

Rémi Bardenet

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Research interests (2017–)

Probabilistic modelling and inference; Monte Carlo methods; interacting particles; applications to signal processing, machine learning, and cardiac cell biology.

Academic positions

- Feb. 2015– **Chargé de recherche**, *CNRS & CRISAL, Université de Lille*, Lille (France).
CRISAL [link] is the dept. of computer science, signal processing and automatic control.
- 2013–2015 **Postdoctoral fellow**, *Department of Statistics, University of Oxford*, Oxford (UK).
2020 Science fellowship of the EPSRC, working with Chris Holmes on large-scale Markov chain Monte Carlo methods, motivated by biological data analysis.

Education

- 2009–2012 **Doctorat (Ph.D.)**, *Université Paris-Sud XI*, Orsay (France), *highest honours*.
Computer science, *Towards adaptive learning and inference - Applications to hyperparameter tuning and astroparticle physics*, under the supervision of Balázs Kégl [link].
- 2008–2009 **Master (M.Sc.)**, *Ecole Normale Supérieure*, Cachan (France), *highest honours*.
Mathematics, computer vision and machine learning ('MVA').
- 2008 **Agrégation**, *Université Louis Pasteur*, Strasbourg (France), *national rank 82*.
Mathematics major, probability & statistics minor.

Recent (2017–) management of funding resources

- 2020–2024 **National individual Artificial intelligence Chair**, *role: PI, 880 k€*.
Project BACCARAT “Bayesian learning of expensive models, with applications to cell biology”.
- 2020–2025 **ERC Starting Grant**, *role: PI, 1.5 M€*.
Project BLACKJACK “Fast Monte Carlo integration with repulsive processes”.
- 2017–2021 **LAI**, *role: PI, 20 k€*.
Project TUNNELING EFFECT between Univ. Lille and Univ. Oxford (UK).
LAIs (“associated international labs”) are initiatives from Univ. Lille to consolidate existing strong international scientific collaborations. They are also sesames to PhD funding from the university.
- 2016–2020 **ANR JCJC grant**, *role: PI, 172 k€*.
Project BoB “Bayesian inference on a budget”.

Awards

- 2021 **CNRS bronze medal**, *CNRS Institute for Information Sciences and Technologies (INS2I)*.
CNRS bronze medals [link] distinguish the early careers of promising researchers working in France. Each of the thematic institutes that form CNRS awards a handful (≤ 3 for INS2I) of medals per year.
- 2013 **2nd prize of the Gilles Kahn award**, *Société Informatique de France*.
Awarded by the French society of Computer Science for the best French Ph.D. of the academic year.

Recent (2020–) international seminars and visits

- ▷ Dept. of decision sciences, Bocconi University, **Milan, Italy** (1 week, 2021).
- postponed Acoustics research institute, **Vienna, Austria**.
- postponed Dept. of information technologies, Univ. Pompeu Fabra, **Barcelona, Spain**.
- postponed Dept. of mathematics, National University of Singapore, **Singapore**.
- ▷ Machine learning group, CWI, **Amsterdam, Netherlands** (1 week, 2019)
- ▷ European space agency technical labs, **Leiden, Netherlands** (2 days, 2019)
 - In 2018, my second kid was born and I limited my international travels to a minimum.
- ▷ Dept. of mathematics, **Univ. Bristol, UK** (3 days, 2017)
- ▷ Dept. of mathematics, **Univ. Aalborg, Denmark** (1 week, 2017)

Recent (2017–) national seminars and visits

NB:

- Since 2020, many events have taken place online, which has caused a rise in the number of seminars. I have not included online seminars here.
- ▷ Dept. of mathematics, **Univ. Paris-Descartes**, Paris (2019, one day)
- ▷ Dept. of mathematics, **Univ. Paris-Saclay**, Paris (2018, one day).
- ▷ *Journée algorithmes stochastiques* [link], **Univ. Paris-Dauphine**, Paris (2017, one day).
- ▷ Dept. of mathematics *Jean Leray*, **Univ. Nantes**, Nantes (2017, two days).

