CHLOÉ PASIN

Postdoctoral Researcher, quantitative immunology

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KEY WORDS

Mechanistic models | Biostatistics | Ordinary differential equations | Parameter estimation | Likelihood maximization | Infectious diseases | Immunology | Vaccine | Ebola | Optimal control | Piecewise deterministic Markov processes | Dynamic programming | HIV | Immunotherapy | Variable selection | Survival analysis | Random forests | Hematopoietic cell transplantation

EDUCATION AND EXPERIENCE

Postdoctoral Researcher

University of Zurich – Institute of Virology

2020 – present Zurich, CH

Trkola & Kouyos groups: determinants of the HIV-1 broadly neutralizing antibody induction.

Postdoctoral Research Scientist

Columbia University Medical Center – Department of Pathology and Cell Biology

2019 – 2020 New York, NY, USA

Yates lab: the research is focused on using theoretical and computational tools to study lymphocytes' maintenance and/or reconstitution. In particular, one of my projects aimed at using survival analysis and selection methods for identifying early cell subpopulations associated with the clinical state of patients (relapse, survival, graft-versus-host disease) following hematopoietic cell transplantation.

PhD in Public Health, biostatistics option

Université de Bordeaux
Bordeaux Population Health Research Center (INSERM U1219) / INRIA Bordeaux Sud Ouest – SISTM team

2015 – 2018 Bordeaux, FR

Modeling and optimizing the response to vaccine and immunotherapeutic interventions. Application to Ebola virus and HIV.
Supervisors : R. Thiébaut, F. Dufour.

- Main projects:
  - Modeling the humoral immune response to Ebola vaccine. European projects EBOVAC1/2, collaboration with Janssen (Johnson&Johnson group).
  - Optimizing IL-7 immune therapies in HIV-infected patients, collaboration with the Vaccine Research Institute.
- Other projects:
  - Developing in silico trials to evaluate and predict the response to short-cycle strategies for HIV antiretroviral therapies.
  - Modeling the viral rebound kinetics following therapeutic vaccination in SIV/SHIV monkeys. Collaboration with Harvard Program for Evolutionary Dynamics.
- Teaching activities (tutor) at ISPED 2016 - 2018, total of 2x64h. Linear mixed models (MSC: epidemiology), linear regression & statistical tests (Master: Public Health), statistical modeling (Public Health residents). Softwares R and SAS.

Predoctoral research year

Fred Hutchinson Cancer Research Center - Vaccine and Infectious Disease Division

2014-2015 Seattle, WA, USA

Effect of rainfall season on the efficacy of a dengue vaccine in Asia and Latin America. Under the supervision of Z. Moodie, in collaboration with Sanofi Pasteur.

Master of Science

Université Paris Descartes

2013 – 2014 Paris, FR - Bordeaux, FR

Applied Mathematics - Statistic modeling in Biology. Internship at INSERM U897, Bordeaux, under the supervision of R. Thiébaut and D. Commenges. Modeling the dynamics of CD4 T lymphocytes after HIV vaccine injection. Application to HVTN 068 clinical trial.

Master's degree

ENS Cachan / Université Paris Diderot

2012 – 2013 Paris, FR - Canberra, AUS

Applied mathematics. Internship at NICTA - now CSIRO, Canberra, Australia, under the supervision of B. Williamson.

Bachelor's degree

ENS Cachan / Université Paris Diderot

2011 – 2012 Cachan, FR

Mathematics Internship at CMLA, Cachan, under the supervision of N. Vayatis. Active Experimental Design for Tsunami Modeling.

Entry at Ecole Normale Supérieure de Cachan - now Ecole Normale Supérieure Paris Saclay (2011)

PUBLICATIONS

- Pasin C, Moy RH, Reshef R, Yates AJ. **Variable selection methods for predicting clinical outcomes following allogeneic hematopoietic cell transplantation.** Scientific Reports 11, 3230, 2021.
- Pasin C, Balelli I, Van Effelterre T, Bockstal V, Solforosi L, Prague M, Douoguih M, Thiébaut R, for the EBOVAC1 consortium. **Dynamics of the humoral immune response to a prime-boost Ebola vaccine: quantification and sources of variation.** Journal of Virology, 2019 : JVI-00579.
- Pasin C, Dufour F, Villain L, Zhang H, Thiébaut R. **Controlling IL-7 injections in HIV-infected patients.** Bulletin of Mathematical Biology, 80(9): 23449-2377, 2018.
- Pasin C, Halloran ME, Gilbert PB, Langevin E, Ochiai RL, Pitisuttithum P, Capeding MR, Carrasquilla G, Frago C, Cortés M, Chambonneau L, Moodie Z. **Periods of high dengue transmission defined by rainfall do not impact efficacy of dengue vaccine in regions of endemic disease.** PLOS ONE 13(12): e0207878, 2018.
- Szabo PA, Dogra P, Gray JI, Wells SB, Connors TJ, Weisberg SP, Krupska I, Matsumoto R, Maya Poon ML, Idzikowski E, Morris SE, Pasin C, Yates AJ, Ku A, Chait M, Davis-Porada J, Zhou J, Steinle M, Mackay S, Saqi A, Baldwin M, Sims PA, Farber DL. **Analysis of respiratory and systemic immune responses in COVID-19 reveals mechanisms of disease pathogenesis.**, meRxiv (2020).
- Balelli I, Pasin C, Prague M, Crauste F, Van Effelterre T, Bockstal V, Solforosi L, Thiébaut R. **A model for establishment, maintenance and reactivation of the immune response after vaccination against Ebola virus**, Journal of Theoretical Biology. 2020 Mar 21:110254.
- Thiébaut R, Villain L, Pasin C, Commenges D. **Modelling the response to Interleukin-7 Therapy in HIV-infected patients.**, chapter in Molina-Paris C & Lythe G. **Mathematical, Computational and Experimental T Cell Immunology**, Springer, 2020.
- Prague M, Jeffrey MG, Balelli I, Pasin C, Li JZ, Barouch DH, Whitney JB, Hill AL. **Viral rebound kinetics following single and combination immunotherapy for HIV/SIV.** BioRxiv (2019): 700401.
- Villain L, Commenges D, Pasin C, Prague M, Thiébaut R. **Adaptive protocols based on predictions from a mechanistic model of the effect of IL7 on CD4 counts.** Statistics in medicine. 2019 Jan 30;38(2):221-35.
- Gross L, Lhomme E, Pasin C, Richert L, Thiébaut R. **Ebola vaccine development: Systematic review of pre-clinical and clinical studies, and meta-analysis of determinants of antibody response variability after vaccination.** International Journal of Infectious Diseases, 74: 83-96, 2018
- Lhomme E, Richert L, Moodie Z, Pasin C, Kalams SA, Morgan C, Self S, De Rosa SC, Thiébaut R. **Early CD4+ T cell responses are associated with subsequent CD8+ T cell responses to an rAd5-based prophylactic prime-boost HIV vaccine strategy.** PLOS ONE. 2016 Apr 28;11(4):e0152952.
- Steinwart I, Pasin C, Williamson R, Zhang S. **Elicitation and identification of properties.** In Conference on Learning Theory 2014 May 29 (pp. 482-526).

