

# Prof. Dr. Klaus-Robert Müller

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## Curriculum vitae

- 2014– Co-Director of the Berlin Big Data Center
- 2014 ERC panel consolidator grants
- 2012– Member of German National Academy of Sciences – Leopoldina
- 2012– Distinguished Professor (WCU project), Korea University, Seoul
- 2011 Visiting researcher (sabbatical) at IPAM UCLA
- 2009–2013 Director of the Bernstein Focus Neurotechnology
- 2008–2011 Research Professor at Deutsche Bank Quantitative Products Lab
- 2007–2011 Research Professor at DIW (Deutsches Institut für Wirtschaftsforschung)
- since 2006 W3 professor for machine learning at Technische Universität Berlin
- 2006 SEL-Alcatel Award for technical communication
- 2005–2006 Visiting Researcher, sabbatical at Max-Planck-Institute Tübingen (MPI Biological Cybernetics, Friedrich Miescher Labs)
- 2003–2006 C4 Professor for neuroinformatics at Universität Potsdam and head of the department IDA group at Fraunhofer FIRST
- 1999–2003 C3 Professor for neural networks and time series analysis at Universität Potsdam and department head IDA group at Fraunhofer FIRST
- 1995– 2008 Tenure position as department head of the intelligent data analysis (IDA) group at GMD FIRST (now FhG FIRST)
- 1994–1995 Visiting Researcher at University of Tokyo
- 1994 Visiting Researcher at the Beckman Institute of the University of Illinois at Urbana-Champaign
- 1992–1993 Research Fellow at the German National Research Center for Computer Science, GMD FIRST, Berlin
- 1989–1992 Ph.D. in Computer Science, Neural Networks, Universität Karlsruhe
- 1984–1989 Master in Physics, Quantum Field Theory, Universität Karlsruhe

## Research fields

- Statistical learning theory (support vector machines, neural networks, boosting)
- Analysis of non-stationary time-series, blind source separation
- Applications: MEG, EEG-based brain-computer interface (BCI), computational neuroscience, acoustic source separation, intrusion detection in computer networks, genomic data analysis, computational chemistry, machine learning for atomistic simulations

## Selected publications

1. Gaebler, M., Biessmann, F., Lamke, J.-P. Walter, H., Müller, K.-R., Hetzer, S., More realistic stimuli increase intersubject synchronization of brain networks, *Neuroimage*, 100, 427–434, 2014.
2. Höhne, J., Holz, E., Staiger-Sälzer, P., Müller, K.-R., Kübler, A., Tangermann, M., Towards brain-computer interfaces as best communication channel and tool for clinical evaluation: a study with locked-in patients, *PLOS ONE*, 9(8): e104854, 2014.
3. Dähne, S., Meinecke F.C., Haufe, S., Höhne, J., Tangermann, M., Müller, K.-R., Nikulin, V., SPoC: A novel framework for relating the amplitude of neuronal oscillations to behaviorally relevant parameters, *Neuroimage*, 86, 111-122, 2014.
4. Schütt, K.T., Glawe, H., Brockherde, F., Sanna, A., Müller, K.-R., Gross, E.K.U., How to represent crystal structures for machine learning: towards fast prediction of electronic properties, *Phys. Rev. B* 89, 205118, 2014.
5. Montavon, G., Braun, M., Krüger, T., Müller, K.-R., *Analyzing Local Structure in Kernel-based Learning: Explanation, Complexity and Reliability Assessment*, IEEE Signal Processing Magazine, 30(4), 62-74, 2013.
6. Rupp, M., Tkatchenko, A., Müller, K.-R., von Lilienfeld, O.A., Fast and Accurate Modeling of Molecular Energies with Machine Learning, *Physical Review Letters*, 108, 058301, 2012.
7. Snyder, J., Rupp, M., Hansen, K., Müller, K.-R., Burke, K., Finding density functionals with machine learning, *Physical Review Letters*, 108, 253002, 2012.
8. Blankertz, B., Lemm, S., Treder, M., Haufe, S., Müller, K.-R., Single-trial analysis and classification of ERP components - A tutorial, *Neuroimage*, 56 (2), 814-825, 2011.
9. von Büna, P., Meinecke, F.C., Kiraly, F., Müller, K.-R., Finding Stationary Subspaces in Multivariate Time Series, *Physical Review Letters*, 103, 214101, 2009.
10. Braun, M., Buhmann, J., Müller, K.-R., On Relevant Dimensions in Kernel Feature Spaces, *Journal of Machine Learning Research*, 9, 1875-1908, 2008.
11. Nolte, G., Ziehe, A., Nikulin, V.V., Schögl, A., Krämer, N., Brismar, T., Müller, K.-R., Robustly estimating the flow direction of information in complex physical systems, *Physical Review Letters*, 100, 234101, 2008.
12. Müller, K.-R., Tangermann, M., Dornhege, G., Krauledat, M., Curio, G., Blankertz, B., Machine Learning for Real-Time Single-Trial Analysis: From Brain-Computer Interfacing Mental State Monitoring, *Journal of Neuroscience Methods*, 167, 82-90, 2008.
13. Blankertz, B., Tomioka, R., Lemm, S., Kawanabe, M., Müller, K.-R., *Optimizing Spatial Filters for Robust EEG Single-Trial Analysis*, IEEE Signal Processing Magazine, 25(1), 41-56, 2008.
14. Sugiyama, M., Krauledat, M., Müller, K.-R., Covariate Shift Adaptation by importance weighted cross validation, *Journal of Machine Learning Research*, 8(May), 985–1005, 2007.
15. Blankertz, B., Dornhege, G., Krauledat, M., Müller, K.-R., Curio, G., The non-invasive Berlin Brain-Computer Interface: Fast Acquisition of Effective Performance in Untrained Subjects, *NeuroImage*, 37 (2) 539-550, 2007.
16. Dornhege, G., Blankertz, B., Curio, G., Müller, K.-R., Boosting Bit Rates in Noninvasive EEG Single-Trial Classifications by Feature Combination and Multi-class Paradigms, *IEEE Transactions on Biomedical Engineering*, 51, 6, 993-1002, 2004.
17. Müller, K.-R., Mika, S., Rätsch, G., Tsuda, K., Schölkopf, B., An Introduction to Kernel-Based Learning Algorithms, *IEEE Transactions on Neural Networks*, 12 (2), 181-201, 2001.
18. G. Rätsch, T. Onoda, K.-R. Müller, *Soft Margins for AdaBoost*, Machine Learning, 42(3):287-320, 2001.
19. Zien, A., Rätsch, G., Mika, S., Schölkopf, B., Lengauer, T., Müller, K.-R., *Engineering Support Vector Machine Kernels that Recognize Translation Initiation Sites*, Bioinformatics, 16(9), 799-807, 2000.
20. Mika, S., Rätsch, G., Weston, J., Schölkopf, B., Müller, K.-R., Fisher Discriminant Analysis with Kernels, in Proc. of Neural Networks for Signal Processing IX: NNSP'99, edited by Y.-H. Hu, J. Larsen, E. Wilson, S. Douglas, 41–48, IEEE Publishing, 1999.
21. B. Schölkopf, A. Smola, K.-R. Müller, *Nonlinear component analysis as a kernel eigenvalue problem*, Neural Computation, 10(5):1299-1319, 1998.
22. LeCun, Y., Bottou, L., Orr, G.B., Müller, K.-R., Efficient Backprop, in *Neural Networks: Tricks of the Trade*, (eds.) Orr, G.B., Müller, K.-R., Springer LNCS 1524, 9–53, 1998.