Amusing Research in Surveying and Spatial Science

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ABSTRACT

Amusing research can improve student learning of a topic and make it more accessible to a more general and more diverse audience, thereby contributing to a better understanding of science in the general public. Humorous science generally applies serious science to unusual but intriguing research questions, while also including the occasional spoof paper. Often, it includes a more serious message hidden between the lines or disguised by tackling a ridiculous topic. This paper highlights some of the weird and wonderful research findings hidden amongst the scientific literature related to surveying and the spatial sciences, aiming to ensure that we remember the funnier side of science and providing answers to questions that we may have been too afraid to ask. Topics covered include producing and presenting research, mysteries encountered in the workplace office, employing vampires and zombies to solve scientific problems, innovative approaches to animal mapping and ecology, grappling with applied physics in our professional and everyday lives, Work Health and Safety (WHS) considerations and examples from surveying practice.

KEYWORDS: *Science humour, learning, data collection, modelling, data analysis.*

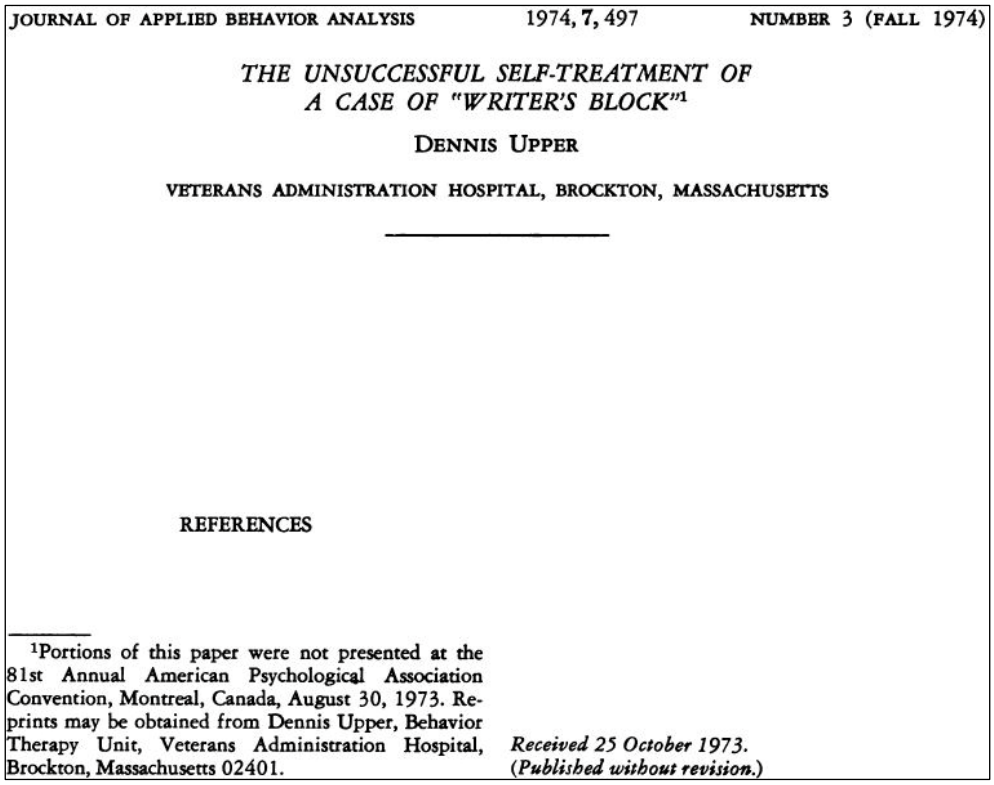
1 INTRODUCTION

The fascinating world of amusing research generally applies serious science to unusual but intriguing research questions, while also including the occasional spoof paper. Humorous science can improve student learning of a topic (e.g. McAlister and Hills, 2023) and make it more accessible to an outside (more general and more diverse) audience, thereby contributing to a better understanding of science in the general public. Often, there is also a more serious message that is hidden between the lines or disguised by tackling a ridiculous topic.

This paper highlights some of the weird and wonderful research findings hidden amongst the scientific literature related to surveying and the spatial sciences, based on the author's series of papers on humorous science (Janssen, 2021a-e, 2022). It aims to ensure that we remember the funnier side of science and provides answers to questions we may have been too afraid to ask. Topics include producing and presenting research, mysteries encountered in the workplace office, the contribution of vampires and zombies to solving scientific problems, innovative approaches to animal mapping and ecology, dealing with applied physics in our professional and everyday lives, Work Health and Safety (WHS) considerations, as well as some examples from surveying practice. This study was conducted entirely in the author's spare time and is in no way related to his employer.

2 WRITING AND PRESENTING A PAPER

Starting with the difficulty to write an academic paper, Upper (1974) famously reported on the unsuccessful self-treatment of a case of writer's block (Figure 1). The reviewer mentioned at the time: "I have studied this manuscript very carefully with lemon juice and X-rays and have not detected a single flaw in either design or writing style. I suggest it be published without revision. Clearly it is the most concise manuscript I have ever seen – yet it contains sufficient detail to allow other investigators to replicate Dr Upper's failure." More than three decades later, this indeed spawned a multi-site cross-cultural replication of the study, showing a remarkable agreement of results between the two (Didden et al., 2007).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THE UNSUCCESSFUL SELF-TREATMENT OF A CASE OF "WRITER'S BLOCK"[1]

DENNIS UPPER

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REFERENCES

[1]Portions of this paper were not presented at the 81st Annual American Psychological Association Convention, Montreal, Canada, August 30, 1973. Reprints may be obtained from Dennis Upper, Behavior Therapy Unit, Veterans Administration Hospital, Brockton, Massachusetts 02401.

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Figure 1: Unsuccessful self-treatment of writer's block (Upper, 1974).

By applying scientific rigour to an entertaining topic, Janssen (2019) demonstrated how one can collect, analyse, interpret and present data by effectively utilising tables, pie charts, time series, histograms and maps. He focused on the rock band AC/DC, examining song lyrics, the band's work rate, the passion of hardcore fans and the marketing of the AC/DC brand. It was found that the word 'rock' is by far the most prominent in AC/DC song titles but lyrically almost half of all songs revolve around sexual encounters. While the frequency of album releases slowed considerably over time, the band generally played 150 live gigs following each studio album in increasingly larger venues. Bon Scott (†1980) songs continue to make up 45% of typical AC/DC concert setlists, demonstrating the immense respect for his contribution, the quality of the early song material and the timelessness of AC/DC's music. Analysis of a questionnaire revealed that hardcore fans generally preferred the older material, experienced their first gig during early adulthood and enjoyed up to 124 gigs since.

Research findings are often presented at conferences and seminars. Rockwood et al. (2004) explored how often attendees nod off during such scientific meetings and examined risk factors for this behaviour. After counting the number of heads falling forward during a 2-day lecture

series attended by 120 people (this method was chosen because counting is scientific), they calculated incidence density curves for nodding-off events per lecture (NOELs) and assessed risk factors using logistic regression analysis. The quality of the lectures varied from entertaining and informative to monotonous and repetitive, to rushed and surreal. The incidence density curve ranged from 3 to 24 NOELs, with a median of 16 NOELs per 100 attendees (Figure 2).

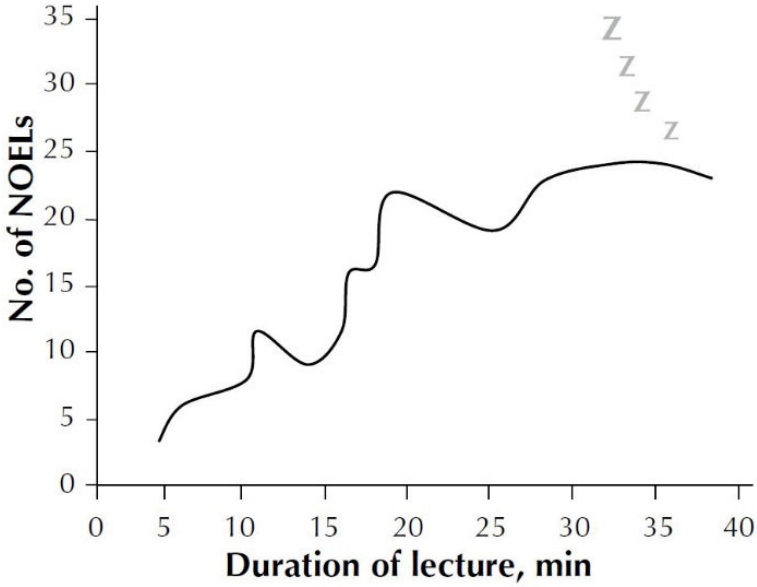

Figure 2: Special incidence density curve, showing the number of nodding-off events per lecture (NOELs) per 100 attendees as a function of presentation time (Rockwood et al., 2004).

