

*Transire suum pectus mundoque
potiri*

The Newsletter

Editor:
David MacTaggart

A NEW BROOM

Greetings dear reader! If you are familiar with the School Newsletter, you will have noticed some obvious changes. With a new editor comes a new (or is it old?) style. It is hoped that this new version of the Newsletter will maintain the high standards laid down by our first editor, *Jethro Browell*, to whom much gratitude is owed.

THE BARNETT AWARD

We are delighted to announce that our very own *Claire Miller* has been given the Barnett Award from the Royal Statistical Society.

Claire's leadership in applying statistical approaches to real-world environmental challenges has produced monitoring and research methodologies used both in the UK and internationally. Claire's contribution to environmental statistics and her work in water quality measuring, monitoring and forecasting has been pioneering.

The Barnett Award and named lecture was established in memory of environmental statistician, Professor Vic Barnett. It is awarded annually to encourage and promote the recognition of outstanding contributions to the field of environmental statistics. The Barnett Award winner delivers the Barnett Lecture at the RSS Annual Conference.

Many congratulations Claire!

NEW STAFF

In this quarter we have been joined by new staff. They are very welcome and we wish them the very best for their time with us in Glasgow.

Valentin Aslanyan joins as a Research Associate with the Geophysical and Astrophysical Fluid Dynamics Group. He is an expert on computational plasma physics and will be working on modelling the solar dynamo and differential rotation.

Baixiang Zhao joins as a Postdoctoral Research Associate funded through multiple projects in medical image analysis combining Deep Learning and Statistical Learning. Baixiang will be working on developing a proof-of-concept tool for tumour delineation and radiotherapy planning using Positron Emission Tomography (PET) for clinical applications.

PHD SUCCESS

Many congratulations to *Roberto Andrade*, who passed his viva in this quarter.

INFINITE JIGSAW PUZZLES

BY MIKE WHITTAKER

Do you consider yourself a puzzle pro? Try your hand at aperiodic tiles - shapes which fit together perfectly to tile the plane but the infinite pattern never repeats. Test your maths and problem solving skills with these hands-on never ending puzzles.



Xiaoqi Lu, Mariam Mubarak, Lucia Nölle, Lorna Richardson, Tao Shen, and Mike Whittaker led an "Ask the Expert" event at the Glasgow Science Centre during the weekend of March 15-16. The event fit in with the British Science Week and had three examples of wooden aperiodic tile sets that the public could play with to try their hand at creating a patch of an aperiodic tiling.

ANALYTICS FOR DIGITAL EARTH

BY CLAIRE MILLER

In March 2025, we hosted the final event in this series of workshops, funded by a successful application for the Mardia prize of the Royal Statistical Society.

Over the past 3 years, the team in Statistics & Data Analytics (led by *Vinny Davies* and including (in no particular order): *Andrew Elliott, Mu Niu, Ruth O'Donnell, Jethro Browell, Xiaochen Yang, Jethro Linley, Lawrence Bull, Janine Illian, Marian Scott* and *Claire Miller*) has organised a series of events to bring people from industry, government, and academia together to combine expertise and discuss how to design and implement digital twins and link them to form a digital earth.

The closing event had fantastic speakers from the Alan Turing Institute, Plymouth Marine Laboratory, Rothamsted and UofG. The discussion panel explored the evolving role of environmental digital twins with collaboration emerging as a key theme, highlighting the need for stronger partnerships between governments, academia, in-

dustry, and communities to drive research and implementation. Looking ahead, major gaps in scalability, standardization, and interoperability were identified, stressing the need for robust uncertainty quantification and data fusion.

Online readers can find out more *here*.

ON BEING GALLANT

BY LUIGI CAO PINNA

A team of multidisciplinary researchers and I, in the GALLANT project, won some funding for six-month research in Govan. The project will support Glasgow City Council's current effort in mapping city trees and their ecosystem services and focus on one of the most deprived areas of the city. Novel multimodal deep learning pipelines will be applied to integrate LiDAR, aerial, hyperspectral, field-based observations and citizen science generated data. Please get in touch with Luigi for info or suggestions.

