








# Irma Lozada Chávez

## Curriculum Vitae

### Personal details

Place of birth Mexico city, MEXICO  
Date of birth January 14th, 1980  
Address Paul-Heyse Str. 53. 04347 Leipzig, Germany  
 (0049) 151.2828.4224  
 (0049) 341.971.6694  
 (0049) 341.971.6679  
 ilozada@bioinf.uni-leipzig.de  
 [www.bioinf.uni-leipzig.de/~ilozada](http://www.bioinf.uni-leipzig.de/~ilozada)

### Education

1995–1998 **High school**, *GPA – 9.9*, Instituto Guajardo, Ministry of Public Education. Guerrero, MEXICO  
1999–2004 **Bachelor of Science in Biology**, *GPA – 9.1*, Faculty of Sciences, National Autonomous University of Mexico. Mexico City, MEXICO  
2004–2005 **Diploma Course in Science Communication**, , General Direction of Science Communication, National Autonomous University of Mexico. Mexico City, MEXICO  
2004–2006 **Master of Science in Biochemistry**, *GPA – 8.8*, Institute of Biotechnology & Center for Genomic Sciences, National Autonomous University of Mexico. Morelos, MEXICO  
2010–present **Doctor of Natural Sciences**, *Ph.D candidate*, Faculty of Mathematics and Informatics, University of Leipzig. Leipzig, GERMANY

### Theses

Title ***The functional role of the Low Complexity Sequences in viral proteomes***  
Supervisors Dr. Arturo Becerra Bracho & Dr. Antonio Lazcano Araujo

Description This thesis explored the distribution of simple repetitive sequences (LCS) within the coding regions of viral RNA and DNA genomes. I found that LCS are more frequent than expected and that some of them are located in catalytic protein domains.

Title ***The evolution of Transcriptional Regulatory Networks is extremely flexible in Bacteria***

Supervisors Dr. Julio Collado Vides

Description This thesis investigated the phylogenetic conservation of the transcription factors (TFs) and regulated genes (TGs) from *Escherichia coli* and *Bacillus subtilis* across prokaryotes. I found a high-order flexibility in the conservation of transcriptional regulation. For instance, TFs evolve much faster than TGs across phyla, only a small fraction of TF-TG interactions is conserved, and that there is no constraint on the elements of the interaction to co-evolve. Because most regulons and global regulators are rapidly lost across phyla, TFs could be the major players responsible for the plasticity and evolvability of transcriptional regulation in bacteria.

Title ***Differential evolution of non-coding DNA across eukaryotes has promoted different pathways to multicellular complexity***

Supervisors Dr. Peter F. Stadler & Dr. Sonja Prohaska

Description This thesis carried out the first systematic analysis to assess the predictive power of four classes of non-coding DNA (introns, repeats, pseudogenes, ncRNAs) to explain major changes in genome size, gene structure and multicellular complexity across 500 eukaryotic genomes. In contrast to highly cited publications and with exception of repeats and exons, I showed that ncDNA features of introns, pseudogenes and small ncRNAs (such as size, density, number and content) are weak predictors of genome size at the broadest phylogenetic scale after accounting for phylogenetic inertia. Hence, most ncDNA follows different evolutionary pathways at the intraspecific level. After defining simple vs complex multicellularity (CM), several statistic analyses underscored a significant relationship among several ncDNA classes and both basal forerunners of CM and complex multicellular organisms. The findings of this work provide testable predictions and a framework to understand how changes of individual ncDNA classes have led to the independent emergence of CM.

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## Peer-reviewed Book chapters

2017 **Astrobiology: a transdisciplinary perspective of life on the Universe**, Editors: Ramirez S.I., Cordero-Tercero M.G. and Montoya Lorenzana L. In Spanish (currently on edition). Of my authorship:

**Chapter 6:** LIFE ON EARTH: its definition and four unifying principles

**Chapter 7:** ORIGIN OF LIFE ON EARTH: its study, theories, and challenges

**Chapter 8:** EVOLUTION OF LIFE ON EARTH: forces, mechanisms, early metabolisms, masive extinctions, and human evolution

**Chapter 13:** IS ASTROBIOLOGY A EMERGENT SCIENTIFIC FIELD OR IS SCIENCE FICTION?: scientific background, paradigms and challenges

