Sara Y. Del Valle

Curriculum Vitae

Los Alamos National Laboratory
Energy and Infrastructure Analysis
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Summary of Qualifications

Sara has been conducting research at Los Alamos National Laboratory for the past ten years. She has worked on developing, integrating, and analyzing mathematical and computational models for the spread of infectious diseases including smallpox, anthrax, malaria, HIV, and influenza on a pandemic scale. She also works on modeling the potential effects of mass casualties on the Healthcare and Public Health Sector including resource allocation and dependencies on other infrastructure. In addition, she studies uncertainty quantification, social networks, mixing patterns, and the role of social behavior on disease dynamics using social media and computational models. Currently, Sara is the technical lead for the National Infrastructure Simulation and Analysis Center (NISAC)'s pandemic influenza project and the principal investigator for an NIH grant for the Modeling of Infectious Disease Agent Study program.

Education

2005   **Ph.D., Applied Mathematics and Computational Sciences**, *University of Iowa*, Advisors: Dr. Herbert W. Hethcote and Dr. James M. Hyman.
Thesis: Effects of Behavioral Changes and Mixing Patterns in Mathematical Models for Smallpox Epidemics

2001   **Masters of Science, Applied Mathematics**, *New Jersey Institute of Technology*.

2000   **Bachelor of Science, Applied Mathematics**, *New Jersey Institute of Technology*.

Leadership Training

2011   **American Association for the Advancement of Science (AAAS) Leadership Seminar**, *Science and Technology Policy*, AAAS, Washington, DC.

2010   **Summer Leadership Institute**, *The AAAS and Society for the Advancement of Chicanos and Native Americans in Science (SACNAS)*, AAAS, Washington, DC.

Research Experience

2006–present   **Scientist/Project Leader**, *Decision Applications Division*, LANL.

2005–2006   **Postdoctoral Research Assistant**, *Computer & Computational Sciences Division*, LANL.

2004–2005   **Graduate Guest Researcher**, *Theoretical Division*, LANL.

2003–2004   **Graduate Research Assistant**, *Center for Nonlinear Studies*, LANL.

Summer 2002   **Graduate Research Assistant**, *Institute for Mathematics and its Applications (IMA)*, University of Minnesota.

Summer 2001   **Graduate Research Assistant**, *Mathematical and Theoretical Biology Institute (MTBI)*, Cornell University.

Summer 2000   **Undergraduate Research Assistant**, *MTBI*, Cornell University.

Appointments

2006–present	**Derivative Classifier**, *Los Alamos National Laboratory*.
2008–present	**Adjunct Research Professor**, *Department of Mathematics and Statistics*, Arizona State University.
2010–2011	**Advisor**, *The National Research Council Committee for Risk Assessment Approaches for Medical Countermeasures*, The National Academies.
2010–2011	**Member**, *Recruitment Diversity Working Group*, LANL.
2010–2012	**D-4 Representative**, *Worker Safety and Security Team (WSST)*, LANL.
2010–present	**Ad hoc Grant Reviewer**, *National Institutes of Health*, (NIH).
2011–2012	**D-Division Chair**, *Worker Safety and Security Team (WSST)*, LANL.
2011–2012	**Associate Directorate Threat Identification and Response (ADTIR) Representative**, *Institutional Worker Safety and Security Team (IWSST)*, LANL.
2011–2012	**Temporary Graduate Faculty**, *Program in Computational Science*, University of Texas at El Paso.
2012	**Pilot Grant Reviewer**, *Modeling Infectious Disease Agent Study (MIDAS) Pilot Grant Review Committee*, University of Pittsburgh.
2012 - present	**Ad hoc Grant Reviewer**, *National Science Foundation*, (NSF).

