

PERSONAL INFORMATION

Sithiprumnea Dul



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Sex: Male | Date of birth: 20/10/1990 | Nationality: Cambodian

WORK EXPERIENCE

September 2014 – June 2018

Doctoral Student

Department of Industrial Engineering, University of Trento, Via Sommarive 9, 38123 Trento, Italy

▪ *Materials and manufacturing process:*

- Process thermoplastics and composites by melt compounding, compression moulding and filament extrusion.
- Optimization the thermoplastic and composite materials formulations suitable for 3D printing-fused deposition modelling (FDM).
- Production the 3D-printed components by the FDM technique.

▪ *Materials testing:*

- Microstructures of polymer nanocomposites tests such as Fourier transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), and X-ray photoelectron spectroscopy (XPS).
- Thermal analysis including thermo-gravimetric analysis (TGA), differential scanning calorimetry (DSC).
- Mechanical tests according to ISO and ASTM standard procedures including tensile test, flexural test, creep test, dynamic mechanical thermal analysis (DMTA).
- Experimental tests on electrical resistivity, conductivity, and electromagnetic interference shielding properties.
- Strain monitoring and Joule's effect test.

May 2017- April 2018

Research Collaborator

Department of Industrial Engineering, University of Trento, Via Sommarive 9, 38123 Trento, Italy

- Guidance the visitor students (Dr. Luiz Gustavo Ecco and Mrs Debora Pereira Schmitz) from Federal University of Santa Catarina, Florianópolis, Brazil regarding the "*Nanocomposites for the electromagnetic shielding applications*".

December 2015 - March 2016

Research advisor of graduate student

Department of Industrial Engineering, University of Trento, Via Sommarive 9, 38123 Trento, Italy

- Supervision a master's degree student on the thesis (University of Trento, 2014-2015) regarding the "*Electrical conductive nanocomposite materials for 3D printing*".

EDUCATION AND TRAINING

September 2014 – June 2018

PhD – Thesis Title: 'Carbon-based Polymer Nanocomposites for 3D-Printing'

Department of Industrial Engineering, University of Trento, Italy

In this PhD project, novel polymer nanocomposites were developed with the aim to increase the performances of 3D-printed parts obtained by fused deposition modelling (FDM). The attention was focused on carbon-based nanofillers incorporated into an acrylonitrile–butadiene–styrene (ABS) polymer by a completely solvent-free process consisting of melt compounding and extrusions. ABS-based nanocomposites were prepared by incorporating different kinds and amounts of graphene nanoplatelets (GNP), carbon nanotubes (CNTs), carbon black (CB) and the mixture of these nanofillers (hybrid systems). Nanocomposite filaments were then used to feed a fused deposition modelling (FDM) machine to obtain 3D-printed specimens.

The nanofillers were found to enhance the mechanical and functional properties of nanocomposites. In particular, the stiffness and strength of 3D-printed products are improvements by the presence of GNP and CNT. Moreover, a higher thermal stability is induced on 3D-printed parts by nanofillers, as indicated by a reduction in both coefficient of thermal expansion and creep compliance. Finally, the 3D-printable nanocomposite materials exhibit a good electrical conductivity, which were used in applications of electromagnetic interference shielding effectiveness and strain monitoring.

Courses:

- Polymers science and technology
- Thermal analysis
- Experimental mechanics of materials
- Materials science and technology
- Effects of defects in fiber reinforced composite materials
- Electron microscopy techniques
- Progress in polymer micro-nanocomposite
- Technical/ scientific English

August 2013 – August 2014

Master's degree in Mechanics of Materials and Structures

University of Girona, Girona, Spain (Global mark: 8.74/10)

Courses:

- Solid mechanics
- Fracture mechanics
- Finite element method in structural mechanics
- Applied mechanics of materials and structures
- Structural dynamics
- Advanced structural analysis
- Composites for construction
- Advanced constitutive modelling
- Pre and post-process tools for structural finite element analyses (ANSYS)
- Applied mechanics of materials and structures

October 2008 – July 2013

Civil Engineering

Institute of Technology of Cambodia, Cambodia (GPA: 3.0/4.0)

Courses:

- Structural analyses
- Strength of material
- Steel construction (Eurocode 3)
- Reinforced concrete design
- Pre-stressed concrete
- Soil mechanics
- Road construction
- Work security
- Software aided design
- Quantity survey etc.

