Bayesian Causal Data Science

Landfried, Gustavo

Nationality	Argentine - Swiss
Languages	English B2/C1 | French C1 | Spanish native
Residence	Buenos Aires (Argentina) | Lausanne (Swiss)
Birthday	October, 1985
Telephone	+54 911 5103 7334 | +41 77 407 1874
Email	glandfried@dc.uba.ar
Web	glandfried.github.io/
Linkedin	linkedin.com/in/gustavo-landfried
Github	github.com/glandfried

Bayesian inference. PhD Computer science. MSc Social anthropology.

- Solid experience in data structures, algorithms, and machine learning
- Promoter of the Latin American Bayesian community (bayesplurinacional.org)
- Causal reasoning based on the strict application of probability rules
- Developer and maintainer of open software in Python, Julia and R
- Outstanding methodological background in social sciences
- Fluent teamwork within interdisciplinary groups
- Technical reports accessible to diverse audiences

Work experience

2023 – Actual

Full-time researcher (75%) and teacher (25%) @ Computer Science Department UBA

Efficient inference methods for probabilistic evaluation of causal arguments expressed in natural language by players in judicial, environmental and epidemiological processes, among others. Development of agile methodologies based on causal graphical networks, which not only serve as an intuitive language for any person, it also provide the mathematical specification upon which the performance of alternative arguments is optimally computed given the available evidence.

2022 – Actual

Director. *Bayesian causal data science* @ Laboratorios de Métodos Bayesianos

Decision-making in health, sports, education, and gambling based on model evidence.

○ **Health**: Principal Statistical Advisor for the evaluation of diagnostic test performance for Chagas disease in Latin America, in collaboration with national health reference centers in Argentina, Bolivia, Colombia, and the Fiocruz Foundation Brazil, organized by the International Organisation for the Diagnosis of Diseases (FIND). We evaluated the performance of alternative causal models, $P(\text{Model}|\text{Data})$ and found a major error in the model used by the European Cooperation in Science and Technology consortium "Harmony (COST Action CA18208) Novel tools for test evaluation and disease prevalence estimation".

○ **Sports** and **Education**: Estimation of skill in the video game industry, high-performance sports, and educational systems at all levels. Developer and mantainer of state-of-the-art libraries for learning analysis in the Python, Julia, and R programming language communities (`TrueSkillThroughTime`), allowing for skill estimation with low uncertainty across the entire time series and ensuring the comparability of estimates across time and space.

○ **Gambling** and **Finances**: Optimal decision-making in temporal perception-action cycles by the Ergodic version of the expected utility theory. Planning and control as inference in Partial Observed Markov Decision Process (POMDP). Growth rate optimization via Kelly criterion, fractional Kelly, and more general criteria based on diversification, cooperation, and specialization.

2016 – 2022 | *Doctoral Fellowship in Computer Science* @ Instituto de Ciencias de la Computación
Artificial Intelligence Lab and High Performance Computing Lab.
Bayesian analysis of human learning in video games communities

2016 – 2022 | *Graduate teaching assistance in Computer Science* @ Buenos Aires University
Teaching activities in various courses at the Computer Science degree.
Master's thesis director in Computer Science and Seminar on Bayesian Inference.

2015 – 2016 | *Coordinator* @ National Audiovisual Audience Measurement System
Coordinator of the areas of social sciences and computer technical support.
Administration of the database and the automatic survey system.

2012 – 2013 | *Social work* @ Ministerio de Desarrollo Social, Argentina
Impact evaluation of public policies and counseling for the "Argentina Trabaja" program.

2008 – 2016 | *Data Scientist* @ Grupo Antropocaos
Formal methods in social sciences. Simulation and predictive models. Online bets.

Association | *Co-founder* – Bayes Plurinacional
Co-founder and coordinator of the Bayesian community of America (bayesplurinacional.org).

- **Artificial Intelligence**: Organization of Artificial Intelligence meetings in Latin America, KHIPUx.
- **Data Science**: Training of top-level human resources in Bayesian methods at a continental level.
- **Programming**: Inference based on probabilistic programming languages and efficient algorithms.

Education Buenos Aires University

2016 – 2022 | PhD in **Computer Science.**

2012 – 2015 | Licentiate in Computer Science. (Suspended after promotion to PhD)

2005 – 2009 | Licentiate (BSc + MSc) in **Anthropological Sciences**.

Teaching Buenos Aires University (UBA) | National University of San Martin (UNSAM)

2024 – | *Bayesian Causal Inference* (with `Python`). Faculty of Sciences. UBA - UNSAM.

2019 – | *One-on-one mentoring.* Director of 5 master's thesis in the Department of Computer Science.

2023 – 2024 | *Algorithms and data structures II* (with `Java`). Department of Computer Science.

2020 – 2023 | *Bayesian Inference* (with `C#`, `Julia`, `Python` and `R`). Faculty of Exact and Natural Sciences.

2019 – 2019 | *Algorithms and data structures I* (with `C++`). Department of Computer Science.

2018 – 2019 | *Introduction to Computer Science* (with `Python`). Department of Computer Science.

2018 – 2018 | *Computational Social Science* (with `R`). Departments of Anthropology and Computer Science.