Mentoring Experience

2012	Mentor/Protégé Program, Protégé (**Los Alamos National Laboratory**)
Summer 2012	Impact of Vaccine Refusal on Pertussis Infection, Catherine Rogers (**University of Texas at Arlington**)
	Dynamic Activities in Agent-based Simulations, Geoffrey Fairchild (**University of Iowa**)
Summer 2011	Characterizing Behavioral Modification for Different Diseases, Samantha Tracht (**University of Tennessee**)
	Mathematical Modeling of Telecommunications Disaster Recovery, Christella Chavez (**University of Oklahoma**)
Summer 2010	Economic Analysis of the Use of Facemasks During Pandemic (H1N1) 2009, Samantha Tracht (**University of Tennessee**)
	Impact of Demographic and Spatial Characteristics on the Spread of 2009 Pandemic Influenza A (H1N1) in the United States, Laura Inkret (**Fort Lewis College**)
	How People of Different Ages Spread Disease, Sarah Rush (**University of Kansas**)
Summer 2009	Mathematical Modeling of the Effectiveness of Face Masks in Reducing the Spread of Novel Influenza A (H1N1), Samantha Tracht (**Capital University**)
	Modeling the Impact of Novel Influenza A (H1N1) Pandemic on Hospital Resources, Juliane Jensby (**Kansas State University**)
Summer 2006	The Effect of Pandemic Influenza on Hospital Bed Shortages, Karima Nigmatulina (**Massachusetts Institute of Technology**)
	Effects of Population Mixing on Pandemic Influenza in Portland, Danielle Robbins (**Arizona State University**)

Graduate Students and Postdocs

Postdoctoral Students — Reid Priedhorsky, Center for Nonlinear Studies & Energy and Infrastructure Analysis Group, **Los Alamos National Laboratory**

Kyle Hickman, Center for Computational Science, **Tulane University**

Dissertation Committees — Paula Gonzales Parra, Program in Computational Science, **University of Texas at El Paso**

Samantha Tracht, Department of Mathematics, **University of Tennessee**

Geoffrey Fairchild, Department of Computer Science, **University of Iowa**

Prior and Current Funding

Principal Investigator — **NIH funded project (U01)**: Quantifying Model Uncertainty for Accurately Forecasting the Spread of Infectious Diseases. (4/11 - 3/16, $3.5M).

Project Lead — **DHS/NISAC funded project**: Healthcare & Public Health Sector Analyses. (01/10 - On going, $450K per year).

Technical Lead — **DHS/OHA funded project**: National Population and Economic Impacts of 2009 Influenza A (H1N1). (6/09 - 1/10, $500K).

Fellowships, Awards, and Nominations

2012 — Los Alamos Award Program, The Associate Directorate for Threat Identification and Response (ADTIR)

2012 — Los Alamos Award Program, D Division

2011 — LANL 2011 Spot Award, D-4 Group

Nominated for LANL Distinguished Mentor Award

2010 — Los Alamos 2009 Distinguished Performance Award, Large Group

Nominated for 2009 Distinguished Performance Award, Individual

Nominated for LANL Distinguished Mentor Award

Nominated for LANL Star Award

2009 — Nominated for Special Act Award, Department of Homeland Security

2007–2010 — Los Alamos Awards Program, D division

2007 — Outstanding Alumni Award from the College of Science and Liberal Arts, NJIT

Best Paper Award, North American Association for Computational Social and Organization Sciences Conference

2004–2005 — Dissertation Fellowship, Alfred P. Sloan Foundation

2001–2002 — Graduate Fellowship, The Graduate Assistant in Areas of National Need

2001 — Best Poster Award, Society for the Advancement of Chicanos and Native Americans in Science Conference

1996–2000 — Scholarship, Distinguished Edward J. Bloustein Scholarship

1996 — Excellence in Mathematics Award, NJIT

Professional Activities

Reviewer for Grants
National Institutes of Health (NIH) Agency for Healthcare Research & Quality (AHRQ); National Science Foundation (NSF); Health Services Research (HSR) Grant Office for the Singapore Ministry of Health, Agency for Healthcare Research and Quality (AHRQ); Los Alamos National Laboratory, Laboratory Directed Research and Development (LDRD DR).

Reviewer for Journals
Public Library of Science (PLoS) ONE, Journal of Theoretical Population Biology, Journal of Theoretical Biology and Medical Modeling, SIAM Undergraduate Research Online, Journal of the Royal Society Interface, International Journal of Society Systems Science, Journal of Artificial Societies and Social Simulation (JASSS), Mathematical Biosciences and Engineering, Journal of Medical and Biological Engineering, Journal of Biological Dynamics, Emerging Infectious Diseases Journal (EID), Proceedings of the National Academy of Sciences.

