Gregorio Alanis-Lobato, PhD

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EDUCATION

King Abdullah University of Science and Technology, Thuwal, Saudi Arabia
PhD in Computer Science, 2011-2014, GPA 4.00/4.00
Dissertation title: *Exploitation of complex network topology for link prediction in biological interactomes*
Dissertation advisor: Prof. Timothy Ravasi

King Abdullah University of Science and Technology, Thuwal, Saudi Arabia
MSc in Computer Science, 2009-2010, GPA 3.37/4.00
Research focus: Computational Biosciences

Instituto Politécnico Nacional, Escuela Superior de Cómputo, Mexico City, Mexico
Computer Systems Engineering, 2005-2009, GPA 9.55/10.00
Dissertation title: *Application of Self-organising Maps to the Protein Folding Problem*
Dissertation advisor: Prof. Jorge Rosas-Trigueros

Instituto Politécnico Nacional, Centro de Estudios Científicos y Tecnológicos No. 9, Mexico City, Mexico
Technician in Programming, 2002-2005, GPA 9.82/10.00

RESEARCH INTERESTS

Network science
- Network growth models
- Complex network geometry
- Network structure, formation and evolution
- Multilayer networks

Genomics and systems biology
- Network medicine
- Complex diseases
- Bias in biology
- Functional and disease ontologies
- Genetic and epigenetic regulation of gene expression

Machine learning
- Data mining
- Non-linear dimensionality reduction
- Manifold learning
- Parameter-free classification and clustering

Data analytics and reproducibility
- R and R Markdown
- tidyverse
- LaTeX and Overleaf
- git and GitHub
- caret and igraph
- MapReduce

RESEARCH EXPERIENCE

February 2015-Present

Research associate at the Computational Biology and Data Mining Research Group
Johannes Gutenberg Universität, Mainz, Germany
Supervisor: Prof. Miguel Andrade
- Integration of bio-data, analysis of the latent geometry of the human protein interaction network, bias reduction in protein network datasets, development of bioinformatic web tools, teaching and supervision of MSc students.

July 2014-December 2014

Research consultant at the KAUST Environmental Epigenetics Programme
Department of Bioscience, King Abdullah University of Science and Technology, Thuwal, Makkah, Saudi Arabia
Supervisor: Prof. Valerio Orlando
- Systems-based analysis of RNASeq and hCAGE data from human skeletal muscle cell differentiation time series. Healthy donors and Duchenne Muscular Distrophy patients were compared with the aim to detect the set of transcripts whose expression over time most highly contributes the differences between them.

Summer 2013

Intern at the Centre for Complex Network Research
Department of Physics, Northeastern University, Boston, MA, USA
Supervisor: Prof. Albert-László Barabási
Project title: *Towards the construction of a reliable genetic interaction map for human*

- Explored different data integration approaches for the construction of a reliable human genetic interaction network.

Summer 2010

Intern at Cisneros Lab
Department of Chemistry, Wayne State University, Detroit, MI, USA
Supervisor: Prof. Andrés Cisneros
Project title: *Analysis of the impact of P. falciparum's LCRs in protein folding regulation by coarse grained molecular dynamics*

- Studied the role of low-complexity regions in the correct folding of *P. falciparum's* proteins by means of molecular dynamics tools such as VMD. These analyses are important for drug design against malaria.

WORK EXPERIENCE

July 2008-July 2009

Intern at IBM
Service Management Automation, Integrated Technology Delivery, IBM, Mexico City, Mexico

- Administered the Server Resource Manager tool in the servers of >5 IBM clients, which allowed IBM to comply with the service level agreement contracted by these clients.
- Administered the Virtual Server Administration tool in the servers of a couple of IBM clients, which allowed for remote server administration of IBM software in client machines.

Sept. 2005-July 2008

Software Developer at the National Paediatric Hospital "Federico Gómez"
Information Systems Department, Mexico City, Mexico

- Migrated the database serving the hospital at the time from MS SQL Server 2000 to MS SQL Server 2005.
- Developed the Patient Classification System, which improved the attention of the >30,000 patients that visit the hospital annually.
- Made walk-in patient attention more efficient by training medical staff in the Classification System.
- Provided training to >20 administrative employees in Office tools every 6 months, making them more updated and competent personnel.
- Started the development of the current Surgery Scheduling System that serves the >9,000 patients that undergo surgery in the hospital annually.

MENTORING AND TEACHING EXPERIENCE

Winter 2016

Teaching Assistant
Johannes Gutenberg Universität, Mainz, Germany

- Assisted Prof. Susanne Gerber with the biological network session for the course *Einführung in die Bioinformatik*, which is part of the MSc in Bioinformatics.