Identified risk factors for nodding off included environmental factors (dim lighting, warm room temperature, comfortable seating), audio-visual factors (poor slides, not speaking into the microphone) and circadian factors (early morning, post meal), but speaker-related behaviour (monotonous tone, tweed jacket, getting lost in the presentation) provided the strongest risk. A questionnaire administered to those who nodded off revealed that most were comforted to know they were not alone and that it was predominantly the speaker's fault. Most had no enthusiasm to attend boring presentations but were influenced by continuing professional development (CPD) credits, guilt or obsessiveness.

Since this paper generated considerably more interest than the authors' more conventional publications, they decided to write a follow-up (Rockwood et al., 2005). Here, they performed a comprehensive, international systematic review of nodding off and napping during medical presentations, spanning more than 100 years (but only three papers during that time, including their own). The results suggested that tranquillising lectures are common, annoying and persistent, with low lighting and boring (and badly presented) contents being the main risk factors for nodding off. The authors also provided a few tips on how to help increase the attention a paper may receive after publication through ingested keywords, citations and tweaking the methodology to exclude unwanted references.

Considering the student perspective, Adams (1999) studied the worrying dead-grandmother exam syndrome. This implies that a student's grandmother is far more likely to die suddenly just before the student takes an exam than at any other time of year (particularly if the student's current grade is poor). Based on 20 years of data, he determined that a student who is about to fail a class and has a final exam coming up is 50 times more likely to lose a family member

than an excellent student not facing any exams. This clearly showed that family members literally worry themselves to death over the outcome of their relative's exam performance.

3 WORKPLACE OFFICE MYSTERIES

The nocturnal activity patterns of an endangered population of the common fork were investigated by Henckel (2005) from the School of Cutlery at the Institute of Inanimate Objects and Existential Phenomenology in Sydney (good luck tracking this author down). This fork-stabbing study was most likely inspired by the dynamic behaviour of cutlery in a typical office environment. Through an extensive survey program, he examined nocturnal fork activity and provided management recommendations to assist with the conservation and long-term viability of the population.

Spotlighting was used as the basis for a targeted trapping program of individual forks. Captured forks were barcoded and fitted with a radio-collar that also included a movement sensor and mortality switch. Mean nocturnal activity data was used to calculate and spatially visualise minimum convex polygons, followed by a modified temporal Jacobian cross-legged twirl non-parametric analysis to create four activity classes (i.e. regular, high, extra high and super). A non-linear Mulder and Scully prime time analysis was then conducted to determine common fork microhabitat preferences. The results indicated that the fork population utilised approximately 0.1 ha of habitat, including an area of extreme activity representing core habitat around the communal tearoom (Figure 3).

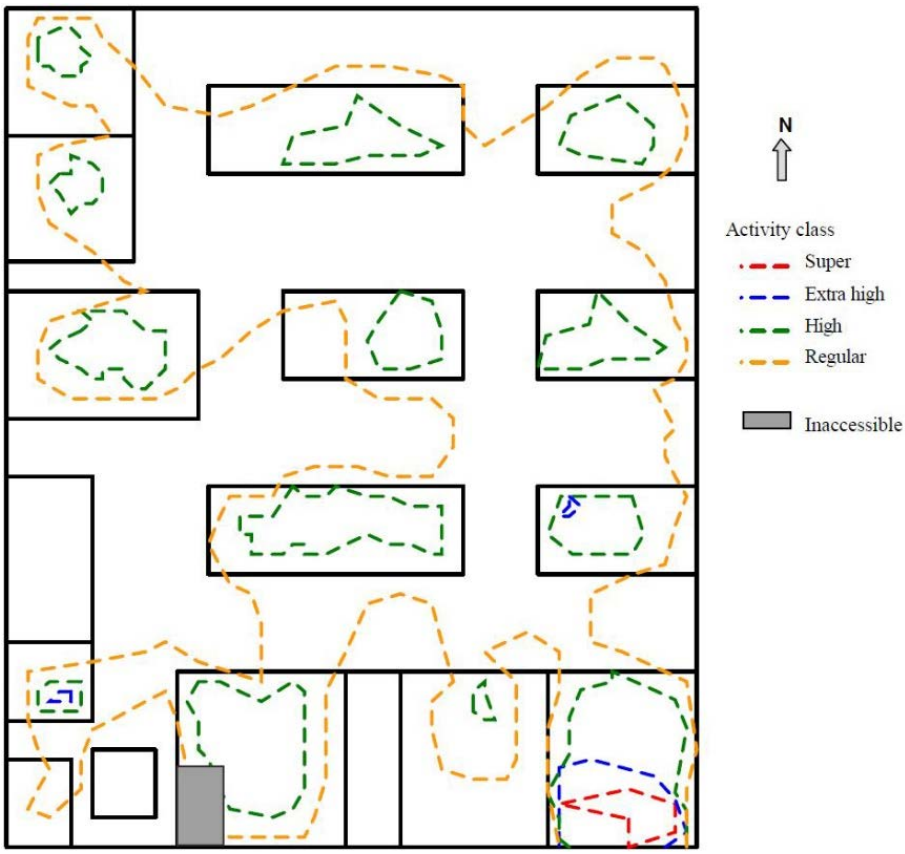

Figure 3: Nocturnal activity levels of the common fork in an office environment, noting the tearoom in the south-eastern corner (Henckel, 2005).

Monitoring of individual forks revealed that the mean travel distance plateaued at 5 days, after which no extension of travel distance was observed. It was noted that some of the identified habitat may have displayed a higher-than-expected fork activity level due to individual humans not returning forks to the tearoom when finished. This could have resulted in a type II error, identifying certain areas to be of greater use to forks than they actually are.

Lim et al. (2005) determined the overall rate of loss of workplace teaspoons in an Australian research institute and investigated whether attrition and displacement were correlated with the relative value of the teaspoons or type of tearoom. After distributing 70 individually numbered teaspoons throughout eight tearooms, weekly counts were carried out for 2 months, then fortnightly for another 3 months. Desktops and other immediately visible surfaces were also scanned for errant spoons. After 5 months, this previously covert research project was revealed to the institute's staff, who were asked to return or anonymously report any marked teaspoons that had made their way into desk drawers or homes. Staff were also asked to complete an anonymous questionnaire about their attitude towards and knowledge of teaspoons and teaspoon theft.

It was found that 80% of the teaspoons disappeared during the study period. The loss was rapid and not influenced by their value, showing that teaspoon availability (and hence office culture in general) is constantly threatened. The teaspoon half-life was determined to be 81 days, i.e. half had permanently disappeared after this time. However, the amount of time a teaspoon survived in its final room varied significantly according to tearoom type: half-life of 42 days for communal tearooms and 77 days for rooms associated with particular research groups (Figure 4). Applying the annual rate of teaspoon loss per employee to the entire workforce of the city, they estimated that 18 million teaspoons go missing in Melbourne each year. Laid end to end, these would extend over 2,700 km (the length of the entire coastline of Mozambique) and weigh over 360 metric tons (the approximate weight of four adult blue whales). It was speculated that the missing teaspoons may be escaping through space to a world inhabited entirely by spoon life-forms, although workplace kleptomania and laziness may provide a more likely answer. Consequently, substituting your next birthday cake for a new bunch of forks or teaspoons may lead to increased happiness and harmony in the office.

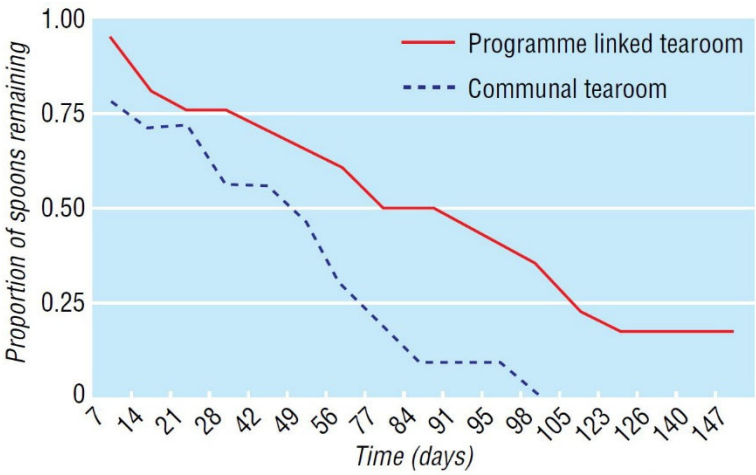

Figure 4: Proportion of teaspoons remaining by tearoom type (Lim et al., 2005).

