

Alan Vincent Di Vittorio

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EDUCATION

Ph.D. in Environmental Science, Policy, and Management

University of California, Berkeley, May 22, 2008

Division of Ecosystem Sciences: Remote sensing and environmental biophysics

Additional study: Human geography; Environmental philosophy, ethics and history

Dissertation: A combined biochemical-spectral model for characterizing pine needle damage

Advisor: Dr. Gregory Biging

M.S. in Aerospace Engineering and Sciences, University of Colorado, Boulder, December 2000

Emphases: Remote Sensing, Atmospheric and Oceanic Science

Thesis: An automated, dynamic threshold cloud-masking algorithm for daytime AVHRR images over land

Advisor: Dr. William J. Emery

B.S. in Electrical Engineering and Computer Science, University of California, Berkeley, May 1996

Forest and Resource Management Field Program: June-August 1996, UC Berkeley

PUBLICATIONS

Di Vittorio, A. V., Negrón-Juárez, R. I., Higuchi, N., and J. Q. Chambers (in review). Understanding tropical forest carbon balance: Comparison of the effects of field plot- and satellite-estimated mortality regimes on the dynamics and spatial structure of Central Amazon forest biomass. *Environmental Research Letters*.

Di Vittorio, A. V. and N. L. Miller (2014). Reducing the impact of model scale on simulated, gridded switchgrass yields, *Environmental Modelling and Software*, 51:70-83.

Chambers, J. Q., R. I. Negrón-Juárez, D. M. Marra, A. V. Di Vittorio, J. Tews, D. Roberts, G. H.P.M. Ribeiro, S. E. Trumbore, and N. Higuchi (2013). The steady-state mosaic of disturbance and succession across an old-growth Central Amazon forest landscape, *PNAS*, 110(10):3949-3954.

Di Vittorio, A. V., and N. L. Miller (2013). Evaluating a modified point-based method to downscale cell-based climate variable data to high-resolution grids, *Theoretical and Applied Climatology*, 112:495-519.

Di Vittorio, A. V., R. S. Anderson, J. D. White, N. L. Miller, and S. W. Running (2010). Development and optimization of an Agro-BGC ecosystem model for C₄ perennial grasses, *Ecological Modelling*, 221:2038-2053.

Di Vittorio, A. V. (2009). Enhancing a leaf radiative transfer model to estimate concentrations and in-vivo specific absorption coefficients of total carotenoids and chlorophylls *a* and *b* from single-needle reflectance and transmittance, *Remote Sensing of Environment*, 113:1948-1966.

Di Vittorio, A. V. (2009). Pigment-based identification of ozone-damaged pine needles as a basis for spectral segregation of needle conditions, *Journal of Environmental Quality*, 38:855-867.

Di Vittorio, A. V., and G. S. Biging (2009). Spectral identification of ozone-damaged pine needles, *International Journal of Remote Sensing*, 30(12):3041-3073.

Sayre, N. F., and A. V. Di Vittorio (2009). General: Scale. In *The International Encyclopedia of Human Geography*, R. Kitchen and N. Thrift, eds. Elsevier, St. Louis, MO.

Di Vittorio, A. V., and W. J. Emery (2002). An automated, dynamic threshold cloud-masking algorithm for daytime AVHRR images over land, *IEEE Transactions on Geoscience and Remote Sensing*, 40(8):1682-1694.

IN PREPARATION

Di Vittorio, A. V., L. P. Chini, B. Bond-Lamberty, J. Mao, X. Shi, J. Truesdale, T. Craig, W. D. Collins, P. Thornton, J. Edmonds, A. Thomson, G. C. Hurtt, K. Calvin, A. Jones. From land use to land cover: Restoring the afforestation signal in GCAM to CESM land use coupling and the implications for CMIP5 RCP simulations.

Di Vittorio, A. V., W. D. Collins. Uncertainty in land use projection associated with constant Agro-Ecological Zones under the constraint of a future radiative forcing target.

