

Final Laidlaw Report: ADAF in Aotearoa

The goals of my LiA project, supervised by Dr Zac McIvor of the University of Otago's Archaeology Department, were clear from the outset. My central aim as an application of my previous year's research, was to harness Artificial Intelligence, specifically Discover Ireland's open-source ADAF (Automatic Detection of Archaeological Features) model to record previously unrecorded sites in New Zealand's vast wilderness areas; areas largely inaccessible to, and far too vast for, traditional field-survey methods.

The real-world effects of this research were manifold, but particularly through updating the Archsite database, an initiative led by the University of Otago's archaeology department, and through engagement with local communities, my work might facilitate the preservation and conservation of sites significant to New Zealand's heritage.

The steps towards my main goal were as follows:

- Familiarisation with ADAF.
- Choosing an archaeological site type.
- Generating a 'cut-out' database of that archaeological site type.
- Inputting this data into the ADAF software.

Getting Settled In:

While my goals were well-defined, my project timeline was unclear and I was not well-defined on what I needed from the supervisor-supervisee relationship. My first issue was not going into those meeting with a clear vision of what I wanted to achieve in those 30mins.

Solution: ***What do I want from our next meeting?*** Come to the next meeting with a list of specific questions and queries. Over the course of the project I also found a comprehensive and maintainable solution to planning project timeline's in the future, the wonder of Google Calendar and Google Task, which I have now fully implemented.

It really did take me some time to settle into my research in Dunedin, in that way my six week timeline was rather unforgiving. Without a well-defined schedule in the early days it was too easy to work from home. Research can be isolating and when I did go in, meeting people in the office was a delight, especially Adelie, a PhD candidate whom I shared my office-space with. The Postgraduate Archaeology Symposium I attended on week 5 of my LIA was an especially wonderful opportunity to chat to and learn about the other postgraduate researchers and their current projects at the University of Otago.

A Steep Learning Curve

“To know anything well involves a profound sensation of ignorance.” John Ruskin, 1843.

With little prior experience, both learning about and using machine learning in a six-week period was highly ambitious, and a learning curve I certainly did not reach the apex of. Despite this, I got stuck into the work, and sought advice from experienced professionals in Otago and abroad.

Zac, of course, was my first point of contact. It was here I considered the ethical concerns of my research from a specifically New Zealand perspective, and not just an Irish one. Broadly speaking, there are two different archaeological philosophies towards data, described by the acronyms; FAIR and CARE. FAIR principles (Findable, Accessible, Interoperable, and Reusable), those used in Ireland, make research easy to share and reuse. CARE principles (Collective Benefit, Authority to Control, Responsibility, and Ethics), those used in New Zealand, hold the rights of historically marginalised groups at its heart, with an ethos of ethical data stewardship.

Representative of Ireland’s approach is the opensource programme ADAF which I was using. This was a real challenge in the process of my research and an opportunity for immense professional growth. Unlike my research the previous summer on early Medieval Ireland, my research in New Zealand necessarily interacts with a thriving indigenous culture which must be respected, and the field of archaeology which the world over is undergoing a process of decolonisation unique to each region.

As I came to understand in my first meeting with Zac, a publishable research output within my timeframe is highly unlikely due to New Zealand's data sovereignty concerns.

It was Zac who reached out to the *Iwi* (tribe) of the Waikato, specifically the *hapū* (subtribes) of Aotea Bay and its hinterland, prior to my use of their region's data in my research.

Engagement with the people who had direct ancestral links to these sites was naturally essential to ensure that the project respected the cultural nuances, sovereignty, and sensitivities around data pertaining to Māori heritage. Unfortunately, due to the demanding technological requirements, I did not have sufficient time to fully develop my model for community engagement.

Aside from Zac, who was extremely generous with his time, I had lengthy conversations with Phil Latham, the Archaeology Laboratory Manager, who provided invaluable insights on the current gaps in site recording. Phil's last job had him updating NZAA's site database, exactly my goal here. Phil walked me through his database and told me about a few areas that my machine learning model would likely turn up new sites. In some isolated areas, oral traditions of pā exist, but there are no known sites. Phil also highlighted the absolute necessity of this work showing me aerial photographs of the recent systematic destruction of an unrecorded Swamp Pā he had found in the Waikato region. Recording sites like these would give them legal protection. To determine the current state of AI research in New Zealand archaeology I contacted Simon H. Bickler and Benjamin Jones with the help of Zac, both experts in this field.¹

Secondary objectives:

I was comparatively far more successful in achieving my secondary objectives, though this progress was natural as a part of my work on my main project goal.

- To develop a knowledge base of what AI is capable of within historical research, and how best this technology can be utilised. For example, it is possible to increasing model accuracy without increasing sample size, by incorporating more variables and

¹ See Jones, B. and S. H. Bickler. (2017). High resolution LiDAR data for landscape archaeology in New Zealand. *Archaeology in New Zealand* 60 (3): 35-44.

using a random forest algorithm. AI can be used to rapidly guide post-disaster heritage triage, and as part of engagement and storytelling with local people.

