Interview with Dr Tommaso D'Antino, 2025 RILEM Robert L'Hermite medallist

Dr Tommaso D'Antino is an Associate Professor at the Politecnico di Milano, Italy. Dr D'Antino has been awarded the RILEM Robert L'Hermite medal this year in recognition of his research activity focusing on the use of composite materials for strengthening and retrofitting existing structures or as reinforcement of new concrete members in place of traditional steel reinforcement. Some of his contributions were included in design guidelines for fibre reinforced polymer (FRP)- and fibre reinforced cementitious matrix (FRCM)-strengthened members. In this interview, Dr D'Antino discusses his experience as a RILEM member, and he gives some hints about his keynote lecture at the upcoming 79th RILEM Annual Week, in Hanoi, Vietnam, on 26 August 2025.

24 July 2025

***

Dr Daniela Ciancio, RILEM Implementation Manager (RIM): Good morning, Tommaso! First of all, congratulations for your RILEM medal! I see you joined RILEM in 2011… as you're only 39, this means that you became a member at just 25!

Dr Tommaso D'Antino (Tommaso): That's right. I joined as a PhD student, actually, because of my supervisor, Professor Carlo Pellegrino, who was the Chair of RILEM TC 234-DUC *Design procedures for the use of composites in strengthening of reinforced concrete structures*. I was doing my PhD on precisely that topic: using FRP composites to strengthen existing concrete structures. I joined the committee under Professor Pellegrino's supervision and started working within RILEM on that topic.

Later, I moved to the United States for a year, where I continued working with composites—specifically FRCM composites. Because of that, I joined a new RILEM Technical Committee: 250-CSM *Composites for sustainable strengthening of masonry*, which focused on composite or sustainable strengthening of masonry structures using FRCM. As my research progressed, I joined another committee, 290-IMC *Durability of Inorganic Matrix Composites used for Strengthening of Masonry Constructions*, which looked at the durability of those materials. At the same time, I participated in 292-MCC *Mechanical Characterization and Structural design of Textile Reinforced Concrete*, which focuses more on the structural behaviour of the materials rather than just their durability. This latter committee is wrapping up now, and we're reviewing some chapters of our State-of-the-Art report.

RIM: Many people say it's intimidating for a PhD student to join a technical committee, surrounded by internationally renowned experts. What was it like for you at 25, joining TC 234-DUC?

Tommaso: For me, it wasn't scary—it was actually thrilling. That committee included some of the leading experts in the field at the time. After reading so many of their papers on FRPs, it was amazing to discuss ideas directly with them. It felt like a great opportunity instead of something to fear. Perhaps it was easier for me because the TC Chair was my PhD supervisor, so I felt comfortable. But overall, it was truly an invaluable experience. It was a crucial step for my career.

RIM: Networking is one of RILEM's great strengths! On another note, how many times did you apply for this medal?

Tommaso: For this particular medal, I believe I applied twice. Before that, I also applied for the RILEM Gustavo Colonnetti medal. So, in total, I've applied four times across the two medals.

RIM: Your expertise leans more towards structures than material characterisation, which is another core theme within RILEM. Could you explain your research in simple terms for our wide audience, many of whom may not be familiar with your research area?

Tommaso: Certainly! My research focuses on innovative materials, particularly fibre-reinforced composites like carbon FRPs. These materials have high strength-to-weight ratios—they're light but strong. I've studied how to use these composites by themselves or in combination with traditional materials such as concrete, masonry, timber, and steel. I started by applying fibre-reinforced polymer composites to strengthen and rehabilitate reinforced concrete structures, improving the capacity of beams and columns. Then I expanded to using FRCM—composites with inorganic matrices—again to enhance the performance of existing concrete and masonry elements.

Recently, my focus has shifted to using composites, like FRP bars, as alternatives to steel reinforcement in new concrete structures, aiming to improve their durability and sustainability. In summary, my research is about integrating innovative composite materials into both existing and new structures.