Other studies focused on drinks and food routinely consumed in the workplace. Mayer and Krechetnikov (2012) investigated the annoying habit of coffee spilling out of its cup while the coffee drinker is walking, which is obviously a serious WHS concern. Using experimental

physics, they studied the conditions under which coffee spills for various walking speeds and initial liquid levels in the cup (Figure 5). The motion was examined using an image analysis program written in MATLAB, while the instant of a spill was determined with a Light-Emitting Diode (LED) signal triggered by a sensor monitoring the coffee level in the cup. It was shown that the particularities of the common coffee cup sizes, the coffee properties and the biomechanics of walking conspire to be responsible for the spilling phenomenon.

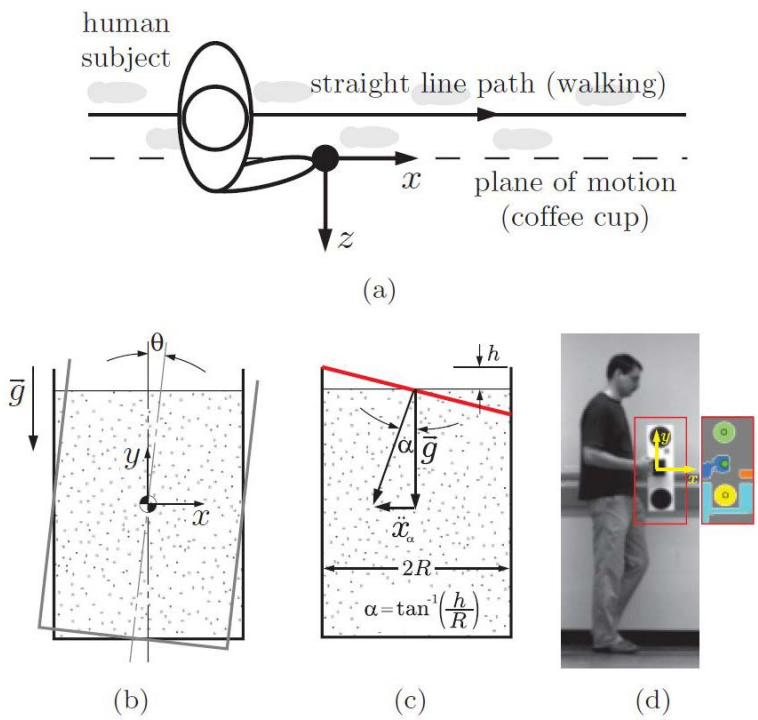

Figure 5: Definition and extraction of the cup dimensions and coordinates in the coffee spill experiments: (a) walking path as viewed from above, (b) plane cup coordinates (x, y) with pitching angle θ and gravity $\bar{g}$, (c) spill angle α and equivalent acceleration $\ddot{x}_\alpha$, and (d) MATLAB image analysis (Mayer and Krechetnikov, 2012).

Examining methods to reduce such spillage, Han (2016) suggested walking backwards (acknowledging associated WHS issues) or using the 'claw-hand' method of carrying the coffee cup (around the rim) to suppress the higher-frequency components of the driving force and thus stabilise liquid oscillation.

Chan (2007) reported on the Chocolate Happiness Undergoing More Pleasantness (CHUMP) study, which was designed to investigate the effects of chocolate consumption on happiness over a 1-month period. The 180 participants were randomised into three study groups. Group 1 received one 50 g dark chocolate bar each day, and group 2 received one 50 g milk chocolate bar each day. Group 3 did not receive any additional chocolate but continued with their normal chocolate-eating habits. Each participant rated their happiness before and after the study using a visual scale, along with their health and global happiness.

Data collection proved difficult, demonstrating the challenges of performing a truly blinded trial. Despite all efforts to the contrary, several participants changed groups mid-study. Some participants in the control group (who received no extra chocolate) started raiding the chocolate of those in the other two groups, while others in the dark and milk chocolate groups traded chocolate based on their individual preferences. The milk chocolate group was the most popular, increasing from 60 participants at inception to 82 at completion. Furthermore, the occurrence of Halloween may have resulted in crossover contamination as some participants

increased their chocolate intake after Halloween by eating extra chocolate that was intended to be distributed to children or by raiding their children's loot bags. Not surprisingly, under these conditions, data analysis failed to prove the strong belief that chocolate consumption leads to more happiness. A far more important indicator of happiness in the CHUMP study appeared to be getting what you want when you want it.

For those dreading to attend the next work-related party, Armstrong (2020) presented a solution on how to maximise your positive impact on the social gathering and then escape discreetly as soon as possible. The procedure, dubbed Gradual Freeze-Out of an Optimal Estimation via Optimisation of Parameter Quantification (GFOOEOPQ), employs artificial intelligence and is based on Bayes' Theorem where the probability of a future model state depends on current knowledge of the model. First, the user completes the necessary interactions for making favourable impressions (or at least ensuring that these people later remember seeing them at the event) and identifies possible exits (including the density of people at these locations and the general flow rate between regions). Once enough data is collected, GFOOEOPQ (pronounced g^*fu*i:ɔ:p^kw) identifies the exit that minimises the chance that anyone notices how early the user snuck out. To achieve this, GFOOEOPQ employs a tempering procedure that iteratively arrives at the global optimum of a dynamic model, which remains valid only for a limited time due to the dynamic nature of the situation (i.e. "glance at the solution, glance over your shoulder, and then go for it or abort"). Tips for optimal interactions were also given, noting that the procedure can be generalised to corporate events and family gatherings if required.

4 VAMPIRES AND ZOMBIES

Humans have been interested in vampirology for a long time, presumably caused in part by the fear of potentially not being on top of the food chain. Applying serious analysis to an imaginary topic, several papers studied the coexistence of humans and vampires based on common predator-prey interactions but as a special case because the prey is turned into predator. Hartl and Mehlmann (1982) were the first of many economists to use mathematical optimisation and control theory to model a dynamic confrontation between the two species. Later, Strielkowski et al. (2012, 2013) modelled the human-vampire problem based on popular fiction literature, comic books, movies and TV series to determine whether peaceful coexistence of humans and vampires would be scientifically possible.

Despite not being part of the surveying curriculum anymore, astronomy remains an important field related to our profession, particularly in relation to satellite-based positioning on Earth and navigation in space. Günther and Berardo (2020) reported on the search for transit signatures of space vampires trapped in the gravitational pull of cool dwarf stars. This research supports the theory that vampires may have originated in outer space, settled down and domesticated asteroids, and then fell onto Earth through meteor crashes.

The authors generated models representing two potential space vampire populations (i.e. bat shape and humanoid shape) and searched light curves from the Transiting Exo-Vampire Survey Satellite (TEvSS) using a template matching algorithm. This clearly showed the distinction between the transit shapes of bats and humanoid space vampires compared to planets void of these creatures (Figure 6). Analysis of the TEvSS data provided a short list of between 0 and 394,400,933 potential space vampire transits. Using Bayesian evidence, they determined that two of these most likely originated from bats (or noise) and one from a humanoid shape (or noise), while the remainder could be due to either shape (or noise). Adding the information

gained from TEvSS data constrained the space vampire occurrence rate to between 0% and 100%. It was noted that such precise analyses will be crucial in future observing schedules for space-vampire characterisation with the James Webb Space-Vampire Telescope (JWSvT) and the Extremely-Large-Vampire Telescopes (ELvTs).

