

K-12

The MOAC and SysBio Newsletter

15th January 2007

Christmas Party Rocks Coventry House



On the eighth of the last month of last year, MOAC celebrated Christmas in time-honoured style with a traditionally home-cooked Christmas dinner. At strategic locations around Coventry, pigs were tucked into their blankets, highly skilled teams peeled mountains of potatoes and parsnips, squads of vegetable cookers manned banks of microwaves and giant birds were roasted.



MOAC's own seminar room played host to this tumultuous event, transformed from the austere place of learning into a wondrous grotto of Christmas frivolity with shiny pieces of paper, by our very own creative geniuses Alistair and Yi.

It was attended by some of MOAC's most important people – the students – and a handful of lecturers, as well as little Lotte who had tremendous fun squirting the assembled guests with water. Accompanied by joyful Christmas music provided by DJ Liam, the party was heralded as a great success by K12 readers.



After the wine had flowed – or had been taxed by the academics – the guests stuffed, crackers pulled – with enough bad jokes being told to ruin a Christmas – and the piles of dice, playing cards, hats, water pistols, fans and compasses cleared away, the dance party could begin. DJ James, mixing in his own particular brand of funkiness, commanded revellers to the dance floor to partake in some serious grooving. This segued into a spicy hot salsa session, with exceptionally entertaining dancing on display.



Once again MOAC's famous Christmas party has been a rip-roaring success, in no small part thanks to the efforts of the MOAC Christmas Special Organising Committee: Martyn, Hayley and Elina. Their efforts are much appreciated. They are currently looking for volunteers to organise this year's party!

– Jon

Photographs courtesy of Peter and Yi.



Editorial

SIAM in Oxford – a conference experience

A term has gone by since the very first edition of the K12 newsletter and we no longer have the luxury of filling it with introductory descriptions. Instead, we have tried to give you a brief insight in to our world.

Be it challenges from the world of sport, forays in to the glamorous world of television, ideas that tickle your mind or hobbies that add a dash of colour, we interdisciplinarians are never short of a story to tell.

Actually committing it to paper though, means adding one more to that seemingly endless list so, many thanks to those who have contributed to this edition and we hope it encourages the rest of you. Thanks also to Antony and Yi for their editorial input.

– Lahari de Alwis

- Mike Li

Not soon after stepping off the train into Oxford station, you get an impression of why companies often boast of being located in Oxford and their employees emphasize the location of their workplace. People are different throughout the country, but there are few places that give an uplifting feeling and these heady places are frequently found near cities or institutions that have an overriding sense of optimism.

The disadvantage of travelling to nice places on business is that you seldom get to see or appreciate the place you have so looked forward to visiting. The first needlessly big building to meet my searching eyes was the Said Business School. The mixing of business and public sector knowledge with academics fitted nicely with the juxtaposition of industry and mathematics at the UK and Irish SIAM meeting (Society for Industrial and Applied Mathematics). Our schedule only allowed a brief wander into the main shopping area and meanderingly past the Radcliffe Camera.

The Oxford Computing Laboratory was to host this session of the UK and Irish SIAM Annual Meeting. The meeting took place unpretentiously in rooms accessed by a small side door and a narrow stairwell

taking us down below ground. The bulk of the time was allocated to presentations of science and mathematics with a small organizational session before lunch. Of interest to people working in the life sciences were presentations, including experiments and modelling of the formation of lipid-rafts, and the correspondence between discrete and continuum models of molecules. There was a purposeful practicality to the talks, and Warwick's Andrew Stuart discussed statistical methods needed to approach scientific questions that are far-removed from the ideal mathematical systems usually studied.

The small delegation attending from Warwick was suitably impressed with an organization that has a rather lower profile at Warwick than one might expect. Students involved in applied mathematics in MOAC may be interested in the January issue of the SIAM journal, *Multiscale Modeling and Simulation* as it has a special section on applications in biology and an article on homogenization to resolve small cellular structures efficiently. In conclusion, the Society for Industrial and Applied Mathematics offers a useful opening into other work that is relevant to the Life Sciences, Chemistry, and Mathematics to complement more familiar scientific reading.

