Daniel J. Short Gianotti

Parsons Laboratory
Massachusetts Institute of Technology
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Current position

2016-Present *Postdoctoral Associate*, Massachusetts Institute of Technology

Areas of specialization

Hydroclimate · Ecohydrology · Terrestrial Climate Feedbacks
Climate Predictability · Water-Carbon-Energy Cycle Coupling

Education

2011-2016 PhD in Geography and Environment, Boston University
Dissertation Title: *The Potential Predictability of Precipitation over the Continental United States*
Defense Date: August 9, 2016
Committee: Bruce T. Anderson (primary advisor), Guido D. Salvucci, Michael C. Dietze, Dara Entekhabi, & Anthony C. Janetos (chair)

1999-2003 BS in Mathematics, Harvey Mudd College

Publications & talks

Works in progress

in prep **Short Gianotti, DJ**, BT Anderson, & GD Salvucci, "A kernel-auto-regressive weather generator for improved subseasonal-to-seasonal precipitation statistics," Expected submission in Water Resources Research April 2019.

resubmitted **Short Gianotti, DJ**, GD Salvucci, R Akbar, K McColl, & D Entekhabi, "Landscape water storage and subsurface correlation from satellite surface soil moisture and precipitation observations," *Resubmitted to* Water Resources Research, August 2019.

submitted **Short Gianotti, DJ**, R Akbar, AF Feldman, GD Salvucci, & D Enthekabi, "Hydrologic Sensitivities of Terrestrial Evaporation and Moisture Drainage in a Warmer Climate," *Submitted to* Geophysical Research Letters, July 2019.

submitted Feldman, AF, **DJ Short Gianotti**, I Trigo, GD Salvucci, & D Entekhabi, "Satellite-based assessment of land surface energy partitioning-soil moisture relationships and effects of confounding variables," *Submitted to* Water Resources Research, June 2019.

Journal articles

2019b Akbar, R, **DJ Short Gianotti**, GD Salvucci, & D Entekhabi "Mapped Hydroclimatology of Evapotranspiration and Drainage Runoff Using SMAP Brightness Temperature Observations and Precipitation Information," Water Resources Research 55. https://doi.org/10.1029/2018WR024459

2019a **Short Gianotti, DJ**, AJ Rigden, GD Salvucci, & D Entekhabi (2019) "Satellite and station observations demonstrate water availability's effect on continental-scale evaporative and photosynthetic land surface dynamics," Water Resources Research 55, 540–554. https://doi.org/10.1029/2018WR023726

2018e Feldman, AF, **DJ Short Gianotti**, AG Konings, KA McColl, R Akbar, GD Salvucci, & D Entekhabi (2018), "Pulse-response vegetation water uptake is persistent across biomes," Nature Plants 4 (12), 1026–1033. https://doi.org/10.1038/s41477-018-0304-9

2018d Rigden, AJ, GD Salvucci, D Entekhabi, & **DJ Short Gianotti** (2018) "Partitioning evapotranspiration over the continental United States using weather station data," Geophysical Research Letters 45 (18), 9605–9613. https://doi.org/10.1029/2018GL079121

2018c Akbar, R, **DJ Short Gianotti**, KA McColl, E Haghighi, GD Salvucci, & D Entekhabi (2018), "Estimation of landscape soil water losses from satellite observations of soil moisture," Journal of Hydrometeorology 19 (5), 871–889. https://doi.org/10.1175/JHM-D-17-0200.1

2018b Akbar, R, **DJ Short Gianotti**, KA McColl, E Haghighi, GD Salvucci, & D Entekhabi (2018) "Hydrological storage length-scales represented by remote sensing estimates of soil moisture and precipitation," Water Resources Research 54 (3), 1476–1492. https://doi.org/10.1002/2017WR021508

2018a Haighighi, E, **DJ Short Gianotti**, R Akbar, GD Salvucci, & D Entekhabi (2018) "Soil and atmospheric controls on the land surface energy balance: A generalized framework for distinguishing moisture- and energy-limited evaporation regimes," Water Resources Research 53 (3), 1831–1851. https://doi.org/10.1002/2017WR021729