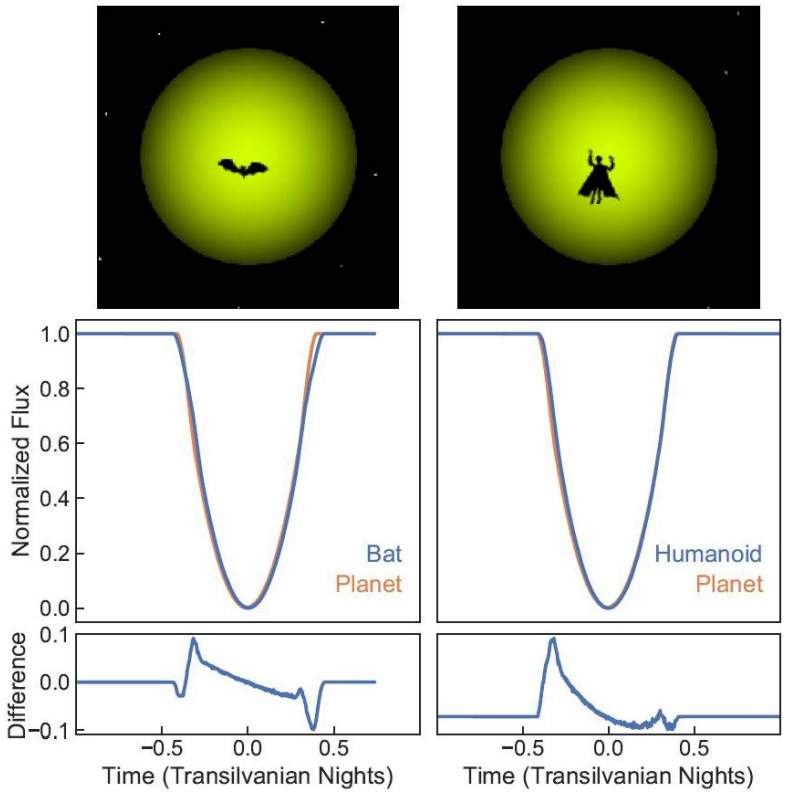

Figure 6: Transit shapes for a bat (left column) and humanoid vampire (right column) in comparison to a planet, showing the distinction between the three transit shapes (Günther and Berardo, 2020).

Due to their inferior intelligence and sophistication, zombies may not be as attractive to the science community as vampires. However, their insatiable hunger for living human flesh and ability to turn humans into zombies by inflicting a bite is an ideal setting to investigate scenarios of an infectious disease outbreak. Munz et al. (2009) were the first to apply mathematical modelling to the analysis of a zombie outbreak by using an epidemiological model to investigate the dynamics of a zombie apocalypse. Several others extended this work.

For example, considering several model variants and employing spatial parameters, Alemi et al. (2015) provided a full-scale stochastic dynamic simulation of a zombie outbreak in the United States (Figure 7). The simulation started with one in every million individuals being infected at random. By the first week, most of the population had been turned into zombies, although the map does not appear that compelling. In the early stages, the outbreak spread in roughly uniform circles, with the speed of infection tied to local population density. Infections on the coasts (higher population density) reached further than those near the centre of the country. After several weeks, the map shows stronger diversity in the directional spread, now over larger geographical areas and influenced by large changes in population density. After 4 weeks, much of the country had been overrun, but remote areas remained zombie-free even after 4 months.

Zombie danger maps were also produced, showing the probability of being infected at a certain location and point in time during an epidemic originating from a single zombie. As expected,

after 7 days, high-population metropolitan areas are most at risk because many individuals could potentially serve as patient zero and zombies rapidly spread in these areas. After 28 days, it is not the largest metropolitan areas that suffer the greatest risk of being overrun but the regions located between them.

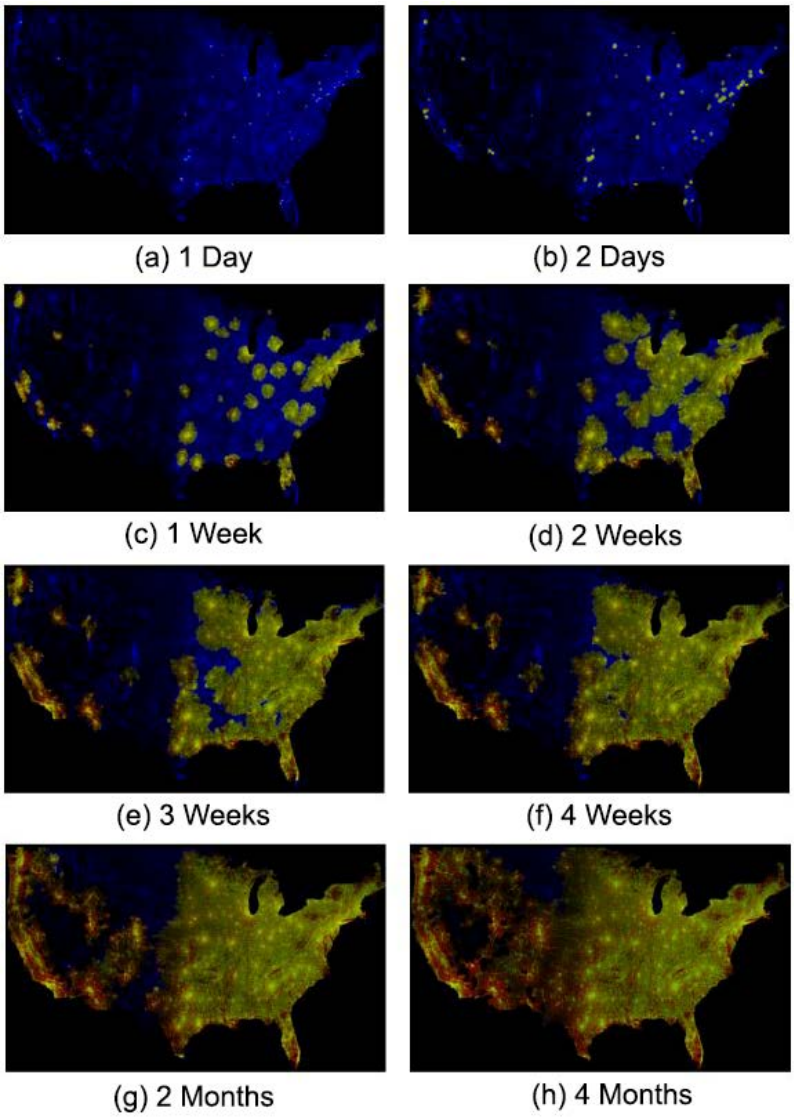

Figure 7: Simulation of a zombie outbreak in the continental United States over time, showing the uninfected human population (blue), active zombies (red) and the permanently dead (green) (Alemi et al., 2015).

These studies demonstrate the flexibility of mathematical modelling and how it can respond to a wide range of challenges for different areas of science, tongue in cheek or not. They also highlight that modelling output is heavily reliant on the assumptions made and the input parameters chosen. Amusing examples can improve student learning and make a topic more accessible to a general audience. Similarly, entertaining outreach programs can help attract potential students into Science, Technology, Engineering and Maths (STEM) and related disciplines. For example, Curtin University's Team Zombie is a multi-disciplinary response team that investigates a zombie outbreak, models the spread and potential interventions, works towards cures or vaccines, and provides options for detection and monitoring. Engaging students from primary school through to university level, it is raising awareness of the many approaches to problem solving through models and simulations (Maxville and Sandford, 2020).

5 ANIMAL MAPPING AND ECOLOGY

Spatial tools are routinely used for animal mapping, ecology and conservation. Ecology is the study of the relationships living organisms have with respect to each other and their natural environment. McNoleg (1996) reported on several breakthroughs in the field of geomatics and demonstrated their application in a particularly difficult habitat mapping exercise for the endangered haggis. This 4-legged mammal is mainly native to the Scottish Highlands and unique because it has one pair of legs (either on the left or right side) that is shorter than the other pair. This evolutionary adaption allows it to easily walk around the very steep mountainous terrain in either clockwise or anti-clockwise direction, depending on its legs. Understandably, haggis have a natural aversion to any other plane of movement, preferring areas where the angle of slope is within a certain tolerance of the difference in height between opposite pairs of legs. After finding its niche, each haggis walks the same path around a hill for its entire life, creating an effect akin to a contour line (which can be visible in aerial and satellite images) due to soil compaction and the reduction in vegetation cover.

By substituting the traditional fuzzy logic image processing technique with misty logic (found more suitable for the environmental conditions encountered in Scotland), introducing a neural-network approach to evidence combination and adopting an innovative data structure hierarchy, the path for each haggis was modelled based on a combination of environmental, spectral, spatial, economic, temporal, taxonomic and astrologic data. A mathematical derivation (even the most outrageous ideas can look credible if expressed using complex symbology) showed that haggis habitats can also be located from geophysical data. Due to the forces at play when a well-fed, sodden haggis rolls downhill after losing its footing, its path can be detected as an extremely bright localised streak in gravitational anomaly maps and therefore be identified via image differencing. However, it was noted that no haggis tracks were detected despite the sophisticated analyses applied, leading McNoleg (1996) to conclude that the haggis is even more endangered than anticipated. On a more serious note, this paper also drew attention to the peer-review process and that some authors include large amounts of buzzwords in titles and (unnecessarily) complex mathematics to increase the paper's chance of acceptance.

