Connective Issues:

BSMB Newsletter

BRITISH SOCIETY FOR MATRIX BIOLOGY

Registered Charity no. 281399

No. 107, June 2025

Editorial

Dear BSMB members,

Hope you are enjoying the British summer time. I would like to take this opportunity to welcome (back) Prof. Kim Midwood as our new Chair of the BSMB! As you know, Kim served as the BSMB secretory (2017-2023) and showed tremendous leadership in guiding our society through some tough times. Heartfelt thanks to Prof. Andy Pitsillides, our outgoing BSMB Chair for his dedication to the Society (6 years as BSMB Secretary and 4 years as the Chair) and strong leadership skills. Andy, you will be deeply missed!

Thanks also go to the outgoing Membership Committee Chair, Prof. George Bou-Gharios, for his tireless efforts and highly impactful personal approach in maintaining and increasing our membership base. Welcome Dr. Anna Piccinini as the new Membership Committee Chair, while retaining your role as the ECR Award Committee Chair.

Mutual membership status agreement between the BSMB and the French Society for Extracellular Matrix Biology (SFBMEc) has been signed. As a reminder, this agreement enables members of the BSMB to register at the SFBMEc annual meetings' member rate, and vice versa.

BSMB recognises next generation matrix biologists. We are delighted to announce this year's running of the BSMB Early Career Researcher Award - John Scott Lecture, a prestigious award presented annually to an early career researcher who has made a significant contribution to matrix biology and has excelled in the early stages of their research career. Please send Anna your nominations!

Qing-Jun Meng, Honorary Secretary

Chair's letter

It was a great pleasure for me to return to the BSMB committee at our AGM in April this year, and an honour to take on the role of Chair. I'm very much looking forward to supporting the BSMB and you, our members, to progress from strength to strength over the next 3 years.

The very first thing I'd like to do in this letter is to extend my personal thanks to our outgoing Chair, Andy Pitsillides. A mainstay of the BSMB community, Andy's contribution to the society cannot be overstated. In particular, over the last years at the helm as Chair he has calmly and assuredly driven the BSMB forward, fostering new and stronger links with our sister European Matrix Societies along the way. BSMB is flourishing today and this is in no small part thanks to Andy's generosity with his time and commitment to the society. I'd also like to echo Qing-Jun's thanks to George Bou Gharios as he steps down from his role overseeing the society's membership. A fellow long term supporter of our society, George has helped grow the BSMB to its biggest membership base to date. Andy and George: you will both be missed enormously on the committee, but we look forward to seeing you at BSMB meetings ahead.

I'd also like to thank all the BSMB committee currently in post – it's been wonderful to see the drive and enthusiasm you each bring to supporting the society. This year, we welcome Hannah Evans as our new student rep - we look forward to working with you Hannah. Of note, we have two positions now available on the committee. Please see below for more information on how to nominate committee posts. Do consider coming to join us in what is a most rewarding endeavour! Also a big thank you to our post-doc rep, Neil Marr, for organising the ECR meeting in London on Thursday July 17th.

Our Spring meeting in April in Nottingham was a fantastic conference – bringing together leaders in matrix biology and immunology, and forging some new exciting collaborations and networks. Many thanks to Anna Piccinini and her local organizing team for all their hard work in making this meeting a success (and the amazingly creative name badges – a hard act for anyone to follow) and to everyone who attended. Our Autumn meeting promises to be equally successful. Salvo Santamaria has put together a fantastic programme, in a great location, and registration is now open – please see below for more details. We look forward to seeing you there.

Finally, as we see changes in research, both within and outside of the matrix field, with hope of meaningful re-integration with EU partners and funding schemes, alongside challenges faced by US colleagues, it feels timely to re-iterate our mission: to support researchers in Matrix Biology, especially students and early career researchers, to continue to advance Matrix Biology together with colleagues around the world.

Kim Midwood, BSMB Chair

BSMB News

Mark your diary

BSMB Autumn 2025 Meeting
Uncovering the Matrisome: Technological Advances and Trends in Matrix Research.
Guildford, September 2nd-3rd, 2025

BSMB Spring 2026 Meeting
Extracellular Matrix Biology Across Tissue Sites (Location, Location, Location).
Manchester, April 13th-14th, 2026

BSMB ECR Award – Call open

We are delighted to announce this year's running of the BSMB Early Career Researcher Award – John Scott Lecture.

The "Early Career Researcher Award" is a prestigious award presented annually to an early career researcher who has made a significant contribution to matrix biology and has excelled in the early stages of their research career. Following the generous bequest from the estate of Professor John Scott (1931-2012), the winner of the Early Career Researcher Award will be presented with a cheque for £1000, and will deliver the 'John Scott Lecture' at the Autumn Meeting – "Uncovering the matrisome: advances and trends in matrix research", 2-3 September 2025, University of Surrey, Guildford, UK.

Eligibility: applicants must have been a member of the BSMB for at least 6 months and have accepted in press at least one research manuscript and no more than three on which they are the corresponding author.

Previous awardees, further application rules and how to apply are here [https://bsmb.ac.uk/page/young-investigator-award/].

Applications should be sent to anna.piccinini@nottingham.ac.uk by no later than Monday 30th June 2025, 5pm.

