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Presently at Kavli Institute, Trondheim

(Updated CV always available at <https://portamana.org/linko.php?w=pmcv.pdf>)

Synopsis

My experience and interests include continuum thermomechanics and quantum theory, Bayesian probability-calculus and formal logic, differential geometry and general relativity, computational neuroscience. I also have a passion for philosophy and history of science. In each of the mentioned subjects I have published original research or given popularizing seminars and lectures (see below).

My teaching and supervising experience ranges from ground-school children to PhD students, in academic institutions and as private tutor.

In research and in teaching I believe in interdisciplinarity and broadness: the diverse fields in physics, mathematics, and all sciences are just one, as one is the sky above us.

Research and education	page cv-2
Pedagogical experience	page cv-3
Memberships & associations	page cv-5
Computation & modelling	page cv-5
Laboratory experience	page cv-6
Grants	page cv-6
Journal refereeing	page cv-7
Languages & interests	page cv-7
Referees	page cv-7
Publications & talks	page cv-9

Research and education

2018-05 – present: **Post-doctoral researcher,**

Kavli Institute for Systems Neuroscience, Norway.

Bayesian probability theory applied to: studies of collective neuronal activity, inference of brain diseases from fMRI data, genetics & psychology. Subsidiary research on general relativity, thermomechanics, and geometry.

2017-03 – 2018-04: **Independent researcher,**

Joint research with Forschungszentrum Jülich (Germany) and Cagliari University (Italy).

Bayesian inference of brain diseases from fMRI data; foundations of maximum-entropy methods. Development of ocean models with spin; improvement of neuronal simulator algorithms; foundations of continuum mechanics within general relativity.

2014-11 – 2017-03: **Post-doctoral researcher,**

Institute of Neuroscience and Medicine 6, Forschungszentrum Jülich, Germany.

Bayesian and maximum-entropy methods for detection of behaviour-related patterns in neural activity; relations between finer & coarser theories of brain activity; sampling theory for neuronal recordings.

2011-11 – 2014-01: **Post-doctoral researcher,**

Climate and Ocean Physics group, University of Oxford, UK.

Stochastic & deterministic theories for geophysical fluid dynamics and their numeric implementation; relations between finer & coarser dynamical theories; maximum-entropy and autoregressive models.

2012-08: **Bayesian statistics consultant,**

The Guide Dogs for the Blind Association, UK.

Bayesian models for estimation of the number of visually impaired children in some UK counties.

2008-10 – 2011-10: **Post-doctoral fellow,**

Quantum Foundations group, Perimeter Institute for Theoretical Physics, Canada.

Foundations of quantum theory and theory of hybrid statistical models; description of quantum phenomena via stochastic continuum mechanics; non-equilibrium statistical mechanics; continuum theories in general relativity.

- 2007-08 – 2008-09: **Post-doctoral researcher**,
Non-Linear Physics research group, Umeå University, Sweden.
Quantum kinetic theory for plasmas with spin; stochastic continuum thermomechanics; non-equilibrium statistical mechanics.
- 2008-08: **PhD**, thesis on *Studies in plausibility theory, with applications to physics* (<https://portamana.org/>).
- 2002-11 – 2007-06: **PhD studies**,
Quantum Electronics and Quantum Optics group, KTH Royal Inst. of Technology, Stockholm.
Quantum communication & quantum optics; beam- and fibre-based interferometry for time-bin entanglement; state estimation and tomography techniques; Bayesian statistical models for quantum and hybrid theories.
- 2002-09 – 2002-10: **Experimental collaborator**,
Quantum Electronics and Optics group, KTH Royal Inst. of Technology, Stockholm.
Quantum communication; Quantum optics; beam- and fibre-based interferometry for time-bin entanglement.
- 2001-01 – 2002-08: **Graduate studies**,
Department of Theoretical Physics, KTH Royal Inst. of Technology, Stockholm.
General relativity; Quantum communication theory; non-linear differential equations.
- 2000-04: **Italian Laurea** in theoretical physics,
Cagliari University, awarded with maximum grades 'cum laude'.
Thesis on *Asymptotic symmetries of anti-de Sitter space in two and three dimensions* (<https://portamana.org/>).
Dilatonic general relativity and its Hamiltonian formulation.

