

## Programme Specification

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### Evolution: From the Galapagos to the 21st Century (2021-22)

#### Subject to revalidation

This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities that are provided.

Awarding Institution	University of Southampton
Teaching Institution	University of Southampton
Mode of Study	Full-time
Duration in years	1
Accreditation details	None
Final award	Master of Research (MRes)
Name of award	Evolution: From the Galapagos to the 21st Century
Interim Exit awards	Postgraduate Certificate in Higher Education Postgraduate Diploma in Higher Education
FHEQ level of final award	Level 7
UCAS code	
Programme code	8170
QAA Subject Benchmark or other external reference	QAA Masters degree characteristics, 2015
Programme Lead	Neil Gostling

### Programme Overview

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#### Brief outline of the programme

The Master of Research in Evolution: From the Galapagos to the 21st Century is a programme that has been designed to allow students, from a range of backgrounds, to explore evolution in a vibrant interdisciplinary setting.

The programme links foundational topics in evolutionary biology with new methods, current global challenges and cutting-edge research topics including:

- Evolutionary Medicine
- Epigenetics/cancer/disease
- Sustainable Environment
- EvoDevo

- Bioengineering
- Computational Evolution
- Socioeconomic Systems
- Philosophy of Science

Distinctive features of this programme include:

A field course to the Galapagos, run by Ken Collins and Neil Gostling (the only one of its kind to be offered by a University in the world), gives students the opportunity to consider evolutionary biology, experimentally and theoretically, in the place that helped Darwin formulate his ideas about Natural Selection.

World-leading research groups in:

- DoHAD, epigenetics of health and disease (Hanson, Lillycrop)
- Extensions to Darwinian evolutionary theory (Watson)
- Evolutionary theory and modelling (Doncaster, Hoyle, Ezard, Watson)
- Evo-eco ,Evo-devo, Palaeobiology (Chapman, Dearing, Edwards, Ezard, Gostling, Marshall)
- allowing students access to project work and the most current thinking in evolutionary biology.

The programme allows students to address current research questions and high-impact challenges such as:

- Predicting responses to climate change (crop security, forestry, ecosystem services)
- Predicting disease outbreaks in interconnected populations
- Safe operating spaces for social-ecological systems
- To what extent does the modern synthesis explain the diversity and complexity of life?
- How does environment influence health and disease (over multiple generations)?
- How does epigenetics affect the mechanistic basis of evolution by natural selection?

This is a minimum of one and maximum of five year programme (one year full-time and up to five years if studied on a part-time basis) comprising mainly of research, but also containing taught modules from Biological Sciences, Ocean and Earth Science and other Schools across the University of Southampton. The MRes Evolution: From the Galapagos to the 21st Century is designed for graduates of biology, geology, environmental science, archaeology, computer science, mathematics, engineering and other relevant numerate disciplines, and offers students the chance to build on the background of their undergraduate degree, while allowing advanced specialisation in Evolutionary Theory in an interdisciplinary learning environment, in contemporary topics in evolution, following a designated pathway.

Taught and led by staff from Biological Sciences (BS), Archaeology, (ARCH), Electronics and Computer Science (ECS), Engineering (ENG), Mathematics (MAT) and Ocean and Earth Science (OES), the MRes is the 'teaching core' of a multidisciplinary venture, led by the Faculty of Environmental and Life Sciences, uniting evolutionary thinking and research across the University. Cutting edge research carried out by academic staff provides direct and enthusiastic input into this challenging and stimulating teaching programme. There are unique opportunities for students to undertake research projects with BS, OES, ECS scientists, archaeologists, mathematicians and engineers, with the potential to be involved with researchers in many other areas, exploring the current evolutionary synthesis.

The programme comprises of two parts: a taught component and an extensive research experience. The larger research component consists of a novel, independent (supported) research project that will be carried out in the state-of-the-art research facilities of the University. The smaller taught component is composed of four modules that will broaden skills in appropriate areas related to the research project. The exact portfolio of courses is selected with the advice of the academic supervisor of the research project. A list of supervisors, their discipline, and areas that you might like to research will be available at the time of application, and through discussion with them, you will be able to have formed ideas about the pathway you wish to explore by the time you arrive in Southampton. This program will provide an education and training suitable for a wide variety of careers and also will prepare you for undertaking a Ph.D.