Recent (2017–) invited talks at international workshops or international conferences

- ▷ Invited speaker at the *Dutch meeting of probabilists and statisticians* [link] Lunteren, Netherlands, November 2022.
- ▷ Plenary speaker at the *International conference on belief functions* [link], Sorbonne University, Paris, October 2022.
- ▷ Plenary speaker at the *Workshop on kernel approximations and space-filling* [link], Cardiff University, Cardiff, July 2022.
- ▷ Invited speaker at the *Workshop on inference for expensive systems in mathematical biology* [link], University of Oxford, UK, May 2022.
- ▷ Plenary speaker at *Mathematical statistics and learning* [link], Univ. Pompeu Fabra, Barcelona, June 2021.
- postponed ▷ Plenary speaker at the international conference on *Mathematical Methods in Physics* [link], Marrakech, Morocco.
- online ▷ ICML workshop on *Negative dependence in machine learning*, International Conference on Machine Learning (ICML), July 2020 (held online).
- cancelled ▷ Session on *Kernel methods for uncertainty quantification*, SIAM conference on uncertainty quantification, Munich, March 2020.
- ▷ Workshop on *Stochastic Geometry, Stereology and Image Analysis*, Sandbjerg, Denmark, June 2019.
- ▷ Workshop on *Point processes in Space, Time and Beyond*, Skagen, Denmark, May 2019.
- ▷ Workshop [link] on *Bayesian nonparametrics for signal/image processing*, Bordeaux, France, July 2018.
- ▷ MLSS *African machine learning summer school*, Algiers, Algeria, June 2018.
- ▷ SSP conference on *Statistical signal processing*, Freiburg, Germany, June 2018.
- ▷ Workshop on *Bayesian nonparametrics for signal/image processing*, Bordeaux, France, June 2018.
- ▷ Workshop on *Cardiac modelling* of the Royal Statistical Society, Chicheley, UK, February 2017.

Selected recent (2017–) invited talks in national workshops/conferences

- ▷ Tutorial speaker at *Stochastic geometry days* [link], Univ. du Littoral Côte d'Opale, Dunkerque, France, November 2021.
- ▷ *Workshop on kernel and sampling methods* [link] of GDR Mascot-Num, Institut Henri Poincaré, Paris (2021, 1 day).
- ▷ Tutorial speaker at *End-to-End Bayesian learning* [link] Centre international de rencontres mathématiques (CIRM), Univ. Aix-Marseille, France, October 2021.
- postponed ▷ Invited opening speaker at the workshop *DPPs in the Alps*.
- ▷ Invited speaker at the French *Académie des Sciences* for a mini-workshop on determinantal point processes, June 2018.
- ▷ Invited speaker at the Physics colloquium of ENS Lyon, France, March 2018.
- ▷ Plenary speaker at the *StatLearn* [link] workshop, Univ. Lyon, April 2017.
- ▷ Plenary speaker at the *GRETSI* [link] conference, September 2017.
- ▷ Bayes in Paris [link] *national seminar series*, Paris, April 2016.

Recent (2017–) teaching experience

CNRS positions come with no teaching duty. Out of personal inclination, I still maintain a small teaching activity at the master level.

- 2019– **Lecturer**, *ENS Paris-Saclay*, Cachan, then Saclay (France).
16 hours per year, on Bayesian machine learning (“MVA” master programme; the most demanded machine learning master nationwide.)

- 2019– **Lecturer**, *Univ. Lille and  cole Centrale de Lille*, Lille (France).
18 to 24 hours per year, on Model-based machine learning (master-level students in data science).
- 2016–2019 **Lecturer**, *ENSAE ParisTech*, Paris (France).
9 hours per year, on Bayesian nonparametrics (master-level students in statistics and econometry).
- 2015–2019 **Lecturer**, * cole centrale de Lille*, Lille (France).
15 hours per year, on practical machine learning with applications to bankruptcy prediction (master-level engineering students). I organized this course around a machine learning competition, see e.g. the *2019 edition* [link].