By Anna Piccinini (Chair of the ECR Award Committee)

ECM special issue across 3 Cell Press journals

In conjunction with Professors Kim Midwood (Oxford) and Qing-Jun Meng (Manchester) we are acting as associate editors for this Extracellular Matrix special. The journals are very keen to receive matrix themed research manuscripts and reviews. Submissions will be subject to the normal editorial process each journal operates.

The deadline for submission of papers has been extended to the 31st of August and there is still space for more papers.

We would direct you to this link https://www.cell.com/cp/special-issues/call-for-papers/extracellular-matrix-in-health-and-disease [cell.com] for more information.

We would be very grateful if you could disseminate this as widely as possible amongst members of the ASMB.

By James Whiteford (Treasurer of BSMB)

WELCOME TO NEW BSMB MEMBERS!

STUDENT MEMBERS
Karthik Vaidya (Birmingham)
Hannah Kelly (Oxford)
Olivia Annet (Bristol)
Ufuk Ersoy (Liverpool)
Christian White (Cornell)
Nicholas Mostaghim (Cornell)
Michelle He (Cornell)
Amber Liu (Cornell)
Anika Assaraf (Southampton)
Xuefeng Yao (Manchester)
Gfit Gwawawa (Oxford)
Morgan Bryant (Aberdeen)
Hannah Evans (Nottingham)
Jiachen Lou (Oxford)
Shaima Riha (Glasgow)
George Pickard (Liverpool)

FULL MEMBERS
Danielle Smyth (Dundee)
Eric Yuan (New York)
Roger Smith (RVC)
Henry McSorely (Dundee)
Karen Paterson (Surrey)
Chloe Stewart (Nottingham)
Ashvatti Durai (Manchester)
Martyn Smith (Leicester)
Muhammad Dain Yazid (Kuala Lumpur)
Shameem Ladak (Leicester)
Meryem Gultekin (Nottingham)
Matthew Burgess (Aberdeen)

By James Whiteford (Treasurer of BSMB)

Meeting highlights:

BSBM Autumn Meeting 2025, 2nd-3rd September 2025, Guildford, Surrey, UK

BSMB 2025 Autumn Meeting - Hosted by Dr. Salvatore Santamaria from the University of Surrey. Co-organizers: Jade Wang (administrator), Tina Burkhard (ECR), Dr. Frederic Buemi (ECR), Alexander Minns (ECR), and Dr. Paola Campagnolo (Assoc. Prof). The meeting theme is 'Uncovering the Matrisome: advances and trends in Matrix Research' and will be held at the University of Surrey, Stag Hill Campus, on the 2nd and 3rd September 2025. The campus is just 10 minutes' walk from the centre of Guildford, offering a vibrant blend of entertainment, culture and history. The borough includes part of the Surrey Hills, a designated Area of Outstanding Natural Beauty. The main meeting will include sections and talks on the matrisome, single-cell omics, proteomics and multi-omics. Confirmed speakers include Dr. Alexander Eckersley (University of Manchester), Prof. Melanie Bailey (University of Surrey), Prof. Alexandra Naba (University of Illinois), Prof.

Valerio Izzi (Oulu), Prof. Irit Sagi (Weizmann), Dr. Emily Noel (University of Sheffield), Prof. Sarah Snelling (University of Oxford), Dr. Suneel Apte (Cleveland Clinic), Prof. Cathy Merry (University of Nottingham), Dr. Rens de Groot (University College London).
The meeting will also host the ECR award and John Scott Lecture. You are invited to submit abstracts for selected talks and posters, making this a great opportunity for early career and more established researchers to share their work on our multidisciplinary theme "Uncovering the Matrisome: advances and trends on Matrix Research" but also in our open session "The Matrix in Health and Disease", accepting abstracts on every Matrix-related topic.
Prior to the meeting, the ECR Satellite event will have as a theme "Employing the matrix: pathways to career", providing an opportunity for early career researchers to network, discuss career pathways and share their experiences with prospective funders, employers and group leaders. Program highlights:

- The Matrisome
- Single-cell Omics
- The Matrix in Development and Disease
- Novel approaches to investigate the Matrisome
- Proteomics and the Matrisome

Our sponsors include the Company of Biologists, the British Heart Foundation, Parse Biosciences (Platinum), Proteintech (Gold), Clinisciences (Silver), Cambridge Bioscience (Silver), iLAB (Silver) and Azenta (Silver).

Important dates:
Registration start: May 12, 2025 Registration end date: Aug. 13, 2025 Registration late date: July 31, 2025
Abstract start: May 12, 2025
Abstract end date: July 15, 2025

For more information about this meeting visit https://bsmbsurrey2025.wixsite.com/bsmb-autumn-2025.

See you all in Guildford!

By Salvatore Santamaria

BSMB Spring Meeting 2026 Manchester – organised by Dr. Doug Dyer

On the 13th-14th April 2026, The University of Manchester will host the BSMB Spring meeting: Extracellular matrix biology across tissue sites (location, location, location). This conference will present work from established and emerging scientists focusing on the different ECM contexts, namely the cell surface glycocalyx, basement membrane, interstitial matrix and musculo-skeletal matrix. We will have a mixture of invited scientists with lots of slots for presentations from submitted abstracts and poster sessions. We look forward to welcoming you all in Manchester soon!

Best wishes.

By Doug Dyer

In print!

