GOVERNMENT OPERATIONAL RESEARCH SERVICE
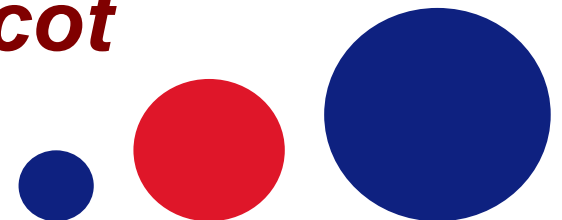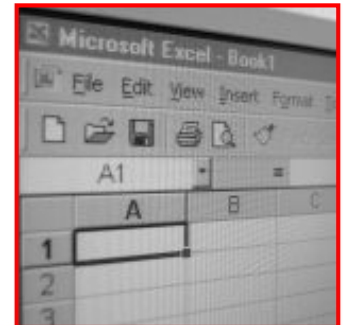
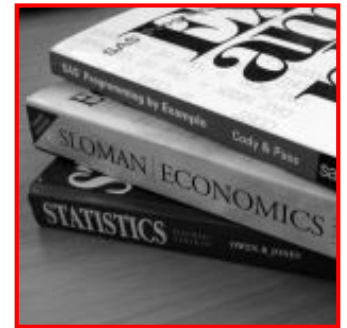# Government Operational Research

Kayleigh Henry-Ellis
Scottish Government

Kayleigh.Henry-Ellis@gov.scot

Contents of this talk

- What is Operational Research?

