

Open PhD Position: Cyber-physical Systems for Advanced Production of Biocomposite Materials

TU Wien is Austria's largest institution of research and higher education in the fields of technology and natural sciences. With over 26,000 students and more than 4,000 scientists, research, teaching and learning dedicated to the advancement of science and technology have been conducted here for more than 200 years. Guided by the motto "Technology for People", TU Wien fosters close collaboration with business and industry and contributes to the prosperity of society.

In the framework of the **Christian Doppler Laboratory for Next-generation wood-based biocomposite “(WoodComp3D)”** (<https://woodcomp3d.at/>), the Research Unit of Structural Simulation and Timber Engineering of the Institute of Mechanics of Materials and Structures invites applications for a PhD position to be filled in the following area:

Cyber-physical systems for advanced production of biocomposite materials

The goal is to transform sawmill byproducts into sustainable, high-performance structural elements through automated robotic fabrication. This research is centered on bridging the gap between intelligent automation and complex material handling. You will develop an adaptable robotic manufacturing cell capable of processing highly viscous, fiber-reinforced bio-materials, evolving alongside parallel material research through the following pillars:

- **Mechatronic Prototyping:** Custom hardware design of components and the physical assembly of production units. This includes the integration of electrotechnical components (wiring, sensors, and actuators).
- **Process & Material Design:** Developing integrated process workflows and liquid-phase biocomposite formulations specifically optimized for automated deposition, like the design and integration of custom end-effectors, pumping systems, and nozzles to precisely dispense and orient highly viscous, fiber-reinforced biocomposite pastes
- **Intelligent Automation:** Design and optimization of robotics algorithms within the ROS2 framework, utilizing a rigorous validation pipeline including Software-, Hardware-, and Material-in-the-Loop (SIL/HIL/MIL) simulations. This role involves experimental verification and the integration of automated testing into Continuous Integration (CI) pipelines to bridge the gap between virtual models and physical systems.
- **Data Science & Evaluation:** Developing a data-driven framework to ensure that field data (sensor logs, vision data) is transformed into measurable product improvements.
- **Applied AI/ML:** Explore and implement AI/ML solutions where they provide tangible value, such as anomaly detection, data-driven quality metrics, or assisted perception features to automate the processing of biocomposites.

A core aspect of the role is the physical handling and optimization of biocomposite materials. This involves a hands-on approach, working directly with liquid-phase matrix systems, chemical additives, and natural fibers to optimize the interface between robotic hardware and material behavior. As part of an interdisciplinary and international team, you will collaborate with experts in process engineering, material chemistry, and computational mechanics.

Workplace Note:

The role is primarily lab-based and requires a full-time presence at the TU Wien Science Center (1030 Vienna), particularly in the first years (setup, prototyping, experiments). Some remote work can be arranged for tasks such as data analysis, documentation, and manuscript writing, depending on the project phase and agreed milestones.

Your Profile:

- University Master's degree in the field of computer science, robotics, electrical engineering, civil engineering, mechanical engineering, material science, or a similar field
- English language skills of at least C1
- Knowledge of scientific work and interest in biocomposite materials and automation technology
- Organizational and analytical skills, as well as a structured way of working
- Interest and enjoyment in research
- Hands-on Mentality - Willingness to work in a workshop/laboratory environment with fibrous and paste/slurry-based materials and to collaborate closely with material scientists to adapt robotic parameters to changing material rheologies
- Proficiency in at least one programming language (e.g., Python or C++) and a strong interest or experience in robotics frameworks (e.g., ROS2)
- Experience with CAD tools (e.g., Fusion 360, SolidWorks) and basic mechatronic integration
- Problem-solving skills
- Self-motivated and proactive team player

We offer:

- A fulfilling position with a wide variety and exciting range of tasks in a collegial team
- Academic Progression: The opportunity to conduct high-level research leading to a Doctoral Degree (PhD) upon successful completion and defense of the dissertation.
- A range of attractive social benefits (see Fringe-Benefit Catalogue of TU Wien)
- Wide range of internal and external training opportunities, various career options
- Access to a brand-new laboratory infrastructure and state-of-the-art robotic equipment at the TU Science Center

TU Wien is committed to increasing the proportion of women, in particular, in leadership positions. Female applicants are explicitly encouraged to apply. Preference will be given to women when equally qualified, unless reasons specific to a male applicant tilt the balance in his favor.

The employment starts as a full-time (40 hours per week) Project Assistant with a salary of EUR 3.776,10 gross (14 x per year) according to the collective bargaining agreement for a PhD student.

We look forward to receiving your application until April 12, 2026. Please note that the application shall contain the following application documents:

- CV
- Motivation Letter
- Certificate of diploma degree (copy)
- If available:
 - List of publications (including researchID, google scholar ID, and/or Orcid ID)
 - A list of grades from all exams taken during the course of study
 - List of experience with software or hardware projects

Contact person:

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H <https://www.woodcomp3d.at/>, <https://www.tuwien.at/en/cee/imws/simulation>

Please mark your application in the email subject field with **[Appl PhD2026 WC3D]**