2016 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 2016.

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

Date	*8th January 2016*
Supervisors' Names and Departments	*Jerry Swan, YCCSA, CS.* *Beth Jefferies, Psychology.* *Karla Evans, Psychology.*
Project Title	*A Generative Model for Gestalt Preferences in Proportional Analogy*
Project Description	*This project requires an enthusiastic researcher to work at the intersection of Computer and Cognitive Science.* *The application area is the easily-described domain of `Letter String Analogy" (LSA) problems:* *e.g. if the string "abc" changes to "abd", what does "ijk" change to?* *Applying pre-existing software , the researcher will create a model which exhibits human preferences to the underlying structural patterns (Gestalts) of LSA problems.* *Previous internship researchers who have worked with these supervisors have successfully published their results in peer-reviewed journals and conferences, so this is an opportunity to stand out from your peer group!* *In more detail:* *Despite recent advances in cognitive neuroscience, there is still a sizable `explanatory gap' in our ability to explain observed behavior even in such seemingly simple `microdomains' as LSA. In the absence of theories and models to fill that gap, it is possible to take a `big data' perspective and use techniques of symbolic nonlinear regression to fit high-level models to empirical distributions obtained from human responses.*  *The project will revisit the results of Hofstadter's famous `CopyCat' model [2],using the symbolic elements of Structural Information Theory [3] as a principled model of Gestalt perception. Using a software framework provided by Computer Science and the experimental methods of Psychology, the researcher will train (several variants of) a regression model against a corpus of human solutions to LSA problems. This model will then exhibit human bias in solving new problems. Unlike neural approaches, this model provides direct explanation of the solution in symbolic terms.*

Required Skills	*Good written and spoken English.* *Self-motivated.* *Attention to detail.* *Interest in both computer and cognitive science is desirable, as is interest in evolutionary computation.* *Knowledge of proramming is required (desirable: Java, preferred: Scala or other functional language) although training will be given.*
Project Dates	*Monday, 11 July 2016 to Friday, 9 September 2016.*
Other Information	
References	*[1] Dastani, Mehdi and Indurkhya, Bipin and Scha, Remko,* *Analogical projection in pattern perception,* *Journal of Experimental & Theoretical Artificial Intelligence,* *15(4), pp 489--511,2003, Taylor & Francis.* *[2] Douglas Hofstadter and Melanie Mitchell.* *The Copycat project: a model of mental fluidity and analogy-making.* *In Fluid concepts and creative analogies. Douglas Hofstadter, 1995. Basic Books, Inc., New York, NY, USA 205-267.* *[3] Leeuwenberg, E. L. J. & van der Helm, P. A. (2013).* *Structural information theory: The simplicity of visual form.* *Cambridge, UK: Cambridge University Press.*

When complete, please email the form to sarah.christmas@york.ac.uk