

# BIOfilm-REsistant Materials for hard tissue Implant Applications

## BIOREMIA – H2020 MSCA European Training Network

Implant-associated infections caused by bacterial biofilms are a major cause of implant rejection. The key idea behind this project is to inhibit microbial biofilm formation by fabricating novel biomaterials and surfaces with enhanced antimicrobial device functionality that will result in improved biological acceptance of hard tissue implants.

BIOREMIA has the primary goal of training a pool of young researchers in the emerging area of biofilm-resistant biomaterials and coatings for bone-related implant applications. Early Stage Researchers will have the unique opportunity to be part of a multidisciplinary and inter-sectoral research training programme within two main research areas:

- Bioactive materials with intrinsic antibacterial properties
- Nanostructured bactericidal surfaces

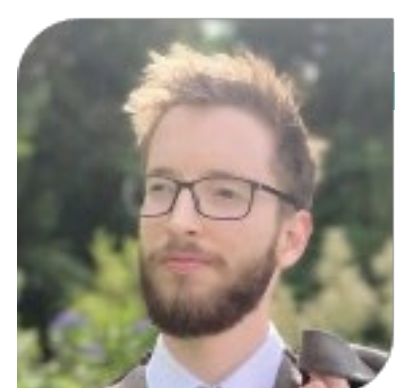


### Early Stage Researchers



**Yannick Fortouna**

**ESR 1 project:** Antibacterial coatings of metallic surfaces: From ab-initio to large scale molecular dynamics simulations  
**Host:** University of Ioannina (UOI), Greece  
**Supervisor:** Prof. Christina Lekka



**Tim Kreuz**

**ESR 6 project:** Antimicrobial bioactive composites with controlled resorbability  
**Host:** University of Cambridge (UCAM), United Kingdom  
**Supervisor:** Prof. Serena Best, Prof. Ruth Cameron



**Adam Turner**

**ESR 11 project:** Material induced inhibition of biofilm formation  
**Host:** University of Gothenburg (UGOT), Sweden  
**Supervisor:** Assoc.Prof. Margarita Trobos



**Ludovico Andrea Alberta**

**ESR 2 project:** Low-rigidity beta-type Ti-based alloys with intrinsic antibacterial and anti-biofilm properties  
**Host:** Leibniz IFW Dresden (IFW), Germany  
**Supervisor:** Assoc. Prof. Mariana Calin



**Kirti Tiwari**

**ESR 7 project:** Design of antimicrobial mechanism of metallic patterned hydrophobic surfaces produced by dealloying and plastic flow deformation of metallic glasses  
**Host:** Università degli Studi di Torino (UNITO), Italy  
**Supervisor:** Prof. Paola Rizzi



**Paula Milena Giraldo Osorno**

**ESR 12 project:** Interplay between inflammation and regeneration and its modulation by surface and bulk composition of metallic materials  
**Host:** University of Gothenburg (UGOT), Sweden  
**Supervisor:** Assoc.Prof. Anders Palmquist



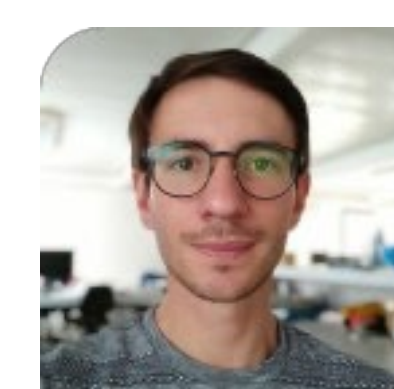
**Aleksandra Bartkowska**

**ESR 3 project:** Fabrication and characterisation of dense and porous Fe-Mn-(Ag,Zn) based alloys with enhanced antibacterial performance for biodegradable implant applications  
**Host:** Universitat Autònoma de Barcelona (UAB), Spain  
**Supervisor:** Prof. Jordi Sort



**John Michael Ahmed Escobar Hernandez**

**ESR 8 project:** Aqueous electrodeposition of hydroxyapatite (HA) and Ag NPs-HA and ZnO-HA composite films with antifouling performance  
**Host:** Universitat Autònoma de Barcelona (UAB), Spain  
**Supervisor:** Assoc. Prof. Eva Pellicer



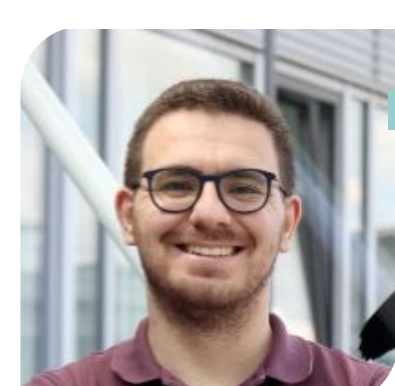
**Juan José Londoño Rueda**

**ESR 13 project:** Bactericidal properties of precious metal-based glassy alloys: an industrial design approach towards a novel class of anti-biofouling materials  
**Host:** PX Services SA, Switzerland  
**Supervisor:** Dr. Andreas Blatter