Biological Sciences, and the University of Southampton are strongly committed to providing the very best learning experience to all our students in a friendly and stimulating environment. We are known nationally and internationally for our excellence in teaching, and are continually improving the scope and delivery of our activities. For example, postgraduate training in marine geology and geophysics at NOCS has received specific international recognition through our EU Marie Curie Training Site in Seafloor and Sub-seafloor Acoustic Imaging.

For students studying the MRes Evolution: From the Galapagos to the 21st Century, the spectrum of programmes within the Faculty, Electronics and Computer Science, and beyond in Southampton, are all scientifically exciting and challenging, as well as highly relevant to the modern world. Within this particular programme of study we aim to develop and enhance your knowledge of evolutionary theory, and enable you to apply it across the discipline of your choice, from palaeobiology to modelling; engineering to (even) business strategy; medicine to global change.

By the end of your MRes programme you will have extended your original subject-specific and more generic skills beyond the level of your undergraduate degree to incorporate evolutionary thinking in your 'non biology' discipline, or to apply evolutionary biology in a different way. This will be partially the result of further instruction during the programme, but also will be a direct result of the application and practice of your skills during your research project and the practical elements of your studies. Additionally, you will have developed research skills of sufficient depth to produce work that is publishable in refereed scientific literature.

Your contact hours will vary depending on your module/option choices. Full information about contact hours is provided in individual module profiles.

## **Learning and teaching**

### Teaching and Learning Methods

To assist the development of your knowledge and understanding of evolutionary theory we use a wide range of teaching methods in this MRes. You will develop core knowledge and understanding via compulsory modules and specialised option module lectures, tutor-led and student-led tutorials, student-led seminars and presentations, laboratory and practical classes, case studies, fieldwork, guided independent study, group study and your own research project. A wide range of support is available for those students who have further or specific learning and teaching needs.

Teaching and Learning methods will include:

- Independent (supported) project work on a research problem that could lead to results publishable in the peer reviewed literature;
- Regular meetings about research work with the supervisory team, with the lead academic as the key provider of guidance;
- Staff-led lectures, tutorials, seminars and demonstrations;
- Directed reading of the primary scientific literature;
- Student-led seminars and presentations (verbal and poster) and contributions to regular research group meetings;
- Carrying out written assignments and other activities associated with the coursework component of the modular component of study.

For the research-based component you will carry out an extensive research project on a topic related to the specialised area. You will plan the project with the support of your academic research supervisor. Initially you will carry out a preliminary review of the literature in the area of research to help you plan the overall objectives and build on the current level of knowledge in the area of research. This will give you the opportunity of producing results that would be of a standard to publish in peer reviewed journals. You will present an overview containing these elements at an early stage to your project supervisor and then have regular contact throughout the remainder of the project. This will include providing a regular summary of research finding to the supervisor. A detailed plan of the final dissertation will be presented to the supervisor three quarters of the way through the project and feedback provided by the supervisor in how to structure the final dissertation.

## **Assessment**

Taught component:

The taught component will be assessed by a mixture of coursework (e.g. essays, poster presentations, oral presentations) and examination. Some modules are not exam based. All skills centred learning is taken at FHEQ Level 7. The exams and coursework are designed to ensure that the learning outcomes have been achieved. The proportion of coursework and exam is that which is judged to most suit student engagement with the content of the course as well as judging the level of understanding. Past examination papers are available through the library website and also on the Staff Student Liaison Blackboard site under the appropriate heading.

Research component:

The research component will be assessed on the basis of the practical outcomes of the project work, ability to communicate these and also the understanding of background literature, all of which is judged through the production of a scientific dissertation. This will be assessed independently by an internal academic examiner within the University of Southampton in addition to the supervisor.

