## Julien Cornebise, Ph.D.

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Born September 19, 1983 – Age 34
Citizenship: French

- One of the **earliest researchers at DeepMind** Technologies from 2012 to 2016, my work contributed to **raise significant early funding** which then lead to the acquisition of DeepMind by Google in 2014.
- A passionate fast-learner straddling **Machine Learning and Computational Statistics**, allying the mathematical expertise of a **Ph.D in Mathematical Statistics** with the **strong coding and computational skills** of a dual **M.Eng. in Computer Science** and **M.Sc. in Mathematical Statistics**.
- With a keen eye for mentoring and growing surrounding talent, I am looking **to build things that couldn't be built before**, while **piloting a team of brilliant minds.**
- I received the **Savage Award 2010 in Theory and Methods** from the **International Society for Bayesian Analysis** for my Ph.D.

## Research positions and projects

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| Since Oct 2016 | **Pro-bono volunteer for Amnesty International**<br>Leading an application of Machine Learning to conflict zones in Africa. |
| 2015-Oct 2016 | **Google DeepMind, Health Research Team**<br>**Tech Lead, Senior Research Scientist**<br>I co-founded the health research team, grew it from 1 to 10 researchers, designed its research direction and its technical backbone, matching DeepMind's capacities with practical needs from clinicians and hospitals, in a heavily constrained environment (privacy, security, perception). Our ongoing projects have received significant press coverage. |
| 2012-2015 | **DeepMind Technologies Ltd** then **Google DeepMind**<br>**Senior Research Scientist, Fundamental Research Group**<br>One of the 5 earliest researchers there. My work on Bayesian uncertainty in deep neural networks contributed to raise significant funding in the early days. |
| 2012 | **Independent Mathematical Consultant**<br>For worldwide pharmaceutical statistical and bio-statistical firms. Offering methodological and algorithmic expertise, data analysis, and software implementation, in Bayesian and more classical statistics. |
| 2011 - March 2012 | **Postdoctoral research associate, University College London, UK**<br>Department of Statistical Science. |
| 2010 | **Postdoctoral fellow, University of British Columbia, Vancouver, Canada**<br>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**<br>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**<br>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, Belgium**<br>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**<br>Collaboration with **University Strasbourg I** and **Nestlé Research Center.** |

## Education

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| 2005 - 2009 | **Ph.D. in Mathematical Sciences, Speciality Statistics and Applied Probability Highest Honors (Mention Très Honorable), University Paris 6 (**http://www.lsta.upmc.fr**)** Received **Savage Award 2010** from **International Society for Bayesian Analysis** Title**: Adaptive Sequential Monte Carlo Methods** Funded by **National Research Fellowship** from Ministry of Research and Higher Education |
| 2004 - 2005 | **M.Sc. in Mathematics and their Applications, Speciality Statistics, University Paris 6 Highest Honors (Mention Très Bien), Graduated 1st of a class of 80** |
| 2000 - 2005 | **M.Eng, Computer Science Major, from Ecole Supérieure d'Informatique Electronique Automatique (ESIEA) Highest Honors (Mention Très Bien), Graduated 1st 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) |

## Visiting researcher stays

- **September 2012 University of Bern,** Department of Mathematics and Statistics, **(Switzerland)**
  Visiting Pr. David Ginsbourger and Dr. Clément Chevalier, 1 week
- **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)**
  Program Bayesian Non-Parametrics in Pharmacokinetic, 2 weeks
- **July 2009 Cornell University**, Department of Statistical Sciences (**NY, USA**)
  Visiting 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

**Associate editor:** *Bayesian Analysis*

**Reviewer for journals:** *Annals of Applied Statistics, Bayesian Analysis***,** *Bernoulli, Statistics and Computing, Technometrics, Computational Statistics and Data Analysis, Journal of Statistical Software, 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:** *ICLR 2018, NIPS 2015, ICML 2014, Bayes Pharma 2013, EGC 2012, AISTATS 2011, EGC 2010, COMPSTAT 2010.*

**Co-organizer of workshops and conferences:**
- **2016 LABELS-MICCAI, Large-scale Annotation of Biomedical data and Expert Label Synthesis Workshop,** October 21
- **2012 Scientific committee Bayes-Pharma** 2012, Aachen, 9-10-11 May
- **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.