2016 – 2017 | *Functional programming* (with `Haskell`). Department of Computer Science.

2010 – 2010 | *Artificial Societies and Ethnography* (with `Netlogo`). Department of Anthropological Sciences.

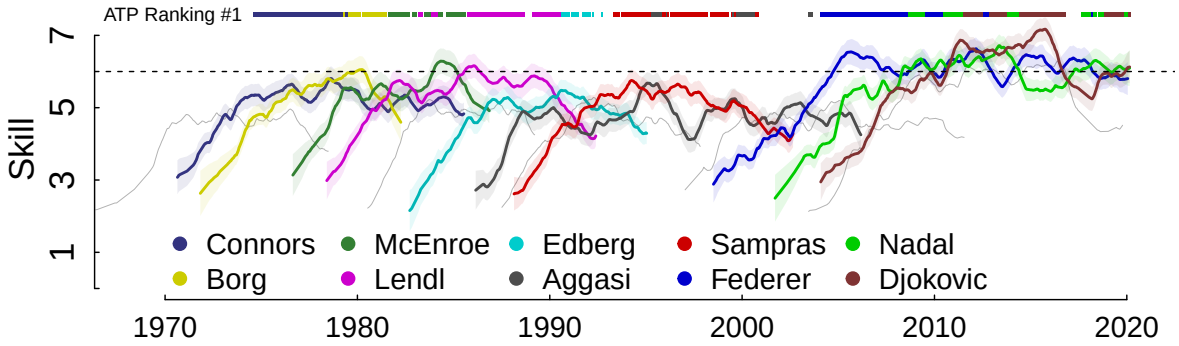
Software tools | `Python` (`Pytorch`, `TensorFlow`, `Keras`, `PyMC`, `Particles`, `Scipy`, `Sklearn`, `Pandas`, `Numpy`, ...), `R` (`Stan`, `Tidyr`, ...), `Julia` (`Turing`, ...), `C++` (`MPI`), `C#` (`Infer.NET`, ...), `Java`, `Haskell`, `Bash` (`screen`, `ssh`, `vi`, `rsync`, `awk`, ...), `SQL`, `NoSQL`, `Git`, `Docker`, `Latex` (`Tikz`), `Html`, ...

Scientific research

Software

The state-of-the-art skill estimator: `TrueSkillThroughTime` (`Python` / `Julia` / `R`)

Developer. Efficiently inference through distributed message-passing algorithms and analytical approximation methods, even in causal networks with millions of nodes and irregular structures.



Articles

○ **Landfried**, G., Cairo G., Mocskos E. *Network Position and Learning Dynamics: Unveiling the Impact of Social Structure on Skill Acquisition in Online Gaming Platforms*. **Journal of Computational Social Sicence. In review 2024**.

○ Longhi, SA; Muñoz-Calderón, A; García-Casares, L; Irazu, L; Rodríguez, MA; **Landfried**, G; Alonso-Padilla, J; Schijman, AG; and Chagas-group *Inter-Laboratory Harmonization Study and Prospective Evaluation of the PURE-T. cruzi-LAMP Assay for Detecting Parasite Presence in Newborn Dried Blood Spots"*. **The Journal of Molecular Diagnostics. In Press 2024.**

- Role: **Responsible of the main statistical analysis**.
- Task: Estimation of the performance of diagnostic tests for different concentrations of the pathogen was achieved through a **Bayesian analysis of human data entry errors**.

○ Denwood, M; Nielsen, S; Olsen, A; Jones, H; Coffeng, L; **Landfried**, G; Nielsen, M; Levecke, B; Thamsborg, SM; Eusebi, P; Meletis, E; Kostoulas, P; Hartnack, S; Erkosar, B; Toft, N. *All that glitters is not gold: an interpretive framework for diagnostic test evaluation using Ascaris lumbricoides as a conceptual example*. **Plos Neglected Tropical Disease. In Press 2024**.

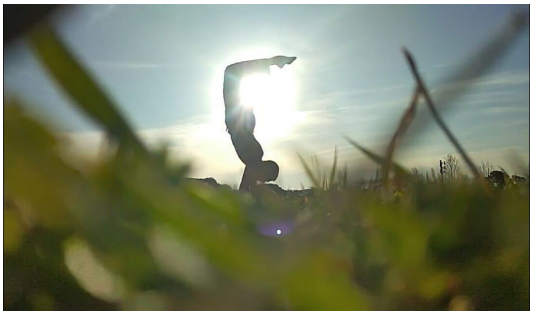
- Role: **Special invitation** due to the discovery of the error in the model used by the European consortium "Harmony (CA18208) Novel tools for test evaluation and disease prevalence estimation".
- Task: **Evaluation of alternative models**.

○ **Landfried** G., Mocskos E. *TrueSkill Through Time: reliable initial skill estimates and historical comparability in Julia, Python and R*. **Journal of Statistical Software. In Press 2024**. Download.

○ **Landfried**, G; Fernandez Slezak, D; Mocskos, E: *Faithfulness-boost effect: Loyal teammate selection correlates with skill acquisition improvement in online games.* **PLoS one. 2019**.

Skills

Patience, perseverance, and reciprocity.



Affection