COMPLIMENTI!

BY MAYETRI GUPTA

Two of our final year Honours students, *Camila Andreozzi* and *Glauco Rampone* (who are Double degree students with the University of Bologna), won first prize at the Undergraduate Edinburgh Operational Research Challenge this March.

The challenge was run in partnership with Public Health Scotland, who proposed a strategic resource allocation problem to determine how to best serve public medical emergencies. Students participated from several universities across the UK. The first prize went to *Camila Andreozzi* and *Glauco Rampone* (University of Glasgow and University of Bologna), who were awarded a paid summer internship with Public Health Scotland and £400.

Online readers can find out more *here* and *here*.

GETTING TO THE POINT

Congratulations to *Meyvizhi Sasibala Senthil Raja* for reaching the final of the UofG's 3 Minute Thesis (3MT). Meyvizhi's presentation is entitled "Drawing the Line on Disease Risk."

The 3MT is an international academic competition developed by The University of Queensland, Australia, which challenges PhD students to consoli-

date their ideas and research discoveries and present a compelling oration on their thesis in just three minutes in language appropriate to a non-specialist audience.

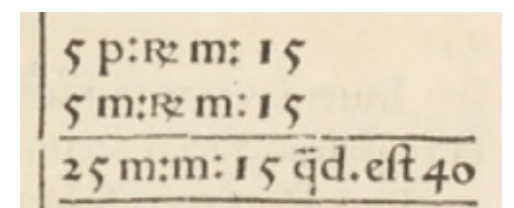
HISTORICAL CURIOSITIES

Girolamo Cardano (1501-1576) is probably best known today in relation to solving cubics. However, he should also be known for publishing the first account, in Latin, of *complex numbers*. The book in question was published in 1545 with the title *Artis Magnae, Sive de Regulis Algebraicis Liber Unus* (Book 1 of the Great Art, or on the Principles of Algebra), which is normally shortened to *Ars Magna* (The Great Art). This is also the first Latin text dedicated entirely to algebra.

Complex numbers appear in *Ars Magna* as the solution to a given problem. In modern notation, this would be written as

$$x + y = 10, \quad xy = 40.$$

Converting these equations to a quadratic, the solutions are readily found to be $5 \pm i\sqrt{15}$. Cardano writes that he does not really understand what is going on, but ploughs on regardless. His solution is shown below:



In Cardano's notation, first two rows list the solutions $5 + \sqrt{-15}$ and $5 - \sqrt{-15}$ respectively. In the last line, he checks that their product equates to 40, i.e. $25 - (-15) = 40$.

Cardano's final words in this section are particularly interesting, "...*hucusque progreditur Arithmetica subtilitas, cuius hoc extremum ut dixi, adeo est subtile, ut sit inutile*. (...and so arithmetical subtlety proceeds, of which this extreme [example], as I said, is so subtle that it may as well be useless.). History has proved that complex numbers are certainly subtle but definitely not useless!

REMEMBERING VICTOR

BY CHRIS ATHORNE

People in the ISMP group will have known Victor Enolski. He visited Glasgow on a number of occasions and joined us for our ISLAND conferences on Islay, Arran and Skye. He was deeply knowledgeable on the

subject of generalised Weierstrass P-functions and collaborated with myself and Chris Eilbeck from Heriot-Watt.

Victor passed away in June 2019. The news reached us at the ISLAND conference on Skye, and I wrote a pair of poems at the time which have now appeared in the journal *Poetry Scotland*. I'd visited Victor in Kyiv the previous year and my partner and I had visited Knoydart earlier in 2019. Loch Nevis (and Knoydart) are located across the sound from the Gaelic College where the conference was held.

The poems are reflections on distance and loss.

i

The thistle's uneven pendulum,
the gull that slips against the stream,

the cloth of water, wrinkled
between the wind's thumbs,

where one by one the hills stand forward
then retreat in limelight on the Sound of Sleat

a small caged, strimming RIB's
stopped by a pod of Minke.

There's Inverie: a one horse town;
one pub, one road, the one way round.

You may walk to the point where Our Lady
stands to bless
and a white chip of a sail moves on the
white crests.