Spring 2016 and Spring 2017

Teaching Assistant
Johannes Gutenberg Universität, Mainz, Germany

- Assisted Prof. Miguel Andrade with the biological network session and exam preparation for the course *Proteinbiochemie und Bioinformatik*, which is part of the MSc in Biomedicine.

Spring 2013 and Spring 2014

Teaching Assistant
King Abdullah University of Science and Technology, Thuwal, Saudi Arabia

- Assisted Prof. Timothy Ravasi in some lectures of course *B-301 Computational Biology and Bioinformatics.*

2005-2009

Private Teacher
Mexico City, Mexico

- Gave private classes of Mathematics, Physics and English to high-school and undergraduate students.

2005-2008 **Information Technologies Trainer**
National Paediatric Hospital "Federico Gómez", Mexico City, Mexico
- Trained administrative employees and medical staff in MS Office tools and medical software.

PUBLICATIONS

2017 Mier, P., **Alanis-Lobato, G.** & Andrade-Navarro, M. Context characterization of amino acid homorepeats using evolution, position and order. *Proteins: Structure, Function, and Bioinformatics* in press.

Mier, P., **Alanis-Lobato, G.** & Andrade-Navarro, M. Protein-protein interactions can be predicted using coiled coil co-evolution patterns. *Journal of Theoretical Biology* 412, 198-203.

Alanis-Lobato, G., Andrade-Navarro, M. & Schaefer, M. HIPPIE v2.0: enhancing meaningfulness and reliability of protein-protein interaction networks. *Nucleic Acids Research* 45(D1) D408-D414.

2016 ✉**Alanis-Lobato, G.**, Mier, P**.** & Andrade-Navarro, M. Manifold learning and maximum likelihood estimation for hyperbolic network embedding. *Applied Network Science* 1(10).

✉**Alanis-Lobato, G.** & Andrade-Navarro, M. Distance distribution between complex network nodes in hyperbolic space. *Complex Systems* 25(3), 223-236.

✉**Alanis-Lobato, G.**, Mier, P. & Andrade-Navarro, M. Efficient embedding of complex networks to hyperbolic space via their Laplacian. *Sci. Rep.* 6, 30108.

2015 ✉**Alanis-Lobato, G.**, Mining protein interactomes to improve their reliability and support the advancement of network medicine. *Front. Genet.* 6(296).

*,✉**Alanis-Lobato, G.**, Cannistraci, C.V., Eriksson, A., Manica, A. & Ravasi, T. Highlighting nonlinear patterns in population genetics datasets. *Sci. Rep.* 5, 8140.

2014 **Alanis-Lobato, G.,** Cannistraci, C.V. & Ravasi, T. Exploring the Genetics Underlying Autoimmune Diseases with Network Analysis and Link Prediction. *Proceedings of the MECBME 2014*, 167-170.

2013 **Alanis-Lobato, G.,** Cannistraci, C.V. & Ravasi, T. Exploitation of genetic interaction network topology for the prediction of epistatic behavior. *Genomics* 102(4), 202-208.

*Cannistraci, C.V., **Alanis-Lobato, G.** & Ravasi, T. Minimum curvilinearity to enhance topological prediction of protein interactions by network embedding. *Bioinformatics* 29, i199-i209.

*Cannistraci, C.V., **Alanis-Lobato, G.** & Ravasi, T. From link-prediction in brain connectomes and protein interactomes to the local-community-paradigm in complex networks. *Sci. Rep.* 3, 1613.

**Publications in which I am a first co-author,* ✉*Publications in which I am corresponding author.*

AWARDS AND RECOGNITIONS

Science
- Academic Excellence Award, King Abdullah University of Science and Technology, (Saudi Arabia, 2013-2014).
- 1st place in the 1st King Abdullah University of Science and Technology Graduate Research Symposium (Saudi Arabia, 2011).
- King Abdullah University of Science and Technology Provost Award (Saudi Arabia, 2009).
- King Abdullah University of Science and Technology Graduate Fellowship Scholarship (Saudi Arabia, 2009).
- Acknowledgement of Academic Excellence in CS Engineering (Mexico, 2005).
- Winner of the Knowledge Olympiad, lunch with Mexican president at the time (Mexico, 1999).

Athletics
- Gold Medal, Discus Throw, Distrital Olympic Games (Mexico, 2001).
- Silver Medal, Discus Throw, National Olympic Games (Mexico, 1999).

CONTRIBUTED TALKS AND POSTERS

Alanis-Lobato, G., Mier, P. & Andrade-Navarro, M. *The latent geometry of the human protein interaction network.* NetSci-X, Tel Aviv, Israel, January 2017 (Talk).

