Transire suum pectus mundoque potiri

The Newsletter

Editor:
David MacTaggart

The writing on the wall

In the last edition of the Newsletter, I took a potshot at the writing on the wall, in particular an inner product missing its vital "dot." If, however, you continue to read at the side and rear of the building, you will find that particular offense removed, and the inner product whole again. I've not yet spotted any other typos - answers on a postcard to the Newsletter. Jokes aside, the equations on the walls have become a big talking point and local attraction. It's a shame we will have to leave them when we move from this temporary building...

Despite this being the Autumn edition of the Newsletter, we are nearing the end of 2025. Therefore, let me wish our readers a very merry Christmas and a happy new year when it comes.

New Staff

Federico Stachurski joins us as a new research associate in Statistics. Federico is working on the GALLANT project.

PhD success

Many congratulations to *Emma Hunter*, *Cameron Wilson*, *Riccardo Giannini*, *Stephen Jun Villejo*, *Yuzhang Ge*, *Majaliwa Masolele*, *Weiyue Zheng*, *Francesco Pagliuca*, *Chenglei Hu* and *Richard Ammon* who passed their vivas in this quarter. If anyone has been missed, please let me know and I'll make up for it in the next quarter.

ERC success

Rachel Boyd has won a prestigious European Research Council (ERC) award to study moduli spaces in low dimensions. The project, named *Modulow*, will focus on studying moduli spaces of three-dimensional manifolds and knots or links within them. Moduli spaces are 'spaces of spaces': they capture all possible variations of these geometric objects in a single space. The project's methodology involves breaking complex objects into simpler pieces, solving problems for those pieces using geometric techniques, then using techniques from algebraic topology to reassemble the results and understand the original structure. The grant will fund two postdoctoral researchers and a PhD student. Many congratulations to Rachel and we wish her well in her research.

Birthday preparations

by Michael Wemyss

The University will be 575 years old in 2026, and numerous events will be happening across the University to mark this occasion. The School is hoping that during the course of 2026 to have multiple opportunities to bring together past and current students and staff to celebrate, and will keep everyone updated on our plans.

SoftMech Meeting

By Dirk Husmeier

Senior and early-career staff involved in the EPSRC-funded SoftMechˆSET research hub, led by *Dirk*, held a joint workshop with their partner hubs (Cambridge, Exeter and UCL) at Jesus College Cambridge on 18-19 September to mark the approaching end of the funding period and discuss opportunities for joint future grant proposals.

From BSc Stats to Mission Control

by Tereza Neocleous

Matej Poliaček (BSc Stats 2016) has taken his journey from the University of Glasgow all the way to the role of Flight Director at the German Aerospace Agency. While this isn't a typical career path for stats graduates, Matej reminds us that things often happen in serendipitous ways. Having been interested in science and space exploration since his childhood in Slovakia, Matej chose a STEM path for his undergraduate studies. After the first few years of his Single Honours Stats degree, he also discovered his love of software development through courses in Data Analysis and R. At the same time, while gaining work experience in finance, Matej realised that the traditional career path wasn't for him. Instead, he followed his passion for space by doing his final year statistics project on clustering of meteorite properties, a first step in a path towards his current role of flight director. Flight directors coordinate with various teams, serve as the interface to International Space Station astronauts during off-hours, and manage complex operations, though the role often goes unnoticed when things run smoothly. Matej finds the work rewarding despite its challenges, comparing the flight director's role to an orchestra conductor who ensures the big picture is maintained while relying on experts in their respective fields.

But getting there wasn't easy. Matej shared his experience of job hunting in the aerospace industry after completing his MSc in Computing Science, noting the intense competition for traditional roles. He eventually found success by applying for a data modelling position with fewer applicants, and is keen to highlight that the space sector offers diverse career opportunities beyond engineering. His advice to graduates? Be persistent, even if you don't tick every box on a job description. Apply anyway. He once applied for a role that ended up going to someone with a PhD in materials science, but the experience still helped him learn. Matej stresses the importance of combining foundational skills in statistics and software with domain-specific knowledge, sharing his personal experience of supplementing his education with online courses, and gaining soft skills from sports clubs and student societies. Matej's journey reminds us that sometimes the most exciting careers aren't planned, but discovered through curiosity, courage and persistence.

Matej at Mission Control.