Pedagogical experience

Higher-level education

- March 2019: **Lecturer**, Faculty of Medicine and Health Sciences, Trondheim, Norway.
Lectures *Introduction to probability* and *Probability and neural data* of the course *Concepts in Data Analysis*.

2018 – present: **Co-supervisor** for several PhD students, Faculty of Medicine and Health Sciences and Kavli Institute for Systems Neuroscience, Trondheim, Norway.

Bayesian models and inference in neuroscience, disease diagnosis, genetics and psychology.

2014 – 2017: **Co-supervisor** for several PhD students, Forschungszentrum Jülich, Germany.

Projects on maximum-entropy methods, Bayesian models and inference in neuroscience, state-space analysis of neuronal models.

2013: **Assistant supervisor for MPhys thesis**, University of Oxford.

2011 – 2012: **Full supervisor for BSc thesis**, Perimeter Institute for Theoretical Physics, Canada; KTH Royal Inst. of Technology, Stockholm; University of Oxford.

Thesis on *Obtaining Entropy via Coarsening: Microscopic Restrictions on Continuum-mechanical constitutive Equations*. The student Veronica Wallängen obtained maximum grades with distinction for her thesis.

2010: **Supervisor for BA project**, Perimeter Institute for Theoretical Physics, Canada, and Franklin W. Olin College of Engineering, MA, USA.

Project on *The relationships between plausibility theory and logic*.

Post-secondary education:

2004 – 2006: **Teacher**, Department of Microelectronics and Applied Physics, KTH Royal Inst. of Technology, Stockholm.

Exercise module of the course *Electromagnetism and waves* (20–30 students); preparation and graduation of written examinations.

2000: **Course tutor**, Department of Biology, Cagliari University.

Physics Laboratory course.

1996 – 1997: **Undergraduate tutor** for junior physics students, Department of Physics, Cagliari University.

1995 – 1996: **Undergraduate teacher**, Department of Physics, Cagliari University.

Introductory lectures in mathematics and physics for first-year undergraduate students (70–150 students).

Secondary education:

2009 – 2011: **Summer-school teacher**, International Summer School for Young Physicists, Perimeter Institute for Theoretical Physics, Canada. Short courses on *Probability theory as extended logic: elements and fundamental questions*; *Feynman-diagram techniques in classical physics: quantum field theory without 'particles'*; and *Pictorial introduction to even and odd vectors and covectors*.

Other pedagogical activity:

1990 – 2000: **Private tutor** in physics, mathematics, Latin; Italy.
Pupils varying from ground-school children to graduating students.

2009 – 2011: **Pedagogical papers**, Perimeter Institute for Theoretical Physics, Canada.
On probability theory and differential geometry.

2003 – 2004: **Pedagogical papers and informal lectures**, KTH Royal Inst. of Technology, Stockholm.
On probability theory, differential geometry, thermomechanics.

2006: Course attendance, **Basic communication and teaching**, KTH Royal Inst. of Technology, Stockholm.

Memberships & associations

Friends of the *Stanford Encyclopedia of Philosophy* Society (<https://plato.stanford.edu/>), 2019 – present.

Society for Natural Philosophy (<http://www.ms.uky.edu/~snp/>), 2004 – 2018.

Electronic Frontier Foundation (<https://www.eff.org/>), 2016 – 2018.