Conferences Organized
Mathematical and Statistical Applications to Epidemiology and Public Health, Society for Industrial and Applied Mathematics (SIAM) Annual Conference, Boston, MA (2006)

Workshops Organized
Career Options for Underrepresented Groups in Mathematical Sciences, Institute for Mathematics and Its Applications, University of Minnesota, Minneapolis, MN (2010)

CNLS Conference on Homeland Security: Computational and Mathematical Approaches to Homeland Security, Public Health Policy and Control: Challenges Posed by Emerging and Reemerging Diseases, LANL (2003)

Seminars Organized
National Infrastructure Simulation and Analysis Center Seminar (NISAC), Los Alamos National Laboratory, Los Alamos, NM (2008)

CNLS Workshop on Epidemiology: Mathematical Epidemiology, LANL (2003)

Mathematical Epidemiology Graduate Student Seminar Series, LANL (2003)

Publications

Peer-reviewed Journal Articles
Bangerter A, Tang JW, **Del Valle SY**, Schaller M, Tellier R. Spontaneous and Adaptive Human Behaviors Affecting Emerging Infectious Disease Transmission (2012), *Submitted*.

Del Valle SY, Hyman JM, Chitnis N. Modeling Age and Mixing Patterns for Infectious Diseases. (2012), In *Mathematical Biosciences and Engineering Special Issue* (In Press).

Agusto FB, **Del Valle SY**, Blayneh KW, Ngonghala CN, Goncalves MJ, Li N, Zhao R, Gong H. The Impact of Bed-net Use on Malaria Prevalence. *Journal of Theoretical Biology*, 2013; 320: 58-65.

Glasser J, Feng Z, Moylan A, Germundsson R, **Del Valle S**, Castillo-Chavez C. Mixing in age-structured population models of infectious diseases. *Journal of Mathematical Biosciences*, 2012; 235:1-7.

Tracht SM, **Del Valle SY**, Edwards BK. Economic Analysis of the Use of Facemasks During Pandemic (H1N1) 2009. *Journal of Theoretical Biology*, 2012; 300:161-172.

LeGresley SE, **Del Valle SY**, Hyman JM. How People of Different Ages Spread Disease. *Proceedings of the 2011 Computational Social Science Society Conference.*

Del Valle S, Tellier R, Settles GS, Tag JW. Can we reduce the spread of influenza in school with face masks? *American Journal of Infection Control*, 2010; 38:676-7.

Tracht S, **Del Valle S**, Hyman JM. Mathematical modeling of the effectiveness of facemasks in reducing the spread of novel influenza A (H1N1). *PLoS ONE*, 2010; 5(2):e9018.

Mniszewski S, **Del Valle** S, Stroud P, Riese J, Sydoriak S. EpiSimS simulation of a multi-component strategy for pandemic influenza. In *Proceedings of the 2008 Spring Simulation Multiconference.*

S. Mniszewski, **Del Valle S**, Stroud P, Riese J, Sydoriak S. Pandemic simulation of antivirals + school closures: buying time until strain-specific vaccine is available. *Computational & Mathematical Organization Theory*, 2008; 14:209-221.

Del Valle S, Hyman JM, Hethcote HW, Eubank SG. Mixing Patterns Between Age Groups Using Social Networks. *Social Networks*, 2007; 29:539-554.

Stroud P, **Del Valle S**, Sydoriak S, Riese J, Mniszewski S. Spatial Dynamics of Pandemic Influenza in a Massive Artificial Society. *Journal of Artificial Societies and Social Simulation*, 2007; 10(9).

Del Valle S, Hethcote H, Hyman JM, Castillo-Chavez C. Effects of Behavioral Changes in a Smallpox Attack Model. *Journal of Mathematical Biosciences*, 2005; 195:228-251.

Del Valle S, Morales-Evangelista A, Velasco MC, Kribs-Zaleta C. Effects of Education, Vaccination and Treatment on HIV Transmission in Homosexuals with Genetic Heterogeneity. *Journal of Mathematical Biosciences*, 2004; 187:11-33.

Book Chapters

Del Valle SY, Mniszewski SM, Hyman JM. Modeling the Impact of Behavior Changes on the Spread of Pandemic Influenza (2013), In *Modeling the Interplay Between Human Behavior and Spread of Infectious Diseases.* Springer-Verlang. ISBN 978-1-4614-5474-8.

Mniszewski SM, **Del Valle SY**, Priedhorsky R, Hyman JM, HIckman KS. Understanding the Impact of Face Mask Usage through Epidemic Simulation of Large Social Networks (2013), In *Modeling and Simulation of Complex Social Systems.* Springer-Verlang (In Press).

Del Valle S, Stroud P, Mniszewski S. Dynamic contact patterns and social structure in realistic social networks. (2008), In *Social Networks: Development, Evaluation, and Influence.* Nova Science Publishers. ISBN: 978-1-60456-800-4.