## Special Features of the programme

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MRes Evolution is a unique program, allowing students access to research in 9 schools across the University of Southampton. From biology to philosophy, archaeology to engineering, you will have the opportunity to work with academics carrying out studies at the forefront of evolutionary research (eg. The Extended Evolutionary Synthesis; Maternal effects and epigenetics; Developmental plasticity; emerging disease; palaeobiology).

Additionally, a field course to the Galapagos allows you to experience the world that Darwin did, and aided his formulation of evolutionary mechanisms. Working with researchers in Galapagos, you will experience 'evolution' first hand.

**Please note:** As a research-led University, we undertake a continuous review of our programmes to ensure quality enhancement and to manage our resources. As a result, this programme may be revised during a student's period of registration; however, any revision will be balanced against the requirement that the student should receive the educational service expected. Please read our [Disclaimer](#) to see why, when and how changes may be made to a student's programme.

Programmes and major changes to programmes are approved through the University's [programme validation process](#) which is described in the University's [Quality handbook](#).

## Educational Aims of the Programme

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The aims of the programme are to provide:

- In-depth training (in for example evolution and engineering/maths/computer science) through advanced coursework and an 8-10 month individual research project, which may be multi-disciplinary within evolutionary biology.
- A rigorous and suitable qualification that would enable you to proceed to a more specialist higher degree at the PhD level.
- Training in practical research methods and application of advanced techniques through both fieldwork, including specimen collection and consolidation and laboratory work, including preparation.
- A high-quality and intellectually stimulating experience of learning in a supportive environment.

In addition to the above, students enrolled on the MRes Evolution: From the Galapagos to the 21st Century will gain:

- An extensive and in-depth knowledge of Evolutionary Theory and its relationship to the disciplines aligned to this programme within biology, ocean and earth science and beyond through a taught module in the wider topics in evolutionary biology
- A sound theoretical knowledge and understanding of the relationships and evolution of the major lineages of living organisms
- Vocational training for a professional career in industries, including Museums, that have interests in evolution along the UK South Coast (inc. Jurassic Coast World Heritage Site and the Dinosaur Isle Museum, Isle-of-Wight);
- Critical appraisal and analytical skills in evolutionary theory and the ability to communicate results to non-specialists;
- Business awareness, communication and presentation skills, developed through group fieldwork, seminar presentations and production of a literature review and project dissertation;

- An opportunity for original and independent research in evolutionary theory in biological, earth, ocean and computer sciences, engineering, business, mathematics, etc.
- An opportunity to develop your skills in scientific computing and critical analysis of scientific literature.

## Programme Learning Outcomes

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Having successfully completed this programme you will be able to demonstrate knowledge and understanding of:

### Learning Outcomes

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- LO1. The value and need for multi-disciplinary approaches in advancing knowledge from a wide selection of topics currently at the frontiers of research and many of the specialist techniques used to investigate them.
- LO2. The use of a range of independent research methods.
- LO3. Knowledge and understanding of the scientific and technological principles underlying the chosen research specialisation in evolution;
- LO4. An understanding of how to design and test scientific hypotheses and an ability to address and develop strategies to resolve a research problem in the chosen specialist area;
- LO5. Skills in critical evaluation of primary and review scientific literature and the ability to develop this knowledge into an ability to collect, record and critically evaluate laboratory data

## Programme Structure

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The programme structure table is below:

Information about pre and co-requisites is included in individual module profiles.

### Part 1 (Year 1)

A Master of Research (MRes) programme differs from a conventional MSc programme in the balance between teaching and research. Training is provided in methods of research and opportunities are available to attend taught modules to support the research project. The research project will be related to the topic selected for the Research Proposal. A dissertation based on this is submitted at the end of the year for the degree of Master of Research.

Graduates will find the extra support offered by the MRes programme an excellent way to prepare for a subsequent three-year research project. Students should note that the research undertaken for the MRes Project would be independent of research for a PhD.

The programme involves teaching activities occupying about one third of the programme and a research project occupying the remaining two thirds of the programme.

The duration of the full-time programme is one year. Students undertake the taught component between August/September and May. The research component is undertaken throughout the whole year and normally completed with the submission of your dissertation by the end of July.