A TERM IN THE LIFE

– Liam Jones

In September 2000 I entered the wonderful realms of higher education at the University of Warwick. Enrolling as a maths student, little did I know that I was to become what can only be described as an eternal student!

Things have changed since then Senate House has become Coventry House and is now home to the new department of MOAC, with one of my close friends - Adair - enrolling in the first year. At the time, I was still ploughing through the joy of final year Maths. Topology, Lie Algebras and Linear Analysis were now words I actually knew the meaning of. I graduated clutching a 1st class degree and off I went to London to earn some money. Two years passed before I realised my calling in life: a PhD!

Back I came to this wonderful old place, enrolling in MOAC. Of course, I knew it would be hard work having done no biology during my university days but I'd done the pre-term questions...

September 2006 came around and term began. We started three courses: "Introduction to Chemical principles", "Introduction to Cellular Biology", and "Introduction to Mathematical Modelling". The

assumption here was that I'd be fine on the maths, have to work a little bit for the chemistry, and for the biology – well, frankly I was stymied.

The mathematics seemed ok, as long as it really was maths. Integration, solving ODEs and functions I was fine with. It was just the rather bizarre assumptions made in some of the models that I didn't quite get – what do you mean some things don't follow Ohms law?!? The chemistry module, on the other hand, was apparently slightly less workload due to reduced number of lectures, and no assignments to hand in. However, we seemed to cover so much material that large amounts of background reading were a must! Finally, of course there was biology. Wow, was this hard with many assignments handed out in different formats. Group work, presentations, labs, posters; it was all there. I haven't even mentioned the lectures of which there were many, each one intense, covering about 60 pages of *Alberts*: the biology bible. If this book doesn't say it, it is not worth knowing. Needless to say I made fairly extensive use of it and worked hard to keep up with the material.

That brings me to the end of the first five weeks. Then came the dreaded exams. Stress levels rose, as did work time and take-aways eaten, but possibly not

..continued on page 6

BATTING FOR THE OTHER SIDE

– Dan Bearup

MOAC, being an interdisciplinary course, lends itself to dividing loyalties. As a mathematician by training, working half the time in a biology lab and the rest with engineers, I was bound to see this in my work life. I did not expect to find it in my personal life but, alas, it has reared its ugly head once more. But it's time to get all that out in the open; I'm coming out!

I play cricket for Biological Sciences but I'm also considering joining the Chemistry cricket team. Shocking really, as it's not like I have many ties to Chemistry. Well, I suppose I'm technically a member of the Chemistry Department and a member of my advisory committee works down there, but I do all my work in BioSci. However, the Chemistry team, unlike that of BioSci, has regular nets and more than one match a term. The last time BioSci played Chemistry they conceded 200 runs in just twenty overs and this despite my unusually good figures of 3-8 (off two overs) and 25 not out (I was required to retire at that point). Actually, the last time BioSci was meant to play Chemistry they didn't get a team out, but you get the idea. Still, despite their obvious failings, I am drawn to the BioSci team. Maybe, like any good Englishman, I just can't help but espouse the underdogs. Jude would, perhaps, have been at home over here. At the end of the day, while I'm sure I'll take full advantage of the match practice with which Chemistry can provide me, I'll probably end up playing against my erstwhile team-mates when the Chemistry-BioSci fixture comes around once again.

My perfidy does not end there however. You see while my loyalty to the gentleman's game has been in force for many years, I find myself increasingly drawn to that game of yobs and thugs. I refer, of course, to football. <Brief pause while the author attempts to

avoid being lynched by the MOAC football team.> Given that I was working in a lab - Structural Biology - full of avid footballers, it was perhaps unsurprising that I was invited along to their practice sessions. More surprising that I went along and discovered that, contrary to performances at school, I was reasonably competent at least as long as I wasn't asked to do anything more taxing than defend. However, you know the end of this story surely; I have, after all, revealed my true colours already. When the intra-BioSci 5-a-side tournament came around did I put my new found skill to use assisting these people who had taken me in? Alas, no. I absconded to the Microbiology team - the underdogs once more, fielding as they were two members of staff. However, after assisting my team in keeping 6 consecutive clean sheets no-one was more surprised than I to discover that we had in fact won, beating out both Structural Biology teams in the process.

