

Jair Wuilloud

LINKS AND CONTACT

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SKILLS

PROGRAMMING

Julia (4/5)

Python (4/5)

C++ (3/5)

Bash (3/5)

Clojure/script (2/5)

JavaScript, HTML, and CSS (2/5)

MACHINE LEARNING

Generative Models (4/5)

HD Computing (4/5)

Conversational Agents (3/5)

Natural Language Processing (4/5)

GPS Processing (4/5)

Neural Networks (4/5)

Reinforcement Learning (2/5)

Optimization (2/5)

GFS (3/5)

TECHNOLOGIES

gpt-3/copilot (3/5)

Pytorch (4/5)

Git and Github (3/5)

AWS/LINODE/AZURE (3/5)

websocket/http (3/5)

Docker (3/5)

EDUCATION

POSTDOC

THEORETICAL PARTICLE PHYSICS

2009–2011, ITP, Bern, Switzerland

PHD

THEORETICAL PARTICLE PHYSICS

2006–2010, University of Münster,

Germany

MASTER

MATHEMATICAL PHYSICS

2006, Geneva, Switzerland

LANGUAGES

French (5/5), English (4/5), German (4/5),

Italian (4/5), Portuguese (1/5)

WORK AND INTERESTS

GENERATIVE MODELS

- Weather and transliteration Models brought into production

AUTOMATION

- Conversational Agents and No Code Software

NEURO-INSPIRED AND SYMBOLIC COMPUTING

- multi-dimensional/brains Agents learning via "one shot learning"
- semantics sparse vectors (words, taxonomy, ...)
- fast, fuzzy query systems for medical data, GPS's space, Text, ...
- interplay with Neural Networks and Machine Learning

COLLABORATIVE SYSTEMS (GPS)

- TaxiQ app, real time recommender system for black cabs
- Automatised car sharing allocation solver

STARTUPS

- Early involvement in multiple well founded startups
- co-founded **Neurotrophic Labs**(USA, 2019–2022), **PLEX AI**(GER, 2019–2020) and **TaxiQ**(UK/CH, 2016–2018)

ACHIEVEMENTS

- at **JUA**, Trained advanced Weather mode on 40TB of data
- at **Interscript**, innovative solution generating code, data and transformer model from a linguist graphical rules/inputs
- at **Interscript**, beaten and replicated benchmarks in resp. Hebrew and Arabic diacritization
- at **mediaplayers**, data strategy processing 0.5×10^9 behavioural data points/3hrs on 1 core
- at **guesser**, implemented original financial models
- at **faxi**, car sharing allocation solution and reports for communities
- with **plex ai**, a chatbot solution leveraging HD computing, with on-line editor/tester and using voice via an app on IOS
- with **neutrophic labs**, a frontend capable of evaluating basic correlations from US medicare dataset within a second
- **Taxiq**, real-time, collaborative web app for London black cabs

PAST WORK SUMMARY

- Conversational agents
- Recommender systems
- NLP: entity detection, sentiment analysis, ...
- Algorithms: various contributions
- Financial models: validation and implementation validation, Bitcoin
- Behavioural simulations: consumers, cabs, ...
- Quantum Fields Theory (12 publications, h-index 5)

WORK HISTORY

JUA | CONTRACTOR

05.2022 – 03.2023 | GFS Weather Forecasting

- 1. R&D to Production: data pipeline, articles, code, prototypes, ...
- 2. Training of generative Weather model on 40TB of data
- *methods*: Fourier Neural Operators, GAN's, GraphNNets.
- *tools*: Pytorch(distributed)/kerchunk/git/poetry/h5/xarray/aws

INTERSCRIPT, RIBOSE | CONTRACTOR

09.2021 – 06.2022 | Transliteration, Diacritization

- 1. Automatised transliteration workflow:
 - workflow:
 - * Rules editing on graph editor
 - * Automatised code Generation
 - * Transliterated data creation
 - * Transformer Model training
 - * Production in Ruby (via ONNX)
 - **transliteration-learner-from-graph, documentation, blog**
- 2. Diacritization for Hebrew and Arabic **rababa**
 - **hebrew** (beating published scores)
 - **arabic** (replicating published scores)
- *methods*: NLP, Rules Graphs → Automatised code + Data generation → generative model for transliteration
- *tools*: Julia/Lucidchart/Pytorch(Transformers)/ruby (ONNX)