Review from BSMB Fell-Muir Award 2021 - Andy Pitsillides, is online:
https://doi.org/10.1111/iep.12525

Review from Early Career Researcher Award 2023 - Chloé Yeung, is online:
https://onlinelibrary.wiley.com/doi/10.1111/iep.70001

Review from BSMB Fell-Muir Award 2023 - Jo Adams, is online:

https://onlinelibrary.wiley.com/doi/10.1111/iep.12517

In prep: Abstracts from the BSMB Spring 2025 Nottingham meeting will be in print soon in the International Journal of Experimental Pathology.

BSMB committee vacancies

Join the Committee! Positions open …

There are two Committee positions becoming available:

Any current BSMB member in good standing is eligible for this post. Committee members formulate policy and have responsibility for organising BSMB meetings. It is expected that each Committee member will take a major part in planning and organising one BSMB meeting during their tenure, and be available to attend most Committee meetings, and occasional further meetings as required. Appointees become BSMB Trustees. It is recommended that those interested read BSMB Constitution and trustee status (www.bsmb.ac.uk).

Nomination process

Nominations for a committee member of the BSMB can be made by any 2 members of the BSMB, or members of the current BSMB Committee.

Any nominations, together with the written consent of the proposed nominee should be forwarded to the Honorary Secretary, Professor Qing-Jun Meng, by Friday 1st August 2025. These can be sent by e-mail to qing-jun.meng@manchester.ac.uk.

In the event of more nominations for the number of vacancies, a ballot of the membership by e-mail will be held. To this end, it would be helpful if nominees can send a brief (one page) CV together with a short statement outlining their aspirations for the Society should they be elected. In the event of no nominations, the Committee may elect to nominate and appoint a person to the post of BSMB committee member.

BSMB Bursaries

BSMB Bursaries and Couchman Travel Awards are available. Current BSMB members are encouraged to apply for bursaries to present your matrix related findings in conferences.

1) The BSMB bursaries: These bursaries are designed to support participation of the early career researchers (i.e. PhD students or post-docs) in our BSMB Spring and Autumn meetings. Presenting at the meeting is one main condition of the bursary. Two types of bursaries are offered: Presenter bursaries will be given to applicants whose abstract is selected for an oral presentation, and Reporter bursaries will be awarded to applicants who are presenting posters at the meeting. For more details, follow the link here.

2) The Couchman Travel Award, kindly sponsored by Professor John Couchman, is open to applications. Each Travel Award will cover up to £150 for a BSMB meeting (~10 awards per year), or up to £300 for a European matrix-related meeting (~2 awards per year). For conditions of the award and to apply, please follow the link here.

3) For bursaries to attend the "Other meetings" category: These bursaries remain open to early career researchers (i.e. PhD

students or post-docs). The awards are for up to £150 for UK meetings (~5 awards per year) and up to £400 for meetings elsewhere in the world (~5 awards per year). Please follow the link here.

4) For bursaries to attend the " Matrix Biology Europe (MBE) or American Society for Matrix Biology (ASMB) meetings" category: These bursaries remain open and fund up to £500 for MBE meetings (~5 awards per year) and £600 for ASMB meetings (~2 awards per year). Please follow the link here.

All bursary applications should be made within the early bird window of the conference registration. Applications should be sent to Dr Kasia Pirog (katarzyna.pirog@newcastle.ac.uk), Chair of the BSMB bursary committee. Please check your eligibility before applying.

By Kasia Pirog (Chair of Bursary Committee)

News from the International Society for Matrix Biology

International travel grants

ISMB provides international travel grants (on average 500 Euros) for young scientists (graduate students or postdocs up to 5 years after Ph.D., with extensions for maternity leave, military service, etc) to allow them to attend major meetings in matrix biology anywhere in the world. While priority will be given to meetings directly supported by ISMB (including Matrix Biology Europe, the American Society for Matrix Biology and the Pan Pacific Connective Tissue Societies Symposium), applications are accepted for any meeting, provided that the scope of the meeting agrees with the aims of the Society.
Candidates should be members of the ISMB (see membership page for details), and a graduate student or postdoc. up to 5 years after Ph.D., with extensions for maternity leave, military service, etc.

Grants will be paid out in the form of reimbursement to grant awardees, after reception of proof of participation. To this aim, users must send a receipt of the expenses (e.g., meeting subscription fees, etc.) within 3 months from the end of the meeting they received support for.

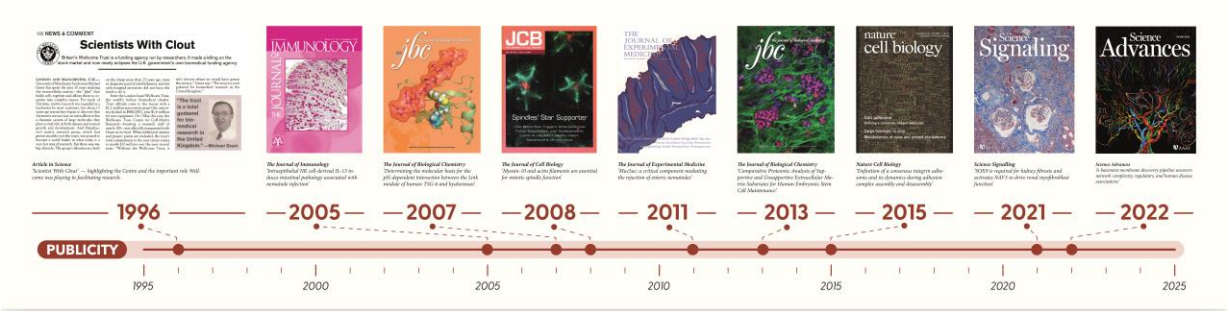
To apply for a travel grant, please fill the form available on ISMB web site (https://www.ismb.org/copy-of-travel-grants) and append a single pdf file containing:
(1) a letter giving information about the meeting, the amount requested and a detailed justification for support
(2) the abstract of your poster/short talk
(3) your curriculum vitae and list of publications.
Please apply several months in advance of the meeting, before one of the following deadlines: January 1, April 1, July 1, October 1.