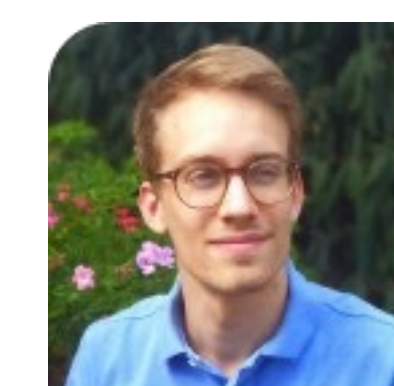
**Fei-Fan Cai**

**ESR 4 project:** Fabrication and functionalization of hierarchical micro- / nano-patterned bulk metallic glasses  
**Host:** Montanuniversität Leoben (MUL), Austria  
**Supervisor:** Prof. Jürgen Eckert



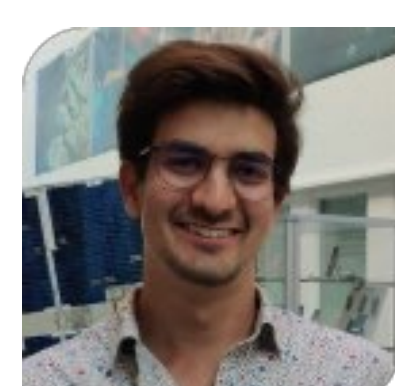
**Adnan Akman**

**ESR 9 project:** Corrosion and electrochemical response of new metastable Ti alloys with bacteria-killing oxide-based coatings  
**Host:** Leibniz IFW Dresden (IFW), Germany  
**Supervisor:** Dr. Annett Gebert



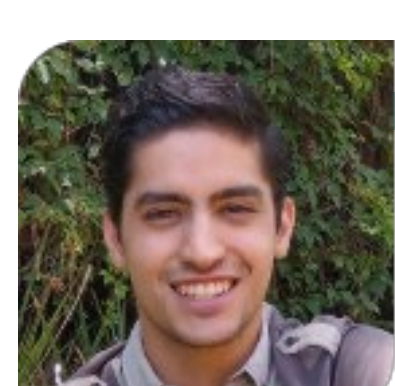
**Yohan Douest**

**ESR 14 project:** Minimally-invasive dental implants with improved microbiological safety from Ti-based BMGs  
**Host:** Anthogyr SAS, France  
**Supervisor:** Dr. Nicolas Courtois



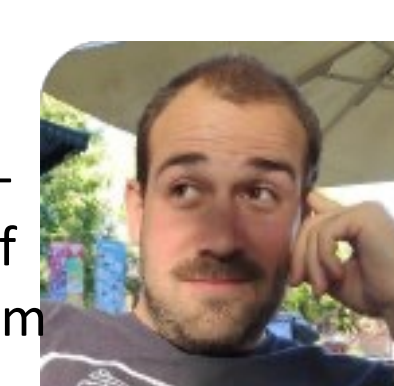
**Miguel Brito Costa**

**ESR 5 project:** Optimisation of biomechanical behavior and deformation mechanisms of antibacterial glassy alloys  
**Host:** University of Cambridge (UCAM), United Kingdom  
**Supervisor:** Prof. Lindsay Greer



**David Zermeño Pérez**

**ESR 10 project:** Sustainable manufacturing of anti-fouling and anti-bacterial bioresorbable PEG-polymer coatings for metal surfaces of implantable medical devices & nanotube-based drug delivery system  
**Host:** Ashland Specialties Ireland Ltd., Ireland  
**Supervisor:** Dr. Udo Greiser














**Sebastião Maria Mollet de Barros**

**ESR 15 project:** Impact of implant coatings on osseointegration and biofilm prevention  
**Host:** Stryker Trauma GmbH, Germany  
**Supervisor:** Dr. Robin Büscher

### BIOREMIA Network

#### 11 Beneficiaries

-  **B1. IFW Dresden (IFW)** – Germany  
M. Calin, A. Gebert, T. Gemming, J. Hufenbach, U. Kühn
-  **B2. Montanuniversität Leoben (MUL)** – Austria  
J. Eckert, F. Spiekermann
-  **B3. University of Ioannina (UOI)** – Greece  
Ch. Lekka
-  **B4. Goeteborgs Universitet (UGOT)** – Sweden  
A. Palmquist, M. Trobos
-  **B5. University of Cambridge (UCAM)** – UK  
S. Best, R. Cameron, L. Greer
-  **B6. Universitat Autònoma de Barcelona (UAB)** – Spain  
J. Sort, E. Pellicer, C. Nogués, J. Fornell
-  **B7. Università degli Studi di Torino (UNITO)** – Italy  
P. Rizzi, F. Turci
-  **B8. PX Services SA (PXS)** – Switzerland  
A. Blatter, S. Prades-Rodel
-  **B9. Ashland Specialties Ireland Ltd (Ashland)** – Ireland  
U. Greiser
-  **B10. Anthogyr SAS (Anthogyr)** – France  
N. Courtois
-  **B11. Stryker Trauma GmbH (Stryker)** – Germany  
R. Büscher