Attempting to ensure the survival of the haggis (it is also considered a Scottish delicacy), King et al. (2007) pioneered the use of ultrasonography in its reproductive management and introduced new genetic material to improve the animal's welfare and productivity under farmed conditions. Selective breeding successfully increased body length, reduced hair coat, modified (drinking) behaviour, reduced seasonality and increased fank (litter) size. However, the uneven leg length remained a problem as it requires the provision of suitably inclined grazing.

By introducing genetic material from haggis native to the southern hemisphere via artificial insemination, they intended to produce even-legged haggis that could graze on flat land. The resulting fank contained nine hagglets with four being the desired even-legged variety of medium leg length, two exhibiting longer left legs, two exhibiting longer right legs, and one occurrence of the unexpected and worrying diagonally long-legged state (Figure 8). This state sometimes occurs in the wild where affected animals cope by grazing the sides of narrow ditches and streams with their two long legs in the water and their two shorter legs on either bank. It was emphasised that further research is required to prevent reoccurrence of this state under farming conditions and that the diagonally long-legged hagglet has been adopted by a lady in a Scottish village where it is living happily on a diet of hand-picked heather and Old Pulteney.

Figure 8: (a) Wild haggis with two hagglets on a steep slope, (b) farmed haggis and her fank of nine hagglets at two days old, and (c) two hagglets demonstrating the desired even-legged state (right) and the unexpected diagonally long-legged state (left) (King et al., 2007).

The use of Global Navigation Satellite System (GNSS) technology has been responsible for significant advances in the tagging and tracking of animals by providing accurate and frequent estimates of the changing distributions of many rare animal species. However, it is extremely difficult to apply conventional methods to the drop bear, a predatory Australian marsupial closely resembling the koala, which hunts by dropping out of a tree and skilfully latching onto the victim's neck to kill its prey. The dense tree canopy regularly causes extended periods of complete GNSS signal loss, and sensors are often damaged during attacks on prey.

Addressing this problem, Janssen (2012, 2013a) proposed an indirect GNSS-based approach by tracking the prey rather than the predator. Using bushwalkers equipped with GNSS and heavy-duty helmets to pinpoint the location and timing of drop bear attacks, he successfully estimated the number and spatial distribution of drop bears in the study area (Figure 9). This research also provided valuable insights into the animal's hunting behaviour, confirming that foreigners are much more likely to be dropped on than Australians and indicating that drop bears do not necessarily target the last person walking in a line. Fortunately, bushwalkers can protect themselves from drop bear attacks, e.g. by wearing forks in their hair, spreading Vegemite behind their ears or under their armpits, urinating on themselves, and avoiding talking

in a foreign language or non-Australian accent. Drop bears may be identified by lying down beneath a tree and spitting upwards (a sleeping drop bear will most likely wake up and spit back). However, this method includes some risk, with potentially devastating consequences if drop bears are on the hunt for prey or in the middle of the mating season.

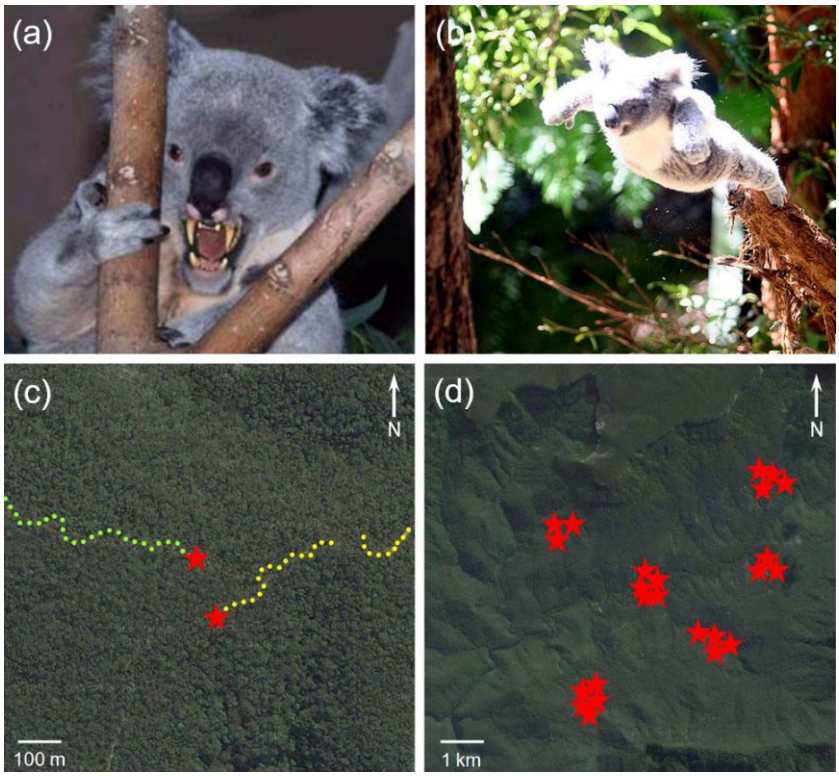

Figure 9: (a) Drop bear in its habitat, (b) drop bear attacking prey, (c) two GNSS tracks ending with a drop bear attack (denoted by a star), and (d) summary of all drop bear attacks observed (Janssen, 2012, 2013a).

The original journal paper (Janssen, 2012) was intended to demonstrate how a research paper should be written, that science can be fun and to increase awareness of GNSS technology (and drop bears, of course). These goals have been achieved, with the paper attracting much attention from Australia and overseas, including in the media (Janssen, 2013b). It quickly and unexpectedly became the most downloaded paper in the journal's online history.

Several other studies have successfully unlocked mysteries in the animal kingdom. Dacke et al. (2013) showed that dung beetles use the Milky Way for orientation. They experimentally determined that dung beetles transport their dung balls along straight paths under a starlit sky but lose this ability under overcast conditions. On a starlit night, beetles were released with their dung balls from the centre of a circular arena of levelled sand. This was repeated after obscuring the beetles' dorsal visual fields with small cardboard caps to prevent them from seeing celestial cues. Filming the beetles from above, their rolling paths were reconstructed and measured, clearly showing much shorter radial paths under clear conditions (Figure 10). In a planetarium, the beetles orientated equally well under a full starlit sky or the Milky Way only but took much longer when presented with only the 18 brightest stars or total darkness. Dung beetles therefore do not rely on a single bright (guiding) star but use the band of light representing the Milky Way for orientation, most likely not being able to discriminate individual stars.

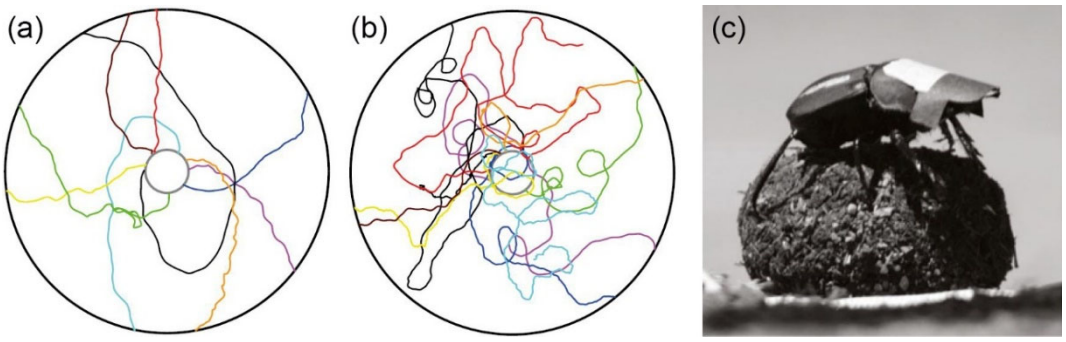

Figure 10: Paths of dung beetles rolling outward from the centre of a circular arena with (a) clear and (b) obstructed views of a moonless night sky, and (c) small caps attached to the beetle enabled blocking its view of the sky (Dacke et al., 2013).

Hart et al. (2013) demonstrated that dogs are sensitive to small variations of the Earth's magnetic field by measuring the direction of the body axis in 70 dogs of different breeds during defaecation and urination over 2 years (7,475 observations in total). The dataset was sorted according to the geomagnetic conditions prevailing during the respective sampling periods, and relative declination and intensity changes of the magnetic field during the dog walks were calculated. Circular statistics revealed that dogs preferred to excrete with their body aligned along the north-south axis under calm magnetic field conditions but abolished this directional behaviour under unstable conditions. The best predictor of the behavioural switch was the rate of change in declination, i.e. the polar orientation of the magnetic field, rather than geomagnetic intensity changes. However, it was noted that calm magnetic conditions occurred in only 30% of all cases.

