

## Julien Cornebise, Ph.D.

E-mail: [julien@cornebise.com](mailto:julien@cornebise.com)

URL: <http://www.cornebise.com/julien/>

Phone: +44 75 00 52 29 53

Last update: July 28th, 2012

Born September 19, 1983 – Age 28

Citizenship: French

A passionate young researcher at the **frontier of Computational Statistics and Applied Probability**, allying the mathematical expertise of a **Ph.D.** in Mathematical Statistics with the **strong computational background of a Master of Engineering in Computer Science**, I am looking for **freelance consulting opportunities**. I received the **Savage Award 2010** from the **International Society for Bayesian Analysis** for my Ph.D.

## Research interests

My statistical experience is so far concentrated in the following areas of **Bayesian computational statistics**:

- **Adaptive Monte-Carlo** methods, i.e. self-tuning of these algorithms with respect to the data so as to maximize their efficiency.
- **Sequential Monte Carlo** (SMC) algorithms, essentially theory and methods, with still a strong interest on applications. Includes non-exhaustively SMC filtering, SMC samplers, and Approximate Bayesian Computation.
- **Markov Chain Monte Carlo** (MCMC) methods, especially their most advanced geometry-based variants.
- **Stochastic optimization**, such as SAEM, MCEM, and its variants and uses for SMC

My main applications are in health sciences, especially pharmacokinetics, pharmacodynamics, and complex dynamic systems. My interests are broad and I am always eager to discover new fields.

## Education

- 2005 - 2009      **Ph.D. in Mathematical Sciences, Speciality Statistics and Applied Probability**  
**Highest Honors** (Mention Très Honorable)  
Title: **Adaptive Sequential Monte Carlo Methods**  
Advisors: **Pr. Eric Moulines** and **Pr. Paul Deheuvels**.  
**TSI - ENST Paris** (<http://www.tsi.enst.fr>), and  
**LSTA - University Paris 6** (<http://www.lsta.upmc.fr>)  
**Savage Award 2010** of **International Society for Bayesian Analysis, Theory & Methods**
- Funded by National Research Fellowship from Ministry of Research and Higher Education  
Defended on June 25th, 2009, in front of the following jury:
- Pr. Paul DEHEUVELS (Advisor)
  - Pr. Eric MOULINES (Advisor)
  - Dr. Fabien CAMPILLO (Reviewer)
  - Pr. Paul FEARNHEAD (Reviewer)
  - Pr. Christophe ANDRIEU (Examiner)
  - Pr. Gérard BIAU (President)
  - Pr. Arnaud DOUCET (Examiner)
  - Pr. Christian ROBERT (Examiner)
- 2004 - 2005      **Master in Mathematics and their Applications, Speciality Statistics, University Paris 6**  
**Highest Honors** (Mention Très Bien), **Graduated 1<sup>st</sup> of a class of 80**
- 2000 - 2005      **Master of Engineering, Computer Science Major, from Ecole Supérieure d'Informatique Electronique Automatique (ESIEA)**  
**Highest Honors** (Mention Très Bien), **Graduated 1<sup>st</sup> of a class of 250**  
5 years engineering school, integrated preparatory cycle, habilitated by french national Engineering Degrees Commission (<http://www.esiea.fr>).
- July 2000        **French National Baccalauréat, Scientific Section,**  
**Highest Honors** (Mention Très Bien)

## Research positions and projects

- Since April 2012      **Independent Mathematical Consultant**  
Offering methodological and algorithmic expertise, data analysis, and software implementation, in Bayesian and more classical statistics. Some of my current clients include pharmaceutical statistical and bio-statistical firms.
- 2011 - March 2012      **Postdoctoral research associate, University College London, UK**  
Department of Statistical Science. Under the supervision of Pr. Mark Girolami.