ORAL COMMUNICATIONS

- Peer-reviewed international conferences:
  - Pasin C, Villain L, Dufour F, Commenges D, Prague M, Thiébaut R. **Use of mathematical modeling for optimizing and adapting immunotherapy protocols in HIV-infected patients**. PAGE (Population Approach Group Europe) meeting, Montreux, Switzerland, 2018.
  - Pasin C, Prague M, Eggo R, Van Effelterre T, Balelli I, Snape M, Anzala O, Praygod G, Anywaine Z, Solforosi L, Verbruggen N, Bockstal V, Watson-Jones D, Edmunds J, Douoguih M, Thiébaut R. **Modelling the humoral immune response to Ebola vaccine. Results from EBOVAC1 project**. Systems Immunology & Vaccine Design symposium, Heidelberg, Germany, 2017.
  - Pasin C, Richert L, Commenges D, Thiébaut R. **Modelling the immune response to HIV vaccine**. British Society for Immunology meeting, Cambridge, UK, 2015.
- Peer-reviewed french conferences:
  - Pasin C, Dufour F, Thiébaut R. **Optimisation des stratégies d'injection d'interleukine 7 pour des patients infectés par le VIH**. SMAI 2017, 8ème biennale des Mathématiques Appliquées et Industrielles, Ronce-les Bains, 2017.
  - Pasin C, Richert L, Commenges D, Thiébaut R. **Modélisation de la réponse à un vaccin VIH**. GDR Statistiques et Santé, Paris, 2015.

- Posters in peer-reviewed international conferences:
  - Pasin C, Reshef R, Yates AJ. **Use of variable selection methods to identify clinical and immunologic factors associated with the clinical outcome of patients following allogeneic hematopoietic stem cell transplantation**. 46th Annual Meeting of the European Society for Blood and Marrow Transplantation, online, 2020 and in Bone Marrow Transplantation 2020 Dec 1 (Vol 55, No suppl 1, pp. 793-794).
  - Pasin C, Villain L, Dufour F, Thiébaut R. **Optimal administration of IL-7 in HIV-infected patients**. Systems Approaches in Immunology and Infectious Diseases, Santa Fe, NM, USA. 2016.

- Invited conferences and seminars:
  - Pasin C, Dufour F, Thiébaut R. **Optimal administration of IL-7 in HIV-infected patients**. Séminaires de Probabilités et Statistiques, Montpellier, France, 2017.
  - Pasin C, Thiébaut R. **Modelling the humoral immune response to Ebola vaccine**. Bordeaux Modelling Workshop, Bordeaux, France, 2016.
  - Pasin C, Dufour F, Thiébaut R. **Optimal administration of IL-7 in HIV-infected patients**. Bordeaux Modelling Workshop, Bordeaux, France, 2016.
  - Pasin C, Commenges D, Jarne A, Richert L, Lhomme E, Thiébaut R. **Mechanistic modelling of CD4+ T cell response to rAd5/DNA HIV vaccine**. Bordeaux Modelling Workshop, Bordeaux, France, 2014.

OTHER ACTIVITIES

- **Scientific reviews**
  - Plos Computational Biology
  - Plos Pathogens

- **Administration**
  - Active member in the Columbia postdoctoral workers union (2019-2020).
  - Member (PhD students' representative) of the INSERM U1219 center committee (2018).
  - Member (PhD students' representative, health sector) of the doctoral college of the University of Bordeaux (2017-2018).
  - Member (PhD students' representative) of the doctoral school committee (2015-2016).
  - Treasurer of the PhD student's association of the doctoral school (2015-2016).

- **Outreach**
  - Member of the communication & outreach committee of CUPS - Columbia University Postdoctoral Society (2019 - 2020)
  - Participation in outreach events (2019) : Girls' Science Day (Columbia University), STEM expo (Harlem), Data for the People (D4P, RockEDU)
  - Association "Women and Science". Interventions in mid and high schools (Bordeaux, 2017).

FUNDINGS

- Philippe Foundation grant : $9000 for 2019-2020
- PhD funding from Ministry of Higher Education and Research (2015-2018).
- Travel fees for attending the conference Systems Approaches in Immunology and Infectious Diseases (Santa Fe, NM, 2016): $500.