So there you have it, a sordid little tale of divided sporting loyalties. Who knows what I will get up to this year.

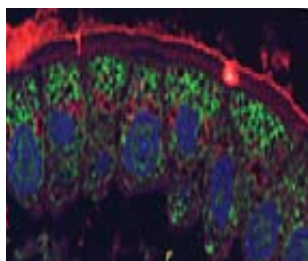


Upcoming MOAC Seminars

24th January

Making Molecules Jump Through Hoops

Guy Clarkson, Chemistry



31st January

Towards a Truly Biomimetic Olfactory Microsystem

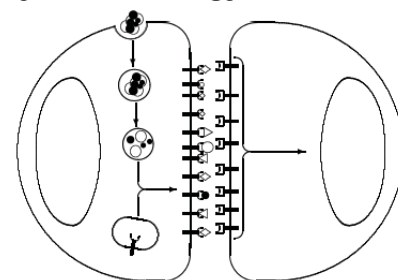
James Covington, Engineering



7th February

Coreceptor Modulation of TCR Avidity

Hugo van den Berg, Systems Biology



UNIVERSITY NOD FOR TRIVIA BOD

– Prakash Patel



The 'University Challenge' quiz show started in 1963 and quickly gained cult viewing status as one of the most challenging quiz shows on TV. Numerous universities have won this show, including many Oxford and Cambridge colleges, but Warwick has never won it in its 41-year history.

As a child, when university was a mythical place where the clever go to study, my first contact with the concept of university was the "University Challenge" television show. I watched in awe as these really intelligent people answered obscure questions. I wished to become one of them.

Since joining the University of Warwick in 2000, I have attempted to get onto the University Challenge team several times, but it was not to be. Then, MOAC came along and, apparently, increased my general knowledge enough to warrant a place on the team.

The journey started on a cold February evening; the selection process being a very low key event in Union North with 40 people showing up. This year's process was very lax compared to previous years, but some say "simple is best". A Union sabbatical officer read out 20 questions, answers were written on an A4 sheet of paper and those with the highest marks were on the team. After a week or so, I found out I had made it, together with Daisy Christodoulou, Harold Wyber and Rory Gill. We were now the Warwick University Challenge team and you may do well to remember our names.

Even so, our place on TV was not assured, which Harold and I found out in last year's unsuccessful bid. About 250 institutions submit a University Challenge team, but only the best 28 teams which perform the best collectively on a 40-question test would appear in the televised finals. This stage took place at Birmingham University in May, accompanied by an interview by two of the producers of the show to see how 'interesting' we were as people – females, ethnic minorities and strong regional accents are looked upon favourably in this PC generation.

Despite our regional accent deficiency, once we knew we had made it to the televised finals, I was a bit of a quandary – explaining a PhD in Molecular Organisation and Assembly in Cells to the audience was not an option. As a result, I said I did a PhD in Chemistry on the logic that both my supervisors were chemists, but I would have loved to have said MOAC, honestly. Also, we had only three weeks to prepare for our date at Granada Studios, Manchester and practice was limited to a couple of unspectacular RAG pub quizzes. Hence, it was a very pleasant shock when we beat Emmanuel

College, Cambridge (an Oxbridge scalp is always satisfying as they seem to expect to beat you) on a balmy June day in Manchester.

The second round versus the University of East Anglia was recorded about three weeks later and it was a far tenser affair. Personally, it was very difficult to prepare mentally as the previous day England had been knocked out of the World Cup; a stench of despair and disappointment hung over Manchester which was compounded by the ironic fluttering of England flags and bunting everywhere. We were close to capitulating on the show just like the England team: our reaction times were slower than our opponents and I hesitated on a few questions. Also, both my parents in the audience feared the worst, but it was the performance we would remember the most and learnt a lot from. It certainly made great entertainment.

I cannot share with you the eventual fate of the Warwick team yet, but the team was surprisingly well-balanced with everyone contributing equally. Nevertheless, despite our glorious run, we are still absolutely rubbish at the Union quiz machines!

