Curriculum Vitae

David Jimenez-Morales PhD, MSc, BSc

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US Visa status: I do not need sponsorship

Education

2006 - 2013 **PhD Bioinformatics**
Department of Bioengineering. University of Illinois at Chicago.
Chicago, Illinois (USA)

2003–2004 **MSc Computational Biology**
Universidad Complutense de Madrid. Madrid (Spain)
Organized by Complutense University, the National Center for Biotechnology (CSIC), Alma Bioinformatics S.L. and Bioforum

1999 **Teaching Certificate**
Postgraduate Certificate in Education.
Instituto de Ciencias de la Educación. Universidad Complutense de Madrid.
Madrid (Spain)

1998 - 2000 **Microbiology PhD Program and Research Certificate**
Department of Microbiology, Universidad Complusense de Madrid.
Madrid (Spain)

1993 - 1998 **BSc Biology (specialty in Fundamental Biology)**
Facultad de Ciencias. Universidad de Granada.
Granada (Spain)\

Research Experience

2006 - **PhD Graduate Student. Liang's Molecular and Systems Computational lab.**
Department of Bioengineering. University of Illinois-Chicago. Chicago
Research Work: *Evolutionary biology. Protein design. Structural bioinformatics. Bioinformatics Models and Prediction Tools.*

Under the guidance of Prof. Jie Liang, I have been studying physicochemical and functional constraints acting on proteins and their evolutionary patterns.

> Characterization of the pattern of amino acid substitutions at the transmembrane segments of outer (beta-barrel) membrane proteins, which allows a better detection of these membrane proteins and it can be useful as part of a toolkit for protein engineering design. Mutants of OmpF were designed based on this pattern of substitutions and experimental results validated our predictions (Collaborator: Prof. Linda Kenney).
Computational tool: bbTM-ST (beta-barrel Transmembrane Search Tool)

> Identification of a physicochemical property of the site where the catalytic action takes place at protein enzymes: we found that the catalytic active site is an unusual electrostatic and steric environment in which side chains and reactants are crowded together in a mixture more like an ionic liquid than an ideal infinitely dilute solution (Collaborator: Prof. Bob Eisenberg).

> Characterization of the signature microenvironment of lysine carboxylation sites and its defining features. Development of a computational method and implemented a tool for the detection of lysine carboxylation (PreLysCar) in proteins with available 3D structure. We have unveiled a larger prevalence of this modification, with important biological consequences. Paper accepted in the journal Acta D (Collaborator: Dr. Daniel Shi).
Computational Tool: PreLysCar (Predictor of Lysine Carboxylation)

> Evolutionary analysis of the catalytic active site of proteins and their relationship with metabolic fluxes. We explore the relationship between enzyme structures, enzyme functions, metabolite concentrations and fluxes in the glycolysis and pentose-phosphate pathways, which form the central carbon metabolism of *E.coli* (Collaborator: Dr. Lei Liu)

2003 - 2005 **Research Assistant. Proteomics Unit & Department of Microbiology II.**
Universidad Complutense de Madrid – Parque Científico de Madrid. Madrid

MSc. Bioinformatics Project: *Bioinformatics Study of glycolytic proteins presence on the cell surface of Saccharomyces cerevisiae*.
I worked on the hypothesis that a classical and well-known group of citoplasmatic proteins could exist outside the cell. With this proposal, we used predicting methods for localization and multifunctional evaluation, in addition to three-dimensional protein structure studies.

Bioinformatics Research Work: *Ecm33 protein family characterization as previous step in structure and function prediction*.
New protein family characterization at protein sequence level and prediction the secondary and tertiary protein structure (using homology modeling, fold recognition and *ab initio* methods)

1998 - 2000 **Research Assistant. Department of Microbiology I. Faculty of Medicine.**
Universidad Complutense de Madrid. Madrid.

Identification of bacterial species isolated from oral human flora. Determined the effects of sub-lethal doses of some antimicrobial agents. Isolation, characterization and identification of bacteria species with nosocomial interest isolated from the guts of farm animals and measured the resistance levels through antimicrobial agents.

