

Mélanie PRAGUE

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CONTACT INFORMATION

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Nationality French
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KEY WORDS

Mathematics - Statistics and probability: Bayesian; Causality; Control theory; Dynamical model; GEE; Ordinary Differential Equation; Maximum Likelihood; Mediation analysis; Missing data; Network; Semi-parametric.

Public Health - Data and statistics: Biomarkers; Biostatistics; High-dimensional data; HIV; Immunology; Personalized medicine; Pharmacometrics; Randomization; Transcriptomic data; Trials design; Vaccine

ACADEMIC POSITIONS

2014 - current **Postdoctoral fellow Harvard school of Public Health Boston USA**
"Semi-parametric estimation of treatment effect in clustered randomized trials in presence of missing data: application to HIV prevention in South Africa"
Advisor : Victor de Gruttola

2013-2014
(jan)
(1 month) **Invited researcher University of Oslo, Norway**
"Comparison of propensity score based methods and dynamical methods for estimation of treatment effect in observational studies"
Advisor : Odd Aalen

2013 (oct-dec)
(3months) **Postdoctoral fellow, INSERM U897**
"Dynamical mechanistic modeling of HIV"
Advisor : Rodolphe Thiébaud

2010-2013 **"Allocataire-moniteur", Université de Bordeaux, FR**
PhD and teaching assistant position
Advisor : Daniel Commenges

EDUCATION

2014 **Qualification** for assistant professor CNU 26

2010-2013 **Ph.D. in Public Health and Biostatistics**
"Monitoring of HIV infected patients based on dynamic models"
Advisor : Daniel Commenges
Biostatistics, École Doctorale SP2 (Political science and public health) within the University of Bordeaux FR.

2009-2010 **Master of Science (M.Sc.) in Statistics and Econometrics** with high honors
(dual curriculum)
Department of Mathematics, University of Rennes 1, FR.

2007-2010 **Master's Degree in Engineering in Statistics (equivalent M.Sc)**
ENSAI, National School for Statistics and Information Analysis, Rennes FR.

2008-2009 **Bachelor of Science (B.Sc.) in Economics (dual curriculum)**
Department of Economics, University of Rennes 2, FR.

- 2005-2007 **Post-Secondary Preparatory Classes – Lycée Montaigne, Bordeaux, FR.**
University-level courses required in preparation for competitive exams into top universities, engineering, and graduate schools (France’s “Grandes Écoles”). Major : Mathematics and Physics
- 2005 **High school diploma with high honors – Lycée V. Louis, Talence, FR.**
Major: scientific, Specialization: Mathematics

PRIZES AND AWARDS

- G-2016-1 **Harvard Rose fellowship Award.** 4 prices a year to offer a cross-cultural experience of research in developing country. My project concerns: "Estimation of incidence and prevalence of HIV in Botswana: pooling data from different registers to evaluate the impact of personal characteristics such as citizenship".
- G-2015-2 **Statistical French Society Award - Marie-Jeanne et Laurent Duhamel price 2015.** Marie-Jeanne Laurent-Duhamel award. Price given once every other year and awarding scientific quality of PhD works in Applied Statistics.
- G-2015-1 **Philippe foundation (renewal)** (6000\$ personal grant for research travels) My project concerned: "Evaluating and targeting of HIV prevention strategies".
- G-2014-1 **Philippe foundation:** Non-profit organization for Franco-American exchanges (5000\$ personal grant). My project concerned: "Methods for analyzing HIV clustered randomized data and cohort data with informative missingness".
- G-2011-1 **Selected for summer school Sidaction Young researchers.** One week intensive class program to mix multidisciplinary early-stage researchers in order to promote collaborations in the field of HIV.