Recent (2017–) scientific responsibilities and research management

- 2022 co-organized an international workshop on *Computational methods for unifying multiple statistical analyses* [link] at CIRM Marseille, France.
- 2022 co-organized the *second workshop on DPPs and fermions* [link], at ENS Lyon, France. [This two-week workshop](#), my longest organized event so far, was a follow-up to our international *first workshop on DPPs and fermions* [link] in Lille, France. across physics, mathematics, and signal processing.
- 2019–2020 Jury member for the French PhD prize in *signal & image processing and computer vision* [link]. Served as president in 2020 (mandates are one-year).
- 2019 co-organised *GRETSI* [link] at Univ. Lille, the main French-speaking event in signal processing. [This is my biggest event so far \(~450 participants\)](#).
- 2019 co-organised the first international *workshop on DPPs and fermions* [link] across physics, mathematics, and signal processing at Univ. Lille.
- 2017–2018 I ran a small workgroup on *reproducible research* in Lille, where software engineers transfer selected skills to researchers to achieve high standards of reproducibility. See our *tutorial* [link] for instance, or a *concrete example* [link] of our standards: our software package on DPP sampling for machine learning. More software activity on my *GitHub account* [link]
- 2017– Reviewer for journals such as *Annals of Statistics*, *Annals of Applied Probability*, *Journal of Machine Learning Research (JMLR)*, *Journal of the Royal Statistical Society B*, *Biometrika*, *Bernoulli*, *Journal of Econometrics*, *IEEE Transactions on Signal processing (TSP)*, *Bayesian Analysis*, *Statistical Science*, *Electronic Journal of Statistics (EJS)*, *Journal of Computational and Graphical Statistics (JCGS)*, *Statistics and Computing*,
- 2017– Reviewer for conferences such as *International Conference on Machine Learning (ICML)*, *Advances in Neural Information Processing Systems (NIPS)*, *International conference on learning theory (COLT)*.

Supervision

Percentages display my own share of the supervision. I am planning my HDR for early 2022; meanwhile I have a special derogation of my doctoral school to be lead doctoral supervisor since 2020.

- 2022– **Ph. D. student**, *CNRS*, Lille (France), 50%.
I am co-supervising Martin Rouault's Ph.D. with My lene Maida (Prof. Univ. Lille & Laboratoire Painlev ), on *Monte Carlo integration with Riesz gases*.
- 2021– **Postdoc**, *Univ. Nantes*, Nantes (France), 30%.
I am co-supervising Juan Manuel Miramont's postdoc with Fran ois Auger (Univ. Nantes), Pierre Chainais (Univ. Lille), and Patrick Flandrin (ENS Lyon), on *Zeros of the Fourier transform of random signals*.
- 2021–2022 **Postdoc**, *CNRS*, Lille (France), 100%.
I supervised Xiaoyi Mai's postdoc on *Repulsive point processes in machine learning*. Xiaoyi then obtained a assistant professorship in mathematics at Univ. Toulouse.
- 2021– **Postdoc**, *CNRS*, Lille (France), 100%.
I am supervising Michael Fanuel's postdoc on *Repulsive point processes for inverse problems*.
- 2021 **Research software engineer**, *CNRS*, Lille (France), 100%.
I supervised Guillaume Gautier's work as a software research engineer in my group.
- 2021– **Postdoc**, *CNRS*, Lille (France), 100%.
I am supervising Alexandre Feller's postdoc on *Determinantal point processes and fermions in quantum optics*.

- 2020–2022 **Postdoc**, *CNRS*, Lille (France), 100%.
I supervised Barbara Pascal's postdoc on *Repulsive point processes in time-frequency analysis*. Barbara then obtained a CNRS junior permanent position at Univ. Nantes, France.
- 2020–disc. **Ph. D. student**, *Ecole Centrale de Lille*, Lille (France), 50%.
I co-supervised the beginning of Yoann Jayer's Ph.D. with Myl ne Maida (Prof. Univ. Lille & Laboratoire Painlev ), on *Sampling algorithms for repulsive stochastic processes*. Yoann unfortunately quit before completing his PhD to join the finance industry.
- 2020– **Ph. D. student**, *Univ. Lille*, Lille (France), 50%.
I am co-supervising Diala Hawat's Ph.D. with Rapha l Lach ze-Rey (HDR, Univ. Paris & MAP5), on *Repulsive points patterns in statistical signal processing*.
- 2019–2021 **Postdoc**, *CNRS*, Lille (France), 100%.
I supervised Arnaud Poinas's postdoc on *Repulsive point processes in experimental design*. Arnaud was co-supervised by Adrien Hardy (Univ. Lille & Laboratoire Painlev ) during his first year of postdoc. Arnaud then obtained an assistant professorship in mathematics at Univ. Poitiers, France.
- 2017–2020 **Ph. D. student**, *Ecole Centrale de Lille*, Lille (France), 50%.
I co-supervised Ayoub Belhadji's Ph.D. with Pierre Chainais (Prof. Centrale Lille & CRIStAL), on *Determinantal point processes for dimension reduction in signal processing*. Ayoub went on to a postdoc with R mi Gribonval at ENS Lyon, France.
- 2016–2020 **Ph. D. student**, *Ecole Centrale de Lille*, Lille (France), 50%.
I co-supervised Guillaume Gautier's Ph.D. with Michal Valko (HDR, Inria Lille & CRIStAL), on *Fast sampling of determinantal point processes*. Guillaume went on to a postdoc with Pierre-Olivier Amblard, Simon Barthelm , and Nicolas Tremblay at Univ. Grenoble-Alpes, France.
- 2014–2018 **Ph. D. student**, *Univ. Oxford*, Oxford (UK), 20%.
I have co-supervised Ross Johnstone's Ph.D. with Gary Mirams and David Gavaghan (Oxford Computer Science), with industrial collaborators at *Roche labs* (Basel, Switzerland) on *Uncertainty characterisation in action potential modelling for cardiac drug safety*. Ross went on to an industry position in data science in Japan.

