2014 YCCSA SUMMER SCHOLARSHIP PROJECT SUBMISSION

This form is for prospective project supervisors to submit their projects to be included in the YCCSA Summer Scholarships Programme for 2014.

It is the purpose of the Summer School that any projects submitted are interdisciplinary in nature.

Date	*06/02/2014*
Main Supervisor's Name	*Dr Jan R. Böhnke,* *Research Fellow, Hull York Medical School (HYMS) & Department of Health Sciences* *(Expertise in Statistical Computing and Applied Psychometrics)*
Main Supervisor's Department	*HYMS funded but "embedded" in the University Department of Health Sciences* *Mental Health and Addictions Research Group (Headed by Professor Simon Gilbody).*
Co-supervisors' name(s) and Departments	***Dr Paul Cairns**, Reader in Human Computer Interaction, Department of Computer Science* ***Professor Tim Croudace**, Chair in Psychometric Epidemiology, HYMS and Department of Health Sciences* ***Mark Wilson**, Research Centre for Social Science (ReCSS) IT Manager* *The successful applicant will also work closely with **Jan Štochl**, a psychometrician starting with Professor Kate Pickett & Professor Tim Croudace in March 2014.*
Project Title	***Shiny applications to make publications sparkle:*** ***Using simulation studies, grid-computing, and free web-applications to enhance the availability of e-psychometrics***
Project Description	*Often researchers in the social and related sciences face the problem how to reduce the dimensionality of a large variance-covariance matrix without losing too much information as well as not to achieve a parsimonious solution. These matrices usually stem from questionnaire data that generate information about underlying variables, also known as latent variables. These are for example attitudes, assessments of mental health, well-being, or cognitive abilities. These data are generated to get reliable estimates of prevalences of disorders, distributions of attitudes or abilities and therefore accuracy is important.* *Currently, factor and principle component analyses are used together with cut off values and rules of thumb to interpret statistics estimated from these matrices to arrive at parsimonious solutions that do not ignore important variation in the data. But recent research has shown that these are not universally applicable and that correct answers to this question very much depend on properties of the given data set, like the number of persons in the sample, the number of questions or the existing correlations in the sample. Therefore, simulation methods are used to derive the cut offs and their distributions for a given problem. Unfortunately, applied researchers often lack the ability or technical capability to implement this, and so in any research using questionnaire data the gap between methodological/statistical recommendation and practice has become very wide.*

	This project will develop an open and easily accessible web resource for researchers to produce accurate estimates of the dimensionality of their data set and their specific research question. The goals the successful applicant will work towards with the team are: *(1) Develop an RStudio/shiny (http://www.rstudio.com/shiny/) web interface that can remain active beyond the duration of the studentship. This interface will should be accessible and intuitive for a broad range of researchers that will use it to produce benchmarks to compare their actual data against when preparing publications.* *(2) Develop and co-produce the code needed for this application and implement a range of models and commonly encountered scenarios.* *(3) Run simulation studies to test whether the implemented models provide the solutions that are documented in the literature or to justify the use of methods where new approaches are developed/implemented. Especially for this bit the project will exploit massively parallel computing architecture of the ReCSS's ARRC Data Analysis Cluster to provide proof of principle work.* *We also aim to co-produce publications on each of the achievements across the range of the engaged disciplines in this studentship.*
Required skills	*Mathematics and computer skills for applied statistics plus an interest in measurement.*
Project dates	*Monday, 14 July 2014 and finishing on Friday, 12 September 2014.*
Other information	*This project has been conceptualised in conjunction with the ReCSS Data Analysis Cluster within the York Alcuin Research Resource Collaboration (ARRC, Mark Wilson), the Dept of Computer Science (Paul Cairns), the Centre for Complex Systems Analysis (YCCSA) and the ESRC funded White Rose Doctoral Training Centre Advanced Quantitative Methods pathway (Tim Croudace). Several bits of the collaboration have been tested in a previous studentship which resulted in a still on-going collaboration.* *The intern will have the opportunity to learn from a supervisory team that brings together staff from across science, social science computing and health sciences departments. The intern will have the opportunity to take part in social science and statistics training activities as offered by Böhnke/Croudace/Štochl.*
References	**Croudace, T. J., & Böhnke, J. R.** (2013). Item bank measurement of depression: will one dimension work?. *Journal of Clinical Epidemiology*, doi: 10.1016/j.jclinepi.2013.08.002 *Jennett,C., Cox,A.L.,* ***Cairns,P.****, Dhoparee,S., Epps,A., Tijs,T., & Walton,A. (2008). Measuring and Defining the Experience of Immersion in Games. International Journal of Human Computer Studies, 66(9), 641-661.* **Stochl, J., Croudace, T.,** Perez, J., Birchwood, M., Lester, H., Marshall, M., Amos, T., Sharma, V., Fowler, D., Jones, P. B., & The National Eden Study Team (2013). Usefulness of EQ-5D for evaluation of health-related quality of life in young adults with first-episode psychosis. *Quality of Life Research*, 22(5), 1055-1063. doi: 10.1007/s11136-012-0222-7 ***Stochl, J.,*** *Jones, P.B., &* ***Croudace T (2012).*** Mokken scale analysis of mental health and well-being questionnaire item responses: a non-parametric IRT method in empirical research for applied health researchers. *BMC Medical Research Methodology, 11,* 12:74. doi: 10.1186/1471-2288-12-74 Walter, S., Wendt, C., **Böhnke, J.R.,** Crawcour, S., Tan, J-W., Chan, A., Limbrecht, K., Gruss, S., & Traue, H. C. (2013). Similarities and differences of emotions in human-machine and human-human interactions: what kind of emotions are relevant for future companion systems?. *Ergonomics*, doi: 10.1080/00140139.2013.822566 Wetzel, E., **Boehnke, J.R.,** Carstensen, C. H., & Ziegler, M. (2013). Do individual response styles matter? Assessing differential item functioning for men and women in the NEO-PI-R. *Journal of Individual Differences*, 34(2), 69-81doi: 10.1027/1614-0001/a000102

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