



# BJ 2024

1<sup>ST</sup> INTERNATIONAL  
CONFERENCE ON **BIO-JOINING**

**FEUP. PORTO - PORTUGAL**

**5-6 DECEMBER 2024**

**U. PORTO**  
FEUP FACULDADE DE ENGENHARIA  
UNIVERSIDADE DO PORTO

## PROGRAMME

[ENGEDUCONFERENCES.COM/BJ2024](https://engeduconferences.com/BJ2024)

## PROGRAMME OF BJ2024

Author underlined → presenting author

\* Plenary lecture

Thursday 5 December 2024	
8:40	<b>BJ 2024 Opening (B032)</b> <b>Room B032</b>
9:00*	<b>Bioinspired soft adhesives in biomedical applications (BJ24_1)</b> <u>JF Mano</u> (University of Aveiro, Portugal) <b>Session 1 – Biomimetic adhesives</b> (Chair: SN Gorb, JF Mano) <b>Room B032</b>
9:40	Biomimetic adhesive microstructures as an approach to understand functioning biological systems <b>(BJ24_3)</b> <u>SN Gorb</u> (Kiel University, Germany)
10:00	Sea urchin bioadhesion: from characterization to emulation <b>(BJ24_28)</b> <u>R Santos</u> (University of Lisbon, Portugal)
10:20	Synergistic effect of combining biomimetic adhesive microstructures of different shapes and functions <b>(BJ24_45)</b> <u>H Kasem</u> (Azrieli College of Engineering, Israel), D Badler, R Goldsberg, A Abu-Ammar
10:40-11:00	<b>COFFEE BREAK</b> <b>Session 2 – Biological adhesives</b> (Chair: AY Stark, U Rothbächer) <b>Room B032</b>
11:00	Egg glue of the stinkbug <i>Nezara viridula</i> : Production site, chemo-mechanical properties, and adhesive strength on natural and artificial surfaces <b>(BJ24_17)</b> <u>A Baral</u> (University of Perugia, Italy), S Piersanti, S Caponi, M Mattarelli, S Gorb, G Salerno, M Rebora
11:20	Tunicate larval adhesion: Cells, species differences and analyses of their secretions <b>(BJ24_25)</b> F Zeng, L Ciampa, <u>U Rothbächer</u> (University Innsbruck, Austria)
11:40	Fish protein-based bio-adhesives for wooden structures <b>(BJ24_26)</b> <u>M Zouari</u> (InnoRenew CoE, Slovenia), J G Pečnik, M Schwarzkopf
12:00	Functional amyloids in adhesive secretions from a marine invertebrate? <b>(BJ24_27)</b> <u>P Flamang</u> (Université de Mons, Belgium), M Bonneel, E Moe, <u>A Whaite</u>
12:20	Biological adhesive systems in a changing world <b>(BJ24_37)</b> <u>AY Stark</u> (Villanova University, PA, USA)
12:40	Increasing adhesive performance of a complex coacervate tissue adhesive <b>(BJ24_50)</b> <u>AN Kwant</u> (University Medical Center Groningen, Netherlands), JS Es Sayed, H Pryshchepa, JK Burgess, DJ Slebos, SD Pouwels, MMG Kamperman
13:00-14:00	<b>LUNCH BREAK</b> <b>Room B032</b>
14:00*	<b>Bioinspired structured adhesives for various surfaces (BJ24_2)</b> <u>L Xue</u> (Wuhan University, China) <b>Session 3 – Bioinspired interfaces and surfaces</b> (Chair: E Pierro, KT Turner) <b>Room B032</b>
14:40	On the micro-drilling of the rigid substrates: does it always improve adhesion? <b>(BJ24_12)</b> <u>E Pierro</u> (University of Basilicata, Italy), G Carbone
15:00	Exploiting disorder in the design of architected interfaces <b>(BJ24_13)</b> S Fulco, M Budzik, <u>KT Turner</u> (University of Pennsylvania, USA)

