

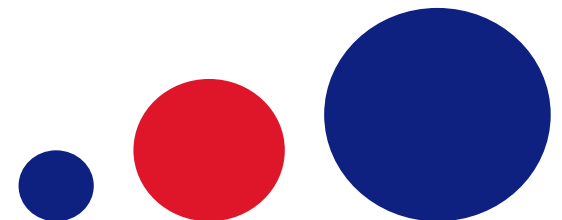


GOVERNMENT **O**PERATIONAL **R**ESearch **S**ERVICE

Government Operational Research

**Finlay Noble Chamings and
Kayleigh Henry-Ellis**
(Kayleigh.Henry-Ellis@gov.scot)

Scottish Government



Contents of this talk

- What is Operational Research?
- OR in the Civil Service
- An Analyst's Perspective
- Career Development
- Benefits
- GORS Recruitment Process
- Useful links



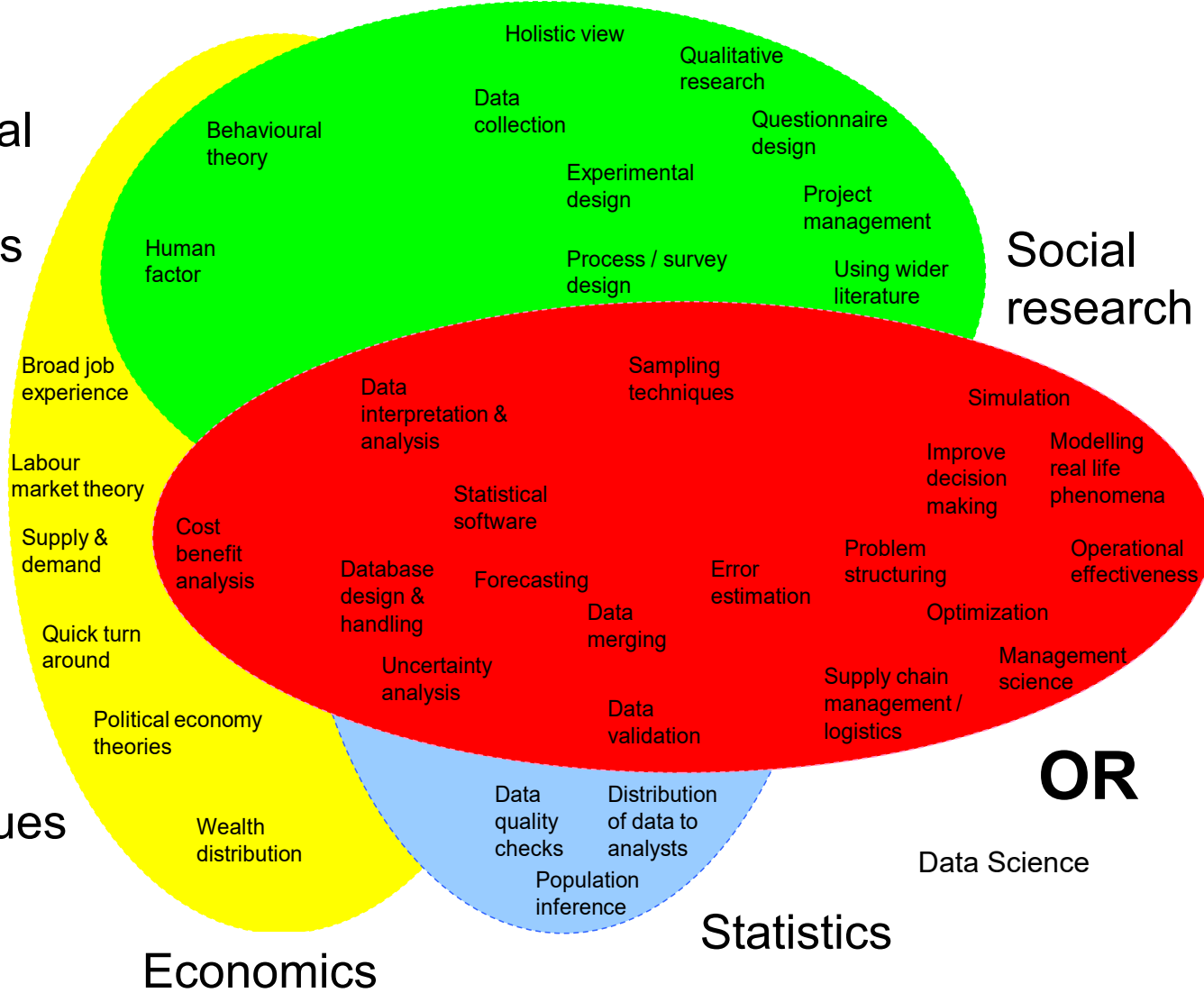
What is OR? What is GORS?