The duration of the part-time programme is between 2-5 years. Students normally undertake the taught component over 2 years. Semester 2 modules should normally be taken after Semester 1 modules. The research component is undertaken throughout the duration of your part-time registration. You will have up and until the July of your fifth year in which to complete your research and submit your dissertation.

Each taught module on this programme is normally worth between 7.5 and 15 credits, which equates to 75 – 150 hours of study. For example a 15 credit point module would normally comprise up to 30 hours contact teaching (lectures, practicals, etc.) with the remainder of the time for your own independent study.

You will also be encouraged to attend research seminars, which at Highfield Campus, Avenue Campus and the NOCS are run at a variety of different levels from research group to academic unit. In particular, you will be encouraged to attend key seminars from leading visiting scientists.

<b>Code</b>	<b>Module Title</b>	<b>ECTS</b>	<b>Type</b>
BIOL6088	MRes Evolution: From the Galapagos to the 21st Century Project 2020-21	60	Compulsory
BIOL6087	Topics in Evolution: from the Galapagos to the 21st Century 2020-21	7.5	Compulsory
SOES6052	Tropical Marine Biology Field Course 2020-21	7.5	Compulsory

#### **Part 1 (Year 1) Optional Modules**

Choose two modules from the following:

<b>Code</b>	<b>Module Title</b>	<b>ECTS</b>	<b>Type</b>
GEOG3068	Biogeography 2020-21	7.5	Optional
BIOL6074	Bioinformatics and Systems Biology 2020-21	7.5	Optional
BIOL6055	Computational methods for biological data analysis 2020-21	3.75	Optional
SESM6038	Computational methods in biomedical engineering design 2020-21	7.5	Optional
ARCH6121	Contexts for Human Origins Research 2020-21	7.5	Optional
ARCH3042	Ecology of human evolution: biological, social and cultural approaches to hominin adaptations. 2020-21	7.5	Optional
BIOL6090	Evolution and Development 2020-21	7.5	Optional
COMP6202	Evolution of Complexity 2020-21	7.5	Optional
BIOL6028	Global Change Biology 2020-21	7.5	Optional

BIOL6089	Independent Research and Literature Project 2020-21	7.5	Optional
SOES6022	Microfossil Evolution, Environments, and Time 2020-21	7.5	Optional
MATH6149	Modelling with Differential Equations 2020-21	7.5	Optional
SESM3033	Orthopaedic Biomechanics 2020-21	7.5	Optional
PHIL6048	Philosophy Individually Negotiated Topic 1 2020-21	7.5	Optional
MATH6140	Structure and Dynamics of Networks 2020-21	7.5	Optional
BIOL6033	The Molecular and Structural Basis of Disease 2020-21	7.5	Optional

## Progression Requirements

Students should pass the modules taken in semester 1 to progress to their research project in semester 2.

The programme follows the University's regulations for [Progression, Determination and Classification of Results: Postgraduate Master's Programmes](#). Any exemptions or variations to the University regulations, approved by AQSC are located in [section VI of the University Calendar](#).

## Support for student learning

There are facilities and services to support your learning some of which are accessible to students across the University and some of which will be geared more particularly to students in your particular Faculty or discipline area.

The University provides:

- library resources, including e-books, on-line journals and databases, which are comprehensive and up-to-date; together with assistance from Library staff to enable you to make the best use of these resources
- high speed access to online electronic learning resources on the Internet from dedicated PC Workstations onsite and from your own devices; laptops, smartphones and tablet PCs via the Eduroam wireless network. There is a wide range of application software available from the Student Public Workstations.
- computer accounts which will connect you to a number of learning technologies for example, the Blackboard virtual learning environment (which facilitates online learning and access to specific learning resources)
- standard ICT tools such as Email, secure filestore and calendars.
- access to key information through the MySouthampton Student Mobile Portal which delivers timetables, Module information, Locations, Tutor details, Library account, bus timetables etc. while you are on the move.
- IT support through a comprehensive website, telephone and online ticketed support and a dedicated helpdesk in the Hartley Library.
- Enabling Services offering support services and resources via a triage model to access crisis management, mental health support and counselling. Support includes daily Drop In at Highfield campus at 13.00 – 15.00 (Monday, Wednesday and Friday out of term-time) or via on-line chat on weekdays from 14.00 – 16.00. Arrangements can also be made for meetings via Skype.
- assessment and support (including specialist IT support) facilities if you have a disability, long term health problem or Specific Learning Difficulty (e.g. dyslexia).
- the Student Services Centre (SSC) to assist you with a range of general enquiries including financial matters, accommodation, exams, graduation, student visas, ID cards
- Career and Employability services, advising on job search, applications, interviews, paid work, volunteering and internship opportunities and getting the most out of your extra-curricular activities alongside your degree programme when writing your CV
- Other support that includes health services (GPs), chaplaincy (for all faiths) and 'out of hours' support for students in Halls and in the local community, (18.00-08.00)
- A Centre for Language Study, providing assistance in the development of English language and study skills for non-native speakers.