2017b McColl, K, W Wang, B Peng, R Akbar, **D Short Gianotti**, M Pan, & D Entekhabi (2017), "Global characterization of surface soil moisture drydowns," Geophysical Research Letters 44 (8), 3682–3690. https://doi.org/10.1002/2017GL072819

2017a Anderson, BT, JC Furtado, E Di Lorenzo, **DJ Short Gianotti** (2017), "Tracking the Pacific Decadal Precession," Journal of Geophysical Research: Atmospheres 122 (6) 3214–3227. https://doi.org/10.1002/2016JD025962

2016b Anderson, BT, **DJ Short Gianotti**, GD Salvucci, & J Furtado (2016), "Dominant timescales of potentially predictable precipitation variations across the continental United States," Journal of Climate 29, 8881–8897. https://doi.org/10.1175/JCLI-D-15-0635.1

2016a Anderson, BT, **DJ Short Gianotti**, J Furtado, & E Di Lorenzo (2016), "A decadal precession of atmospheric pressures over the North Pacific," Geophysical Research Letters 43 (8) 3921–3927. https://doi.org/10.1002/2016GL068206

2015c Anderson, BT, **DJ Short Gianotti**, & GD Salvucci (2015), "Detectability of historical trends in station-based precipitation characteristics over the continental United States," Journal of Geophysical Research 120 (10) 4842–4859. https://doi.org/10.1002/2014JD022960

2015b Gill, AL, AS Gallinat, R Sanders-DeMott, AJ Rigden, **DJ Short Gianotti**, JA Mantooth, & PH Templer (2015), "Changes in Autumn Senescence in Northern Hemisphere Deciduous Trees: a Meta-Analysis of Autumn Phenology Studies," Annals of Botany, (Special Issue on Plants and Climate Change) 116, 875–888. https://doi.org/10.1093/aob/mcv055

2015a Anderson, BT, **D Gianotti**, & G Salvucci (2015), "Characterizing the potential predictability of seasonal, station-based heavy precipitation accumulations and extreme dry-spell durations," Journal

of Hydrometeorology 16 (2) 843–856. https://doi.org/10.1175/JHM-D-14-0111.1

2014a **Short Gianotti, DJ**, BT Anderson, & GD Salvucci (2014), "The Potential Predictability of Precipitation Occurrence, Intensity, and Seasonal Totals over the Continental United States," Journal of Climate 27 (18), 6904–6918. https://doi.org/10.1175/JCLI-D-13-00695.1

2013b Pal, I, BT Anderson, GD Salvucci, & **DJ Gianotti** (2013), "Shifting seasonality and increasing frequency of precipitation in wet and dry seasons across the US," Geophysical Research Letters 40 (15), 4030–4035. https://doi.org/10.1002/grl.50760

2013a **Gianotti, D**, BT Anderson, & GD Salvucci (2013), "What Do Rain Gauges Tell Us about the Limits of Precipitation Predictability?" Journal of Climate 26 (15), 5682–5688. https://doi.org/10.1175/JCLI-D-12-00718.1

Conference presentations

2019 Yao, P, H Lu, S Yue, F Yang, H Lyu, K Yang, KA McColl, **DJ Short Gianotti**, & D Entekhabi (2019) "Estimating Surface Soil Moisture from AMSR2 TB with Artificial Neural Network Method and SMAP Products," IEEE Geoscience and Remote Sensing Society: Paper #2869, Yokohama, Japan.

2018 **Short Gianotti, DG***, GD Salvucci, KA McColl, R Akbar, & D Entekhabi (2018) " Hydrologic length scale of L-band radiometric soil moisture retrievals," American Geophysical Union Fall Meeting: H42G-02, Washington, DC.

2018 Feldman, AF*, **DJ Short Gianotti**, AG Konings, KA McColl, R Akbar, GD Salvucci, & D Entekhabi (2018) "Water Exchange Patterns in the Soil-Plant Continuum Based on SMAP Microwave Satellite Measurements," American Geophysical Union Fall Meeting: B53D-06, Washington, DC.