Computational & modelling experience

Very proficient with **R** (inference, data analysis, Monte Carlo methods), **Mathematica** (integration, solution of differential equations, data analysis, 3D & 4D plotting, symbolic manipulation, neural-network dynamics), **Matlab** (big data analysis, plotting), **Maple** (3D & 4D plotting), **Python** (data analysis, plotting, stochastic dynamics), parallel programming (**MPI**, **PBS**, and so on). Fairly proficient with **Fortran**

(solution of partial differential equations, finite-difference simulations), **FEniCS/Dolfin** (solution of partial differential equations, finite-elements simulations), **NEST** (neural-network dynamics), **LabView** (interferometric data recording and analysis). My **C** variants and **Lisp** are a bit rusty but functioning.

Everyday familiarity with **LaTeX** and version-control systems like **Git** and **SVN**.

Coding of time- & event-driven spike-based neuron models (NEST, C++).

Coding and analysis of geophysical-fluid-dynamical models with several timestepping schemes and stochastic components, in Fortran (finite differences) with parallel computing (MPI), and in FEniCS/Dolfin (finite elements).

Laboratory experience

Experience in a quantum-optics laboratory and knowledge of its standard maintenance routines and safety measures. Use and care of equipment like lasers, optical elements, oscilloscopes, interferometers, modulators, etc. I have experience with the construction and set-up of fibre- and beam-based interferometers for detection of time-bin entanglement, including construction of parts of the metal frame, beam-fibre coupling maximization and stability, beam alignment and collimation, power monitoring and stabilization, placement of a thermal-stabilization and -monitoring system, coupling and programming (LabView) of various measuring and monitoring hardware and software.

Grants

Kempe foundations, Örnsköldsvik, Sweden: EUR 29 100/ USD 45 200 (SEK 275 000), for post-doctoral research in non-linear physics (2007).

Foundation *Blanceflor Boncompagni-Ludovisi, née Bildt*, Stockholm: EUR 8 500/ USD 13 200 (SEK 80 000), for graduate research in quantum communication theory (2002).

Foundation *Angelo Della Riccia*, Florence: EUR 6 900/ USD 10 700 (SEK 65 000), for graduate research in theoretical physics (2001).

Journal refereeing

Referee for: Acta Physica Polonica A, American Journal of Physics, Annals of Physics, Foundations of Physics, International Journal of Theoretical Physics, Journal of Physical Chemistry, Journal of Physical Oceanography, New Journal of Physics, PLOS Computational biology, Quantum Information & Computation, Proceedings of the Royal Society A, Studies in History and Philosophy of Modern Physics.

Languages & interests

Languages: **Italian**, mother tongue. **English**, fluent, spoken and written. **Swedish**, fluent, spoken and written. **Norwegian**, good reading and writing proficiency. **French** and **German**, fair reading and writing proficiency (mainly scientific writings). **Latin** and **Esperanto**, fair reading and writing proficiency. Beginner **Japanese**.

Other interests: Buster Keaton, Swing dancing, martial arts, parkour, literature, music, languages, flying, art, philosophy, typography, odradek & Urusei Yatsura.

Referees

Ingemar Bengtsson ingemar@fysik.su.se +46-(0)8-5537-8732
Professor, *Quantum Information & Quantum Optics* group
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Professor, *Theoretical and High-energy Physics* group
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Richard Epp rjepp@uwaterloo.ca +1-519-888-4567 x37002
(referee for pedagogical experience)
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Professor, *Centre for Neural Computation*
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Laure Zanna Laure.Zanna@physics.ox.ac.uk +44-(0)18652-72925
[currently moving to Courant Institute, New York University, as Associated Professor]
Professor, *Climate and Ocean Physics* group
University of Oxford, AOPP Clarendon Laboratory
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Former students

Vahid Rostami (PhD supervision)
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Daniel Franz (summer-school mentoring)
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Cyndia Yu (summer-school mentoring)
cyndiayu@college.harvard.edu +1-(480)-729-2937
Harvard College, Department of Physics,
524 Winthrop Mail Center, Cambridge MA 02138, USA

Publications & talks

In preparation

[8] **P.G.L. Porta Mana**, D. Bragantini, I. C. Güzey, Y. Roudi: *Statistical relations between SNPs and insomnia: a simplified Bayesian study*. Draft available at <https://github.com/pglpm/genobayes/raw/master/genobayes4.pdf>.