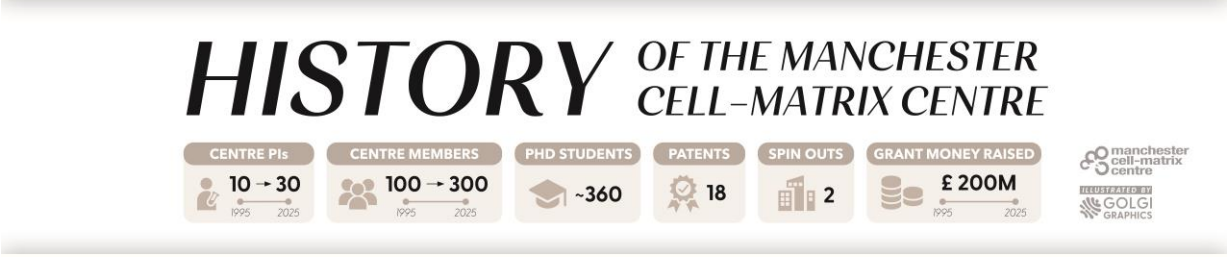
News from the Manchester Cell- Matrix Centre – 30th Anniversary celebrations!

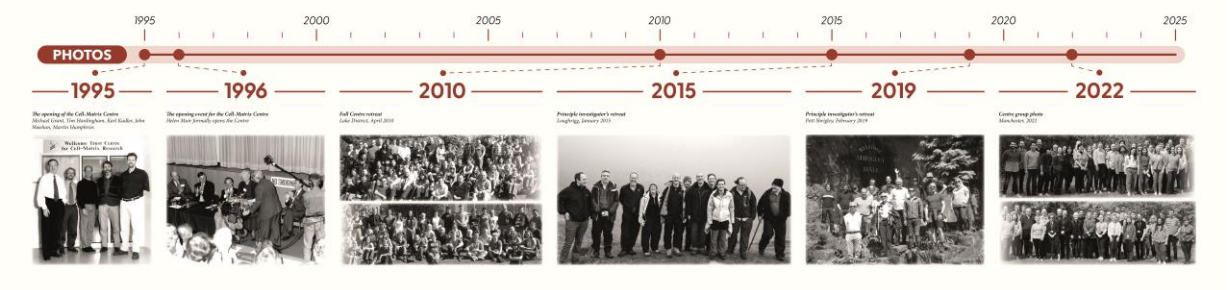
Manchester Cell-Matrix Centre 30th Birthday

The Manchester Cell-Matrix Centre held a special event on 25th June to celebrate its 30th birthday. The event was opened by Duncan Ivison, President of the University of Manchester and a series of reflective talks were opened by Professor Mike Grant who founded the Centre in 1995. The speakers looked back at the outstanding achievements of the Centre over the past 30 years (including 5 Fell Muir awards!) and highlighted the important role of technology in driving research discoveries. The second half of the meeting presented by emerging career researchers and technologists looked to the future and the exciting developments in cell-matrix research and the prospects for understanding and treating human disorders associated with abnormal matrix. The event closed with drinks and canapes enjoyed by current members along with alumni and collaborators, past and present.

Manchester has contributed hugely to the field and the BSMB itself over the years and we wish it continued success for the next 30 years!







Current BSMB Committee

Chair, Prof. Kim Midwood
University of Oxford
kim.midwood@kennedy.ox.ac.uk

Honorary Secretary, Prof. Qing-Jun Meng
University of Manchester
qing-jun.meng@manchester.ac.uk

Honorary Treasurer, Dr. James Whiteford
QMUL, London
j.whiteford@qmul.ac.uk

Elected Members:

Dr. Douglas Dyer
University of Manchester
douglas.dyer@manchester.ac.uk

Dr. Salvatore Santamaria
University of Surrey
s.santamaria@surrey.ac.uk

Dr. Angus Wann
University of Southampton
A.K.T.Wann@soton.ac.uk

Dr. David Wilkinson
University of Liverpool
david.wilkinson@liverpool.ac.uk

Co-opted Members:
Dr. Anna Maria Piccinini
University of Nottingham
Anna.Piccinini@nottingham.ac.uk

Dr. Kasia Pirog
University of Newcastle
Katarzyna.Pirog@newcastle.ac.uk

Post-doc Rep, Dr. Neil Marr
The Royal Veterinary College
nmarr@rvc.ac.uk

PhD rep, Miss Hannah Evans
University of Nottingham
mzyhe3@nottingham.ac.uk

Meeting Reports

Meeting Report of the BSMB Spring Meeting 14th-15th April 2025, Nottingham

Jessica Ackerman (University of Oxford), Iashia Mulholland (University of Manchester), and Chloe Stewart (Queen Mary University of London)

Matrix biologists from around the world gathered at the beautiful University of Nottingham campus, where Dr Anna Piccinini

welcomed attendees to a fascinating meeting on 'ECM, Immunity and Infection'. The programme featured sessions exploring the interplay between the ECM and the immune system, ECM-pathogen interactions, and how the ECM influences health outcomes following infection.

