

Author of transformer, attention, rnn, HomomorphicEncryption, and HEtools software libraries in R, Python, and Julia. Author of “Transformers from Scratch in R” (forthcoming). Experienced developer in SQL, C, Python (TensorFlow, PyTorch), R, Go, JavaScript.

## Employment

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- 2024- OWNER | VALIQ SECURITY, ZURICH, SWITZERLAND  
Build FHE libraries in Python, Julia, R, C, Rust. Build Swift apps (iOS, MacOS).
- 2023-24 ML ENGINEER | BILLTRUST, NEW JERSEY, USA  
ML engineer: deep learning, machine learning, Bayesian statistics, data engineering, Python, R, SQL, Julia.
- 2017-23 ML RESEARCHER | UNITED NATIONS (ITU), GENEVA  
Researcher; Machine Learning, Built Homomorphic Encryption (Python, R, Julia) library. Developed AWS (Kubernetes/Docker) transcript and translation platform, trained custom SageMaker models. Built Flask web app for QR codes of itu.int domains. Android (Java/Kotlin) and iOS apps.
- 2016-17 RESEARCHER | UNITED NATIONS (UNCTAD), GENEVA  
Impact evaluation of FTAs on Developing Countries (East African Community), using Computation General Equilibrium programming (GTAP)
- 2015-16 ECONOMIST | THE INTERNET SOCIETY, GENEVA  
Paper on exogenous increase in availability of local language content and internet adoption, presented at EEA 2016 | Conceptualised and executed report “Promoting Local Content in Africa” presented at Africa Internet Summit, leading to Google update advertising policy to help monetise African language content. Global Latency measurements (Dyn).
- 2013-15 RESEARCH CONSULTANT | COGINTA, GENEVA / GUINEA  
Directed a large scale representative baseline survey of Conakry (Guinea) population | Conducted analysis for Canton of Geneva commissioned survey on police victimisation
- 2014-15 RESEARCH ASSISTANT | CENTRE ON CONFLICT, DEVELOPMENT AND PEACEBUILDING  
Collaborated with the “Institute Nationale du Developement Humaine” (govt. Morocco) to supervise 400-household survey, using RDD identification strategy
- 2013-14 RESEARCH ASSISTANT | CENTRE FOR FINANCE AND DEVELOPMENT, GENEVA  
Developed survey design on remittances from Geneva | Redeveloped Centre’s website
- 2013-14 TEACHING ASSISTANT | THE GRADUATE INSTITUTE, GENEVA  
Taught weekly Masters’ Statistics workshops | Supervised Masters’ Research Projects
- 2012 RESEARCH CONSULTANT | DUTCH DEVELOPMENT FINANCE INSTITUTE FMO, THE HAGUE  
Designed and directed survey on ESG funds performance
- 2009 RESEARCH ASSISTANT | UNIVERSITY OF GRONINGEN, NETHERLANDS  
Data collection and analysis for Ministry of Economics Affairs commissioned survey

## Education

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- 2012-16 PHD IN DEVELOPMENT ECONOMICS | THE GRADUATE INSTITUTE GENEVA  
Jury: Richard Baldwin (president), Jean-Louis Arcand (supervisor) & Michael Kende  
Internet Adoption in Africa | Trade & Global Value Chains | Gender and Child Growth

2010–12 MASTER IN QUANTITATIVE ECONOMICS AND FINANCE | UNIVERSITY OF ST. GALLEN  
 Research for Dr. Piedro Veglio, Executive Director of the World Bank  
 Microhydropower in remote dev. countries, at the World Bank (D.C.)

2006-10 BSC ECONOMICS | UNIVERSITY OF GRONINGEN

2006-10 BA THEORETICAL PHILOSOPHY | UNIVERSITY OF GRONINGEN

## Software experience

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Python (Tensorflow, PyTorch), R, Julia, SQL, C, Go, Rust Javascript, Swift, Linux,  $\text{\LaTeX}$

## Selected Research Papers

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2017 “Global Value Chains in LICs” | *CTEI Working Paper Series*

2016 “Making the Next Billion Demand Access” | *CFD Working Paper* | *G7 briefing notes*

2015 “decompr: GVC decomposition in R” | *CTEI Working Paper Series*

## Conference Presentations

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2016 The Internet Adoption from google.co.za in Setswana” | *EEA Annual Conference 2016*

2013 “Urban Violence and Collective Efficacy in Karachi and Dhaka” | *Pictet Foundation*

## Other Publications, Op Eds and Short Notes

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2017 “Global Value Chains in Developing Economies” | *VoxEU*

## Software Development

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2023 HEtools *PyPI*. Homomorphic Encryption (BFV, BGV, CKKS).

2023 HEtools *Julia General Registry*. Homomorphic Encryption (BFV, BGV, CKKS).

2023 HomomorphicEncryption *CRAN*. Homomorphic Encryption (BFV, BGV, CKKS).

2023 libactivation *PyPI*. Activation functions (sigmoid, logistic, Gompertz, ReLU).

2022 transformer *CRAN*. transformer blocks (attention, feed-forward neural networks).

2016 rnn *CRAN*. Recurrent Neural Network architectures in native R.

2016 datasets.load *CRAN*. utilities and Graphical User Interface for loading datasets | 130k

2015 decompr *CRAN*. Global Value Chain decomposition.

2014 diagonals *CRAN*. Tools for manipulating fat-diagonal matrices, e.g. block matrices

## Languages

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English (native), Dutch (native), Spanish (advanced), German (advanced), French (advanced)

## Affiliations

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Ifo Economists Expert Group (University of Munich, for Switzerland)