Pedro Fontanarrosa

Curriculum Vitae

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Education

2019–Present **Ph.D. in Bioengineering, Synthetic Biology Track**, *University of Utah*, Utah, *3.8 of 4.0*.

2017–2019 **Master in Bioengineering, Synthetic Biology Track**, *University of Utah*, Utah, *GPA: 3.67 of 4.0*.
Thesis option.

2007–2014 **Licentiate in Biological Sciences, orientation Genetics, Evolution and Ecology**, *University of Buenos Aires*, Argentina, GPA: 8.39 of 10.00.
7-year professional degree program with thesis.

Masters Thesis

Title *Automated Generation of Dynamic Models for Genetic Regulatory Networks*

Supervisors Professors Chris Myers, Tara Deans and Orly Alter

Description This thesis work developed an automated model generator which produces dynamic models of genetic regulatory networks and can be used to determine circuit failures.

Title *Sources of life history trait and morphology variability associated with resistance to alkaloids in a cactophilic gender of Drosophila*

Supervisors Professors Ignacio M. Soto, María Isabel Remis, Marcela Karina Castelo, and Ana Laura Carbajal de Fuente

Description This thesis explores the idea that speciation in cactophilic *Drosophila* may be linked to alkaloid presence of different cacti.

Publications

Refereed Journal Articles

- Baig, H., **Fontanarrosa, P.**, Kulkarni, V., McLaughlin, J., Vaidyanathan, P., Bartley, B., Bhatia, S., Bhakta, S., Bissell, M., Clancy, K., Cox, R. S., Moreno, A. G., Gorochowski, T., Grunberg, R., Luna, A., Madsen, C., Misirli, G., Nguyen, T., Novere, N. L., Palchick, Z., Pocock, M., Roehner, N., Sauro, H., Scott-Brown, J., Sexton, J. T., Stan, G.-B., Tabor, J. J., Vilar, M. V., Voigt, C. A., Wipat, A., Zong, D., Zundel, Z., Beal, J., and Myers, C. 2020. "Synthetic Biology Open Language Visual (SBOL Visual) Version 2.2". en. In: *Journal of Integrative Bioinformatics* 17.2-3.

- Baig, H., **Fontanarrosa, P.**, Kulkarni, V., McLaughlin, J. A., Vaidyanathan, P., Bartley, B., Beal, J., Crowther, M., Gorochowski, T. E., Grünberg, R., Misirli, G., Scott-Brown, J., Oberortner, E., Wipat, A., and Myers, C. J. 2020. "Synthetic Biology Open Language (SBOL) Version 3.0.0". en. In: *Journal of Integrative Bioinformatics* 17.2-3.
- **Fontanarrosa, P.**, Doosthosseini, H., Espah Borujeni, A., Dorfan, Y., Voigt, C. A., and Myers, C. J. 2020. "Genetic Circuit Dynamics: Hazard and Glitch Analysis". In: *ACS Synthetic Biology*.
- McLaughlin, J. A., Beal, J., Mısırlı, G., Grünberg, R., Bartley, B. A., Scott-Brown, J., Vaidyanathan, P., **Fontanarrosa, P.**, Oberortner, E., Wipat, A., Gorochowski, T. E., and Myers, C. J. 2020d. "The Synthetic Biology Open Language (SBOL) Version 3: Simplified Data Exchange for Bioengineering". English. In: *Frontiers in Bioengineering and Biotechnology* 8.
- Nguyen, T., Jones, T. S., **Fontanarrosa, P.**, Mante, J. V., Zundel, Z., Densmore, D., and Myers, C. J. 2019d. "Design of Asynchronous Genetic Circuits". In: *Proceedings of the IEEE*, pp. 1–13.
- Carreira, V. P., Padró, J., Mongiardino Koch, N., **Fontanarrosa, P.**, Alonso, I., and Soto, I. M. 2014. "Nutritional Composition of Opuntia Sulphurea G. Don Cladodes". In: *Haseltonia* 2014.19, pp. 38–45.
- Mongiardino Koch, N., **Fontanarrosa, P.**, Padro, J., and Soto, I. M. 2013. "First Record of Megaselia Scalaris (Loew)(Diptera: Phoridae) Infesting Laboratory Stocks of Mantids (Parastagmatoptera Tessellata, Saussure)". In: *Arthropods* 2.1, pp. 1–6.
- Padró, J., Mongiardino Koch, N., **Fontanarrosa, P.**, Carreira, V. P., Hasson, E., and Soto, I. M. 2011. "Acta Toxicológica Argentina". In: *Publicación de la Asociación Toxicológica* 19, pp. 95–96.