Heart to digital heart

by Hao Gao

Hao Gao (Glasgow) and Dr Pierre-Frédéric Villard from University of Lorriane organized "the First International Workshop on Digital Twins for Mitral Valve" in Paris from 25-26 September 2025. This workshop explored mitral valve digital twins by uniting clinical imaging, machine learning and biomechanics experts. It addressed challenges in patient-specific modelling, including leaflet-blood interactions and limited imaging data, and presented workflows combining AI-based image processing with computational simulations. The session highlighted feasibility studies for major funding initiatives toward clinical translation. Oral Presentations were given by *Nick Hill*, *Jay Mackenzie*, *Sarah Donald* and *Linhao Kang* from the University of Glasgow, and Dr Marie-Odile Berger, Dr Pierre-Frédéric Villard, Dr Fateme Ghayyem and Ms Insaf Mellakh. Fruitful discussions have been generated from this workshop, which was supported by the British Council in Paris, the Springboard Programme for bilateral UK–France partnership grants with a focus on ECRs.

Hao Gao (front left) with members of the workshop.

Glasgow ICM 2030 Bid

By Brendan Owens

The bid for Glasgow to host the International Congress of Mathematicians in 2030, with the associated General Assembly meeting in Dublin, has been officially submitted on 19th November after more than a year of hard work. The bid committee includes *Damián Gvirtz-Chen*, *Ana Lecuona*, *Brendan Owens*, *Ian Strachan*, *Tiffany Vlaar*, *Andy Wand* and *Michael Wemyss*, as well as other members outwith the School.

The expected attendance would be in the order of 5000 people from all over the world. Competing bids from Hong Kong and Tokyo are expected to be submitted. The next stage of the selection process will be a site visit in February by the International Mathematical Union, and the final decision will be made by the General Assembly in New York next July.

The committee celebrated with a Cecil the Caterpillar cake.

Research Students' Conference (RSC) in Probability and Statistics

by Eilidh McMurdo

We were delighted to host the 48th Research Students' Conference in Probability and Statistics at the University of Glasgow in August 2025. 60 students from across the UK and EU attended, with lots of interesting talks and poster presentations given about their PhD research so far. Participants had great fun at the evening activities which included axe-throwing at Boom Battle Bar, a pub quiz in GUU, before finishing off the conference with a Gala Dinner and Ceilidh.

Along with the presentations and posters from participants, our three guest speakers, Dr Kate Pyper (Tesco), Dr Ivona Voroneckaja (Hypercube) and *Professor Claire Miller* (University of Glasgow), gave wonderful presentations to participants about their careers.

The generosity of our sponsors, including the Heilbronn Institute for Mathematical Research (UKRI EPSRC), and The School of Mathematics and Statistics (UofG), allowed us to keep ticket costs low. Additionally, the Royal Statistical Society kindly provided 2 prizes for the best talk and poster with free registration to RSS 2026, and Tunnock's provided snacks for the welcome packs. To reduce the ticket and travel costs for those from underrepresented or disadvantaged backgrounds, funding was also kindly provided from the Marion Reid EDI and Public Engagement Fund

Thanks to participants for attending, along with the department, our guest speakers, and sponsors for their support with RSC 2025!

The RSC Team: Eilidh McMurdo, Iain Bell, Aaron Coats and Claire Singleton.

Glasgow Science Festival proposals now open

By Ella Gilchrist

The year 2026 marks a significant milestone for Glasgow Science Festival as we reach 20 years old! This year's festival will run from Thurs 4th to Sun 14th June 2026. Since the festival was set up in 2007, we have engaged with 860K+ people at our in-person events and over 1 million+ when we include digital engagements. Thank you to everyone who has been involved over the years, some of you for nearly all 19! We felt this warranted a deviation from our usual 'themes', so our title for this year is:

Glasgow Science Festival 2026: Cheers for 20 Years!

As always, we leave things open to interpretation, but we are looking at a retrospective on the festival, what outstanding ways has Glasgow-based research contributed to their respective fields over the last 20 years, and what could the next 20 years look like

Our partners have a very broad research base, so as always, please don't worry if you have a great idea that doesn't fit with the theme. Not all our activities will, and we would still want to hear from you. GSF is a STEAMS festival, encompassing Science, Technology, Engineering, the Arts, Mathematics and Social Science. Proposals from all fields are very welcome.

All information about the festival and how to submit your proposal can be found on our website. Proposals will remain open until **Monday 12th January 2026**.