Publications

Peer-reviewed Journals

2013 - Jimenez-Morales D, Adamian L, Shi D, and Liang J.
Lysine Carboxylation: Unveiling a spontaneous posttranslational modification.
Acta Crystallographica Section D. Vol 69. doi:10.1107/S0907444913023640

2012 - Jimenez-Morales D, Liang J, and Eisenberg B
Ionizable Side Chains at Catalytic Active Sites of Enzymes.
Eur Biophys J. Vol 41, Issue 5 (2012), P 449-460 PubMed.

2012 - Naveed H, Jimenez-Morales D, Tian J, Pasupuleti V, Kenney L, Liang L (2012)
Engineered oligomerization state of OmpF protein through computational design decouples oligomer dissociation from unfolding
J Mol Biol. 2012 May 25;419(1-2):89-101. Epub 2012 Mar 3. PubMed

2011 - Liang J, Naveed H, Jimenez-Morales D, Adamian L, Lin M
Computational studies of membrane proteins: Models and predictions for biological understanding.
Biochim Biophys Acta. 2011 Oct 12. PubMed.

2011 - Jimenez-Morales D and Liang J
Pattern of Amino Acid Substitutions in Transmembrane Domains of β-Barrel Membrane Proteins for Detecting Remote Homologs in Bacteria and Mitochondria.
PLoS ONE. 2011;6(11):e26400. Epub 2011 Nov 1. PubMed.
Supplementary information and bbTM-ST.

2008 - Jimenez-Morales D, Adamian L, and Liang J
Detecting Remote Homologues Using Scoring Matrices Calculated from the Estimation of Amino Acid Substitution Rates of Beta-Barrel Membrane Proteins.
Conf Proc IEEE Eng Med Biol Soc. 2008, 30:1347-1350. PubMed.

2008 - Jimenez-Morales D
Substitution Rates of Amino Acid residues in Transmembrane Regions of Beta-Barrel Membrane Proteins.
BioE Student Journal. N1, 2008. Front Cover.

Books

2001 - Coauthor. *Propiedades adicionales no antibióticas de los macrólidos*.
Scientific Communication Management Editors.

2001 - Coauthor. *Guía Setas Autóctonas*.
Editorial Doyma. Madrid.

Popular Science Articles

2000 - Jimenez-Morales D
Problematic in the use of antiobiotics in animal farms.
Nº41. Ganaderos Magazine. sp

2000 - Jimenez-Morales D
Bovine spongiform encephalopathy.
Nº37. Ganaderos Magazine. sp

Abstracts & Communications

2011 - Jimenez-Morales D, Liang J, and Eisenberg B.
Active Sites of Enzymes are Crowded with Charge.
Biophysical Journal. 100(3): p. 218a. Abstract 1191-Pos and Poster Board B101

2011 - Jimenez-Morales D, Liang J, and Eisenberg B.
Active Sites of Enzymes are Crowded with Charge.
6th Annual Midwest Conference on Protein Folding, Assembly, and Molecular Motions.
University of Notre Dame.

2010 - Jimenez-Morales D, Li R, Wang Z, Li Y, Liu L, Liang J.
Evolutionary Speed of Enzymes Functional Surfaces and their Relationship with Metabolic Fluxes in Networks of Central Carbon Metabolism of Bacteria. Biophysical Journal 98(3) pp. 741a

2008 - Jimenez-Morales D, Adamian L, Liang J.
Substitution Rates Of Amino Acid Residues In Transmembrane - Extracellular And Periplasmic- Regions Of Beta-Barrel Membrane Proteins.
Biophysical Journal 94(2) pp. 1959

2002 **-** Jimenez-Morales D.
Tools for the Apored Virtual.
V-Aporeunión. Tordesillas (Valladolid)

1999 - Jimenez-Morales D, Heredia S, Calvo A, Gomez-Luz ML, Prieto J.
Sensibilidad a antimicrobianos de Enterococcus faecalis de procedencia animal.
Spanish Chemotherapy Society Congress. May 1999

