TRAVIS AARON HOPPE

Curriculum Vitæ
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PhD Physics
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professional experience

2016-current **Senior Data Scientist / Portfolio Analyst**

- Developed analytic tools to process the text of NIH grants and publications using distributional embeddings (e.g. word2vec).
- Analyzed grant and publication portfolios, evaluating metrics such as clinical impact, technological impact, and award rates to build quantitative comparisons between various populations.
- Architected and productionized machine learning models for classification, regression, outlier detection, and language modeling. Maintained several open-source tools used internationally.
- Designed and validated an interagency government blockchain to detect grant duplication with minimal shared data.
- Restored historical texts from books and PDFs into actionable data.

2014-2016 **Postdoctoral Fellowship at National Institutes of Health**

- Researched novel integration schemes for molecular dynamics simulations. Developed protein models for tertiary structure prediction from primary sequence.
- Worked in collaboration with experimentalists to test and validate models.

2011-2014 **Postdoctoral Fellowship at National Institutes of Health**

- Developed multi-scale theoretical and computational models to study protein folding, structure, and protein-protein. Derived hard-sphere models to account for crowding in biomolecular simulations and potentials to model anisotropic charge distributions.
- Managed large-scale parallel projects (1000+ cores) to simulate the cellular environment.

2005-2011 **Teaching Assistant (Drexel)**

- Organized, taught, and ran 22 undergraduate courses.
- Restructured the entire computational component for physics majors by transitioning from FORTRAN to Python.

skills

- **Machine learning and Natural Language Processing**: Tensorflow, pyTorch, Keras, Convolutional Neural Networks (CNN), Generative Adversarial Networks (GANs), Transformers (BERT), word2vec.
- **Programming and Database**: Python, C++, JavaScript, SQL, NoSQL (MongoDB, Elasticsearch).
- **Project management**: Small team leader for analysis and code design.

education

2011 **Doctor of Philosophy, Physics**
Drexel University
On the Role of Entropy in the Protein Folding Process, Thesis.

2008 **Master of Science, Physics**
Drexel University

2005 **Bachelor of Science, Physics**
Bachelor of Science, Mathematics
University of Nevada

publications

Policy

2019 **Topic Choice Contributes to Lower Rate of NIH NIH Awards to African-American/Black Scientists**, *Travis Hoppe, Aviva Litovitz, Kristine Willis, Rebecca Meseroll, Matthew Perkins, B. Ian Hutchins, Alison Davis, Michael Lauer, Hannah Valantine, James Anderson, & George Santangelo*, Science Advances.

2019 **The NIH Open Citation Collection: A public access, broad coverage resource**, *Ian Hutchins, Kirk Baker, Matthew Davis, Mario Diwersy, Ehsanul Haque, Robert Harriman, Travis Hoppe, Stephen Leicht, Payam Meyer, George Santangelo*, PLoS Biology.

2017 **Additional support for RCR: A validated article-level measure of scientific influence**, *Ian Hutchins, Travis Hoppe, Rebecca Meseroll, James Anderson, & George Santangelo*, PLoS Biology.

Protein-Protein Interaction

2019 **Non-specific Interactions Between Macromolecular Solutes in Concentrated Solution: Physico-Chemical Manifestations and Biochemical Consequences**, *Travis Hoppe & Allen Minton*, Frontiers in Molecular Biosciences.

2016 **Incorporation of Hard and Soft Protein-Protein Interactions into Models for Crowding Effects in Binary and Ternary Protein Mixtures**, *Travis Hoppe & Allen Minton*, Journal of the Physical Chemistry B.

2015 **Dependence of Internal Friction on Folding Mechanism**, *Wenwei Zheng, David De Sancho, Travis Hoppe & Robert B. Best*, Journal of the American Chemical Society.

2015 **An equilibrium model for the combined effect of macromolecular crowding and surface adsorption on the formation of linear protein fibrils**, *Travis Hoppe, Allen Minton*, Biophysical Journal.

2013 **A simplified representation of anisotropic charge distributions in proteins**, *Travis Hoppe*, Journal of Chemical Physics.

2013 **Singular Value Decomposition of the Radial Distribution Function for Hard Sphere and Square Well Potentials**, *Travis Hoppe*, PLoS ONE.