- 2010 **Postdoctoral fellow, University of British Columbia, Vancouver, Canada**  
Department of Computer Science and Department of Statistics. Under the supervision of Pr. Arnaud Doucet. **Second half of the postdoc** started at SAMSI.
- 2009 **Postdoctoral associate on Sequential Monte Carlo methods, Statistical and Applied Mathematical Sciences Institute (SAMSI), NC, USA**  
Active participant of the SMC international annual program. **First half of a two-parts postdoc** to be continued at University of British Columbia in 2010.
- 2005 - 2009 **PhD thesis: Adaptive Sequential Monte Carlo Methods**  
Prepared at **ENST Paris** and **University Pierre et Marie Curie- Paris 6**
- 2005 **Design of experiments for estimation of parameters in systems of nonlinear differential equations, Statistics Department, Eli Lilly Research Center, Louvain La Neuve, Belgium**  
Six months internship in the Statistics department of the international pharmaceutical company Eli Lilly's research center.
- 2004 – 2005 **Estimation with MCMC Methods, Nestlé Research Center, Lausanne, Switzerland**  
Collaboration with **University Strasbourg I** and **Nestlé Research Center**. Estimation of parameters from a mixture of gaussian laws with Markov Chain Monte-Carlo methods.

#### Visiting researcher stays

- **August 2010** **University of New South Wales**, School of Mathematics and Statistics (**Australia**)  
Visiting Dr. Gareth Peters, 1 month
- **July 2010** **Statistical and Applied Mathematical Sciences Institute (SAMSI) (NC, USA)**  
Programme Bayesian Non-Parametrics in Pharmacokinetic, 2 weeks
- **July 2009** **Cornell University**, Department of Statistical Sciences (**NY, USA**)  
Visite au Pr. Anand Vidyashankar, 2 days
- **July 2009** **University of Cambridge**, Signal Processing and Communications Laboratory (**UK**)  
Visite au Pr. Simon Godsill and Dr. Francois Septier, 1 week
- **Sep–Nov 2008** **Statistical and Applied Mathematical Sciences Institute (SAMSI) (NC, USA)**  
Visiting graduate with postdoctoral duties in the SMC program, 3 months
- **February 2008** **LTH/Lund University**, Centre for Mathematical Sciences (**Sweden**)  
Visiting Dr. Jimmy Olsson, 1 month

#### Administrative duties and services to the community

**Reviewer for journals:** *Bayesian Analysis, Bernoulli, Statistics and Computing, Technometrics, Computational Statistics and Data Analysis, Journal of Statistical Computation and Simulation, ACM Transactions on Modeling and Computer Simulation, IEEE Transactions in Signal Processing,, Pattern Recognition Letters, Autonomous Robots Communications in Nonlinear Science and Numerical Simulations, Inference and Learning in Dynamic Models*

**Reviewer for conferences:** *EGC 2012, AISTATS 2011, EGC 2010, COMPSTAT 2010.*

#### Organizer of reading and working groups:

- **2011-2012 Weekly reading group** CSML/Gatsby/Department of Statistics, **UCL**
- **2011-2012 Weekly working group on Computational Statistics, UCL**
- **2010 Weekly reading group on Monte-Carlo**, Dept of Statistics et Dept of Computer Science, **UBC**.  
Joint with Pr. Arnaud Doucet.
- **2009 Population Monte Carlo working group, SAMSI** SMC program, joint with Pr. Arnaud Doucet
- **2009 Tracking working group, SAMSI** SMC program, joint with Pr. Simon Godsill.
- **2005-2007 Founder and organizer of PhD candidates seminar, , LSTA, University Paris 6**

#### Co-organizer of workshops and conferences:

- **2012 Scientific committee Bayes-Pharma 2012**, Aachen, 9-10-11 Mai
- **2009 SAMSI SMC Transition Workshop**, 9-10 November, joint with Pr. Arnaud Doucet, Pr. Simon Godsill, Pr. Mike West
- **2009 Sessions PMC/SMC Samplers** and session **Bayesian Tracking** at JSM 2009, Washington D.C.