PEER-REVIEWED JOURNALS

- Accp-2016-1 **Published**
Prague M., Wang R., Stephens A., Tchetgen Tchetgen E, DeGruttola V. Accounting for interference variables using semi-parametric augmentation for improving efficiency in clustered randomized trials with missing at random outcomes. **Biometrics (IF=1.83), in press.** ([link](#))
- RI-2014-1 Thiébaud R., Drylewicz J., Prague M., Lacabaratz C., Beq S., Crough T., Sekaly R.P., Lederman M.M., Sereti I., Commenges D., Levy Y. Quantifying and Predicting the Effect of exogenous Interleukin-7 on CD4+T cells in HIV-1 Infection. **PLOS comp. Biol. (IF=4.87) online.** ([link](#))
- RN-2014-1 Thiébaud R., Prague M. and Commenges D. Modèles mathématiques dynamiques pour la médecine personnalisée. **Medecine/Science ITMO Sante publique** 30(2) 6-9. ([link](#))
- RI-2013-2 Prague M., Commenges D. and Thiébaud R. Dynamical models of biomarkers and clinical progression for personalized medicine: the HIV context. **Advanced Drug Delivery Review (IF=11.5)** 65(7) 954-965. ([link](#))
- RI-2013-1 Prague M., Commenges D., Guedj J., Drylewicz J., Thiébaud R. NIMROD: A Program for Inference via Normal Approximation of the Posterior in Models with Random effects based on Ordinary Differential Equations. **Computer methods and Programs in Biomedecine (IF=1.53)** 111(2) 447-458. ([link](#))

- RI-2012-2 Prague M., Commenges D., Drylewicz J., Thiébaud R. Treatment monitoring of HIV infected patients based on mechanistic models. **Biometrics (IF=1.83)**. 68(3) 902–911. ([link](#))
- RI-2012-1 Philip P, Sagaspe P, Prague M., Tassi P, Capelli A, Bioulac B, Commenges D, Taillard J. Acute versus chronic partial sleep deprivation in middle-aged people: differential effect on performance and sleepiness. **Sleep (IF=5.05)**. 35(7): 997-1002. ([link](#))
- In revision**
- Rev-2016-2 Prague M., Gran JM., Thiébaud R., Aalen A., Commenges D. Dynamic versus marginal structural models for estimating the effect of HAART on CD4 in observational studies : application to the Aquitaine Cohort study and the Swiss HIV Cohort Study. **Biometrics**. ([link](#))
- Rev-2016-1 Prague M. Dynamical modeling for Optimization of treatment in HIV infected patients. **Invited paper in Statistical French Society journal**.
- Submitted**
- Sub-2016-3 Le Grand R., Bosquet N., Dispinseri S., Hopewell N., Gosse L., Desjardins D., Shen X., Tomaras G., Saidi H., Prague M., Barnett S., Thiebaut R., Cope A., Scarlatti G., Shattock R.J. Superior efficacy of a microbicide and vaccine combination over single prevention approaches against vaginal SHIV challenge in cynomolgus monkeys. **Plos Pathogens**.
- Sub-2016-2 Jarne A., Prague M., D. Commenges Y. Levy and R. Thiébaud Modeling CD4+ dynamics in HIV-infected patients from INSPIRE 2&3 clinical trials receiving repeated cycles of exogenous interleukin 7. **Annals of applied statistics**. ([link](#))
- Sub-2016-1 Prague M., Wang R., and De Gruttola V. CRTgeeDR: An R package for generalized estimating equations with missing data in cluster randomized trials. **Journal of statistical softwares**.
- In preparation**
- W-2016-7 Staples P., Prague M., Onnela JP. and De Gruttola V. Leveraging classical analysis of cluster randomized trials with contact network information in infectious diseases.
- W-2016-6 Staples P., Prague M., Onnela JP. and De Gruttola V. Analytics of the Giant Component and SIR Infectious Sizes For Stochastic Blockmodel with degree correction networks.
- W-2016-5 Prague M. and Turner L. GEE Analysis of Cluster Randomized Controlled Trials with Missing Data: An orientation
- W-2016-4 De gruttola V., Prague M. and Smith D. Opinion Paper: Why quantitative approaches should be seen as central in HIV cure?
- W-2016-3 Prague M., Wang R. and De Guttola V. Estimation of intervention effect when treatment attribution is informative in cluster randomized trials.
- W-2016-2 Prague M., Rosenblum D., Hill A., Commenges D. and Thiébaud R. From in vitro to in vivo quantification of antiretroviral drugs effects based on dynamical models of HIV
- W-2016-1 Prague M. and Balzer L. and De Gruttola V. Comparison of tMLE and doubly-robust GEE for estimating treatment effect in cluster randomized trials