A diver sends up a gunshot of spray.
It's somebody's death in the afternoon.

ii

You showed me your childhood
above the Andriyivsky Descent,

the architecture of golden artichokes
and the house of the Lionheart,

the great gate to the East,
the bricked up streets.

We were pugilists in Sophia Square
with fists for laughs in the city of snipers.

In Maidan the flak suited troops
were running to tanks.

School kids were climbing on Howitzers.
Imagine this, a home!

That year, when we took off to Knoydart,
there were Minke in the Sound.

NOT PHYSICS BUT NATURAL PHILOSOPHY

BY ARIEL RAMIREZ TORRES

Raimondo Penta and I have recently been informed that our bid to host the 60th Meeting of the Society for Natural Philosophy at the University of Glasgow in the summer of 2026 has been accepted (featuring Raimondo and I as co-organisers). This is a prestigious and historical conference in continuum mechanics, and we are delighted that our proposal has been

accepted. Here below a brief description of the society: "The Society for Natural Philosophy, founded in 1963 by the late Clifford Truesdell, nourishes specific research aimed at the unity of mathematical and physical science. It seeks to recognize and promote work of high quality. It operates through organization of selective meetings on topics of common interest to small groups of mathematicians, physicists, chemists, and engineers." Online readers can discover more *here*.

Editor's note: For those who don't know Clifford Truesdell, I heartily recommend you look him up. A man after my own heart - the founder of the journal *Archive for Rational Mechanics*, he grew frustrated at the quality of scientific writing in English and so allowed submissions in other languages, including Latin!

NÁBOJ

BY SHAZIA AHMED

We were delighted to host the Náboj international mathematical competition on Friday 14 March for the third year in a row. The competition is hosted in many cities across 15 countries with the event taking place concurrently across all centres. We welcomed 90 students and their teachers from schools in and around Glasgow with 12 teams competing in the junior (S3/4) category and seven in the seniors (S5/6), more than doubling the numbers participating in previous years.

Each team started with a sealed envelope containing the first 6 problems. As soon as the team solved a problem, one team member took their solution to the problem checkers. If the solution was marked correct, the team member took the problem slip to the problem exchangers who scanned the problem showing it had been successfully solved. The next problem in the sequence was then issued.

There was a live leaderboard which could be configured to show the progress of the teams in the room, the country or internationally; we switched between 'room' and 'country'. It was a very intense two-hour period where the teams worked hard to solve as many questions as possible with Williamwood High School scooping the first prize in both categories!

Thanks very much to *Tara Brendle* for her welcome talk for the pupils. Thanks also go to our student helpers: *Ellie Hughes, Matthew Parker, Samirah Mohammed, Ryan Lamy, Matthew Burke, Emma Crawford* and *Katie Coligan*, and to staff helpers and organisers: *Steve Roper, Lewis Dean, Matt Durey, Ruth Douglas, George Vazanelis* and *Shazia Ahmed*. We are also grateful for the financial support from

the Marion Reid Bequest, Glasgow Mathematical Journal Learning and Research Support Fund, Edinburgh Mathematical Society and sponsorship from Jane Street.

If anyone would like to be involved with the organising or problem-testing, please get in touch with the outreach team *here*.

COFFEE MATHS

Here is one for discussion at the coffee break (marker pens at the ready!).

Let H_n be the n -th harmonic number

$$H_n = \sum_{k=1}^n \frac{1}{k}.$$

The Euler-Mascheroni constant is defined as

$$\gamma = \lim_{n \rightarrow \infty} (H_n - \ln n).$$

Show by means of a *visual* proof that $1/2 < \gamma < 1$. Hint: think of Riemann integration.

The elegant solution is due to *Ángel Plaza* from the University of Las Palmas de Gran Canaria. The solution will be available with the next Newsletter.