Peer-reviewed Abstracts, Short Papers, and Conference Proceedings:

- Bücherl, L., Mante, J., **Fontanarrosa, P.**, Zhang, Z., Jepsen, B., Roberts, R., and Myers, C. J. August 3rd-5th, 2020. "Genetic Circuit Hazard Analysis Using STAMINA". In: *12th International Workshop on Bio-Design Automation*. online, pp. 39–40.
- **Fontanarrosa, P.**, Hosseini, H., Borujeni, A., Dorfan, Y., Voigt, C., and Myers, C. 2019. "Analyzing Genetic Circuits for Hazards and Glitches". In: *11th International Workshop on Bio-Design Automation*. Cambridge, UK, pp. 32–33.
- Mante, J., **Fontanarrosa, P.**, and Myers, C. J. 2019. "Stochastic Analysis of an Genetic Sensor". In: *11th International Workshop on Bio-Design Automation*. Cambridge, UK, pp. 40–41.
- **Fontanarrosa, P.**, Göksel, M., Nguyen, T., Jones, T. S., Wipat, A., and Myers, C. J. 2018. "An Improved Model Generation Method Using Cello's Optimized Parameters". In: *COMBINE 2018*. Boston, USA, p. 44.
- **Fontanarrosa, P.**, Mongiardino Koch, N., Padro, J., and Soto, I. M. 0017. "¿Cómo Influye La Presencia de Mescalina En La Viabilidad y En El Tiempo de Desarrollo de Líneas de Drosophila Buzzatii Con Diferentes Inversiones Cromosómicas?" In: *Los Insectos y El Hombre, Diversidad de Interacciones, Diversidad de Miradas*. San Carlos de Bariloche, Argentina, p. 294.

Technical Reports

- Padró, J., Saint Esteven, A., Benedictto, M., Vrdoljak, J. E., De Panis, D., **Fontanarrosa, P.**, and Soto, I. M. Febuary 2015. *Arthropod, Cactii and Other Succulent Plants Survey in the Natural Reserve of Valle Fértil, San Juan, Argentina.* Tech. rep. 1300 4257-22. Environment and Sustainable Development Secretariat of the province of San Juan, Argentina.
- Padró, J., Mongiardino Koch, N., **Fontanarrosa, P.**, and Soto, I. 2012. *Study of Biodiversity of the Arthropod and Microorganism Communities Associated with Decaying Cactus Tissue in the Natural Reserve of Valle Fértil, San Juan, Argentina.* Tech. rep. 1300 0236-13. Environment and Sustainable Development Secretariat of the province of San Juan, Argentina.

Honors & Awards

2017–2019 **Fulbright and Argentine Presidential Fellowship in Science & Technology**, *Funded by the Argentine President's Cabinet and the U.S. Embassy of Buenos Aires. Administered by the Argentine Fulbright Commission with support from LASPAU.*
Pursue a master's degree in the United States starting Fall 2017.

2015 **Research and Communication Excellency Award**, *Ministry of Science and Technology, Argentinean government*, Argentina.
Distinction awarded for excellency in research and communication of research work done under the "Beca Estímulo" scholarship.

2011–2014 **Beca Estímulo (Encouragement Scholarship)**, *Bestower: University of Buenos Aires.*
Research and Development tasks in the field of genetics and ecology.

Experience

Research Projects

2018–Present **Synergistic Discovery and Design (SD2)**, *The Defense Advanced Research Projects Agency (DARPA).*
Genetic circuit design for extreme environments enabled by models extracted from petabyte+ perturbation analyses.

Project FA8750-17-C-0229

2013–2014 **International Barcoding of Life**, *(IBOL) Argentina Fund.*
Barcoding of the diversity of arthropod communities associated to cacti decomposition. This demanded the negotiation of permits with the National Park Administration of the Argentinean government, the coordination of an expedition team to spend weeks in the San Juan desert, and the logistics for the collection of conservation of specimens for the barcoding project.