## Peer-reviewed Publications

- 2006 **Bacterial regulatory networks are extremely flexible in evolution**, Lozada-Chávez I.\*, Chandra J.S. and Collado-Vides J., *Nucleic Acids Research*, 34(12): 3434-3445. (150 citations).
- 2007 **Structural (and sequence-based) analysis of transcriptional regulation**, Contreras-Moreira B., Lozada-Chávez I., Espinosa A.V., *JNB Structural Bioinformatics*. <http://digital.csic.es/handle/10261/3500>.
- 2008 **The role of DNA-binding specificity in the evolution of bacterial regulatory networks**, Lozada-Chávez I.\*, Espinosa A.V., Collado-Vides J. and Contreras-Moreira B.\*, *Journal Molecular Biology*, 379(3): 627-643. (42 citations).
- 2009 **Changes in beta-giardin sequence of *Giardia intestinalis* sensitive and resistant to albendazole strains**, Jiménez-Cardoso E., Eligio-García L., Cortés-Campos A., Flores-Luna A., Valencia-Mayoral P. and Lozada-Chávez I., *Parasitology Research*, 105(1): 25-33. (13 citations).
- 2009 **Metagenomic diversity through *mcrA* gene in hypersaline conditions**, Lozada-Chávez I., Montoya L., Rodríguez N., Marin I. and Amils R., *Origins of Life and Evolution of Biospheres*, 39, SI: 382-383.
- 2009 **Regulation by transcription factors in bacteria: beyond description**, Balleza E., López-Bojorquez L.N., Martínez-Antonio A., Resendis-Antonio O., Lozada-Chávez I., et al., *FEMS Microbiology Reviews*, 33(1):133-51. (81 citations).
- 2011 **The sulfate-rich and extreme saline sediment of the ephemeral Tirez lagoon: a biotope for acetoclastic sulfate-reducing bacteria and hydrogenotrophic methanogenic archaea**, Montoya L., Lozada-Chávez I., Amils R., Rodríguez N. and Marin I., *International Journal of Microbiology*, 2011: 753758. doi:10.1155/2011/753758. (4 citations).
- 2012 **“Hyphotesis for the modern RNA world”: a pervasive non-coding RNA-based genetic regulation is a prerequisite for the emergence of complex multicellularity**, Lozada-Chávez I.\*, Stadler P.F. and Prohaska S.J., *Origins of Life and Evolution of Biospheres*, 41(6):587-607. (15 citations).
- 2012 **The influence of the evolutionary theory on the search of life in the Universe (in Spanish)**, Lozada-Chávez I., In “Astrobiología y Filosofía IV”. *Letras de Deusto*, 42(134):49-75. ISSN 0210-3516.
- 2017 **ceRNAs in plants: computational approaches and associated challenges for target mimic research**, Paschoal A.R.†, Lozada-Chávez I.†, Domingues D.S. and Stadler P.F., *Briefings in Bioinformatics*, doi: 10.1093/bib/bbx058.
- 2018 **Genome-wide features of introns are evolutionary decoupled among themselves and from genome size throughout Eukarya**, Lozada-Chávez I.\*, Stadler P.F. and Prohaska S.J., *under review*, <https://www.biorxiv.org/content/early/2018/03/18/283549>.
- in preparation* **Evolutionary dynamics of RNA viruses as quasispecies**, Lozada-Chávez A.N., Lozada-Chávez I.\*, José V.M.\*, et al.

in preparation **Interplay between RNA structure and protein evolution in RNA viruses**, Lozada-Chávez A.N., Lozada-Chávez I\* and Stadler P.F..