#### Elected responsibilities:

- **2005-2007 Board of the Faculty of Mathematics, University Paris 6**, representing graduate students
- **Since 2005 Grand électeur of ESIEA's class of 2005**, alumni representative
- **2004-2005 Students delegate of Master in Statistics, University Paris 6**
-

## Teaching

- 2007 - 2008      **Continued Education in Applied Mathematics at ENST Paris**  
Matlab sessions for continued education, « New methods of simulation and application to filtering ».
- 2005 - 2008      **Graduate Teaching Assistant at University Paris 7 – Denis Diderot**  
2007 – 2008, « Elementary Analysis and Algebra », 1<sup>st</sup> year computer science students.  
2005 – 2007, « Introduction to Mathematical Software: Mathematica », 1<sup>st</sup> year math students.
- 2006 - 2007      **Practical Sessions in Applied Mathematics at ENST Paris**  
Matlab sessions, « Monte-Carlo Methods applied to Finance » for engineering students.
- 2001 – 2004      **Undergraduate Teaching Assistant at ESIEA**  
Practical sessions in algorithmics, C, and Java programming for engineering students.
- 2002 – 2003      **Consultant: Instructor in industry for P.I.E.R.**  
Consultant-instructor, teaching Java programming to experimented industry employees.

## Professional experience outside research and teaching

- 2000 – 2004      **ACM International Collegial Programming Contest (ICPC)**  
Training and four (4) participations to ACM-ICPC, worldwide contest among universities and engineering schools. Ranked in the top third (<http://icpc.baylor.edu/icpc>).
- 2002 – 2003      **Consultant: Developer for P.I.E.R. and G.B.M. SA**  
Through the P.I.E.R., Junior-Entreprise of ESIEA, conceived and developed corporate applications and automatic selling terminal.
- 2001 – 2003      **System Administrator of Group ESIEA's Webservers**  
System administration and securing under Linux and FreeBSD: Apache, MySQLd, Netfilter.

## Languages

**English:** Fluent (TOEIC Score: 955/990).

**Spanish:** Intermediate level (6 year study).

**Italian:** Beginner's level.

**French:** Native language.

**Programming:** C/C++, Java, Matlab, Object Oriented design patterns, R, SAS, Mathematica, Bash, SQL, PHP, HTML

**System administration:** Linux, FreeBSD, Apache, SSHd, MySQL, FTPd

## References

References available upon request.

## Publications list as of March 7<sup>th</sup>, 2012

4 journal articles in preparation  
9 contributions to internal journals  
7 conferences with article-based reviewing process and proceedings  
17 conferences with abstract-based reviewing process  
17 seminars with invitation from the organizers  
Full-text available on <http://www.cornebise.com/julien/research.php>

### In preparation

1. **J. Cornebise, M. Girolami**, *Particle Manifold Metropolis Adjusted Langevin Algorithm*
2. **J. Cornebise, G. Peters, A. Doucet**, *Population Pharmacokinetic/Pharmacodynamic and Stochastic Differential Equations: Particle MCMC based Inference*
3. **J. Cornebise, E. Moulines, J. Olsson**, *On the use of the coefficient of variation criterion for sequential Monte Carlo adaptation: a statistical perspective*
4. **J. Cornebise, L. Burgette**, *Balanced Dirichlet Process*

### Journal contributions

1. **S. Filippi, C. Barnes, J. Cornebise, M.P.H. Stumpf** (2011), *On optimality of kernels for approximate Bayesian computation using sequential Monte Carlo*, ArXiv report <http://arxiv.org/abs/1106.6280> under revision for Statistical Applications in Genetics and Molecular Biology, 25p
2. **I. Korostil, G.W. Peters, J. Cornebise, D. Regan** (2011), *Adaptive Markov Chain Monte Carlo Forward Simulation for Statistical Analysis in Epidemic Modelling of Papillomavirus*. ArXiv report <http://arxiv.org/abs/1108.3137>, under revision for Statistics in Medicine, 38 p.
3. **J. Cornebise, E. Moulines, J. Olsson** (2011), *Adaptive Sequential Monte Carlo g by means of mixture of experts*. ArXiv report <http://arxiv.org/abs/1108.2836>, Submitted, 25 p.
4. **C. Andrieu, S. Barthelme, N. Chopin, J. Cornebise, A. Doucet, M. Girolami, I. Kosmidis, A. Jasra, A. Lee, J-M. Marin, P. Pudlo, C. P. Robert, M. Sedki, S. S. Singh** (2011), *Some discussions of D. Fearnhead and D. Prangle's Read Paper "Constructing summary statistics for approximate Bayesian computation: semi-automatic approximate Bayesian computation"*, ArXiv report <http://arxiv.org/abs/1201.1314>, to appear in Journal of the Royal Statistical Society, Series B
5. **J. Cornebise, G.W. Peters** (2011), *Discussion on "Riemann manifold Langevin and Hamiltonian Monte Carlo methods" by M. Girolami and B. Calderhead*, Journal of the Royal Statistical Society, Series B, **73**(2), 179
6. **L. Bornn, J. Cornebise** (2011), *Discussion on "Riemann manifold Langevin and Hamiltonian Monte Carlo methods" by M. Girolami and B. Calderhead*, Journal of the Royal Statistical Society, Series B, **73**(2), 174-177
7. **J. Cornebise, G.W. Peters** (2010), *Discussion on the paper by Andrieu, Doucet, and Holenstein*, Journal of the Royal Statistical Society series B, **72**(3), 317-319.
8. **G.W. Peters, J. Cornebise** (2010), *Discussion on the paper by Andrieu, Doucet, and Holenstein*, Journal of the Royal Statistical Society series B, **72**(3), 329-330.
9. **J. Cornebise, E. Moulines, J. Olsson**, (2008), *Adaptive methods for sequential importance sampling with application to state space models*. Statistics and Computing, **18**(4), 461-480.