[7] **P.G.L. Porta Mana**, V. Rostami, Y. Roudi, E. Torre: *Inferring the total activity of a large neuronal population from a small sample*. Draft available at https://github.com/pglpm/maxNt/raw/master/maxNt_v6.pdf.

[6] **P.G.L. Porta Mana**, A. Filipowicz: *Bayesian Plinko: Bayesian models to mimic human inferences*. Draft available at <https://github.com/pglpm/plinkinetti/raw/master/plinkinetti180414.pdf>.

[5] **P.G.L. Porta Mana**, *A geometric understanding of overtraining*. Draft available at <https://github.com/pglpm/neurobayes/raw/master/overtraining/luca180806-overtraining.pdf>.

[4] **P.G.L. Porta Mana**, *A geometric understanding of exchangeability*. Draft available at https://github.com/pglpm/tutorial_exchangeability/raw/master/tutorial_exchangeability180623.pdf.

[3] **P.G.L. Porta Mana**: *‘Eppur ruota’: modelling the ocean as a fluid with spin*. Draft available at Open Science Framework [doi:10.17605/osf.io/8pwc7](https://doi.org/10.17605/osf.io/8pwc7).

[2] **P.G.L. Porta Mana**: *Force, inertia, metric in Newtonian relativity and general relativity*. Draft available at Open Science Framework doi:[10.17605/osf.io/rvcxs](https://doi.org/10.17605/osf.io/rvcxs).

[1] **P.G.L. Porta Mana**: *The beauty of Grassmann spaces*. Draft available at https://github.com/pglpm/grassmannpeano/raw/master/grassmann_spaces_170418.pdf.

Papers and conference proceedings

See also Orcid profile <https://orcid.org/0000-0002-6070-0784>

[35] **P.G.L. Porta Mana**: *Dimensional analysis in general relativity and differential geometry*. Open Science Framework doi:[10.17605/osf.io/jmqnu](https://doi.org/10.17605/osf.io/jmqnu) (2020)

[34] **P.G.L. Porta Mana**: *A relation between log-likelihood and cross-validation log-scores*. Open Science Framework doi:[10.17605/osf.io/k8mj3](https://doi.org/10.17605/osf.io/k8mj3), arXiv:[1908.08741](https://arxiv.org/abs/1908.08741) (2019).

[33] **P.G.L. Porta Mana**: *Sampling on the simplex*, Open Science Framework doi:[10.17605/osf.io/5zu6m](https://doi.org/10.17605/osf.io/5zu6m) (2019).

[32] **P.G.L. Porta Mana**, V. Rostami, E. Torre, Y. Roudi: *Maximum-entropy and representative samples of neuronal activity: a dilemma*. Open Science Framework doi:[10.17605/osf.io/uz29n](https://doi.org/10.17605/osf.io/uz29n), arXiv:[1805.09084](https://arxiv.org/abs/1805.09084), bioRxiv doi:[10.1101/329193](https://doi.org/10.1101/329193) (2018).

[31] C. Bachmann, H. I. Jacobs, **P.G.L. Porta Mana**, K. Dillen, N. Richter, B. von Reutern, J. Dronse, O. A. Onur, K.-J. Langen, G. R. Fink, J. Kukolja, A. Morrison: *On the extraction and analysis of graphs from resting-state fMRI to support a correct and robust diagnostic tool for Alzheimer's disease*, doi:[10.3389/fnins.2018.00528](https://doi.org/10.3389/fnins.2018.00528), in Front. Neurosci. (2018).