Director Ignacio M. Soto

2012–2013 **Alkaloid resistance in the genus Drosophila: Effects of artificial selection on ecological specialization and evolution of anti-herbivore strategies**, *National Agency for Scientific and Technological Promotion, Argentina.*

Project PICT-2010-2603

2011–2014 **Alkaloid resistance for insects with saprotrophic nutrition: Genetic bases and effects of artificial selection**, *National Secretariat of Science and Technology and the University of Buenos Aires conjoint program (UBACyT).*

Project 20020100300061

Research Experience

2017–Present **Research Assistantship**, *Chris Myers' Lab, University of Utah*, Utah, USA.
Genetic design automation (GDA) software development, and genetic regulatory network (GRN) design, modeling, and simulation. Specifically:

- GDA tool development: iBioSim
- Development of novel modeling automation techniques
- GRN modeling and simulation
- Design of genetic circuits with specific applications
- Development and maintenance of genetic parts repositories

2010–2014 **Research Assistantship**, *Evolution Laboratory, University of Buenos Aires*, Buenos Aires, Argentina.

In Argentina, research assistantships are earned through a very competitive contest hosted by the Argentinean government.
Responsibilities:

- Maintained isogenetic lines of Drosophila flies
  - Collection of *Drosophila* specimens in National Parks of the province of San Juan, Argentina
  - Coordinated expedition team to recollect cacti tissues
  - Petition of special permits for recollection of protected species' specimens
- Managed statistical programs and data bases
- Trained and supervised new lab members
- Authored and collaborated in the writing of different scientific papers research programs and technical reports for the Argentinean government

Teaching Experience

2015–2017 **IB & IGCSE Highschool Chemistry Teacher (in English)**, *Northlands School*, Buenos Aires, Argentina.

Taught freshmen, sophomore, junior and senior students (approx. 250). Full time (40 hs. per week). Coordinated and planned Extended Essays in chemical research.

2014–2015 **IB & IGCSE Primary and Highschool Science and Mathematics Teacher (in English)**, *Tarbut School*, Buenos Aires, Argentina.

Taught freshmen, sophomore, junior and senior students (approx. 250). Full time (40 hs. per week). Orchestrated the XXIII and XXIV Mathematical Ingenious Olympiads.

Other

2019–Present **Synthetic Biology Open Language (SBOL) Editor**, *COMBINE Standards*.

SBOL Editors' primary responsibility is ensuring the effective curation of documents for the community. SBOL Editors are elected by a community vote and hold weekly meetings to coordinate their execution of these responsibilities.
Detailed responsibilities:

- Equitably representing the community in voting, documents, and guidance of discussion
- Curation and dissemination of the SBOL standards and related documents (including writing, editing, and coordinating changes)
- Maintaining an open and structured process by which members of the SBOL Development Group can modify and improve SBOL standards (including timely implementation of tracking, processing, responding to, and organizing voting on change proposals)
- Ensuring effective development and maintenance of official SBOL software libraries and associated documentation and tutorials
- Coordinating scholarly publications and ensuring proper attribution of contributions
- Running elections and other community votes
- Organization (or delegation) of SBOL Workshops and other events
- Maintaining community infrastructure, including: the SBOL web site, source code repositories, mailing lists

Scientific Conferences

As an expositor

2020 **COMBINE 2020**, Online (virtual).

CONFERENCE PAPER: "Genetic Circuit Hazard Analysis Using STAMINA". Authors:Bücherl, Lukas; Mante, Jeanet and **Fontanarrosa, Pedro**; Zhang, Zhen; Jepsen, Brett; Roberts, Riley and Myers, Chris J.

2020 **HARMONY 2020**, EMBL-EBI, Cambridgeshire, UK.
Codefest-type meeting, with a focus on development of the standards, interoperability and infrastructure.

2019 **IWBDA 2019**, *Cambridge University*, Cambridge, England.
CONFERENCE PAPER and CONTRIBUTED TALK: "Analyzing Genetic Circuits for Hazards and Glitches". Authors: **Pedro Fontanarrosa**, Hamid Doosthosseini, Amin Espah Borujeni, Yuval Dorfan, Chris A. Voigt, and Chris Myers.

2019 **COMBINE 2019**, *Heidelberg Institute for Theoretical Studies (HITS)*, Heidelberg, Germany.
CONTRIBUTED TALK: "Analyzing Genetic Circuits for Hazards and Glitches". Authors: **Pedro Fontanarrosa**, Hamid Doosthosseini, Amin Espah Borujeni, Yuval Dorfan, Chris A. Voigt, and Chris Myers.