The meeting kicked off with a successful primary school outreach programme led by Dr Anna Piccinini and Grace Needham. Through hands-on demonstrations and accessible explanations, primary school children were introduced to the vital role of the ECM – a topic they engaged with enthusiastically! (see the full report on page 14).

The first session focused on ECM and immune system, starting with Judith Allen,

who showed that IL-13-driven macrophage activation and chitinase-like proteins are essential for ECM remodelling and tissue repair during type 2 immune responses.

Simone Scilabra next spoke about his work identifying iRhom2 as a key regulator of MHC class I shedding in macrophages, highlighting its potential as a precision target for inflammatory disease therapy. Casimiro Geraduzzi demonstrated that neutrophils drive kidney fibrosis through upregulation of ECM production, and that their depletion reduces fibrotic remodelling. Janet Lee revealed that megakaryocyte- and platelet-derived TSP-1 stabilises the provisional matrix and limits extracellular proteolysis in lung infection, controlling neutrophil activation and promoting barrier repair.

The second session focused on research into ECM-pathogen interactions and the immune response. Kristian Riesbeck described how respiratory pathogens like Moraxella catarrhalis bind via FN and integrin receptors to ECM proteins (like collagen, vitronectin, and laminin) allowing their persistence in host tissues. Emiliya Seytyagyayava showed that chitinase-like proteins (YKL-40, Ym1, Ym2) directly modulate collagen fibril formation and matrix assembly during inflammation and repair. Richard Farndale presented structural insights into how bacterial adhesion molecules bind collagen, influencing biofilm formation and infection persistence,

identifying a target for infected wound therapies. Finally, Henry McSorley explained how helminth-secreted proteins bind heparan sulfate and block IL-33 signalling, dampening type II immune responses and aiding parasite survival.

The keynote speaker was Kim Midwood, who was awarded the BSMB Fell Muir award (picture below) for her outstanding contributions to matrix biology.

Her exciting talk highlighted how the ECM can act as a powerful driver of inflammation, and consequently a promising therapeutic target. She focused on tenascin-C, a matrix protein that activates immune responses through TLR4 and is elevated in chronic inflammatory diseases like RA. Her research has mapped the pro-inflammatory regions of tenascin-C and led to the development of drugs that selectively block its action. Further work outlined distinct disease pathogenesis in males vs females, with tenascin-C accumulation in the RA lining layer found only in females, suggesting a need for sex-specific treatments. Professor Midwood also advocated for using 'omics technologies to discover new matrix-based drug targets, and the potential for matrix mimetics to stimulate pro-resolving macrophages. Her enthusiasm and passion for matrix biology was evident throughout, with her parting words "if you're not having fun, you're doing it wrong" an inspiration to all attendees, especially ECRs.

The evening Gala Dinner provided a fantastic opportunity to reconnect with familiar faces and meet new ones! It also marked the official welcome of Professor Kim Midwood as the new Chair of the BSMB, with a heartfelt thank you delivered to Professor Andy Pitsillides for his visionary leadership and outstanding contribution to the BSMB.

The first session of the second day was focussed on ECM-immune system crosstalk in lung infections. Tracy Hussell discussed the influence of influenza virus on lung basement membrane, predominantly the regions associated with cleavage and release of matrikines. This was followed by Holly Sedgwick who outlined how she employed a combination of multiplex omics techniques to analyse the matrix composition surrounding B cell follicles. Iashia Mulholland spoke about how the endothelial glycocalyx is persistently altered in influenza infection, despite virus clearance, suggesting these changes could lead to increased susceptibility to secondary infection. Charles Frevert spoke about how versican-hyaluronan matrices regulate the innate immune response in influenza A virus,

with a particular focus on neutrophil migration.

The next session was focussed on ECM cues and the immune repose to infection. Hélène Moreau started this session by highlighting how tumorigenesis induces a drastic remodelling of the tumour ECM architecture leading to immune cell migration. This was followed by Rebecca Dodd who spoke about how injury from nematode lung migration induces increased IL-13-driven hyaluronan accumulation. Anika Assaraf then introduced engineered 3D alginate microspheres via bioelectrospray and microfluidics to be used for infection studies. Oliver Fackler presented his research on the development of complex 3D extracellular systems to investigate HIV-1 spread and immune recognition with a particular focus on CD4 T cell dynamics.

The final session was focussed on 'hot topics in the ECM'. Professor Anna Blom opened with a compelling talk on how ECM components, such as matrix proteins like COMP, modulate the immune system via the complement pathway across various tissue and tumour microenvironments. Kavitha Kirubendran's talk followed with her development of an *in vitro* model to investigate how the ECM within the hepatocellular carcinoma tumour microenvironment influences T-cell activity. Samuele Di Carmine then presented his research on IL-33-mediated fibroblast activation in idiopathic pulmonary fibrosis and its contribution to disease progression. The session concluded with Professor Luisa Martinez-Pomares, who offered a fascinating perspective on an alternative ECM: the microbial biofilm. Her talk highlighted how components of microbial biofilms can modulate immune cell activity, with a particular focus on carbohydrate interactions with the C-type lectin receptors of immune cells.

The meeting concluded with thanks to all presenters for sharing their insightful, cutting-edge research in matrix biology, followed by presentation of the ECR prizes – congratulations to all the well-deserving winners!