### Ph.D. thesis

1. **J. Cornebise** (2009), *Adaptive Sequential Monte Carlo Methods*, Université Pierre et Marie Curie – Paris 6, deposited March 2009, defended June 25, 2009.  
Received the **2010 Savage Award of the International Society for Bayesian Analysis**, category **Theory and Methods**, "for a dissertation that makes important original contributions to the foundations, theoretical developments, and/or general methodology of Bayesian analysis."

### Conferences with full article reviewing

1. **F. Septier, J. Cornebise, S. Godsill, Y. Delignon** (2011) *A Comparative Study of Monte-Carlo Methods for Multitarget Tracking*", in IEEE International Workshop on Statistical Signal Processing (SSP), 28-30 June 2011, Nice (France),
2. **J. Cornebise, E. Moulines, J. Olsson** (2008), *Adaptive methods for sequential importance sampling with application to state space models*, in Proceedings of 16th European Signal Processing Conference ([EUSIPCO 2008](#)), August 25-29, 2008, Lausanne (Switzerland).  
**Finalist of the best student paper award** (8 finalists out of 300 articles)

3. **J. Cornebise, E. Moulines, J. Olsson** (2008), *Adaptive methods for sequential importance sampling with application to state space models*, in Proceedings of Fourth International Workshop on Applied Probability ([IWAP 2008](#)), July 7-10, 2008, Compiègne (France).
4. **J. Cornebise, B. Boulanger** (2006), *Planification d'expérience optimale et équations différentielles : révision des bases et méthodologie*, in Actes des 38èmes Journées de Statistique de la SFDS, May 29 - June 2, 2006, Clamart (France).
5. **J. Cornebise, M. Maumy, P. Girard** (2005), *A practical implementation of the Gibbs sampler for mixture of distributions: application to the determination of specifications in food industry*, in Proceedings of XIth International Symposium on Applied Stochastic Models and Data Analysis ([ASMDA 2005](#)), May 17-20, 2005, Brest (France), p. 828-837, ISBN 2-908849-15-1, Jacques Janssen and P. Lenca (eds), Groupe des écoles de télécommunications de France (publisher).
6. **J. Cornebise, M. Maumy, P. Girard** (2005), *An application of MCMC methods and of mixtures of laws for the determination of the purity of a product*, in Actes des 37èmes Journées de Statistique de la SFDS, June 2005, Pau (France).
7. **L. Beaudoin, L.-A. Chabardes, J. Cornebise, C. Dufour, K. Florczak, F. Gachot, P. Schott** (2005), *A Meteosat second generation receiving, processing and storing images system developed by engineer students*, in Proceedings of IEEE International Geoscience and Remote Sensing Symposium, July 25-29, 2005 (IGARSS'05), Seoul (Korea), Volume 5, p. 3159-3162.