Recent (2017–) track Record

In this section, I present my research interests in a loose chronological order, restricting to themes in which I have been active in the period 2017–2022.

Scalable Bayesian inference. Loosely speaking, Bayesian inference for big data faces two main challenges: big data can be *tall* – it contains an overwhelming number of individual data points – or it can be *large* – each data point contains a large number of components. Since 2013, I have had a keen interest into scaling up Bayesian inference to tall datasets while maintaining the theoretical properties that make Bayesian inference desirable in the first place. Restricting to the period 2017–2021, I have proposed the first MCMC algorithm that can provably use less than the original number of data points while maintaining the same accuracy as if using the entire dataset [11]. Focusing on large datasets, this time, we obtained efficient reduction of dimensionality in linear regression using randomized column subset selection [5]. These days, I am thinking of going back to tall data with an entirely different approach, rephrasing inference for tall data as a tractable statistical decision problem that is constrained by data access, instead of looking for scalable versions of algorithms that are designed to solve an unconstrained decision problem.

Applications to biology. I have been part of the 2020 science network – a UK-based network of young computational scientists. In the 2017–2021 time frame, I have transferred statistical tools to computational biology, in particular cardiac modelling [48]. Currently, I'm collaborating with the US FDA and its British equivalent to assess the dangerous side-effects of anti-arrhythmic drugs [47].

Determinantal point processes. This has been my most active theme in 2017–2021. Determinantal point processes (DPPs) are point process models that naturally encode diversity or repulsiveness between the points of a given realization, using algebraic arguments. They arise in many fields, e.g. random matrix theory, combinatorics, or quantum physics. Our landmark result was to show that DPPs lead to fast Monte Carlo integration [6], leading to a natural stochastic version of Gaussian quadrature, and we have proven faster-than-Monte-Carlo central limit theorems for our estimators. See also [27] for a different description of the train of thought that took us to the results in [6]; [20, 18] for computational improvements to sampling DPPs; and [7] for a Python toolbox on DPP sampling. Another line of attack of the same problem led us to generic bounds for numerical integration in reproducing kernel Hilbert spaces using DPPs [17, 16]. In a similar spirit, we are now investigating DPPs for experimental design [2], subsampling in stochastic gradient methods [15]. We are also interested in nonparametric inference for DPPs [14].

Applications to signal processing. After a stimulating *talk* [link] by Patrick Flandrin, I was intrigued by the seemingly repulsive point process formed by the zeros of the short-time Fourier transform of white noise. We proved [9] that this process is an instance of zeros of a Gaussian analytic function, an object of recent booming interest in the random matrix community. This opened a probabilistic toolbox full of theorems that apply directly to the design of filters for signal processing. This first result sparked a lot of interest and raised new deep questions. In our follow-up work [8], we gave new links to an analytic wavelet transform as well as discrete windowed Fourier transforms. This gives yet another viewpoint and a stimulating new field of application for repulsive point processes such as DPPs. These questions are part of the new ANR project ASCETES (PI Sylvain Meignen), to which I'm participating. Currently, I am also revisiting the links of the formalisms of time-frequency analysis and quantum optics, putting the involved point processes at the forefront [?]. In a sense, this is a modern re-reading of Odile Macchi's rich 1975 thesis, where she defined DPPs to model the detection times of a beam of free fermions.