- Use mathematical techniques and software.....
- to solve complex organisational problems.
- Make better decisions!
“The science of better” www.scienceofbetter.org
- Many examples worldwide: workforce scheduling; building networks; processing queues.
- **GORS is the UK Government’s community of OR analysts**
- We are 950+ strong, working across 25+ departments
- Examples of our work:
 - Optimisation techniques to estimate the number of desks needed to minimise queues through airport immigration
 - Forecasting the flow of people through the criminal justice system



The analytical professions in Government

- We are the analytical minds informing Government policies
- Professions complement each other
- We might work as part of large multi-profession teams, or with operational colleagues



Where are we?



Scottish Government
Riaghaltas na h-Alba
gov.scot



HM Revenue
& Customs



Department
for Environment,
Food & Rural Affairs



Department
of Health



Food
Standards
Agency



Ministry
of Justice



Home Office



Department for
Communities and
Local Government



Department
for Culture,
Media & Sport



Education Office
Agency



Cabinet Office



Department
for Transport



Department
for Education



Department for
Business, Energy
& Industrial Strategy



Department
for Work &
Pensions



Office for
National Statistics

These are some of the departments employing GORS members, including those with the largest analytical groups. OR analysts are also employed in other departments and agencies.



GORS case study: forecasting

- **Department of Health needs to ensure blood supply meets demand**
 - Short shelf life
 - Need to optimise to minimise costs and wastage
- **GORS analysts forecast demand by identifying underlying drivers**
 - Demographics and health of population
 - Changes in number of procedures per 100,000 population requiring blood
 - Changes in average blood use per procedure
 - Challenges: obtaining, cleaning, verifying data!
- **Also modelled movement of blood in hospitals**
 - Identify possible cost savings
 - Provide evidence and incentives for change



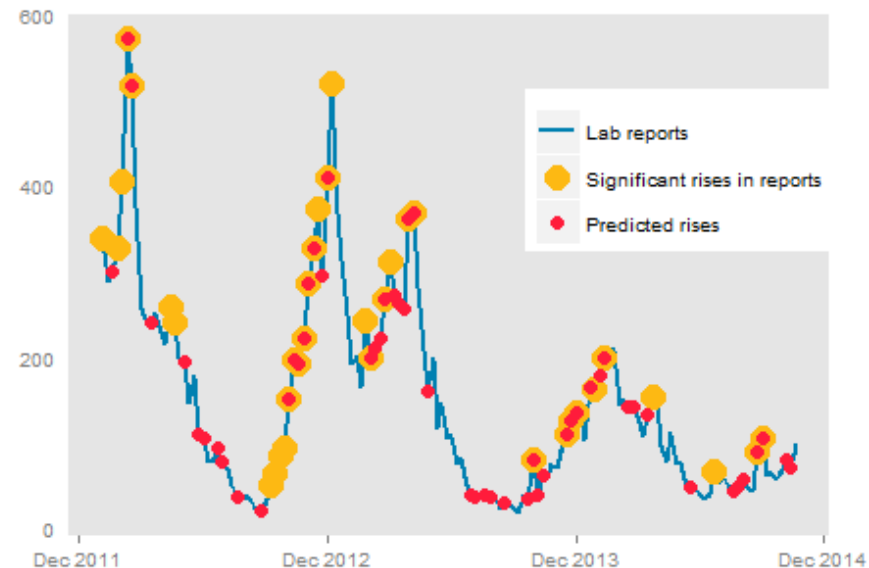
GORS case study: data science

- **Food Standards Agency want early warning of Norovirus outbreak**
 - When cases are rising (not peaked)
 - Launch targeted intervention, with NHS
- **GORS analysts used data mining and modelling**
 - Obtained 3 years of data from Twitter and lab reports
 - Build model to predict probability of outbreak from Tweets
 - New cross-team collaboration!