Chowell G, Cintron A, **Del Valle S**, Sanchez F, Song B, Hyman JM, Hethcote HW, Castillo-Chavez C. Mathematical Applications Associated with the Deliberate Release of Infectious Agents. (2006), In *Modeling the Dynamics of Human Diseases Paradigms and Challenges.* AMS Contemporary Mathematics Series 410:51-71. ISBN-10: 0821837753.

Technical Reports

Inkret LG, **Del Valle SY**. The Impact of Demographic and Spatial Characteristics on the Spread of 2009 Pandemic Influenza A (H1N1) in the United States. (2010).

Del Valle SY, Ambrosiano JJ, Cash LJ, Doyle JC, Edwards BK, et al. National Population and Healthcare Sector Impacts of 2009 Influenza A (H1N1). (2010), LA-UR 10-00186.

Del Valle S, et al., National Population and Economic Impacts of 2009 Influenza A (H1N1). (2009), LA-UR 09-06335.

Del Valle SY, Eidenbenz SJ, Ewers, M, Inkret LR, Linger SP, et al. Transportation Sector: Transportation Disruption Study of Tappan Zee Bridge. (2009), LA-CP 09-01754.

Del Valle S, Mniszewski S, Stroud P, Sydoriak S. School Closure Policy Dilemma. (2007), LA-UR 07-8258.

Stroud PD, Mniszewski SM, **Del Valle SY**, Riese JM, Sydoriak SJ. Earlier and Faster Production of Vaccine for Pandemic Mitigation. (2007), LA-UR 07-0534.

Mniszewski SM, **Del Valle SY**, Stroud PD, Riese JM, Sydoriak SJ. Effect of Home Transmission Reduction on Pandemic Influenza. (2007), LA-UR 07-1557.

Stroud PD, **Del Valle SY**, Mniszewski SM, Riese JM, Sydoriak SJ. Pandemic Influenza Impact Analysis Report, Simulation of Disease Spread and Intervention Effectiveness, Sensitivity Analysis. (2007), LA-UR 07-1989.

Del Valle S. Recommendations for Phase II Environmental Sampling Following a BioWatch Actionable Result. (2007), LA-CP 07-0903.

Del Valle SY, Mniszewski SM, Stroud PD, Riese JM, Sydoriak SJ. Can Temporary Behavioral Changes Generate Waves During a Pandemic? (2007), LA-UR 07-1171.

Stroud PD, **Del Valle SY**, Mniszewski SM, Riese JM, Sydoriak SJ. Pandemic Influenza Impact Analysis Report: Simulation of Disease Spread and Intervention Effectiveness. (2006), LA-UR 06-7966.

Del Valle SY. Planning for Pandemic Influenza: Hospital Bed Surge Capacity Analysis for Los Angeles. (2006), LA-UR 06-4786.

Del Valle SY, Kubicek DA, Mniszewski SM, Riese JM, Roberts D, Romero PR, Smith JP, Stroud PD, Sydoriak SJ. EpiSimS Los Angeles Case Study. (2006), LA-UR 06-0666.

Del Valle SY, Stroud PD, Smith JP, Mniszewski SM, Riese JM, Sydoriak SJ, Kubicek DA. EpiSimS: Epidemic Simulation System. (2006), LA-UR 06-6714.

Robbins DE, **Del Valle SY**, Minszewski SM. The Effects of Population Mixing on Pandemic Influenza in Portland. (2006), LA-UR 06-5937.

Stroud P, **Del Valle SY**, Sydoriak SJ, Smith JP, Minszewski SM, et al. joint NISAC-CIPDSS. Analysis of Avian Influenza Viruses Issues for the Catastrophic Assessment Task Force. (2005), LA-UR 05-9254.

Grandine T, **Del Valle S**, Moeller T, Natarajam SK, Pencheva GV, Sherman JC, Wise SM. Designing Airplane Struts Using Minimal Surfaces. (2002), Technical report for the IMA, University of Minnesota.

Chowell G, **Del Valle S**, Martino L, Kerman D. Deterministic and Stochastic Reaction-Diffusion Models in a Ring. (2000), Technical report for MTBI, Cornell University.

Other Publications

Del Valle SY and Smith JP. Understanding Complex Systems: Population Interactions Resulting in Disease Transmission. (2011) *Mathematics Awareness Month Magazine.*

Del Valle S. Effects of Behavioral Changes and Mixing Patterns in Mathematical Models for Smallpox Epidemics. (2005), Ph.D. Thesis, University of Iowa.