- Immerse myself in knowledge of pre-colonial Māori culture and settlement during my brief stay, and transfer this knowledge, in the spirit of pioneering anthropologist Claude Lévi-Strauss' Structuralist approach, to deepening my own understanding of both pre-Christian settlement patterns in Ireland (territorial *oppida* and linear earthworks), alongside wider questions of human culture.

Although data sovereignty concerns restrict immediate research outputs, the longer-term effect envisages embedding such ethical considerations in all future archaeological projects while providing tools for heritage conservation that are both scientifically robust and community aligned.

Reflective Essay: Resilience in Scholarship

My dream, as I will tell anyone who'll listen, is to be a history professor. And, if from little acorns mighty oaks may grow, Laidlaw has provided this acorn a light and phototropic direction. This reflection really centres on self-belief, experience, and resilience, three equal, inseparable parts of a Trion-Re'.

Do not be surprised if you find my impression of the Laidlaw programme glowing, it is difficult to be critical of a programme which depends on, and rewards, your own capability for self-reflection and desire for personal growth. To have had a bad experience would be an unflattering form of self-confession.

I do not exaggerate when I say I had a dearth of self-belief when I began this programme. This experience was a common one. I hope my cohort won't mind me saying that we often spoke of a feeling of "imposter syndrome". Even after being awarded the scholarship and for once thinking myself worthy of the title of 'scholar', I found the 6-week research period of summer 2024 circuitous, isolating, and at times disillusioning, and those feelings of doubt

certainly reappeared in 2025 during my time in Dunedin. Both times I reflected on what I perceived as a lack of resilience.

"Graduate students are especially liable to self-doubt, for they are constantly being reminded of their lack of knowledge and of how little they have accomplished compared to the senior professors." Steven M. Cahn, *Student to Scholar*, 2008.

"Doubt is not a pleasant condition. But certainty is an absurd one." Voltaire, *Letter to Frederick the Great*, 28 November 1770. Voltaire, considered the father of modern historiography and historical philosophy.

How did Laidlaw change this? Resilience comes with life experience, and **Laidlaw gave me the opportunities to fail and learn and fail some more (but better this time, think falling up the stairs)**. The research project in Trinity's Centre for Environmental Humanities and my application of research in the University of Otago's Archaeology Department were practice to smooth the road of bigger, more consequential projects in my future.

Within these two projects I gained innumerable skills. Skills of prioritisation to focus my mind on what I want to get out of life, and organisational skills to help me achieve it. It has highlighted for me the ethical concerns of the historian and provided so much grounding information in the field of scholarly research. It has afforded me the opportunity to expand my professional network. When I was in New Zealand, outside of my research, I took the opportunity to meet two other scholars, both professors of Late Antiquity, an area of research I plan to specialise in myself. Not to mention the practical experience of QGIS and machine learning which I can return to again and again in my later career.

A Bright Future

Though long and arduous, though road ahead of me is well-trodden and I am well-prepared. Postgraduate study and a PhD will be a necessity. In the words again of Cahn, that "is one race you win simply by finishing." Resilience is key to academic success. When my work is criticised or even denigrated will I remain steadfast? To paraphrase Khadijah Ibrahiim, the keynote speaker of 2024's Laidlaw Conference, curiosity killed the cat, but in the end, it will

be satisfaction that brought him back! **I now hold my own light, like the fires at the centre of the Temple of Vesta or *Yazd Atash Behram*, Laidlaw has given me gifted me the inextinguishable spark of self-worth that will guide me through the tribulations of my academic career.**

After reflection on leadership precipitated by Laidlaw, alongside my current roles as Class Representative and First Year Mentor, I have also taken on the role of one of 2025's Peer Supporters at Trinity. For this role I completed an intensive week of training in the summer of 2025 and look forward to providing one-to-one pastoral care for my fellow students this coming academic year. Laidlaw has highlighted the value of pastoral care and empathetic leadership, which I plan to incorporate into my future supervisory style, blending academic rigour with genuine concern for team welfare.

Cultural humility has been a key leadership theme, recognising the limits of my own perspective and the necessity of truly listening to all voices in projects like my LiA experience. This openness has deepened my understanding of ethical responsibilities which I must carry as a future historian and leader.

The feeling of being underprepared in coding and technical skills, was a consistent struggle which initially hampered my confidence. Yet, this discomfort became a catalyst for learning resilience and adaptability—skills indispensable to research and leadership. I learned that embracing failure is not just acceptable but necessary for growth, as it fosters grit and a capacity to refine strategies. Failure is excellent; it teaches resilience if you just keep going. And as a very wise woman once told me happiness is only our ability to cope with chance.

From a fateful email to Francis Ludlow asking to him to be my 2024 supervisor, to another to Zac that same year, this has been a period of immense personal growth, not precipitated by Laidlaw but undoubtedly accelerated by it. My time with Laidlaw has also taught me to seek out opportunities that scare me. Those are the experiences that will truly accelerate my learning and development. The experiences I've had, the people I've met, Laidlaw has given me the basis for a life in research I would not otherwise have so swiftly attained. Following the ancient maxim *Nosce te Ipsum*, Laidlaw has given me a chance to learn a great deal about myself, and that is a debt I'm not sure I'd ever be able to repay. And so I graduate the

Laidlaw Scholarship programme this November, a great deal more prepared for what will definitely be an exciting postgraduate career!