PEER-REVIEWED CONFERENCES

International events:

- 24-27 July 2016
CI(I)-2016-3 **Invited panelist and speaker, Summer Sim, Montreal, Canada.**
M. Prague Estimation and validation in population modeling: comparison of simulations and model-based approaches for predictions.
- 15-18 May 2016
CI(I)-2016-2 **Invited speaker, Society for clinical trials, Montreal, Canada.**
M. Prague Inverse-probability-weighted semi-parametric estimation of treatment effect in cluster randomized trials with missing data
- 6-9 March 2016
CI-2016-1 **ENAR, Austin, USA.**
M. Prague, P. Staples, E. Tchetgen Tchetgen, V. De Gruttola and JP. Onnela. Estimating the Marginal Effect of Interventions to Reduce Spread of Communicable Diseases: What can be gained from Contact Network Information?
- 17-20 March. 2015
CI-2015-1 **Society for clinical trials, Washington DC, USA.**
M. Prague, R. Wang, E. Tchetgen Tchetgen, A. Stephens, V. De Gruttola Accounting for Informative Missingness, Interaction and Interference in Cluster Randomized Trials.
- 2-7 Aug. 2014
CI(I)-2014-4 **Invited speaker, Joint Statistical Meeting, Boston, USA.**
M. Prague, R. Wang, E. Tchetgen Tchetgen, V. De Gruttola Comparison of GEE-based methods in cluster-randomized trial with missing data when outcome depend on other patients covariates.
- 2-7 Aug. 2014
CI-2014-3 **Joint Statistical meeting, Boston, USA.**
M. Prague, D. Commenges, J.M. Gran, O. Aalen and R. Thiébaud From descriptive to mechanistic models to study causal effects : application to the effect of HAART on CD4 count.
- 6-11 July 2014
CI-2014-2 **International Biometric Society, Florence, Italy.**
A.Jarne, R. Thiébaud, M. Prague and D.Commenges Using mechanistic models to analyze the effect of interleukins 7 treatment in HIV infected patients
- 24-26 April 2014
CI-2014-1 **Medical Research Council Conference on Biostatistics, Cambridge, UK**
D. Commenges, M. Prague, R. Thiébaud Mechanistic versus marginal structural models for estimating the effect of HAART on CD4 counts
- 8-11 May 2013
CI-2013-1 **HIV Dynamics, Utrecht, Netherlands.**
M. Prague, D. Commenges and R. Thiébaud From in vivo to in vitro quantification of antiretroviral drugs effects based on dynamical models of HIV.
- 21-25 Aug. 2012
CI-2012-2 **33st Annual conference of the International society for Clinical Biostatistics, Bergen, Norway**
M. Prague, D. Commenges, R. Thiébaud Toward information synthesis with mechanistic models of HIV dynamics.
- 4-6 June 2012
CI-2012-1 **Eurandom Workshop on Parameter Estimation for Dynamical Systems (PEDS II), Eindhoven, Neetherland**
M. Prague, D. Commenges Bayesian MAP Estimation in Models with Random effects based on Ordinary Differential Equations applied to Treatment Monitoring in HIV.
- 11-13 April 2011
CI-2011-1 **3rd Conference of the International Biometric Society Channel Network, Bordeaux, France**
M. Prague, D. Commenges, J. Drylewicz, R. Thiébaud, Treatment monitoring of HIV infected patients : optimal drug dose control.

