Ian Leifer

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Recent PhD graduate and former software engineer. Experienced in working with biological data on every level from mining and wrangling to machine learning, statistical analysis and visualization. Seeking a data scientist position in the wellness industry, which will allow me to combine my data science and statistics background with my passion for wellness while creating social impact.

EDUCATION

PhD Physics (Complex networks) Fall 2016 - Mar. 2022

The Graduate Center, City University of New York (New York, NY)

Scientific Advisor: Dr. Hernan Makse.

Thesis: "Symmetry-inspired analysis of biological networks".

- Analyzed biological data using data science, statistical analysis and machine learning.
- Created and led a highly cross-disciplinary collaboration between multiple research groups.

Project: Analyzed biological data to uncover functional building blocks of directed networks.

- Scraped more than 450 networks across 37 databases and wrangled them into the same format.
- Formulated an algorithm and implemented it in an R package with C insertions.
- Parallelized the R package above to analyze data on 100,000 networks.
- Developed a framework visualizing outputs based on the analysis of over 450 networks up to 30,000 nodes.

Project: Performed A/B testing using biological data to confirm graph theoretical hypothesis.

- Formulated and applied an A/B testing framework to look for cross-correlations in the subsets of data based on 4000 signals measured 1500 times.
- Developed a framework to visualize the cross-correlation data on 4000 signals.

Project: Created optimization models for symmetry-driven repairs of graphs.

- Using the API scraped 170,000 data files and compiled them into a few interpretable datasets.
- Built two optimization models based on integer programming and cluster analysis aimed at repairing directed and undirected graphs with missing edges.
- Developed a framework to visualize an abstract mathematical concept of the automorphism group to interpret outputs of the optimization model.

MSc Solid State Physics Fall 2014-Spring 2016

VSHOPF UNN (Nizhny Novgorod, Russia)

BSc Physics Fall 2010-Spring 2014

VSHOPF UNN (Nizhny Novgorod, Russia)

PROFESSIONAL EXPERIENCE

Teaching Assistant Sep 2017-present

City College of New York and Graduate Center CUNY

Teaching physics labs for undergraduate students

- Was an instructor in a pilot innovative physics teaching program using education research-based materials.
- Designed a semi-automated grading software improving objectivity and doubling the speed.
- Taught a workshop for PhD students "Introduction to Git".
- Presented a workshop for PhD students "Introduction to R for Network Analysis. Symmetries in networks".

Software Engineer C/C++ Aug 2013-Apr 2015

MERA. Software Services Company. Nizhny Novgorod, Russia.

Developing the driver for Radio Base Stations.

- Implemented the support of IPv6 by our driver as a part of an agile team.
- Uncovered a major issue in the testing process and implemented a project to fix it.
- Led a team of 3 people for 3 months successfully implementing the project improving the testing process.

Software Engineering Intern C/C++ Summer 2013

MERA. Software Services Company. Nizhny Novgorod, Russia.

SKILLS

Programming languages	**R** (Advanced), **C/C++** (Advanced), **Python** (Intermediate) Bash (Intermediate), Matlab (Intermediate), Perl (Intermediate)
Human languages	Russian (fluent), English (fluent)
Software development	**Linux**, **pandas**, **NumPy**, **tidyverse**, **Git**, **Agile Methodologies** Scikit-learn, ggplot2, SQL, Rcpp, TCP/IP stack, Keras

PUBLICATIONS

9. ***Ian Leifer****, David Phillips, Francesco Sorrentino and Hernán A. Makse.* Symmetry-driven link prediction in networks through pseudobalanced coloring optimization. Under review **Journal of Statistical Mechanics: Theory and Experiment**, 2021.
8. *Paolo Boldi,* ***Ian Leifer****, and Hernán A. Makse.* Quasi-Fibrations of Graphs to Find Symmetries in Biological Networks. Under review **Chaos**, 2021.
7. *Amirhossein Nazerian, Shirin Panahi,* ***Ian Leifer****, David Phillips, Hernán A. Makse, and Francesco Sorrentino.* Matryoshka and Disjoint Cluster Synchronization of Networks. In press **Chaos**, 2022.
6. *Higor S. Monteiro,* ***Ian Leifer****, Saulo D. S. Reis, José S. Andrade Jr., and Hernán A. Makse.* Efficient algorithmic paradigm to identify partial synchrony in information-processing networks using graph fibrations. **Chaos** 32, 033120 (2022)
5. ***Ian Leifer****, Mishael Sánchez, Cecilia Ishida, and Hernán A. Makse.* Predicting synchronized gene coexpression patterns from fibration symmetries in gene regulatory networks in bacteria. **BMC Bioinformatics** 22, 363 (2021).
4. ***Ian Leifer****, Flaviano Morone, Saulo D. S. Reis, José S. Andrade Jr., Mariano Sigman, and Hernán A. Makse.* Circuits with broken fibration symmetries perform core logic computations in biological networks. **PLoS Comput Biol**, 16(6): e1007776 (2020).
3. *Flaviano Morone,* ***Ian Leifer****, and Hernán A. Makse.* Fibration symmetries uncover the building blocks of biological networks. **PNAS USA**, 117 (15), 8306-8314 (2020).
2. ***Ian Leifer****, and Lev Leifer.* Small business valuation with use of cash flow stochastic modeling. **Proceedings** of SMRLO'16, pp. 511-516 (2016).
1. ***Ian Leifer****, and Lev Leifer.* Investigation of investments in foreign real estate effectiveness. **Proceedings** of scientific-practical conference for high-schools, 2009.

TALKS AND AWARDS

- **Award:** Doctoral Student Research Grant (Round 15, 2020).
- **Invited talk:** "Symmetry-inspired building blocks perform core logic computations in directed networks". DynaMo, a satellite meeting at Networks 2021.
- "Fibration symmetries uncover the building blocks of biological networks". APS March meeting 2021.
- "Fibration symmetries uncover the building blocks of biological networks". Complex2020.
- "Fibration symmetries uncover the building blocks that perform core logic computations in biological networks". Synthetic Biology Approaches to Improve Human and Environmental Health 2020.
- "Small Business Valuation with Use of Cash Flow Stochastic Modeling". SMRLO'16.
- "Development of statistical models for simulation of natural disasters on example of forest fires". Intel ISEF 2009 (local chapter).

OTHER ACTIVITIES

- Played on Ultimate Frisbee college team.
- Underwent air force officer training.
- Other interests include hiking, yoga, mental and physical wellness and spirituality.