Report on the BSMB/BSID symposium By James Whiteford

On ye 29th of April 2025 I had the pleasure of representing the BSMB (in pace of Andy

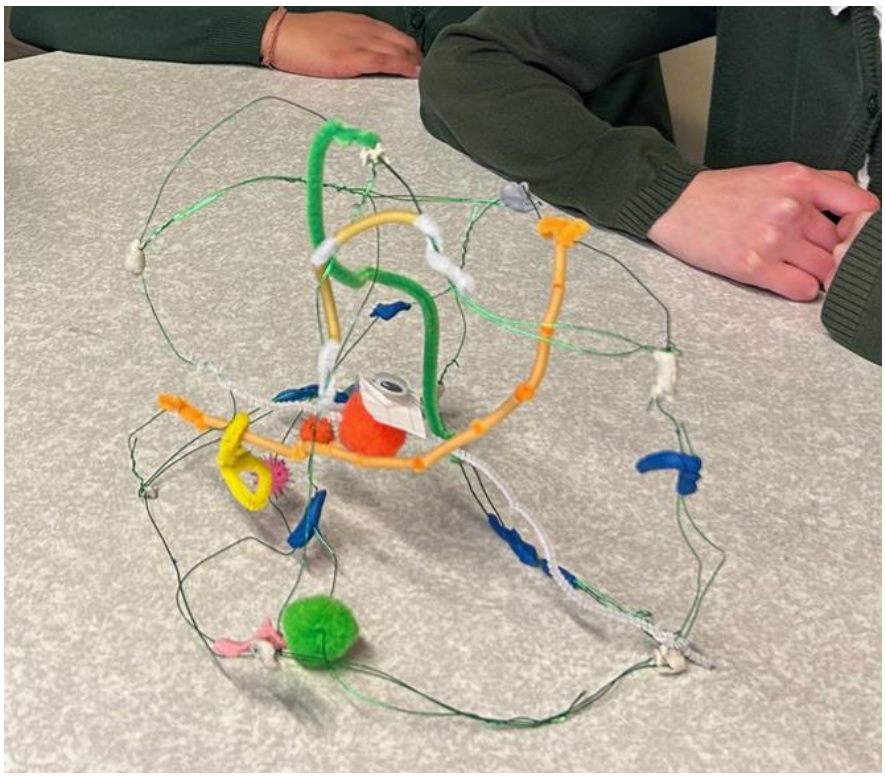
Pitsillides) at the British Society of Investigative Dermatology (BSID) annual conference at King's College London, where we had been asked to support a guest speaker and introduce the BSMB to a new audience. Dr Ishier Raote from the Institut Jacques Monod, Paris, France gave an excellent talk via Zoom on his work relating to TANGO1 and collagen secretion. I was also able to highlight the relevance of matrix biology to dermatology, promote the benefits of joining the BSMB and promote our next meeting in Surrey.

SEE YOU IN SEPTEMBER 2025 IN GUILDFORD

Extracellular matrix: without it, we would be just a shapeless mass of cells

A Science Outreach Project by Piccinini lab, University of Nottingham

A report by Dr Anna M. Piccinini



Introduction

This project was developed at the University of Nottingham, School of Pharmacy, by Dr Anna Piccinini and Miss Grace Needham (second year PhD student in Piccinini lab). The activity was enhanced by our close collaboration with Dr Hilary Collins (our outreach co-ordinator) and supported by Mrs Helen Baird, a year 6 teacher at Middleton Primary and Nursery school. Furthermore, to enhance the long-term impact of the project, we collaborated with the British Society for Matrix Biology (BSMB).
This half-day event was our first science outreach project of this kind, aimed at year 6 pupils (90 children) at the Middleton Primary and Nursery school in Nottingham. We spent one hour with each of three classes captivating the children with engaging activities and interactive elements. During a second visit, the children showcased their own models of the extracellular matrix that they had made at home after the first session. The Biochemical Society funding I received was used to supply sensory and colourful resources for the models and to provide a certificate and cash prize which were awarded to enable the school to buy science books and resources for children in year 6.

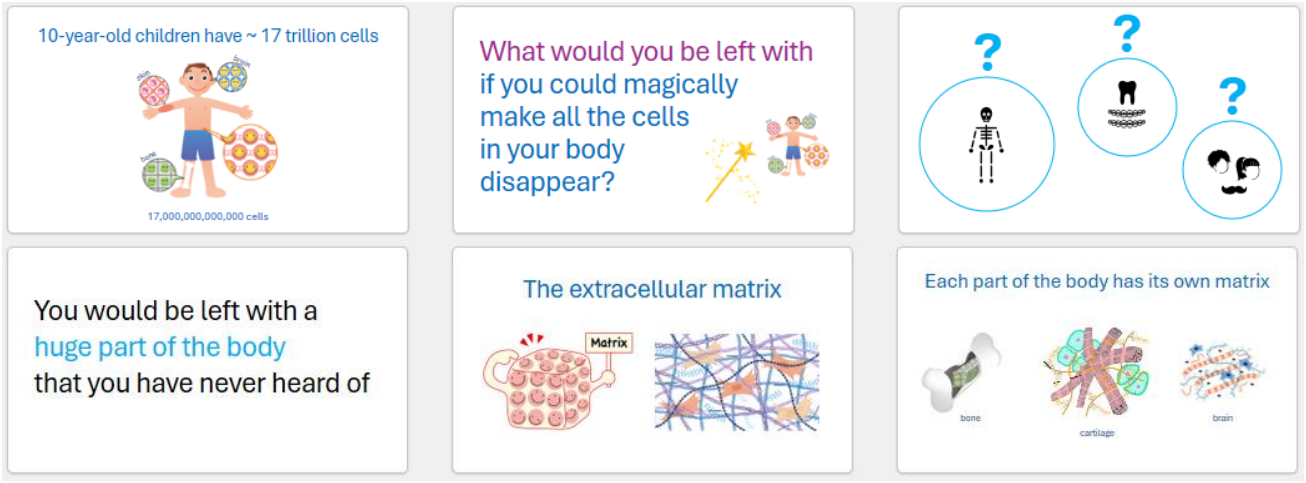
What motivated us to do this?

