

Dear all

In this week's digest:

- CSIRO Land and Water in Canberra has a position available for an Integration modeller. Find out more at <https://jobs.csiro.au/job/Canberra%2C-ACT-Integration-Modeller-CSIRO-Land-&-Water/834088900/>
- Submissions are invited for a session on *Emerging methods, strategies and frameworks in climate/engineering system interaction studies to support climate change adaptation and mitigation* at the CMOS-CGU-ESC Joint Congress being held virtually June 1st-3rd & 6th-8th, 2022. The deadline for abstracts is 28 February. See https://cmos.ca/site/congress/scientific_sessions?nav=sidebar#_Toc94131941
- Macquarie University has a position available for a Senior Lecturer, Associate Professor or Professor level in Applied Mathematics with a closing date of 10 April 2022. Details at https://mq.wd3.myworkdayjobs.com/CareersatMQ/job/North-Ryde-Campus/Professor-in-Applied-Mathematics_R000004585
- Western Sydney University is looking for a scientific programmer to join their team developing a new model of Australian vegetation dynamics. More information here: <https://uws.nga.net.au/cp/index.cfm?event=jobs.jati&returnToEvent=jobs.home&jobID=D4679146-DBDD-C815-8861-C00071D532DB&audienceTypeCode=EXTiFRAME&UseAudienceTypeLanguage=1>
- Positions in mathematical optimization and natural language processing for an ARC Discovery Project, *An intelligent machine modelling assistant for combinatorial optimization problems*, commencing in 2022 are available at Deakin University, Macquarie University, and the University of Melbourne. See further details below. Contact Professor Vicky Mak-Hau, vicky.mak@deakin.edu.au for further information.

If you would like something included in this digest, please email it to office@mssanz.org.au

Kind regards, Karen

 Karen Mobbs
 MSSANZ Executive Officer

POSITIONS IN MATHEMATICAL OPTIMIZATION AND NATURAL LANGUAGE PROCESSING

Positions:

1 x Postdoctoral Research Fellow at Deakin University

3 x PhD positions, (one position each at Deakin University, Macquarie University, and the University of Melbourne)

Background:

These positions will service an ARC Discovery Project, "An intelligent machine modelling assistant for combinatorial optimization problems", commencing in 2022. Machine-assisted

optimization modelling is pioneering interdisciplinary research at the border of computing, Artificial Intelligence (AI), and mathematics. The academic research team comprises Professor John Yearwood, Associate Professor Vicky Mak-Hau and Dr Bahador Ofoghi at Deakin University, Dr Diego Molla-Oliod at Macquarie University and Professor Bill Moran at the University of Melbourne. The aim of the project is to address the research challenges in the development of a machine modelling assistant (MMA) to provide a non-mathematical domain expert end-user with assistance in formulating and solving mathematical models for business optimisation problems. The project will utilize advances in multiple current AI technologies, in particular natural language processing (NLP) and novel ideas in combinatorial optimization to develop a framework for automating mixed-integer linear programming model formulation. The ultimate focus will be on the development of an interactive, query-based tool for the business community. These four positions will contribute skills and effort to accomplish a range of tasks under the overall vision. For PhD students, tuition fees will be waived by the appropriate institution.

PhD Position in Natural Language Processing and Knowledge Engineering

Focus of research:

Based at Deakin University with primary supervisor Dr Bahadorrezza Ofoghi, the student will be discovering and testing new algorithms for synthesizing and extracting elements of a mathematical linear programming model from text with reference to the concepts and relations within an existing ontology using both natural language processing techniques and rule-based structures/grammars.

Required Skills:

Experience in natural language processing and machine/deep learning, a good understanding of knowledge engineering and representation techniques, such as ontology management tools and proficiency in current scripting and programming languages such as Python, Java, and C#.Net. Previous experience with natural language processing and deep learning APIs Huggingface, Tensorflow, Torch, NLTK, and spaCy is desirable.

PhD Position in Natural Language Processing – Question Generation

Focus of research:

Based at Macquarie University with primary supervisor Dr Diego Molla-Oliad, this PhD project will mainly focus on the step of question generation that will be used by the conversation agent for information elicitation.

Required Skills:

Experience in natural language processing and machine/deep learning, a good understanding of knowledge engineering and representation techniques, such as ontology management tools and proficiency in current scripting and programming languages such as Python, Java, and C#.Net. Previous experience with natural language processing and deep learning APIs Huggingface, Tensorflow, Torch, NLTK, and spaCy is desirable.

PhD Position in Mixed-Integer Linear Programming Model Analysis

Focus of research:

Based at the University of Melbourne with primary supervisor Professor Bill Moran, this student will focus on mixed-integer linear programming formulation analysis; with a view of utilizing a model ontology for combinatorial optimization problems in business applications.

Required Skills:

A background in a mathematically rich field and experience in mathematical optimization and specifically mixed-integer linear programming is required. Programming skills in Python and modelling language such as CPLEX, OPL, AMPL, or Minizinc are desirable.

Postdoctoral Research Fellow

Focus of research:

Based at Deakin University, this appointee will be a key person in the overall project, working with all members of the project team, and under the guidance of primary supervisor Professor Yearwood.

Required Skills:

Knowledge of Natural Language Processing and Machine Learning is required along with strong programming skills. Knowledge of ontology, structure grammar, and mathematical programming (e.g., Linear Programming), combinatorial optimization and its application is desirable.