## Work Experience

### Research

- 2001–2003 **Undergraduate Assistant**, GENOMICS AND BIOINFORMATICS, Faculty of Sciences, UNAM, MEXICO.
- 2004–2006 **Graduate Assistant**, GENOMICS AND BIOINFORMATICS, Center for Genomic Sciences & Institute of Biotechnology, UNAM, MEXICO.  
Prediction and comparative analysis of orthologous sequences involved in the transcriptional regulatory networks of *Escherichia coli* and *Bacillus subtilis* across prokaryotes.
- 2007–2009 **Research Assistant**, GENOMICS AND BIOINFORMATICS, Center for Genomic Sciences, UNAM, MEXICO.
- Prediction and analysis of DNA-binding specificity in Transcription Factors using genomic, expression and structural data from *E. coli* and *B. subtilis*.
  - Analysis of the mutations in the *beta-giardin* gene of *Giardia intestinalis* strains that are sensitive, resistant, or recovered-resistance to albendazole.
  - Determine and analyse the metabolic and phylogenetic composition of methanogenic archaea, sulfate-reducing and sulfur-oxidizing prokaryotes in the extreme athalassohaline and sulfate-rich sediment of Tirez Lagoon (Spain).
- 2010–Present **Ph.D. researcher**, GENOMICS AND BIOINFORMATICS, Faculty of Mathematics and Informatics, University of Leipzig & Max Planck Institute for Mathematics in the Sciences, GERMANY.
- Development of pipelines for the genome-wide detection and analyses of intron features of protein-coding genes, different classes of repeats and pseudogenes as well as small ncRNAs (e.g., miRNAs) across 500 complete eukaryotic genomes
  - Phylogenetic-based statistics of genome-based features, and the development of a theoretical framework to analyze the evolution of multicellular complexity.
  - Integrative analysis of protein selection, intrinsic disorder and RNA structure across complete genomes from 12 different RNA viruses

### Lines of expertise in Genomics & Bioinformatics

- Models: Virus, Prokaryotes & Eukaryotes
- Orthology and paralogy detection of domains/proteins & genes/pseudogenes. Phylogenetic reconstruction, horizontal gene transfer detection, phylogenetic-based statistics. Non-coding RNA detection based on sequence homology and structure. Analysis on sequence based-selection, codon usage & mutual information content. Comparative analysis of metabolic pathways and networks. Computational modeling of quasispecies behaviour.

### Computer skills

OS platforms **Linux, Microsoft Windows, Mac**

Graphics **Inkscape, Adobe Graphic Design, CorelDRAW Graphics Suite**  
Editors **L<sup>A</sup>T<sub>E</sub>X, OpenOffice, Microsoft Office**  
Programming **Perl, python, C++, R**

### Teaching

- 2001 **Undergraduate Teaching Assistant**, GENETICS LEVEL I, (80 hours), Faculty of Sciences, UNAM. Mexico City, MEXICO.
- 2002 **Undergraduate Teaching Assistant**, MOLECULAR BIOLOGY OF THE CELL LEVEL III, (80 hours), Faculty of Sciences, UNAM. Mexico City, MEXICO.
- 2004 **Teacher Trainer**, EVOLUTION, PHYLOGENY AND GENOMICS, (28 hours), National High School (EPN), UNAM. Mexico City, MEXICO.
- 2006–2008 **Post-graduate Teacher**, BASIC MOLECULAR BIOLOGY APPLIED TO BIOINFORMATICS, (40 hours), National Institute of Health (NIH). Mexico City, MEXICO.
- 2007 **Undergraduate Teacher**, BIOINFORMATICS LEVEL II, (10 hours), Center for Genomic Sciences, UNAM. Mexico City, MEXICO.
- 2009–2010 **Undergraduate and Graduate Teacher**, ASTROBIOLOGY FOR TEACHERS: LIFE ON EARTH, (4 hours), The Mexican Society of Astrobiology (SOMA) & UNAM. Mexico City, MEXICO.
- 2010 **Post-graduate Teacher**, THE EVOLUTION OF LIFE ON EARTH, (6 hours), Faculty of Biology, Autonomous Metropolitan University (UAM). Mexico City, MEXICO.
- 2011 **Undergraduate and Graduate Teacher**, FUNDAMENTAL CONCEPTS ON BIOLOGY, (4 hours), First Mexican School of Astrobiology (SOMA) & UNAM. Mexico City, MEXICO.

### Extracurricular Courses

- 1998 **15 hours**, VIRAL VECTORS IN GENIC THERAPY AND BASIC RESEARCH. National Institute of Cancer & Institute of Biomedic Research. Mexico City, MEXICO.
- 2000 **30 hours**, WINTER SCHOOL IN BIOMATHEMATICS, Faculty of Sciences, UNAM. Mexico City, MEXICO.
- 2002 **30 hours**, UNIX ENVIRONMENT, General Direction in Services of Academic Compute (DGSCA), UNAM, Mexico City, MEXICO.
- 2003 **30 hours**, PERL PROGRAMMING LANGUAGE, General Direction in Services of Academic Compute (DGSCA), UNAM, Mexico City, MEXICO.
- 2004 **25 hours**, INTERNATIONAL COURSE OF BIOINFORMATICS: “GENOMICS AND PROTEOMICS”, Institute of Cellular Physiology, UNAM. Puerto Vallarta, JAL, MEXICO.
- 2006 **35 hours**, WINTER SCHOOL IN GENOMICS, Center for Genomic Sciences, UNAM. Cuernavaca, MOR, MEXICO.
- 2010 **60 hours**, EMBO PRACTICAL COURSE: “COMPUTATIONAL RNA BIOLOGY”, EMBO|EMBL & Institute I.E.S.C. Corsica, FRANCE.

