Summer Research Projects 2026

Projects in Mathematics, Statistics and Physics

Project 1 – Statistics: Predicting Extreme Solar Flares

Project 2 – Statistics: Bayesian Modelling of Road Traffic Collisions

Project 3 – Statistics: The 12th Man: Do Fans Actually Help Sports Teams Perform Better?

Project 4 – Statistics: Modern MCMC for recombinant genomes

Project 5 – Statistics: Simulation of allele frequencies with jumps

Project 6 – Statistics: Exploration in tree-space

Project 7 – Pure Mathematics: Knot theory and 4-dimensional spaces

Project 8 – Pure Mathematics: Representation Theory

Project 9 – Pure Mathematics: Complex Analysis

Project 10 – Astrophysics: Teaching astronomy with small telescopes using observational experiments

Project 11 – Astrophysics: Measuring the gas content of distant galaxies with growing supermassive black holes

Projects in Natural and Environmental Science

Project 12 – Chemistry: Phosphonium Salts

Project 13 – Marine Science: The Dove Marine Laboratory

Projects in Engineering

Project 14 – Engineering: Analysis of scalar gradient statistics in premixed turbulent H2-air flames

Project 15 – Engineering: Computational Fluid Dynamics (CFD) analysis of the aspect ratio effects on mixed convection of non-Newtonian fluids in cylinders with rotating lids

Project 16 – Chemical Engineering: Carbon Capture using Engineered Biofilms

Project 17 – Mechanical Engineering: RATTL Projects:

Gamification of Medical Models
Ultrasound Phantom Models
3D Printing Radiological Scans
A&E Waiting Room Wearables & Feedback System
Eye Examination Device and Software

Project 18 – Engineering: Smart Network Monitoring to Mitigate Transformer Supply Chain Shortages

Project 19 – Engineering: Quantum Computing for Hybrid AC/DC Grid Operations

Project 20 – Engineering: Realising Flexible Power Grids through Maximizing the Lifetime of Utility- Owned Converters

Project 21 – Engineering: Voltage control algorithms for low-voltage networks

Project 22 – Engineering (Hydrology and Water Management): Monitoring drought-related land subsidence using satellite-radar observations

Project 23 – Civil Engineering: Managing the use of low-carbon, cement replacement materials in construction

Project 24 – Engineering (Hydrology and Water Management): Impact of Thermal Conductivity of the Ground for Energy-SuDs.

Project 25 – Engineering: The role of drainage in slope failures in infrastructure slopes under changing climate conditions

Project 26 – Engineering (Transport): Rail Disruption Management

Project 27 – Engineering (Transport): Human Factors for Rail Freight Operations

Project 28 – Engineering: Catchment-Scale Modelling of Natural Flood Management Interventions in Upland Peat Landscapes

Project 29 – Engineering: From Lab to Landscape: Simple guidelines to optimise Leaky Barriers in Upland Peat Catchments

Project 30 – Engineering: Compound hazards and their potential impacts on the insurance sector

Project 31 – Engineering: Designing a climate service to finance future wind farms

Project 32 – Engineering: Exploring stress times of compound stress for the water and energy sectors

Project 33 – Engineering: How Climate and Building Policies Influence Embodied Carbon in Engineered Wood Supply Chains

Project 34 – Engineering (Water): Using ensemble design storms to improve flood risk estimation

Project 35 – Engineering (Water): Which weather regimes cause UK flash floods?

Project 36 – Engineering: Which weather regimes impact the Scottish Railway Network?

Project 37 – Engineering: Optimising operations, reliability, and trenching strategies for offshore power cables in offshore wind farms

Project 38 – Engineering: Hydrological modelling and analysis of a spatially variable unsaturated slope during heavy rainfall

Project 40 – Engineering: Numerical simulation of ground vibration effects due to high-speed trains

Project 41 – Engineering: Use of GNSS Reflectometry to measure river and lake water levels

Project 42 – Engineering: Identification of infrastructure failure events in deformation monitoring time series

Project 43 – Engineering: Use of high-rate, high-precision kinematic GNSS for rail track condition monitoring

Project 44 – Engineering: Modelling Smart Traffic Management Corridor for Logistics from Nissan Factory to Port of Tyne and assessment of the business case

Project 45 – Engineering: Traffic flow and ambient air pollution: a case study on Westgate Road, Newcastle

Project 46 – Mechanical Engineering: Dispersion of point particles in a backward facing step configuration

Project 47 – Mechanical Engineering: Numerical simulation of polydisperse resolved particles in a vertical container

Project 48 – Mechanical Engineering: Particle accumulation in street canyons due to wind in urban environments

Project 49 – Chemical Engineering: Gas-solid reactions for environmental catalysis