[30] **P.G.L. Porta Mana**, C. Bachmann, A. Morrison: *Inferring health conditions from fMRI-graph data*. Open Science Framework doi:[10.17605/osf.io/r2huz](https://doi.org/10.17605/osf.io/r2huz), arXiv:[1803.02626](https://arxiv.org/abs/1803.02626), bioRxiv doi:[10.1101/295113](https://doi.org/10.1101/295113) (2018).

- [29] **P.G.L. Porta Mana**: *Quantum theory within the probability calculus: a there-you-go theorem and partially exchangeable models*, Open Science Framework doi:[10.17605/osf.io/m38x6](https://doi.org/10.17605/osf.io/m38x6), arXiv:[1803.02263](https://arxiv.org/abs/1803.02263) (2018).
- [28] **P.G.L. Porta Mana**: *Unlearning and Seyab's theorem: a dialogue about updating probability*, Open Science Framework doi:[10.17605/osf.io/wptc4](https://doi.org/10.17605/osf.io/wptc4), arXiv:[1802.00807](https://arxiv.org/abs/1802.00807) (2018).
- [27] J. Krishnan, **P.G.L. Porta Mana**, M. Helias, M. Diesmann, E. A. Di Napoli: *Perfect detection of spikes in the linear sub-threshold dynamics of point neurons*, arXiv:[1706.05702](https://arxiv.org/abs/1706.05702), doi:[10.3389/fninf.2017.00075](https://doi.org/10.3389/fninf.2017.00075), in Front. Neuroinf. (2017).
- [26] V. Rostami, **P.G.L. Porta Mana**, M. Helias: *Pairwise maximum-entropy models and their Glauber dynamics: bimodality, bistability, non-ergodicity problems, and their elimination via inhibition*, arXiv:[1605.04740](https://arxiv.org/abs/1605.04740), doi:[10.1371/journal.pcbi.1005762](https://doi.org/10.1371/journal.pcbi.1005762), in PLoS Comp. Biol. (2017).
- [25] **P.G.L. Porta Mana**: *Geometry of maximum-entropy proofs: stationary points, convexity, Legendre transforms, exponential families*, Open Science Framework doi:[10.17605/osf.io/vsq5n](https://doi.org/10.17605/osf.io/vsq5n), arXiv:[1707.00624](https://arxiv.org/abs/1707.00624) (2017).
- [24] **P.G.L. Porta Mana**: *Maximum-entropy from the probability calculus: exchangeability, sufficiency*, Open Science Framework doi:[10.17605/osf.io/xdy72](https://doi.org/10.17605/osf.io/xdy72), arXiv:[1706.02561](https://arxiv.org/abs/1706.02561) (2017).
- [23] L. Zanna, **P.G.L. Porta Mana**, J. Anstey, T. David, T. Bolton: *Scale-aware deterministic and stochastic parametrizations of eddy-mean flow interaction*, doi:[10.1016/j.ocemod.2017.01.004](https://doi.org/10.1016/j.ocemod.2017.01.004), in Ocean Modell. (2017).
- [22] **P.G.L. Porta Mana**, E. Torre, V. Rostami: *Inferences from a network to a subnetwork and vice versa under an assumption of symmetry*, bioRxiv doi:[10.1101/034199](https://doi.org/10.1101/034199) (2015).
- [21] **P.G.L. Porta Mana**, L. Zanna: *Toward a stochastic parametrization of ocean mesoscale eddies*, doi:[10.1016/j.ocemod.2014.04.002](https://doi.org/10.1016/j.ocemod.2014.04.002), <https://portamana.org/linko.php?w=portamanaea14.pdf>, in Ocean Modell. (2014).
- [20] **P.G.L. Porta Mana**, P. G. Lewis: *On two recent conjectures in convex geometry*, arXiv:[1105.4641](https://arxiv.org/abs/1105.4641) (2011).