- 2011 **120 hours**, ADVANCED SCHOOL OF ASTROBIOLOGY: “MAKING CONNECTIONS”, Instituto de Astronomia, Geofísica e Ciências Atmosféricas, Universidade de São Paulo. São Paulo, BRAZIL.
- 2012 **60 hours**, THE FUTURE OF PHYLOGENETIC NETWORKS, Lorentz Center: International center for scientific workshops. Amsterdam, NETHERLANDS.
- 2017 **16 hours**, DATA VISUALISATION IN 'R': ADVANCED COURSE, Research Academy Leipzig, University of Leipzig, GERMANY.
- 2018 **16 hours**, CRITICAL REASONING AND LOGIC, Research Academy Leipzig, University of Leipzig, GERMANY

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## Extracurricular academic activities

- 2001 **Founder Member of the Mexican Society of Astrobiology (SOMA)**.  
<http://soma.nucleares.unam.mx/home/index.php/en/>
- 2006–2012 **Founder and Executive Editor for the web site in science communication for the Genomic Sciences**, Center for Genomic Sciences, UNAM.  
[www.divulgacion.ccg.unam.mx](http://www.divulgacion.ccg.unam.mx)
- 2008–2012 **Executive Council of SOMA as the Public Outreach Sub/Secretary**.  
<http://soma.nucleares.unam.mx/home/index.php/en/>
- 2018–2020 **Executive Council of SOMA as the Secretary of Public and Academic Relations**.  
<http://web.soma.org.mx/index.html>
- 2009–2014 **Editor in chief of the bimonthly electronic bulletin for the SOMA society**.  
<http://soma.nucleares.unam.mx/home/index.php/en/intpub/somabol>
- 2011 **Coordinator in chief for the Public Outreach Festival: “The Day of Astrobiology”**, December 3rd, more than 2,000 attendees, SOMA & Institute for Science and Technology of Mexico City (ICYTDF, now known as the Ministry of Science, Technology and Innovation (SECITI)), Mexico City, MEXICO.  
<http://www.seciti.cdmx.gob.mx/>
- Since 2002 **Member of the International Astrobiology Society (ISSOL - International Society for the Study of the Origin of Life)**.  
<http://issol.org/>
- Since 2014 **Member of the European Astrobiology Network Association (EANA)**.  
<http://www.eana-net.eu/>
- Since 2006 **Ad hoc reviewer in scientific journals**, *For example: Frontiers in Genetics, Theory in Biosciences, among others.*

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## Fellowships & Awards

- 2001–2004 **Fellowship as an assistant of Researcher level SNI III**, National System of Researchers (SNI), CONACyT, UNAM, MEXICO.  
Researcher in charge: Dr. Antonio Lazcano Araujo

- 2004–2006 **Scholarship for a Master degree in Biochemistry**, National Council of Science and Technology (CONACyT), Center for Genomic Sciences, MEXICO.  
Researcher in charge: Dr. Julio Collado-Vides
- 2009–2012 **Scholarship for a Ph.D. degree in Bioinformatics**, National Council of Science and Technology (CONACyT), University of Leipzig, GERMANY.  
Researcher in charge: Dr. Peter F. Stadler
- 2013–2015 **Fellowship for Ph.D. research**, Max Planck Institute for Mathematics in the Sciences, University of Leipzig, GERMANY.  
Researcher in charge: Dr. Peter F. Stadler
- 2011 **Best poster award in the field of Evolutionary Perspectives**, “*The evolution of RNA genomes from a ‘quasispecies’ perspective*”, Lozada-Chávez A.N., Marco V. José and Lozada-Chávez I.  
ISSOL – The International Astrobiology Society and Bioastronomy (IAU C51) Joint International Conference. Montpellier, FRANCE
- 2011 **Best poster award**, “*The modern RNA world: a pervasive non-coding RNA-based genetic regulation is a prerequisite for the emergence of multicellular complexity*”, Lozada-Chávez I., Prohaska S.J. and Stadler P.F..  
São Paulo Advanced School of Astrobiology: Making Connections. São Paulo, BRAZIL