### BIOREMIA Work Packages



15 Early Stage Researchers









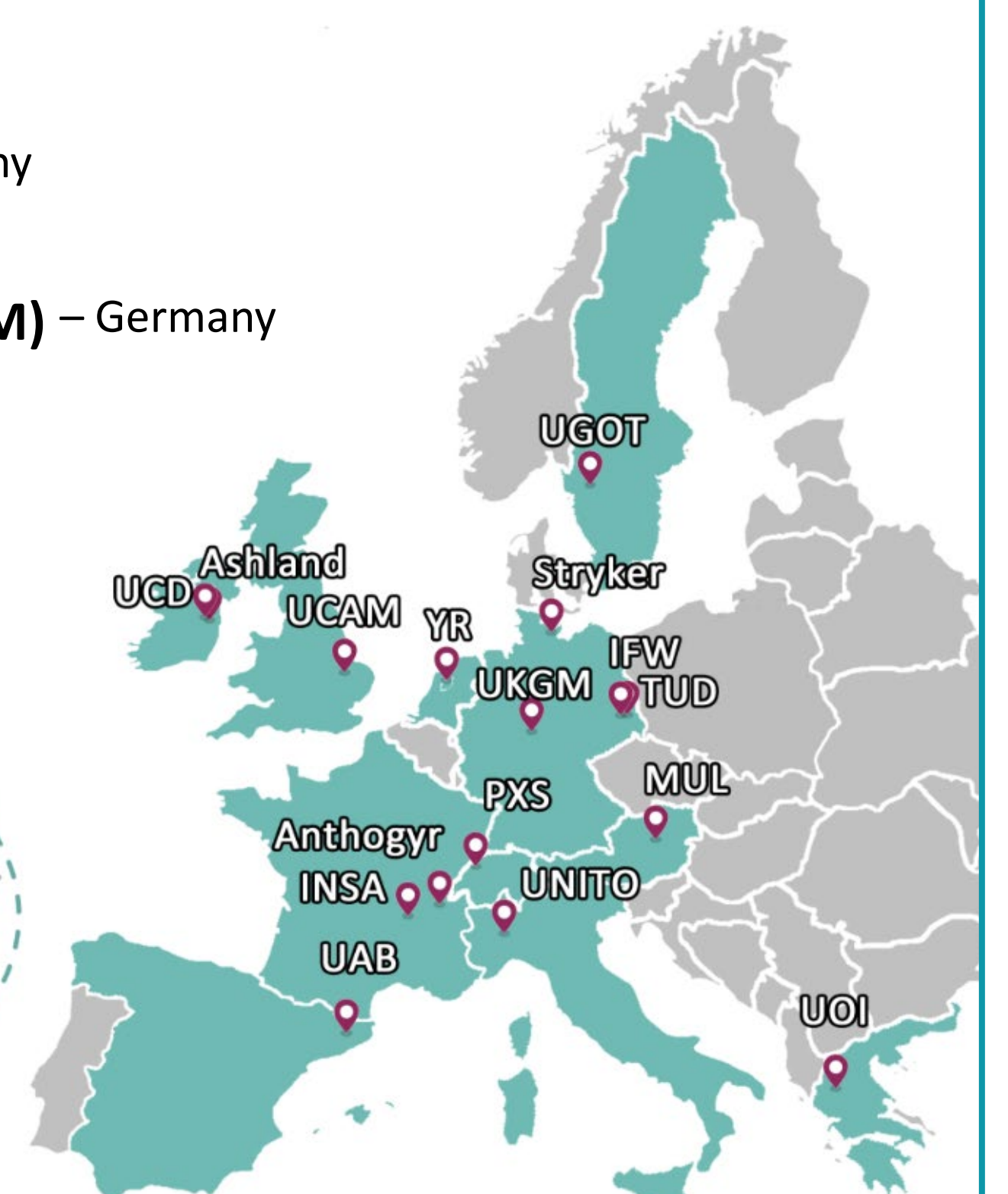
15 ESR Projects

- WP 1: Material design & Innovative processing
- WP 2: In-depth characterisation of materials
- WP 3: Biocompatibility & Bacterial testing
- WP 4: Gateway to industry

- WP 5: Training
- WP 6: Dissemination & Outreach
- WP 7: Network management & IPR
- WP 8: Ethics requirements

#### 6 Partner Organisations

-  **P1. Yellow Research BV (YR)** – The Netherlands  
L. Jaspers
-  **P2. Technische Universität Dresden (TUD)** – Germany  
K. Nielsch, M. Gelinsky
-  **P3. University Clinics of Giessen & Marburg (UKGM)** – Germany  
C. Heiß, K. Lips
-  **P4. University College Dublin (UCD)** – Ireland  
T. Ó Cróinín
-  **P5. Yale University (Yale)** – USA  
U. Schwarz, J. Schroers
-  **P6. INSA Lyon (INSA)** – France  
D. Fabregue, J. Chevalier



17 organisations located in 12 countries