DR. JONAS LIPPUNER

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Fluent languages: English, German

SUMMARY

I am a staff scientist at Los Alamos National Laboratory and also consult for algorithmic traders. I am passionate about writing code to solve challenging problems and building autonomous systems. I easily pick up new things and enjoy learning and applying new methods, techniques, and concepts to achieve specific goals.

Interests: computational physics and finance, GPU programming, cryptocurrencies, blockchain technologies (e.g. Ethereum smart contracts), quantitative and algorithmic trading, artificial intelligence and machine learning

CURRENT POSITIONS

Founder & CEO **L2 Quant LLC** **since Apr 2020: L2 Quant LLC**
Software development, research, live trading **Aug 2019 − Apr 2020: self-employed**
- Developing Linux-based C++ high-frequency automated trading system and signals (backtesting and live trading)
- Implementing market data and order routing APIs (FIX, REST, WebSocket) for various exchanges
- Developing and running (incl. server administration) FX arbitrage and crypto hedging strategies
- Researching, backtesting, and analyzing algorithmic trading strategies for futures, equities, FX, and crypto
- Managing trade and quote level data collection for several exchanges (spot and derivatives)

Scientist **Los Alamos National Laboratory** **since Apr 2018: Staff Scientist**
Computational Physics and Methods, CCS-2 **Sep 2017 − Apr 2018: Postdoc**
- Developing core infrastructure for parallel multi-physics code using block-based adaptive mesh refinement
- Received competitive **Early Career Research grant for $416k** over 2 years as sole PI
- Modernizing flagship multi-physics Fortran production code by porting core infrastructure components to C++
- Research in computational and nuclear astrophysics, lead organizer of weekly astrophysics seminar series

EDUCATION

California Institute of Technology **Pasadena, CA, USA** **Oct 2012 − Jun 2017: Grad student**
Ph.D. in Physics **Jul 2017 − Aug 2017: Postdoc**
- Investigated where in the universe and how heavy elements like gold, lead, and uranium were created
- Developed *SkyNet*, an open source, highly modular nuclear reaction network containing over 140,000 nuclear reactions, also includes code to make movies of the evolution, and an easy-to-use Python interface; *SkyNet* is actively being used by several research groups around the world, see https://bitbucket.org/jlippuner/skynet

University of Manitoba **Winnipeg, MB, Canada** **Sep 2008 − May 2012**
B.Sc. (Hons.) in Mathematics and Physics
- Graduated with the highest GPA (4.48/4.50, 99.6%) among all undergraduate students (about 2700)
- Received numerous merit-based awards and scholarships, see http://jonaslippuner.com/awards

ACADEMIC TRACK RECORD

- 25+ refereed scientific publications, 2100+ citations, h-index 21, 18 contributed conference talks
- 23 invited conference and seminar talks in North America, Europe, and Asia
- Serving as reviewer of scientific journal articles, research proposals, and computing time proposals

PROGRAMMING LANGUAGES AND TECHNOLOGIES

Highly Proficient	Substantial Experience	Working Knowledge
C/C++, Python, NVIDIA CUDA, Linux / Unix, CMake, git, FIX, REST, WebSocket, LaTeX	C#, Fortran, OpenMP, HDF5, Kokkos, TensorFlow, MATLAB, Mathematica, Spack, Wireshark, Windows	MPI, JavaScript, TypeScript, Solidity, MySQL, EasyLanguage, Legion, Java, ASP.NET, PHP

Communication skills: scientific writing, collaborative writing, data visualization and animation, making high quality graphs and figures, oral and poster presentations (won awards for some of my presentations)

Research skills: finding and understanding relevant literature, formulating and testing hypotheses, asking relevant questions, analyzing and understanding complex processes, collaborating on research projects

Coding skills: parallelizing and optimizing existing code, substantial GPU programming experience, collaborative development on large coding projects, code reviewing, compiling and running software on large HPC clusters

Algorithms and Techniques
- Wide range of numrical methods, Monte Carlo, optimization and root-finding techniques
- Discretizing and solving partial differential equations (finite difference/element, spectral, discontinuous Galerkin)
- Basic signal processing (e.g. Fourier analysis, wavelet analysis, fast folding, template matching)
- Basic machine learning (neural network basics, convolutional neural networks, deep learning, autoencoder basics)

Past Experience

JPL Graduate Fellow	**Jet Propulsion Laboratory (USA)**	**Jun 2016 − Sep 2016**

Deep Space Tracking Systems
- Implemented and accelerated algorithms for pulsar searches and radio astronomy time series analysis with GPUs
- Debugged and improved existing single radio pulse detection pipeline

Intern	**NVIDIA Corporation (USA)**	**Jun 2015 − Sep 2015**

CUDA DevTech
- Implemented a prototype library for efficient MPI-style collective communication between multiple GPUs
- This library is now used in TensorFlow, PyTorch, Caffe, MxNet, etc., see https://developer.nvidia.com/nccl

Volunteer Bookkeeper	**Small non-profit organization (USA)**	**Apr 2013 − Jun 2014**

- Responsible for all business accounting, payroll, taxes, and ensuring compliance with tax exempt status
- Introduced automated generation and email distribution of donation statements

Research Student	**University of Manitoba (Canada)**	**Summer 2011 & 2012**

Department of Mathematics
- Implemented a finite element method in MATLAB to numerically solve partial differential equations

Research Student	**CancerCare Manitoba (Canada)**	**Summer 2009 & 2010**

Medical Physics Department
- Developed an open source extension to an existing software package to simulate medical x-ray imaging
- Implemented a parallel Monte Carlo radiation transport for GPUs achieving speedups of $20 - 40$ times

Software Engineer, Web Developer	**Local Government (Switzerland)**	**Oct 2007 − Aug 2008: Intern**
City Clerk's Office		**Sep 2008 − Sep 2009: Contractor**

- Developed database back end and front end of City Parliament website
- Automated or drastically simplified various common repetitive, tedious tasks in the City Clerk's Office

Honors, Prizes, and Fellowships (selected, see http://jonaslippuner.com/cv)

- **CNLS Fellowship** (Center for Nonlinear Studies, Los Alamos National Laboratory, 2017)
- **JPL Graduate Fellowship** (NASA Jet Propulsion Laboratory, 2016)
- **Best Talk** (Theoretical Astrophysics in Southern California Meeting, University of California, San Diego, 2014)
- **Governor General's Silver Medal** (for highest standing at the undergraduate level, University of Manitoba, 2012)
- **University Gold Medal in Science** (for highest standing in undergraduate Science, University of Manitoba, 2012)
- **Allen Medal in Physics** (for highest standing in the final two years of Honours Physics or Honours Physics and Mathematics, University of Manitoba, 2012)
- **Best Entry in Physics and Astronomy** (Faculty of Science Poster Competition, University of Manitoba, 2011)