- [19] **P.G.L. Porta Mana**: *Conjectures and questions in convex geometry: of interest for quantum theory and other physical statistical theories*, Open Science Framework doi:[10.17605/osf.io/8anwr](https://doi.org/10.17605/osf.io/8anwr), arXiv:[1105.3238](https://arxiv.org/abs/1105.3238) (2011).
- [18] **P.G.L. Porta Mana**: *Affine and convex spaces: blending the analytic and geometric viewpoints*, Open Science Framework doi:[10.17605/osf.io/jw9f6](https://doi.org/10.17605/osf.io/jw9f6), arXiv:[1104.0032](https://arxiv.org/abs/1104.0032) (2011).
- [17] **P.G.L. Porta Mana**: *In favour of the time variable in classical thermodynamics*, Open Science Framework doi:[10.17605/osf.io/cu4ad](https://doi.org/10.17605/osf.io/cu4ad), arXiv:[1012.3091](https://arxiv.org/abs/1012.3091) (2010).
- [16] **P.G.L. Porta Mana**: *On the relation between plausibility logic and the maximum-entropy principle: a numerical study*, arXiv:[0911.2197](https://arxiv.org/abs/0911.2197) (2009).
- [15] G. Brodin, M. Marklund, J. Zamanian, Å. Ericsson, **P.G.L. Porta Mana**: *Effects of the g-factor in semi-classical kinetic plasma theory*, arXiv:[0809.2382](https://arxiv.org/abs/0809.2382), doi:[10.1103/PhysRevLett.101.245002](https://doi.org/10.1103/PhysRevLett.101.245002), in Phys. Rev. Lett. (2008).
- [14] **P.G.L. Porta Mana**: *Studies in plausibility theory, with applications to physics*, Ph.D. thesis, <https://portamana.org/linko.php?w=mana070106-thesis.pdf> (2007).
- [13] **P.G.L. Porta Mana**, A. Månsson, G. Björk: *The Laplace-Jaynes approach to induction*, arXiv:[physics/0703126](https://arxiv.org/abs/physics/0703126) (2007).
- [12] A. Månsson, **P.G.L. Porta Mana**, G. Björk: *Numerical Bayesian state assignment for a quantum three-level system. II. Average-value data with a constant, a Gaussian-like, and a Slater prior*, arXiv:[quant-ph/0701087](https://arxiv.org/abs/quant-ph/0701087) (2007).
- [11] A. Månsson, **P.G.L. Porta Mana**, G. Björk: *Numerical Bayesian state assignment for a three-level quantum system. I. Absolute-frequency data, constant and Gaussian-like priors*, arXiv:[quant-ph/0612105](https://arxiv.org/abs/quant-ph/0612105) (2006).
- [10] **P.G.L. Porta Mana**, A. Månsson, G. Björk: *'Plausibilities of plausibilities': an approach through circumstances*, arXiv:[quant-ph/0607111](https://arxiv.org/abs/quant-ph/0607111) (2006).
- [9] **P.G.L. Porta Mana**, A. Månsson, G. Björk: *On distinguishability, orthogonality, and violations of the second law: contradictory assumptions, contrasting pieces of knowledge*, arXiv:[quant-ph/0505229](https://arxiv.org/abs/quant-ph/0505229) (2005).

