UNSW Science External Engagement 2025; The Enchanted Garden

Dr. Karen Privat & Dr. Rhiannon Kuchel
Electron Microscope Unit
MWAC

We partnered with Community Gardens Australia (CGA) for our *Micro-World of Gardening* project, to create eye catching content in the form of scanning electron micrographs for the development of outreach materials and digital content. CGA is a networking organisation connecting community gardeners around Australia, representing both a significant domestic and national outreach opportunity. This project predominantly helped to build a collaboration with a broad and potentially previously uncaptured audience. Our research documents a new world of enchantment, from the macro world to the micro, beyond the surface of gardening and gardens, capturing electron micrographs of pollen, insects, soil and plant matter. Materials generated by this venture are being used by hundreds of community gardens for the purposes of education and enrichment of the society members and stakeholders.

To promote our research and network with representatives of the CGA we were invited to speak at an annual workshop, held at the Riverwood Community Gardens (RCG). There we provided an educational presentation, detailing the project scope, as well as an introduction to electron microscopy and how our outputs could be used to elevate their websites and social media, as well as being used for educational content (Fig. 1B). Whilst at the RCG, we also took the opportunity to collect our first set of samples (Fig. 1A &C).



Figure 1 A. Karen & Rhiannon at Riverwood CGA. **B**. Oral presentation to C/B Council. **C**. Riverwood CGA.

Over the course of our experiment, we visited four independent CGA's and collected, prepared and imaged over 70 samples (Fig 2 A & B). These samples predominantly included pollen, leaves and insects (Fig. 3).

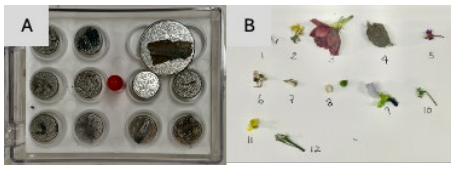


Figure 2 A. SEM sample box with CGA specimens. **B**. An example of some of the specimens collected.

The samples were mounted onto SEM pin stubs and coated with Platinum (Fig 2. A). Due to beam sensitivity, a majority of the samples were imaged at a low beam current and/or low vacuum (Fig 3). The resulting micrographs were then screened for quality, with the best being uploaded to a folder shared with CGA. This project has provided the opportunity to forge an ongoing relationship between CGA and UNSW FoS with the potential for future collaborative projects.

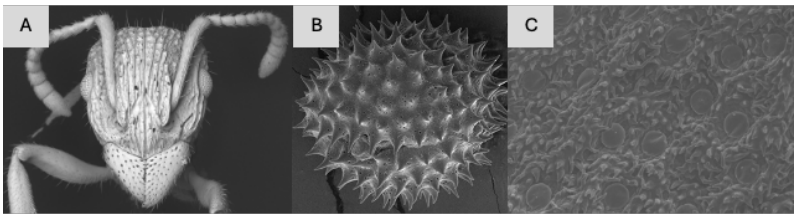
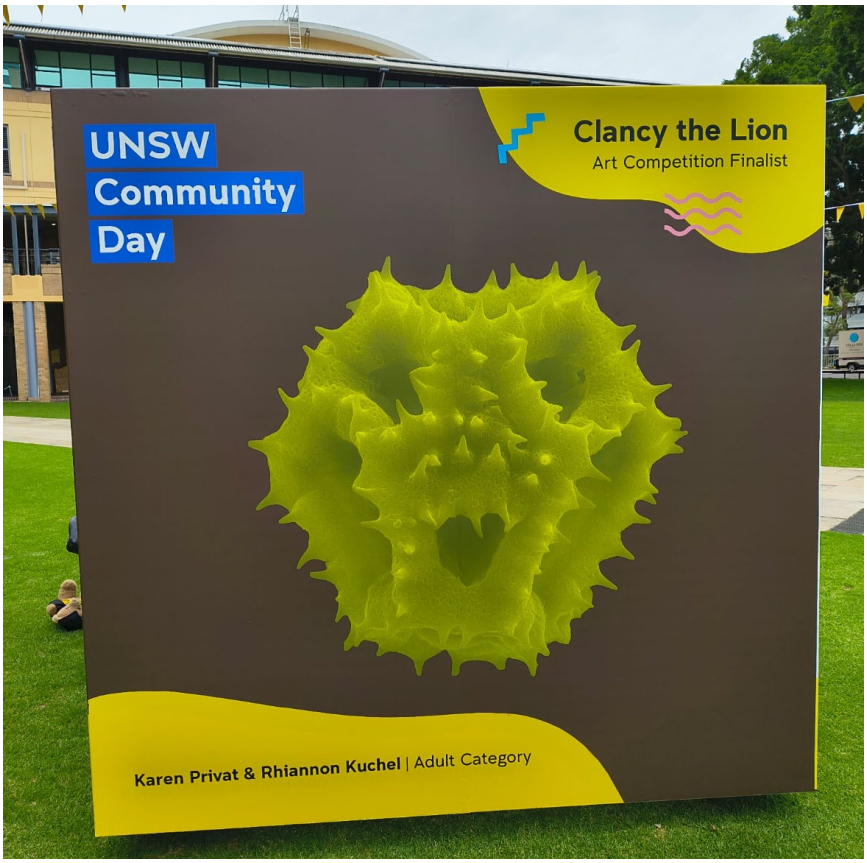


