NU Farms operates over 800ha, spread across three sites – Nafferton, Cockle Park and Ousten. Commercial production is arable, biomass, and grass-fed dairy focused, but with additional facilities on site, such as polytunnels, glasshouses, poultry facilities and laboratories, to support teaching and student projects. Conducting your undergraduate or Masters dissertation at NU Farms can be rewarding, affording opportunities to utilise pre-existing data, established experimental platforms, and work on, and contribute to, on-going commercial and research projects, as well as long-term datasets. Certain projects may even benefit from industry links* and/or on-farm technical/research support, though as resources are limited there may be a cap on the number of students that can work on a topic at any one time.

This brochure features the types of farm-focused projects that can be done at Newcastle University in general, particularly highlighting those that would use NU Farms, or NU Farms pre-existing data, linked to existing commercial and research 'platforms'. Some suggested projects can be undertaken largely remotely using farm systems software and data, though others require data collection on-farm, which is sometimes best done over the summer. Travel is possible by public transport to Nafferton and by booking a seat on the SNES minibus to Cockle Park (on most Mondays, Wednesdays and Fridays) through our Technical Team. Ousten is only easily accessible by personal transport.

Whilst it is easier to fit dissertations to ongoing farm projects and activity, it is possible to suggest additional ideas for projects that could run at NU Farms that aren't covered below. As resources and supervisory time are limited, such proposals should be discussed with potential supervisors in your degree programme, or by contacting the NU Farms Academic Strategy Group Chair (david.george1@newcastle.ac.uk). Likewise, students interested in any of the specified dissertation topics outlined below should check with the named contact that projects in these areas are still available – given the nature of farming, some projects may need to be withdrawn. It's also worth noting that all projects will require basic ethical approval, with those involving the use of animals, or their data, requiring more in-depth approval from AWERB.

Summer Scholarships

In addition to offering dissertation opportunities, NU Farms is a great choice for students wanting to apply for Summer Scholarships linked to crop and animal sciences, or wider agri-environment management. Opportunities for scholarship funding can be found by searching online for external funders, and are also available through internally advertised scholarships at NU (e.g. our annual Peter Barber Scholarship). Students wanting to explore Summer Scholarship opportunities at NU Farms further should discuss any plans with a pre-identified supervisor, or look for opportunities on the university's JobsOC pages.

*Look for the industry linked icon and email the named project contact for further details

LIVESTOCK PROJECTS

NU Farms has a 250 strong Spring and Autumn calving, grazing-based dairy herd. It is also home to C-Dial which may be available to support some projects, subject to booking and use elsewhere. Livestock projects would typically focus on productivity, sustainability and welfare parameters, linking closely to commercial production objectives and the NU Farms commercial team. Potential student projects in the areas below are of particular interest based on current commercial directions for the farms and/or ongoing academic research.

THEME: Dairy Herd
CONTACT: Dr Hannah Davis (Hannah.Davis@newcastle.ac.uk)
SITE: Remote / Nafferton
SUMMARY: Use of farm systems with NMR/Parlour/Sense Hub/Weights and other data. Projects may include:

- Comparison of sense hub data with AI Service/PD's.
- Do health reports from Sense Hub correlate to medicine use in the herd – are there any early warnings? This could also link to data from Allflex, rumination (via Rumiwatch) and heat detection collars.
- Genetic work – herd now – sire planning for target cows.
- Success of sexed semen, and fertility within the herd.
- Animal productivity, health and behaviour on the NU Farms grazing platforms.
- Projects with a livestock emissions focus, though these should be discussed with your supervisor/contact to ensure access to available equipment.

THEME: Calves/Youngstock
CONTACT: Dr Hannah Davis (Hannah.Davis@newcastle.ac.uk)
SITE: Nafferton / remote
SUMMARY: Animal live weight gain within the system – comparison of groups, breeds and assessment of feed/system efficiency. Projects could look at different feed systems, weaning, animal health and behaviour.

