Project Title	VALPRO Path – Added Value Opportunities for Plant Protein Crops in Europe
Abstract detailing work objectives and what the placement student can expect be doing.	VALPRO Path aims to deliver novel agricultural systems with increased resilience and productivity by intercropping peas and faba beans Field pea has long been recognized as a valuable source of protein for feed and food. It is the third most economically important grain legume. The potential of pea flour and other constituents, as a high protein substitute in a range of food products, has already been demonstrated. Lodging risk can occur in the presence of intense rain/wind events, which have become increasingly frequent with climate volatility. TEAGASC, in collaboration with European breeders will establish the best varieties of pea and faba beans to be evaluated based on agronomic traits and resistance to biotic and abiotic stresses. The two best performing combinations will be validated in farmers' fields (Ireland) and in research farms in different European pedo-climatic regions. The potential uses of mixed and/or separated grain, will be identified by grain characterization and development of grain/flour separation methodologies. The internship will include both field and lab activities - Field related tasks: Trial sowing and phenotyping - Lab related tasks: Seed quality (determination of protein, TGW, moisture, etc.)

Project Title and Number	EVOLVE - Evaluate Crop establishment systems and Rotations
Abstract detailing work objectives and what the placement student can expect be doing (100 words max.)	The placement student will: • Collect field data on a range of crops in the Knockbeg trial which encompasses a 5 crop rotation alongside continuous winter wheat; all of which are grown under 4 crop establishment systems. • Sample and process pre-harvest samples for all rotation crops. Harvest and post harvest processing will also be involved. There may also be an opportunity to be involved in soil physical measurements and soil respiration measurements depending on timing. • Enter, check and process research data.

Project Title and Number	EVOLVE
Abstract detailing work objectives and what the placement student can expect be doing (100 words max.)	Evaluate cultural weed control methods through two field trials focused on crop and weed densities and crop row spacing and weed density interactions. The placement student will gain hands-on experience in experimental design and fieldwork, including data collection such as plant counts, growth parameters study, biomass sampling, harvesting, and analysis of yield and yield components.

Project Title and Number	Wheat Security - Identification and sustainable deployment of wheat genetic diversity to enhance the resilience and security of the European food supply.
Abstract detailing work objectives and what the placement student can expect be doing (100 words max.)	Wheat security will contribute to identification and sustainable deployment of wheat genetic diversity to enhance the resilience and security of the European food supply. As part of this project, a field trial growing 20 different bread and durum wheat varieties from across the EU under different nitrogen and disease managements will take place in Teagasc. The student will assist in taking soil, root and plant samples from the field trial that will later undergo microbiome analysis. They will complete disease scoring of these varieties in the field for Septoria tritici blotch (STB). Taking pre harvest samples to determine components of yield (ears/m^2, grains per ear, thousand seed weight etc.)

Project Title	Investigating/Monitoring Diseases in Irish Crops
Abstract detailing work objectives and what the placement student can expect be doing (150 words max.)	Due to the mild and humid weather that often prevails in Ireland, foliar diseases are endemic in crops and if left untreated have the potential to significantly reduce yields. The pathology team investigate/monitor a wide range of diseases across many crops such as Wheat, Barley, Oats, Potato, Faba Bean and Apples, diseased material is sampled in the field, isolated, cultured and tested in the lab. **Laboratory based procedures/techniques** • Seed-surface sterilisation • Media preparation (autoclave, balances, pH meter) • Fungal Isolation • Long term storage media, preparation of glycerol stocks • Fungicide sensitivity testing • *In vitro* fungicide sensitivity tests will determine the impact of new and emerging fungicides (multichannel pipettes, plate reader) • DNA extraction/PCR • Risk assessments • Health & Safety • Waste management • General laboratory duties **Field/Glasshouse based - seasonal** • Planting, sampling, harvesting, assessing • Glasshouse virulence testing

Project Title and Number	AEROBIOMICS
Abstract detailing work objectives and what the placement student can expect be doing (100 words max.)	Fungicide resistance in cereal pathogens poses a serious risk to Irish crop production. It is essential to continually monitor for such resistances to ensure those strategies applied remain effective. The student will be required to assist in the collection of samples (airborne and field), the isolation of key cereal pathogens, and the testing of these pathogens for fungicide resistance. This testing will involve both traditional microbiological methods, but also molecular based approached including amplicon sequencing and ddPCR.