Selected Invited Presentations

2012 Joint Mathematics Meetings, **Hynes Convention Center**, Boston, MA

Computer Science Departmental Colloquium, **University of Iowa**, Iowa City, IA

Infectious Disease Transmission Dynamics: Increasing Diversity in Science, **Harvard School of Public Health**, Arlington, VA

Mathematics Departmental Colloquium, **Indiana University of Pennsylvania**, Indiana, PA

Society to Advancement of Hispanics, Chicanos, & Native Americans in Science, **2012 SACNAS National Conference**, Seattle, WA

Keynote Speaker for 25th Annual WPI Invitational Mathematics Meet, **Worcester Polytechnic Institute**, Worcester, MA

Open Problems in Mathematical Epidemiology Workshop, **University of British Columbia**, Vancouver, BC Canada

2011   Women in Mathematics Symposium, Institute for Pure & Applied Mathematics, **University of California**, Los Angeles, CA

National Institute for Mathematical and Biological Synthesis, **University of Tennessee**, Knoxville, TN

European Conference on Mathematical and Theoretical Biology, **Institute of Mathematics of the Polish Academy of Sciences**, Krakow, Poland

Mathematical Sciences Departmental Colloquium, **University of Texas**, El Paso, TX

Society to Advancement of Hispanics, Chicanos, & Native Americans in Science, **2011 SACNAS National Conference** San Jose, CA

2010   Mathematics Departmental & Junior Colloquiums, **University or Tennessee**, Knoxville, TN

Modeling & Simulation for Defense, **Institute for Defense and Government Advancement**, Orlando, FL

Estimating the Impact of the 2009 H1N1 Influenza Pandemic and Its Control Using Mathematical and Statistical Models, **2010 Society for Industrial and Applied Mathematics Annual Meeting**, Pittsburgh, PA

Career Options for Underrepresented Groups in Mathematical Sciences, Institute for Mathematics and Its Applications, **University of Minnesota**, Minneapolis, MN

2009   International Mathematical Modeling Meeting: Mitigating the Spread of Influenza A (H1N1), **BC Centre for Disease Control**, Vancouver, BC Canada

Multi-Agency Cyber Technical Exchange Meeting, **Air Force Research Labs**, Wright-Patterson Air Force Base, Dayton, OH

2008   National Infrastructure Simulation and Analysis Center Seminar (NISAC), **Sandia National Laboratories**, Albuquerque, NM.

2007   Workshop on the Mathematics of Global Public Health: Modeling disease transmission and biological invasions, **Arizona State University**, Tempe, AZ.

Opportunities in Mathematical Biology for Under-represented Groups Workshop, **Mathematical Biosciences Institute**, Columbus, OH

2006   Mathematical Models in Population Dynamics, Pan-American Advanced Studies Institute, **Universidad de El Salvador**, San Salvador, El Salvador.

Models of Infectious Disease Agent Study (MIDAS) Workshop on Behavioral Epidemiology, **Brookings Institution**, Seattle, WA.

Modeling Pandemic Influenza, Pandemic Influenza: Building Community Resiliency, **San Mateo County**, San Mateo, CA

Center for Discrete Mathematics and Theoretical Computer Science (DIMACS) Workshop: The Epidemiology and Evolution of Influenza, **Rutgers University**, New Brunswick, NJ

Selected Contributed Presentations

2011 The Computational Social Science Society, **CSSSA 2011 Conference**, Santa Fe, NM

2006 Mathematical and Statistical Applications to Epidemiology and Public Health, Society for Industrial and Applied Mathematics **(SIAM) Annual Conference**, Boston, MA

2005 The European Conference on Mathematical and Theoretical Biology (ECMTB), **Dresden University of Technology**, Dresden, Germany.

Society for Industrial and Applied Mathematics **(SIAM) Annual Conference**, New Orleans, LA

2004 Computational and Mathematical Population Dynamics, **Universita degli Studi di Trento**, Trento, Italy.

2003 Annual Meeting of the Society for Mathematical Biology, **University of Dundee**, Dundee, UK

Biomathematics Conference, **University of Iowa**, Iowa City, IA

Society for the Advancement of Chicanos and Native Americans in Science **(SACNAS) National Conference**, Albuquerque, NM

Computational and Mathematical Approaches to Homeland Security, Public Health and Control: Challenges Posed by Emerging and Re-Emerging Diseases, **Center for Nonlinear Studies Conference**, LANL, Los Alamos, NM