PRESENTATIONS

Di Vittorio, A. V., "New agro-ecological zones and their potential to affect land use projections", Combined GTSP Technical Workshop and GCAM Community Modeling Meeting, College Park, MD, Oct. 1-4, 2013.

Di Vittorio, A. V., "Understanding the influence of agro-ecological zones on land use projections," joint CESM Societal Dimensions and Land Modeling Working group meeting, Boulder, CO, Feb. 19-22, 2013.

Invited: Di Vittorio, A. V., "Shifting lands with the winds of change: Understanding land use - climate interactions," ESPM land change science seminar series, UC Berkeley, CA, Jan. 29, 2013.

Chambers, J. Q., R. I. Negron-Juarez, D. M. Marra, A. V. Di Vittorio, J. Tews, D. Roberts, G. H.P.M. Ribeiro, S. E. Trumbore, and N. Higuchi, "Episodic tree mortality disturbance and the steady-state mosaic of an old-growth Central Amazon forest landscape," DOE BER Climate and Earth System Modeling PI Meeting, Washington, DC, Sept. 19-22, 2011.

Invited: Di Vittorio, A. V., N. L. Miller, N. M. Kelly, K. Koy, S. Running, R. Anderson, D. Zilberman, "Where to plant biofuel crops: Integrating ecology, economics, and potential land uses in a spatial model," Workshop on Biofuels in Latin America, March 17-18, 2009.

Award: Di Vittorio, A. V., "An enhanced leaf model for estimating pigment concentrations and *in vivo* specific absorption coefficients from leaf reflectance and transmittance," ESPM Graduate Research Symposium, Berkeley, CA, May 3, 2008.

Di Vittorio, A. V., "Revealing the ozone specter: A quantitative signal of forest stress," GeoLunch, Geospatial Innovation Facility, Berkeley, CA, Oct. 19, 2007.

Di Vittorio, A. V., "GIS-based ground truth validation of a forest canopy digital surface model produced by digital photogrammetry," ASPRS 2006 Annual Conference: Prospecting for geospatial information integration, Reno, NV, May 1-5, 2006.

POSTERS

Di Vittorio, A. V., "Implications of constant land unit boundaries for land use projection in a changing climate," American Geophysical Union annual meeting, San Francisco, CA, December 12, 2013.

Di Vittorio, A. V., "Implications of constant bioclimatic zones for land modeling in a changing climate," 18th Annual CESM Workshop, Breckenridge, CO, June 17-20, 2013.

Di Vittorio, A. V., B. Bond-Lamberty, J. Mao, L. P. Chini, J. Truesdale, X. Shi, M. L. Branstetter, W. D. Collins, P. Thornton, J. Edmonds, A. Thomson, G. C. Hurtt, K. Calvin, A. Jones, T. Craig, "iESM update: New land-use coupling and initial results of a fully-coupled experiment," 18th Annual CESM Workshop, Breckenridge, CO, June 17-20, 2013.

Di Vittorio, A. V., and J. Q. Chambers, "Merging plot and Landsat data to estimate the frequency distribution of Central Amazon mortality event size for landscape-scale ecosystem simulations," American Geophysical Union annual meeting, San Francisco, CA, December 6, 2012.

Chambers, J. Q., R. I. Negron-Juarez, A. V. Di Vittorio, D. Marra, S. W. Rifai, G. Ribeiro, N. Higuchi, "Toward detection of CO₂ fertilization of tree growth and biomass accumulation in Amazon forests," American Geophysical Union annual meeting, San Francisco, CA, December 7, 2012.

Di Vittorio, A. V., and J. Q. Chambers, "Agent-specific tree mortality rates in the eastern United States from FIA data," American Geophysical Union annual meeting, San Francisco, CA, Dec. 6, 2011.

Di Vittorio, A. V., N. L. Miller, "Evaluating multi-scale grids for regional agro-ecosystem simulations of switchgrass," American Geophysical Union annual meeting, San Francisco, CA, Dec. 14, 2010.