2010 **Protein Folding with Implicit Crowders: A Study of Conformational States Using the Wang-Landau Method**, *Travis Hoppe, Jian-Min Yuan*, Journal of Physical Chemistry B.

Protein Topology & Graph theory

2014 **Integer sequence discovery from small graphs**, *Travis Hoppe, Anna Petrone*, Discrete Applied Mathematics.

2009 **Entropic flows, crowding effects, and stability of asymmetric proteins**, *Travis Hoppe, Jian-Min Yuan*, Physical Review E.

Experimental Modeling

2014 **Programmable Nanoscaffolds that Control Ligand Display to a G-Protein Coupled-Receptor in Membranes allow Dissection of Multivalent Effects**, *Andrew Dix, Daniel Appella, Travis Hoppe, et al.*, Journal of the American Chemical Society.

2014 **Quantification of plasma HIV RNA using chemically engineered peptide nucleic acids**, *Chao Zhao, Daniel Appella, Travis Hoppe, et al.*, Nature Communications.

2008 **The importance of EBIT data for Z-pinch plasma diagnostics**, *A S Safronova, Travis Hoppe, et al.*, Canadian Journal of Physics.

2006 **Spectroscopic and Imaging Study of Combined W and Mo-pinches at 1 MA-pinch Generators**, *Alla Safronova, Travis Hoppe, et al.*, IEEE Transactions on Plasma Science.

awards

2017 **Office of the Director's Honor Award**
Outstanding support for the Grants Support Index & Next Generation Research Initiative Analytical Team

2014 **Top Presentation Award**
Institution-wide recognition during the NIDDK Annual Conference.

2010 **Research Assistant Grant**
Competitive grant from Drexel Physics Department on the basis of outstanding research and teaching.

2010 **Student Research Achievement Award (SRAA)**
Top poster at the Biophysical Society 2010 meeting.

2009 **Department Research Award (Senior Division)**
Given by the Drexel Physics Department, this award recognized a high proficiency in both original research and synthesis of results into publications.

2008 **Department Research Award (Junior Division)**
Restricted to the first two years of study, the junior division award was awarded for early achievements in research.

2007 **Teaching Assistant of the Year**
Recognition by Drexel University as the top Teaching Assistant in the College of Arts and Sciences.

conferences

2016 **Biophysical Society: Los Angeles**
Poster: Coevolutionary signal enhancement

2015 **Biophysical Society: Baltimore**
Seminar: Mean-field lattice-model IDPs, Binding Affinity & Specificity

2014 **Advances in Enhanced Sampling Algorithms: Telluride**
Seminar: Topological considerations in the Wang-Landau algorithm

2013 **Biophysical Society: Philadelphia**
Seminar: Coarse-grained Electrostatic Models for Protein Solutions

2010 **Biophysical Society: San Francisco**
Poster: Wang-Landau Density of States in Crowded Protein Environments

2009 **Drexel University Libraries' Communication Symposium: The Hidden Costs of Scholarly Communication**
Invited Panel Member

2009 **Biophysical Society: Boston**
Poster: Exhaustive Properties of Simple Lattice Peptides

teaching (Drexel)

2011 **PHYS 305**, Computational Physics II*

2010 **PHYS 304**, Computational Physics I*
PHYS 160, Introduction to Scientific Computing*
PHYS 305, Computational Physics II*

2009 **PHYS 304**, Computational Physics I*
PHYS 160, Introduction to Scientific Computing*
DSP 099, Dragon Summer Program: Remedial Mathematics
PHYS 100, Preparation for Engineering Studies
PHYS 305, Computational Physics II*

2008 **PHYS 304**, Computational Physics I*
PHYS 102, Fundamentals of Physics II*
PHYS 115, Contemporary Physics III*
PHYS 114, Contemporary Physics II*

2007 **PHYS 113**, Contemporary Physics I*
PHYS 102, Fundamentals of Physics II, Lab
PHYS 115, Contemporary Physics III*
PHYS 114, Contemporary Physics II*

2006 **PHYS 113**, Contemporary Physics I*
TDEC 101, Fundamentals of Physics I, Lab
TDEC 103, Fundamentals of Physics III*
TDEC 102, Fundamentals of Physics II*

2005 **TDEC 101**, Fundamentals of Physics I*

*Developed new curricula and modernized the Computational Physics, Contemporary Physics and Introduction to Scientific Computing courses at Drexel.