1. Raziskovalna organizacija:

Univerza v Ljubljani, Biotehniška fakulteta

2. Ime in priimek mentorja:

Primož Oven

3. Področje znanosti iz šifranta ARRS:

4.01 Gozdarstvo, lesarstvo in papirništvo

4. Kontaktni e-naslov mentorja:

primoz.oven@bf.uni-lj.si

5. Kratek opis programa usposabljanja:

SI: Lesne zaloge Slovenije predstavljajo strateško pomemben surovinski vir, saj gozdovi pokrivajo skoraj 60 % države, ustvarjena dodana vrednost na kubični meter posekanega lesa pa je skromna. Poleg tradicionalne rabe se pri izkoriščanju lesa vse bolj uveljavljajo tudi nove produktne smeri, kamor zagotovo sodi tudi nanoceluloza. Nanocelulozo je mogoče pridobivati tudi iz lesa, ki ni primeren za izrabo v klasični lesni industriji, prav tako po tudi iz lesa, ki je zaradi morebitnih naravnih ujem popolnoma razvrednoten.

Raziskovalno delo kandidata bo na eni strani usmerjeno v razvoj in optimizacijo metode pridobivanja nanoceluloze iz ligno-celulozne biomase ter karakterizacijo pridobljenega produkta. Drugi sklop raziskav pa bo zasnovan na razvoju nanokompozita s ciljnimi lastnostmi. Nanocelulozo bo zato potrebno kemično modificirati, proučiti njeno kompatibilnost z matrico, izdelati preizkušance, proučiti lastnosti kompozita in optimizirati razmerja med ojačitveno komponento in matrico.

Doktorski študij bo potekal na interdisciplinarnem doktorskem študijskem programu Bioznanosti, ki ga koordinira Biotehniška fakulteta Univerze v Ljubljani. Kandidat bo deloval na znanstvenem področju Les in biokompoziti. Večina eksperimentalnega dela bo opravljenega na Oddelku za lesarstvo, delo pa bo vpeto v mednarodne raziskave. Raziskovalno delo na tem področju tako ponuja številne izzive in možnosti objav znanstvenih prispevkov v vrhunskih znanstvenih revijah, načrtovano pa je tudi tesno sodelovanje z industrijo.

EN: Slovenian forests cover almost 60 % of the country and hence, wood represents strategically important resource - unfortunately, added values per cubic meter of felled wood remains low. In addition to traditional use of wood, new products have emerged in recent years, and nanocellulose belongs to them. Nanocellulose could be obtained from wood which is not suitable for traditional wood industry, as well as from wood, which is completely depreciated due to natural disasters.

Research work of a candidate will be directed toward development and optimization of method of isolation of nanocellulose from ligno-cellulosic biomass and characterization of the product. Another set of research will encompass development of new composites with targeted properties. Nanocellulose will be chemically modified, compatibility with the polymer matrix will be investigated, samples will be produced, properties of composite examined and thereafter ratio between reinforcing component and matrix optimized.

The doctoral program will be held at the doctoral program of Biosciences, coordinated by the Biotechnical Faculty, University of Ljubljana. The candidate will be involved in the scientific field Wood and biocomposites. Most of the experimental work will be performed at the Department of Wood Science and Technology and it will be integrated into international research. Research in this area also offers many challenges and opportunities for publications of scientific papers in top scientific journals. Close cooperation with industry is planned.