- OR in the Civil Service

- An Analyst's Perspective

- Career Development

- Benefits

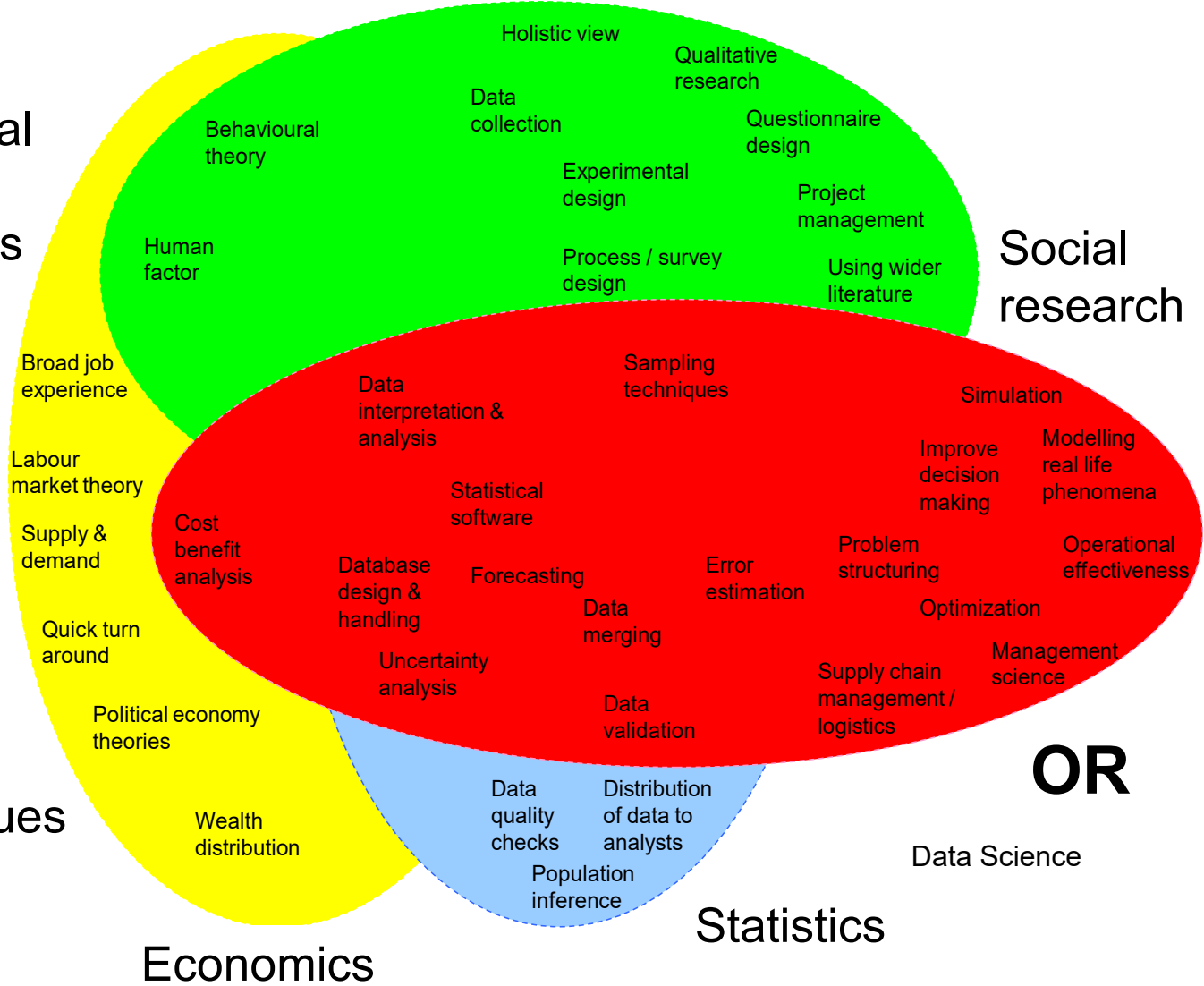- GORS Recruitment Process

- Useful links

- Contact Us

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What is OR? What is GORS?

- Use mathematical techniques and software…..

- …. to solve complex organisational problems.

- Make better decisions!
  "The science of better" https://www.theorsociety.com/about-or/

- 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

  – Prioritise funding for development projects in rural areas

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

Social research

Holistic view

Qualitative research

Data collection

Questionnaire design

Behavioural theory

Experimental design

Project management

Human factor

Process / survey design

Using wider literature

Broad job experience

Sampling techniques

Simulation

Data interpretation & analysis

Labour market theory

Statistical software

Improve decision making

Modelling real life phenomena

Supply & demand

Cost benefit analysis

Database design & handling

Forecasting

Error estimation

Problem structuring

Operational effectiveness

Quick turn around

Data merging

Optimization

Uncertainty analysis

Supply chain management / logistics

Management science

Political economy theories

Data validation

OR

Wealth distribution

Data quality checks

Distribution of data to analysts

Data Science

Population inference

Statistics

Economics

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Where are we?

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.

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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

DH Department of Health

NHS Blood and Transplant

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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
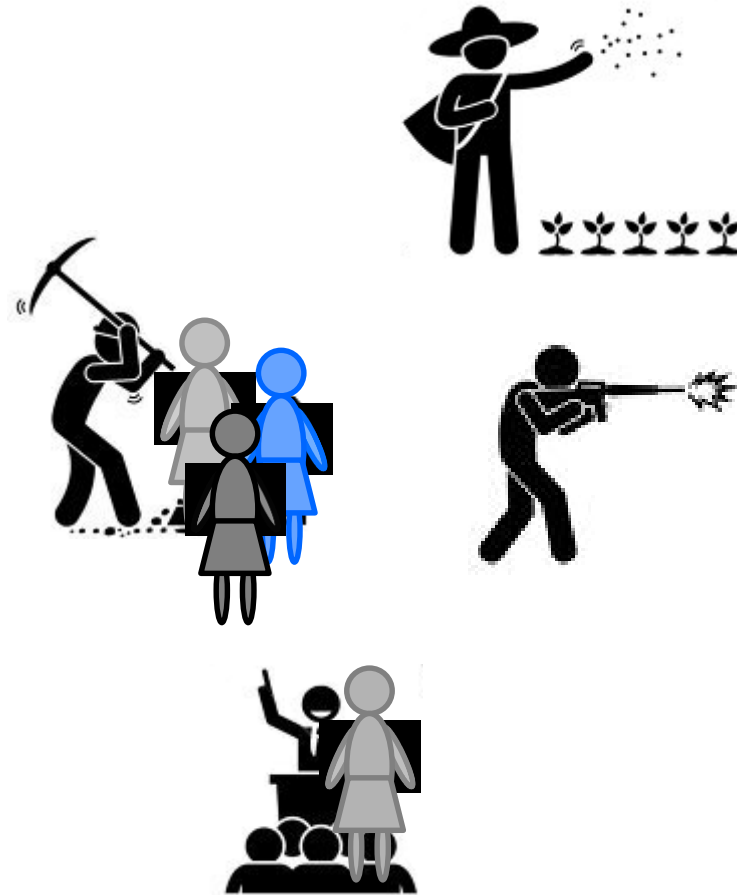vomit puke
stomachvirus
wintervirus
vomit AND virus