Watch out for...

Bugadoo Bear's costume changes
Our impossibly cute mascot decides to join the team in wearing a different outfit for each round. When the outfits ran out, he resorts to cross-dressing.

Outlandish Celebrations
If my celebratory punches in the air weren't cringe-worthy enough, watch the end of my second round match – it will keep you on the edge of your seat!

The Kiss
This masterpiece in impromptu greeting occurs at the End. I try something never attempted before by a University Challenge contestant, but I am told that not many actions shock our host Jeremy Paxman that much.



The second round of University Challenge – Warwick vs UEA – will air on Monday 26th February at 8:00pm.



LUCAS' SHAPES

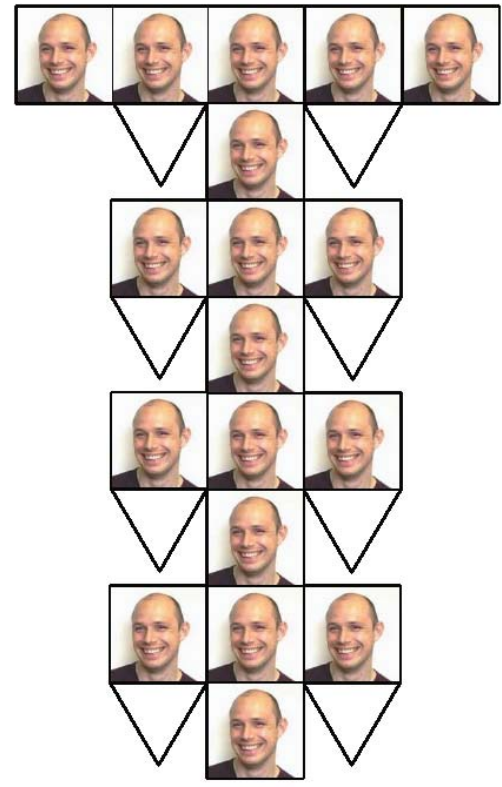
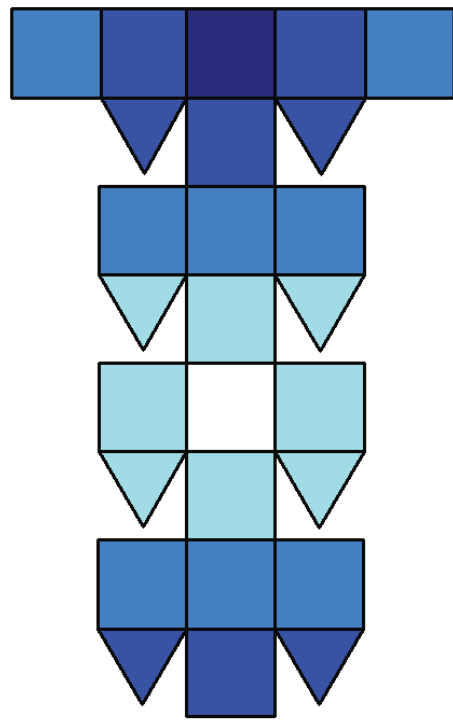
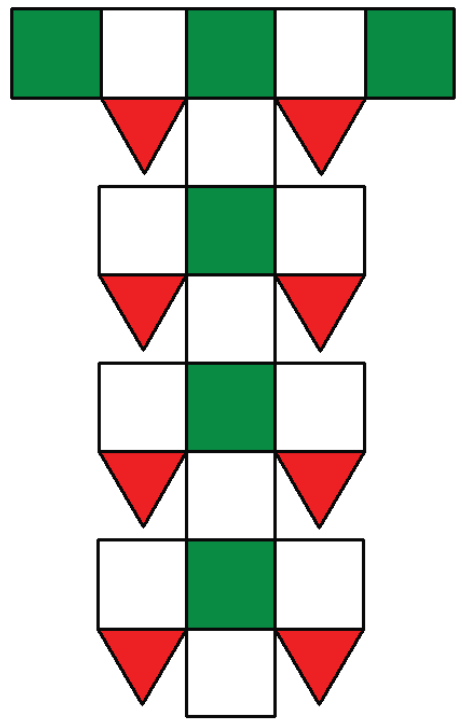