### Workshops and conferences with abstracts reviewing

1. **J. Cornebise** (2012), *Practicalities in Implementing Adaptive Particle MCMC*, International Society for Bayesian Analysis (ISBA 2012), Invited session on Application of Particle Filtering and Sequential Update, June 25-29, 2012, Kyoto (**Japan**)
2. **J. Cornebise, E. Moulines, J. Olsson** (2011), *Adaptive Sequential Monte Carlo Methods*, Joint Statistical Meeting, August 1-4, 2011, Miami Beach (Florida, **USA**)
3. **J. Cornebise, M. Girolami** (2011), *Exploiting Geometry to Design MCMC Methods for Nonlinear Dynamic Systems*, Workshop on Geometric and Algebraic Statistics 3, April 5-7, 2011, Warwick (**UK**)
4. **J. Cornebise, G.W. Peters, A. Doucet** (2011), *Stochastic Mixed Effects via Particle MCMC*, 2nd International Symposium on Biopharmaceutical Statistics, March 1-5, 2011, Berlin (**Germany**)
5. **J. Cornebise, G.W. Peters, A. Doucet** (2010), *Field Report: Adaptive Particle MCMC for Mixed Effect Models and Stochastic Differential Equations*, NIPS 2010 Workshop Monte Carlo Methods, December 10-11, 2010, Whistler (BC, **Canada**)
6. **J. Cornebise, A. Doucet** (2010), *Stochastic Differential Equations for Population PK/PD: Why, and How To Infer with Particle MCMC*, Workshop on Bayesian Semiparametrics for PK/PD inference, SAMSI, July 12-24, 2010, Durham (North Carolina, **USA**).
7. **J. Cornebise, A. Doucet** (2010), *Inference for Mixed-Effects Stochastic Differential Equations with Particle MCMC*, ISBA-Valencia Meeting 2010, June 3-8, 2010, Benidorm (**Spain**)
8. **J. Cornebise, O. Ratmann** (2009), *Auxiliary SMC Samplers and Applications to ABC/PRC*, Transition Workshop of 2008-09 Program on Sequential Monte Carlo Methods at [SAMSI](#), November 9-10, 2009, Durham (North Carolina, **USA**).
9. **J. Cornebise, E. Moulines, J. Olsson** (2009), *Adaptation of the Proposal in SMC Methods: KLD-based Criteria and Adaptive Algorithms*, INFORMS Applied Probability Society conference, Cornell University, July 12-15, 2009, Ithaca (NY, **USA**)
10. **J. Cornebise, E. Moulines, J. Olsson** (2009), *Adaptive Design of Transition Kernels in Sequential Monte Carlo Methods*, Joint Statistical Meeting, August 1-6, 2009, Washington (DC, **USA**)
11. **J. Cornebise, E. Moulines, J. Olsson** (2008), *Adaptive methods for sequential importance sampling*, Opening Workshop of 2008-09 Program on Sequential Monte Carlo Methods at [SAMSI](#), September 7-10, 2008, Durham (NC, **USA**).
12. **J. Cornebise, E. Moulines, J. Olsson** (2008), *Adaptive methods for sequential importance sampling with application to state space models*, Journées Modélisation Aléatoire et Statistique ([MAS](#)) de la SMAI, August 27-29, 2008, Rennes (**France**).
13. **J. Cornebise, E. Moulines, J. Olsson** (2007), *Adaptive refueling in particle filter algorithms*, Workshop [New directions in Monte Carlo Methods](#), Fleurance (**France**), June 25-29, 2007.
14. **J. Cornebise, R. Douc, E. Moulines** (2006), *Limit theorems for particle approximations with applications to branching*, Workshop on Sequential Monte Carlo Methods: filtering and other applications ([SMC 2006](#)), Oxford (**UK**), July 3-5, 2006.
15. **J. Cornebise, B. Boulanger** (2005), *Dynamic systems as intractable systems of differential equations: design of experiments*. Poster presented at the joint Pharmacokinetics UK and Rosenön Meeting ([PKUK 2005](#)), Brighton (**UK**), November 23-25, 2005.

16. **S. Glatt, J. Cornebise, B. Boulanger, I. Gueorguieva** (2005), *Optimal design for first in human studies to investigate the pharmacokinetic/pharmacodynamic behaviour of TGF-beta RI kinase inhibitor*, talk given at the joint Pharmacokinetics UK and Rosenön Meeting ([PKUK 2005](#)), Brighton (**UK**), November 23-25, 2005.
17. **J. Cornebise, M. Maumy, P. Girard** (2005), *Une implémentation pratique de l'échantillonneur de Gibbs : application à la détermination de spécifications dans l'industrie agro-alimentaire*, talk given at the Premières Rencontres de Jeunes Statisticiens, Aussois (**France**), August 29 - September 2, 2005.

