

Lauretto  
Pereira  
Stern

BAYESIAN INFERENCE AND MAXIMUM ENTROPY  
METHODS IN SCIENCE AND ENGINEERING

1073

AIP

ISBN 978-0-7354-0604-9  
ISSN 0094-243X

# BAYESIAN INFERENCE AND MAXIMUM ENTROPY METHODS IN SCIENCE AND ENGINEERING

28<sup>th</sup> International Workshop on Bayesian Inference and  
Maximum Entropy Methods in Science and Engineering

*Boracéia, São Paulo, Brazil      6 – 11 July 2008*

*EDITORS*

Marcelo de Souza Lauretto  
Carlos Alberto de Bragança Pereira  
Julio Michael Stern

AMERICAN  
INSTITUTE  
OF PHYSICS

AIP CONFERENCE PROCEEDINGS ■ 1073



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**Proceedings in the Series of Workshops on  
Bayesian Inference and Maximum Entropy Methods  
in Science and Engineering**

Year		Held in	Publisher	ISBN
2008	28 <sup>th</sup>	Boracéia, São Paulo, Brazil	AIP Conf. Proceedings Vol. 1073	978-0-7354-0604-9
2007	27 <sup>th</sup>	Saratoga Springs, NY, U.S.A.	AIP Conf. Proceedings Vol. 954	978-0-7354-0468-7
2006	26 <sup>th</sup>	Paris, France	AIP Conf. Proceedings Vol. 872	978-0-7354-0371-0
2005	25 <sup>th</sup>	San José, CA, U.S.A.	AIP Conf. Proceedings Vol. 803	0-7354-0292-2
2004	24 <sup>th</sup>	Garching, Germany	AIP Conf. Proceedings Vol. 735	0-7354-0217-5
2003	23 <sup>rd</sup>	Jackson Hole, WY, U.S.A.	AIP Conf. Proceedings Vol. 707	0-7354-0182-9
2002	22 <sup>nd</sup>	Moscow, ID, U.S.A.	AIP Conf. Proceedings Vol. 659	0-7354-0119-5
2001	21 <sup>st</sup>	Baltimore, MD, U.S.A.	AIP Conf. Proceedings Vol. 617	0-7354-0063-6
2000	20 <sup>th</sup>	Gif-sur-Yvette, France	AIP Conf. Proceedings Vol. 568	0-7354-0004-0
1999	19 <sup>th</sup>	Boise, ID, U.S.A.	AIP Conf. Proceedings Vol. 567	0-7354-0003-2

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***All papers have been peer reviewed***

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**AMERICAN  
INSTITUTE  
OF PHYSICS**

**Melville, New York, 2008**

**AIP CONFERENCE PROCEEDINGS ■ VOLUME 1073**

## **Editors:**

Marcelo de Souza Lauretto  
Escola de Artes, Ciências e Humanidades  
Universidade de São Paulo  
Rua Arlindo Bétio, 1000  
Ermelino Matarazzo  
CEP 03828-000 – São Paulo – SP  
Brazil  
E-mail: marcelo.lauretto@gmail.com

Carlos Alberto de Bragança Pereira  
Julio Michael Stern

Instituto de Matemática e Estatística  
Universidade de São Paulo  
Rua do Matão, 1010 – Bloco A  
Cidade Universitária  
CEP 05508-090 – São Paulo – SP  
Brazil

E-mail: cadepb@gmail.com  
jmstern@hotmail.com

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L.C. Catalog Card No. 2008938819  
ISBN 978-0-7354-0604-9  
ISSN 0094-243X  
Printed in the United States of America

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## PREFACE

The Twenty-eighth International Workshop on Bayesian Inference and Maximum Entropy Methods in Science and Engineering, MaxEnt 2008, was held at Boraceia Beach, São Paulo, Brazil, from July 6-11, 2008.

The workshop had 4 tutorials, 9 invited speakers, 26 oral presentations and 35 poster presentations and was attended by participants from institutions of 13 countries, namely, Argentina, Belgium, Brazil, Colombia, France, Germany, Israel, Italy, Japan, the Netherlands, Switzerland, the United Kingdom and the United States, with citizens of the former and 8 more countries, namely, Bulgaria, China, Iran, Nepal, Russia, Spain, Syria and Turkey.

Like the previous MaxEnt Workshops, this meeting encompassed all aspects of information theory, probability, statistical inference and statistical physics, including research on foundations and theoretical developments, as well as modeling techniques for several specific application areas.

The MaxEnt workshops are unique in several aspects and, we hope, MaxEnt 2008 was no different. The strong attendance of these workshops by both masters and novices alike and the ease with which they mix and intermingle is critical in the transmission of ideals across generations. The organizers would like to extend a special thank to the experienced professionals who throughout the years have spent time with and have inspired the new generation of scientists at this workshop. This is perhaps one of the greatest strengths of this conference, and has led to a coherence and exchange of ideas that is unparalleled in the scientific community. MaxEnt also exhibits a great diversity of techniques and applications all presented in a single-track format. In this sense, these meetings are truly interdisciplinary.

The aim of the MaxEnt workshops is to push at the forefront of our understanding. We contend that this is impossible unless diverse and possibly controversial points of view are deliberately encouraged. Just as the impressionist painters found their work rejected at the annual exhibitions of the Salon de l'Académie, we feel that some of the papers collected at MaxEnt could very well be rejected by established scientific journals. We hope MaxEnt 2008 was able to play the essential role of a Salon des Refusés. Some ideas may be controversial, and may eventually be proven wrong, but at an early stage they need to be nurtured rather than prematurely dismissed. Just as the impressionists did not compromise quality as they explored esthetic frontier, we hold that these papers do not compromise on quality as they explore the scientific frontier.

Unlike previous years, this year no participant was unable to attend due to difficulties obtaining visas. We are extremely grateful for this opportunity to see a scientific meeting bringing together, in a spirit of tolerance and cooperation, people from all ages, races, religions, ideologies and nationalities (and cheering for “almost” all football clubs).

For the first time in the MaxEnt meetings, we have asked the authors of the tutorial sections to prepare real text books. The objective of these text books is to provide an in

depth analysis of important subjects introduced at the tutorial presentations. The tables of contents of these books, at the end of the proceedings, give a good idea of the scope of each tutorial.

This meeting would not have been possible without the sponsorship of several institutions. First and foremost we acknowledge Boise State University and the E.T. Jaynes Foundation. We have also had the sponsorship from IME-USP - Institute of Mathematics and Statistics of the University of São Paulo and its graduate programs in Statistics and Applied Mathematics; IF-USP - Institute of Physics; FIA - Fundação Instituto de Administração; FIPE - Fundação Instituto de Pesquisas Econômicas; CAPES - Coordenação de Aperfeiçoamento de Pessoal de Nível Superior; FAPESP - Fundação de Apoio à Pesquisa do Estado de São Paulo; CNPq – Conselho Nacional de Desenvolvimento Científico e Tecnológico; and IM-AGIMB - Instituto de Milênio Avanço Global e Integrado da Matemática Brasileira. We also had the support from IPTI - Instituto de Pesquisas em Tecnologia e Inovação; Supremum Assessoria e Consultoria; Uniersia; and MaxEnt Workshops Inc.

We hope that all the participants of MaxEnt 2008 had the opportunity to work hard (building science and breaking dogmas), enjoy the beach, make friends, and have fun!

*MaxEnt 2008 Editors,*

Marcelo de Souza Lauretto,  
Carlos Alberto de Bragança Pereira,  
Julio Michael Stern,  
*Institute of Mathematics and Statistics  
of the University of São Paulo, Brazil*