



Future Technology Lab



UNIVERSITÀ DI PARMA

University of Parma

Future Technology Lab Interdepartmental Research Centre

<http://www.centritecnopolo.unipr.it/futuretechnologylab/en/>

Post-graduate/Post-doc fellowship within the project GIMCANA– Glunzioni Metallo-Composito ad Alta resisteNzA (High strength Metal-Composite joints)

Applications are invited for a research fellowship in the field of testing and simulation of metal-composite joints, whose interface is reinforced with a 3D-printed, standalone lattice reinforcement, called SLIM2CORE. The application is foreseen in lightweight components design and manufacturing. The experimental activities are focused on:

- tensile tests for the characterization of polymer composite;
- static shear strength tests, with Single-La Joint (SLJ) geometry;
- fracture tests in I mode (DCB geometry) and mode II (End Notch Flexure geometry, ENF);

The last two testing will be performed for both the reinforced and unreinforced metal-composite interface.

The simulation requires a multiscale approach consisting in:

- the development of a Unit Cell (UC) of the reinforced interface. The mechanical properties to be applied to the UC are evaluated in the experimental phase from unreinforced interface fracture tests and composite testing;
- identification of a cohesive behavior of the UC;
- application of the cohesive model to the simulation of the SLJ and fracture tests, for comparison with the corresponding experiments with a reinforced interface.

The fellowship is part of the project “**GIMCANA– Glunzioni Metallo-Composito ad Alta resisteNzA (High strength Metal-Composite joints)**”, funded by Emilia-Romagna region on POR-FESR European funds, involving research centres of the University of Bologna (CIRI MAM) and CRIT (Vignola, Italy) and the support of private companies, among which MIND, Blacks, TecEurolab, Bercella and Beam-IT, working in the field of lightweight component design and 3D printing.

The project runs for 2,5 years starting from Oct 2023 with a possible extension to July 2026. The contract type and the remuneration will depend on the candidate profile, the range being 24–40 k€/year. The requirements for participation are BSc (Laurea) or equivalent for a research grant (borsa di ricerca, max. 1 year, repeatable), MSc (Laurea Magistrale) or equivalent for a research fellowship (assegno di ricerca, min. 1 year), PhD for a Research Contract (min. 2 years); MSc. students are evaluated if they are close to graduation.

An enthusiastic and self-motivated person is needed with background preferentially on Automotive, Mechanical or Aeronautical Engineering; candidates possessing a Civil or Materials Engineering degree are also evaluated. An enquiring and rigorous approach to research together with a strong intellect and disciplined work habits are appreciated. Training will be given on bonded joint properties, design, testing and modelling, which may include cohesive zone modeling and advanced multiscale interface models using finite element methods. Participation to national and international conferences is foreseen, giving the

opportunity to become a skilled communicator, comfortable in an international situation. Good team-working, observational and communication skills are essential. A fluent English, spoken and written, is mandatory. For foreign candidates, the knowledge of Italian is a preferential skill.

For further details about the position contact Prof. Alessandro Pirondi, alessandro.pirondi@unipr.it, +39 0521 90 5885. Interested applicants should send an up-to-date curriculum vitae to Prof. Alessandro Pirondi on the above e-mail address. Suitable candidates will be contacted.

Closing date: 1st Nov 2023