2018 Lu, H, F Yang, H Lyu, K Yang*, KA McColl, **DJ Short Gianotti**, & D Entekhabi (2018) " Estimating Surface Soil Moisture from AMSR2 TB with Machine Learning Methods and SMAP Products," American Geophysical Union Fall Meeting: H51W-1649, Washington, DC.

2018 Salvucci, GD*, AJ Rigden, D Entekhabi, & **DJ Short Gianotti** (2018) "Partitioning evapotranspiration over the continental United States using SMAP observations and weather station data," American Geophysical Union Fall Meeting: H41F-01, Washington, DC.

2018 **Short Gianotti, DJ**, GD Salvucci, AJ Rigden, & D Entekhabi (2018) "Water Use Efficiency Dependence on Soil Moisture," Science Utilization of SMAP Meeting #2, Arcadia, CA.

2018 Feldman, AF*, **DJ Short Gianott**, AG Konings, KA McColl, R Akbar, GD Salvucci, & D Entekhabi (2018) "Water Exchange Patterns in the Soil-Plant Continuum Based on SMAP Microwave Satellite Measurements," Science Utilization of SMAP Meeting #2, Arcadia, CA.

2018 **Short Gianotti, DJ**, GD Salvucci, AJ Rigden, & D Entekhabi* (2018) "Linkages between water, energy and carbon cycles revealed by SMAP," SMAP End of Prime Mission Science Meeting, Jet Propulsion Laboratory, Pasadena, CA.

2018 Akbar, R, **Short Gianotti, DJ***, K McColl, E Haghighi, GD Salvucci, & D Entekhabi (2018) "Estimation of ecosystem-scale soil water losses from satellite observations of soil moisture," SMAP End of Prime Mission Science Meeting, Jet Propulsion Laboratory, Pasadena, CA.

2017 **Short Gianotti, DJ***, AJ Rigden, GD Salvucci, & D Entekhabi (2017) "Effects of water availability through the coupled land-atmosphere system," American Geophysical Union Fall Meeting: H12G-07, New Orleans, LA.

2017 Haghighi, E*, **Short Gianotti, DJ**, R Akbar, GD Salvucci, & D Entekhabi (2017) "What determines transitions between energy- and moisture-limited evaporative regimes?" American Geophysical Union Fall Meeting: H44C-07, New Orleans, LA.

2017 Salvucci, GD*, AJ Rigden, **DJ Short Gianotti**, & D Entekhabi (2017) "Soil moisture (SMAP) and

vapor pressure deficit controls on evaporation fraction over the Continental U.S.," American Geophysical Union Fall Meeting: H12G-01, New Orleans, LA.

2017 **Short Gianotti, DJ***, AJ Rigden, GD Salvucci, & D Entekhabi (2017) "Soil moisture controls on water/energy/carbon coupling," Science Utilization of SMAP Meeting, Cambridge, MA.

2017 Akbar, R*, **DJ Short Gianotti**, E Haighighi, GD Salvucci, & D Entekhabi (2017) "Estimation of ecosystem-scale soil water losses from satellite observations of soil moisture," Science Utilization of SMAP Meeting, Cambridge, MA.

2017 Entekhabi, D*, SMAP Science Team, **DJ Short Gianotti**, Akbar, R, AJ Rigden, GD Salvucci, & JS Kimball (2017) "The Science Applications of SMAP," Science Utilization of SMAP Meeting, Cambridge, MA.

2016 **Short Gianotti, DJ***, AJ Rigden, GD Salvucci, & D Entekhabi (2016) "Soil Moisture Controls on Evaporative Fraction," American Geophysical Union Fall Meeting: H24C-03, San Francisco, CA.

2015 **Short Gianotti, DJ***, GD Salvucci, & BT Anderson (2015) "California Drought, Weather Variability, and Climate Variability," AGU Chapman Conference on California Drought: Causes, Impacts, and Policy, Irvine CA.

2014 **Short Gianotti, DJ***, BT Anderson, & GD Salvucci (2014) "Characterizing weather and climate variability for precipitation: A data-based stochastic modeling framework," American Geophysical Union Fall Meeting, San Francisco CA.