wintervomitingbug
upsetstomach
sicknessbug
sick
norovirus diarrhoea
vomit puke
stomachvirus
wintervirus
vomit AND virus

To reduce false positives, require three positives in a row



GORS case study: Covid-19 Analysis

- Weekly report including:
 - Contact patterns
 - Waste water
 - Projecting hospital and ICU demand

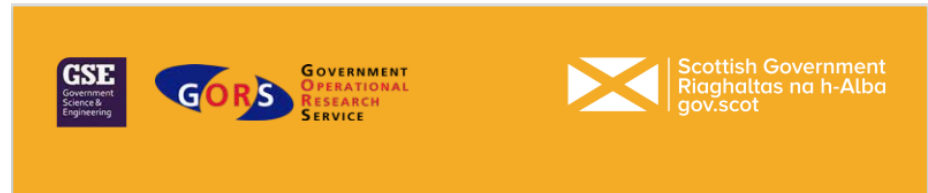
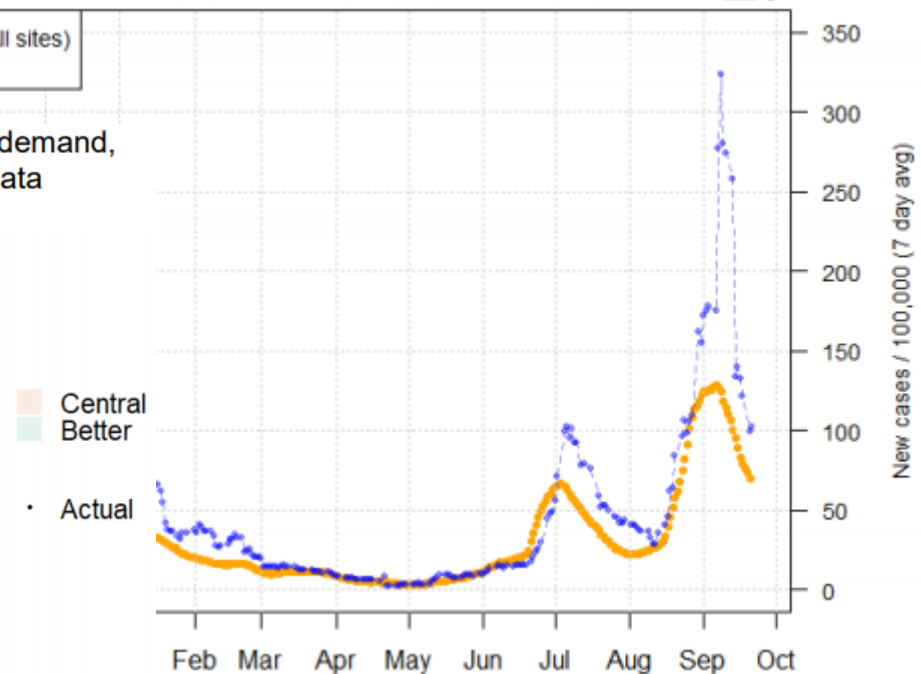
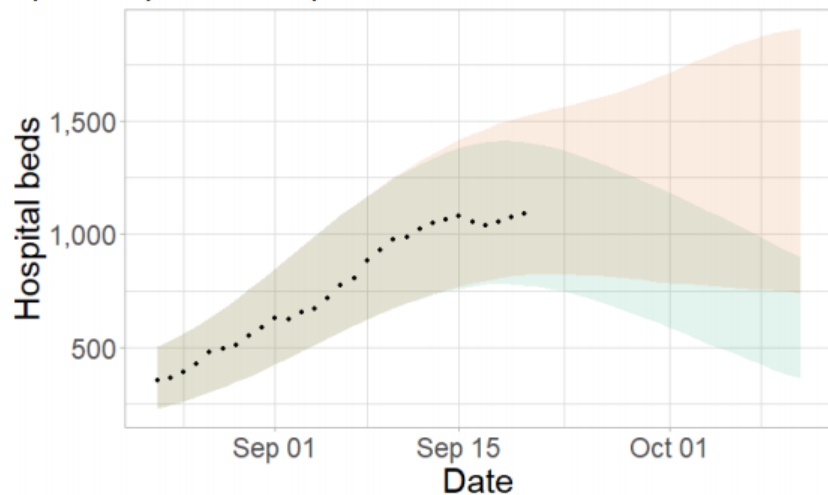