We wanted to:
1) Fascinate children about science.
2) Inspire young people underrepresented in STEM to love STEM subjects and motivate them to carry on their study in a STEM subject.
3) Educate the public that the extracellular matrix is not just about collagen drinks and cosmetics.
4) Inspire other scientists in the field, especially early career researchers, to reach out to children and talk to the public about this topic.

What did we achieve with this project?

1) Fascinate children about science.

We achieved this aim by providing diverse activities and interactive elements helping pupils engage in and enjoy a science workshop. We believe that these hands-on, creative activities can generate a lifelong impression in children.
To break the ice and boost children's self-confidence, we used visuals illustrating the fact that our body is made of many, many cells, a concept familiar to them. Soon the children were buzzing with excitement as they were answering the question "what would you be left with if you could magically make all the cells in your body disappear?". With most children's hands up high, it was very rewarding to listen to their answers and witness their natural curiosity and innate drive to understand how things work as they learned about the extracellular matrix, a fascinating (and huge) part of the body they have never been told about!

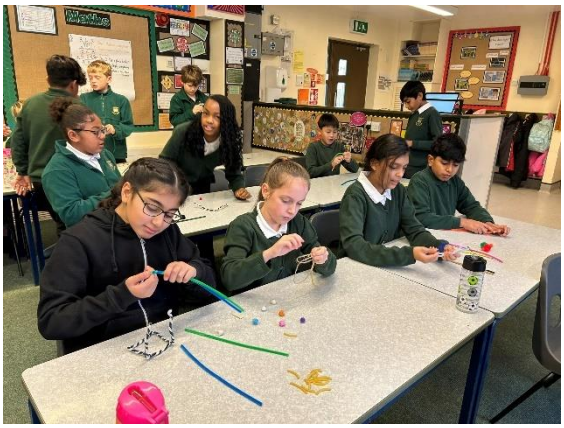


Visuals used to introduce the extracellular matrix.

The children went on learning that the matrix is different in different parts of their body. By touching their own knuckle bones and a chicken bone, they noticed that in the bone the matrix is strong, rigid and hard. By bending the tip of their nose and their ears, they realised that in the cartilage the matrix is strong but flexible. And by observing some jelly with pieces of fruit in it, they learned that in the brain the matrix is very soft and flexible.
To help the children understand why the matrix is important, we involved them in hands-on activities. Brittle chicken bones wowed the children as they realised that if bones lacked collagen, they would break easily. Then, bendy chicken bones made children's jaw drop and appreciate that the bone loses its strength if calcium is removed from the bone matrix.

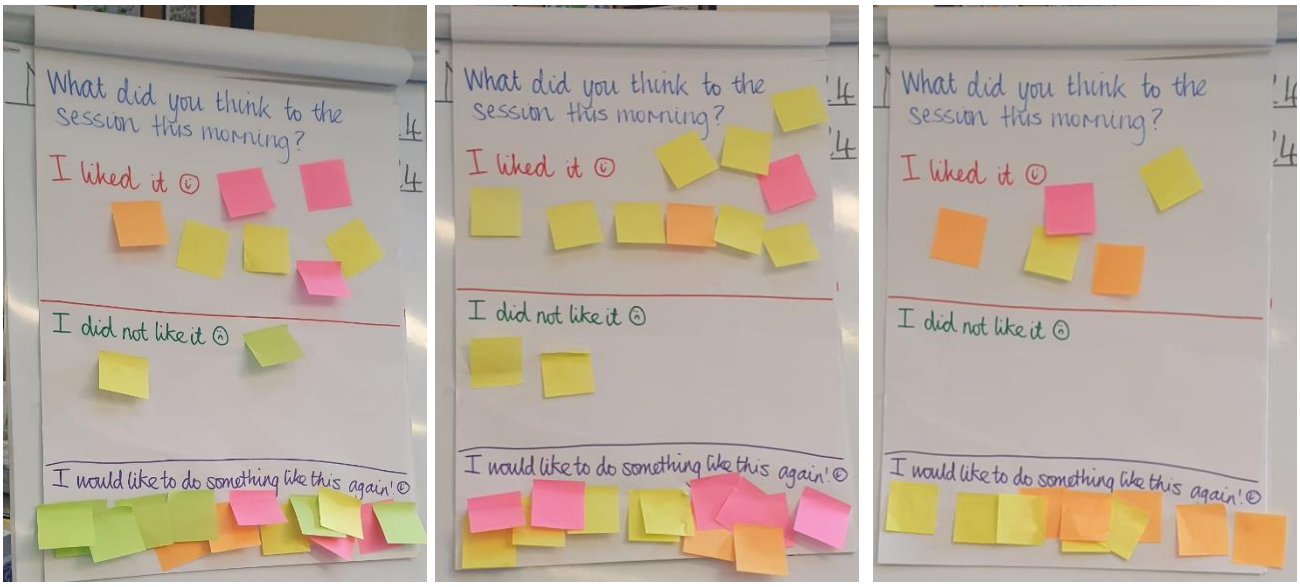
Bone matrix visual and photographs of children exploring, bending and breaking bones.