Due to popular demand, this term's newsletter contains a net for one of the colourful geometric shapes featured in the MSc office. Simply colour in, cut out and appropriately tape together the net featured on the pull-out page to create YOUR VERY OWN PERSONALISED **RHOMBICUBOCTAHEDRON!!!**

But first, some information about the rhombicuboctahedron; It has 26 faces, 8 regular triangles and 18 squares. Not all the squares are identical; six are next to four other squares and twelve are next to two triangles and two squares. There are 48 edges and 26 vertices and it belongs to the point group O_h . The rhombicuboctahedron is a very robust shape and you will be *astounded* at the heights that it can be dropped from without significant damage. Other uses, some of which are historical, include geometric tennis, efficient packing of jelly babies and the repulsion of evil spirits.

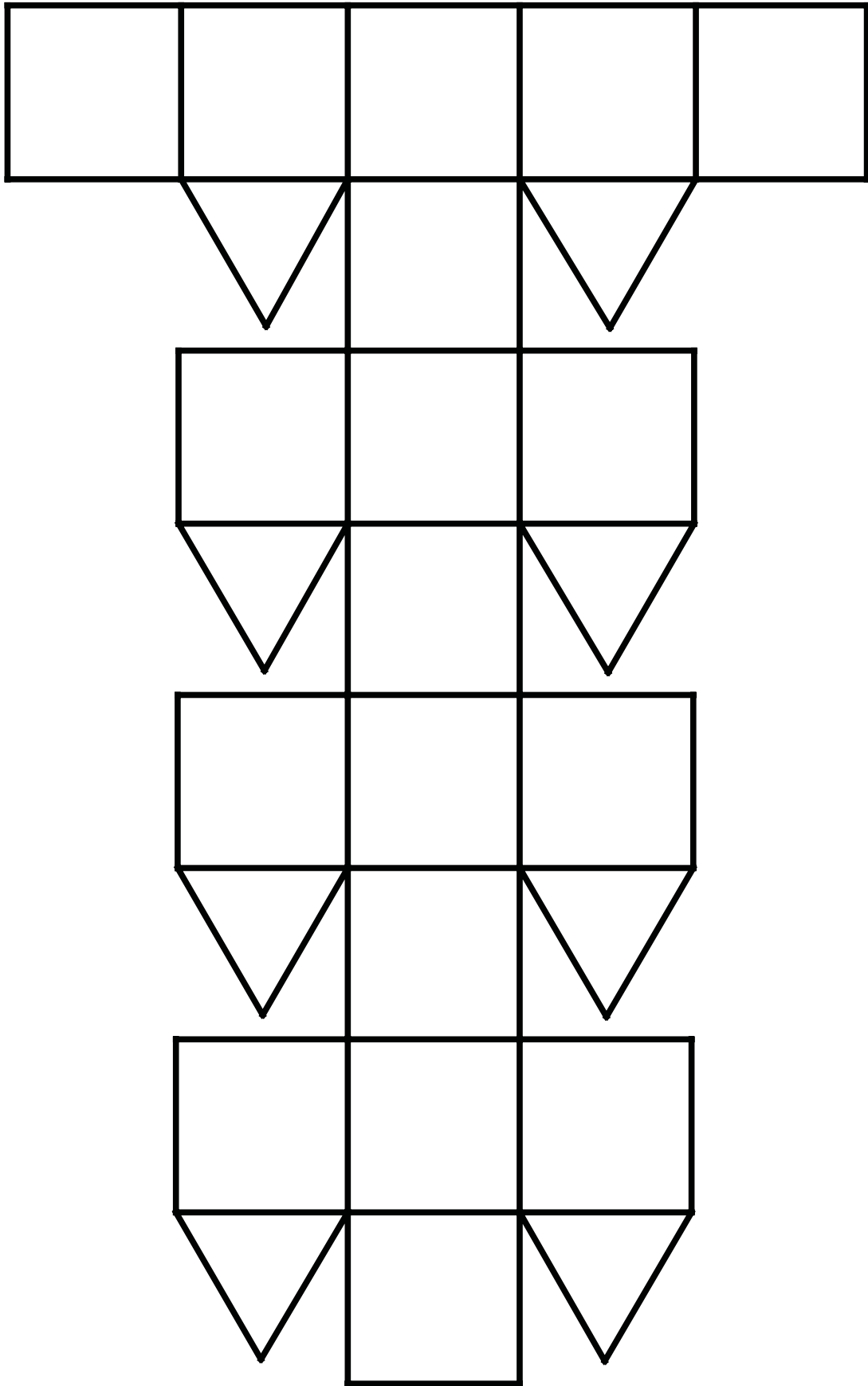
– Lucas Wilkins

Colouring Suggestions



Lucas' Shapes

No. 1 – Rhombicuboctahedron



Next Term: Shape No. 2 - The Sphere

Want to pick the brains of your MOAC and SysBio colleagues on any subject that interests you? Write in to the next edition of the newsletter in 600 words or less and get them talking.

News from Wonderland – Richard Wilson

Strawson converts to panpsychism and bops Dennett and Chalmers on the way.

Wonderland's venerable glass bead game was rocked to its foundations when Galen Strawson, a convicted physicalist, announced his "crazy" [a quote from the man himself] conversion to panpsychism.

For centuries, perhaps millennia, the best minds have been failing to understand the most familiar, obvious and immediate phenomenon in the universe. This puzzling state of affairs drives some to extreme measures such as pretending it doesn't exist, explaining it away by smoke and mirrors or constructing weird and wonderful metaphysics.

Life, the universe and everything

The debate is about the ultimate nature of the universe.

A prevalent common-sense view is that we are beings in a world made up of two different substances: mind and matter. Descartes held this view of dualism, but got in a tangle when trying to show how the two interact, as when you perceive or act.

The interaction problem evaporates with a monist view. Physicalists claim there is only physical matter; Gilbert Ryle refers to mind as the 'ghost in the machine' of the body. Idealists believe it's all in the mind, of God in the case of Bishop Berkeley. Dual-aspect theory posits a fundamental substance of which the mental and physical are properties. Panpsychists take a similar view, coalescing matter and mind.