To reduce false positives, require three positives in a row
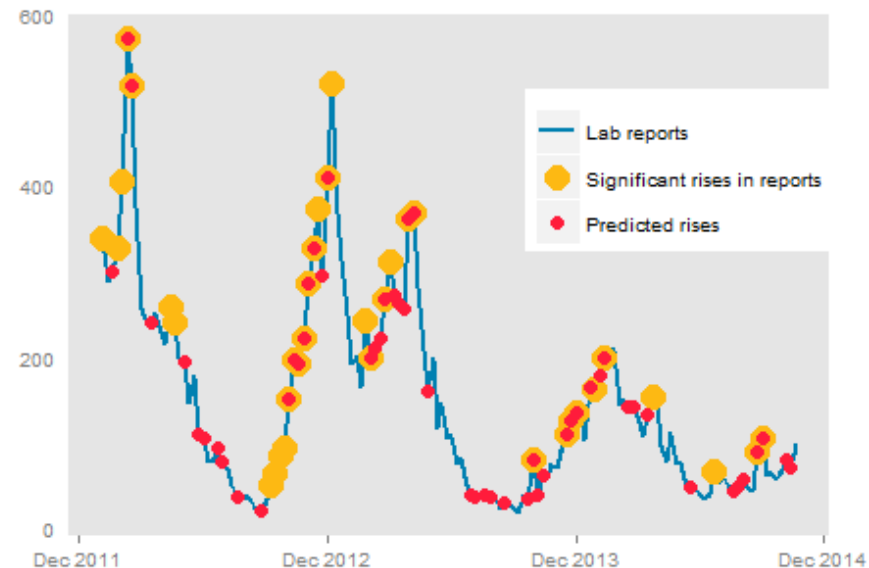
GORS case study: role assignment

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	90	100	10	10
	40	80	70	30
	20	90	30	80
	60	30	20	10

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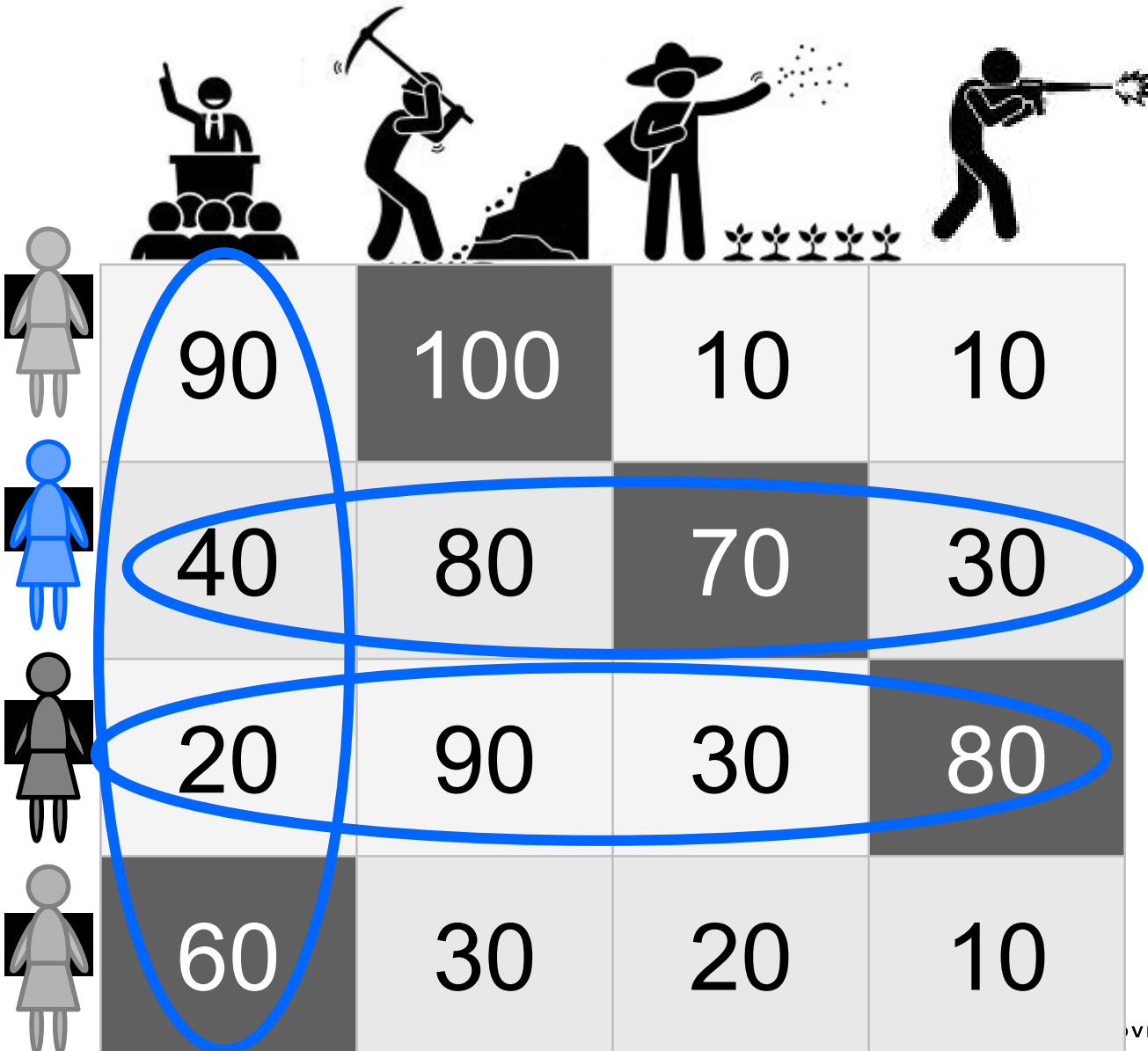
Day in the life of an OR analyst

