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| ***School/Department:*** | **Department of Biostatistics, Erasmus MC** |
| ***Supervisor information:***  [World no 21 Public, Environmental & Occupational Health 2021](https://www.usnews.com/education/best-global-universities/erasmus-university-rotterdam-500349) | Prof. dr. Dimitris Rizopoulos, (promotor, [d.rizopoulos@erasmusmc.nl](mailto:d.rizopoulos@erasmusmc.nl))  Dr. Joost van Rosmalen (co-promotor, [j.vanrosmalen@erasmusmc.nl](mailto:j.vanrosmalen@erasmusmc.nl))  See [www.drizopoulos.com](http://www.drizopoulos.com) and  <https://www.scopus.com/authid/detail.uri?authorId=26041070200> for a personal website and an overview of publications. The most relevant publications on this topic are:  -J. van Rosmalen, D. Dejardin, Y. van Norden, B. Löwenberg, E. Lesaffre (2017). *Including historical data in the analysis of clinical trials: Is it worth the effort?* Statistical Methods in Medical Research.  -Hatswell A, Freemantle N, Baio G, Lesaffre E, van Rosmalen J (2020). *Summarising salient information on historical controls: A structured assessment of validity and comparability across studies*. Clin Trials.  -Banbeta A, van Rosmalen J, Dejardin D, Lesaffre E (2018). *Modified power prior with multiple historical trials for binary endpoints*. Stat Med |
| ***Project Title:*** | **How to assess the value of historical controls in Bayesian dynamic borrowing methods** |
| ***Abstract:*** | Consider the common situation where a clinical trial is planned, say on a new treatment for Alzheimer’s disease, and data from previous trials are available. The intervention treatment tends to differ across trials, but the control treatment often remains the same. We might then add the controls of the previous trials to the analysis of the current (newly planned) trial, to increase the statistical power and reduce the sample size. However, care must be taken to ensure that these historical data are sufficiently comparable to the current study, to avoid a bias in the estimates. Several Bayesian statistical methods have been developed that include the historical data when it is sufficiently similar to the current data, but downweight or even discard the historical data in case of substantial differences. The main methods are the power prior (Ibrahim & Chen, Statistical Science 2000), the meta-analytic predictive prior (Neuenschwander et al., Clin Trials 2010) and the commensurate prior (Hobbs et al., Bayesian Anal 2012). Despite the wide range of available methods, it’s not clear which method performs best.  In this project we will focus on determining which of the available methods is best suited for practical use, what settings should be used for that method and on developing a framework with appropriate metrics (e.g. power and type I error rate) to compare different methods. The meta-analytic predictive prior will be the starting point.  Research questions include:   * How should frequentist characteristics of borrowing methods be assessed? * What is the best way to make borrowing methods robust against prior-data conflict? * How should we choose the settings (e.g. the prior) of these dynamic borrowing methods to optimize the tradeoff between power and type I error rate? * How can we justify the choice for a borrowing method based on what we know about the similarity of the historical and the current data?   These borrowing methods will be applied to real-life case studies (e.g. we have a case study on a series of trials for Alzheimer’s disease) and simulated data.  Keywords: Bayesian statistics, biostatistics, historical data, power prior, meta-analytic predictive prior |
| ***Requirements of candi***  ***date:*** | We’re looking for an enthusiastic student with a background (master’s degree) in biostatistics or statistics who is interested in developing and applying new biostatistical methodology. Knowledge of Bayesian statistics is a prerequisite. A good command of the English language (especially writing) is also necessary.  We offer a good working environment with a friendly atmosphere and constructive scientific supervision in the Department of Biostatistics of Erasmus MC, Rotterdam, the Netherlands. The department is well known for its expertise on methods for analyzing longitudinal data (joint modeling and other methods), Bayesian statistics and the analysis of historical data. In addition to the project outlined above, we can also facilitate PhD projects on other topics.  The scholarship will, at least, cover subsistence allowance and an international airplane ticket. We’re able to provide help with the scientific part of your scholarship proposal.  English language requirement: IELTS 7.0 *(min 6.0 for all subs)*, TOEFL 100 *(min 20 for all subs)* |

**English requirements：**

**Please refer to Erasmus University China Center official website for your information** [www.eur.nl/eucc](http://www.eur.nl/eucc)

*Erasmus University China Center -> CSC Scholarship -> “I am a prospective CSC PhD Candidate” -> Table 1*

Please note:

Each institute requires difference level of English, make sure to find the right institute. 2022 CSC-PhD programme information will be shared and updated soon!