Statistics at the Data Science & AI Festival

By Daniela Castro-Camilo

The Statistics Group delivered two lively events at this year's Data Science & AI Festival. Solving Real-World Problems with Statistics and Data Science showcased how our research tackles challenges in health, environment, policy, and society, with attendees exploring real examples of statistics driving impact. Later, Stats in Action: Games of Chance, Change, and Creation brought statistics to life through hands-on activities, including a storm-response forecasting game, the inequality-themed Life's Not Fair board game, and AI-assisted creativity with CoArtLab. Both sessions were energetic, engaging, and a great celebration of the breadth of Stats@Glasgow.

Participants playing Life's Not Fair.

Mathematics & Climate

By Tiffany Vlaar

I am a founding member of the Institue of Mathematics and its Applications' (IMA) first special interest group on Mathematics for Climate, Environment and Sustainability. We hosted our first event in De Morgan's House in London on 23 September. A full report is available *here*, with photos therein, and will also appear as an article in Mathematics Today. This was also featured by the Parliamentary and Scientific Committee, see *here*.

Full recordings of the day are available on the *IMA's YouTube channel*.

Ed. note: please consult the online version of the Newsletter for the links in this article.

Wind Research

By Klimis Stylpnopoulos

Paul Ghelasi (a visiting PhD student from the University of Duisburg) and I organised a wind and price forecasting workshop at the Whitelee Wind Farm in Glasgow, under the guidance of *Jethro Browell*. The event included presentations on recent research developments in wind forecasting, electricity price forecasting, and household emissions. We also welcomed a guest speaker from the Aristotle University of Thessaloniki, Greece, who presented new insights into energy droughts in the Mediterranean region.

Workshop participants.

HECKTOR 2025

By Surajit Ray

Team AISTAT, led by *Professor Surajit Ray* with his PDRA *Dr Baixiang Zhang*, has achieved 2nd place in Task 3 of the prestigious HECKTOR 2025 Challenge.

Task 3 focused on the diagnosis of HPV status from FDG-PET/CT imaging and clinical information, a critical component in head and neck cancer management. The team's innovative multimodal learning approach earned them a cash prize of €300.

Their related paper, "From Pixels to Prognosis: Multimodal Learning for Head and Neck Cancer in the HECKTOR 2025 Challenge," will be published soon

Science Slam!

Many congratulations to *Zita Fülöp*, who was the winner of Science Slam 2025. Science Slam is an annual event that provides a unique opportunity for our talented PhD researchers to present their projects in a creative and innovative way.

NEWTMALS

By Raimondo Penta

The Centre for Mathematics Applied to the Life Sciences (CMALS) has organised the "New trends in Mathematics and Life Sciences" workshop on September 15th and 16th 2025, partially supported by the Glasgow Mathematical Journal Trust. The workshop took place in room 116 of the Mathematics and Statistics Building, School of Mathematics and Statistics, University of Glasgow. The primary aim of the event was to stimulate new collaborations and discussions concerning Mathematics Applied to life sciences. The workshop featured a confirmed line-up of invited speakers, round tables, Networking lunches & coffee breaks. Further details can be found *here*.

Historical Curiosities

Teaching 1st year mathematics got me thinking about the origin of some of the basic terms that we use all the time. Starting with the term *mathematics* itself, this was interchangeable in Roman times with *astrologer*. In the post-Roman world, this association diminished and Cassiodorus (d.c. 583), in his *Institutiones*, defines mathematics in this way: *Mathematica, quae quattor complecitur disciplinas, id est, arithmeticam, geometricam, musicam et astronomicam,... est scientia quae abstractam considerat quantitatem* - Mathematics, which is composed of four disciplines, that is, arithmetic, geometry, music and astronomy,... is the science which considers abstract quantities. As someone whose research combines mathematics and astronomy, I'm very much in favour of this classical definition!

During the medieval period, many words were inherited from classical Latin. Examples include the arithmetic operations *addere*, *subtrahere*, *multiplicare*, *dividere* and *quadrare*. Words were also borrowed from Greek and Arabic sources and incorporated into Latin, such as *cubus*, *parallilos*, *polyhedron* and *problema*. Sometimes words were transliterations rather than translations, such as *isogonius* and *omologus* from (the Greek) Euclid's *Elements*. From Arabic, some well-known words were taken directly, such as *algebra* from the title of al-Khwārizmī's text *Ḥisab al-jabar wa'l-muqābala* (c. 825) and *algorismus* from that author's name.

