

Dr. Dmitry Bandurin

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Quantitative Analyst / Data Scientist

Result-driven and well-organized professional with strong analytical skills, expert in the proper formulation of complex problems, development of novel solutions, work in collaboration and independently, time-critical operations and problem handling.

Extensive experience in experimental research, data analysis, data modeling, scientific computing and software development. Co-author of about 20 software packages in physics experiments. Monte-Carlo / pseudo-experiment modeling. Big experience in different machine learning techniques. Live data monitoring, writing software codes to control hardware operation. Leader of two algorithm groups and a physics group at the Fermilab. Supervision of undergraduate and PhD students. Experience in teaching object-oriented data analysis and physics courses. Primary author of many papers published in major peer-reviewed physics journals.

Areas of Expertise

- Experimental Data Analysis
 - High Energy Physics
 - Research
 - Algorithms Development
 - Collaborative Work
 - Team Building & Motivation
 - Project Leadership
 - Teaching & Supervision
 - Statistical Analysis
 - Programming
 - Machine Learning
 - Computer Administration (Linux OS)
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Professional Achievements

Data Analysis

- Big experience in experimental data analysis (PetaByte scale);
- Extensive application of machine learning algorithms in research (results are published in physics journals);
- Extensive experience of work with many Monte-Carlo packages;
- Practical experience in writing code for modeling physics processes in detectors (using Geant package);
- Co-author of the package for statistical unfolding of experimental data;
- Analysis using Python of Twitter data;
- Large-scale data processing on Amazon Web Services (TeraByte graphs processing);
- Data analysis using (Elastic) MapReduce and the Pig language, Hadoop distributed file system;
- Statistical data analysis using \mathcal{R} and ROOT packages;
- Analysis of market data using Python and QSTK, portfolio optimization; work with large datasets of historical price data.

Computer Proficiency

- Programming in C/C++ (incl. STL) [Brainbench cert.], Fortran, Python (incl. NumPy, Pandas), Perl, MatLab, SQL (SQLite, MySQL, PL/SQL), Java, HTML, data visualization with Tableau;
- \mathcal{R} , ROOT (data processing and analysis framework), PAW (physics analysis workstation);
- Computer administration and C-shell programming in Unix (Linux);
- Windows OS and its main applications (Word, Excel, PowerPoint);
- Practical work with HDFS, programming using MapReduce and Pig language;
- Practical use of distributed data processing;
- Co-author of about 20 software packages in physics experiments.

Research, Development in Scientific Laboratory Environment

- Work in D0 Experiment / Fermi National Accelerator Laboratory (Fermilab), USA; 2000 – present;
- Work in CMS Experiment / European Organization for Nuclear Research (CERN), Switzerland; 1997 – 2011;
- Work in HERA-B Experiment / Deutsches Elektronen-Synchrotron (DESY), Germany; 1998 – 1999;
- Primary authors of 17 measurements in Fermilab and CERN experiments;
- Primary author of many software-implemented algorithms running in real experiment environment.

Project Supervision, Management and Task Leadership

- Leader of two algorithm groups, solving most critical problems for the experiment; 2006 – 2009 (development of jet energy scale setting algorithm, most precise in the world, http://www-d0.fnal.gov/phys_id/jes/public_RunIIa, <http://arxiv.org/abs/arXiv:1312.6873>; development of electron/photon identification algorithms, <http://arxiv.org/abs/arXiv:1401.0029>);
- Supervision of about 10 PhD students (7 of them have received PhD).

Education

- **Ph.D. in Physics+Mathematics**, Joint Institute for Nuclear Research (JINR), Dubna, Russia June, 2004.
- **M.S. in Theoretical and Nuclear Physics**, Moscow State University/University Scientific Center by JINR. Graduated with a highest distinction (*Summa Cum Laude*).

Additional Courses

- *Computing for data analysis* (John Hopkins University, certificate 'with distinction')
[programming in R, data analysis, graphics];
- *Data analysis* (John Hopkins University, certificate 'with distinction')
[programming in R, analysis methods, practical application of machine learning algorithms];
- *Introduction to Data Science* (University of Washington, certificate 'with distinction')
[relational databases, MapReduce, NoSQL, statistical modeling, machine learning, visualization, a variety of algorithmic topics];
- *Machine Learning* (Stanford University, certificate 'with distinction')
[multivariate linear regression, logistic regression, regularization, neural networks, support vector machines, unsupervised learning (clustering and dimensionality reduction), anomaly detection, recommender systems, large-scale machine learning];
- *Computational investing* (Georgia Institute of Technology, certificate 'with distinction')
[company valuation, CAPM, historical data and its manipulation, portfolio performance assessment and optimization];
- *Introduction to Computational Finance and Financial Econometrics* (University of Washington)
[descriptive statistics with R, returns, time series, portfolio theory].

All certificates can be uploaded from <http://www-d0.fnal.gov/~bandurin/Certificates>

Employment History

- Jan. 2006 – present: *Fermilab, Research Scientist*;
- 2000 – 2005: *JINR, Laboratory of Nuclear Problems, Scientific Associate*;
- 1994 – 2000: *JINR, Laboratories of Theoretical and Particle Physics, Research Assistant*.

Publications

Primary author of 26 papers in major peer-reviewed physics journals (such as *Physics Review Letters*, *Physics Review D*, *Physics Letters B*, *European Physics Journal*, *Journal of High Energy Physics*, *Nuclear Instruments and Methods* and others), and 15 papers published in proceedings of international conferences; co-author of 268 papers published by D0 Collaboration and 75 papers published by CMS Collaboration in the physics journals. Full list of publications can be found here: http://www-d0.fnal.gov/~bandurin/MyHome/publications-dmitry_bandurin.pdf

Some featured articles in *Fermilab today*: <http://www-d0.fnal.gov/~bandurin/MyHome/featured.html>

Public talks

More than 40 talks are given at international conferences, workshops, and seminars. Full list of talks can be found here: http://www-d0.fnal.gov/~bandurin/MyHome/talks-dmitry_bandurin.pdf

Teaching

- *Object-oriented data analysis in high energy physics* (JINR, 2003 – 2004);
- *Computing in high energy physics* (Dubna University, 2002 – 2003);
- *Quantum field theory* (JINR, 2002).

Other info: US permanent resident, married.