



Luca Di Stasio

Early Stage Researcher

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Background

I am currently employed as a full-time PhD candidate in Polymeric Composite Materials at the Division of Materials Science, Department of Engineering Sciences and Mathematics, Luleå tekniska universitet (LTU) in Luleå, Sweden. I currently teach in 4 graduate-level courses offered in the subject of Polymeric Composite Materials. The courses are offered as part of the LTU-offered Master programme in Composite Materials and the international joint Master programmes in Materials Science and Engineering EEIGM/EUSMAT (European School of Materials Science and Engineering) and AMASE (Advanced Materials Science and Engineering). Previously, I taught at the École Européenne d'Ingénieurs en Génie des Matériaux (EEIGM) in Nancy, France in undergraduate- and graduate-level courses in Solid Mechanics, Viscoelasticity, Linear Elastic Fracture Mechanics, Mechanics of Composite Materials. I also contribute to the research activities of the Polymeric Composite Materials subject at LTU, working on integrated computational and experimental mechanics of polymers and polymer composites with a focus on fatigue, fracture and damage (see my Research Statement for more details). In addition, I am involved in the supervision of graduate students in the context of Master theses and project courses. I am actively involved in the continuous improvement of teaching practices in the subject of Polymeric Composite Materials by proposing new experimental activities for students (composites repair laboratory, bi-axial strain gauge measurements) as well as improving the virtual learning space of the courses offered in the subject. Furthermore, I actively contribute to the pedagogical research in Higher Education; currently I am working on a contribution (article and oral presentation) to the upcoming *Development Conference for Swedish Engineering Education 2019*.

Higher Education Courses and Study Programmes

Subject Related Courses

As detailed in my resumé, I have received a BSc in Aerospace Engineering (2010) from Politecnico di Milano (Milan, Italy), a MSc in Mechanical Engineering (2012) from Drexel University (Philadelphia, USA), a MSc in Space Engineering (2013) from Politecnico di Milano (Milan, Italy), a PhD in Materials Science and Engineering (exp. Dec. 2019) from Université de Lorraine (Nancy, France) and a PhD in Polymeric Composite Materials (exp. Dec. 2019) from Luleå tekniska universitet (Luleå, Sweden). The courses I attended in these programs qualify me to teach within the specializations of Polymeric Composite Materials, Computational Mechanics, Experimental Mechanics, Computational Materials Science. I have also published peer-reviewed journal articles and conference papers and given several oral presentations in international conferences and seminars on Polymeric Composite Materials and Computational Mechanics (see my full list of publications for a more detailed account).

Pedagogic Courses

I have successfully completed the 7.5 ECTS course *Qualifying course for university teachers* at Luleå tekniska universitet (Luleå, Sweden) in February 2019. During my stay at the École Européenne d'Ingénieurs en Génie des Matériaux (EEIGM) in Nancy, France, I also completed the following courses (in-presence or online) on Higher Education: Teaching in Higher Education (4 ECTS), Teaching Sustainability and Sustainable Development (2 ECTS), Oral Communication and Body Language in the Workplace (3.5 ECTS).

Experience of Teaching and Supervision within Higher Education

In the short- to medium-term perspective, I am currently laying the groundwork for several future works: derivation of the vectorial VCCT from Eshelby's elastic energy-momentum tensor and proposal of a new mode-partitioning strategy based on eigenvalue analysis; investigation of fiber/matrix debonding with concurrent non-linear (viscoelastic, viscoplastic) behavior of the surrounding matrix; 3D modeling of fiber/matrix debonding; 3D imaging of fiber/matrix debonding using in-situ micro-tomography; development of an image analysis algorithm for automated stress-free temperature identification through curvature measurements of asymmetric laminates and its implementation with a temperature feedback loop on low-cost hardware (e.g. android handset, Arduino, Raspberry Pi); creation and real-time update of specimens' digital twins through low-cost hardware (Kinect for Xbox); application of Bayesian inference to the prediction of elastic, viscoelastic, viscoplastic, failure and fracture toughness properties.

In the long term, I envision the development of the distributed, de-centralized, remotely-controlled, integrated laboratory for composite science and engineering: a set of fully automated laboratories and high-performance computing clusters connected together by a decentralized network (peer-to-peer) and accessible through

an online platform, to allow collaborative projects on integrated computational-experimental analysis and design of materials between parties located around the globe.