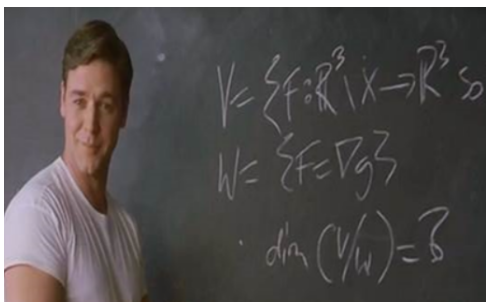
Words related to trigonometry also have Arabic origins. For example, the word *sinus* translates the Arabic word for "curved line." There were several different versions of sine that related to lengths, with the opposite side of the triangle, corresponding to

what we refer to today in relation to the sine, being the *sinus rectus* (right sine). "Tangent" and "cotangent" were *umbra versa* and *umbra recta* respectively. The tangent is the shadow cast by a rod affixed to a wall and horizontal to the ground, and a cotangent is the shadow cast by a rod fixed vertically in the ground. These words have indeed cast long shadows!

For more information, including many references, I recommend the essay by Barnabas Hughes O.F.M. called "Mathematics and Geometry" in *Medieval Latin: An Introduction and Bibliographic Guide* (Ed. F.A.C. Mantello and A.G. Rigg).

Maths at the Movies

There are very few films with serious mathematics written on blackboards, so when this happens, we at the Newsletter make the most of it.



The mathematician John Nash was played by Russell Crowe (above) in the 2001 film *Beautiful Mind*. In this classroom scene, Crowe (Nash) walks into the classroom, throws the textbook in the bin, tells the students that the class is a waste of time (particularly of his time) and then has "knowing glances" with the most beautiful student in the class (Jennifer Connelly). Apart from this perfect mathematics lecture realism, some interesting mathematics gets written on the board. As written, the problem posed would help from being fleshed out somewhat:

$$V = \{\mathbf{F} : \mathbb{R}^3 \backslash X \to \mathbb{R}^3 \,|\, \nabla \times \mathbf{F} = \mathbf{0}\},$$

$$W = \{\mathbf{F} \in V \,|\, \mathbf{F} = \nabla g\},$$

$$\dim(V/W) = ?$$

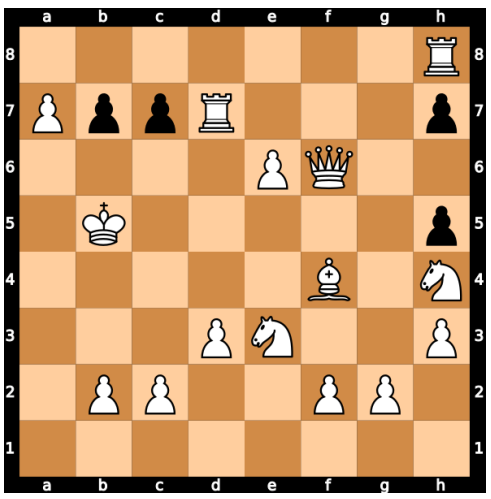
So what is this problem about? First, is it really a question mark or the number 8? When speaking to a former colleague, *Daniele Valeri*, he favoured the latter and turned it into a problem his 2nd year calculus students could work through. Here we will do the same, but to make things even simpler let's set $\dim(V/W) = 1$. The challenge is to find a solution for planar vectors using knowledge from 2nd year linear algebra and vector calculus. In words, V consists of vector fields on $\mathbb{R}^2 \setminus X$ (for our reduced problem) that are irrotational and W is the subspace of vector fields defined on $\mathbb{R}^2 \setminus X$ that are both irrotational and conservative. The question is, what is X such that $\dim(V \setminus W) = 1$? If $X = \emptyset$, then we have the classic result of irrotational vector fields being conservative. To solve our problem, we need a (slightly) more complex X. The general version of this problem is described by de Rham cohomology, in which there is a close connection between the construction of vector spaces and their topology. A solution will be provided with the next Newsletter, giving X and the general form of $\mathbf{F}$. A famous quote from the scene is "This problem here will take some of you many months to solve..." Let's see if that is true.

The link to the solution from last quarter's problem is *here*.

