CA15216 Newsletter

December 2018

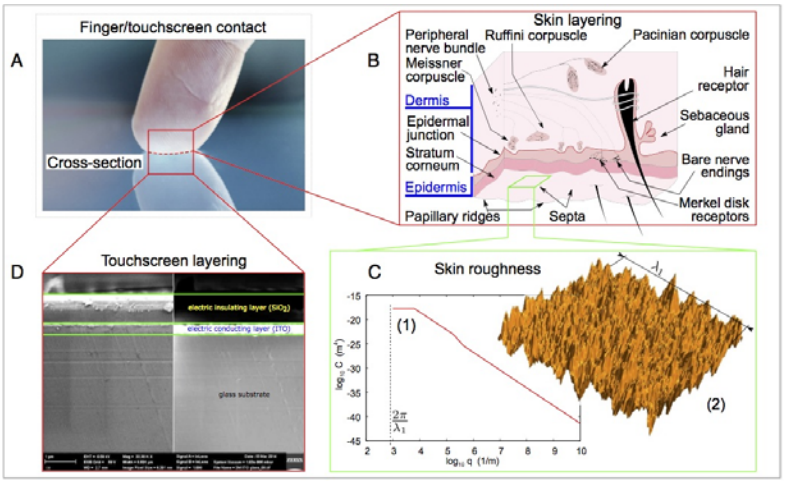
Dear Action member,

Welcome to the COST Action 15216 newsletter. As an Action participant, you receive this by email approximately every three months. The purpose is to update you about Action activities, provide direction for how you can contribute to delivering the goals of the Action and to disseminate information relating to events, research highlights and opportunities. A copy will also be available on the ENBA website (www.enba4.eu) where all other Action-related information can be found.

This newsletter is the primary platform for circulation of Action-related information designed to stimulate interactions and promote networking and inclusivity within the Action. Space can be made available for all members who wish to publicise their novel research findings, relevant events or vacant positions. To discuss this, please contact the most relevant Task Leader, as presented on the ENBA website.

Research Highlights

Your research highlights can be presented here alongside other exciting bioadhesion news from the media. Please contact the most relevant Task Leader with a brief, exciting summary of your findings and a relevant graphic if you would like to participate:



Ayyildiz et al., 2018. Contact mechanics between the human finger and a touchscreen under electroadhesion. PNAS. (https://doi.org/10.1073/pnas.1811750115)

Understanding and controlling human skin contact against the surface of electronic devices is an important electromechanical design criterion. Using mean field theory based on multiscale contact mechanics, the authors studied electroadhesion and sliding friction during finger–touchscreen interactions. Based on these results it should be possible to further augment the friction force and, thus, human tactile sensing of the device by using a thinner insulating film than is used in current touchscreens.

3rd ICBBA, Haifa, Israel

The 3rd International Conference on Biological and Biomimetic Adhesives (ICBBA 2018) took place from November 20th until November 22th in Haifa, Israel. The meeting was a joint event organized by the Technion – Israel Institute of Technology and the COST Action CA 15216 "European Network of Bioadhesion Expertise-ENBA". The conference was chaired by Prof. Havazelet-Bianco-Peled and Prof. Alejandro Sosnik, both from the Technion.

The conference brought together 114 delegates from 28 countries, representing universities, research institutes and industries. Studies at the forefront of bioadhesion science and technology were presented in three plenary lectures followed by 44 invited and contributed lectures in two parallel sessions. A poster session displaying the work of 29 researchers included a 'best poster' competition. The best poster award, sponsored by the journal Biomimetics, was awarded to Marie Bonneel from the University of Mons, Belgium.

The Special Issue entitled "Bioadhesion, Biological and Biomimetic Adhesives" that will be published in the journal Biomimetics is currently in production and submissions are welcome until 15 July 2019 (https://www.mdpi.com/journal/biomimetics/special_issues/bioadhesion).

In addition to the scientific events, the participants enjoyed a very rich social program that included a welcome reception, a banquet dinner in a traditional restaurant located at the beautiful German Colony of Haifa and a free tour to Caesarea National Park that was contributed by the Ministry of Science and Technology of Israel.

Catechol Workshop, Barcelona, Spain

The workshop '*International Symposium on Catechol-based Adhesives and Coatings*' was held in Barcelona over two days (October 19-20 2018) at the facilities of the Catalan Institute of Nanoscience and Nanotechnology (ICN2-CSIC). The participants included COST colleagues (and students of the groups) involved in the area of catechol chemistry. Talks were highly complementary and ranged from synthesis to bio-applications and nanoparticles to coatings. In addition, several well-recognized siicentists in the field from the EU, US, Korea and China also attended the meeting.