Alanis-Lobato, G., Mier, P. & Andrade-Navarro, M. *Efficient hyperbolic embedding of complex networks via the spectral decomposition of their Laplacian.* 7th International Workshop on Complex Networks, Dijon, France, March 2016 (Talk).

Alanis-Lobato, G., Cannistraci, C.V. & Ravasi, T. *Exploring the Genetics Underlying Autoimmune Diseases with Network Analysis and Link Prediction.* Middle East Conference on Biomedical Engineering 2014, Doha, Qatar, February 2014 (Talk).

Alanis-Lobato, G., Cannistraci, C.V. & Ravasi, T. *Learning new biology from GWAS by means of network analysis and link prediction.* Human Genome Meeting 2013, Singapore, April 2013 (Poster).

Alanis-Lobato, G., Cannistraci, C.V. & Ravasi, T. *A novel graph dissimilarity index for prediction of genetic interactions.* European Conference in Computational Biology (ECCB) 2012, Basel, Switzerland, September 2012 (Poster).

Alanis-Lobato, G., Cannistraci, C.V. & Ravasi, T. *Prediction of genetic interactions using network topology.* Intelligent Systems for Molecular Biology (ISMB) 2012, Long Beach, CA, USA, July 2012 (Poster).

Cannistraci, C.V., **Alanis-Lobato, G.** & Ravasi, T. *Minimum curvilinearity to address high-throughput protein-protein interaction experiments.* ISMB/ECCB 2011, Vienna, Austria, July, 2011 (Poster).

Cannistraci, C.V., **Alanis-Lobato, G.** & Ravasi, T. *Minimum curvilinearity to address high-throughput protein-protein interaction experiments.* King Fahd University of Petroleum and Minerals Graduate Seminar, Dhahran, Saudi Arabia, May 2011 (Talk).

Cannistraci, C.V., **Alanis-Lobato, G.** & Ravasi, T. *Minimum curvilinearity to address high-throughput protein-protein interaction experiments.* 1st KAUST Graduate Research Symposium, Thuwal, Saudi Arabia, May 2011 (Talk).

Alanis-Lobato, G. T. *Self-organising maps applied to protein structure classification.* ECCB 2010, Ghent, Belgium, September 2010 (Poster).

Alanis-Lobato, G., Rodriguez-Garibay, G. & Rosas-Trigueros, J. *Self-organising maps applied to protein structure prediction.* USA-Mexico Workshop in Biological Chemistry, Mexico City, Mexico, March 2009 (Poster).

CONFERENCES ORGANISED/CHAIRED

February 2014 — *Middle East Conference on Biomedical Engineering 2014*, Hilton, Doha, Qatar
Chair of Bioinformatics and Systems Biology Session

January, 2013 — *Workshop in network theory and paradigms in complex networks*, King Abdullah University of Science and Technology, Saudi Arabia
Invited speakers: Prof. Marián Boguñá (University of Barcelona), Prof. Jesper Tegnér (Karolinska Institute) and Dr. Carlo V. Cannistraci (King Abdullah University of Science and Technology)
Organisers: **Gregorio Alanis-Lobato, MSc**; Prof. Timothy Ravasi; Prof. David Keyes

TECHNICAL SKILLS

Software/Frameworks	R, Maxima, Inkscape	*Scripting Languages*	JavaScript, HTML/CSS, bash
Office Suites/Text Editors	MS Office, iWork, LaTeX, vi, nano	*Databases*	SQL, MySQL
Programming Languages	C/C++, Java	*Operating Systems*	Linux, Mac OS X, Windows

LANGUAGES

Spanish (native), English (fluent), German (A2), Arabic (very basic)

REFERENCES

Prof. Miguel Andrade Navarro
Professor, Faculty of Biology
Head of the Computational Biology and Data Mining Lab
Johannes Gutenberg Universität and Institute of Molecular Biology, Mainz, Germany
e-mail: andrade@uni-mainz.de
Tel: +49-6131-39-21582

Prof. Valerio Orlando
Professor, Bioscience
Head of the Environmental Epigenetics Programme
King Abdullah University of Science and Technology, Thuwal, Makkah, Saudi Arabia
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Prof. Timothy Ravasi
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Head of the Integrative Systems Biology Lab
King Abdullah University of Science and Technology, Thuwal, Makkah, Saudi Arabia
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Prof. Jorge Luis Rosas-Trigueros
Professor, Computer Systems Engineering
Head of the Transdisciplinary Lab of Evolutionary Systems
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