With the rise of neuroscience, physicalism has become the popular theory, but is incompatible with panpsychism since the former maintains that mind is fundamentally matter while the latter insists on both matter and mind being fundamental.

Zombies

Dualists try to show monist views as untenable. In his book *The Conscious Mind*, David Chalmers makes a case against physicalism by getting us to imagine 'zombies': "perfect physical duplicates" of experiencing human beings but lacking consciousness. He argues that, since we can imagine zombies, they are possible and therefore consciousness is logically independent of matter. Therefore, physicalism must be false because it requires consciousness to arise from matter.

Strawson begs to differ, stating "...it is fabulously implausible to suppose that an atom-for-atom duplicate of an experiencing human being could be produced and not have experience".

Dennett through the looking glass

Physicalists need to show that consciousness reduces to brain processes. Daniel Dennett takes a reductionist view, exposing what he sees as fallacies in commonly held beliefs about the attributes of consciousness while maintaining his belief in the reality of conscious experience. Strawson is not alone in thinking that Dennett is merely paying lip service to the notion of consciousness by employing a 'looking-glass' definition.

Mind out of matter

Strawson realises that the problem for physicalism is accounting for consciousness. He states the tenets of physicalism as a pair of theses: NE – physical matter is something wholly and utterly non-experiential. RP – experience is a real concrete phenomenon and every real concrete phenomenon is physical.

As NE is incompatible with RP, a favoured route to reconciliation is through the concept of emergence.

Water on the brain

Emergence can be illustrated by considering water. A single water molecule is not liquid; the liquidity of water emerges from group interactions of water molecules. Strawson concurs, but contends that getting RP out of NE requires 'brute' emergence which, he claims, would violate physical laws.

Strawson argues that as NE and RP cannot be reconciled, the only option is to invoke panpsychism: "...all energy, I trow, is an experience-involving phenomenon. This sounded crazy to me for a long time, but I am quite used to it now that I know that there is no alternative short of 'substance dualism'...".

