

# DAYA SAGAR DHUNGANA

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**Technical Skills** Clean Room; Molecular Beam Epitaxy (MBE); SEM, AFM, XRD, Optical Microscopy, Profilometry, Wet and Dry Etching, Bonding; Magnetic Squid, Microfluidics Devices.

Fluent in C, C++; R, Python; MATLAB; Verilog, System Verilog, Cadence; Blender, ImageJ

## Experience

2016–2018 **LAAS-CNRS** TOULOUSE, FRANCE

*PhD (Nanoelectronics and Quantum Computing – 3 Years)*

*Project: “Growth of InAs and Bi<sub>1-x</sub>Sb<sub>x</sub> Nanowires on Silicon for Nanoelectronics and Topological Qubits by Molecular Beam Epitaxy”*

- Accomplished full CMOS compatible InAs nanowires on Si by MBE for the first time.
- Achieved high yield of InAs and InAsSb nanowires on patterned Si wafers.
- Realized defect free Bi<sub>1-x</sub>Sb<sub>x</sub> nanowires on Si for the first time.
- Engineered Bi<sub>1-x</sub>Sb<sub>x</sub> nanowires in the range of 3D topological insulators.
- Innovated an automated image processing and data treatment methodology for nanowires analysis.

**Applied Expertise:** Clean room, Molecular Beam Epitaxy (MBE), Surface Treatments (HF, In-situ Hydrogen Gas and Plasma) Characterisation (SEM, TEM and XRD), Image Processing (ImageJ) and Data Treatments (R/Python)

Spring 2015 **INL-CNRS** LYON, FRANCE

*Research Intern (Microfluidics device – 6 months)*

*Project: “Carbonyl Iron/PDMS composite for microfluidic devices”*

- Enhanced the magnetic properties of the PDMS/Carbonyl Iron composite.
- Designed, developed and implemented the composite on microfluidics devices.
- Introduced an automated methodology to track the particles movement in the microfluidic devices.

**Applied Expertise:** Photolithography, Microfluidic Devices, Optical Microscopy, Magnetic Squid

Summer 2014 **MATEIS-CNRS** LYON, FRANCE

*Research Intern (3D Modelling/Electron Microscopy – 4 months)*

*Project: “3D Modelling and Quantification of Dispersion States of Carbon Nanotubes (CNTs) on Polyurethane Matrix ”*

- Innovated a 3D quantification methodology to analyze the dispersion states of CNT on Polymer.

**Applied Expertise:** STEM Microscopy, 3D tomography, MATLAB, Image Processing (ImageJ)

## Education

2015 – 2018 **UNIVERSITE PAUL SABATIER TOULOUSE 3** TOULOUSE, FRANCE

*PhD (Micro and Nanosystem)*

Dissertation: Growth of InAs and Bi<sub>1-x</sub>Sb<sub>x</sub> Nanowires on Si for Nanoelectronics and Topological Qubits by Molecular Beam Epitaxy (October 9, 2018)

2013 – 2015     **UNIVERSITE CLAUDE BERNARD LYON 1**     LYON, FRANCE  
*Master of Engineering (Nanoscale)*  
Conducted the feasibility study of a lithography startup in the market.  
Recipient of PALSE Scholarship to conduct master studies in France.

**Major Courses:** Nano fabrications, Nano Characterisations, Semiconductor Physics,  
Nanoelectronics, Photonics, Material Science, MEMS , Optoelectronics

2007– 2011     **INSTITUTE OF ENGINEERING**     KATHMANDU, NEPAL  
*Bachelor of Engineering (Electronics and Communications)*  
Organized a 3 days national level electronics/computer engineering technical festival.  
Accomplished national level engineering entrance examination (ranked 100 out of 4000 candidates).

**Major Courses:** Electronics Circuits and Devices, Signal Processing, Instrumentation,  
Electromagnetism, Computer Architecture, Communication Systems, Engineering Mathematics

## Personal/Other

2016-2018     **MENTORSHIPS**     TOULOUSE, FRANCE  
1 master student from Italy for 6 months.  
1 undergraduate student from France for 1 month.  
1 undergraduate student from USA for 2 weeks

2017     **IEEE SUMMER SCHOOL ON NANODEVICES**     TOULOUSE, FRANCE  
Examined the industrial applications of contemporary nanomaterials research.

**Skills Covered:** Electronics Circuits and Devices, Signal Processing, Instrumentation,  
Electromagnetism, Computer Architecture, Communication Systems, Engineering Mathematics

**Languages:** English, French (conversation), Hindi, Nepali

**Additional interests:** Reading, Game Development, Unreal Engine, Geometry, Machine Learning

## Publications

- **Dhungana, D.S.**; Hemeryck, A.; Sartori, N.; Fazzini, P.-F.; Cristiano, F.; Plissard, S.R. Insight of Surface Treatments for CMOS Compatibility of InAs Nanowires. *Nano Res.*, **2018**, 1–6. [IF: 8.00] <https://link.springer.com/article/10.1007%2Fs12274-018-2257-8>
- Jomaa, M.H.; Roiban, L.; **Dhungana, D.S.**; Xiao, J.; Cavaillé, J.Y.; Seveyrat, L.; Lebrun, L.; Diguët, G.; Masenelli-varlot, K. Quantitative Analysis of Grafted CNT Dispersion and of Their Stiffening of Polyurethane (PU). *Compos. Sci. Technol.*, **2019**, *171*, 103–110. [IF: 5.59] <https://www.sciencedirect.com/science/article/pii/S0266353818312314>
- Deman, A.-L.; Mekkaoui, S.; **Dhungana, D.**; Chateaux, J.-F.; Tamion, A.; Degouttes, J.; Dupuis, V.; Le Roy, D. Anisotropic Composite Polymer for High Magnetic Force in Microfluidic Systems. *Microfluid. Nanofluidics*, **2017**, *21*, 170 [IF: 2.34] <https://link.springer.com/article/10.1007/s10404-017-2008-2>
- Le Roy, D.; **Dhungana, D.**; Ourry, L.; Faivre, M.; Ferrigno, R.; Tamion, A.; Dupuis, V.; Salles, V.; Deman, A.L. Anisotropic Ferromagnetic Polymer: A First Step for Their Implementation in Microfluidic Systems. *AIP Adv.*, **2016**, *6*. [IF: 1.57] <http://aip.scitation.org/doi/full/10.1063/1.4943927>

## Conferences

- **Oral Presentation** : **Dhungana, Daya S.**, et al. "Defect Free Bi<sub>1-x</sub>Sb<sub>x</sub> Nanowires on Si by MBE", Materials Research Society(MRS) Fall 2017, Boston , USA , Nov 26 - Dec 1 2017.
- **Poster Presentation** : **Dhungana, Daya S.**, et al. "Surface Treatments for CMOS Compatible InAs Nanowires by MBE." Materials Research Society (MRS) Fall 2017, Boston, USA, Nov 26 - Dec 1 2017.
- **Oral Presentation:** **Dhungana, Daya S.**, et al "Defect-free Bi<sub>1-x</sub>Sb<sub>x</sub> nanowires on Si by MBE" J2N 2017, Grenoble, France, November 13-15, 2017
- **Poster Presentation:** **Dhungana, Daya S.**, et al. "Controlling nanowire nucleation for integration on silicon." Nanotechnology Materials and Devices Conference (NMDC), IEEE, Toulouse, 2016.
- **Oral Presentation:** **Dhungana, Daya S** et al. "Surface Preparation of Si(111) Substrates and Growth of III-V Nanowires by Molecular Beam Epitaxy", French Nanowires Workshop 2016, Meudon, France