John Salvatier

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Open Source

2012 – current **PyMC 3.0**, *Bayesian inference package (Python).*

- Lead author of Theano based replacement for PyMC 2.2 with dramatically simpler, smaller and more powerful code-base, which will soon replace PyMC 2.2 and become PyMC 3.0
- Engineered transparent missing value imputation
- Engineered automatic transformations for constrained variables to be unconstrained for more efficient training
- Implemented No U-Turn Sampler allowing efficient fitting of much larger models.
- Lead author on *Probabilistic Programming in Python using PyMC* (2016, forthcoming in PeerJ Computer Science)
- Presented on PyMC3 at PyDataConf Seattle 2015

Jan 2016 **Deep-Go**, *Replicating Google's Go Convolutional Network in Lua using Torch.*

- Replicating *Move Evaluation in Go Using Deep Convolutional Neural Networks* (2014)
- Exploring different models and training strategies

2010 – 2012 **PyMC 2.0**, *Bayesian inference package (Python, C, Fortran).*

- Added Automatic Differentiation for likelihoods
- Implemented gradient based samplers which scale better with problem size, self-tune, handle difficult distributions well, etc.
- Engineered PyMC extension allowing for multiple chain samplers
- Experimented with numexpr and Cython code generation using Jinja2 templating for likelihoods

2012 **NumPy**, *(C).*
Patch adding advanced indexing interface to NumPy's C-API

2012 **Theano**, *(Python, C).*
Patch adding fast advanced indexing and gradient support

2009 **scikits.bvp_solver**, *(Python, Fortran).*
Built and presently maintain a user-friendly interface for the Fortran numerical boundary value problem solver BVP_SOLVER

Experience

10/2015 – current **Researcher**, *AI Impacts*, Berkeley, CA.

- Designing and planning AI Progress survey
- Interviewed AI researchers on AI progress forecasts and AI milestones
- Interviewed AI researchers on sociology of AI research
- Information theory of AI timeline research

4/2013 – 7/2015 **Software Development Engineer II**, *Amazon.com, Inc.*, Seattle, WA.

- Taught functional data programming for scala and javascript to two teams
- Became internally recognized expert in the Spark mapreduce framework
- Critical part of project to rebuild Contribution Profit system in Spark
- Conceived of Retail Video Recorder for recording fast help videos for business users and then lead prototype team

2009 – 10/2012 **Developer/Quantitative Analyst**, *RPX Research, Inc.*, Redmond, WA.

- Engineered on-line, high-frequency (10ms), price model for a bond trading algorithm with continuous updating, extendible model and data-feed specific tuning (C#)
- Engineered price, trade and volatility time-series models for large datasets in search of bond, futures and equity market trading strategies using SQL, NumPy and PyMC (C#, Python)
- Engineered system for creating and visualizing trading performance metrics using SQL and MSChart and with higher-order function based extensions
- Built system for evaluating bond, futures and equity trading strategies against historical market data by simulating real time trading
- Added high-frequency price data to data collection infrastructure

2012 **Statistical Consulting**.

Built Bayesian proportional-hazards model for Corporate bond defaults with a latent, time-varying, financial-fragility factor and multi-level effects. Fit numerically using two-layer Hamiltonian Monte-Carlo.

Other

2014 – 2015 **Founded Seattle Effective Altruists**.

- Hosted regular presentations and discussions about how to effectively improve the world with 20+ attendees
- Hosted workshops helping people give $300,000+ to highly effective charities
- Hosted special discussions for Nick Bostrom and Peter Singer visits
- Spun off work groups focused on Rationality and AI Safety Research
- Transitioned group leadership to two other organizers

Publications

Salvatier J., Wiecki T., Fonnesbeck C. (2016) *Probabilistic Programming in Python using PyMC* PeerJ Computer Science, forthcoming.

Owain Evans, Andreas Stuhlmüller, John Salvatier, and Daniel Filan. *Modeling Agents with Probabilistic Programs* http://agentmodels.org.

Abel D, Salvatier J., Stuhlmüller A., Evans O. (2016) *Agent-Agnostic Human-in-the-Loop Reinforcement Learning* Future of Interactive Learning Machines Workshop at NIPS 2016

Kreuger D., Leike J., Evans O., Salvatier J. (2016) *Active Reinforcement Learning: Observing Rewards at a Cost* Future of Interactive Learning Machines Workshop at NIPS 2016

Technical

- Expert with C#, Python, Scala, PyMC3, Spark, Pandas
- Experienced with Java, Haskell, Standard ML, C, C++, Fortran, R, LaTeX
- Fluent with Bayesian statistical modeling and sophisticated Monte-Carlo sampling
- Well-versed in economics and decision theory
- Skilled at technical writing

Education

2009 **University of Washington**, *B.S. in Chemical Engineering.*

2009 **University of Washington**, *B.S. in Paper Science and Engineering.*