15:20	Tuning the mechanical properties of architected materials: from sandwich beams to triply periodic minimal surface composite lattices <b>(BJ24_30)</b> <u>Q Grossman</u> (University of Liège, Belgium), M Lê, L D'Andrea, D Gastaldi, P Vena, D Ruffoni	
15:40	Interface thickness and orientation in 3D printed fiber-reinforced composites <b>(BJ24_31)</b> <u>T Volders</u> (University of Liege, Belgium), M Contino, F Passoni, L Andena, D Ruffoni	
16:00-16:20	<b>COFFEE BREAK</b> <b>Session 4 – Bioadhesion</b> (Chair: S Wang, EV Gorb) <b>Room B032</b>	
16:20	Delamination-induced pattern formations of tree bark <b>(BJ24_15)</b> <u>T Yamaguchi</u> (The University of Tokyo, Japan), Y Uenobu	
16:40	Nanoscale chemical-mechanical characterization of interphase and bondline <b>(BJ24_18)</b> <u>S Wang</u> (University of Tennessee, USA)	
17:00	Solid lubrication at the micro-scale: the case of insect joints <b>(BJ24_34)</b> <u>C Putignano</u> (University of Kiel, Germany), K Nadein, J Thomas, A Kovalev, SN Gorb	
17:20	Can hydrogels mimic cartilage to lubricate soft joints? <b>(BJ24_35)</b> <u>C Putignano</u> (University of Kiel, Germany), G Carbone	
17:40	Unveiling the adhesion mechanisms of an arrow worm (Spadella cephaloptera): Insights into bioadhesives and development <b>(BJ24_36)</b> <u>C Barrera</u> (University of Vienna, Austria), T Wollesen	
18:00	Damage quantification of thin films on soft substrate <b>(BJ24_10)</b> A Singh, <u>R Santoprete</u> (L'Oréal Research and Innovation, France), GS Luengo, C Creton, M Ciccotti	
19:00	<b>Poster session and RECEPTION (Room under the Auditorium)</b>	
<b>Biomimetic adhesives</b>		
Poster 1	Attach, resist, defend and immobilise: how marine invertebrates inspire biomimicry <b>(BJ24_47)</b>	<u>A Whaite</u> (University of Mons, Belgium), E Duthoo, E Hennebert, P Flammang
Poster 2	Biomimicry meets agriculture: Designing nature-inspired adhesives for green pest control <b>(BJ24_51)</b>	<u>A Arunachalam</u> (University of Groningen, The Netherlands), A van der Molen, I Breet, T Oosterhoff, P Dijkstra, B Knecht, M Macel, MMG Kamperman
<b>Bioadhesion</b>		
Poster 3	Attachment ability of Coccinella septempunctata male and female beetles to a smooth substrate <b>(BJ24_9)</b>	<u>EV Gorb</u> (Kiel University, Germany), SN Gorb
Poster 4	Characterisation of the byssus of an economically important pearl-producing bivalve <b>(BJ24_48)</b>	<u>A Whaite</u> (University of Mons, Belgium), A Elizur, S Cummins
Poster 5	Nanocellulose-reinforced adhesives for lightweight and sustainable vehicle design <b>(BJ24_53)</b>	<u>F Arán-Ais</u> (INESCOP, Spain), M Sanchez-Lozano, MP Carbonell-Blasco, FJ Simon-Portillo, MA Moyano, O Cuadrado-Sempere, D Abellán-López, MD Romero-Sánchez
<b>Joining of natural materials</b>		
Poster 6	Strength improvements of wooden joints by using tough layer technique <b>(BJ24_6)</b>	<u>S Jalali</u> (INEGI, Portugal), EAS Marques, RJC Carbas, LFM da Silva
Poster 7	Influence of citric acid on the properties of medium-density particleboard produced with tannin-formaldehyde adhesive <b>(BJ24_52)</b>	RR Rodrigues, DE Teixeira, APD Nakamura, <u>AKL Cavalcante</u> (University of Brasília, Brazil), CHS Del Menezzi, LMH Carvalho
<b>Biologically inspired joints</b>		
Poster 8	Bio-inspired composite adherends: enhancing adhesive joint toughness under high-rate four-point bending <b>(BJ24_4)</b>	<u>H Malekinejad</u> (INEGI, Portugal), RCJ Carbas, EAS Marques, LFM da Silva
Poster 9	Bio-inspired helicoidal CFRP composite behaviour under bending and out of plane loading <b>(BJ24_38)</b>	<u>H Malekinejad</u> (INEGI, Portugal), RCJ Carbas, EAS Marques, LFM da Silva
Poster 10	Sustainable design of impact resistant vehicle structures through tailored material and design <b>(BJ24_24)</b>	<u>EAS Marques</u> (University of Porto, Portugal), M Kasaei, S Jalali, RJC Carbas, LFM da Silva
<b>Adhesion and adhesives in veterinary</b>		
Poster 11	Adhesives in veterinary medicine: a review <b>(BJ24_8)</b>	<u>CMC Ferreira</u> (INEGI, Portugal), BD Simões, EAS Marques, RJC Carbas, LFM da Silva
<b>Adhesion and adhesives in dentistry</b>		
Poster 12	Microscopic inspection at occlusal pits and fissures sealants to enamel interfaces <b>(BJ24_46)</b>	R Fidalgo-Pereira, D Abrantes, N Veiga, B Henriques, M Özcan, <u>JCM Souza</u> (Universidade Católica Portuguesa, Portugal)

8:40\* **Bio-based adhesives from wood sources - liquefied wood, lignin and tannin (BJ24\_14)**  
M Šernek (University of Ljubljana, Slovenia)

### Session 5 – Joining of wood I

(Chair: M Šernek, LH Carvalho)

#### Room B032

9:20 Evaluating the mechanical properties of bio-based polyurethane adhesives in zero-thickness bond applications **(BJ24\_5)**  
S Jalali (INEGI, Portugal), RJC Carbas, EAS Marques, LFM da Silva

