. Qual. 28:378-387.

Loague K, Abrams RH, Davis SN, Nguyen A, **Stewart IT**, 1998. A case study simulation of DBCP groundwater contamination in Fresno County, California. 2. Transport in the saturated subsurface. J. Contam. Hydrol. 29:137-163.

Projects with Undergraduate Students

Project	**No of Students and period of mentorship**	**Deliverables**
Impact of drought and warmer temperatures on flow and water quality in urban streams. Students involved in installing and servicing sensors, sample collections, GIS mapping of riparian areas, data analysis (learning matlab scripting and general coding).	2014 – present 5 students	2 students have co-presented at AGU conference, Peer reviewed publication in preparation, 1 student received a Clare Boothe Luce research fellowship with me as mentor, peer reviewed article in preparation.
Food and water security under climate change for Nicaraguan smallholders. Students assisted with data analysis and mapping (GIS) water avaialability and quality at the community level, coordinating with local monitoring effort, students visited Nicaragua and participated in monitoring.	2015 – present 4 students	Study with colleagues Chris Bacon, William Sundstrom, Ed Maurer. Peer-reviewed publication with student co-authors in preparation. Project is ongoing. Students co-presented at scientific conference. Funded by NSF research grant
Analysis of landuse and development patterns around the historic Santa	2013 - 2017 5 students	Study with colleagues Lisa Kealhofer and Lee Panich.

Clara Mission. Students digitized information from historic maps and archaeologic finds, developed metrics to assess changes.		Manuscript for peer-reviewed journal article in preparation. Funded by Sustainability Research Grant.
Fine particle air pollution at elementary schools near roadways in Santa Clara County (CA). Students are involved in monitoring campaign using particle counters, plotting data, coordinating with community partners, transcribing survey data.	2015 – present 5 students	Study with colleague Chris Bacon. Peer-reviewed article with undergraduate co-authors planned.
21st century increases in the the likelihood of extreme hydrologic conditions in the Southwest. Students worked on analyzing output from hydrologic simulations, plotting the results.	2013 – 15 2 students	Study with colleague Darren Ficklin. Peer-reviewed publication with student co-authors. Students presented at AGU conference.
Student prepared GIS database of riparian zones for the Guadalupe River (CA).	2012 1 students	Student presented at SCU undergraduate research symposium.
Socioeconomic disparities in the provision of school gardens in Santa Clara County. Students worked on data collection, statistical analysis, GIS mapping.	2010 – 12 2 students	Students presented at SCU undergraduate research symposium. Students are co-authors on peer-reviewed journal article.
The very large ecological array: System design and initial deployment strategies for a monitoring network at Blue Oaks Ecological Reserve. Student prepared GIS viewshed analysis.	2009 – 10 1 student	Study with colleague Michael Hamilton. Gomez presented a poster at the Society of Conservation GIS annual meeting
Shifts in Western North American snowmelt runoff regimes for the recent warm decades. Student worked on hydrograph time series analysis, probability calculations, and GIS mapping.	2007 – 09 1 student	Study with colleague Edzer Pebesma. Peer-reviewed publication and presentation/ poster at AGU conference.
Analysis of the linkage between the physical characteristics of a watershed and its sensitivity to climatic change. Student worked on preparing GIS layers for all watersheds.	2007- 2008 1 student	Poster presentation at AGU. Peer reviewed article published.

Courses

- ENVS 199B Special Topics: An Assessment of Near Roadway Air Pollution (Spring 2018)
- ENVS 197 Special Topics: Matlab in Hydro-climate analysis (Spring 2017)
- ENVS 197 Special Topics: Preparation for the ESRI Desktop Associate Certification Exam (Winter 2016, Spring 2016)
- ENVS 197 Special Topics: Hydroclimate Analysis (Spring 2008)
- ENVS 160 Water Resources L&L, (Winter 2013, 2015, Fall 2016, 2017, 2018)
- ENVS 117 Intermediate GIS (Fall 2015)
- ENVS 116 Introduction to GIS (3 sections in Spring 2016)
- ENVS 115 GIS in the Environmental Sciences L&L. (Fall 2007, 2008, 2009, 2010, 2011, Spring 2012).
- ENVS 101 Senior Capstone (Winter 2018)
- ENVS 23 L&L Introduction to Earth Systems (previously ENVS 13 L&L Soil, Air & Water). (Spring 2007, 2008, 2009; 2010; Winter 2010, 2011).
- ENVS 20 The Water Wars of California L&L (Winter 2008, 2009)
- CENG 139 Groundwater Hydrology, Civil Engineering, SCU (Spring 2005)
- GEOL 130L, 131L, 132L: Environmental Geology Lab. Stanford University (AY 1994/95)
- GEOL 101: Introduction to Geology. University of Hawai'i at Manoa (1994)

Service

Major Service to the Profession

- Associate Editor for the Journal of the American Water Resources Association (since 2016)
- Reviewer for Water Resources Research, Journal of Climate, Journal of Environmental Quality, Climatic Change, Journal of the American Water Resources Association, Journal of Hydrology, Geophysical Research Letters, Environmental Management
- Session and panel organizer at yearly AGU conference and others (i.e. AAG 2016, 2018)
- Tenure reviewer (outside expert) (2013, 2016, 2018)
- Postdoctoral advisor for Darren Ficklin (2009 – 12)
- Expert witness for AB32, the California Greenhouse Gas Lawsuit on behalf of the State of California and several Environmental Organizations (2006 – 08)
- Reviewer for the PAN Pesticide Database (2007)
- Advisor to the 'Energy Project' (Sound Vision Productions) (2008)
- USGS volunteer (2008 -2010)
- AGU media advisor volunteer (2009)
- Guest editor for Climatic Change (2011 – 12)
- Judge, Tech Awards, Santa Clara, CA (2011, 2012)

Major Service to the Department

- Coordinated Program Review (2016-17)
- Department chair (2014-17)
- Chaired continuous lecturer search (2014), Participated in four faculty searches (2010, 2011, 2014, 2015 (leading role)) and two lecturer searches (2007-09), ongoing hiring of academic year and quarterly lecturers
- Built and managed the GIS computer lab of the Environmental Studies Institute at Santa Clara University (2007 – 10) & ongoing coordinator

- Participated in ESI self-study activities and report for WASC accreditation (2009-2010)
- Participated in report and activities to establish the ESS department (previously ESI) (2009 - 2011)
- Contributed to revision of ESS majors curriculum (2010- 2011)
- Faculty advisor for student clubs, Global Water Brigades (2008-2009) and Green Club
- Department Library Liaison (2009 – 11)
- ESS Faculty Senate Representative (2011-12)

Major Service to the College and University

- STEM chair for planning Sobrato Campus for Discovery and Innovation (2015 – current)
- Bannon Institute scholar (2016-18)
- Faculty Affairs Committee (2017 – current)
- Ignatian Faculty Forum participant (2016 – current)
- Co-founded interdisciplinary research group to examine environmental justice issues in Santa Clara County in conjunction with community partners
- Organizing committee for "Our common home" conference in response to the papal encyclical "Laudato Si" at Santa Clara University (Summer and Fall 2015)
- Member of working group to develop inclusive excellence postdoctoral program (2017)
- Global Social Benefit Intern mentor (2016)

Service to the community

- Community outreach for environmental education in preK-6 classes
- Consulting and volunteer work for the Santa Clara Creeks Coalition, Guadalupe River Park Conservancy, Tuolumne River Trust, Friends of Mission Peaks Regional Park
- Participating in river clean-up events