- [8] **P.G.L. Porta Mana:** *Distinguishability of non-orthogonal density matrices does not imply violations of the second law*, [arXiv:quant-ph/0408193](https://arxiv.org/abs/quant-ph/0408193) (2004).
- [7] G. Björk, **P.G.L. Porta Mana:** *Schrödinger-cat states: size classification based on evolution or dissipation*, [doi:10.1117/12.547048](https://doi.org/10.1117/12.547048), in Proc. SPIE (2004).
- [6] **P.G.L. Porta Mana:** *Probabilistic properties of non-deterministic physical systems*, Open Science Framework [doi:10.17605/osf.io/nz8aw](https://doi.org/10.17605/osf.io/nz8aw), [arXiv:quant-ph/0403084](https://arxiv.org/abs/quant-ph/0403084), in A. Yu. Khrennikov, ed.: 'Quantum Theory: Reconsideration of Foundations – 2' (Växjö University Press, 2004) (2004).
- [5] G. Björk, **P.G.L. Porta Mana:** *A size criterion for macroscopic superposition states*, [arXiv:quant-ph/0310193](https://arxiv.org/abs/quant-ph/0310193), [doi:10.1088/1464-4266/6/11/001](https://doi.org/10.1088/1464-4266/6/11/001), in J. Opt. B (2003).
- [4] **P.G.L. Porta Mana:** *Why can states and measurement outcomes be represented as vectors?*, Open Science Framework [doi:10.17605/osf.io/q9frx](https://doi.org/10.17605/osf.io/q9frx), [arXiv:quant-ph/0305117](https://arxiv.org/abs/quant-ph/0305117) (2003).
- [3] **P.G.L. Porta Mana:** *Consistency of the Shannon entropy in quantum experiments*, [arXiv:quant-ph/0302049](https://arxiv.org/abs/quant-ph/0302049), [doi:10.1103/PhysRevA.69.062108](https://doi.org/10.1103/PhysRevA.69.062108), in Phys. Rev. A and in Virtual J. Quantum Information (2003).
- [2] M. Cadoni, **P.G.L. Porta Mana:** *Hamiltonians for a general dilaton gravity theory on a spacetime with a non-orthogonal, timelike or spacelike outer boundary*, [arXiv:gr-qc/0011010](https://arxiv.org/abs/gr-qc/0011010), [doi:10.1088/0264-9381/18/5/302](https://doi.org/10.1088/0264-9381/18/5/302), in Class. Quantum Grav. (2000).
- [1] **P.G.L. Porta Mana:** *Asymptotic symmetries of anti-de Sitter space in two and three dimensions*, Cagliari University; <https://portamana.org/linko.php?w=thesis.pdf> (2000).

Seminars and posters

- [34] *Cross-validation and early stopping: a Bayesian point of view?*, invited talk at the 11th Trondheim symposium in Statistics, Trondheim, Norway (2020).

- [33] with C. Bachmann, H. Jacobs, S. Buttler, K. Dillen, G. R. Fink, J. Kukolja, A. Morrison: *Graph properties of the functionally connected brain under the influence of Alzheimer's disease*, poster at the 12th Meeting of the German Neuroscience Society (NWG), Göttingen, Germany (2017).
- [32] *Einstein 1905, Euler 1753: the importance of semantics in science*, Forschungszentrum Jülich, Germany (2017).
- [31] with V. Rostami, M. Helias: *Bimodality and inhibition in pairwise maximum-entropy models for neuroscience*, poster at the 9th Bernstein Sparks Workshop, Göttingen, Germany (2016).
- [30] *The relation between theories on different scales: insights from geophysical fluid dynamics*, invited talk at Cagliari University, Italy (2016).
- [29] *In search of a coarser theory of the brain not suggested by finer theories: lessons from continuum thermomechanics*, Forschungszentrum Jülich, Germany (2015).
- [28] *Inference of variable-rate Poisson model from spike-train data: hidden assumptions and approach via exchangeability*, Forschungszentrum Jülich, Germany (2015).
- [27] *Probability relations between neuronal networks and subnetworks*, Forschungszentrum Jülich, Germany (2015).
- [26] *Introduction to probability logic (Bayesian theory) and its use in neuroscience*, Forschungszentrum Jülich, Germany (2015).
- [25] *Geophysical fluid dynamics and coarse-scale brain activity: similarity of problems! similarity of solutions?*, invited talk at the Forschungszentrum Jülich, Germany (2014).
- [24] *And yet it rotates! (The disappearance of rotational momentum on large scales: modelling large-scale water as a fluid with intrinsic spin)*, University of Oxford, UK (2014).
- [23] *Stochastic parametrization of mesoscale eddies: is water at large scales a liquid polymer?*, University of Oxford, UK (2013).

