

# Biomathematics & Statistics Scotland Corporate Plan 2012-2016

## VISION STATEMENT

*“to improve science & society through an understanding of variation, uncertainty and risk”*

## MISSION STATEMENT

*“to develop and apply quantitative methodologies with a rigorous mathematical and statistical basis”*

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## Introduction

Biomathematics and Statistics Scotland (BioSS) provides a distinct grouping of quantitative specialists working to improve the delivery and impact of research in the broad areas of agriculture, the environment, food and health.

BioSS's vision statement is:

*“to improve science & society through an understanding of variation, uncertainty and risk”.*

BioSS is primarily funded by the Scottish Government's Rural and Environment Science and Analytical Services Division (RESAS), and we are one of their Main Research Providers (MRPs).

Amongst the MRPs, the role of BioSS is:

**to deliver high-quality consultancy, training and research in statistics, mathematical modelling and bioinformatics as part of the strategic research in environmental, agricultural and biological science funded by the Scottish Government.**

BioSS has an international reputation for working at the interface between the mathematically-based sciences and a wide range of applied sciences. A science quality review of BioSS in 2009 described it as being “an already excellent organisation”.

BioSS's mission statement is:

*“to develop and apply quantitative methodologies with a rigorous mathematical and statistical basis”.*

BioSS has a distributed staff structure to enable effective engagement with scientists in the MRPs, but overcomes the challenges of geographical separation through a strong sense of corporate identity.

BioSS's core values are:

- to be experts at our work;**
- to be good collaborators;**
- to support each other;**
- to continually improve.**

BioSS is formally a part of the James Hutton Institute, but interacts scientifically with the MRPs and other external organisations as if it were independent. This is enshrined in the BioSS Strategic Planning Group, consisting of representatives from all MRPs, SASA (Science and Advice for Scottish Agriculture) and RESAS, which guides the strategic development of BioSS for the benefit of all these organisations.

This Corporate Plan is structured into the following sections, which together cover the context in which we work and strategic objectives for how delivery will be achieved:

**Our Applications** - in which we provide specialist statistical and mathematical expertise to improve scientific quality and efficiency;

**Our Research** - to address new challenges and underpin the technical expertise required by our collaborative applications;

