Eshel FARAGGI

PROFILE

Unique and passionate **physicist** with over 30 years experience in predicting the outcome of complex systems. Leading developer for a framework to predict the scaling of hysteresis, laser absorption by the retina, and the 3D structure of proteins. Responsible for implementing the bi-modal distribution of the protein dihedrals into protein structure prediction tools. Was among the first to introduce ML into 3D protein prediction. Over 15 years experience in ML and AI. A pioneer of this approach in bioinformatics.

Google scholar publication list

CONTACT DETAILS

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PERSONAL INFORMATION

Citizenship: **Israel, USA**
Languages: **Hebrew** (native), **English** (native), **Arabic** (D2)

SKILLS

- Mechanics, E&M, Fluid Dyn.
- Machine Learning
- FORTRAN, C/++, Matlab, Math.
- Linux, BASH, Perl, Python, JAVA
- MS Word, Excel, PowerPoint
- Empath, Photographer, Musician
- Carpenter

EDUCATION

PH.D. Physics   *University of Texas at Austin*   **2003**
◊ Thesis title: *Ferromagnetic properties of partially filled two-dimensional Ising lattices*
◊ Mean field and Ising models of percolating ferromagnets and hysteresis.

B.Sc. Physics/Mathematics *Hebrew University, Jerusalem*   **1996**

EXPERIENCE

ADJUNCT PROFESSOR at *Department of Physics, Indiana University Indianapolis (IUPUI), Indianapolis, Indiana USA*   **2017–Now**
◊ Teaching undergraduate physics.

PHYSICIST at *Research and Information Systems, LLC, Indianapolis, Indiana*   **2012–Now**
◊ Machine learning in protein structure and variation. Electromagnetism in biological cell division. Understanding nuclear structure from only electromagnetic charge and its quantum interaction.

CONSULTANT at *Battelle Center for Mathematical Medicine, Nationwide Children's Hospital, Columbus, OH*   **2012–2024**
◊ Machine learning models for protein structure prediction and predicting the effect of genetic variation. The role of entropy in protein structure.

VISITING PROFESSOR at *Dept. of Biochem. and Mol. Bio., Indiana University School of Medicine, Indianapolis, Indiana*   **2012–2017**
◊ Machine learning in protein structure and disorder.

RESEARCH ASSOCIATE at *CCBB, School of Informatics, Indiana University Purdue University, Indianapolis, Indiana*   **2007–2012**
◊ Predicting protein dihedrals, ASA, disorder, and 3D structure.

RESEARCH ASSOCIATE at *Department of Physics, Florida International University, Miami, Florida*   **2003–2007**
◊ Fluid/solid thermodynamic modelling for laser/retina interaction.

SELECTED PUBLICATIONS

2022 ◊ Faraggi, E; There is only charge: Heisenberg-Coulomb based theory of the quarks, nucleons, and the nuclei. **Authorea Preprints.**

2019 ◊ Faraggi, E, Dunker, AK, Jernigan, RL, & Kloczkowski, A; Entropy, Fluctuations, and Disordered Proteins. **Entropy, 21, 764.**

2017 ◊ Faraggi, E, Dunker, AK, Sussman JL, & Kloczkowski A; Comparing NMR and X-ray protein structure: Lindemann-like parameters and NMR disorder. **J. of Biomol. Struc. and Dyn. 1-11.**

2015 ◊ Faraggi E & Kloczkowski A; GENN: a GEneral Neural Network for learning tabulated data with examples from protein structure prediction. **Artificial Neural Networks. Springer New York, 165-178.**

2014 ◊ Faraggi E, Zhou Y, & Kloczkowski A; Accurate single-sequence prediction of solvent accessible surface area using local and global features. **Proteins, 82, 3170.**

2014 ◊ Faraggi E & Kloczkowski A; A global machine learning based scoring function for protein structure prediction. **Proteins, 82, 752**

2012 ◊ Faraggi E; Symmetrical charge-charge interactions in ionic solutions: implications for biological interactions **arxiv.org/abs/1201.0556**

2009 ◊ Eshel Faraggi, Yuedong Yang, Shesheng Zhang, and Yaoqi Zhou; Predicting Continuous Local Structure and the Effect of Its Substitution ... **Structure 17, 1515-1527**