For the final part of the science workshop, children were invited to build their own matrix models. Some children created "dynamic" 3D models of the matrix by working in groups of ~5 to make 3D networks of collagen fibers (using wool knitting yarns) around cells (the children) that interconnect them. All children, in pairs, created 3D models using pipe cleaners and other craft resources of different colours, textures and shapes.



Photographs of children creating 3D models of the extracellular matrix and examples of materials used to make triple-helical collagen fibers (wool knitting yarns, top; pipe cleaners, bottom), polysaccharide chains (macaroni pasta) and cells (clay and googly eyes).

Feedback from the children:



73 out 90 children gave feedback at the end of the session. We were pleased that over 64% of the children *"would like to do something like this again".*

Feedback from the teachers who were sent a short survey after the session:

1) Was the session interactive?

- *It was a very interactive session, and the children enjoyed being able to handle the jelly and the chicken bones.*
- *My class enjoyed the session and it was good that they were actively involved and not just sitting and listening for an hour.*
- *The children really enjoyed the workshop.*

2) Please comment on children engagement in learning and activities.
    - *The children were all involved in the activities and this was great because it allowed children of different abilities to work together.*
    - *My class learnt new things this sessions - it was great to see them making links with their prior learning and the completely new things being introduced during this session.*
    - *We all went away from the session having learnt something new and exciting.*
3) Was the session pitched at the right level to year 6 children?
    - *I felt that the session was pitched at the right level for Y6 children. Even the children with lower abilities were able to engage and understand.*
    - *The ideas being taught were quite complex but were presented in such a visual and interactive way that all the children could understand clearly.*
4) Would you host this session again?
    - *We would be very happy to host this session again in school. The children enjoyed it and benefitted from it.*
    - *It's an invaluable experience for them to have this kind of specialist input to add to the science curriculum.*
    - *We would very much like to repeat the sessions next! That will be great to include in our planning for Science next academic year.*
5) How did/will the children benefit from this session?
    - *Children will go on to learn about the circulatory system and nutrition later in Y6. This session will add to their understanding of the working of the human body and when we come to talk about cells the children will have some existing knowledge.*
    - *Children are now more aware of the role of the extracellular matrix in supporting cells in place and connecting them to each other. They will be able to put cells in some context.*
    - *Meeting real-world scientists will help children move away from common tropes about scientists and see that scientists are people like them. They will be more likely to consider a career in science.*

Examples of 3D extracellular matrix models made by the children at home.

2) Inspire young people underrepresented in STEM to love STEM subjects and motivate them to carry on their study in a STEM subject.

Our audience included female children from different backgrounds leaving in the East Midlands and neurodiverse and disabled children who are underrepresented in STEM. Children living outside

London tend to have less opportunities to interact with scientists and science and technology events. To help steer females towards STEM, we have provided them with the invaluable opportunity to meet two female scientists (the PhD student and I), and to help inspire all children to love STEM subjects, we have provided fun and hands-on activities allowing pupils to engage in and enjoy a science workshop.
We designed our activities in a way that every child could feel involved, including one child on a wheelchair with cerebral palsy and five children with diagnosed ASD and/or ADHD: we used diverse resources (from sensory objects to visuals) to ensure that children with vision problems and/or neurodiverse children could also feel included; we allowed children to decide whether to work in small or larger groups depending on what worked best for them; we offered a "dynamic" activity for children who preferred to move around and/or struggled to work or focus in a sitting position, and a "static" activity where the children, including those on a wheelchair, could build their models in pairs at a table; we used vegan Jell-O to make a model of brain matrix as some children are not comfortable touching gelatin; and we run the activity in the school in the presence of their teachers (a familiar and accessible environment) rather than offsite to allow everyone to attend.

3) **Educate the public that the extracellular matrix is not just about collagen drinks and cosmetics.**

We demonstrated the amazing things the matrix does in our body to the children. By doing this, we hit two birds with one stone - the teachers acknowledged that they did not know about the matrix! We also reached out to the children's families both directly, through the school's weekly newsletter for parents, and indirectly by asking children to make a matrix model at home. As a result, some parents reached out to me and one commented *"My daughter said it was amazing. She is really positive about it, thanks for doing it"*.

4) **Inspire other scientists in the field, especially early career researchers, to reach out to children and talk to the public about this topic.**

We will showcase this outreach activity at the British Society for Matrix Biology Spring 2025 meeting (~120 delegates expected). The meeting will be held at the University of Nottingham and this work will be presented during the opening of the meeting and the poster sessions. Some children agreed for their models to be displayed at the meeting together with a poster with photographs picturing the children carrying out the activities. This will demonstrate that matrix biology is a subject that can successfully captivate children and hopefully inspire them to also engage young people in their science.
Furthermore, we plan to submit an article about the activity to The Biochemist which, together with this report, can help enhance the long-term impact of this outreach project.