My opinion is that Strawson's embrace of this nonsense is born of desperation. Panpsychism is false because it widens the scope of the mental to the non-sentient. Even if it were true, it is incompatible with physicalism (as it negates NE) and so is unfit for purpose. There is more life in emergence than he thinks, but to explain why would take another article and I'm sure you've had enough philosophy for one day.

...continued from page 2

productivity. I'm pleased to say that the examiners treated me well and I came out of the first half of term relatively unscathed!

No sooner had I left the Chemistry oral exam, I was in a lecture on AFM for CH922 BioImaging and CH921 Data Acquisition 1. It was not long before I worked out what these courses were actually about: learning how to extract data from molecules and organisms. Data acquisition 1 had some lab work but was mainly lectures, whereas Bioimaging was much more about using the equipment. We had demonstrations in the

use of NMR, SICM, SECM, AFM and EM from people who use them on a day to day basis. Both courses were enjoyable and I felt that I had less work overall this half of term than before, since I was only doing two options. The exams were reasonable, but I really needed a holiday by the end of it all! And, I got one – Christmas!

So, what conclusions can be drawn thus far and what can be said about MOAC? The environment is great for working, the people are all really helpful and the course is well-structured. The only problem is that it seems that now they actually want me to do some work...

5-A-SIDE FOOTBALL REPORT:

– Dominic Lawrance

Last term saw the formation of the unofficial MOAC/SB 5-a-side football team, a.k.a 'MSc Dream Team'. A formidable blend of both dainty theoreticians and brutal biologists promised to be an ironclad combination for success. This rare and somewhat begrudging collaboration between MOAC and SB students was driven by a mutual hunger to educate and humiliate the undergrad upstarts that plague our beloved campus.

Fate, it seems, is not without a sense of irony.

The first game of the season saw the MSc Dream Team face a stern challenge. Pitted against 'Bibs and Cones: The Revolution', a dim-witted undergrad team with a name to match, the Dream Team expected their beautiful passing game to rip the opponents apart. Alas, the first half was a lacklustre affair with both teams failing to seize the initiative. The breakthrough came just before half time when Dream Team captain and all-star, all-time best player Dominic Lawrance (that's me, could you guess?) passed the ball directly to the opposition striker, gifting him a one on one against the keeper which was gratefully accepted.

Making amends early in the second half, the aforementioned all-star levelled the score at 1-1 with a sublime individual effort – pick pocketing the ball from the opposition just outside their area and slotting home from 8 yards with a powerful shot which left a gaping hole in the back of the net. The rest of the second half proved more riveting with chances at both ends of the pitch. Eventually though, the MSc Dream Team succumbed to the sheer greasiness of the undergrad style of play and conceded a second weak goal when stand-in keeper Yeorgios (a.k.a George The Noob) allowed a slippery shot to get past him from the narrowest of angles. All in all, it was a good effort, but nevertheless a 2-1 defeat.

The second game of the season saw the MSc Dream Team up against JM4s, which apparently stands for 'Jack Martin 4s'. Some punters suggested before the game that a team naming itself after a kitchen would surely not stand up to the footballing prowess of the Dream Team. Unfortunately, the Dream Team were

once again stifled in the first half. The first 10 minutes were relatively dull, albeit for one crunching tackle by James 'The Hair' Stephenson on the best opposing player (a subtle tactical call). The Dream Team went 1-0 down a few minutes later in a carbon copy of the incident from the previous game; the Dream Team captain shamefully passed straight to an attacker for an almost identical goal to be scored.

However, in keeping with the repetition it was once again the captain who brought the Dream Team back into the game on the stroke of half time, rounding a player and carefully placing the ball beyond the keeper to level at 1-1. The Dream Team came out all guns blazing in the second half and it soon paid dividends. Shortly after the restart, a rapid counter-attack exploited space down the right wing for Pete 'Sensei' Silman (PGCE Maths) to execute a perfect low cross for vice-captain Andy 'Spandex' McCarthy to tap in an easy chance (even Colin Robinson could have scored). The undergrads then began to tire, probably as a result of their malnutrition and excessively lazy lifestyle. From that point on, it was Dream Team all the way as the more mature and talented side split their undergrad counterparts apart like a knife through butter. A fluent passing game was demonstrated with Howard 'Size 2' Lightfoot proving that people who can do advanced integration can also play good football. A romping second half left the score-line at 5-1 to the MSc boys.