French events:

- 1-5 June 2015
CN(I)-2015-1 **Invited award speaker, French Statistics Society conference, Lille, France.**
M. Prague Use of dynamical models for treatment optimization in HIV infected patients.

- 10-11 Oct. 2013
CN(I)-2013-3 **Invited Dynamic Predictions in Cancer workshop**
M. Prague, D. Commenges and R. Thiébaud Individual predictions using mechanistic models.
- 17-18 June 2013
CN(I)-2013-2 **Invited Workshop on Modelling in immunology, Bordeaux, France**
M. Prague, D. Commenges and R. Thiébaud Dynamic modelling of the response to antiretroviral therapy in HIV infected patients
- 21-31 May 2013
CN-2013-1 **French Statistics Society conference, Toulouse, France.**
M. Prague, D. Commenges, J. Guedj, J. drylewicz and R. Thiébaud Inférence par Approximation Normale de l'a posteriori dans les modèles dynamiques à Effets mixtes.
- 20 Sept. 2012
CN-2012-2 **Statistics in Health French research group days, Rennes, France.**
M. Prague, D. Commenges, R. Thiébaud Illustration of information synthesis of clinical trials with mechanistic models of HIV dynamics.
- 2-3 July 2012
CN-2012-1 **R French users meeting, Lightning talks, Bordeaux, France.**
M. Prague, A. Diakité, D. Commenges R Package “marqLevAlg” : the Marcquardt-Levenberg algorithm an alternative to “optimx”.
- 30 May 2011
CN-2011-1 **Statistics in Health French research group days, Paris, France.**
M. Prague, D. Commenges Estimation in Differential Equations and prediction of treatment response in HIV infected patients.

INVITED SEMINARS

- 25 Feb. 2016
S-2016-1 **Inria Nancy, BIGS team, Nancy France.**
M. Prague Modèles mechanistes pour des applications en santé: théorie, estimation et application.
- 15 Dec. 2015
S-2015-2 **IRD, MERIT team, Paris, France.**
M. Prague and V. De gruttola
Estimating intervention effect in cluster randomized trials: handling missing data, interferences
- 12 March 2015
S-2015-1 **INSERM U897, ISPED, Bordeaux, France.**
M. Prague, R. Wang, E. Tchetgen tchetgen and V. De gruttola
Double robust estimation of causal effect of intervention in cluster randomized trial with missing data.
- 10 Dec. 2013
S-2013-3 **Department of statistics, University of Oslo, Norway.**
M. Prague, D. Commenges and R. Thiébaud Estimation of HAART treatment effect in observational studies.
- 27 Nov. 2013
S-2013-2 **INSERM U1137, University of Paris Diderot, France.**
M. Prague, R. Thiébaud and D. Commenges
Utilisation de modèles dynamiques pour l'optimisation des traitements des patients infectés par le VIH
- 26 Oct. 2013
S-2013-1 **John Hopkins hospital, Pharmacologie sciences Dept., Baltimore, USA**
M. Prague, R. Thiébaud and D. Commenges. Dynamical models in the HIV context: Prediction of treatment responses and optimization
- 11-13 Dec. 2012
S-2012-2 **Department of methodological statistics, University of Liège, Belgium.**
M. Prague, D. Commenges Estimation and treatment optimization in HIV infected patients.
- 6 March 2012
S-2012-1 **Inria Sud-Ouest, ALEA team, Bordeaux France.**
M. Prague and D. Commenges Estimation pour équations mécanistes.

POSTERS COMMUNICATIONS

International events:

- 9-10 Nov. 2015
P-2015-1 **NIH Workshop Quantitative Methods and Models in the Era of Big Data.**
M. Prague, P. Staples, JP Onnela, V. De Gruttola Leveraging classical analysis of cluster randomized trials with contact network information in infectious diseases

8-11 May 2013
P-2013-1 **HIV Dynamics and evolution, Utrecht, Netherlands**
A. Jarne, R. Thiébaud, M. Prague, D. Commenges Modeling the effect of Interleukine-7 on CD4+ T cell.