1999 - Jimenez-Morales D, Heredia S, Calvo A, Gomez-Luz ML, Prieto J.
Sensibilidad a antimicrobianos de Enterococcus faecalis de procedencia animal.
Spanish Chemotherapy Society Congress. May 1999

Invited talks

3/28/2013 - Department of Microbiology and Immunology.
Loyola University Chicago **(**2160 South First Avenue. Maywood, IL)

10/4/2012 - Midwest Center for Structural Genomics & Biosciences Division.
Argonne National Laboratory (9700 S. Cass Av. Argonne, IL)

Teaching

Instructor

Department of Bioengineering. University of Illinois at Chicago.
Fall 2010 - BIOE480: *Introduction to Bioinformatics*
Fall 2012 - BIOE481: *Bioinformatics Laboratory*

Teaching Assistant

Department of Bioengineering. University of Illinois at Chicago.
Spring 2013 - BIOE250, *Clinical Problems in Bioengineering*
Fall 2010, 2012 - BIOE480, *Introduction to Bioinformatic*
Spring 2007 - BIOE455, *Intro to Cell and Tissue Engineering*
Fall 2006 - BIOE240, *Modeling Physiological Data & Systems*

Computing

Computer Skills

Bioinformatics Packages: Sequence analysis software (Blast, MEME-MAST, ClustalW, T-Coffee, HMMER, HHsearch,...); molecular structures visualization software (PyMOL, VMD, Rasmol, Dino, SPDBV); molecular dynamics (NAMD); molecular interactions (Mint, Osprey); etc.

Languages: Perl, R, Unix shell scripts, Matlab, C/C++, Java, Html, PHP.

Other applications: Design and internet (Photoshop, Illustrator, Freehand, Flash, Dreamweaver,…); databases (MySql, Access); statistician (SAS, SPSS); etc.

Operating Systems: Unix/Linux and Mac OS X (advance)

Computer Tools

I have developed the following computational tools:

- **PreLysCar** (Predictor of Lysine Carboxylation)
  http://tanto.bioengr.uic.edu/prelyscar/

- **bbTM-ST** (beta-barrel TransMembrane Search Tool)
  http://tanto.bioengr.uic.edu/bbtmst/bbtmstool.php

Web Design and Development

2003 - Proteomic Unit
http://www.ucm.es/info/gyp/proteomica/en/
Proteomics Unit. Facultad de Farmacia. UCM-PCM (Madrid, Spain)

2004 - Genomic Unit
http://www.ucm.es/genomica
Genomic Unit. Facultad de Farmacia. UCM-PCM (Madrid, Spain)

2002, 2005 - Spanish Network of Apoptosis (APORED)
http://apored.bq.uam.es/
Department of Cell and Developmental Biology.
Centro de Investigaciones Biológicas (CIB-CSIC)

Software Administration

2002 - 2005 - Spanish Network of Apoptosis (APORED)
Department of Cell and Developmental Biology. CIB-CSIC

- Administrator of workspace BSCW (Basic Support for Cooperative Work) of the APORED.
- List co-administrator of APORED email distribution list, and list administrator of Apobecarios email distribution list.
- Website updates

Awards

2008 - 2010 **Beca Talentia Excellence Grant**
Regional Ministry for Innovation, Science and Enterprise. Junta de Andalucía. Spain.

References

Jie Liang, Professor
Bioengineering Department – University of Illinois at Chicago.
820 South Wood St. Room W103. Chicago, IL 60612 USA

Linda J Kenney, Professor
Professor of Microbiology & Immunology, UIC
PI, Mechanobiology Institute, Singapore (MBI)
National University of Singapore

Robert S. Eisenberg, Professor
Dept of Molecular Biophysics & Physiology - Rush University
1653 West Congress Parkway. Chicago IL 60612 USA

Dashuang (Daniel) Shi, PhD
Children's National Medical Center
Center for Genetic Medicine Research (CGMR)
111 Michigan Avenue, NW, Washington, DC 20010-2970

Concha Gil García, PhD.
Microbiology II Department – Proteomics Core Facility - Faculty of Pharmacy.
Universidad Complutense de Madrid
Avda. Ramón y Cajal, s/n. Madrid, 28040 Spain

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