Gonzalo Andrés Vidal Peña

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FORMAL EDUCATION

Newcastle University, Newcastle Upon Tyne   2021 – 2023
  Computer Science PhD
  Interdisciplinary Computing and Complex BioSystems (ICOS) research group

Pontifical Catholic University of Chile, Santiago   2019 – 2021
  Biological and Medical Engineering PhD. *Student representative*
  Institute for Biological and Medical Engineering

Pontifical Catholic University of Chile, Santiago   2017 – 2019
  Biochemistry. *Honours*

University of Chile, Santiago   2012 – 2016
  Biochemistry.

University of Chile, Santiago   2010 – 2012
  Bachelor of Natural and Exact Sciences. *Honours*

PROJECTS

SynBio DBTL
  Development of software, hardware, standards and biological parts necessary to close and automate the DBTL cycle for Synthetic Biology using tools from robotics, IoT and AI.
  Software tools: LOICA, PUDU, XDC, Flapjack.

Biocomputing
  Design and analysis of genetic networks that encode logic gates, motifs, oscillators, toggle-switches and novel devices implementing computation in the frequency domain and TX-TL coupling using metamorphic proteins. Modeling with ODE, PDE and stochastic simulations to research the relevance of noise on systems over time and space.

Non-equilibrium Polysome Dynamics
  Research of gene expression in prokaryotes with a complex systems approach, using frameworks like statistical mechanics.

Mitochondrial dynamics regulation
  Research cell signal transduction under a biochemical approach with focus on mitochondrial dynamics in cell lines, and the development of automated analysis pipelines.
  Software tools: MiNuD

TECHNICAL STRENGTHS

Dry Lab

Modeling and Analysis	ODE, Stochastic, Complex Systems, Individual Based Modeling.
Programming Languages	Python, R, SQL, Matlab, GO, Julia.
Main Packages	ScyPy, NumPy, Pandas, Scikit-Image.
AI Packages	TensorFlow, Keras, PyTorch, Scikit-learn.
Visualization Packages	Matplotlib, Seaborn, Plotly.
Other Software & Tools	GitHub, ImageJ, GraphPad, Latex, MS Office, Affinity Designer.

Wet Lab

Test Equipment	Plate reader, Flow cytometry, Microscopy
Hosts/Chassis	*E. coli* (DH5α, MG1655, DHL705), Human Cell lines (A7r5).
Automation Equipment	OT-2, Echo, Felix, PIXL.

PUBLICATIONS

Phase-based genetic logic circuits. *BioRxiv.*   2023
   doi.org/10.1101/2022.12.13.5202896

Functional Synthetic Biology. *OUP Synthetic Biology.*   2023
   doi.org/10.1093/synbio/ysad006

Experimental Data Connector (XDC): Integrating the Capture of Experimental Data and Metadata Using Standard Formats and Digital Repositories. *ACS Synthetic Biology.*   2023
   doi.org/10.1021/acssynbio.2c00669

Synthetic biology open language (SBOL)version 3.1.0. *Journal Of Integrative Bioinformatics.*   2023
   doi.org/10.1515/jib-2022-0058

Accurate characterization of dynamic microbial gene expression and growth rate profiles. *OUP Synthetic Biology.*   2022
   doi.org/10.1093/synbio/ysad006

LOICA: Integrating Models with Data for Genetic Network Design Automation. *ACS Synthetic Biology.*   2022
   doi.org/10.1021/acssynbio.1c00603

Flapjack: Data Management and Analysis for Genetic Circuit Characterization. *ACS Synthetic Biology.*   2020
   doi.org/10.1021/acssynbio.0c00554

Novel Tunable Spatio-Temporal Patterns from a Simple Genetic Oscillator Circuit. *Frontiers In Bioengineering and Biotechnology.*   2020
   doi.org/10.3389/fbioe.2020.00893

Glucagon-like peptide-1 inhibits vascular smooth muscle cell dedifferentiation through mitochondrial dynamics regulation. *Biochemical Pharmacology.*   2016
   doi.org/10.1016/j.bcp.2016.01.013

WORK EXPERIENCE

SBOL Industrial Internship, BioDesign Automation Consortium (BDAC)   2022
   SBOL-based automation of DNA construction.
   - Development of a workflow to go from plasmid design in SBOL to assembly instructions in the OT-2 liquid handling robot.