Project Title and Number	AIDE
Abstract detailing work objectives and what the placement student can expect be doing (100 words max.)	The primary focus of this project is to review the use of monitoring tools for the management of barley yellow dwarf virus (BYDV) and its aphid vectors. This will involve the student identifying species of aphids caught across a national yellow trapping programme. As part of this the student would assist with regular in-field aphid monitoring. In addition to insect identification the student would also be assisting with molecular lab working including RNA extraction and PCR to test for the presence of BYDV in both aphid and leaf samples. The student would gain technical skills in entomology, agronomy, molecular biology and virology. The student would also be assisting in running aphid behaviour and tolerant barley variety experiments.

Project Title and Number	RapID Pest
Abstract detailing work objectives and what the placement student can expect be doing (100 words max.)	This project is developing molecular tools for rapid identification of aphid pest species from complex samples. The student will be involved in : • data curation of image library associate with vouched specimens (30%). • identification and cataloguing of aphids from various insect traps (50%). • Occasional molecular lab work (20%)

Project Title and Number	Potato Breeding
Abstract detailing work objectives and what the placement student can expect be doing (100 words max.)	To assist in areas of potato cooking quality evaluations and cross pollination of new varieties in the Potato Breeding Programme. Duties may include: • Assist in crossing house to cross new potato varieties. Carrying out cross pollination of plants. Collecting pollen, emasculating flowers, making crosses, collecting berries and preparing true seed. • Care and maintenance of plants within the glasshouse • Preparing, cooking and scoring potato varieties on cooking quality. • General fieldwork duties such as assisting in planting/rogueing etc.

Project Title and Number	Potato Breeding
Abstract detailing work objectives and what the placement student can expect be doing (100 words max.)	To assist in areas of potato cooking quality evaluations and true seed extraction of new varieties in the Potato Breeding Programme. Duties may include: • Extracting true seed from the potato berries of new potato varieties from the cross pollination season • Preparing, cooking and scoring potato varieties on cooking quality. • General fieldwork duties such as assisting in harvest etc.

Project Title and Number	PastureBNI
Abstract detailing work objectives and what the placement student can expect be doing (100 words max.)	The BNIPastures project involves screening forage plants in a hydroponics system and characterising their capacity to release root exudates that can inhibit nitrification – a process known as biological nitrification inhibition (BNI). The discovery of this trait in key pasture species may offer opportunities to reduce nitrous oxide emissions from livestock systems. The student will receive hands on training in statistical design of experiments, hydroponics systems, exudate collection, *Nitrosomonas europaea* bioassays, and data analysis.

Project Title and Number	Selection of cereal varieties suited to low-input, Irish growing conditions with focus on milling and nutritional traits (1538)
Abstract detailing work objectives and what the placement student can expect be doing (100 words max.)	Within Protein-I, cereal grains grown under Irish-conditions are evaluated for traits of milling and nutritional importance. Crops predominantly focused upon include spring wheat, winter barley and winter rye but also ancient wheats. Experience will involve tasks including measurement of indirect grain quality traits such as protein, moisture, test weight via NIR, completion of Hagberg Falling Number tests and assistance with enzymatic assay whereby dietary fibre, beta glucan is measured will be conducted. Students can expect to be involved in establishment and maintenance of crop glasshouse trials also.

Project Title and Number	Dabbing Cap/renu2cycle
Abstract detailing work objectives and what the placement student can expect be doing (100 words max.)	The main area of work is looking at the agronomy of cereal crops such as wheat barley and rye. A key area is better understanding effect of fertiliser nitrogen on crop growth (mainly winter wheat, winter rye and spring and winter barley) with a view to optimising the input of both mineral and organic fertilisers. The objective is to determine the best time to apply the nitrogen and how much is needed so that the as much as possible of the fertiliser nitrogen gets into the crop and cannot be lost to the environment. Other areas of interest include the role of cover crops in Irish cropping systems. During the year there is normally a mixture of laboratory and field work. Normally we take samples from the experiments in the field and bring them to the laboratory where we do a series of measurements on them during the growing season (March to August) and then these samples are processed in the lab after harvest. There are also grain samples

	generated which are analysed for grain quality parameters such as protein, moisture, hectolitre weight and 1000 grain weight. Laboratory analysis also includes determination of N content of plant material.