2018 **COMBINE 2018**, *Boston University*, Boston, MA USA.
POSTER: "Dynamic Model Generation in iBioSim". Authors: **Pedro Fontanarrosa**, Hamid Doosthosseini, Tramy Nguyen, and Chris Myers.

2013 **XVI National Congress of Philosophy**, Buenos Aires, Argentina.
ORAL PRESENTATION "Brian Goodwin and the role of genes in the explanation of generative dynamics of some species in relation to the historical development of the notion of natural selection."

2012 **VIII Argentine Congress of Entomology**, San Carlos de Bariloche, Rio Negro, Argentina.
POSTER: "How does the presence of mescaline influence the viability and development times of Drosophila buzzatii isogenic lines with different chromosomal inversions?". Authors: **Fontanarrosa, Pedro**; Mongiardino, Nicolás; Padró, Julián; Soto, Ignacio.

2011 **XVII Argentine Congress of Toxicology**, Tandil, Buenos Aires, Argentina.
POSTER: "Evolutionary eco-toxicology: Lethal and teratogenic effects of natural alkaloids present in the secondary host of cactophilic flies.". Authors: Padró, Julián; Mongiardino, Nicolas; **Fontanarrosa, Pedro**; Carreira, Valeria; Hasson, Esteban; Soto, Ignacio

As an attendant

2010 **III Ibero-American Congress of Philosophy of Science and Technology** , CABA, Argentina.

2009 **I Reunion of Evolutionary Biology of the Southern Cone**, CABA, Argentina.

Computer skills

Beginner	HTML
Intermediate	C++, JAVASCRIPT, R
Advanced	PYTHON, JAVA, LaTeX

Languages

Spanish	**Mothertongue**	
English	**Proficient**	*TOEFL ITP: 630 (February 2016)*
Portuguese	**Intermediate**	*Conversationally fluent*
French	**Beginner**	*Can read & write*

Certifications and Trainings

2015 **Principles of Computing (Part 2)**, *Rice University, Coursera Massive Open Online Course*, grade: 93.8%.
Statement of Accomplishment with Distinction

2015 **Principles of Computing (Part 1)**, *Rice University, Coursera Massive Open Online Course*, grade: 95.7%.
Statement of Accomplishment with Distinction

2014 **An Introduction to Interactive Programming in Python**, *Rice University, Coursera Massive Open Online Course*, grade: 100%.
Statement of Accomplishment with Distinction

2012 **Experimental Design and Statistic Analysis for Graduate Thesis**, *Department of Ecology, Genetics and Evolution, University of Buenos Aires* , Argentina.

2011 **"Metabiology: Life as Evolving Software", by Gregory Chaitin**, *School of Computer Science (ECI), University of Buenos Aires*, Argentina.

2009 **Speech, Debate and Leadership**, *School of Law, University of Buenos Aires*, Argentina.

Volunteer Experience

2013–2017 **Biohacking BA volunteer work**, Argentina.
Artists, scientists, engineers, hackers and any person who is curios and wants to learn, play and build "life" is invited to join our "garage laboratories" inspired in the maker spaces. Volunteer work consisted on organization of talks, workshops, invited guest lectures as well as DIY projects like:
- Recycling of old refrigerators into incubators
- Manufacture a PCR thermocycler using Arduino
- Synthesize a "Hello World" with *E. coli* and GFP
- Develop an open hardware glucose meter
- Create art using genetic engineering techniques
- 3D print a micropipette

2010–2012 **Organization of yearly "Biology Week"**, *School of Natural & Exact Sciences, University of Buenos Aires*, Argentina.
Each year, the University of Buenos Aires (UBA) hosts a "Biology Week" intended to promote science careers for high school students. The organization of this event required, amongst other things, the development of posters with information on the different tracks in the Biological sciences and scientific research, and the design of different installations and stands with interactive science projects so that students can take part of.

2006–2010 **Argentine Atheist Association volunteer work**, Argentina.
Volunteer work varied from:
- Organization of yearly conference meeting in Mar del Plata, Argentina
- Translation of documents
- Divulgation of information
- Organization of invited talks and other events
- Finance managment

2004–2008 **The Argentine Homosexual Community (CHA) volunteer work** , Argentina.
Volunteer work varied from:
- Organization of yearly conference meeting in Mar del Plata, Argentina
- Translation of documents
- Divulgation of information
- Organization of invited talks and other events
- Finance management