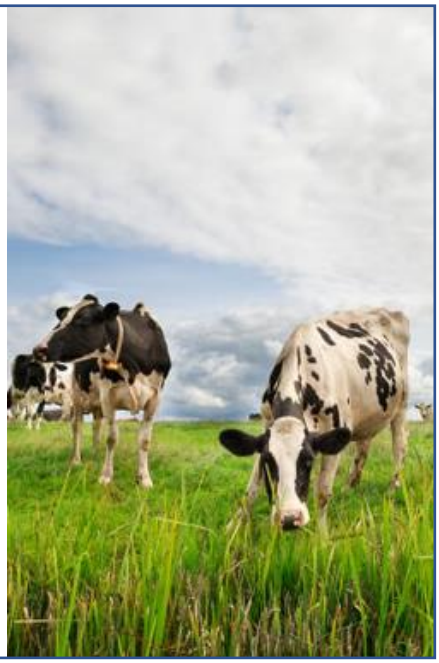
GRAZING PROJECTS

Linking to NU Farms dairy herd, projects considering grazing approaches may focus on productivity, pasture biodiversity, parasites, soil health and a number of other outputs, affording opportunity to tailor projects to personal interests. Potential student projects in the areas below are of particular interest based on current commercial directions for the farms and/or ongoing academic research.

THEME: Smart Overwintering
CONTACT: James Standen (James.Standen@newcastle.ac.uk)
SITE: Remote / Cockle Park / Nafferton
SUMMARY:
From 2020 we have drilled different types of brassicas to feed the youngstock outside over winter at Cockle Park and have weighed cattle regularly. We would really like this data analysed. This would probably link with a plant-based project, as well as a grazing/animal project. Animal data will comprise body condition and mobility scoring along with metabolic analysis, and in addition soil/environmental data can be taken.

THEME: Grass and Pasture Management
CONTACT: Dr Hannah Davis (Hannah.Davis@newcastle.ac.uk)
SITE: Nafferton and Cockle Park
SUMMARY:

- We have started to work on silage/fresh grass data and are mapping grass into the clamp for feed analysis at silaging to compare with the made silage and how well it feeds the cows. We have also been loaned a Harvest Lab so we can (and plan to) analyse silage from the face on a weekly basis.
- We established a mob grazing platform at Nafferton in 2021. It would be useful to look at this over time using current and baseline data, alongside the 'business as usual' planned rotational grazing.
- We are planning three different grazing groups within the dairy unit. These are spring calvers, autumn calvers and the mob grazing groups. Additionally, there is a field with four different herbal grass mixes and another with variable grazing strategies.
- We have a precision project on estimating grass growth to calculate DM availability/break area; data collection/use from this platform would be possible.



THEME: Palace Leas Hay Meadow
CONTACT: Prof Darren Evans (darren.evans@newcastle.ac.uk)
SITE: Cockle Park
SUMMARY: Now >125 years old, Palace Leas Hay Meadow Plots consists of 14 blocks that have received varying nutrient inputs since the 1890's. This unique resource can be used for projects looking at how historic input patterns of fertilisers can affect grassland productivity, quality, soils, above/below-ground biodiversity, plant community composition and more.

THEME: Biostimulants for Pasture
CONTACT: Dr Hannah Davis (Hannah.Davis@newcastle.ac.uk)
SITE: Nafferton
SUMMARY: From 2025 we will be establishing a trial platform with ORC to explore whether biostimulant application to pasture can maintain sward growth and quality whilst minimising synthetic fertiliser inputs. Projects to assess pasture productivity in response to biostimulant use, or other effects of treatment, would be welcome.

THEME: Grassland Operations: The impact of a Chain Harrow
CONTACT: Simon Parker (simon.parker@newcastle.ac.uk)
SITE: TBC
SUMMARY: Does the chain harrow have any positive impact on forage quality or quantity? Many grassland managers will utilise a chain harrow on conservation pastures in spring, but is the time and effort spent using it beneficial economically, or is it just making a pasture appear manicured?