## Languages

- Spanish **Native**  
English **Fluent**  
Basic level **German, Portuguese, French, Latin (basic speaking phrases and reading)**

## Meetings

- 2001 **Committee organizer & Attendee**, First Mexican Reunion of Astrobiology. Mexico City, MEXICO.
- 2002 **Talk**, “*Identification of Low Complexity Sequences-LCS in Viral Proteins*”, Symposium of Comparative and Evolutionary Genomics. Puerto Vallarta, JAL, MEXICO.
- 2002 **Poster**, “*The Functional Role of the LCS in Viral Proteomes*”, Irma Lozada-Chávez and Arturo Becerra Bracho, Second Mexican Reunion of Astrobiology. Cuernavaca, MOR, MEXICO.
- 2002 **Attendee**, Second National Meeting of Virology. Acapulco, GRO, MEXICO.
- 2002 **Poster**, “*The Evolutionary Role of the LCS in Viral Proteomes*”, Irma Lozada-Chávez and Arturo Becerra Bracho, The 10th ISSOL Meeting & 13th OL International Conference. Oaxaca, OAX, MEXICO.
- 2004 **Attendee**, Astrobiology Graduate Conference 2004-NASA. Tucson, AZ, USA.
- 2004 **Organizing Committee & Talk**, “*Evolution of Genomes in the Early Evolution of Life*”, Third Mexican Reunion of Astrobiology. Mexico City, MEXICO.

- 2004 **Poster**, “*Evolutionary Conservation of Transcriptional Regulatory Network across Bacterial Species - A perspective from Escherichia coli K12*”, Irma Lozada-Chávez and Julio Collado-Vides, The 11th ISSOL Meeting & 14th OL International Conference. Beijing, BJ, CHINA.
- 2006 **Poster**, “*Bacterial Regulatory Network is Extremely Flexible in Evolution*”, Irma Lozada-Chávez and Julio Collado-Vides, Keenen Graduated Research Symposium & Gordon Research Conferences in Origin of Life. Maine, BOS, USA.
- 2007 **Organizing Committee & Talk**, “*Genetic Regulation in the Early Evolution of Life*”, Fourth Mexican Reunion of Astrobiology. Mexico City, MEXICO.
- 2007 **Poster**, “*Identification of Methanogenic Archaea in Hypersaline Sediment*”, Lilia Montoya, Irma Lozada-Chávez and Ricardo Amils, National Meeting of Microbiology. Barcelona, SPAIN.
- 2008 **Poster**, “*Structural and sequence analysis of transcriptional regulation*”, Bruno Contreras, Irma Lozada-Chávez and Vladimir Espinosa, VIII National Conference of Bioinformatics. Valencia, SPAIN.
- 2008 **Posters, (1)** “*Evolution of Bacterial Regulatory Networks: the role of DNA-binding specificity*”. Irma Lozada-Chávez, Bruno Contreras and Julio Collado-Vides, **(2)** “*Metanogenic Diversity through mcrA gene in hypersaline conditions*”. Irma Lozada-Chávez, Lilia Montoya and Ricardo Amils. The 12th ISSOL Meeting & 15th OL International Conference. Florence, ITALY.
- 2008 **Organizing Committee & Talk**, “*Diversity of metanogenic organisms living in the hypersaline Tirez lake, an analog of Europa*”, Fifth Mexican Reunion of Astrobiology. Mexico City, MEXICO.
- 2009 **Talk**, “*The Evolution of Gene Regulatory Networks*”, The 24th TBI – Winterseminar– Computational Mathematics and Theoretical Biology. Bled, SLOVENIA.
- 2009 **Organizing Committee**, Sixth Mexican Reunion of Astrobiology. Mexico City, MEXICO.
- 2009 **Attendee**, Consortium on Regulatory RNA in prokaryotes. Berlin, GERMANY.
- 2009 **Talk**, “*How to study the evolution of non-coding RNA in eukaryotes*”, Herbstseminar Bioinformatik. Decin, CHECK REPUBLIC.
- 2010 **Talk**, “*Exploring the Evolution of Non-coding RNA in eukaryotes*”, The 25th TBI –Winterseminar– Computational Mathematics and Theoretical Biology. Bled, SLOVENIA.
- 2010 **Organizing Committee**, Seventh Mexican Reunion of Astrobiology. Mexico City, MEXICO.
- 2010 **Attendee**, Scientific Commission B and F, 38th COSPAR Scientific Assembly. Bremen, GERMANY.
- 2010 **Talk**, “*Exploring the Evolution of Non-coding RNA in eukaryotes (continuation)*”, Herbstseminar Bioinformatik. Decin, CHECK REPUBLIC.