NLP JOBS & RESEARCH | VARIOUS CUSTOMERS AND OWN R&D

3.2021 – 05.2022 | NLP, NLG, Chatbots

- Humbaba project: <https://jairwuilloud.com/projects/humbaba/>
- *methods*: NLP, NLG, High Dimensional computing
- *tools*: Julia/Clojurescript/Pytorch/transformers/gpt2

NEUROTROPHIC LABS | Co-FOUNDER

6.2019 – 5.2022 | Real time medical investigation, USA

- 1. "Neuro-inspired" modelling of patient histories and participation to US based competitions
- 2. Real time processing of medicare dataset returning basic correlations
- *methods*: High Dimensional computing(SDMs), statistics
- *tools*: Julia/Rasa/Clojurescript/Linode/DVC

PLEX AI | Co-FOUNDER

4.2019 – 8.2020 | "Neuro-inspired" conversational system, GER/UK

- 1. Developed innovative multidimensional, conversational system of systems, IOS app + web editor/tester
- *methods*: High Dimensional computing(SDMs), Symbolic logic, Brain inspired models, NLP(Intent, Entities, Sentiment), RNNs, text2speech & speech2text
- *tools*: Julia/Rasa/Python/Cloud/Clojurescript/Linode/voice technologies/Docker

MEDIA PLAYERS | LEAD DATA SCIENTIST, CONTRACT

2.2020 – 12.2020 | Data-driven Marketing Solutions, UK/US

- 1. Pilots and PoCs: interplay of behavioural simulations and campaigns learning
- 2. US compliant Data architecture compressing 500×10^6 behavioural data points/day
- *methods*: Reinforcement learning, Behavioural simulations, data strategy+monitoring+logging+tagging
- *tools*: Julia/Python(PySpark)/AWS/Git/DVC/TreasureData(digdag, SQL)

FAXI | SENIOR DATA SCIENTIST, CONTRACT

5.2019--4.2020 | Carsharing app, UK

- 1. Recommendations and community based car sharing report services
- 2. Developed highly efficient fuzzy matching for identifying similar trajectories in space time
- *methods*: Trajectory matching, optimisation (transport problems) and recommendations strategies
- *tools*: Julia(juMP)/R/Python/Clojurescript/AWS/shinyapp/Docker

CONSTELLATION.AI | SENIOR DATA SCIENTIST

2.2018--2.2019 | AI focused Startup (Conversational Agent), London, UK

- 1. R&D, implementation of prototypes and presentations, demos, training of engineer
- 2. Provisional patent of code that became app semantic engine:
System and Method for encoding multiple information sources including human Language
- *methods*: High Dimensional computing(SDRs/SDMs), Brain inspired models, NLP, chatbot, Clustering, NNs and RNNs, Quantum Computing(basics)
- *tools*: Julia/Python(numpy, scipy sparse, pytorch)

TAXIQ | Co-FOUNDER

8.2015--1.2018 | real-time collaborative app for Black Cabs, UK/CH

- 1. Data generation and collection
- 2. PoCs using image processing, simulation and reinforcement learning on trajectories. Developed original and research inspired methods
- 3. Co-developed system from scratch, front/back with APIs integration
- 4. System deployment with Analytics, Monitoring components and live support for testers
- 5. Built/Coordinated team (8 contributors), business plan/contract, pitch material/video presentation.
- *methods*: GPS tracking and processing, collaborative system, supervised/unsupervised physical ranks extraction, MC behavioural simulations, search trees, Neural Networks
- *tools*: C++(Root)/Javascript/Julia/Apache2/Python/SQL

BLOCKSEER | DATA SCIENTIST, CONTRACT

8.2017--9.2017 | Bitcoins transaction analytics, USA

- 1. Evaluated bitcoins arbitrage opportunities from multiple exchanges
- 2. Built analytics module for generic analyses and tests
- *methods*: financial mathematics
- *tools*: Python(scipy, pandas)

