Andrew John Lowe

Madarassy László utca 28, 1194 Budapest, Hungary

✉ andrew.john.lowe@gmail.com · in linkedin.com/in/andrewjohnlowe

PROFESSIONAL PROFILE

I am a data scientist, ex-particle physicist and ex-time metrologist with over a decade's worth of experience working at the forefront of scientific research within large international collaborations. I have a PhD in particle physics and spent several years based at the European Organization for Nuclear Research (CERN) in Geneva and was a member of the team that discovered the Higgs boson, the observation of which led to the award of the 2013 Nobel Prize in Physics. My core competencies include statistical data analysis, data mining, high-speed real-time data analysis ("Big Fast Data"), quantitative problem solving in cross-functional teams, software development and testing, Monte Carlo simulation, mathematical modelling, large-scale computing, data visualisation and interpretation of results. I am a co-author of more than 400 peer-reviewed scientific publications and have spoken in numerous international workshops and conferences.

EMPLOYMENT

Jun. 2017–present
Data Scientist/Business Analyst
EPAM Systems Inc., Hungary

Responsibilities: Convert large volumes of structured and unstructured customer data using advanced analytical solutions. Use and fit different mathematical and econometric models, develop descriptive and predictive models that deliver better decisions. Turn analysed data into actionable insights and business value. Create high-quality data visualisations in cooperation with business analysts. Communicate effectively with other departments (product managers, engineers) to discuss complex data-driven findings and technical specifications. Continuously develop knowledge base within the data scientist team and participate in common brainstorming sessions.

Project participation: Development of a cloud-hosted chatbot to process customer service requests for a major investment bank. Role: Information Architect. Technologies used: IBM Watson Conversation, JSON.

Sept. 2013–May 2017
Scientific Research Fellow
Wigner Research Centre for Physics, Hungarian Academy of Sciences, Hungary

Performed statistical data analysis for the ALICE experiment at CERN, which recreates conditions that are believed to have existed a fraction of a second after the Big Bang. Used state-of-the-art machine learning to develop predictive classification algorithms for recognising particles based on their decay properties.

Conducted the first-ever particle physics data analysis performed entirely in the R statistical programming language. Devised a novel fast data-driven feature selection method that identifies the variables with the best predictive power for a given classification or regression task. Developed pattern recognition algorithms that promise to improve discovery reach in searches for new particles at CERN and beyond.

Pioneered implementation of reproducible research by writing the first-ever fully reproducible particle physics analysis paper. Founded the ALICE Statistics and Machine Learning Working Group. Co-organiser of the first CERN workshop dedicated to the use of machine learning in particle physics. Taught machine learning tutorials at Eötvös Loránd University and CERN. Engaged with local data science community via public outreach talks and conference presentations.

| Apr. 2010– | **Postdoctoral Fellow, Deputy Team Leader** |
| Oct. 2012 | *California State University, Fresno, USA (based at CERN)* |

Systematically investigated the potential benefit of hundreds of different predictor variables for a range of analyses using Monte Carlo simulations written in C++. Several new variables were found that provide significant improvements in sensitivity for a variety of Higgs boson and new particle searches.

| Feb. 2008– | **Postdoctoral Fellow** |
| Aug. 2009 | *Indiana University, USA (based at CERN)* |

Developed an algorithm in C++ and Python for real-time particle identification in streaming data at an input rate of 1 GB/s. Optimised algorithm parameters and achieved excellent performance. This algorithm underpins a large part of the ATLAS experiment's physics programme by providing the data used for many analyses. It has been used for data-taking since 2010 and has currently processed 70 PB and recorded 3 PB for subsequent analysis.

| Mar. 1998– | **Assistant Research Scientist** |
| Sept. 2000 | *Centre for Time Metrology, National Physical Laboratory (NPL), UK* |

Provided technical and administrative support to a range of key activities relating to the maintenance and dissemination of the UK's national time scale.

EDUCATION

| 2001–2008 | **PhD Particle Physics** |

Royal Holloway, University of London, UK (including 17 months at CERN)
Thesis title: *Performance and robustness studies of the trigger for the ATLAS experiment*

Played a major role in the development of the core software and algorithms in C++ for a real-time multi-stage cascade classifier that filters and reduces the collision event data rate from 60 TB/s to a manageable 300 MB/s that can be written to permanent storage. Performed detailed time profiling of the core software and devised improvements that made it 8 times faster, thus meeting a critical requirement of the system.

| 2000–2001 | **MSc Particle Physics** |

Royal Holloway, University of London, UK
Thesis title: *Light Higgs ($H \rightarrow b\bar{b}$) at the LHC*

Investigated the search potential of the $H \rightarrow b\bar{b}$ decay channel for a light Higgs boson using the ATLAS detector at CERN. First ever data-mining analysis of this type to be performed entirely in C++.

| 1993–1996 | **BSc (Hons) Physics** |

Royal Holloway, University of London, UK

TRANSFERABLE SKILLS

- **Communication:** Invited speaker at numerous international conferences, frequent presentations in group meetings, report writing, public speaking, teamwork in a collaboration of about 3000 people
- **Problem solving:** Capacity to lead independent research, understand and dissect complex problems and find creative solutions
- **Project management:** Accustomed to handling parallel projects with strict deadlines

COMPUTING SKILLS

Programming languages:
- C++ *(16 years' experience)*
- R *(3 years' experience)*
- Python *(basic knowledge)*
- SQL *(basic knowledge)*
- Octave
- Bash shell scripting
- FORTRAN
- Pascal

Software development:
- Emacs
- Sublime Text
- RStudio
- UML
- Git/GitHub
- CVS
- Subversion (SVN)
- Valgrind

Data mining software:
- ROOT *(13 years' experience)*
- H_2O
- Weka
- Orange
- RapidMiner
- KNIME
- Rattle
- PAW

Documentation:
- LaTeX *(17 years' experience)*
- Markdown
- Doxygen

Operating systems:
- Unix *(17 years' experience)*
- Linux *(17 years' experience)*
- Microsoft Windows

Data visualisation:
- TIBCO Spotfire
- ggplot2
- Shiny

Other: object-oriented analysis and design, grid computing, CPU and time profiling, code optimisation, memory debugging. Over 30 years' programming experience in various languages.