

TITLE**Using STEPP analysis to represent and explore biomarkers signature in precision medicine****SUBJECT**

Within the Biostatistics & Programming department of Sanofi, in the Translational Medicine team, the internship will focus on understanding, implementing and using the Subpopulation Treatment Effect Pattern Plot (STEPP) analysis for visualizing predictions from a statistical model [Bonetti et al., 2004] [YIP et al., 2016].

Indeed, precision medicine *i.e. giving the right patient the right treatment*, is a burning topic. One goal is to identify subsets of patients that would be more likely to respond to a treatment based on certain biomarkers. Assuming that a biomarkers signature was highlighted and a score was derived from, the STEPP analysis could be an exploratory tool for assessing the treatment-by-biomarkers-signature heterogeneity and graphically exploring the patterns of treatment effect across overlapping intervals of the signature values. This could be very helpful in choosing a signature threshold to define subsets of responders.

The aim of this internship will be to propose recommendations about the STEPP use according to simulations results, R package investigation [Yip et al., 2018] and application on a clinical trial dataset. This could be extended to propose a methodology to refine the choice of the biomarkers signature threshold and/or to implement an R Shiny application for STEPP exploration.

PROFILE

- Bac + 5 (ENSAI, ISUP, ENSAE, Master 2 in Biostatistics, ...)
- Good knowledge of R
- Knowledge of R Shiny would benefit
- Abilities: autonomous, rigorous, team player

INFORMATION

Duration: 6 months

Start date: February-April 2019

Location: Chilly-Mazarin (91)

Attractive salary

TUTOR

- SANOFI :
 - Emilie Gérard, Biostatistician - Biostatistics & Programming Department – Translational Medicine Group - Chilly-Mazarin : Emilie.Gerard@sanofi.com

REFERENCES

- [1] M. Bonetti and R. D. Gelber, “A graphical method to assess treatment-covariate interactions using the Cox model on subsets of the data,” *Stat. Med.*, vol. 19, pp. 2595–2609, 2000.
- [2] M. Bonetti and R. D. Gelber, “Patterns of treatment effects in subsets of patients in clinical trials,” *Biostatistics*, vol. 5, no. 3, pp. 465–481, 2004.
- [3] W.-K. Yip *et al.*, “Subpopulation Treatment Effect Pattern Plot (STEPP) analysis for continuous, binary and count outcomes,” *Clin Trials*, vol. 13, no. 4, pp. 382–390, 2016.
- [4] W. Yip *et al.*, *Package ‘stepp.’* 2018.