Publications

My research is multidisciplinary, and publishing habits differ among the relevant disciplines, here CS, biology, and experimental physics. I group computer science, computational statistics, applied probability, and signal processing under the acronym 'CS' below.

CS journals

- [1] D. Hawat, G. Gautier, **R. Bardenet**, and R. Lachièze-Rey. On estimating the structure factor of a point process, with applications to hyperuniformity. *Under revision for Statistics and Computing; arXiv preprint arXiv:2203.08749*, 2022.
- [2] A. Poinas and **R. Bardenet**. On proportional volume sampling for experimental design in general spaces. *To appear in Statistics and Computing*, 2022.
- [3] B. Pascal and **R. Bardenet**. A covariant, discrete time-frequency representation tailored for zero-based signal detection. *IEEE Transactions on Signal Processing*, 2022.
- [4] G. Gautier, **R. Bardenet**, and M. Valko. Fast sampling of β -ensembles. *Statistics and Computing*, 2021.
- [5] A. Belhadji, **R. Bardenet**, and P. Chainais. A determinantal point process for column subset selection. *Journal of Machine Learning Research (JMLR)*, 2020.
- [6] **R. Bardenet** and A. Hardy. Monte Carlo with determinantal point processes. *Annals of Applied Probability*, 2020.
- [7] G. Gautier, **R. Bardenet**, G. Polito, and M. Valko. DPPy: Sampling determinantal point processes with Python. *Journal of Machine Learning Research; Open Source Software (JMLR MLOSS)*, 2019.
- [8] **R. Bardenet** and A. Hardy. Time-frequency transforms of white noises and Gaussian analytic functions. *Applied and Computational Harmonic Analysis*, 2019.
- [9] **R. Bardenet**, J. Flamant, and P. Chainais. On the zeros of the spectrogram of white noise. *Applied and Computational Harmonic Analysis*, 2018.
- [10] **R. Bardenet**, F. Lavancier, X. Mary, and A. Vasseur. On a few statistical applications of determinantal point processes. *ESAIM: Proceedings and Surveys*, 60:180–202, 2017.
- [11] **R. Bardenet**, A. Doucet, and C. Holmes. On Markov chain Monte Carlo methods for tall data. *Journal of Machine Learning Research (JMLR)*, 2017.
- [12] **R. Bardenet** and O.-A. Maillard. Concentration inequalities for sampling without replacement. *Bernoulli*, 2015.
- [13] **R. Bardenet**, O. Cappé, G. Fort, and B. Kégl. Adaptive MCMC with online relabeling. *Bernoulli*, 21(3):1304–1340, 2015.

CS refereed international proceedings

- [14] M. Fanuel and **R. Bardenet**. Nonparametric inference of continuous DPPs. In *Advances in Neural Information Processing Systems (NeurIPS)*, 2021.
- [15] **R. Bardenet**, S. Ghosh, and M. Lin. Determinantal point processes based on orthogonal polynomials for sampling minibatches in SGD. In *Advances in Neural Information Processing Systems (NeurIPS)*, 2021.
- [16] A. Belhadji, **R. Bardenet**, and P. Chainais. Kernel interpolation with continuous volume sampling. In *International Conference on Machine Learning (ICML)*, 2020.
- [17] A. Belhadji, **R. Bardenet**, and P. Chainais. Kernel quadrature with determinantal point processes. In *Advances in Neural Information Processing Systems (NeurIPS)*, 2019.
- [18] G. Gautier, **R. Bardenet**, and M. Valko. On two ways to use determinantal point processes for Monte Carlo integration. In *Advances in Neural Information Processing Systems (NeurIPS)*, 2019.

