

Robert F. Archibald

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Physicist (PhD, McGill) and Senior Data Scientist with a decade of experience building statistical frameworks that turn incomplete, unreliable data into decisions stakeholders can trust: first across noisy X-ray telescope observations, then across multi-billion-dollar actuarial models at Manulife, where scikit-learn models replicated reserve calculations to sub-1% error while cutting compute cost by over 90%. That same discipline, quantifying uncertainty and reconciling discrepancies across data sources, transfers directly to the data-reliability problem this role centers on.

Core Competencies

- **Uncertainty Quantification & Missing Data:** Characterizing confidence in incomplete/unreliable data products, statistical inference under missing or inconsistent inputs
- **Predictive Modeling:** Python (scikit-learn, scipy, numpy, pandas, statsmodels), robust prediction despite noisy or partial data, feature engineering
- **Time Series & Variability Modeling:** Time series analysis, stochastic simulation, numerical methods
- **Data Reconciliation & Quality:** Cross-source discrepancy and duplicate detection, statistical root-cause tracing, data-quality rule definition alongside engineering teams
- **Advanced SQL & Large-Scale Data:** SQL, distributed cloud batch compute (Azure, ~2,000-VM environment)
- **Stakeholder & Auditor Communication:** Translating statistical uncertainty into clear, defensible operational recommendations in regulated, scrutinized settings

Professional Experience

- **Manulife** **Montréal, Canada**
Senior Data Scientist 2019-2026
 - Built an automated statistical comparison tool to reconcile actuarial model outputs across 10s of GB of scenario results, identifying discrepancies and duplicates between data products and tracing each to its root cause (model updates, assumption changes, population shifts)
 - Engineered scikit-learn ML models to replicate and validate insurance reserve calculations produced by the third-party actuarial platform AXIS, achieving sub-1% error on tens of billions of dollars of reserves while training on only 10% of the policy population, cutting compute cost by over 90%
 - Deployed actuarial tooling to an AKS cluster; direct experience with IFRS 17 in an audit context, including documenting methods, assumptions, and limitations for regulatory review
 - Presents technical findings and their statistical confidence to cross-functional teams, senior stakeholders, and auditors in a heavily scrutinized, regulated setting
- **Manulife / ICON Consulting** **Toronto, Canada**
High Performance Computing Specialist 2018-2019
 - Designed and delivered a fully unit-tested data validation and ETL framework reconciling data across COBOL files, SQL databases, CSVs, and Excel
 - Maintained Python Azure SDK tooling managing a ~2,000-VM scalable, distributed batch compute environment for large-scale quantitative workloads
- **University of Toronto** **Toronto, Canada**
Postdoctoral Fellow 2017-2018
 - Designed and implemented an automated search pipeline over multi-year, 100s-of-GB X-ray telescope datasets to flag statistically significant time-varying sources despite substantial instrumental noise

- **McGill University** **Montréal, Canada**
 Research Associate / Doctoral Work 2011-2017
 - Developed a Python package for near real-time statistical analysis of a multi-year, multi-object monitoring programme; planned and executed multi-telescope observing campaigns under real resource and data-quality constraints

Education

- **McGill University** **Montréal, Canada**
 PhD in Physics 2014-2017
 Thesis: "X-ray Timing of Young Pulsars."
- **McGill University** **Montréal, Canada**
 MSc in Physics 2011-2014
 Thesis: "An Anti-glitch in a Magnetar."
- **Dalhousie University** **Halifax, Canada**
 BSc in Physics 2007-2011
 Thesis: "Factoring by Adiabatic Quantum Computation."

Publications

- 25 peer-reviewed articles in astrophysics (McGill University, 2011-2017), over 800 citations. Full list available on request.