Di Vittorio, A. V., R. S. Anderson, J. D. White, N. L. Miller, and S. W. Running, "Development and optimization of an Agro-BGC ecosystem model for C₄ perennial grasses," Soil and Water Conservation Society, Sustainable Feedstocks for Advanced Biofuels workshop, Atlanta, GA, September 28-30, 2010.

Di Vittorio, A. V., R. S. Anderson, J. D. White, N. L. Miller, and S. W. Running, "Growing C₄ perennial grass for bioenergy using a new Agro-BGC ecosystem model," American Geophysical Union annual meeting, San Francisco, CA, December 17, 2009.

Di Vittorio, A. V., and N. L. Miller, "Bioenergy crop model simulation and evaluation of Miscanthus," American Geophysical Union annual meeting, San Francisco, CA, December 19, 2008.

GRANTS, AWARDS, and HONORS

- Towards Integrated Assessment of Energy/Water/Climate Interactions (2012 - 2015; ~\$1 million); PI: WD Collins; Primary author: AV Di Vittorio; Department of Energy, Office of Science, Biological and Environmental Research, Integrated Assessment Research Program
- Second best presentation: May 2008 Graduate Research Symposium; Department of Environmental Science, Policy, and Management; University of California, Berkeley
- Hannah & Frank Schwabacher Memorial Scholarship, Spring 2007
- William Carroll Smith Fellowship, Spring 2008
- President, UC Berkeley Ski Team, 1995-1996

RESEARCH EXPERIENCE

Project Scientist, Lawrence Berkeley National Laboratory, Earth Sciences Division

- September 2012-Present; Supervisor: Dr. William Collins
- Projecting land use and cover change under different policy scenarios using the integrated Earth System Model (IESM), which couples an economic Integrated Assessment Model (GCAM) with a biophysical Earth System Model (CESM).
- Evaluating land use and cover change projections with respect to climate feedbacks and water, energy, and food sustainability
- Improving Integrated Assessment Model and Earth System Model coupling

Postdoctoral Fellow, Lawrence Berkeley National Laboratory, Earth Sciences Division

- January 2011-August 2012; Advisor: Dr. Jeffrey Chambers
- Remote sensing and modeling of carbon cycle impacts from land use change and forest disturbance (GRASS, SQL, ENVI/IDL, R)
- Integrated Assessment Model and Earth System Model diagnostics and coupling

Postdoctoral Scholar, University of California, Berkeley, Energy Biosciences Institute

- July 2008-December 2010; Advisor: Dr. Norman Miller
- Implemented perennial C₄ grasses (e.g. switchgrass, *Miscanthus sp.*) and agricultural practices in the computational ecosystem model Biome-BGC for simulating bioenergy crop production (C, R, ArcGIS, ENVI/IDL)
- Developed software to downscale global reanalysis data to a user-defined, high-spatial resolution grid (C, R, ArcGIS, ENVI/IDL, netCDF)
- Developed and implemented a framework for running and evaluating ecosystem models on a high-spatial resolution grid located on any terrestrial portion of the globe (C, R, ArcGIS, ENVI/IDL)
- Preliminary design of a GIS-based land suitability analysis system for biofuel crops based on ecology, economics, and socio-political factors (C, R, ArcGIS, ENVI/IDL)
- Co-authored three grant proposals for ecosystem modeling and GIS-based land suitability analysis

Graduate Student Researcher, University of California, Berkeley, Department of Environmental Science, Policy, and Management

- May 2005-June 2008; August 2002-December 2004; Advisor: Dr. Gregory Biging
- Composed and implemented a research plan for the development of a quantitative method for identifying and modeling ozone-damaged pine needles (C, R, ArcView, ArcGIS)
- Developed a GIS validation model from forest inventory data for digital photogrammetry of forest ecosystems (C, ArcInfo, AML)

Graduate Student Researcher, University of California, Berkeley, Department of Geography