Figure 4: Mean Adult Contacts (truncated at 100) from SCS.



Figure 12. Medium term projections of modelled hospital bed demand, from Scottish Government modelling, based on positive test data reported up to 20th September.



Day in the life of an OR analyst

- Desk-based computer modelling and development
- Meeting with other analysts (areas of work overlap, expertise, etc.)
- Meet senior management to share outputs of work and scope further work
- Meet operational colleagues to better understand public service systems
- Provide training to colleagues
- Assist in recruitment
- Seminars or other training courses



My story – Kayleigh Henry-Ellis



Graduated with MSc Operational Research in 2015



Move to Newcastle to join DWP Fraud and Error Measurement Analysis Team as part of the Fast Stream



Ran and developed SAS code to produce Official National Statistics for fraud and error in the benefit system and helped to draft the publication



My story – Kayleigh Henry-Ellis



The Scottish
Government
Riaghaltas na h-Alba

Moved to Scottish Government 2016

SIMUL8

Built admin resource estimate model
from scratch



Small department – interaction with
stakeholders, line managing student
projects, pro bono projects...





Social Security Staffing Estimates

Kayleigh Henry-Ellis

The problem

Social Security Scotland needs to choose how many staff to recruit for benefits amid uncertainty around how many people will apply when a benefit launches.

Our solution

To present the impact of choosing a certain number of staff under different scenarios for the volume of applications received. Impacts considered included the length of time clients waited for a decision.



Long wait → Quick decision

Total days from application to decision		Staffing Scenario		
		Low	Medium	High
Volumes Scenario	Low	Green	Green	Green
	Medium	Red	Yellow	Light Green
	High	Red	Orange	Yellow

Our approach

A discrete event simulation model was built using Simul8 which varied the number of applications and the number of staff. Workshops were held to agree the scenarios to use for staffing and application assumptions.

The benefits

Simulation is a useful tool for visually showing the impact the number of staff has on “queues” of clients waiting for the decision on their application, and can show the effects over time.

This project highlighted the risks of each of the staffing scenarios in terms of their impact on clients, giving decision makers the ability to make a more informed decision where there is uncertainty.

My story – Finlay Noble Chamings, Social Security Scotland



2011–2015: Natural Science
MSci in Cambridge (mostly
physics)



The University of
Nottingham

2015–2019: Theoretical
Physics PhD in Nottingham



4th March 2020: Travelling...?



Social Security Scotland
Tearainteachd Shòisealta Alba

Rest of 2020:
Recovering
from long covid

Summer 2020:
GORS application

January 2021:
Joined Social
Security Scotland



My story – Finlay Noble Chamings, Social Security Scotland

- Current Work – Clinical Operations Modelling
 - Disability benefit applications may require input from a medical practitioner to understand the client's (applicant's) condition
 - How many practitioners do we need?

 - **What** tasks are practitioners needed to carry out?
 - **How many** times will each task need to be carried out?
 - **How long** do the tasks take on average?