In a more obscure example, Ghirlanda et al. (2002) determined that chickens prefer beautiful humans. By averaging 35 individual images each of males and females, average male and female faces were generated. A third face was obtained by averaging these two averages. Graphical image manipulation (linear extrapolation based on pixel patterns) was then used to create four additional faces, showing either exaggerated male or female traits, resulting in a set of seven faces increasing in femininity from left to right (Figure 11a).

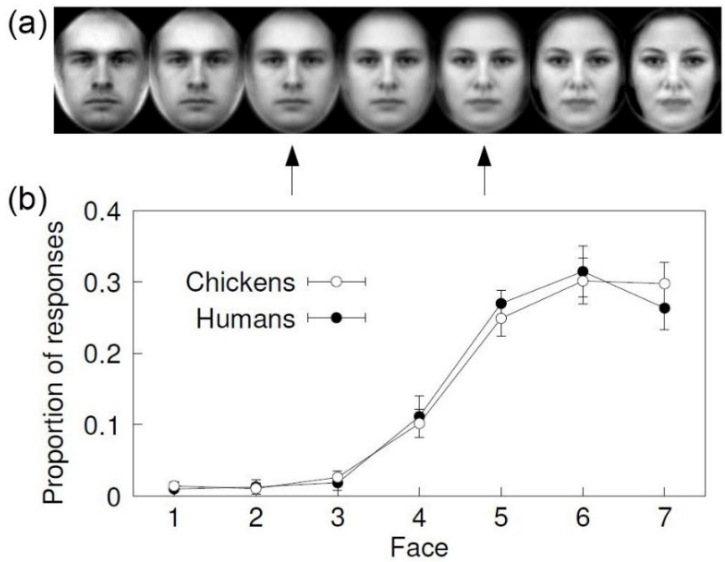

Figure 11: (a) Generated test faces with the average male and female face indicated by an arrow, and (b) average proportion of pecks by chickens in response to these faces along with human ratings of the same faces (Ghirlanda et al., 2002).

Biology students (7 males, 7 females) were then asked to rate all faces in random order according to how desirable it would be to go on a date with the portrayed person. The total scores collected by each face were transformed into relative scores, allowing comparison with animal data. Chickens (2 roosters, 4 hens) were first trained by being rewarded with food after pecking at the average male (hens) or female (roosters) face and then shown all seven faces at random. The results showed that human and chicken behaviour was almost identical (Figure 11b), thus proving that chickens prefer beautiful humans.

It is hoped that these important research efforts will continue, so we can further advance our understanding of the animal kingdom, allow animal conservation practices to be enhanced, and have some fun along the way. In particular, further research is required to fill the current knowledge gap related to mysterious animals such as the bunyip, hoop snake or gravel shark.

6 EXPLORING OUR PHYSICAL WORLD WITH TONGUE IN CHEEK

The laws of physics play a crucial role not only in surveying, mapping and geodesy but also in our general understanding of the world in which we work and play. Despite defying these laws, B. Volfson was granted a US patent in 2005 for inventing a space vehicle propelled by a superconducting shield, which alters the curvature of space-time outside the craft in a way that counteracts gravity.

This inspired Cyr and Lanthier (2007) to present a cost-utility analysis of abolishing the law of gravity. Using a hidden Markov model (a statistical model in which the system is assumed to be a Markov process with hidden unknown parameters), they estimated that 2 million quality-adjusted life years would be saved and determined the cost-effectiveness of adapting Volfson's anti-gravity machine for use on Earth. It was argued that a microgravity environment could have important positive impacts, such as stopping climate change by reducing fossil fuel use by 90% because cars would no longer be needed with transportation only required for overseas travel. However, they also noted that several negative side effects were ignored, e.g. extended microgravity exposure on the human body and technical problems related to the absence of gravity (including the use of wigs, intravenous fluids and toilets). Nevertheless, the study proved that a combination of technological, statistical and medical jargon can convince intelligent people to read a manuscript (and have a chuckle).

Noting that only a few legged species on Earth manage to run on water, Minetti et al. (2012) conducted experiments with humans running in place on water at simulated reduced gravity. They predicted the gravity levels required for humans to run on water (about 20% of the Earth's gravity) and tested these predictions using a reduced gravity simulator. Progressive body weight unloading of a person running in place on a wading pool confirmed that a person could run on water at lunar (or lower) gravity levels using small rigid fins. 3D motion capture of reflective markers on major joints revealed that humans keep the head-trunk segment at nearly constant height, in spite of the high stride frequency and the intensive effort required to move their body through space. These results showed that a hydrodynamic model for lizards running on water can also be applied to humans, despite the enormous difference in body size and shape.

Pedbost et al. (2009) identified a peculiar new class of galaxy cluster using data from the Galaxy Zoo project. It is well known that galaxies are not randomly distributed throughout space but tend to cluster together. However, it was a surprise to find several high-density clusters that are linear and box-like with individual galaxies approximating the shapes of letters in the modern

alphabet. Although galaxies displaying morphologies corresponding to Latin characters have been noticed before (S and Z being particularly common), a localised collection of this size arranged in sub-groups was highly improbable. In one example, these shapes and sub-groups were interpreted as “we apologise for the inconvenience” (Figure 12).

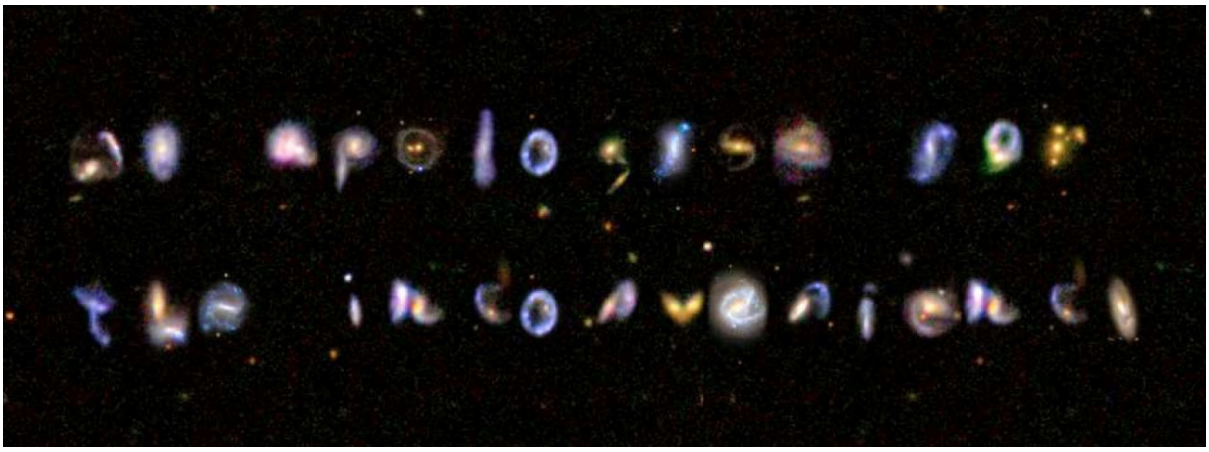

Figure 12: Colour composite image of an unusual galaxy cluster identified by Galaxy Zoo participants (Pedbost et al., 2009).

Noting that this may indicate the existence of intelligent extra-terrestrial life, the scale of the message would require a life-form with extraordinary powers. Two other clusters demonstrated additional features, including punctuation, capital letters, a numeral, an abbreviated unit and left-justified sub-groups, with messages interpreted as “caution! structure formation in progress” and “Delays possible for 7 Gyr”. When considered collectively, these appeared to suggest a common theme reminiscent of road works. This not only implies the existence of other intelligent beings (inconvenienced by said road works) but also may cause concern for Earth potentially having to make way for an intergalactic super-highway.

Armstrong (2012) reported on the non-detection of the Tooth Fairy at optical wavelengths. It appears that the Tooth Fairy obtains a child’s tooth with minimal difficulty and undetected, despite potential barriers such as bolted front doors and bad-tempered dogs. The only observational evidence of the being’s transient presence is the disappearance of the tooth and the small gift left behind in its place. Attempting to finally detect the Tooth Fairy, an optical 1.3-metre telescope was programmed to obtain an 8-hour time series of the author sleeping about 47 m away on the roof of the neighbouring observatory, with a freshly removed wisdom tooth under her pillow. At the end of the night, the wisdom tooth could not be located (neither could the pillow, which had tumbled down the sloped roof and come to rest against a tumbleweed).

