Dr Andi Lowe

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PROFESSIONAL PROFILE

I am a British data scientist with several years of experience consulting for a diverse range of business clients and a 15-year background in data-oriented scientific research within large international teams. I have a PhD in particle physics, spent several years based at CERN in Geneva, and was a member of the team that discovered the Higgs boson. My core competencies include statistical data analysis, machine learning, software development, mathematical modelling, data visualisation and interpretation of results. I am a co-author of over 500 peer-reviewed scientific publications and have spoken at numerous international workshops and conferences.

EMPLOYMENT

Jun. 2017–present **Data Scientist**
EPAM Systems Inc., Hungary

Worked directly and collaboratively with business clients on a range of consulting projects, including:

- *Texas Instruments*

Contributed to the development of a proof of concept using millimetre-wave radar technology for remote sensing. Performed statistical and image analysis to support project decision-making.

- *Child Mind Institute*

Engineered a machine learning algorithm to detect and monitor body-focused repetitive behaviours such as trichotillomania, excoriation, and onychophagia. Contributed to the development of a wrist-worn monitoring device that enables healthcare professionals to effectively track treatment outcomes. Oversaw data collection methods and hardware choices, proactively identified project risks, and facilitated seamless execution through effective team communication.

- *Merck Sharp & Dohme*

Entrusted with defining the optimal features of an email marketing campaign using insights from the analysis of data captured with neuromarketing software.

- *London Stock Exchange Group*

Devised, developed, and maintained software in R and Python to anonymise Personal Identifiable Information (PII) data, aligning with EU GDPR data protection and privacy laws. This initiative safeguarded a critical $250 million per annum revenue stream for the client. The software ingests, cleans and analyses the data and uses machine learning to generate a synthetic dataset that is structurally and statistically analogous but with robust privacy protections for use in non-production environments. Instituted best practice guidelines to aid the client in meeting GDPR commitments.

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

Performed data analysis in R and C++ 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 machine learning to develop classification algorithms for recognising particles based on their decay properties. Engaged with the data science community via public outreach talks and conference presentations.

Apr. 2010–Oct. 2012 **Postdoctoral Fellow, Deputy Team Leader**
California State University, Fresno, USA (based 100% at CERN, Switzerland)

Systematically investigated the potential benefit of hundreds of different predictor variables for a range of data-mining analyses using Monte Carlo simulations written in C++. Engineered features that improve search sensitivity for new particles, thereby reducing the necessary time and cost of experimental data collection for discoveries.

Feb. 2008–
Aug. 2009

Postdoctoral Fellow
Indiana University, USA (based 100% at CERN, Switzerland)

Developed an algorithm in C++ and Python for real-time particle identification in streaming data that has 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 supplying data for numerous analyses. It has been used in production for data-taking since 2010 and has processed tens of petabytes of data, supporting the analysis work of approximately 3000 physicists.

Mar. 1998–
Sept. 2000

Assistant Research Scientist
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, Switzerland)

Played a key role in the development of the core software and algorithms written 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 which 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. Ran analyses on petabyte-scale datasets using a distributed computing system. Wrote software that was used in the discovery of the Higgs boson.

2000–2001

MSc Particle Physics
Royal Holloway, University of London, UK

Investigated the search potential for the Higgs boson using the $H \to b\bar{b}$ decay channel with the ATLAS detector at CERN. This was the first data-mining analysis of this type to be performed entirely in C++, setting a benchmark for other researchers in the field.

1993–1996

BSc (Hons) Physics
Royal Holloway, University of London, UK

TRANSFERABLE SKILLS

- **Communication:**
  Excel in working closely with clients as a consultant, communicating effectively with other departments and business stakeholders to discuss complex data-driven findings and technical specifications. Proficient in translating client requirements into detailed project documentation. Invited speaker at numerous international conferences. Adept at visual storytelling and data visualisation best practices. Highly skilled at demystifying complex technical concepts for varied audiences. Consistently praised for building strong client relationships.

- **Problem solving:**
  Capacity to lead independent research, dissect complex problems, and devise innovative and effective solutions.

- **Project management:**
  Proficient in managing parallel projects under tight deadlines, both onsite and remotely. Conversant with Agile and Waterfall software development methodologies. Experienced in leading project meetings.

COMPUTING SKILLS

- **Programming languages:** Python (NumPy, Pandas, Scikit-Learn, Matplotlib, Seaborn, etc.), R, SQL, C++, Octave
- **Data mining software:** KNIME, Weka, XGBoost, H_2O, caret, ROOT
- **Data visualisation:** ggplot2, Plotly, TIBCO Spotfire, Tableau, flexdashboard
- **Notebooks/Documentation:** Jupyter, Google Colab, R Markdown, LaTeX
- **Software development:** Docker, Git/GitHub/GitLab, Jira, RStudio, UML, Valgrind, Visual Studio Code
- **Operating systems:** Unix, Linux, Microsoft Windows
- **Other:** object-oriented analysis and design, CPU and time profiling, code optimisation, memory debugging.