JUST EAT | DATA SCIENTIST, CONTRACT

9.2016--3.2017 | Online food ordering company, UK

- 1. Chatbot for helpline: support engineers team
- 2. "Food Ontology": classification, clustering, scraping (training with historical data, test harness, diagrams and dialogues visualisation)
- *methods*: NLP, sparse matrices, random forest+embeddings, recurrent and convolutional neural nets
- *tools*: AIML/word2vec/Python(scipy,numpy,sklearn,keras)/Julia/Clojure

DATAFFIRM | DATA SCIENTIST, CONTRACT

2.2016--5.2016 | Website processing company data, London, UK

- 1. Prototypes and PoCs for Twitter Data Analysis related to company names, designed techniques and proposals for the learning strategy
- 2. Wrote components for production
- *methods*: NLP and tweets analysis
- *tools*: Clojure/Python/Julia/C++

CONDE NAST | DATA SCIENTIST, CONTRACT

1.2015--12.2015 | New E-Commerce Launch, UK

- 1. Developed prototypes and PoCs for the ecommerce recommendation system
- 2. Designed an analytics system monitoring key performance indicators (KPIs "atomic" computation)
- 3. Developed on the thinktopic deep learning libraries (NNets and earth mover algorithms)
- 4. "behaviour driven" simulation mimicking user behaviour presented in meetup
- *methods*: text classification with NLP and Neural Networks, website optimisation strategy through simulations mimicking user behaviour, AB testing, multi armed bandit, visualisations
- *tools*: Clojure/Julia/Cassandra/Python/Scala(Spark)

THOMSONREUTERS | DATA SCIENTIST, EMPLOYEE

8.2014--1.2015 | Technology Innovation Team, UK

- 1. Support engineers team with Analyses/Models/Ideas
- 2. Developed PoC through user/item interaction simulations for a recommender system targeting lawyers
- 3. Analysed reuters news and developed early prototype for personalised news on Google cars
- *methods*: Collaborative Filtering, Users/Items modelling, NLP
- *tools*: Julia/Python

TRAINING AND "CONSULTANCY" | ASPIRING DATA SCIENTIST

8.2013--8.2014 | Data Analysis/ Machine Learning Training and "Consultancy", Berlin, GER

- 1. Training with standard courses and literature about ML and writing the main algorithms
 - 2. For LocaFox, developed a simulation demonstrating the optimisation software they could sell to local stores based on their data
 - 3. For Mapegy, assessed feasibility of matching correlations between stock market indices and their company investment in R&D tracking
 - 4. For Semasio, in real time ad retargeting, proposed a metric for tracking the competition and evaluating own performance as well as alternative strategies
 - 5. Co-developed on a friend's bitcoin trading platform
- *methods*: Machine Learning Algos, Marketing Simulations, Financial Mathematics
 - *tools*: Julia/C++/Python(Panda,Numpy,scipy)

DEUTSCHE BANK | SENIOR QUANTITATIVE ANALYST

02.2012--05.2014 | Model Risk and Validation, Berlin, GER

- Model & DBpricer validation and implementation (Credit/Securitization), tools development (testing, data structure)
- *tools*: C++/Python/VBA/LaTeX/bash

ITP UNI BERN | POSTDOCTORAL RESEARCHER

11.2009--12.2011 | Albert Einstein Center for Fundamental Physics, Bern, Switzerland

- Data analysis and algorithms development, PhD Student supervision, papers/presentations/posters
- *tools*: fortran90/C++/bash/"supercomputers"

WWU MÜNSTER | PHD THESIS IN QUANTUM FIELD THEORY

6.2006--2.2010 | University of Münster (WWU), Germany, Advisor: Gernot Münster
topic: Exotic numerical models for QCD and supersymmetry