The Students' Union provides

- an academic student representation system, consisting of Course Representatives, Academic Presidents, Faculty Officers and the Vice-President Education; SUSU provides training and support for all these representatives, whose role is to represent students' views to the University.
- opportunities for extracurricular activities and volunteering
- an Advice Centre offering free and confidential advice including support if you need to make an academic appeal
- Support for student peer-to-peer groups, such as Nightline.

## Methods for evaluating the quality of teaching and learning

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You will have the opportunity to have your say on the quality of the programme in the following ways:

- Completing student evaluation questionnaires for each module of the programme.
- Acting as a student representative on various committees, e.g. Staff/Student Liaison Committees, School Programmes Committee OR providing comments to your student representative to feedback on your behalf.
- Serving as a student representative on Faculty Scrutiny Groups for programme validation.
- Taking part in programme validation meetings by joining a panel of students to meet with the Faculty Scrutiny Group.

Further details on the University's quality assurance processes are given in the [Quality Handbook](#).

## Career Opportunities

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The MRes Evolution: from the Galapagos to the 21st Century will equip you for a wide range of careers in science and other professions. During your program, you will have developed key transferable skills in practical and analytical subjects together with independent-learning, advanced problem-solving and critical thinking abilities which are valued by employers throughout the world. Graduates of the program will be scientifically literate and numerate, who can go onto further research (PhD) or into employment. A Masters by Research Degree offers a significant advantage over other Masters qualifications because they have a significant research component, making up two thirds of the program, equivalent to 8 months of research. This prepares students for the rigour of PhD study and an academic career. The interdisciplinary nature of this program offers unparalleled opportunities for students to take advantage of a curriculum with extensive transferable skills provision across a number of different modules, from computer science to maths, engineering and biology.

## External Examiner(s) for the programme

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Professor Michael Benton

Professor of Vertebrate Paleontology

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Students must not contact External Examiner(s) directly, and external examiners have been advised to refer any such communications back to the University. Students should raise any general queries about the assessment and examination process for the programme with their Course Representative, for consideration through Staff: Student Liaison Committee in the first instance, and Student representatives on Staff: Student Liaison Committees will have the opportunity to consider external examiners' reports as part of the University's quality

assurance process.

External examiners do not have a direct role in determining results for individual students, and students wishing to discuss their own performance in assessment should contact their Personal Academic Tutor in the first instance.

**Please note:** This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if they take full advantage of the learning opportunities that are provided. More detailed information can be found in the programme handbook.

## Appendix 1:

Students are responsible for meeting the cost of essential textbooks, and of producing such essays, assignments, laboratory reports and dissertations as are required to fulfil the academic requirements for each programme of study. In addition to this, students registered for this programme also have to pay for:

### Additional Costs

Type	Details
Meals during Galapagos Field course	Flights and accommodation are included in fees, but students need to pay for meals while in Galapagos (approximately £200-300)

In some cases you'll be able to choose modules (which may have different costs associated with that module) which will change the overall cost of a programme to you. Details of such costs will be listed in the Module Profile. Please also ensure you read the section on additional costs in the University's Fees, Charges and Expenses Regulations in the University Calendar available at [www.calendar.soton.ac.uk](http://www.calendar.soton.ac.uk).