French events:

13 Feb. 2012
P-2012-1 **Inaugural Days of Bordeaux's high performance computing cluster, Bordeaux, France.**
M. Prague, P. Gay Parallel computing: Generality and application in biostatistics.

1-7 Sept. 2011
P-2011-1 **Early-stage researchers on HIV Summer School, Carry-en-rouet, France.**
M. Prague, D. Commenges HIV and immune system dynamics modeling and drug dose reduction.

TECHNOLOGY DEVELOPMENT (Software and other realization)

I try to pair the methods I develop with disseminated implementation.

Soft-2016-1 **R packages 'CRTgeeDR'**
<https://cran.r-project.org/web/packages/CRTgeeDR/index.html>

Soft-2013-1 **Fortran stand-alone 'NIMROD'**
<http://www.isped.u-bordeaux2.fr/NIMROD/documentation.aspx>

Soft-2012-1 **R packages 'marcqLevAlg'**
<https://cran.r-project.org/web/packages/marqLevAlg/index.html>

RESPONSABILITIES

Reviewer Main journals I am a reviewer for are: Biometrics (1 article a year since 2014), Statistics in medicine (3 article a year since 2013), Plos (1 article a year since 2014), Trials (1 article a year since 2016), IEEE/ ACM Computational biology and Bioinformatics (2 articles since 2010), Society of clinical trials (1 article since 2016).
Translator for Biometrics (5 abstracts a year 2011-2016)

Membership in scientific organizations I am a member of "Société de Statistiques Française", "Société de Biometrie Française", "Femmes et mathématiques", "Society for clinical trials" and "International Biometric Society" and "Statistics without border". In particular, for the latter, I volunteered in 2015 to be involved in statistical analysis for this non-profit organization.

Conference organization I helped in organizing the International Biometrics Society Channel Network (April 2011), Bordeaux, France and "Rencontre jeunes chercheurs conférenciers" at "Journée de la statistiques 2016, Montpellier" conference as a member of Young French statistician.

Working group I am the organizer of the weekly Working Group that we renamed "**Quantitative research group in infectious diseases**" (QGRID). The senior PI of this working group is Victor De Gruttola, Harvard school of Public health - Biostatistics department.

TEACHING

Teaching-assistant (i.e. Moniteur allocataire de recherche) 2010-2013 : 64 hours/year.
Descriptions and some teaching material are available on [my website](#).

Master in Biostatistics **(M2-level) Bayesian Statistics** (2011-2013 / Lectures and tutorials / 12h)
(M2-level) Inferential Statistics (2010-2013 / Tutorials / 16h)
(M1-level) Introduction to SAS (2010 / Integrated lectures in tutorials / 6h)

Bachelor Social Sci. **(L1-level) Basics in Statistics & probabilities** (2010-2011 / Tutorials / 16h)

Bachelor in Medicine	(L1-level) Basics in IT and office software (2010-2013 / Integrated lectures and tutorials / 20h)
Engineering degree	(M2-level) Introduction to research (2011-2013 / Lecture / 5h)
Technical Degree in Public health	(L1-level) Linear regression (2010-2013 / Lectures and tutorials / Correspondence course / Internet forum management) (L1-level) Analyze of variance (2010-2013 / Lectures and tutorials / Correspondence course / Internet forum management)