Standard data processing failed to detect evidence of the Tooth Fairy. However, given the tooth’s disappearance, it was concluded that she indeed paid a visit. Preliminary evidence therefore suggests that the Tooth Fairy is transparent at optical wavelengths. The lack of a gift being left behind was attributed to the creature possibly feeling offended at this deliberate attempt to invade her privacy. Noting the limiting time resolution of 4 seconds for both the exposures and dead time between the observed images, the findings also indicate that the Tooth Fairy may be operating at much faster speed than previously assumed.

7 WORK HEALTH AND SAFETY

Peculiar and amusing research can also address important WHS issues and help improve our general physical and mental wellbeing. For example, Maguire et al. (2000) investigated the navigation-related structural change in the hippocampus (the part of the brain that is crucial for learning and memory) of taxi drivers. MRI brain scans of 16 London taxi drivers were analysed using 3D image analysis and compared with those of 50 age- and gender-matched people lacking such extensive navigation exposure. Although no difference was detected in the overall hippocampus volume, its structure in taxi drivers was found to be significantly different, and the regional distribution of its volume correlated with the amount of time spent as a taxi driver. This indicated that the hippocampus stores a spatial representation of the environment and can expand regionally to accommodate people with a high dependence on navigational skills.

Employing statistical analysis of various behavioural tests in addition to MRI brain scans, Maguire et al. (2006) later confirmed these findings by ruling out the potential influence of self-motion, driving experience and stress on the observed pattern of grey matter volume distribution in taxi drivers. This was achieved by comparing a new cohort of 18 London taxi drivers with 17 bus drivers who were matched for age, gender, education, intelligence, driving experience and stress level but differed in that they follow a constrained set of routes.

Consequently, head injuries are of particular concern to spatial professionals. Kamp et al. (2011) investigated traumatic brain injuries based on more than 700 head injuries occurring in the Asterix comic books. They performed a neurological examination for each head-injured character and correlated the clinical data with information regarding trauma mechanism (mostly blunt force), sociocultural background of victims and offenders, and the circumstances of the trauma to identify risk factors. Not surprisingly, the Romans suffered the most head injuries, mainly inflicted by Asterix and Obelix. Injuries were most severe when helmets were not used, emphasising the importance of wearing Personal Protective Equipment (PPE). Astonishingly, no character suffered long-term consequences or death. Characters who took the ‘magic potion’ caused significantly more severe head injuries, and administration of this drug after sustaining such an injury led to a prompt recovery.

Cyr et al. (2004) studied a unique case of delayed personal development. Tintin, the young reporter whose stories were published between 1929 and 1976, was about 14-15 years old when introduced (with the height of a 7- or 8-year-old), so would have been 60 years old during his final adventure. An exhaustive assessment of Tintin’s stories found that he suffered many significant head injuries causing unconsciousness. For each incident, they identified the cause of the trauma, the length of losing consciousness (calculated by the number of frames before Tintin returns to normal activity) and the severity of the trauma (indicated by the number of objects revolving above his head). Never did Tintin shave, grow taller or exhibit signs of pubertal development, suggesting that he suffered from growth hormone deficiency caused by repeated head traumas. It should be noted that the first two authors are the third author’s children, providing an excellent example of engaging young children with science.

Uncovering the mystery of what makes banana peels so slippery, Mabuchi et al. (2012) determined the frictional coefficient under banana skin using an experiment to simulate a slipping accident. Friction (or slipperiness) under banana skin was measured on a flat panel of linoleum floor and compared to a banana-free situation. A force transducer detected the applied forces in three dimensions at 100 Hz (Figure 13). They found that the tiny sacs of gooey substance lining the inside of banana skins burst when stepped on, forming a lubricated surface

ideal for slipping. Compared to other fruit, banana peels were by far the most slippery. It was also shown that a banana skin is less slippery when the inside of the peel is in contact with the shoe because the irregularity of the shoe sole tends to break the lubricating film. A follow-up paper provided further information and explained the connection to mucus, based on the similarity of the lubricating function in banana peels and the joints of a rabbit (Mabuchi et al., 2016).

Figure 13: Experimental set-up to measure the friction coefficient under banana skin and the coordinate system used (Mabuchi et al., 2012).

Shah et al. (2011) compared the travel time between hospital floors using stairs or elevators. Four people aged between 26 and 67 years completed 14 walking trips each, ranging from one to six floors both ascending and descending, and a total of 336 elevator trips. Statistical analysis determined that the mean travel time between floors was 13 seconds by stairs and 36.5 seconds by elevator, the difference being caused by waiting for the elevator's arrival. Not surprisingly, elevator travel time varied depending on the time of day and day of the week. All participants were able to continue their duties without resting after taking the stairs, so fatigue was not an issue. Acknowledging the small sample size, it was concluded that taking the stairs can save 15 minutes each day, which could translate into improved productivity and fitness. Although spatial professionals may be making fewer trips per day, this should encourage us all to use the stairs whenever possible.

In a very timely contribution, Chapman and Thamrin (2020) characterised how the working arrangements and productivity of Australian medical researchers changed during the COVID-19 pandemic, with particular attention to wearing pyjamas. Over a 3-week period, 160 staff and students at five medical research institutes in Sydney self-assessed their productivity and mental health. The most frequent working-from-home arrangements were the kitchen or dining table (42%), followed by individual (28%) or shared (22%) home offices, while five respondents (3%) resorted to working in their bathroom. Interruptions to teleconferences included internet problems, children, other household members, pets, the doorbell, phone calls, toilet breaks and one instance of sleepwalking. Only a few participants confessed to wearing pyjamas while working, which was not associated with lower productivity but linked with poorer mental health. People working at home with young children reported lower productivity but no deterioration in mental health, and early career researchers were less productive than established researchers. Hopefully, these findings will help remove the stigma attached to wearing pyjamas during work hours and improve flexible working policies. A broader promotion of National Pyjama Day in the workplace may be a good starting point in this regard.

8 SURVEYING PRACTICE EXAMPLES

Occasionally, weird and wonderful things also occur in surveying practice. There are tales of surveyors enduring an arduous journey to a concrete-pillared trigonometric (trig) station for a GNSS survey but forgetting to bring a tribrach, which resulted in applied bush mechanics and an antenna height of zero. Others reached a trig following a lengthy and rather challenging 4WD access only to discover that a brand-new bitumen road had been built right to the top on the other side of the hill. Then there are those who successfully finished observing and painting the trig but may have been a little overzealous during the rough 4WD trip back down, inadvertently painting the inside of the truck's canopy in the process. Others were just about to hop out of the vehicle after it came to a stop in front of a closed gate as a speeding emu crashed into their door. With the emu simply shaking its head in surprise, leaving a pile of feathers and running off, you can imagine the difficulty to explain the huge dent left behind to their manager. Some may have found their trig easily enough and without incident but did not expect it to be decorated appropriately for the season (Figure 14). Others ended up becoming the talk of a small rural town because they transported their survey gear around in a borrowed wheelbarrow for a week while waiting for a vehicle replacement after a failed river crossing attempt – certainly a walk of shame, but their dedication to finish the job was admirable.

Figure 14: TS3663 PANORAMA in Christmas mode (courtesy of Nic Gowans).

In the cadastral realm, the importance of key boundary marks and reference marks in maintaining a sound cadastre cannot be stressed enough. However, some surveyors may have taken this a little too far, with instances of two or even three GI pipes being placed at the same location (Figure 15), thus confusing several generations of surveyors. Some survey plans include unusual notations, providing excuses for certain lot corners not being marked due to the ground being too steep or too hard, the presence of large dogs or a hostile occupant (Figure 16). There is also evidence that trees were sometimes marked with a 'dickie hole' in the old days, which apparently is a technical description (Figure 17).