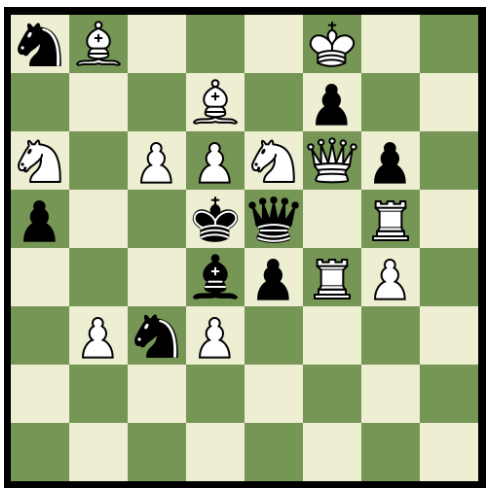
Hodge Theory

by David Hodge

For this month, we return the logical genre of retro problems. A problem from mathematician and composer Cedric Lytton, published in the Sydney Sunday Mirror in 1968. Here's the final position of a game, where white has just given checkmate, but the black king has rolled off the board. Which square must it have been on?



Last issue's solution:



If white could pass then there are checkmates ready for every single black move!

1...Na8-any 2.Ne6-c7#; 1...a5-a4 2. Nb4#; 1...Nc3-any 2.d3xe4#; 1...Bd4-any 2. Q/Rxe5#; 1...e4-any 2.Rxd4#; 1...f7xe6 2.Qxe6#; and 1...Qf5/Qxg5 2.Qxd4#

However, every white move that tries to pass, except one, prevents one (or more) of these lines working. E.g. 1.b3-b4? a5-a4! and there's no 2.Nb4#. Or more trickily, 1.Kxf7? Qf5! and now 2.Qxd4# is not legal; or 1. Ke8? Nc7+! and 2.Ne6xc7# it not legal.

The solution is 1.Kg8! with all the mates described above. This problem was composed by Carel Sammelius and published in 1963.

Head of School's Corner

by Nigel Mottram

Many thanks to David for bringing together another very entertaining newsletter - mention of the (*award winning*) *equations on the side of the building* reminds me that we have a large poster for the foyer about to be printed, explaining the mathematics and statistics behind our building's external decoration. Judging by the number of people I see standing outside, gazing up at the building in deep discussion with their friends, I think some explanation would be very well received. I also enjoyed hearing about Matej Poliaček, and I thought it would be worth using this space to mention a bit more about the increasing emphasis on graduate skills and employability that we have been developing in our courses over the last couple of years. For many students, one of the most important outcomes of a degree in the mathematical sciences is not just the deeper understanding of the structure and beauty of their subject, but the graduate attributes and skills that prepare them for life beyond university. Skills such as logical reasoning, critical thinking, finding structure in complex systems, effective communication, and the ability to assess and adapt to new challenges are all at the heart of our programmes, but we sometimes don't emphasise them enough to our students. At Open Days and Offer Holder Days I meet many students – and particularly parents – who are increasingly focused on skills and employability. They want to know how a Maths & Stats degree will be "useful", by which they often mean how will it open up opportunities after university and lead to a rewarding career. Technologies such as artificial intelligence are transforming the world of work, creating new roles and reshaping existing ones, and we need to emphasise that a deep understanding of mathematics and statistics (which often underpins these new technologies) will allow them to fully embrace such advances, and adapt to new ones in the future. In the School we already have skills-focused courses ("Professional Skills" and "Writing and Presenting Mathematics" spring to mind) and our online *Continuing Professional Development courses* are all focused on skills for the workplace – but through our recent Curriculum Reviews, we are now developing new courses and adapting existing ones to make sure our graduates are ready for whatever awaits them after they leave us. Our new and redeveloped courses in programming, Machine Learning and other areas of AI will undoubtedly be popular with students who are thinking of useful skills for their careers. We also continue to put project work at the core of our Honours-level teaching, and the research, problem-solving and presentation skills that this develops will be hugely beneficial. Of course, our "*Statistics with Work Placement*" degree – which includes a full-time work placement year within a five-year programme – has always had employability embedded in it. In 2026 we will launch new equivalent work-placement degrees for Mathematics students and combined-honours Mathematics & Statistics student. All of this in-course learning is complemented by the University's Careers Service, with the *Graduate Attributes* framework, and by networking and alumni events organised by the *Maclaurin Society*. One of these recent MacSoc sessions was hugely popular, and it was wonderful to hear from our recent alumni about how they have used the maths and stats they learned during their degree. If you're interested more generally about how students use a maths and stats degree, then you can find the UK-wide annual survey report *here*. Graduate destinations are certainly at the front of my mind today, as I'm writing this on the day of our winter graduation ceremony, and if you know of alumni – recent or otherwise – with an interesting story to tell, then please get in touch. It would be great to share with prospective and existing students the wide variety of careers our graduates pursue.