RIM: What impact has your research had in industry? Have your findings been put into practice or included in standards?

Tommaso: In the early part of my career, I worked on the bond behaviour between externally bonded composites and structural members. Together with colleagues, we improved the formulas describing stress transfer between composites and substrates. These improvements have been reflected in the Italian design guidelines for these materials.

Later, I proposed the design equation for shear strengthening with FRCM in existing reinforced concrete members. That equation is included in the Italian guidelines CNR-DT 215 (*Guide for the Design and Construction of Externally Bonded Fibre Reinforced Inorganic Matrix Systems for Strengthening Existing Structures*). As for FRP bars, I participated in the Italian committee that reviewed and revised the CNR-DT 203 (*Guide for the Design and Construction of Concrete Structures Reinforced with Fiber-Reinforced Polymer Bars*), whose new version, namely the CNR-DT 203/R1, has been recently released. My contributions included new formulations for the bond behaviour of bars and for use of FRP bars as shear reinforcement, based on experimental data. I am also involved in the writing of an ASTM document for the study of the bond behaviour of FRCM, and I have worked within ACI, notably I contributed in writing the guideline ACI 549.6R "*Guide to Design and Construction of Externally Bonded Fabric-Reinforced Cementitious Matrix (FRCM) and Steel-Reinforced Grout (SRG) Systems for Repair and Strengthening Masonry Structures*".

RIM: How common are these innovative rebars in current practice?

Tommaso: They're increasingly common, especially in cold countries such as Canada or the northern United States, where corrosion of steel reinforcement is a major problem due to de-icing salts. Using composite bars eliminates this issue, increasing the longevity of reinforced concrete structures. These rebars are also being used more frequently in Italy, which is why the design guidelines have recently been updated.

RIM: And in Italy, are these used mainly for marine structures or large infrastructure?

Tommaso: Yes, they're particularly valuable where corrosion is a concern—marine structures, bridges, or areas with aggressive environments. Even though Italy isn't as cold as Canada, we still have applications where corrosion is a significant challenge.

RIM: I see from your CV that you are active in ACI and *fib*, as well as RILEM. What's your perspective on collaboration between these international associations?

Tommaso: Collaboration between these associations is crucial for producing high-quality, internationally accepted technical documents. Since many of us work on the same topics across different countries and organisations, communication is essential to avoid conflicting guidelines. For example, an Italian certification should be compatible with a French or American one, so that products can be used internationally.

A great example of this collaboration is the liaison between ACI 549 and RILEM TC 250-CSM, where we produced a shared document on FRCM. This means you can use FRCM in Italy and the US with similar design formulations. People working within RILEM are often the same people involved in organisations like *fib*, so it makes sense to collaborate and produce joint documents.

RIM: You'll be presenting your research in Hanoi at the next annual week. Can you give us a preview of your talk?

Tommaso: I'll be presenting my work from the past 15 years on the use of fibre-reinforced composites. My aim is to demonstrate their potential—both the advantages and disadvantages—when used to strengthen existing structures or in designing new ones. Although these materials are well known to some, many people still aren't familiar with their benefits, such as improved durability and sustainability, even if initial costs are higher. My goal is to highlight their long-term value.

RIM: One last question… all the RILEM TCs you have joined are terminating their activities or are already closed. Have you considered establishing a new Technical Committee and serving as chair?

Tommaso: Yes, I started thinking about that a couple of years ago, especially in the context of composite bars for concrete structures. With new documents and ongoing discussions about design equations and certifications across Europe, it's time to convene experts in this area and produce a shared document, finally harmonising the design approaches. There are several topics, such as bond and fatigue, which require further research. RILEM provides an excellent platform to advance this work and promote the use of these materials.

RIM: Thank you, Tommaso! I look forward to meeting you in Hanoi!

Tommaso: Thank you!