- 2011 **Talk & Posters**, “*The modern RNA world: evolution of regulatory non-coding RNAs and their contribution to the emergence of living complexity*”, (1) “*The evolution of RNA genomes from a ‘quasispecies’ perspective*”. Lozada-Chávez A.N., Marco V. José and Lozada-Chávez I. **Best poster award**, (2) “*Astrobiology in Mexico: The Mexican Society of Astrobiology*”. Vázquez R., Lozada-Chávez I., Ramírez S.I., et al. ISSOL – The International Astrobiology Society and Bioastronomy (IAU C51) Joint International Conference. Montpellier, FRANCE.
- 2011 **Poster**, “*The modern RNA world: a pervasive non-coding RNA-based genetic regulation is a prerequisite for the emergence of multicellular complexity*”, Lozada-Chávez I., Prohaska S.J. and Stadler P.F., São Paulo Advanced School of Astrobiology: Making Connections. **Best poster award**. São Paulo, BRAZIL.
- 2011 **Attendee**, The Royal Society meeting: “The chemical origins of life and its early evolution”. London, ENGLAND.
- 2012 **Poster**, “*The Mexican Society of Astrobiology (SOMA)*”, Segura A., Ramírez S, Lozada-Chávez I., et al., Astrobiology Science Conference. Atlanta, Georgia, USA.
- 2012 **Organizing Committee**, Eighth Mexican Reunion of Astrobiology. Cuernavaca, MOR, MEXICO.
- 2012 **Talk**, “*The Education & Public Outreach Program of the Mexican Society of Astrobiology*”, Astrobiology International Education & Public Outreach. NAI Workshop without walls. NASA Astrobiology Institute, USA.
- 2012 **Talk**, “*Possible metabolisms on Europa: the Tirez Lake (Spain) as one of its terrestrial analogous*”, 2nd Day of Astrobiology: “Europa and astrobiology of Icy Worlds”. Mexico City, MEXICO.
- 2013 **Talk**, “*Differential evolution of non-coding DNA across eukaryotes has promoted different pathways to multicellular complexity*”, The ICREA conference on the evolution of multicellularity. Barcelona, SPAIN.
- 2013 **Attendee**, Network of Researchers on Horizontal Gene Transfer and Last Universal Common Ancestor. Milton Keynes, UK.
- 2013 **Attendee**, EMBO|EMBL Symposium: The Non-Coding Genome. Heidelberg, GERMANY.
- 2014 **Talk**, “*Differential evolution of non-coding DNA across eukaryotes has promoted different pathways to multicellular complexity*”, ISSOL – The International Astrobiology Society and Bioastronomy (IAU C51) Joint International Conference. Nara, JAPAN
- 2014 **Talk**, “*Towards a Theory of Life: four universal unifying principles of life and its definition*”, The 4th meeting about Open Questions in the Origin of Life (OQOL). Kizugawa, JAPAN.
- 2015 **Poster**, “*Differential evolution of non-coding DNA across eukaryotes: The relationship of introns with genome size and multicellularity*”, Lozada-Chávez I., Prohaska S.J. and Stadler P.F., Annual meeting of the Society for Molecular Biology and Evolution (SMBE). Vienna, AUSTRIA.