THE LIGHTER SIDE OF THE EQUATION

Toilet humour

The contents of what is scribbled on the walls of the gentlemen's bathroom are not normally worth any consideration. However, the following mathematical jibe appeared on a wall from the old (University Gardens) building:

$$\frac{\sin x}{n} = \text{six}.$$

Bookworm

It is true that students make less use of the library these days. If they did, however, they would find many gems and the odd surprise. For example, in UCLA, students of analysis could swat up on their material with the aid of

SEX, CRIME AND FUNCTIONAL ANALYSIS

PART 1: FUNCTIONAL ANALYSIS

BY J.D. STEIN

It is not known if Parts 2 & 3 were ever published... For many more anecdotes, see *Mathematical Apocrypha* by Steven G. Krantz.

Honours review?

A proposal question for the new course on differential forms:

Write the equations of electromagnetism, ideal fluid dynamics and ideal MHD in terms of differential forms. (3)

Solution: $dF = 0$, $dG = 0$, $dH = 0$.

One for the lecture

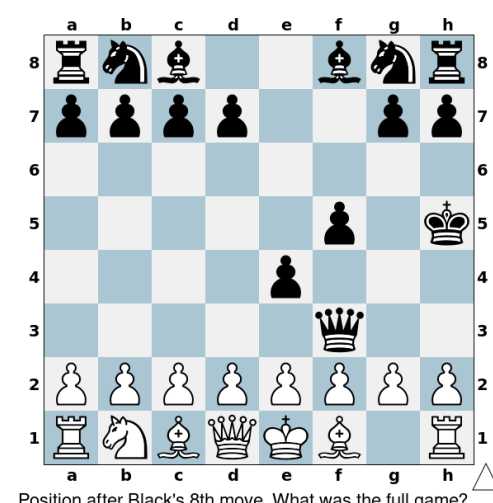
Do you know what's odd? Every other number.

Editor's note: It's the way you tell 'em!

HODGE THEORY

BY DAVID HODGE

If you found the last quarter's problem easy or just want something different, here's a trickier retro problem for the logicians, or those who watched Ludwig on the BBC last year (the only limitation for such 'retro' problems are that all the moves were legal, not that they were good or sensible!). Remember, the solution will be totally unique!



Here's the solution to last time's problem in standard (ish) notation: 1. Bg8 Pc2 2.Rf7 Ka2 3.Ra7 mate. This was the only way for white to win in three, it's shocking that white's first two moves are to run away almost as far as possible from the action. The critical idea is to cross over the f7 square with the bishop to give black a legal move on turn 2.

THE LIFE OUTSIDE

Many of us in the School enjoy hiking but few reach the level of our very own *Jenn Gaskell*. Jenn recently made a *Life Outside* podcast about running across the Himalayas...twice! The podcast is available on Spotify or, for our online readers, *here*.

HEAD OF SCHOOL'S CORNER

BY NIGEL MOTTRAM

This newsletter is slightly later than originally planned because I was waiting until I had attended the annual HoDoMS (Heads of Departments of Mathematical Sciences) meeting. HoDoMS has existed for thirty years, since its first meeting at UCL in 1995, and from then on has been part of the UK mathematical sciences landscape – aiming to “discuss and promote the interests of HE Mathematics in the UK and to facilitate dia-

logue between departments.” It does this through input into various reports, acting as a sounding board and contributing to surveys that inform policy documents produced by, for instance, CMS, IMA, LMS, RSS, and more recently the Academy of the Mathematical Sciences. It also does this through the annual meeting, at which Heads of Departments and Schools meet for two days. This annual meeting is part information session – often with reports from EPSRC, INI/ICMS and the professional societies – but also with sessions on current topics of interest, such as government higher education policy, teaching practices, the REF, knowledge exchange, student demographics etc, but it’s also a chance for all Heads to compare notes on the situations in their respective Universities – essentially a group therapy session!

The talks from each annual meeting can be found the Events section of the HoDoMS website (<https://www.hodoms.org.uk/document-category/events/>), and you may be interested in talks from previous years. This year’s talks will eventually be put up on the same page, but you can already see the programme by clicking here. Because of the financial uncertainties facing UK Universities this year, and the impact this is having on Departments of Mathematical Sciences (as well as all other Departments), this year’s meeting was very well attended. Some of the Heads have had to deal with losing staff through voluntary redundancy schemes (one University was on its third round), some were starting or had been told of imminent compulsory redundancies schemes, and some were in the fortunate situation where no such schemes were being implemented – all Universities were being very cautious about committing any funding without greater certainty about student enrollments in September, which will be influenced by so many factors, including government policy in the UK but also overseas (particularly China, USA and Australia) and the economic situation in countries from which our international students arrive from. As I’ve mentioned in recent emails and at School Meetings, at Glasgow we are in a relatively good position, with the finances of the University being in a healthy state – although there remains a very cautious approach to our finances as we go forward.