**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 and 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**

**Elected responsibilities:**
- **2005-2015 *Grand électeur* of ESIEA's class of 2005**, alumni representative
- **2005-2007 Board of the Faculty of Mathematics, University Paris 6,** representing graduate students
- **2004-2005 Students delegate of Master in Statistics, University Paris 6**

## Teaching

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

## Professional experience pre-graduate

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| 2000 – 2004 | **ACM International Collegial Programming Contest (ICPC)** <br> 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** <br> 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** <br> 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++, Python, R , Matlab, SAS, Mathematica, Java, Bash, SQL, PHP, HTML
**System administration:** Linux, FreeBSD, Apache, SSHd, MySQL, FTPd

## References

References available upon request.

**Julien Cornebise, Ph.D.**

# Publications list as of January 2018

3 patents
4 invited speaker
10 journal contributions
8 conferences with proceedings
17 conferences with abstract-based reviewing process
3 book chapters

## Patents
1. Submitted, Details still confidential, (2015)
2. C. Blundell, J. Cornebise, (2015) *Recommending Content using Neural Networks*, GP-21686-00-US
3. D. Jimenez-Rezende, J. Cornebise, D. Wierstra, (2014) *Signal Processing Systems*, United States WO 2014140541 A2, PCT/GB2014/050695

## Invited speaker
1. **Google StatFoo 2016** – Mountain View, CA*. Statistics to Machine Learning: Tales of Bridging A Minor Gap.*
2. **International Joint Conference on Artificial Intelligence 2015** (IJCAI) 2015 – Buenos Aires, Argentine. *Towards General Artificial Intelligence.*
3. **Bayesian Optimization in Academia and Industry, NIPS 2014 Workshop**, Montreal – Canada. *Gaussian Processes in Practice: Field Report from a Deep Learning (then) Start-up.*
4. **University of Oxford, Department of Computer Science, 2014.** *Towards General Artificial Intelligence.*

## Journal contributions
1. **J. Z. Leibo, J. Cornebise, S. Gómez, D. Hassabis** (2015), *Approximate Hubel-Wiesel Modules and the Data Structures of Neural Computation*, ArXiv report https://arxiv.org/abs/1512.08457
2. **S. Filippi, C. Barnes, J. Cornebise, M.P.H. Stumpf** (2011), *On optimality of kernels for approximate Bayesian computation using sequential Monte Carlo*, Statistical Applications in Genetics and Molecular Biology 12 (1) 87–107.
3. **I. Korostil, G.W. Peters, J. Cornebise, D. Regan** (2013), *Adaptive Markov Chain Monte Carlo Forward Simulation for Statistical Analysis in Epidemic Modelling of Papillomavirus.* ArXiv report http://arxiv.org/abs/1108.3137, Statistics in Medicine 32 (11) 1917-53
4. **J. Cornebise, E. Moulines, J. Olsson** (2011)**,** *Adaptive Sequential Monte Carlo by means of mixture of experts.* ArXiv report http://arxiv.org/abs/1108.2836, Statistics and Computing, 25p.
5. **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
6. **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
7. **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
8. **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.
9. **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.
10. **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.

## Conferences with proceedings
1. **C. Blundell, J. Cornebise, K. Kavukcuoglu, and D. Wierstra**. (2015). *Weight Uncertainty in Neural Networks.* https://arxiv.org/abs/1505.05424 Proceedings of the 32nd international conference on Machine Learning (ICML 2015)
2. **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)**,**

3. **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)
4. **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).
5. **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).
6. **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).
7. **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).
8. **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.

**Book chapters**
1. **E. Moulines and J. Cornebise** (2014) Chapter 10 Particle Filtering, in *Nonlinear time series: theory, methods and applications with R examples*, CRC Press
2. **E. Moulines and J. Cornebise** (2014) Chapter 11 Particle Smoothing, in *Nonlinear time series: theory, methods and applications with R examples*, CRC Press
3. **E. Moulines and J. Cornebise** (2014) Chapter 12 Inference for Nonlinear State Space Models Particle, in *Nonlinear time series: theory, methods and applications with R examples*, CRC Press

**Conferences and Workshops 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 Criterions 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.

**Ph.D. thesis**

**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."