## Seminars

1. J. Cornebise, **March 26, 2012**, *MCMC Particulière Adaptatif et Modèles à Effets Mixtes Stochastiques*, **UMR AgrosParisTech/INRA 518**, Department of Applied Mathematics and Computer Science, Paris (France)
2. J. Cornebise, **January 25, 2011**, *Adaptive Particle MCMC and Stochastic Mixed Effects Models*, **Department of Statistical Science, University College London**, London (**UK**)
3. J. Cornebise, **September 27, 2010**, *Monte-Carlo Inference for Population Pharmaco(kinetic)dynamics*, **Laboratory for Computational Intelligence Forum, University of British Columbia**, Vancouver (BC, Canada)
4. J. Cornebise, **August 23, 2010**, *Stochastic Mixed Effects Models with Particle Markov Chain Monte Carlo in Pharmacokinetics/Pharmacodynamics*, **CSIRO – CMIS**, Sydney (**Australia**)
5. J. Cornebise, **August 13, 2010**, *Stochastic Mixed Effects Models with Particle Markov Chain Monte Carlo in Pharmacokinetics/Pharmacodynamics*, **Statistics Seminar Series, University of New South Wales**, Sydney (**Australia**)
6. J. Cornebise, **February 1, 2010**, *Auxiliary SMC Samplers and Applications to Approximate Bayesian Computation*, **Department of Statistical Sciences, Duke University**, Durham (NC, **USA**)
7. J. Cornebise, **October 19, 2009**, *Adaptation and Sequential Monte Carlo algorithms: new theory and algorithms*, Probability and Random Systems Seminar, **Department of Mathematics, North Carolina State University**, Raleigh (NC, **USA**)
8. J. Cornebise, **September 4, 2009**, *Adaptation and Sequential Monte Carlo algorithms: from theory to practice*, **Department of Statistical Sciences, Duke University**, Durham (NC, **USA**)
9. J. Cornebise, **July 16, 2009**, *How to adapt Sequential Monte Carlo algorithms*, **Department of Statistics Seminar, Cornell University**, (NY, **USA**)
10. J. Cornebise, **May 18, 2009**, *Recent breakthrough in adaptive sequential Monte Carlo methods*, **Parisian seminar of Statistics**, Institut Henri Poincaré, Paris (**France**)
11. J. Cornebise, **January 29, 2009**, *Adaptive proposal kernels in sequential Monte Carlo*, Seminar of **BigMC ANR project**, Institut Henri Poincaré, Paris (**France**)
12. J. Cornebise, **October 31, 2008**, *How to catch a submarine and a plane with the same tool*, Undergraduate workshop, **SAMSI** (NC, **USA**)
13. J. Cornebise, **October 28, 2008**, *Challenges in the SMC Tracking workgroup*, Graduate and Postdoctoral seminar, **SAMSI**, North Carolina (**USA**)
14. J. Cornebise, **October 17, 2008**, *Analysis of quality criteria and adaptive methods in sequential importance sampling*, Population Monte-Carlo workgroup meeting, **SAMSI**, (NC, **USA**)
15. J. Cornebise, **March 14, 2008**, *Adaptive Methods for Sequential Importance Sampling with Application to State Space Models*, Seminar of **Mathematical Statistics Department** from Center for Mathematical Sciences, **Lund University** (LU)/**Lund Technical Institute** (LTH) (**Sweden**).
16. J. Cornebise, **December 19, 2007**, *Comment Attraper un Sous-Marin ou une Introduction Élémentaire aux Méthodes de Monte-Carlo Séquentiel*, Groupe de Travail des Thésards du **LSTA** ([GTT LSTA](#)), Chevaleret, Paris (**France**).
17. J. Cornebise, **May 5, 2006**, *Planification Non-Linéaire Optimale d'Expériences: Introduction et Application en Pharmacologie*, Groupe de Travail des Thésards du **LSTA** ([GTT LSTA](#)), Chevaleret, Paris (**France**).