Project Title	Potato pre-breeding
Abstract detailing work objectives and what the placement student can expect be doing (150 words max.)	**1st October-30th December** *Genotyping Phenotyping and of edited lines (laboratory).* To detect genetic modifications in the phytoene desaturase gene of CRISPR/Cas9-mediated genome-edited potato generated in our lab. This project will require the student to learn and apply techniques in plant tissue culture, microbiology and molecular biology. Among them, the student will learn: 1. Potato *in vitro* tissue culture 2. DNA extraction 3. PCR and multiplex PCR 4. *Library construction for sequencing* 5. Phenotyping in the glasshouse. 6. Bioinformatic analysis of the results 7. Good practice managing GMO material **2nd December-30th February** *New breeding techniques (**NBT**, Laboratory).* To test different combinations of promoter/proto-spacer sequences for CRISPR/Cas9-mediated genome editing of targeted genes of potato. This project will require the student to learn and apply techniques in plant tissue culture, microbiology and molecular biology. Among them, the student will learn: 1. Potato *in vitro* tissue culture 2. Golden-gate assembly (Restriction-ligation) 3. PCR 4. *E. coli* and *A. tumefaciens* transformation 5. Potato plant transformation and regeneration 6. Good practice managing GMO material **2nd June-31th August** *Effectoromics.* The student will learn under the supervision of MOLP how to agro-infiltrate genetically modified *A. tumefaciens* strains in leaves of potato varieties with different susceptibility to powdery scab ,and record the reaction of each genotype to each effector candidate in terms of HR. This project will require the student to learn and apply techniques in plant tissue culture, microbiology and molecular biology. Among them, the student will learn: 1. Tissue culture. Transfer of in vitro plants to glass house. 2. Growth of *Agrobacterium tumefaciens* strains transformed with different powdery scab effectors. 3. Colony PCR. 4. Co-agroinfiltrations of different strains to test the heterologous expression of gene candidates in potato plants. 5. Assessment and Imaging of hypersensitive response (HR) in potato leaves. *Multidisciplinary techniques (Miscellaneous).* Depending of the time frame and the availability of other projects, the student will be given the opportunity to learn other techniques and participate in Teagasc corporative activities (10-15% of the time).

Project Title and Number	AshforFuture; Breeding ash for dieback disease tolerance
Abstract detailing work objectives and what the placement student can expect be doing (100 words max.)	Ash trees, a native species to Ireland, hold immense ecological, cultural, and economic significance. However, they are under severe threat due to climate change and invasive pests and pathogens. One of the most serious threats is ash dieback, caused by the invasive fungal pathogen Hymenoscyphus fraxineus. At Teagasc, we are working on an innovative breeding program to develop ash genotypes that are tolerant to ash dieback. As a placement student, you will have the opportunity to contribute to this vital project. Your responsibilities will include: 1. Assisting with the AshforFuture project, focusing on enhancing disease tolerance in ash trees. 2. Supporting and conducting experiments and data collection both in the field and through *in vitro* planta assays. 3. After receiving sufficient training, becoming responsible for conducting experimental work in lab, glasshouses and polytunnels. 4. Participating in induction and training programs available during your placement to develop your skills. 5. Assisting with microbial and molecular lab work, contributing directly to the success of the project. This placement offers a unique opportunity to gain hands-on experience in cutting-edge research that aims to protect a vital species. You'll work closely with experienced researchers, gaining valuable skills in both field and laboratory settings.