ARABLE PROJECTS

Arable projects at NU Farms can focus on a range of current themes, from the challenges and opportunities of different tillage systems, to the impacts of emerging approaches such as biostimulants and soil amendments to capture carbon. Potential student projects in the areas below are of particular interest based on current commercial directions for the farms and/or ongoing academic research.

THEME: Tillage
CONTACT: Dr Dave George (david.george1@newcastle.ac.uk)
SITE: Nafferton/Cockle Park/Ousten
SUMMARY: We started our 1/3 direct-drill, min-till and ploughed plots in 2020. Past yield data can be considered, along with other agronomic, production and environmental data that can be collected.

THEME: Precision Slurry
CONTACT: James Standen (James.Standen@newcastle.ac.uk)
SITE: Nafferton/Cockle Park
SUMMARY: John Deere have provided the farm with a Harvest Lab and, working with a contractor, we have fitted the machine to a tractor and applicator to allow recording of the nutrient applications through slurry at Cockle Park and Nafferton. Response to precision slurry could be measured in a number of ways.

THEME: QLIF Plot Platform
CONTACT: Dr Dave George (david.george1@newcastle.ac.uk) / Dr Elisa Lopez-Capel (elisa.lopez-capel@newcastle.ac.uk)
SITE: Nafferton
SUMMARY: Our replicated QLIF platform at Nafferton is looking at four different production approaches (organic, conventional, biologically-driven and carbon-building) across two tillage regimes (inversion and direct-drill). This platform offers lots of potential for projects focused on a wide range of crop/environmental responses to these treatments, including (but not limited to) soil and crop health, nutrient cycling, pests, weeds and diseases, biological control, below and above ground invertebrate conservation and water management. There is potential to link to both enhanced rock weathering work (see later), incorporating legacy effects of past management programmes if desired.

THEME: Biostimulants
CONTACT: Dr Elisa Lopez-Capel (elisa.lopez-capel@newcastle.ac.uk)
SITE: Cockle Park / Nafferton
SUMMARY: Biostimulants come in many forms and are claimed to deliver myriad benefits to crop production in arable systems, including improved tolerance to abiotic stresses and increased N uptake. Our commercial farms have been trialling certain interesting products, and we would welcome projects that can support this work with more detailed data gathering – either through field or pot trials.

THEME: Vermicompost Products
CONTACT: Dr Dave George (david.george1@newcastle.ac.uk)
SITE: Cockle Park
SUMMARY: Our industry contacts in the north of the region are keen to explore whether vermicompost-based crop enhancement products can deliver benefits for crop production and protection. Pot trials could be run to answer this question.

THEME: Enhanced Rock Weathering
CONTACT: Dr Elisa Lopez-Capel (elisa.lopez-capel@newcastle.ac.uk) / Dr Tom Reershemius (tom.reershemius@newcastle.ac.uk)
SITE: Nafferton
SUMMARY: Working alongside industry partners, we established a replicated experiment across two fields in 2022 to explore the effects of rockdust application to arable crops and soils. Dissertation projects are welcomed to explore existing data, or add value to the dataset currently being generated by the project team.

THEME: Soil Amendments
CONTACT: Dr Elisa Lopez-Capel (elisa.lopez-capel@newcastle.ac.uk)
SITE: Nafferton
SUMMARY: We have numerous industry contacts who are developing existing and novel soil amendments to address key challenges – e.g. improving soil moisture management through use of hydogels. Projects to test the effectiveness of these products, typically in pot trials, are welcomed.

THEME: Economies of Scope: Gleaning
CONTACT: Simon Parker (simon.Parker@Newcastle.ac.uk)
SITE: TBC
SUMMARY: Grain which passes through the combine harvester and lands on the floor is largely wasted in terms of its utilisation by the grower. Lambs are particularly adept at utilisation of grain from the floor due to their narrow mouths and short distance between eye and the lips. This investigation will involve managing a group of lambs on a post-harvest site to establish whether viable live weight gain can be achieved from allowing lambs to glean fallen grain.