The coffee time discussions at the HoDoMS meeting are always particularly useful for Heads to compare their strategies going forward and to share ways that we can demonstrate the continuing and growing need for the mathematical sciences – in the teaching of students, in fundamental research, in scholarship and in translating our re-

search into impact.

All of the talks and discussions were interesting, but I wanted to pick out two particular sessions – on the first day there was a talk on “AI in the teaching and learning context” by Michael Grove and on the second day a discussion titled “Navigating senior management” led by Chris Linton.

Michael Grove is already well known to those in the School that have an interest in AI tools for learning and teaching – he is a Professor of Mathematics and Mathematics Education, and is the Deputy Pro-Vice-Chancellor for Education Policy and Academic Standards at the University of Birmingham. He talked about the use of AI at Birmingham, by students and academics, and that they have now started using AI tools to assist staff in grading and providing feedback [1]. In fact, many students have been using AI tools for feedback for some time now, and he highlighted the need to make sure students understood the value of feedback from academic staff (usually as well as AI-generated feedback). Michael also stressed that much more work is needed to understand how we can effectively use AI for learning and teaching, and to understand what mathematicians of the future will need in terms of skills in using AI tools – he mentioned previous workshops on this topic in Glasgow [2] and online [3] and he encouraged everyone to attend the upcoming workshop in Edinburgh [4] – it seems that Glasgow is certainly at the forefront of this topic!

Chris Linton led an extremely interesting discussion on effective interaction with senior management at Universities (Chris has been Head of Maths, Head of College and a Deputy Principal at Loughborough, so he offered advice from many different angles). HoDoMS operates under Chatham House Rule, which meant the discussion was very open, but it also means I can share some of the discussion without attributing comments. The key points seemed to be: that it’s all about people and people have their likes and dislikes (even if they try and remove all bias), they are only human and unfortunately make mistakes; that special pleading about the uniqueness of your discipline does not often make a convincing argument, because many other disciplines are also saying similar things; that internal allies are much more useful than external allies, because those inside an organisation have a better understanding of local issues; that in any situation it is better to be part of the solution, and in particular to be part of the solution that fits with the strategy of the organisation; that the aims of a University and its Departments/Schools are often very similar, albeit with different influ-

ences that determine an eventual policy or outcome, so trying to find the common ground is the best way forward. All interesting comments, and probably very useful to keep in mind as we work together with others in the University.

There were also many more extremely interesting talks – updates on the development of the Academy of Mathematical Sciences (it’s going well) and the Isaac Newton Institutes EDI initiatives, on the EPSRC Mathematical Sciences budget (success rates are significantly down compared to last year), and a personal view on how the REF Environment component is being developed.

I’d be very happy to discuss any of the above, with anyone who is interested, either at coffee time at our regular times on Tuesdays and Thursdays (10.45am) or individually – just email me.

Finally, I just want to thank everyone for all their work over the last semester. Many of us now shift our thoughts to marking and exam boards, but others will also continue teaching, either the MSc projects or the Online Distance Learning courses – thanks to all. And many thanks also to everyone who contribute to this newsletter – particularly to David MacTaggart who has now taken over as the Newsletter Editor.

Links for online readers:

- [1] *Principles on the use of AI*
- [2] *Generative AI workshop*
- [3] *talmo.uk*
- [4] *Edinburgh workshop*

PET THERAPY

In response to the seemingly ever-growing stress levels of everyone, we are introducing a moment of calm with one of our furry friends. This quarter, we are joined by the Editor’s own dog, *Mila*.



Mila is very friendly with both children and adults. She also likes sheep, but not bigger dogs and cows.

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