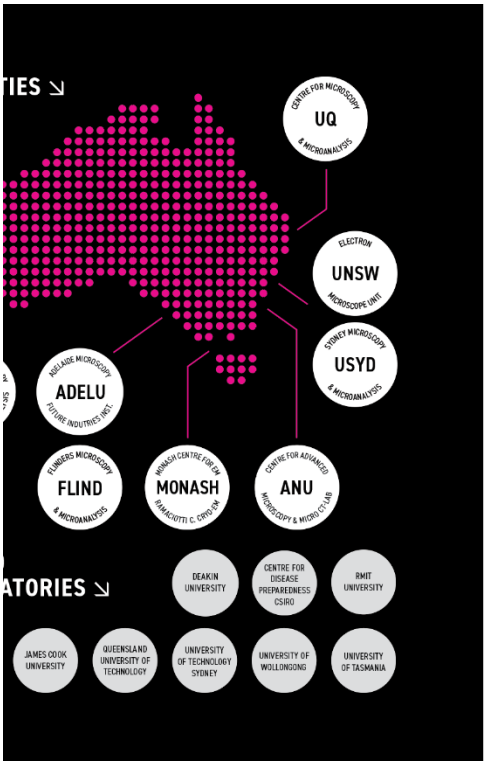
Figure 3 A. Ant head (unknown spp.). **B**. Marigold (*Tagetes erecta*) pollen. **C**. Thyme (*Thymus vulgaris*) leaf.

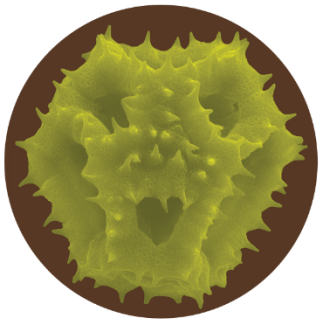
Supporting information:

We also submitted an entry into the Clancy Art Competition and were awarded a competition finalist in the adult art category. The micrograph shows a single Dandelion pollen grain (*Taraxacum officinale*).



This dandelion pollen image seems to have captured the public's imagination, and will also be used in the upcoming *Research Highlights* issue put out by Microscopy Australia (a NCRIS-funded national network of microscopy facilities of which the UNSW EMU is a member.





Dandelion pollen grain by Rhiannon Kuchel and Karen Privat with Community Gardens Australia, captured via SEM at the EMU, UNSW.

WHY IS MICROSCOPY SO IMPORTANT?

Microscopy is a core scientific technique. It reveals the fundamental building blocks of life and materials, right down to individual proteins and atoms.

It is an essential tool that underpins the creation of new knowledge across a huge range of disciplines. **Since 2014, more than 40% of the Nobel prizes for science were given for research that relied on microscopy**, of those, two prizes were awarded specifically for the development of microscopy techniques.

"Without microscopy, there is no modern science – end of story," – Dr Alan Finkel, former Chief Scientist of Australia.