Robert L. Jernigan

Appointments:

2002-present Director, Laurence H. Baker Center for Bioinformatics and Biological Statistics, Plant Sciences Institute, Iowa State University

2002-present Professor, Department of Biochemistry, Biophysics and Molecular Biology, Iowa State University

1972-2002 Principal Investigator; Section Chief; and Deputy Laboratory Chief
Oversight of NCI Supercomputer Facility
Molecular Structure Section
Laboratory of Experimental and Computational Biology
National Cancer Institute
National Institutes of Health

Education:

NIH Postdoctoral Fellow, UCSD with Bruno Zimm
Stanford University, Ph.D., Chemistry with Paul Flory (Nobel Laureate)
California Institute of Technology, B.S. Chemistry

Research Interests:

Computational biology, bioinformatics, protein structure prediction, protein modeling, systems biology and post-genomic studies; molecular computations, gene annotation, protein networks, structure-function studies of biochemical and biophysical processes; new approaches to computer modeling and simulation (protein and RNA folding, external conditions, molecular recognition, nucleic acid conformations, recombination and regulation, conformational transitions, semi-molecular models of macromolecular assemblies); applications to develop new medical therapies, including protein engineering, database extraction and drug design, applications of machine learning.

Research Accomplishments:

- Development of residue-residue interaction energies derived from crystal structures for proteins
- Conformational means and fluctuations of different DNA sequences
- Lattices to fit protein and RNA structures and ways to generate extremely large numbers of diverse conformations
- Amino acid mutation substitution matrix from structural data
- Probing proteins to locate peptide binding sites
- Structural lattices for protein structures
- Coarse-grained protein models to understand folds and conformational fluctuations
- Development of simple models to generate large-scale protein motions and their use to understand structure-function relationships
- Analyses of ribosome motions and their relationship to protein synthesis
- Protein structure predictions
- 220 publications

Awards and Honors:

NIH Special Achievement Award, Grants - Intramural NIH, Extramural NIH
Fellow, Institute for Advanced Studies, Hebrew University, Jerusalem
Top 5% of Lifetime Funding Recipients - NIH Intramural Research Program
NIH Merit Award "*in recognition of research contributions on protein and nucleic acids…,,"* 1995
Fellow – AAAS, 1999-present
NSF Physics Division Office – "You are playing a seminal role in setting directions for Biological Physics in the Division. (And I could hardly think of anyone else whom I would trust more in helping us do this.)"
Iowa State University Award for Excellence in Research, Iowa State University 2008
Fellow, Biophysical Society, 2008

Past Committees:

NIH Adv. Comm. Computer Use; NIH-DCRT Scient. Comp. Eval. Comm.; NIH Time Alloc. Grp. Adv. Scient. Comp. Lab., FCRDC; NCI-Adv. Scient. Comp. Lab. - Coord. Grp.; NIH Tech. Eval. Pan. Adv. Scient. Comp. Lab., FCRDC, NIH Supercomp. Upgrd. Panel; Adv. Comm., Cornell Univ. Theory Ctr.; NIH Struct. Biol. Steering Grp.; Publications Committee, Biophysical Society (Overseeing *Biophys. J.)*, Chairman. Numerous NIH and NSF Panels and Study Sections

Editorial Boards:

Editorial Advisory Board, *Biochemistry*
Editorial Advisory Board, *Journal of Biological Chemistry (2002-2008)*
Editorial Advisory Board, *Bioinformatics and Biological Insights*