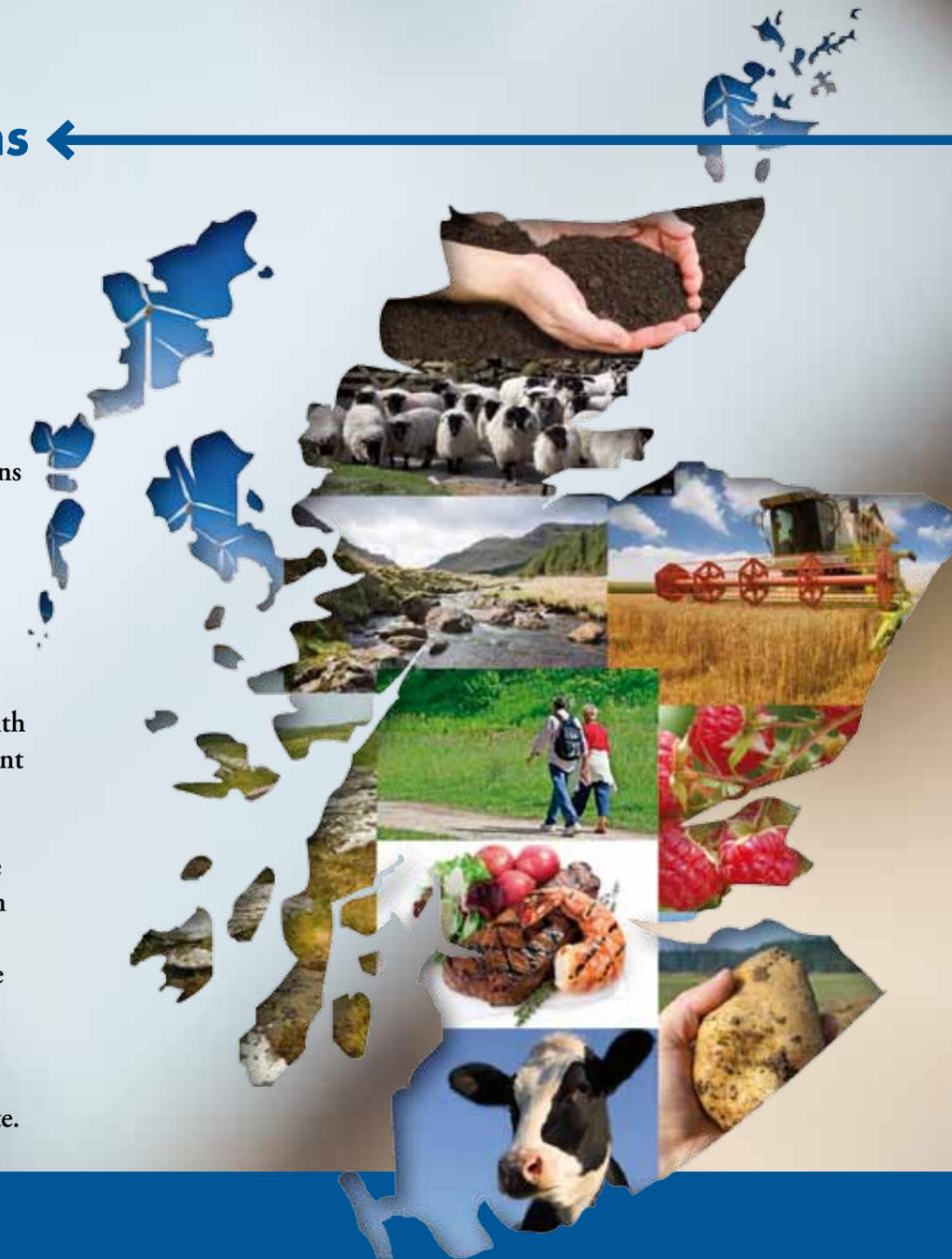
**Our Knowledge Exchange** - which ensures the quantitative expertise of BioSS staff benefits multiple target audiences;

**Our Staffing & Infrastructure** - to develop the intellectual, computational and organisational capability required to deliver the above;

**Our Finance** - to foster BioSS as a secure and sustainable organisation.

## Our Applications

The *raison d'être* for BioSS is to provide quantitative expertise to enhance the efficiency of research related to agriculture, the environment, food and health. Effective involvement in applications requires an appreciation of the scientific questions to enable the underlying quantitative issues to be identified and addressed. Consequently BioSS has a geographically distributed staffing structure to ensure close contact with scientists, allowing the establishment and maintenance of long-term working relationships, whilst our size enables staff to develop a range of specialisms that can be drawn on as required. Interactions between BioSS staff and scientists take place at a wide range of levels, from advisory to innovative, with design and analysis tasks carried out by BioSS or the scientist as appropriate.



### Strategic objectives

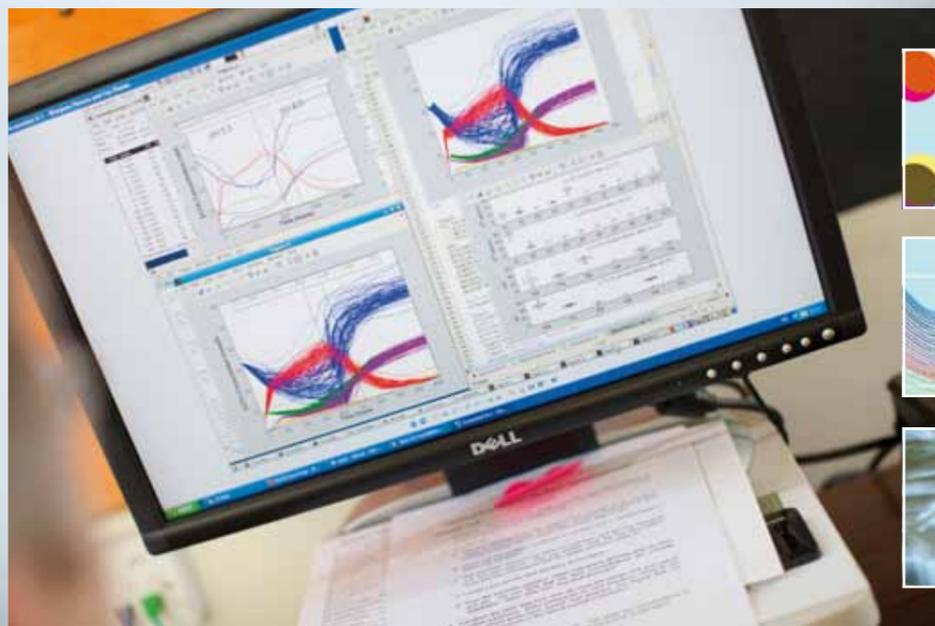
Over the period 2012-2016 we aim to expand the quality, scope and impact of the work in our application areas by:

- ↳ using our network of contacts to identify potential collaborative projects and contributing to these throughout their lifetime, from being properly costed into bids submitted to funding bodies through to co-authorship of reports, scientific papers and presentations to scientific and stakeholder audiences;
- ↳ working with existing and new scientific collaborators to ensure that experiments, surveys and observational studies are well designed, that modelling and data analysis take full account of all sources of variation, and that results are correctly interpreted given competing explanations and uncertainties;
- ↳ drawing on the capabilities developed in our research to ensure that the methodologies used accord with best current practice, and identifying generic quantitative issues to be addressed in our research;
- ↳ developing the profiles of BioSS staff in their respective application areas, raising awareness of our expertise in these areas and of the quantitative issues and approaches being taken in the subject as a whole.

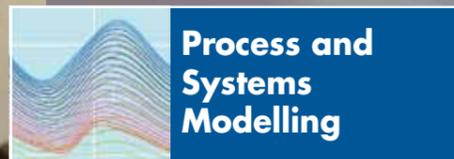
## → Our Research

BioSS has a programme of applied strategic research that underpins our applications by addressing generic methodological issues encountered. This research is focussed on topics that arise in multiple contexts, and either involves novel adaptations of existing techniques or, where necessary, more fundamental methodological

development. In either case, it is the closeness of our research to applications which provides the motivation, giving it a distinctive flavour in the quantitative research community and ensuring the benefits are immediately available in the application areas.



**Statistical  
Bioinformatics**



**Process and  
Systems  
Modelling**



**Statistical  
Methodology**

## Strategic objectives

Over the period 2012-2016 we aim to enhance our reputation for methodological research by:

- ↳ conducting a programme of applied strategic research in which we tackle generic quantitative issues that underlie important scientific problems encountered in our applied work;
- ↳ maintaining a high profile in the academic and research communities for our distinctive blend of application-driven methodological research, through authorship of papers, involvement in learned societies, and contributing to scientific workshops and conferences;
- ↳ developing our individual and collective skill sets, to stay abreast of the most important and relevant methodological advances, by sharing information through a variety of internal fora and by drawing on external expertise and resources;
- ↳ augmenting the funding available for research from the Scottish Government portfolio, through major awards from the EU and the UK Research Councils and through securing contracts that link our research expertise directly to the needs of government and industry.

## → Our Knowledge Exchange ←

BioSS's activities take place at the interface between the development and application of quantitative methodologies, hence much of our work contains an element of knowledge exchange (KE). We have found it necessary to take an adaptable approach to knowledge exchange, depending on whether the target audience is from the scientific community, research students, government & non-governmental

**Detailed discussions with clients and amongst colleagues maximises the quality and relevance of our work**



**Video conferencing reduces the need to travel**



organisations, the private sector or the general public. This has led us to develop: a suite of over ten training courses for scientists; a strong grouping of PhD students; a wealth of experience in how best to work with scientists from the research, regulatory and private sectors; bespoke software products with graphical user interfaces, and hands-on materials to encourage discussion of quantitative issues by example.