The format of the workshop was designed to promote discussion, and was considered a great success in this regard. All the lectures were assigned the same format and presented by experts in the field. The organizer, Prof. Daniel ruiz-Molina, introduced the meeting with some thoughts relating to the approach of this special event and research posters were co-located with all coffee-breaks and lunch. The selection of speakers was done based upon their excellence in the field, but also taking into account gender balance.

Up to researchers 40 attended the workshop on both days, including some editors of well-recognized journals, such as Nature Communications. All oral and poster communications were delivered by COST Action members or participants from all parties. At the end of the meeting a final round-table discussion, chaired by Prof. Joao Mano (Portugal), allowed all participants to discuss future trends of the area. The organizer concluded the meeting acknowledging the organising staff, the interaction among research groups and looking forward to the next ENBA activities.

Forthcoming Action Events

Training Schools:

• All training schools planned for GP3 have now been completed. Please contact relevant task or WG leaders with suggestions or recommendations for future training schools!

Workshop:

• Forthcoming workshops in 2019 will include **Biofouling** and **Wood Adhesives** – details to follow.

MC Meeting:

• COST Association Office, Brussels, 2019. Date to be announced.

COST-related conference sessions:

The following international conferences have Action-organised sessions for which there will be full or partial travel support:

BioSmartTrainee joint workshop, Cambridge, UK (18th – 20th March 2019).

TERMIS 2019, Rhodes, Greece (27th – 31st May 2019).

Adhesion '19, Bristol, UK (3rd – 5th September 2019).

Opportunities within this Action

- ***An open Task Leader position*** – Task 1.3 properties/performance (Contact Nick Aldred; nicholas.aldred@ncl.ac.uk)
- ***Opportunities to organise Training Schools and Workshops*** (Contact the relevant Task Leader)
- ***An open-call for Short-term Scientific Missions*** (Patrick Flammang; Patrick.Flammang@umons.ac.be)

External Opportunities

PhD or post-doc at the National University of Ireland, Galway. Possibility to apply for funding for recombinant expression of adhesion proteins from stalked barnacles (Irish Research Council http://research.ie/). Contact Anne Marie Power (annemarie.power@nuigalway.ie)

Publications

Here are some recent journal publications that have stemmed from the Action, in no particular order!!:

B Lengerer, **M Bonneel**, **M Lefevre**, **E Hennebert**, **P Leclère**, **E Gosselin, P Ladurner**, **P Flammang** (2018) The structural and chemical basis of temporary adhesion in the sea star *Asterina gibbosa*. Beilstein J Nanotechnology 9: 2071-2086

Y R Corrales Ureña, **A Sanchez, R Pereira, K Rischka**, **T Kowalik, J Vega-Baudrit** (2017) Extracellular micro and nanostructures forming the velvet worm solidified adhesive secretion. Mater Res Express 2017: 4

G Salerno, M Rebora, **A Kovalev, E Gorb, S Gorb** (2018) Contribution of different tarsal attachment devices to the overall attachment ability of the stink bug *Nezara viridula*. J Comp Physiol A

J von Byern, I **Grunwald, M Kosok, M Saporito, U Dicke, O Wetjen, K Thiel, K Borcherding, T Kowalik, M Marchetti-Deschmann** (2017) Chemical characterization of the adhesive secretions of the salamander *Plethodon shermani* (Caudata, Plethodontidae). Scientific Reports, 7, 1, 6647_1-6647_13

U Bozuyuk, NO Dogan, S Kizilel (2018) Deep Insight into PEGylation of Bioadhesive Chitosan Nanoparticles: Sensitivity Study for the Key Parameters Through Artificial Neural Network Model, ACS Applied Materials Interfaces 10: 33945-33955

U Bozuyuk, O Yasa, IC Yasa, H Ceylan, S Kizilel, M Sitti (2018) Light-Triggered Drug Release from 3D-Printed Magnetic Chitosan Microswimmers, ACS Nano 12: 9617-9625

Short-Term Scientific Missions (STSMs)

Applications for STSMs are particularly encouraged in areas that address the Action Scientific Objectives (above) and from/between early-career investigators and inclusiveness target countries.