This project requires access to secure land immediately post-harvest, growing lambs and the facility to assess DLWG. Field measurement of the grain remaining after harvest will need to be undertaken and compared to a comparator group of lambs that have access to a similar diet without the ability to glean. Full Ethical Approval will be required, which will include needing to ensure that all lambs will need access to water and long fibre, and so a timely approach is essential to submit an Ethical Approval request before April.

This project is likely to be suitable for someone with access to these facilities at home as the timing of the exercise will necessarily not be during the semester. If the facilities exist at the university farms and the project were to be undertaken at the university farms, then the student would need to commit to being able to attend the university farms throughout the harvest period.

VERTICAL FARMING PROJECTS

Whilst we occasionally run projects with a vertical farming focus in the glasshouses at Cockle Park, most of our work in this area is now run in the Agriculture Building, where we have set-up a 'Verti-Tech' hub with industry partners Fyto Ltd.

THEME: Vertical Farming
CONTACT: Dr Ankush Prashar (Ankush.Prashar@newcastle.ac.uk)
SITE: On campus
SUMMARY: Dissertation projects in our Verti-Tech hub are often linked to ongoing research that we are conducting jointly with Fyto Ltd. Current projects have a focus on growing a range of vegetable and salad crops under varying light and nutrient inputs to explore effects on crop yield, quality, and nutritional content.

ENGINEERING PROJECTS

In addition to projects with a primary focus on plants and animals, work on engineering dissertations is also possible at NU Farms. Potential student projects in the areas below are of particular interest based on current commercial directions for the farms and/or ongoing academic research.

THEME: Remote Sensing and Robotics
CONTACT: Dr Ankush Prashar (Ankush.Prashar@newcastle.ac.uk)
SITE: Nafferton
SUMMARY: Work is ongoing into imaging to determine crop health status and inform remote decisions for nitrogen / fungicides, with potential for projects in this area to incorporate elements of machine learning and robotics.

ENVIRONMENT & ECOSYSTEM SERVICES PROJECTS

Many of the projects above may include elements of environmental assessment, or consider delivery of ecosystems services. Nevertheless, projects in these areas that span NU Farms as a whole are also available. Potential student projects in the areas below are of particular interest based on current commercial directions for the farms and/or ongoing academic research.

THEME: Farmland Ecological Networks
CONTACT: Prof Darren Evans (darren.evans@newcastle.ac.uk)
SITE: Nafferton / Cockle Park
SUMMARY: Farmland biodiversity is embedded in complex networks of species-interactions, both above- and below-ground, but is poorly understood. Project opportunities examining the impacts of environmental change on ecological networks consisting of pest and beneficial insects (e.g. plant-pollinator, host-parasitoid interactions), including the use of DNA-based methods, are available.

THEME: Baselining Biodiversity
CONTACT: Dr Dave George (david.george1@newcastle.ac.uk)
SITE: Nafferton / Cockle Park / Ousten / external farms
SUMMARY: With ELMs/SFI there is increased interest in how we baseline and monitor biodiversity to allow us to evidence positive change. Projects would be welcomed on either topic, potentially linking to ongoing research.

THEME: Valuing Agri-Ecosystem Services
CONTACT: Dr Dave George (david.george1@newcastle.ac.uk)
SITE: Cockle Park / Nafferton / Ousten
SUMMARY: Farming has the potential to both generate and benefit from a number of ecosystem services, yet how we can best assess and value these is currently unclear. Projects in this area are of particular interest.

THEME: Cover and Companion Crops
CONTACT: Dr Dave George (david.george1@newcastle.ac.uk)
SITE: Nafferton / Cockle Park / remote
SUMMARY: With cover and companion cropping embedded in SFI standards and regenerative agriculture *per se*, we've developed field platforms and a database to help select seed mixes suited to specific site conditions and end-user needs. Through our links to the UK AgriTech Centre we have also been exploring how machinery solutions can be used to assist establishment. Opportunity exists to collect data from the field on all aspects of cover crop performance, and/or fill remaining gaps and field-test our database as a tool for the industry.

