

2024-25 HIVE Summer Internship Project

Visualising the Curtin co-authorship network

35HUM_COKI_CoAuthorshipViz

Primary Academic Supervisor

Dr Karl Huang

Project Background

Curtin University's Institutional Repository, espace (<https://espace.curtin.edu.au/>), is an open access repository with nearly 75,000 records of Curtin-authored research outputs, including journal articles, book chapters, research theses and more. With over 38% of espace items openly accessible by anyone in the world with an internet connection, it is a key piece of research infrastructure that enhance the discoverability and visibility of Curtin's research.

The Library and the HIVE have a long-standing collaboration on visualising the co-authorship network using metadata in espace. The visualisation is a network graph that showcases the research volume of and the connection between individual authors, as well as their faculty affiliation. The 3D network visualisation is programmed in Unity, and can be displayed on the cylinder screen in the HIVE. Users may customise views by faculty and open access status.

The project team would like to incorporate the data from the Curtin Open Knowledge Institute (COKI) to enhance the visualisation with other dimensions, such as subject and discipline information. This will be a proof of concept for a co-authorship network to extend beyond Curtin using the rich dataset of COKI.

Project Description, Expected Outputs, Possible Stretch Goals

The project would seek a fresh perspective on the data explained above and would explore narratives and patterns beyond the visualisation as it stands now. For example:

- Cross-disciplinary research network: What faculties collaborate with each other more often? Who are the key connectors between faculties?
- Collaborations over the last decade: How has our collaboration network changed over time? Who were the more prolific authors 10 years ago, and who are they now? Has the number open access items significantly increased over this time? Which faculty has the greatest number of open access items? Has the number of collaborators for each author increased or decreased over time?

Further development of the existing visualisation is encouraged, in particular, the inclusion of subject and discipline data to enrich the insights from the visualisation. Note that, subject headings are not currently captured in the metadata, but fields of interest, research topics, and semantics could potentially be derived from the abstracts using machine learning techniques. Alternatively, subject information, author and object identifiers could be brought in from the dataset of Curtin Open Knowledge Institute (COKI). This would allow us to explore:

- Which topics are cross-disciplinary collaborations exploring?
- Which topics are currently covered mostly from one area, but could potentially be explored in future research collaborations?

Other expected outcomes are:

- develop a workflow to regularly update the visualisation(s), and
- develop an output suitable for display on the large screen next to the revolving door on level 3 of the TL Robertson Library.

Links to background reading and any relevant recent work in the field

espace <https://espace.curtin.edu.au/>

Quigley, N., Chan, J., Clift, J. (2022). The role of Australian institutional repositories in sharing academic research: Research report. Curtin University Library. <https://doi.org/10.25917/S5A6-R623>

Fonseca, B.d., Sampaio, R.B., Fonseca, M.V.d. et al. Co-authorship network analysis in health research: method and potential use. Health Res Policy Sys 14, 34 (2016). <https://doi.org/10.1186/s12961-016-0104-5>

What type of visualisation will the student develop or produce?

Network analysis, 3D network graphs for the HIVE display, and network graphs outputs for general display in the TL Robertson library on the large screen adjacent to the level 3 entrance

How will the visualisation contribute to your research outcomes?

We will be able to surface additional narratives and perspectives of the co-authorship network, which in turn showcases the multifaceted ways the espace service and metadata could engage with stakeholders and users. The visualisation output for the Library screen will bring our digital collection and service into the building, connecting the invisible, online library services with the physical one.

If the project is successful, where would you consider publishing the results?

Espace, Curtin Library newsletter, and other relevant outlets.

Draft Project Timeline:

Week 1

Prior work review, project scoping, software scoping

Week 2

Introduction to data sources and tools. Refine and finalise project plans and expected outputs.

Week 3

Explore the data and start development work. Check in with relevant supervisors.

Week 4

Confirm project plan and scope with supervisors. Commence visualisation development. Check in with relevant supervisors.

Week 5

Visualisation development. Check in with relevant supervisors.

Week 6

Visualisation development. Review of prototype and feedback from supervisors. Check in with relevant supervisors.

Week 7

Visualisation development. Check in with relevant supervisors.

Week 8

Visualisation development. Check in with relevant supervisors. Plan for final report and prepare for showcase presentation.

Week 9

Finalise final report and showcase presentation.

Week 10

Plan for final report and showcase presentation.

Student Experience and Supervision:

How often will you meet with the student over the 10-week period?

One a week

Your work desk location and the location of student desk

B105 Library Level 4

Student Attributes:

Please indicate any preference for student's academic discipline or field of study

Maths, Computer Science or Engineering, Design and Built Environment

What competencies are required to start this project

Beginner - Unity 2D/3D Artistry (assets, lighting, cameras, materials implementation)

Beginner - Unity Programming (C# coding, animation syntax, debugging, problem-solving)

Beginner - Unity Virtual Reality Development (rendering pipelines, scene content design, interaction)

Beginner - Data structures, analytics, statistical modelling

Do you have any other student attributes you think are important to the project?

Any student with some Unity experience will be considered, no matter the background. Being willing to learn is a must.