- [19] **R. Bardenet**, P. Chainais, J. Flamant, and A. Hardy. A correspondence between zeros of time-frequency transforms and Gaussian analytic functions. In *Proceedings of the International conference on Sampling Theory and its Applications (SampTA)*, 2019.
- [20] G. Gautier, **R. Bardenet**, and M. Valko. Zonotope hit-and-run for efficient sampling of projection dpps. In *International Conference on Machine Learning (ICML)*, 2017.
- [21] **R. Bardenet** and M. K. Titsias. Inference for determinantal point processes without spectral knowledge. In *Advances in Neural Information Processing Systems (NIPS)*, pages 3375–3383, 2015.
- [22] **R. Bardenet**, A. Doucet, and C. Holmes. Towards scaling up MCMC: an adaptive subsampling approach. In *Proceedings of the International Conference on Machine Learning (ICML)*, 2014.
- [23] **R. Bardenet**, M. Brendel, B. Kégl, and M. Sebag. Collaborative hyperparameter tuning. In *International Conference on Machine Learning (ICML)*, 2013.
- [24] **R. Bardenet**, O. Cappé, G. Fort, and B. Kégl. An adaptive Metropolis algorithm with online relabeling. In *Proceedings of the International Conference on Artificial Intelligence and Statistics (AISTATS)*, volume 22, pages 91–99, April 2012.
- [25] J. Bergstra, **R. Bardenet**, B. Kégl, and Y. Bengio. Algorithms for hyperparameter optimization. In *Advances in Neural Information Processing Systems (NIPS)*, volume 24. The MIT Press, 2011.
- [26] **R. Bardenet** and B. Kégl. Surrogating the surrogate: accelerating Gaussian-process-based global optimization with a mixture cross-entropy algorithm. In *Proceedings of the 27th International Conference on Machine Learning (ICML)*, 2010.
- [27] **R. Bardenet** and A. Hardy. From random matrices to Monte Carlo integration via Gaussian quadrature. In *Proceedings of the IEEE Statistical Signal Processing workshop (SSP)*, 2018.

CS refereed national proceedings (selected papers)

- [28] X. Mai and **R. Bardenet**. Un processus ponctuel déterminantal pour la sélection de variables supervisée. In *Actes de la conférence du GRETSI*, 2022.
- [29] B. Pascal and **R. Bardenet**. Une famille de représentations covariantes de signaux discrets et son application à la détection de signaux à partir de leurs zéros. In *Actes de la conférence du GRETSI*, 2022.
- [30] J. M. Mlramont, **R. Bardenet**, P. Chainais, and F. Auger. A public benchmark for denoising and detection methods. In *Actes de la conférence du GRETSI*, 2022.

CS refereed workshops

- [31] G. Gautier, **R. Bardenet**, and M. Valko. On two ways to use determinantal point processes for Monte Carlo integration. Technical report, ICML workshop on Negative dependence in machine learning, 2019.
- [32] **R. Bardenet**, M. Brendel, B. Kégl, and M. Sebag. SCoT: surrogate-based collaborative tuning for hyperparameter learning that remembers the past. NIPS workshop on Bayesian Optimization and Decision Making, 2012.
- [33] **R. Bardenet**, B. Kégl, and G. Fort. Relabeling MCMC algorithms in Bayesian mixture learning. Snowbird Learning workshop, 2011.
- [34] **R. Bardenet** and B. Kégl. Sampling-based optimization with mixtures. NIPS workshop on Optimization for Machine Learning, 2009.

CS book chapters

- [35] **R. Bardenet**. *Proceedings of the 2012 IN2P3 School of Statistics*, chapter Monte Carlo methods. EDP Sciences, 2013.

Physics Journals (selected papers)

- [36] P. Abreu et al. The lateral trigger probability function for UHE cosmic rays showers detected by the Pierre Auger Observatory. *Astroparticle Physics*, 35:266–276, 2011. Auger Collaboration paper.
- [37] P. Abreu et al. Anisotropy and chemical composition of ultra-high energy cosmic rays using arrival directions measured by the Pierre Auger Observatory. *Journal of Cosmology and Astroparticle Physics*, page 022, 2011. Auger Collaboration paper.
- [38] P. Abreu et al. Advanced functionality for radio analysis in the Offline software framework of the Pierre Auger Observatory. *Nuclear Instruments and Methods in Physics Research A*, 635:92–102, 2011. Auger Collaboration paper.