- 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

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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 Ellis

Moved to Scottish Government

Built admin resource estimate model from scratch

Small department – interaction with stakeholders, line management, pro bono projects…

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![Scottish Government Riaghaltas na h-Alba gov.scot]

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			
	Medium			
	High			

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.

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

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Career Path?

- **Increasing seniority as an analyst**
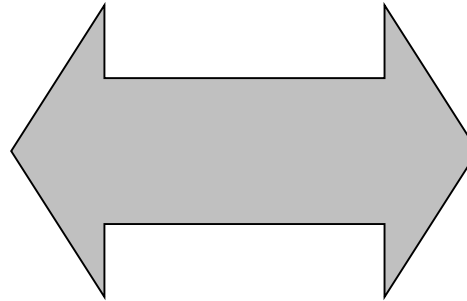
  Fast Stream ↓

  - 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

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Benefits

Salary (London)

Placement students: Minimum £20,000 pro-rata
GORS Level 1: £24,700 - *£38,000*
GORS Level 2: *£30,400 - £45,000*
GORS Level 3: *£32,000* - £51,400
Fast Stream: £33,900 - £45,500

Starting salaries will differ depending on entry level, department, location, qualifications and experience. There are substantial bonuses available in some departments for those with postgraduate qualifications.

Benefits

– Flexitime, part-time, compressed hours, job sharing

– Minimum 22 days annual leave plus 8 bank holidays, additional day each year

– Open, multi-discipline environment

– Working for the UK's largest 'business'

  – *high-profile projects*

  – *networking opportunities*

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Benefits

Salary (National – excluding London)

Placement students: Minimum £16,600 pro-rata
GORS Level 1: £21,600 - *£42,700*
GORS Level 2: *£27,500 - £42,700*
GORS Level 3: *£29,000* - £46,400
Fast Stream: £27,500 - £42,400

Starting salaries will differ depending on entry level, department, location, qualifications and experience. There are substantial bonuses available in some departments for those with postgraduate qualifications.

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- Flexitime, part-time, compressed hours, job sharing
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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 competency framework** (see website)?

- 2:1 undergraduate degree in a 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.

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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.

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GORS mainstream (GORS levels 1-3)

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

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

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

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: www.operational-research.gov.uk

Departments with vacancies: 50+ vacancies across most GORS Departments

Applications open until 22nd October: https://www.faststream.gov.uk/government-operational-research-service/index.html

Assessment:

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

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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 22 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:

2021/22 placement applications: Opening in Autumn.

Assessment:

40 minute competency-based interview in London or Sheffield

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"

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Contact details

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