- 2015 **Talk**, “*Differential evolution of non-coding DNA across eukaryotes: The relationship of introns with genome size and multicellularity*”, Herbstseminar Bioinformatik. Decin, CHECK REPUBLIC.
- 2016 **Attendee**, The 26th TBI –Winterseminar– Computational Mathematics and Theoretical Biology. Bled, SLOVENIA.
- 2016 **Poster**, “*Differential evolution of non-coding DNA across eukaryotes: The relationship of introns with genome size and multicellularity*”, [Lozada-Chávez I.](#), Prohaska S.J. and Stadler P.F., Symposium on “Chemolution: From Chemistry to Evolution”. Vienna, AUSTRIA.
- 2016 **Talk**, “*Differential evolution of non-coding DNA across eukaryotes: The relationship of pseudogenes with genome size and multicellularity*”, Herbstseminar Bioinformatik. Decin, CHECK REPUBLIC.
- 2017 **Talk**, “*Differential evolution of noncoding DNA across eukaryotes and its close relationship with complex multicellularity*”, Central German Meeting on Bioinformatics at the Max Planck Institute for Mathematics in the Sciences. Leipzig, GERMANY.

## Science communication

- 2003 **Committee organizer & Talk**, “*The Low Complexity Sequences in Virus: a model for the increment of genetic material in early biological systems*”, Astrobiology in Mexico: is Life outside Earth possible?, Faculty of Sciences, UNAM, Mexico City, MEXICO.
- 2004–2005 **Committee organizer & Talk**, “*A resource for biological evolution: the genome*”, Popularization of Life Sciences, Museum of Geology, UNAM, MEXICO.  
<http://www.geologia.unam.mx/igl/museo/index.html>
- 2005–2006 **Committee organizer & Talk**, “*The Origin and Evolution of Life on the Earth*”, Conferences and Radio Interviews: What do you know about...?, The House of Science, UAEM, Morelos, MEXICO.  
<http://www.uaem.mx/difusion-y-medios/medios/radio/despertar-con-ciencia-y-tecnologia.php>
- 2006 **Guest Speaker**, “*The Genomic Sciences in our Life Style*”, Conferences: Life Sciences and Technology, The House of Science, UAEM, Morelos, MEXICO.
- 2007 **Guest Speaker**, “*The Origin of Life Now: The Search of an Interdisciplinary Answer*”, Conferences of the Astronomic Society NIBIRU, Faculty of Sciences, UNAM, MEXICO. [https://en.wikipedia.org/wiki/Nibiru\\_Sociedad\\_Astronomica](https://en.wikipedia.org/wiki/Nibiru_Sociedad_Astronomica).
- 2007 **Guest Participant in Discussion Panel**, “*Genetics, Genomics and their Applications in our Lives*”, Conferences on Science Outreach, Museum of UNIVERSUM, UNAM, MEXICO. <http://www.universum.unam.mx/>.
- 2007 **Author in Article**, “*The On and Off of Life: Milk and Genetic Regulation*” (in Spanish), Web site for communication in genomic sciences, Center for Genomic Sciences, UNAM, MEXICO. <http://www.divulgacion.ccg.unam.mx/?q=quees>.

- 2010 **Guest Speaker**, “*The genome and the tombola of life*”, Institute for Science and Technology of Mexico City (ICYTDF, now known as the Ministry of Science, Technology and Innovation (SECITI)), MEXICO. <http://www.seciti.cdmx.gob.mx/>.
- 2010–2015 **Author in Posters**, “*The SOMA society: Key concepts on Astrobiology*”, <http://soma.nucleares.unam.mx/home/index.php/en/intpub/material-didactico>, National Public Outreach Festival: “The Night of the stars”, MEXICO. <http://www.nochedelasestrellas.org.mx/>

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## References for this CV

- **Dr. Peter F. Stadler**. Institut für Informatik, Universität Leipzig, DEUTSCHLAND. ✉ [stadler@bioinf.uni-leipzig.de](mailto:stadler@bioinf.uni-leipzig.de)
- **Dr. Julio Collado**. Centro de Ciencias Genómicas, UNAM, MÉXICO. ✉ [collado@ccg.unam.mx](mailto:collado@ccg.unam.mx)
- **Dra. Antígona Segura**. Instituto de Ciencias Nucleares, UNAM, MÉXICO. ✉ [antigona@nucleares.unam.mx](mailto:antigona@nucleares.unam.mx)
- **Dr. Bruno Contreras**. Estación Experimental Aula Dei, CSIC, ESPAÑA. ✉ [bcontreras@eead.csic.es](mailto:bcontreras@eead.csic.es)
- **Dra. Enedina Jiménez**. Instituto Nacional de Salud, MÉXICO. ✉ [enedina@servidor.unam.mx](mailto:enedina@servidor.unam.mx)