Vanessa Ortiz

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Career Summary

- Data-driven, highly analytical researcher with over 14 years of experience in modeling and numerical analysis.
- Proven ability to identify and extract tangible, real-world applications in the analysis of large, complex data sets.
- Strong writing and presentation skills developed over 6 years as an Assistant Professor at Columbia University.
- Passionate about utilizing data/statistical analysis to develop creative methods of solving challenging problems.
- Native Spanish speaker with full written/spoken proficiency in English and intermediate Italian speaking skills.

Demonstrated Strengths

- Mathematical Modeling
- Network Analysis
- Monte Carlo Simulations
- Statistical Analysis
- Predictive Modeling
- Quantitative Modeling
- Machine Learning
- Differential Systems
- Chemical Engineering

Professional Experience

Columbia University, New York, NY **2010 – Present**
Assistant Professor

- Develop/teach curriculum on numerical analysis/programming in Python and its applications to chemical engineering.
- Conduct in-depth research into network/statistical analysis, protein signal propagation, and conformational changes.
- Work closely with undergraduate/graduate students and postdoctoral fellows to provide academic guidance.

University of Wisconsin, Madison, WI **2007 – 2010**
Postdoctoral Research Assistant

University of Pennsylvania, Philadelphia, PA **2002 – 2007**
Graduate Research Assistant

Education & Training

Ph.D. in Chemical Engineering – University of Pennsylvania, Philadelphia, PA
BS in Chemical Engineering – University of Puerto Rico-Mayaguez, PR

Machine Learning Specialization:
Foundations, Regression (Completed)
Classification, Clustering & Retrieval, Recommender Systems & Dimensionality Reduction, Deep Learning (In Progress)

SAS:
Programming I: Essentials (Completed)
Statistics I: Introduction to ANOVA, Regression & Logistic Regression (In Progress)

Selected Projects

Block-Copolymer Assembly – Model development and analysis of molecular simulations of block-copolymer assembly in water for the design of drug carriers that can effectively penetrate human cells (curve fitting, statistical analysis)
Protein Stability Under Force – Analysis of molecular simulations of proteins to understand the effects of mutations and other environment variables on protein stability under applied force (statistical analysis)
DNA Flexibility – Model and method development, and analysis of computer simulations to understand and predict DNA's sequence-dependent mechanical properties and hybridization patterns (curve fitting, statistical analysis)
Protein Signal Propagation – Development and application of network-analysis-based computational methods to quantify signal propagation in proteins (statistical analysis, network analysis)
Protein Elasticity – Development and application of elasticity-based computational methods to quantify conformational changes in proteins (minimization, statistical analysis, community analysis, principal-component analysis)
Protein Conformational Changes – Analysis of molecular simulations of proteins to identify conformational changes that are important for oligomerization (statistical analysis, clustering)

Technical Skills

OS:	Windows, Unix/Linux
Programming:	SQL, SAS, Python (matplotlib, numpy, scipy, graphlab), Tcl/Tk, Matlab, bash/shell, Fortran, C, LaTex
Software	MS Office (Word, Excel, Powerpoint, Publisher), Aspen, NAMD, GROMACS, LAMMPS

Awards & Honors

Rodriguez Family Junior Faculty Development Award
Computation and Informatics in Biology and Medicine Postdoctoral Training Fellowship (2007 – 2010)
Ruth L. Kirschstein Predoctoral Research Fellowship (2006 – 2007)
Predoctoral Research Fellowship (2003 – 2005)
Luis C. Monzón Award for Best Chemical Engineering Student of Class of 2002

Professional Affiliations

Session Chair & Liason Director for CoMSEF, American Institute of Chemical Engineers (AIChE)
Session Chair, American Physical Society (APS)
Session Chair, Biophysical Society (BPS)
Member, American Chemical Society (ACS)
Member, Society of Hispanic Professional Engineers (SHPE)
Member, The New York Academy of Sciences (NYAS)

Publications

Ribeiro AAST and **Ortiz V**, "A Chemical Perspective on Allostery", Chem. Rev., (2016), DOI: 10.1021/acs.chemrev.5b00543

Ribeiro AAST and **Ortiz V**, "MDN: A Web Portal for Network Analysis of Molecular Dynamics Simulations", Biophys. J., 109 1110 (2015)

Ribeiro AAST and **Ortiz V**, "Local Elastic Constants of LacI and Implications for Allostery", J. Mol. Graph., 57 106 (2015)

Ribeiro AAST and **Ortiz V**, "Energy Propagation and Network Energetic Coupling in Proteins", J. Phys. Chem. B, 119 1835 (2015)

Ribeiro AAST and **Ortiz V**, "Determination of signaling pathways in proteins through network theory: importance of the topology", J. Chem. Theory Comput., 10 1762 (2014)

Collier G and **Ortiz V**, "Emerging Computational Approaches for the Study of Protein Allostery", Arch. Biochem. Biophys., 538 6 (2013)

Ortiz V and de Pablo JJ, "Molecular origins of DNA flexibility: Sequence effects on conformational and mechanical properties", Phys. Rev. Lett., 106 238107 (2011).

Loverde SM, **Ortiz V**, Kamien RD, Klein ML, and Discher DE, "Curvature-driven molecular demixing in the budding and breakup of mixed component worm-like micelles", Soft Matter, 6 1419 (2010)

Sambriski EJ, **Ortiz V**, and de Pablo JJ, "Sequence effects in the melting and renaturation of short DNA oligonucleotides: structure and mechanistic pathways", J. Phys.-Condes. Matter, 21 034105 (2009)

Johnson CP, Massimiliano G, **Ortiz V**, Bhasin N, Harper S, Gallagher PG, Speicher DW, and Discher DE, "Pathogenic proline mutation in the linker between spectrin repeats: disease caused by spectrin unfolding", Blood, 109 3538 (2007)

Discher DE, **Ortiz V**, Srinivas G, Klein ML, Kim Y, Christian D, Cai S, Photos P, and Ahmed F, "Emerging applications of polymersomes in delivery: From molecular dynamics to shrinkage of tumors", Prog. Polym. Sci., 32 838 (2007)

Ortiz V, Nielsen SO, Klein ML, and Discher DE, "Computer simulation of aqueous block copolymer assemblies: Length scales and methods", J. Polym. Sci. Pt. B-Polym. Phys., 44 1907 (2006)

Ortiz V, Nielsen SO, Discher DE, and Klein ML, Lipowsky R, and Shillcock J, "Dissipative particle dynamics simulations of polymersomes", J. Phys. Chem. B, 109 17708 (2005)

Nielsen SO, Ensing B, **Ortiz V**, Moore PB, and Klein ML, "Lipid bilayer perturbations around a transmembrane nanotube: A coarse grain molecular dynamics study", Biophys. J., 88 3822 (2005)

Ortiz V, Nielsen SO, Klein ML, and Discher DE, "Unfolding a linker between helical repeats", J. Mol. Biol., 349 638 (2005)

Ortiz V, Lopez-Alvarez YM, and Lopez GE, "Phase diagrams and capillarity condensation of methane confined in single- and multi-layer nanotubes", Mol. Phys., 103 2587 (2005)