PERSONAL SKILLS

Mother tongue
Other languages

Khmer

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C1	C1	C1	C1
French	B1	B1	B1	B1	B1
Italian	A1	A1	A1	A1	A1

Levels: A1/A2: Basic user - B1/B2: Independent user - C1/C2 Proficient user
[Common European Framework of Reference for Languages](#)

Technical skills and competences

During my working experience and my master's program, I got some experience in the modal and structural analysis using both analytical and FE calculation methods. I'm also effective in designing mechanical components using 3D ANSYS software. It covered the basic modelling and meshing techniques to more advanced aspects such as non-linear analyses involving the *non*-linear behaviour of materials or contact, heat transfer, structural analysis and fluid dynamic analysis. Applied examples of real and simulated cases in the engineering of mechanics of materials and structures. Cases of problem solving and projects in mechanics of materials and structures in different areas: products and machinery industry, transport industry (vehicles, aerospace, etc.) and building. The ability in producing both concise and detailed written reports and in showing the results in the form of presentation complete my technical profile.

Communication skills

Working in different environments and cultural diversity, I developed an high flexibility and a very fast fitting. I am able to well perform an oral presentation. I am able to work independently, and I like also team-working, proposing new ideas and solutions and also listening to suggestions given by the others. A strong will and interest in acquiring new knowledge always help me to solve problems and push me towards new targets.

Organisational / managerial skills

- Good organisational skills gained as a research advisor for postgraduate students during my PhD program.
- Good team-leading skills gained in school projects.
- Good ability to prioritize and plan effectively, working under pressure and to deadlines, establishing priorities and rationally organizing my work.

Computer skills and competences

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|--------------------------------------|-------------------|
| - MATLAB | - Proficient User |
| - ANSYS: APDL, Workbench CFX | - Proficient User |
| - Auto-cad 2D&3D | - Proficient User |
| - Solidwork | - Basic User |
| - Robot Structural Analysis | - Proficient User |
| - Microsoft Office, Internet, Email. | - Proficient user |

ADDITIONAL INFORMATION

Publications

- S. Dul, L. Fambri, and A. Pegoretti, *Fused deposition modelling with ABS-graphene nanocomposites*, Composites Part A: Applied Science and Manufacturing, **2016**. 85 (1): p. 181-191.
- A. Dorigato, V. Moretti, S. Dul, S.H. Unterberger, and A. Pegoretti, *Electrically conductive nanocomposites for fused deposition modelling*, Synthetic Metals, **2017**. 226 (1): p. 7-14.
- S. Dul, L. Fambri, C. Merlini, G.M.O. Barra, M. Bersani, L. Vanzetti, and A. Pegoretti, *Effect of graphene nanoplatelets structure on the properties of acrylonitrile-butadiene-styrene-composites*. Polymer Composites, **2017**. In press.
- S. Dul, L. Fambri, and A. Pegoretti, *Filaments production and fused deposition modelling of ABS/carbon nanotubes composites*, Nanomaterials, **2018**. 8(1): p. 49-73.
- D. P. Schmitz, L. G. Ecco, S. Dul, E. C. L. Pereira, B. G. Soares, G. M. O. Barra, and A. Pegoretti, *Electromagnetic Interference Shielding Effectiveness of ABS carbon-based Polymer Composites Manufactured via Fused Deposition Modelling*, Materials Today Communications, **2018**. 15 (1): p. 70-80.
- S. Dul, A. Pegoretti, and L. Fambri, *Effects of the Nanofillers on Physical Properties of Acrylonitrile-Butadiene-Styrene Nanocomposites: Comparison of Graphene Nanoplatelets and Multiwall Carbon Nanotubes*, Nanomaterials, **2018**. 8(9): p. 674-695.

Conferences

- S. Dul, H. Mahmood, L. Fambri, and A. Pegoretti, *Graphene-ABS nanocomposites for fused deposition modelling*, in *Proceedings of European Conference on Composite Materials (ECCM17)*, Munich, Germany, 26-30 June 2016. ISBN 978-3-00-053387-7. Oral presentation.
- S. Dul, L. Fambri, and A. Pegoretti, *Carbon nanotubes-ABS nanocomposites for fused deposition modelling* in *Milan Polymer Days conference (MIPOL2017)*, Milan, Italy, 15-16 February 2017. Poster presentation.
- S. Dul, L. Fambri, and A. Pegoretti, *Strain monitoring of carbon nanotubes nanocomposites by fused deposition modelling* in *Europolymer conference 2017 (EUPOC-2017)*, Gargnano, Italy, 21-25 May 2017. Poster presentation.

References

- Prof. Alessandro Pegoretti, Full professor
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- Prof. Luca Fambri, Associate professor
Department of Industrial Engineering and INSTM Research Unit, University of Trento, Trento, Italy
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- Prof. Andrea Dorigato, Assistant professor
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