POLICY AND PRACTICE PROJECTS

NU Farms was a pilot site for multiple standards introduced through the SFI. Opportunity exists to work in areas aligned to current policy, or changes in practice, as below.

THEME: Integrated Pest Management
CONTACT: Dr Dave George (david.george1@newcastle.ac.uk)
SITE: Nafferton / Cockle Park / Ousten
SUMMARY: IPM is a policy requirement, increasing in importance with new SFI support systems. Project opportunities vary year-to-year based on ongoing research, but projects based on IPM are always available.

THEME: Biomass Crops
CONTACT: Prof Yit Arn Teh (yitarn.teh@newcastle.ac.uk)
SITE: Cockle Park
SUMMARY: From 2023 we have been involved in several large biomass projects, creating platforms at Cockle Park to explore the potential of different crop species and varieties. Dissertation projects linked to these are welcomed, and could explore a wide range of topics covering anything from agronomy and biodiversity to carbon capture and nutrient cycling.

THEME: Biodiversity Net Gain (BNG)
CONTACT: Dr Diogo Souza Monteiro (Diogo.Souza-Monteiro@newcastle.ac.uk)
SITE: Remote
SUMMARY: BNG is a legislative requirement for all building developments, providing opportunities for farmers to monetise biodiversity in a similar fashion to carbon. Identifying and exploring trade-offs between production and biodiversity promotion, as well as the contracts process, is of interest to researchers in our Centre for Rural Economy.

THEME: Agro-Forestry Assessment
CONTACT: Prof Yit Arn Teh (yitarn.teh@newcastle.ac.uk)
SITE: Cockle Park
SUMMARY: Our highly topical NU Farms agro-forestry platform was established in 2022 and has already generated significant industry interest, with numerous opportunities to build upon baseline data and monitor environmental, agronomic and financial effects as our work in this area progresses.

SOCIAL SCIENCE PROJECTS

The Centre for Rural Economy (CRE) is an award-winning research centre at Newcastle University. It specialises in interdisciplinary social science and applied policy research, working towards the achievement of sustainable development in rural areas. Through links to CRE, students with interests in Social Science research can undertake dissertations such as those below.

THEME: Farm Succession
CONTACT: Prof Sally Shortall (sally.shortall@newcastle.ac.uk)
SITE: Remote
SUMMARY: What is the difference between succession and inheritance? What are decision making patterns in the farm family? This topic aims to understand family dynamics around decision making in the farm family. It will look at whether the process is formal or informal, and which works best.

THEME: Farm Tenancies
CONTACT: Prof Sally Shortall (sally.shortall@newcastle.ac.uk)
SITE: Remote
SUMMARY: There are multiple types of tenancies. Do tenancies shape agricultural practices? Do estate owners shape practice on tenancies? The Wildlife Trusts bought the Rothbury Estate in 2024, so it is an interesting time to research this question.

THEME: Women in Agriculture
CONTACT: Prof Sally Shortall (sally.shortall@newcastle.ac.uk)
SITE: Remote
SUMMARY: Agriculture is the occupation where women are least represented, and this is across the globe. While women are less likely to inherit land, they are active members of the family farm. They 'marry in' and bring a fresh perspective to agricultural practice. Their off-farm income often supports on farm activities. Often women lead on farm diversification initiatives.