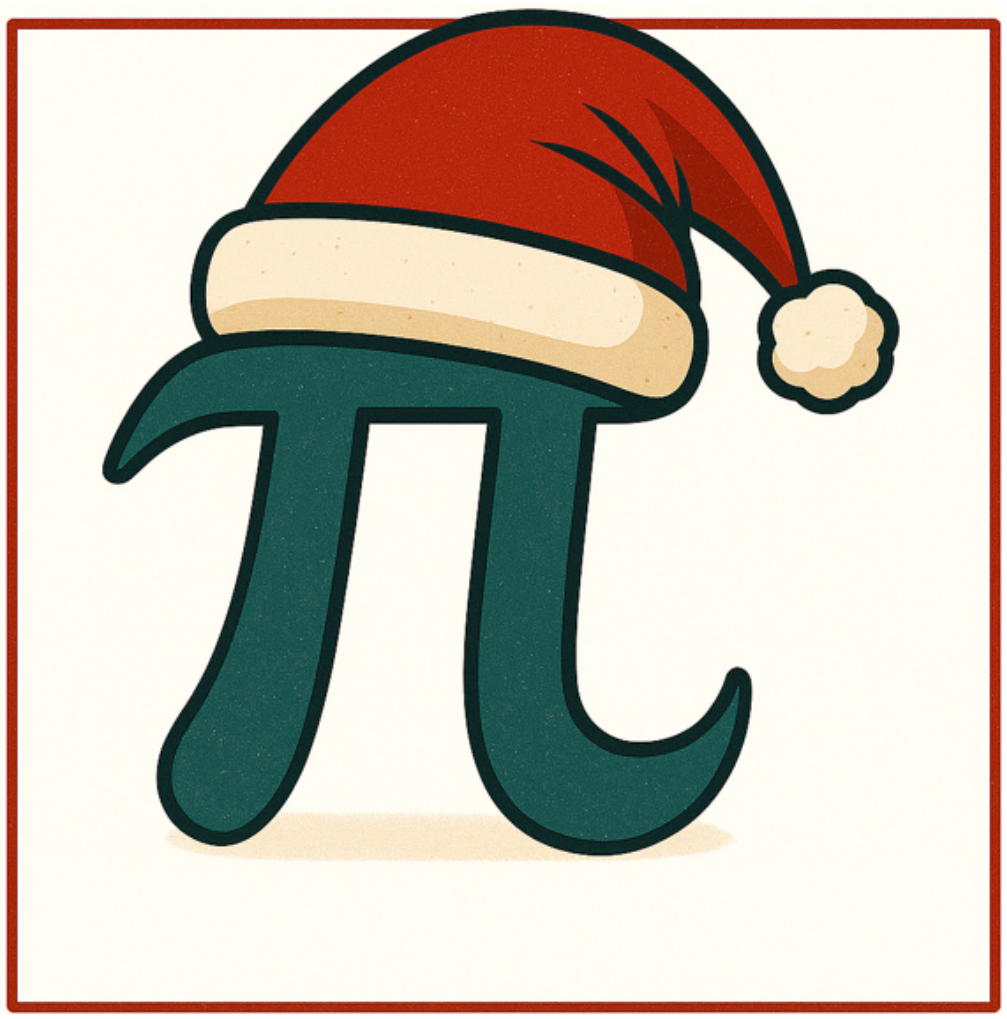
Pet Therapy

Here is our last pair of furry friends for this year. First up is *Voe*. As can be seen below, his favourite sport is waterskiing, but he does go running with *Jenn Gaskell* too.

Getting into the spirit of the festive season is *Lynsey-Anne Moffat's* dog *Daphne*. Turkey tasting is a big responsibility and I also, humbly, sacrifice myself for this role every year too.

Let us know

Thank you to all who contributed to this quarter's Newsletter. If you would like to contribute to future editions, we would be delighted to hear from you. Please contact the Editor at *david.mactaggart@glasgow.ac.uk*



Don't eat too many mince πs over Christmas,
that would be irrational!