

CTMTDS Newsletter 23, December 2023

This month's newsletter focuses on the activities in December

IN THE SPOTLIGHT

Congratulations to Research Fellow [Eden Li](#) on winning the Innovation and Excellence in Research award in the Australian Business Deans Council (abdc.edu.au) for her [Data Workflow Method](#). The panel was impressed with the strong engagement and collaboration with industry throughout the research process, including applying the method to enhance the data fitness of a mining operation.



NATIONAL COLLABORATIONS

[Hoa Bui](#) attended AustMS meeting at the University of Queensland. Her trip was funded by the GSOP 2023 Grant Development Funding.

She shared her exciting research on new fast and exact algorithms to solve a classical facility locations problem.



Hoa sharing her research at the University of Queensland

[Sandy Spiers](#) and [Ponpot Jartrillaphand](#) attended and presented their research at the [WOMBAT/WICO conference in Sydney 11-15 December 2023](#).

In 2023, the annual Workshop on Optimisation, Metric Bounds, Approximation and Transversality (WOMBAT 2023) was run in conjunction with the second biennial Workshop on the Intersections of Computation and Optimisation (WICO 2023). Together, these workshops brought together Australian and international researchers interested in all areas of optimisation and computational mathematics.



Ponpot presenting Parallel Machine Scheduling Problem with Flexible Resources and Shift Consideration the WOMBAT conference.

TEAM NEWS

CTMTDS wished three of our researchers farewell from Perth in December, knowing that it will not be the last we will hear from them.

- [Dr Eden Li](#) will start a position as a [Senior Lecturer in Project Management](#) at Edith Cowen University
- [Ziyu Zhao](#) submitted her PHD on 20 December returning to China to catch up with her family after four year not being able to see them.
- [Ryan Leadbetter](#) completed his final presentation ready to submit his PhD early in 2024. Ryan left Perth in December 2023 to move to Queensland.

We wish them every success and look forward to a continued involvement in their research.

Events

Researchers Catch-Up

Tyler Bikaun presented: MaintIE: A Fine-Grained Annotation Schema and Benchmark for Information Extraction from Maintenance Short Texts

Maintenance short texts (MST) are value resources for asset management as they offer insights into the condition and maintenance of machines and infrastructure. However, extracting and using this information efficiently on a large scale can be challenging.

Tyler introduced "MaintIE," a novel multi-level annotation scheme designed for entity recognition and relation extraction within MST, in this presentation. This scheme categorises information into five primary classes - Physical Object, State, Process, Activity, and Property - and further breaks them into 224 specific entities. Additionally, it includes six relations tailored to the context of MST.

Tyler outlined the creation of two corpora using MaintIE. The first is a meticulously annotated corpus of 1,076 texts characterised by its high quality and fine-grained detail. The second is a larger, coarse-grained corpus comprising 7,000 texts, which has been instrumental in enhancing the capabilities of fine-grained information extraction. Tyler explored the performance of various deep-learning models using these corpora, setting benchmarks for automated entity recognition and relation extraction in MST and demonstrated how the MaintIE scheme, corpus, and models can be adopted by industry through their public release made available under the MIT license to foster further research and innovation in this domain.

Hoa Bui presents - Maintenance scheduling optimisation in the resources and energy industry

In academic literature, maintenance scheduling optimisation is often seen as a resource-constrained project scheduling problem, a topic studied extensively since the late 1950s. However, existing mathematical models and solution methods, including exact, heuristic, and meta-heuristic approaches, are only partially suited for the unique challenges of real-world scheduling problems in the resources and energy industry, characterised by their large-scale and tight constraints.

In this presentation, Hoa gave a general picture of how researchers at the Optimisation Theme at ITTC are working to bridge these gaps and develop practical solutions for optimising maintenance schedules for our industry partners.

Publications

- Li, K., Griffin, M.A., Barker, T., Prickett, Z., Hodkiewicz, M.R., Kozman, J., and Chirgwin, P. (2023). Embedding data science innovations in organizations: a new workflow approach, *Cambridge Core*, <https://doi.org/10.1017/dce.2023.22>
- Zhao, Z., Liu, W., French, T., Stewart, M. (2024). CySpider: A Neural Semantic Parsing Corpus with Baseline Models for Property Graphs. In: Liu, T., Webb, G., Yue, L., Wang, D. (eds) AI 2023: Advances in Artificial Intelligence. AI 2023. Lecture Notes in Computer Science(), vol 14472. Springer, Singapore. https://doi.org/10.1007/978-981-99-8391-9_10

Stay tuned for our next issue where we will cover:

- Special events for 2024
- New publications for 2024

Do you have news to share?

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