- [39] P. Abreu et al. The Pierre Auger Observatory scaler mode for the study of solar activity modulation of galactic cosmic rays. *JINST*, 6:01003, 2011. Auger Collaboration paper.
- [40] P. Abreu et al. Search for first harmonic modulation in the right ascension distribution of cosmic rays detected at the Pierre Auger Observatory. *Astroparticle Physics*, 34:627–639, 2011. Auger Collaboration paper.
- [41] P. Abreu et al. The exposure of the hybrid detector of the Pierre Auger Observatory. *Astroparticle Physics*, 34:368–381, 2011. Auger Collaboration paper.
- [42] P. Abreu et al. Update on the correlation of the highest energy cosmic rays with nearby extragalactic matter. *Astroparticle Physics*, 34:314–326, 2010. Auger Collaboration paper.

Physics refereed proceedings

- [43] **R. Bardenet** and B. K gl. An adaptive Monte Carlo Markov chain algorithm for inference from mixture signals. In *Proceedings of ACAT’11, Journal of Physics: Conference series*, 2012.

Physics technical reports

- [44] B. K gl, R. Busa-Fekete, K. Louedec, **R. Bardenet**, X. Garrido, I.C. Mari , D. Monnier-Ragaigne, S. Dagoret-Campagne, and M. Urban. Reconstructing $N_{\mu 19}(1000)$. Technical reports 2011-054, Auger Project Technical Note, 2011.
- [45] **R. Bardenet**, B. K gl, and D. Veberic. Single muon response: The signal model. Technical Report 2010-110, Auger Project Technical Note, 2010.
- [46] R. Dallier, **R. Bardenet**, S. Gambetta, H. Lyberis, and C. Macolino. Radio spectrum measurements at Auger, part 2. Technical Report 2010-032, Auger Project Technical Note, 2010.

Biology Journals

- [47] B. J. Ridder, D. J. Leishman, M. Bridgland-Taylor, M. Samieegohar, X. Han, W. W. Wu, A. Randolph, P. Tran, J. Sheng, T. Danker, A. Lindqvist, D. Konrad, S. Hebeisen, L. Polonchuk, E. Gissinger, M. Renganathan, B. Koci, H. Wei, J. Fan, P. Levesque, J. Kwagh, J. Imredy, J. Zhai, M. Rogers, E. Humphries, R. Kirby, S. Stoelzle-Feix, N. Brinkwirth, M. Giustin, N. Becker, S. Friis, M. Rapedius, T. A. Goetze, T. Strassmaier, G. Okeyo, J. Kramer, Y. Kuryshv, C. Wu, H. Himmel, G. R. Mirams, D. G. Strauss, **R. Bardenet**, and Z. Li. A systematic strategy for estimating herg block potency and its implications in a new cardiac safety paradigm block potency and its implications in a new cardiac safety paradigm. *Toxicology and Applied Pharmacology*, 2020.
 - [48] K. A. Beattie, A. P. Hill, **R. Bardenet**, Y. Cui, J. I. Vandenberg, D. J. Gavaghan, T. P. de Boer, and G. R. Mirams. Sinusoidal voltage protocols for rapid characterization of ion channel kinetics. *Journal of Physiology*, 2018.
 - [49] R. H. Johnstone, **R. Bardenet**, D. J. Gavaghan, and G. R. Mirams. Hierarchical Bayesian inference for ion channel screening dose-response data. *Wellcome Open Research*, 2016.
 - [50] J. Kursawe, P. Brodskiy, C. Narcisso, J. J. Zartmann, R. E. Baker, **R. Bardenet**, and A. G. Fletcher. Robust cell tracking in epithelial tissues through identification of maximum common subgraphs. *Journal of the Royal Statistical Society Interface*, 2016.
 - [51] R. H. Johnstone, E. T. Y. Chang, **R. Bardenet**, T. P. De Boer, D. J. Gavaghan, P. Pathmanathan, R. H. Clayton, and G. R. Mirams. Uncertainty and variability in models of the cardiac action potential: Can we build trustworthy models? *Journal of molecular and cellular cardiology*, 96:49–62, 2016.
 - [52] B. Knapp, **R. Bardenet**, M. Bernabeu, R. Bordas, M. Bruna, B. Calderhead, J. Cooper, A. G. Fletcher, D. Groen, B. Kuijper, J. Lewis, G. McInerny, T. Minssen, J. Osborne, V. Paulitschke, J. Pitt-Francis, J. Todoric, C. A. Yates, D. Gavaghan, and C. M. Deane. Ten simple rules for a successful cross-disciplinary collaboration. *PLoS Computational Biology*, 11(4):e1004214, 2015.
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