Project Title and Number	Genetic study of Common Alder to identify potential bio-agents for improved tolerance against Alder dieback disease (Project no. 1981)
Abstract detailing work objectives and what the placement student can expect be doing (100 words max.)	The native tree species, Common Alder, holds substantial economic and ecological significance. Alder is threatened by the root rot pathogen *Phytophthora alni*, which has the capacity to impede growth, survival, and overall ecosystem dynamics. At Teagasc, we are breeding alder to develop dieback disease-tolerant genotypes. The placement student will: 1) Assist and conduct experiments and data collection from field, in the glasshouse, and *in vitro* antagonistic studies 2) Take sufficient training to become responsible for conducting experimental work in glasshouse and polytunnels 3) Participate in induction and training programmes available during their placement 5) Help with microbial and molecular lab work related to the proposed work

Project Title and Number	Project title: ElmAsh: Investigating the rapid multiple techniques and microbiome of ash (*Fraxinus excelsior*) and genetic conservation of Wych elm (*Ulmus glabra*) to breed disease-tolerant genotypes.
Abstract detailing work objectives and what the placement student can expect be doing (100 words max.)	Common ash (*Fraxinus* excelsior) is the most widespread ash species in Europe, which plays an important ecological and economical role. Since the early 1990s, there is a significant decline in ash population due to ash dieback, a disease caused by the fungus *Hymenoscyphus fraxineus*. Therefore, it is necessary to select and breed disease-tolerant ash genotypes. This research focuses on in-vitro micropropagation and speed breeding experiments for rapid multiplication of disease-resistant ash trees. The student will be involved in field, laboratory and glasshouse work, with the tasks including sample collection, media preparation, culture maintenance, data collection, and taking care of trees in glasshouse.

	There will be training, and supervision imparted until the student become competent to work on their own. Also, opportunities to get involved in other projects is open, based on the applicants interests.

Project Title and Number	2062 - Developing an apple sensory profile tool by deciphering consumer preference using a combination of conventional and rapid descriptive sensory profiling techniques and correlating these with standard pomological apple characterisation metrics 2352 - Initial agronomic performance of different apple genotypes grown in Ireland and the influence of genotype, rootstock and training system interaction on vegetative, productive and physiological behaviour
Abstract detailing work objectives and what the placement student can expect be doing (100 words max.)	2062 Project focuses on characterizing the physico-chemical quality and sensory properties of different apple varieties. Interns will help identify high market potential varieties and profile Irish apple consumers to guide new orchard plantings and management practices. 2352 Project investigates the agronomic performance of new apple genotypes and training systems. Interns will assess vegetative and productive behaviour under various training systems and rootstocks to identify efficient combinations for high productivity and fruit quality. • Feb/Mar: Winter pruning and vigour data assessment. • Apr/May/Jun: Phenology characterization and fruit set assessment. • Jul/Aug: Summer pruning and tree management. • Sep/Oct/Nov: Fruit harvest and quality assessment.

Project Title	Breeding forage grass, legumes and herbs for Irish farm systems.
Abstract detailing work objectives and what the placement student can expect be doing (150 words max.)	Grassland is Ireland's greatest renewable feed resource amounting to >90% of agricultural land and providing the main ruminant food. Our goal is to apply best practice to effectively and efficiently select for the best phenotypes leading to the development of improved cultivars of grass, legumes and herbs for Irish farms. Most steps in a breeding cycle are undertaken each year. The student would assist us in the implementation of the programme including the planning stages, co-ordination and supervision of the tasks, plant evaluation and monitoring, and some of the manual work such as planting, crossing, weeding, seed harvesting and packaging. The student's objective would be to obtain a good understanding of the theory and operation of a forage breeding programme. The student project would be to conduct and write a review on the theory and methods of a commercial forage breeding programme using the OP breeding programme as an example.

Project Title and Number	Strategies to Reduce Ammonia Emission from Irish Pig Farms
Abstract detailing work objectives and what the placement student can expect be doing (100 words max.)	Ireland aims to cut ammonia emissions by 5% by 2030, with livestock—particularly pig farming—contributing 4-8% of ammonia. This project focuses on reducing emissions through dietary adjustments and exploring slurry management technologies. The first phase involves measuring ammonia concentrations in finishing pig units using devices like LGR, GASERA, and Cynomys sensors. Once baseline data is established, reduction strategies such as dietary manipulation and slurry technologies will be studied for their effectiveness. Intern will gain hands-on experience with ammonia measuring devices and setups, manage large datasets from slurry/pig rooms and use data tools, calculate emission, work directly in pig farm.