Regrettably, the rest of the season went downhill from there. Injuries and absenteeism resulted in a weakened squad and the team lost 3 games on the trot. The most notable defeat was delivered in the knockout cup by way of a 12-0 demolition, no thanks to Ed 'Pie Man' Morrissey who failed to shine on his debut for the team.

This coming term the Dream Team will be looking to regain some pride. Why not join us as we attempt to win our second game ever? If you are interested in playing football of the highest order with some of the finest minds in the country then come and find either myself or Andy in the MOAC common room.

Please note all nicknames used in the above article are entirely fictitious.



The dynamic, in more ways than one, MOAC and SysBio 5-a-side football team featuring (from left to right) Andy, Yeorgios, Dom, Ed and Marc.

Accomplishments

📖 James Sinfield was first author of "Induction of synchronous oscillatory activity in the rat lateral amygdala in vitro is dependent on gap junction activity", published in *European Journal of Neuroscience*, 2006, **24**(11).

📖 Gemma was a co-author of "Differential reactivity of individual zinc ions in clusters from bacterial metallothioneins", published in *Inorganica Chimica Acta*, 2007, **360**(1).

This was adjudged the best paper of "Inorganic Chemistry - The Next Generation", a special issue of the same journal and received an award.

📖 Peter is first author of "Evolution of gene overlaps: relative reading frame bias in prokaryotic two-component system genes.", which is currently in press for *Journal Of Molecular Evolution*.

📖 James Sinfield is first author of "Behavior of Spiking Neuronal Networks with Random Interactions", which is currently in press for *Physical Review E*.

📖 Hashem is author of "On finiteness of multiplication modules", which has been accepted to *Acta Mathematica Hungaria*.

As reported in the previous edition of the newsletter, the papers in press can now be found in the following publications.

📖 "c-Myc and Downstream Targets in the Pathogenesis and Treatment of Cancer" – Sam Robson et. al.
Recent Patents on Anti-Cancer Drug Discovery, 2006, **1**(3).

📖 "Scanning electrochemical microscopy: principles and applications to biophysical systems" – Martin Edwards et. al.
Physiological Measurement, 2006, **27**.

🏆 Raul won first prize in the poster competition for the European CD users meeting.

Announcements

🎉 Congratulations to Hayley and Jez on their engagement!



🎉 Cake Day

The third Friday of every month will be "Cake Day" at MOAC.

The cake of the month will be unveiled at lunchtime to celebrate the birthdays of the month.

Everyone is welcome and please feel free to volunteer to provide the cake for the following month.

SSLC report

The MOAC and SysBio SSLC convened last term to discuss matters arising from the first term of the new academic year and other relevant issues.

The new members of the committee are,
Lucas Wilkins/Howard Lightfoot (2006 MOAC Reps.)
Andrew McCarthy (2006 SysBio Rep.)

Apart from the usual issues concerning lectures and other departmental matters, which were taken under consideration, the decision was taken to have MOAC PhD vivas recorded rather than having a third academic present as an advisor. The recording can be used in the event of a complaint from the student. The situation will be reviewed and it is suggested that this process is informally reviewed after each of the first few vivas. This decision was reached by canvassing opinions of MOAC students, with students being given the option to object to the proposal.

In answer to a general appeal to describe the role of the MOAC course director, it was observed that the position of a personal tutor, as in other departments, would be a satisfactory role. The director would be the first port of call for PhD students having problems with supervisors. It was considered that having an academic guide assigned to the MSc students would be useful and, as such, steps have been taken to assess who could fill this role. This guide would be expected to conduct regular meetings to review the progress of each student.

For all those fish-pie lovers, there will no longer be a queue for the microwave with the addition of new ovens in both the MOAC and SysBio kitchens.