## Strategic objectives

Over the period 2012-2016 we will improve the efficiency of our knowledge exchange activities by:

- ↳ building on our successful history of training scientists in quantitative methodologies, advancing the use of adaptable formats for handouts and presentations with a wide selection of relevant examples;
- ↳ continuing to work with the other MRPs to create and take opportunities for KE tailored to meet the needs of our shared target audiences, identified as the four pillars of KE in the KnowledgeScotland development plan;
- ↳ developing software products to ensure that the algorithms developed in our research are made available to meet the needs of our user communities, including client organisations from the public and private sector;
- ↳ continuing to gain greater value from our Seedcorn money by part-funding co-supervised PhD students, with matched funding from other collaborating organisations, to help strengthen the next cohort of quantitative scientists.

## Our People & Infrastructure ←

BioSS is a knowledge-based organisation that depends on the expertise and enthusiasm of its staff. Our distributed staff structure ensures close contact with our scientific collaborators. To maintain internal cohesion, we hold three formal General Meetings each year, to allow an exchange of experiences and ideas, and encourage staff to meet informally to discuss topics of mutual interest. The BioSS Management Group (BMG) meets quarterly to co-ordinate our activities, following which there is feedback to staff. Our staff who are not on the BMG hold an annual 'Non Management Group Meeting' to discuss common concerns, culminating in a formal report to, and response from, the BioSS Management Group.

Our scientific achievements and the collection and presentation of management information



BioSS staff show off their Investors In People Silver Award

are underpinned by excellent IT facilities that are accessible over the internet. BioSS staff, students and collaborators can use shared servers and computer clusters both to reduce the computational demands on desktop machines and to enable them to capitalise on the full range of opportunities provided by the continuing remarkable advances in computing power.

## Strategic objectives

Over the period 2012-2016 we will improve the efficiency with which BioSS staff work by:

- ↳ ensuring staff understand what is expected of them, how their work contributes to our achievements as an organisation, and continuing to maintain an open dialogue between staff and management through informal discussion and annual 'Non Management Group Meetings';
- ↳ encouraging staff to identify with our core values, determining key areas for personal development, and providing everybody with opportunities to develop their technical and professional skills and capabilities;
- ↳ developing our computing and administrative systems to provide an enabling environment that makes best use of advances in IT capabilities in both our scientific work and in our systems for information provision;
- ↳ identifying methodological and technological advances that are important for BioSS's future development, and ensuring these are captured and shared amongst relevant staff.

## Our Finance ←

BioSS's principal sponsor is the Scottish Government's Rural and Environment Science and Analytical Services Division (RESAS). The basis of our RESAS funding changed substantially on transition to their 2011-16 portfolio, due to pension contributions forming a transparent part of the funding transaction and the inclusion of new, competitively funded, Centres of Expertise and Strategic Partnerships. The challenging environment for recruiting strong quantitative staff

has meant that the increase in our expenditure has lagged behind our success in raising additional revenue. Our past successes in attracting additional revenue, combined with highly skilled and committed staff, will enable us to move forward with confidence that our current income levels can be maintained.

BioSS augments its income from the Scottish Government with a wide range of grants and contracts



## Strategic objectives

Over the period 2012-2016 we will ensure the financial security of BioSS by:

- ↳ maintaining the high regard in which we are held, both for the quality of our research and for the guarantee of quality that our inclusion in projects brings to scientific work in our application areas;
- ↳ developing our capabilities in methodologies that are likely to be attractive to funding bodies, and continuing to expand the range of organisations we collaborate with in order to broaden our funding base;
- ↳ encouraging and supporting staff in their bids to obtain competitively funded work, and emphasising the importance of this by assigning 30% minimum time allocations for revenue generation to scientific staff;
- ↳ seeking to balance the mixture of short-term and long-term projects we bid for, and ensuring that the value of income obtained from short-term projects reflects their true costs for tendering and delivery.

# Contact points

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## Principal Collaborating Organisations

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**Rowett Institute of Nutrition and Health**  
Aberdeen AB21 9SB  
[www.abdn.ac.uk/rowett](http://www.abdn.ac.uk/rowett)

**Royal Botanic Garden Edinburgh**  
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[www.rbge.org.uk](http://www.rbge.org.uk)

**Science and Advice for Scottish Agriculture**  
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