2014 **Short Gianotti, DJ***, BT Anderson, & GD Salvucci (2014) "Stochastic analysis of California's recent precipitation drought in the context of the last one hundred years," American Geophysical Union Fall Meeting, San Francisco CA.

2014 Dietze, M*, HE Emery, D Gergel, **D Gianotti**, JA Mantooth, & AJ Rigden (2014), "Integrating satellite and tower phenology: a case-study in real-time ecological forecasting" American Geophysical Union Fall Meeting, San Francisco CA.

2014 Dietze, M*, HE Emery, D Gergel, **D Gianotti**, JA Mantooth, & AJ Rigden (2014), "Predicting phenology: A case-study in real-time ecological forecasting," Ecological Society of America Annual Meeting, Sacramento CA.

2013 **Gianotti, DJ***, BT Anderson, & GD Salvucci (2013), "Potential Predictability of Precipitation: Occurrence or Intensity?" 38th Climate Diagnostic and Prediction Workshop, College Park MD.

2012 **Gianotti, DJ***, BT Anderson, & GD Salvucci (2012), "Establishing Potential Predictability of U.S. Precipitation Using Rain Gauge Data," 37th Climate Diagnostic and Prediction Workshop, Fort Collins CO.

2012 Pal, I*, BT Anderson, G Salvucci, & **D Gianotti** (2012), "Magnitude and significance of observed trends in precipitation frequency over the U.S.," 37th Climate Diagnostic and Prediction Workshop, Fort Collins CO.

2012 Anderson, BT*, **D Gianotti**, & GD Salvucci (2012), "Historical expansion of the summertime monsoon over the southwestern United States: What can regional models tell us about its causes?" Regional Spectral Modeling Workshop, Scripps Institution of Oceanography, San Diego CA.

2012 Pal, I*, BT Anderson, G Salvucci, & **D Gianotti** (2012), "Magnitude and significance of observed trends in precipitation frequency over the US," American Geophysical Union Fall Meeting, San Francisco CA.

2011 **Gianotti, D***, BT Anderson, & G Salvucci (2011), "Stochastic and deterministic aspects of observed seasonal-mean precipitation variations and extreme event occurrences over the United States," American Geophysical Union Fall Meeting, San Francisco CA.

2011 Anderson, BT*, **D Gianotti**, & GD Salvucci (2011), "Detection of historical summertime monsoon precipitation variations and trends over the southwestern United States," WCRP Open Science

Conference, Denver CO.

2011 Anderson, BT*, D Gianotti, & GD Salvucci (2011), "Detection of historical precipitation variations and trends over the continental United States," Department of Energy Principal Investigators Meeting, Washington DC.

2007 Schubert, DH*, **DJ Gianotti**, & K Sauers (2007), "Upgrades to a wastewater lagoon treatment system in a rural sub-Arctic community in Alaska," International Symposium on Cold Region Development, Tampere Finland.

2007 Schubert, DH*, **DJ Gianotti**, & G Jones (2007), "Application of a Thermal-hydraulic Model to Analyze and Design a Circulating Water System in Alaska," International Symposium on Cold Region Development, Tampere Finland.

2005 **Gianotti, DJ***, C Woolard, & D White (2005),"Wastewater treatment lagoon design in rural Alaska," 45th Alaska Water and Wastewater Management Association Annual Statewide Conference, Juneau AK.

* *denotes presenting author*

Non-refereed research documents

2007 Schubert, DH, **DJ Gianotti**, & K Sauers (2007), "Upgrades to a wastewater lagoon treatment system in a rural sub-Arctic community in Alaska," Proceedings of the 8th International Symposium on Cold Region Development.

2007 Schubert, DH, **DJ Gianotti**, & G Jones (2007), "Application of a Thermal-hydraulic Model to Analyze and Design a Circulating Water System in Alaska," Proceedings of the 8th International Symposium on Cold Region Development.

2005 Woolard, C, **D Gianotti**, K Hardie, D White, & A Pinto (2005), "Waste Stabilization Pond Design and Performance Study," Prepared for the Alaska Department of Environmental Conservation.

2003 **Gianotti, DJ** (2003), "Fluid drop coalescence in a Hele-Shaw cell," Undergraduate Mathematics Thesis, Advised by A Nadim, *Harvey Mudd College*.