 - Many of the answers depend on assumptions, so:
 - **Engage** with subject matter experts to work out assumptions
 - **Appropriate error analysis** in modelling



My story – Finlay Noble Chamings, Social Security Scotland

- Current Work – Clinical Operations Modelling
 - Monte Carlo model (in R programming language)
 - Randomly sample from **input** distributions (time a task takes, number of tasks you need to do)
 - Calculate a large number of **output** staffing estimates (one for each random sample)
 - Take average and confidence intervals
 - Present the data in the most helpful and clear way for those who need it (e.g. people in charge of recruiting)
 - Further engagement
 - Future refinement



Career Path?

- Increasing seniority as an analyst

Fast Stream

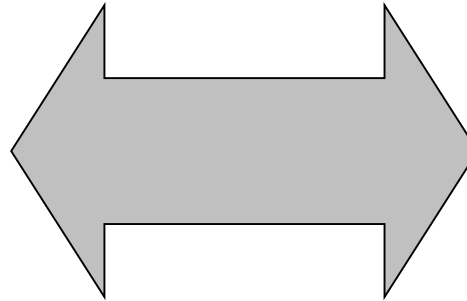
- GORS Level 1 (EO)
 - Analyst working under supervision
- GORS Level 2 (HEO)
 - Working more independently
- GORS Level 3 (SEO)
 - More project ownership
 - Line management?

- Principal Analyst / Grade 7 - 6

- Your own work area and team
- Contact with ministers
- *The expert?*

- Senior Civil Service (Grade 5-)

- No hands-on analysis
- Policy-facing
- Director levels, permanent secretary?!



- Change work area

- Change department

- Switch to more policy facing role

- Private office



Experiences and Opportunities

Training and professional development

- 100 hours dedicated development time (50/50 technical/core skills)
- Opportunities for paid skills training (e.g. Masters in Statistics)
- Ongoing learning and development opportunities, e.g. seminars, short courses, OR Society meetings, GORS conferences...
- Shadowing, secondment, departmental transfer opportunities
- Training courses provided specifically for new starters: political awareness courses, tours of parliament etc.

Wider experiences

- Social and professional networking within GORS and across government.
- Opportunities for volunteering and pro-bono OR
- Mentoring schemes



Benefits 1

Salaries

- Placement students: £17,500 to £26,000 pro-rata
- Salaries for posts vary by department, qualifications, relevant experience and location. Starting salaries are in the following ranges:
 - Fast Stream: £28,000 - £43,000 (London)
 - Fast Stream: £21,500-£35,000 (National)
 - GORS mainstream (EO-SEO): £28,000 - £50,500 (London)
 - GORS mainstream (EO-SEO): £21,500 - £46,000 (National)
- Most undergraduates or postgraduates start between £25,000 and £29,000. Some departments operate a flexible starting pay policy which may be available to successful applicants depending on relevant qualifications and previous experience.



Benefits 2

Benefits

- Exciting work with meaningful social impact: our work is vital in government decision-making and influencing policies that have a real and meaningful impact nationwide
- Flexitime, part-time, compressed hours, job sharing
- Between 22 and 30 days annual leave, 8 bank holidays, plus one privilege day per year
- Open, multi-discipline environment
- Working for the UK's largest 'business'
- high-profile projects
- networking opportunities



What are we looking for?

- Are you a technically-minded person interested in tackling the nation's problems using maths, modelling and systems thinking?
- Can you explain your analysis to a non-technical audience?
- Can you demonstrate the key skills and abilities laid out in the **GORS Technical Framework and Civil Service Success Profiles** (see website)
- 2:1 undergraduate degree in a highly numerate discipline
- ...or a 2:2 with relevant work experience and/or a postgraduate qualification in an appropriate discipline.
- Your degree must be at least 50% “highly numerate” i.e. with a strong component of Maths, OR, Physics, Econometrics, Engineering etc.
- **Predicted grades are accepted**