- [22] with L. Zanna: *Developing a stochastic parameterization of mesoscale eddies*, poster at the European Geosciences Union General Assembly, Austria (2013) and the IUGG Conference on Mathematical geophysics, UK (2012).
- [21] *A critique of the maximum-entropy principle by one of its supporters*, invited talk at the 31st International Workshop on Bayesian Inference and Maximum Entropy Methods in Science and Engineering 'MaxEnt 2011', Waterloo, Canada (2011).
- [20] *Vectors and affine forms, straight and twisted: with applications to electromagnetism and general relativity*, Perimeter Institute for Theoretical Physics, Canada (2011).
- [19] *Parallels between truth logic and probability theory (a pseudo-historical, game-theoretic presentation)*, Perimeter Institute for Theoretical Physics, Canada (2010).
- [18] *Metaphysical deductions and assumptions in quantum physics (or: there can't be only particles behind the wave function)*, invited talk, Perimeter Institute for Theoretical Physics, Canada (2008).
- [17] *A historical review of the 'convex approach' to quantum theory, and an overview of the 'probability table' formalism*, invited talk at the workshop 'Operational probabilistic theories as foils to quantum theory', Department of Applied Mathematics and Theoretical Physics, Cambridge University (2007).
- [16] *Plausibility theory as inductive logic*, Stockholm University (2006).
- [15] *A review on non-completely-positive maps and evolution of non-isolated quantum systems*, KTH Royal Inst. of Technology, Stockholm (2006).
- [14] *Gravitomagnetism, and inertia as a real force. (With an appendix on the effects of weightlessness on the human body)*, KTH Royal Inst. of Technology, Stockholm (2005).
- [13] *Probability theory as an extension of formal logic*, KTH Royal Inst. of Technology, Stockholm (2005).

- [12] with G. Björk: *Uncertainty, information and entropy*, invited talk at the 'Ninth International Conference on Squeezed States and Uncertainty Relations', Besançon, France (2005).
- [11] *Non-orthogonality of statistical matrices and violations of the second law of thermodynamics*, KTH Royal Inst. of Technology, Stockholm (2004).
- [10] *Probability tables: the convex approach to quantum theory*, invited talk at the conference 'Quantum Theory: Reconsideration of Foundations – 2', Växjö University (2004).
- [9] *Notes on entropy assignments, statistical mechanics, and convex sets, for classical and quantum mechanics*, Stockholm University(2004).
- [8] *A panoramic picture of modern rational thermodynamics and thermomechanics*, KTH Royal Inst. of Technology, Stockholm (2004).
- [7] *In between classical and quantum systems: Visualising the convex properties of sets of states and measurements*, Stockholm University and KTH Royal Inst. of Technology, Stockholm (2003).
- [6] *On experimental data tables, sets of states and measurement outcomes, distinguishability, and the boundary between classical and quantum systems*, KTH Royal Inst. of Technology, Stockholm (2003).
- [5] *Maximum-entropy method in statistical mechanics and negative temperatures*, KTH Royal Inst. of Technology, Stockholm (2003).
- [4] *Conceptual adequacy of the Shannon entropy in quantum measurements*, KTH Royal Inst. of Technology, Stockholm, and Cagliari University (2002).
- [3] *Reproduction of quantum phenomena by a deck of cards*, KTH Royal Inst. of Technology, Stockholm, and Cagliari University (2002).
- [2] *Tomography of quantum states*, KTH Royal Inst. of Technology, Stockholm, and Cagliari University (2001).
- [1] *Runge-Kutta methods for nonlinear differential equations and Hopf algebras*, KTH Royal Inst. of Technology, Stockholm (2001).