2002 Lampe, K, K Hultman, K Hedstrom, **D Gianotti**, E Deyo, & R Seat (2002), "Internal metrology for the Space Interferometry Mission," Undergraduate Physics Clinic Report, Advised by R Haskell, D MacDonald, & B Nemati, *Harvey Mudd College & NASA-JPL*.

Non-conference presentations

2019 Toft*†, N, N Lutz*†, **DJ Short Gianotti**, & D Entekhabi (2019) "Impacts of Soil Moisture on Ecosystem Carbon and Water Exchanges," Civil & Environmental Engineering Mini-UROP Presentations, Massachusetts Institute of Technology.

2016 **Short Gianotti, DJ*** (2016) "The Potential Predictability of Precipitation over the Continental United States," Dissertation Defense, Boston University.

2015 **Gianotti, DJ*** (2015) "Weather models for climate variability," Dept. of Earth & Env. Graduate Student Presentations, Boston University.

2014 **Gianotti, DJ*** (2014) "Real weather, fake weather, and the California Drought," Dept. of Earth & Env. Graduate Student Presentations, Boston University.

2012 **Gianotti, DJ*** (2012) "How predictable is rain?" Dept. of Geography & Env. Graduate Student Presentations, Boston University.

2012 **Gianotti, D***, BT Anderson, & G Salvucci (2012), "Stochastic and deterministic aspects of observed seasonal-mean precipitation variations and extreme event occurrences over the United States," Science and Engineering Research Symposium, Boston University.

* *denotes presenting author*

† *denotes student advisee*

Published software packages

2016 **Short Gianotti, DJ** (2016) "Occurrence Markov Chain daily precipitation model," http://github.com/dgianotti/OMC-precip, DOI:10.5281/zenodo.45435.

Appointments held

2016-Present Postdoctoral Associate, Massachusetts Institute of Technology
2011-2015 Research Assistant, Boston University
2011 Math Teacher, Boston Public Schools
2004-2010 Private Tutor, Anchorage & Los Angeles
2007-2008 Lab Technician, California Institute of Technology
2005-2006 Environmental Engineering Associate, GV Jones & Associates
2004-2005 Research Assistant, University of Alaska, Anchorage
2003-2005 Substitute Teacher, Anchorage School District
2004 Staff, National Youth Science Camp
2001-2003 Writing Consultant, Harvey Mudd College
2002 Research Assistant, Lawrence Berkeley National Lab

Teaching

Teaching Fellow:
2015 *Introduction to Quantitative Environmental Modeling* (Boston University)

Guest Lecturer:
2016-2018 *Introduction to Hydrology and Water Resources* (MIT)
2017 *Introduction to Hydrologic Modeling* (MIT)

K-12 Instruction:
2010-2011 High school mathematics (Boston Public Schools)
2004-2006 All subjects, all ages (Substitute Teacher – Anchorage School District)

Private Tutoring:
2002-2010 Math, physics, writing through advanced undergraduate
2006-2010 Chemistry, biology through introductory undergraduate
2006-2010 All subjects through advanced secondary

Mentorship

Thesis Committee Member:
2018-2019 Apisada (Ju) Chulakadabba (MIT Civil & Environmental Engineering)
Undergraduate Senior Thesis Title: *Integration of Satellite and In-situ Data for the Study of Vegetation Responses to Precipitation Pulses in the Southwestern United States*

First-year Mini-UROP:
2019 Naomi Lutz & Nicole Toft (MIT Civil & Environmental Engineering): *Impacts of Soil Moisture on Ecosystem Carbon and Water Exchanges*

Professional development

2015 *ComSciCon 2015* Communicating Science Workshop, Harvard University.

Professional service

Non-journal reviews

2018 IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse gas fluxes in Terrestrial Ecosystems
(First Order Draft for US Global Change Research Program)

Journal reviews

Bulletin of the American Meteorological Society
Hydrology and Earth System Sciences
Journal of Hydrometeorology
International Journal of Climatology

Memberships & Research Communities

American Geophysical Union
Boston Water Group
Boston Area Hydrology Journal Club
Harvard Plants & Climate