UNIGE | MASTER IN MATHEMATICAL PHYSICS

4.2006 | University of Geneva, Switzerland

UNIGE | BACHELOR IN PHYSICS

3.2005 | University of Geneva, Switzerland

CESSOUEST | SCIENTIFIC MATURITY

1998 | Highschool of Nyon, Switzerland

SCIENTIFIC PRESENTATIONS

- 9.2020 Nice Heidelberg, **IVA, a Chatbot as System of Systems coordinated via Natural Language**
- 7.2015 Clojure Meetup, Berlin(Germany), **Users simulation for an E-commerce**
- 6.2010 Lattice conference, Villasinius (Italy)
- 11.2008 5th Vienna central European seminar on Particle Physics and Quantum Field Theory "Highlights in Computational Quantum Field Theory", Vienna (Austria), talk as supported junior scientist, **Nf=1 QCD**
- 6.2008 Symposium symmetries and phase in the universe, organised by the german Universe excellence cluster, Isee (Germany), poster about **QCD with one number of flavour**
- 3.2008 German Physical Society, Freiburg (Germany), talk at the **cosmology and particles physics** convention
- 5.2006 IDSIA , Lugano (Switzerland), **quantum models on the circle and the sphere**

SCIENTIFIC AND COMMERCIAL PUBLICATIONS

- M.Gabler, J. Wuilloud, ... **Jua Vilhelm: A novel end-to-end AI system for global weather prediction**, American Meteorological Society
- J. Wuilloud, J. Martinez, **High Dimensional Computing for Public Safety**, heroX Public Safety challenge
- J. Wuilloud, **Fast and light fuzzy GPS processing with Coarse Coding**, unpublished
- J. Wuilloud, **Carpooling VS Public Transports: impact on COVID-19 Spread**, faxi(Toyota), 05.2020
- J. Wuilloud, **Superpositions with Sparse Distributed Memories, High Dimensional and Dense Vectors**, unpublished, 03.2019.
- J. Wuilloud, A. Dutra, **System and Method for encoding multiple information sources including human Language**, provisional patent, constellation.ai, 01.2019
- A. Deuzeman, U. Wenger and J. Wuilloud, **Spectral properties of the Wilson Dirac operator in the ϵ -regime**, arXiv:1110.4002 [hep-lat], accepted by JHEP.
- J. Wuilloud, G. Bergner , **Acceleration of the Arnoldi method and real eigenvalues of the non-Hermitian Wilson-Dirac operator**, (2011), accepted by Computer Physics Communications, arXiv:1104.1363 [hep-lat].
- K. Demmouche, F. Farchioni, A. Ferling, I. Montvay, G. Munster, E.E. Scholz, J. Wuilloud, **Simulation of 4d N=1 supersymmetric Yang-Mills theory with Symanzik improved gauge action and stout smearing**, to appear in Eur. Phys. J. C (2010), arXiv:1003.2073 [hep-lat]
- K. Demmouche, F. Farchioni, A. Ferling, I. Montvay, G. Munster, E.E. Scholz, J. Wuilloud, **Simulations of supersymmetric Yang-Mills theory**, (2009), arXiv:0911.0595 [hep-lat]
- K. Demmouche, F. Farchioni, A. Ferling, I. Montvay, G. Münster, E. E. Scholz and J. Wuilloud, **Dynamical simulation of lattice 4d N=1 SYM**, PoS Confinement8 (2008) 136, arXiv:0811.1964
- F. Farchioni, I. Montvay, G. Munster, E. E. Scholz, T. Sudmann, J. Wuilloud, **Hadron spectrum of QCD with one quark flavor**, PoS LAT2008 (2008), "arXiv:0810.0161" [hep-lat].
- K. Demmouche, F. Farchioni, A. Ferling, I. Montvay, G. Münster, E.E. Scholz, J. Wuilloud, **Spectrum of 4d N=1 SYM on the lattice with light dynamical Wilson gluinos**, PoS LAT2008 (2008), "arXiv:0810.0144" [hep-lat].
- F. Farchioni, I. Montvay, G. Munster, E. E. Scholz, T. Sudmann and J. Wuilloud, **Hadron masses in QCD with one quark flavour**, Eur. Phys. J. C 52 (2007) 305 "arXiv:0706.1131" [hep-lat].
- F. Farchioni, G. Munster, T. Sudmann, J. Wuilloud, I. Montvay and E. E. Scholz, **Hadron spectrum of QCD with one quark flavor**, PoS LATTICE2007 (2006) 135, "arXiv:0710.4454" [hep-lat].
- T. Boyer, W. Bietenholz and J. Wuilloud, **Spin chain simulations with a meron cluster algorithm**, Int. J. Mod. Phys. C 18 (2007) 1497, arXiv:cond-mat/0701331.