- May 2007-July 2007; Advisor: Dr. Nathan Sayre
- Co-authored a book chapter on geographical scale

Staff Research Associate, University of California, Berkeley, Department of Environmental Science, Policy, and Management

- April 2002-July 2002; Advisor: Dr. Gregory Biging
- Developed a GIS validation model from forest inventory data for digital photogrammetry of forest ecosystems (C, ArcInfo, AML)

Graduate Research Assistant, Colorado Center for Astrodynamics Research, University of Colorado, Boulder

- August 1998-December 2000; Advisor: Dr. William Emery
- Developed and evaluated an automated cloud-masking algorithm for AVHRR data (C)
- Automated an AVHRR data processing procedure for creating vegetation indices (C, IDL, cshell script)
- Developed a snow mask for AVHRR-derived vegetation indices based on existing snow coverage data (ArcInfo, AML)

TEACHING EXPERIENCE

Graduate Student Instructor, University of California, Berkeley

- Fall 2007: Administered the lab section for the course in Natural Resource Sampling. Prepared and gave four lectures on cluster sampling. This lab included field sampling exercises and computer-based analysis of the field data. Professor: Dr. Greg Biging
- Fall 2006, 2005, 2004: Taught discussion sections for the course in Environmental Philosophy and Ethics. Professor: Dr. Carolyn Merchant
- Spring 2006: Taught discussion sections for the course in Culture and Natural Resource Management. Instructor: Dr. Kurt Spreyer

Substitute Teacher, El Dorado County Office of Education

- September 2001-May 2002
- Taught in secondary school (classroom) and Independent Learning Center (one-on-one) settings

Adjunct Faculty, Los Rios Community College District

- August 2001-May 2002
- Administered the Visual Basic 6.0 Lab Course at Folsom Lake College Center, August 2001-December 2001

Ski Instructor, Kirkwood Resort Company

- February 2002-April 2002; November 1997-March 1998; December 1996-April 1997
- Taught skiing to beginner, intermediate, and advanced adults, and also to beginner children

REVIEW ACTIVITIES

International Journal of Remote Sensing; since 2008

Remote Sensing of Environment; since 2010

IEEE Transactions on Geoscience and Remote Sensing; since 2010

Ecological Modelling; since 2011

Public Library of Science; since 2011

BioEnergy Research; since 2012

Science of the Total Environment; since 2013

IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing; since 2013

Earth's Future, since 2013

SERVICE ACTIVITIES

Co-coordinator of the weekly seminar series for the LBNL Climate Sciences Department; April 2012 – April 2013

LANGUAGE

Spanish—Intermediate reading, writing, and conversational abilities

SKILL SUMMARY

- Three and a half years of ecosystem model development and testing, including bioenergy crop modeling and diagnosing a global climate/ecosystem/economic model
- Two and a half years developing a system to downscale global climate data to high-spatial resolution grids
- One and a half years analyzing forest plot and Landsat data for tree mortality estimates
- Fourteen years of experience in digital image analysis and GIS for monitoring environmental change, including: ArcInfo, ArcView, ArcGIS, GRASS, QGIS, ENVI, PCI, AVIRIS, AVHRR, Landsat
- Fifteen years of programming experience, including: C, R, IDL, SQL, AML, Visual C++, S-Plus, Visual Basic, FORTRAN, Scheme, LISP, MIPS, Dynamic C, HTML, MATLAB, shell scripts
- Five years of teaching experience in technical, non-technical, and participatory subjects
- Interdisciplinary research experience
- Experience using portable spectrometers and integrating spheres

- Plant biochemistry lab skills: pigment analysis and thylakoid extraction
- Forestry training: forest ecology, forest mensuration, silviculture, and forest management
- Eight scientific papers and one book chapter published; one scientific manuscript in review and two in preparation; seven presentations and ten posters
- Extensive studies in Environmental Philosophy and History, Human Geography, and Science and Technology Studies
- Grant writing experience