Nationality Requirements

- From 1st January 2021, broadly the following groups will be able to work in non-reserved posts within the Civil Service:
 - UK nationals
 - Nationals of Commonwealth countries
 - Nationals of the Republic of Ireland
 - EEA nationals with (or eligible for) status under the EUSS
 - Relevant EEA or Turkish nationals working in the Civil Service
 - Relevant EEA or Turkish nationals who have built up the right to work in the Civil Service
 - Certain family members of the relevant EU & Turkish nationals
- <https://www.gov.uk/government/publications/nationality-rules>



Routes into GORS for graduates

How to apply: www.operational-research.gov.uk

GORS Level 1-3

This is our main route for GORS recruitment for OR analysts across Government Departments. Level 1 is intended for recent graduates and postgraduates, whilst levels 2 and 3 for those with some experience of analysis and managing analytical projects.

Fast Stream

There are a limited number of places for the GORS Fast Stream – a talent management programme for graduates who have the potential to become the future leaders of the Civil Service.

One-Year and Summer Student Placements

There are 12 month and 3 month student placements in some departments.

2020/21 placements were available at the DWP, Home Office, HMRC, DfE, BEIS, MoJ, DfT, NHS England, Ministry for Housing, Communities & Local Government (MHCLG) and the Valuation Office Agency.



GORS mainstream (GORS levels 1-3)

How to apply: [Government Operational Research Analyst - Civil Service Jobs - GOV.UK](#)

Departments with vacancies: ~25 vacancies across most GORS Departments each round

Applications open: Multiple rounds per year – sign up for alerts! NOW OPEN!

Assessment:

Candidates are given 45 mins to prepare a 5 min presentation on one of three problem structuring questions. This presentation starts a 1 hour interview which includes follow up questions before moving onto competency based questions.

GORS Fast Stream

How to apply: <https://www.faststream.gov.uk/index.html>

Departments with vacancies: 70 vacancies across most GORS Departments

Applications open: Typically September to October. NOW OPEN!

Assessment:

Online assessment + ½ day Fast Stream assessment centre + ½ day Operational Research assessment centre



GORS One-year & Summer placements

How to apply: www.civilservicejobs.service.gov.uk

How does it work?

Join an analytical team in one of the participating Departments and contribute to their projects before returning to study.

Get full access to training opportunities for GORS employees.

You will be paid from £17,000 pro-rata, with 25 days pro-rata annual holiday.

Eligibility criteria:

2nd+ year of undergraduate degree with a high level of numerate content, expecting a 2:1 or above.

Next applications open:

2022/23 placement applications: Opening in Autumn 2021.

Assessment:

30-minute Operational Research Exercise and

40-minute competency-based interview (likely virtual)

Contact: Analytical.studentplacement@dwp.gov.uk

More info: <http://www.operational-research.gov.uk/recruitment/students/>



How to apply – important websites

1. **GORS website** - www.operational-research.gov.uk for general info, info on and links to fast stream, mainstream and student placement opportunities
2. **Civil Service Jobs website** - www.civilservicejobs.service.gov.uk – for mainstream and student placement opportunities across government. **GORS job search tips below:**
 - *Individual jobs for GORS main-stream (continuously advertised throughout the year):*
 - Find these by selecting ‘Operational Research’ under ‘Job Role’.
 - *Collective intakes for GORS main-stream (at specific times each year):*
 - Find these by selecting a specific “GORS” department under ‘Organisation’.
3. **Fast Stream** – <http://www.faststream.gov.uk/> - for all fast stream opportunities and lots of useful info. Search GORS fast stream by doing:
 - ‘Fast Stream Schemes’
 - ‘Government Operational Research Service’
4. **Job Alerts** – register for an account on Civil Service Jobs website: Log in -> Job Alerts tab -> Follow the instructions and set up for ‘OR and Analytical’.
5. Follow us on **Facebook**: <https://www.facebook.com/GovernmentOR> or search for “Government Operational Research Service – GORS”



How to apply – Applications now being taken

- **GORS mainstream**

[Government Operational Research Analyst - Civil Service Jobs - GOV.UK](#)

deadline Friday 22nd October 2021

- **GORS Fast Stream**

<https://www.faststream.gov.uk/index.html>

deadline Thursday 21st October 2021