Institute for Biological and Medical Engineering   2019
   Automation and Robotics Technician.
   - DNA assembly automation. Liquid handling robot setup to perform BASIC and Golden Gate assembly. Development of automated pipelines for genetic network characterization.

Monsanto   2017 – 2018
   Advice, research, project realization.
   - Water management. Satellital and drone image processing. Determination of Kc in *Brassica*. Part of the program Sin Limites from Pontificia Universidad Católica de Chile.

Milandu   2016 – 2019
   R&D and Co-founder

- Startup in Maule valley, Chile. Water management and remote sensing on amaranth crops.

AWARDS

IWBDA Best Poster Award	2022
Newcastle University, School of Computing scholarship	2021
Institute for Biological and Medical Engineering scholarship	2019
Pontifical Catholic University of Chile academic excellence	2018
University of Chile scholarship	2011
Ministry of Education, Bicentenary scholarship	2011

TEACHER ASSISTANT / DEMONSTRATOR

Project and Dissertation in Data Science	2023
Software Engineering	2023
Contemporary Topics in Computing	2023
Computer Systems Design and Architectures	2023
Advanced Synthetic Biology	2022
Introduction to Synthetic Biology	2022
Biomedical Data Analytics and AI	2022
Synthetic Biology and Artificial Biological Function Prototyping	2018, 2019
Complex Systems	2017, 2018, 2019

LEADERSHIP

IWBDA Workshop Co-Chair   **2023**

The International Workshop on Bio-Design Automation (IWBDA) provides a forum for cross-disciplinary discussion, with the aim of seeding and fostering collaboration between the researchers from the synthetic biology, systems biology, and design automation communities.

SynBioNet NEUK Co-Chair   **2022-present**

Synthetic Biology Networking at the North East of UK, led by Newcastle University and Northumbria University.

iGEM Enginnering Committee   **2020-present**

Active member on the general, software and interlab committees. Automation interlab leader, developing, planning and conducting inter laboratory studies using automation.

SBOL Editor   **2020-present**

Editor of the Synthetic Biology Open Language specification. Lead, develop, maintain, and coordinate community software, activities and events.

Biological and Medical Engineering postgraduate student representative   **2019-2021**

Creation, funding acquisition and realization of interdisciplinary projects. Representation of BME postgraduate students on the school.

CONFERENCES

Workshop: Software tools for synthetic biology. *Synthetic Biology: Engineering, Evolution & Design (SEED).* **2023**

PUDU: Build and Test Automation for SynBio. *Hackathon of the Computational Modelling in Biology Network (HARMONY).* **2023**

A proposal for connecting and automating the Synthetic Biology Design Build Test Learn cycle. *Synthetic Biology UK (SBUK) — SAGE PGR Conference.* **2022**

Talk: Software tools for the Synthetic Biology DBTL cycle. *International Genetically Engineered Machine.* **2022**

Program Committee — Standardizing the Representation of Parts and Devices for Build Planning (Best poster award) — Steps Towards Functional Synthetic Biology — Experimental Data Converter. *International Workshop on Bio-Design Automation (IWBDA).* **2022**

LOICA 1.2: Genetic Network Design Automation for Spatio-Temporal Patterns — Workshop: Software tools for synthetic biology. *Synthetic Biology: Engineering, Evolution & Design (SEED) - Hackathon of the Computational Modelling in Biology Network (HARMONY) — SNES FEST.* **2022**

Workshop: Flapjack, Data Management and Analysis for Genetic Circuit Characterization — LOICA: Logical Operators for Integrated Cell Algorithms. *International Workshop on Bio-Design Automation (IWBDA).* **2021**

LOICA: Logical Operators for Integrated Cell Algorithms. *The 1st International Biodesign Research Conference (IBDRC) — Computational Modeling in Biology Network (COMBINE).* **2020**

Self-organized Patterns from a Synthetic Genetic Oscillator in Bacterial Colonies. *International Society for Microbial Ecology Latin America (ISMELA).* **2019**

Open-Source Paper-Fluidic Device for Bacterial Culture, Communication and Biocomputation. *International Society for Microbial Ecology Latin America (ISME-LA) — Synthetic Biology: Engineering, Evolution & Design (SEED).* **2019**

Modelling non-equilibrium polysome dynamics with totally asymmetric simple exclusion process (TASEP). *ISCB-LA SOIBIO EMBNET.* **2018**