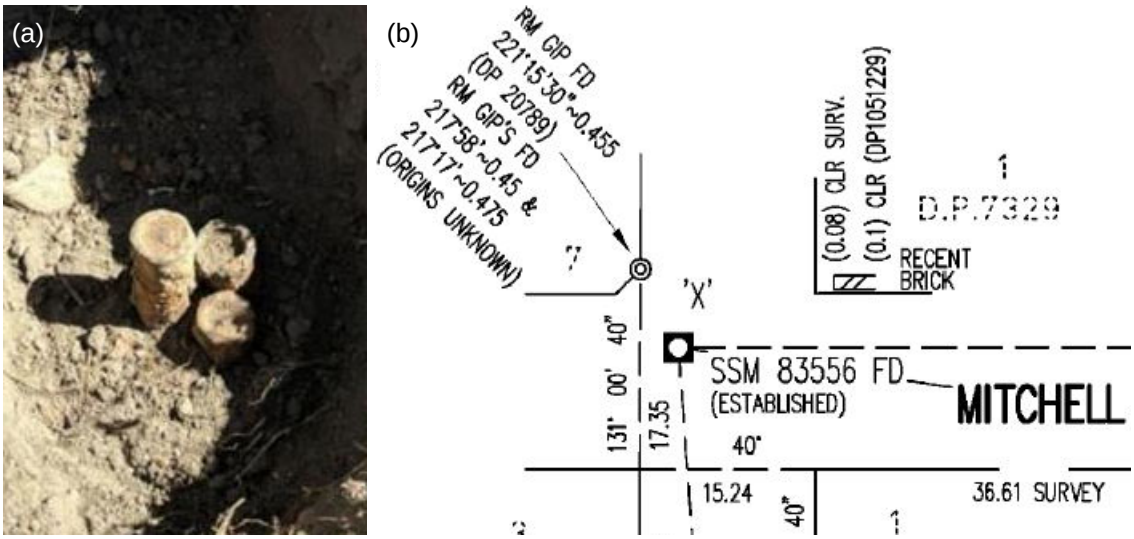

Figure 15: (a) Three GI pipes referencing a single corner (de Belin, 2018) and (b) extract from DP1246370 showing these on the plan (de Belin, 2021).

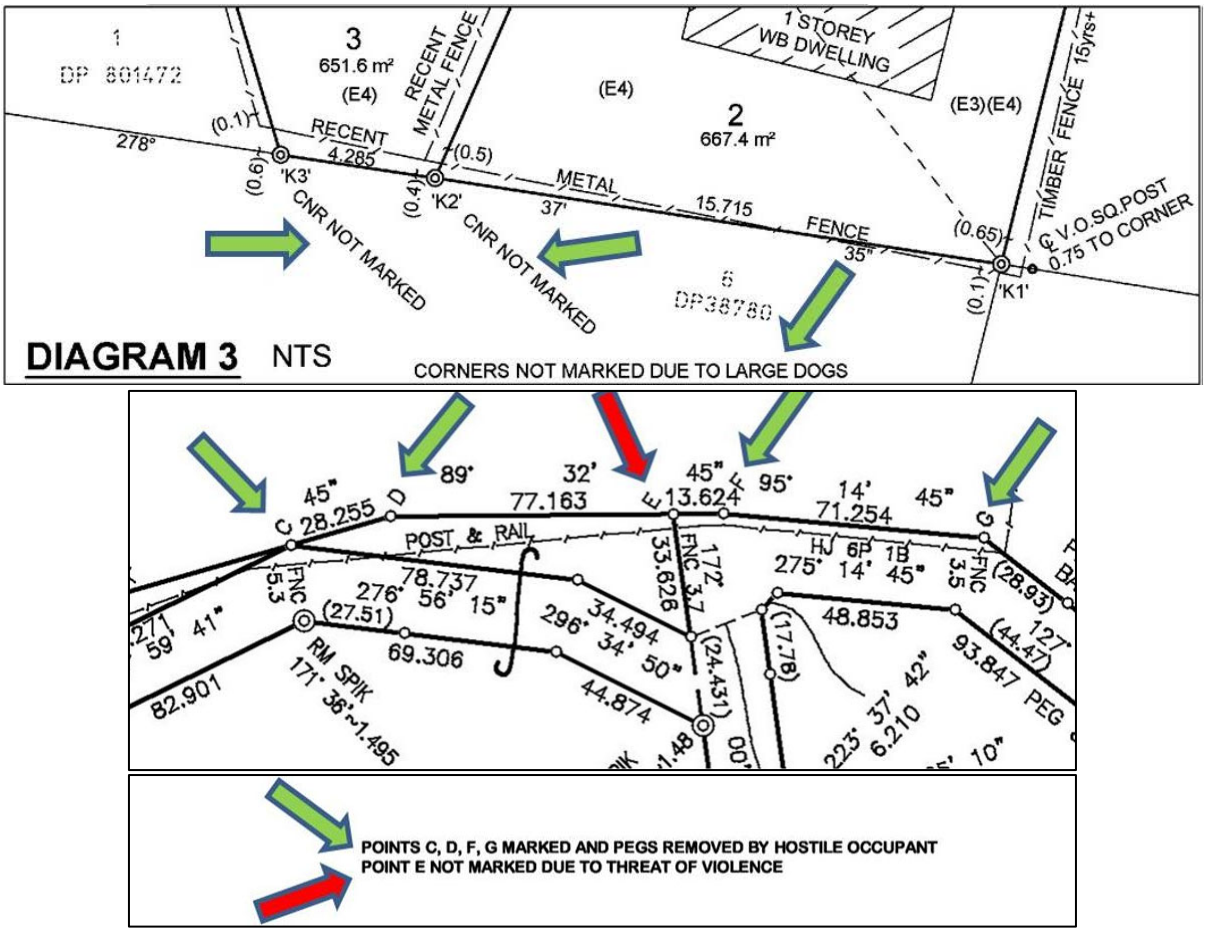

Figure 16: Corners not marked due to large dogs or intervention by a hostile occupant (de Belin, 2021).

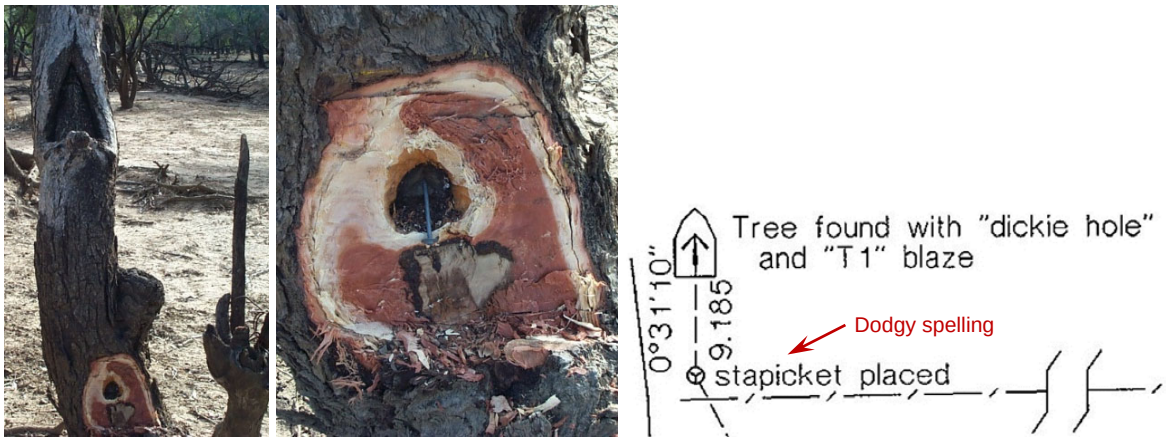

Figure 17: Tree with 'dickie hole' and its description in the Locality Sketch Plan of PM142268.

Finally, it is acknowledged that GNSS technology has been responsible for substantial advances and improvements in the surveying industry. However, it is important to note that GNSS is not the solution for *everything*, and surveyors should remember the other tools at their disposal when attempting to observe certain survey marks (Figure 18).

Figure 18: SS101605, not a particularly good GNSS site.

9 CONCLUDING REMARKS

In an age of increasing importance of high-quality, peer-reviewed research output by academics ('publish or perish'), it would be a shame to lose the funny side of science as it is also a crucial part of academic freedom. Thankfully, several journals continue to support the publication of the occasional humorous paper. Unusual and imaginative research is also being honoured through the Ig Nobel Prizes, which were introduced in 1991 to make people laugh and then think, spurring their interest in science along the way. In a world still suffering from the effects of the COVID-19 pandemic, maybe this is now more important than ever.

This paper has provided an introduction into the fascinating world of amusing research related to surveying and the spatial sciences, addressing general issues associated with publishing and presenting, typical problems encountered in the workplace office environment, the contribution of vampires and zombies to science, innovative approaches to animal mapping and ecology,

attempts to explore our physical world, WHS issues and our general wellbeing, as well as highlighting some examples encountered in surveying practice. It has demonstrated that science humour not only plays an important role in improving student learning and the general public's understanding of science, but also contributes to increased happiness and harmony in the workplace. Thinking outside the box is very much encouraged!

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