Please check the Action website (http://www.enba4.eu/activities/short-term-scientific-missions/) or contact Patrick Flammang (Patrick.Flammang@umons.ac.be) for further information.

Here are a few examples of recent STSMs:

- *Identifying adhesive proteins from limpets (19 days, UK to BE)*

- *Ultrathin multilayer membranes as cyto-delivery system to treat defects on superficial articular cartilage (29 days, PT to AT)*

- *Recombinant sericins for biomimetic composite materials (19 days, CZ to FI)*

The next deadline for applications is **January 15th** for STSMs taking place between 15/02/2019 and 30/04/2019.

The application, comprising **1)** a work plan, **2)** a letter of support from the Home Institution (especially for PhD students), **3)** a written agreement from the Host Institution, and **4)** a CV, should be submitted online (http://www.cost.eu/STSM).

Resources

Do not forget our Action social media profiles!!!

Twitter: *@ENBAbioadhesion*

Facebook: *European Network of Bioadhesion ENBA*

Research Gate: *European Network of Bioadhesion (ENBA)*

Scientific Objectives

Every year the Action must submit a Work and Budget Plan, in which the primary Action Activities are described and costed. One important element is the list of Scientific Objectives. These objectives should be proposed and delivered by Action members, preferably those formed into Focus Groups. Below are some of the new Scientific Objectives that the Action must address within the current Grant Period (until April 2019). The full list can be located on the ENBA intranet. We would be particularly interested to hear about your work, collaborations, publications and other activities relating to these:

• Identify common themes in the biology and chemistry of problematic adhesion to surfaces in the marine environment ***(biofouling)***.

• Investigate the potential of ***catechols*** for production of bio-inspired adhesives and fouling-resistant coatings.

• Develop a web resource to enable the community to locate publicly available ***molecular/compositional data*** for the adhesives of commonly-studied organisms.

• To identify and address challenges associated with ***heterologous expression*** of adhesive proteins.

Focus Groups

The objectives of the Action are defined in a 'bottom-up' direction from the Action Focus Groups. Currently there are four, as outlined below. If you wish to initiate a Focus Group and have between 6 and 12 interested individuals, you can propose this to the most relevant Task Leader. Focus groups can then bid for Workshop/Training School support to further the Action objectives:

Biofouling

Nick Aldred (Leader)
Thomas Ederth
Anne Marie Power
Marco Faimali
Mattias Berglin
Sheelagh Conlan
Claire Hellio
Patrick Flammang
Nicole Poulsen
Marleen Kamperman
Päivi Laaksonen

Wood Adhesives

Janek von Byern (Interim Leader)
Pavlo Bekhta
Tomasz Krystofiak
Eleftheria Athanasiadou

Biomolecular

Romana Santos (Leader)
Patrick Flammang
Païvi Laaksonen
Nick Aldred
Peter Ladurner
Janek von Byern
Anne Marie Power

Catechols

Daniel Ruiz
João F. Mano
Marleen Kamperman
Klaus Rischka
Henrik Birkedahl
Seda Kizilel

Summery of some NNC – IPC partner

Pavlo Bekhta (NNC - Ukraine) is an expert in the field of wood-based composites technologies and wood modification technologies. His research interests are: physical and mechanical properties of wood and wood-based composites; thermo-mechanical compression of wood, wood-polymer composites, wood composites using agro-fibers..

David Merritt (IPC - Australia) has broad knowledge of insect entomology, population genetics, morphology and bioluminescence. Moreover, he is an expert for environmental management, risk management, population and environmental monitoring, an aspect that becomes more and ore an important through the Convention on Biological Diversity and the Nagoya Protocol on Access and Benefit-sharing.

Andrew Smith (IPC - USA) investigates biological adhesives for the past three decades. He studied animals that use suckers for strong adhesion combined with mobility, animals that use glues for strong adhesion lasting many hours, and animals that secrete adhesive gels as a defensive measure. He has expertise in a wide range of experimental methods, ranging from whole transcriptome sequencing to biochemical analyses of protein function to stress/strain measurements of isolated samples.

Viktoryia Kulikouskaya (NNC - Belarus) works in the field of nanostructured thin-film materials and 3D scaffolds from biopolymers (polysaccharides). Her research also deals with the investigation of the opportunity to control cells adhesion (stem cells, fibroblasts, etc) and behavior on solid surfaces by their modification using Layer-by-Layer films due to design cell attractive or cell repellent (antifouling) surfaces.