9:40 Curing of bio-based adhesives from tannin and lignin, determined by ABES **(BJ24\_11)**  
M Šernek (University of Ljubljana, Slovenia)

10:00 Impact of tannins type on their performance as binder in the production of particleboards **(BJ24\_19)**  
RA Fernandes (Associação Rede Competência em Polímeros, Portugal), N Ferreira, S Lopes, J Santos, JM Martins, LH Carvalho

10:20 Self-crosslinking of lignin as bio-based adhesives for bio-joining of wood **(BJ24\_20)**  
B-D Park (Kyungpook National University, Republic of Korea), ES Wibowo, S Ghahri, EC Watumlawar

10:40-11:00 **COFFEE BREAK**

### Session 6 – Joining of wood II

(Chair: T Yamaguchi, LFM da Silva)

#### Room B032

11:00 A path for increasing the sustainability of vehicle structural design supported by adhesive bonding **(BJ24\_23)**  
EAS Marques (University of Porto, Portugal), S Jalali, RJC Carbas, M Kasaei, LFM da Silva

11:20 Collagen obtained from the byproduct of the fur industry as an adhesive for wood **(BJ24\_29)**  
S Monteiro (Associação Rede Competência em Polímeros, Portugal), R Fernandes, A Sous, FD Magalhães, J Martins, L Carvalho

11:40 Evaluation of the adhesion performance of several bio-adhesives in comparison with traditional adhesives for wood-based panels **(BJ24\_40)**  
ML Almeida (Instituto Politécnico de Viseu, Portugal), V Silveira, R Papadakis, NT Paiva, FD Magalhaes, RM Ramos, S Adamopoulos, JM Martins, LH Carvalho

12:00 Graphene quantum dots/polyethylenimine as a versatile crosslinker for starch-based adhesives **(BJ24\_41)**  
V Silveira (Swedish University of Agricultural Sciences, Sweden), S Adamopoulos, R Papadakis

12:20 Application of non-conventional Pinus radiata bark extraction methods in the design of bioadhesives for wood-based products **(BJ24\_42)**  
J Santos (Associação Rede Competência em Polímeros, Portugal), D Escobar-Avello, T Oñate-Valdés, V Ferrer, RA Fernandes, C Fuentealba, JM Martins, LH Carvalho

12:40 Re-bondable bio-base structural adhesive **(BJ24\_49)**  
N Terasaki (National Institute of Advanced Industrial Science and Technology (AIST), Japan), M Shibakami, T Himiyama

13:00-14:00 **LUNCH BREAK**

14:00\* **Rationalizing surface preparations, complexity and eventual outcomes tied to adhesion in dental materials (BJ24\_43)**  
B Love (The University of Michigan, USA)

### Session 7 – Adhesion and adhesives in dentistry

(Chair: B Love, T Pinho)

#### Room B032

14:40 Effect of ageing on the mechanical properties of dental resin with and without Bisphenol A **(BJ24\_32)**  
L Lopes-Rocha (CESPU, Portugal), RJC Carbas, LFM da Silva

15:00 Exploring alternative adherents for dental material testing: Beyond human teeth **(BJ24\_33)**  
MJ Calheiros-Lobo (CESPU, Portugal), M Calheiros-Lobo, RJC Carbas, LFM da Silva, T Pinho

15:20 Adhesive interface of resin-matrix composite and cements for restorative dentistry: An in vitro study **(BJ24\_44)**  
R Fidalgo-Pereira (Universidade Católica Portuguesa, Portugal), Ó Carvalho, S Catarino, JCM Souza

16:00-16:20 **COFFEE BREAK**

## Session 8 – Adhesion and adhesives in veterinary and medicine

(Chair: JC del Real Romero, F Arán Ais)

### Room B032

16:20	Characterization of mechanical properties of a commercial adhesive applied in the equestrian sector <b>(BJ24_7)</b> <u>CMC Ferreira</u> (INEGI, Portugal), BD Simões, EAS Marques, RJC Carbas, LFM da Silva
16:40	Electro-adhesive performance of double network hydrogels based on acrylamide and sodium alginate <b>(BJ24_16)</b> <u>S Jalali</u> (University of Alberta, Canada), H-J Chung, D Sameoto
17:00	Comparative biomechanical analysis of two tension band wiring methods for transverse patellar fracture fixation <b>(BJ24_21)</b> DS Martínez, <u>JC del Real Romero</u> (Comillas Pontifical University, Spain), FL-O Muñoz
17:20	Bioadhesion and cytotoxicity in-vitro evaluation of different 3D printed polymeric biomaterials <b>(BJ24_22)</b> MS Lozano, MIA Sánchez, MIM López, <u>F Arán Ais</u> (INESCOP Centre for innovation and technology, Spain)
20:00	<b>BJ2024 BANQUET at Porto Caves Calém</b>