TRAVIS AARON HOPPE

Curriculum Vitæ   PhD Physics
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professional experience

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

- Developed analytic tools, models, and software to process the natural language of text using distributional embeddings (e.g. word2vec) over the NIH grants and publication corpus.

- 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.

- Restored historical texts from books, records, 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 over 22 undergraduate courses, including lesson plans and curricula.

- 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.