STUDENT SUPERVIZING

	PhD students:
2015-2016	During my postdoctoral fellowship, I have the opportunity to supervise a PhD student from Harvard T.H. Chan School of public health for his second paper of his dissertation. This consists in meeting twice a week (a one-to-one meeting and a meeting with the student's mentor). For this project (W-2016-7), I provided most of the general directions both technically and research-wise. Because this first mentoring experience has been successful, we also continue to work together on his third paper of his PhD (W-2016-6). Patrick Staples should graduate in 2016.
	Master Internships:
Apr. – Sept. 2013 (6 months)	Master 2 in statistics and ENSAI 3rd year: Damien Fossat-Cercler “Dynamical modeling of pharmacoepidemiology in observational studies: optimization of methods for numerical integration.”
Apr. – Sept. 2012 (6 months)	Master 2 in Biostatistics, Pau University: Ana Jarne “Modeling of T-lymphocytes dynamics after InterLeukine-7 injections in HIV infected patients: introduction of a feedback loop”
Jun. – Sept. 2011 (3 months)	ENSAI 2nd year: Sybille Masse “Understanding the Effect of Interleukin-7 with mathematical models”

PROFESSIONAL HISTORY

Apr.-Sept. 2009	INSERM, National Institute of Health and Medical Research, Unit 897, Biostatistics team, Master 2 thesis, Bordeaux, France. Six months internship – Analysis of Phase II/III HIV Clinical trials.
May – Aug. 2008	Averion International - SAS programmer, Basel Switzerland. Analysis of a Phase III Clinical Trial in oncology.
June-Aug. 2007	INSERM, Unit 897, Bordeaux France. Data entry in nutrition studies.

SOCIAL INVOLVEMENT

2010 – current	French National Figure skating judge and referee
2007 – 2010	French Sectional Figure skating judge
2004 – 2007	French Regional Figure skating judge
2013 – current	American Sectional Figure skating judge and gold test and MIF judge.
2003	First level coaching certificate.

LANGUAGES

French	Mother tongue
English	Lived 2 years in Boston, USA. I interact fluently (Level C2 CEFR; TOEIC 897/990), good writing.
Spanish; Chinese	Beginner school level

IT SKILLS

Environment	Unix, Windows, Mac OS
Statistical Software	R, SAS, SPSS, SPAD, XLSTAT
Programming language	Fortran, Maple, Java, Python, SQL, HTML, Latex

TRAINING SCHOOL

Conference workshops	Sidaction summer school (Carry-en-rouet, France, Sept 2010) International Workshop on Statistical modeling (Valencia, Spain, July 2011) MCIA parallel computing days (Bordeaux, France, May 2012; 2013).
Humanities classes (Harvard)	English pronunciation classes (48h) Scientific Writing classes (24h) NIH grant writing (8h) How to fund research (4h)
Statistics classes (Harvard)	Statistical Inference (30h) Semi-parametric theory (30h) Missing data (20h) Mediation analysis (30h).

OTHERS

I really enjoy **travelling** (USA, Australia, Vietnam, Sweden, Canada, ..., and to be continued). I am a **creative** person and use to play the **piano** and **painting** all my childhood. **Sport** is my favorite hobby, in particular **figure skating**. Because I have been a figure skating **judge** for over 10 years, I have an important **community life**. Thus, about 12 weekends a year, I **volunteer** and **dedicate myself** to this activity to help skaters to achieve their goals.

REFERENCES

Postdoctoral Experiences:

Aalen Odd	University of Oslo	o.o.aalen@medisin.uio.no
De Grutolla Victor	Harvard School of Public Health	degrut@hsph.harvard.edu
Onnela Jukka-Pekka	Harvard School of Public Health	onnela@hsph.harvard.edu

PhD Experiences (Research and Teaching):

Commenges Daniel	INSERM U897, Univ. Bordeaux	daniel.commenges@isped.u-bordeaux2.fr
Robin Genuer	INSERM U897, Univ. Bordeaux	robin.genuer@isped.u-bordeaux2.fr
Fleur Mougin	INSERM U897, Univ. Bordeaux	fleur.mougin@isped.u-bordeaux2.fr
Pierre Joly	INSERM U897, Univ. Bordeaux	pierre.joly@isped.u-bordeaux2.fr

External opinion:

Gégout Anne	Inria Nancy, BIGS	anne.gegout-petit@univ-lorraine.fr
Mentré France	INSERM U738, Univ Paris Diderot	france.mentre@inserm.fr