FUTURE FARM OPERATIONS

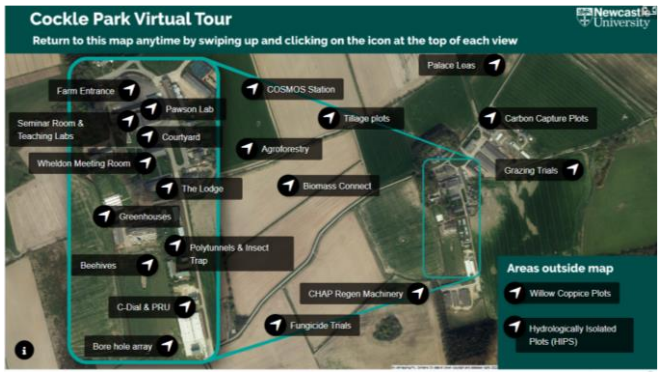
We have a number of plans/thoughts about farm activities to start over the next couple of years, which could suit students who want a more theoretical desk-based study for their dissertation which would help future farm planning. The farm is happy supporting these with guidance / direction / advice, etc. Ideas of current interest are listed below.

THEME: Future Farm Operations
CONTACT: James Standen (James.Standen@newcastle.ac.uk)
SITE: Remote
SUMMARY: Projects could include exploring the potential of:

- An outdoor beef finishing system - the idea being to take beef calves in the autumn, rear over the winter, then grow-on on grass, but finished on a mix (grown outdoors) - including cereal/pulse, kale/rape, grass/legume.
- Grazing s - splitting the dairy herd into groups around grass management. We are discussing options with a commercial partner around this.
- Improved farm facilities - the next stage of the planning the development of NU-Farms is underway and you can help improve our thinking around capital investments, infrastructure or enterprise improvements.
- A regenerative pig system (or hybrid - i.e. pigs that go inside and outside)
- Biomass heating system - CP or Nafferton - using our willow and biomass crops
- Creating a business hub at CP (using redundant buildings) and/or outdoor activity/research centre
- Natural capital markets for NU-Farms
- Developing a permanent poultry system - review of system types, recommendations etc
- Agroforestry expansion

EXPLORE OUR FARMS

Interested but want to know more? You can explore our farms in more depth by reading our NU-Farms Bulletin (https://www.ncl.ac.uk/farms/bulletins/) or taking a virtual tour of Nafferton and Cockle Park (https://www.ncl.ac.uk/farms/virtual-tours/).



PAST PROJECTS

Below you will find a selection of past student projects to provide a flavour of dissertation possibilities linked to NU Farms.

Investigation into the effects of mob grazing on dung beetle communities. BSc thesis undertaken at Nafferton. Supervisor: Dr Richard Francksen / Dr Dave George.

The impact of dry cow management on early lactation dairy productivity and efficiency. MRes thesis undertaken at Nafferton. Supervisor: Dr Hannah Davis.

Effects of a feed supplement (Bovishake) on structural growth, body weight gain, and fat and muscle growth of calves. MSc thesis undertaken at Nafferton. Supervisor: Dr Hannah Davis.

Standardising methods of essential oil efficacy testing against the poultry red mite, *Dermanyssus gallinae*. BSc thesis undertaken at Cockle Park. Supervisor: Dr Kirsty McInnes.

Effects of tillage methods and previous organic and conventional management practices on soil invertebrates. MSc thesis undertaken at Nafferton. Supervisor: Dr Dave George.

Impact on soil compaction of changing from conventional tillage to direct drilling. BSc thesis undertaken at Nafferton. Supervisor: Dr Julia Cooper.

The effect of feeding method (milk bars or automatic feeders) and weaning method (cold turkey versus gradual decrease) on live weight gain in calves. BSc thesis undertaken at Nafferton. Supervisor: Dr Hannah Davis.

Investigating the effects of variable rate drilling on spring barley cereal development and quality under conventional management. MSc Thesis, undertaken at Cockle Park. Supervisor: Dr Dave George.

Investigation into separation of dairy calves from their dams at birth and potential impact on calf and cow health, development and welfare. BSc Thesis, undertaken at Nafferton. Supervisor: Dr Catherine Douglas.

Investigating the health effects and economic viability of early cow and calf separation. BSc Thesis, undertaken at Nafferton. Supervisor: Dr Catherine Douglas.

The behavioural effects associated with vitamin A toxicity in pigs. BSc Thesis, undertaken at Cockle Park. Supervisor: Dr Matthew Leach.

Newcastle University | NU Farms