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Languages Known:	Bengali, English and Hindi

Key Academic Qualifications: -

Ph. D. (Interdisciplinary Studies)	Faculty of Mechatronics, Informatics and Interdisciplinary studies, Technical university of Liberec, Liberec, Czech Republic. 2018
M. Sc. (Ecology and Environment)	Sikkim-Manipal University of Health, Medical and Technological Sciences, Sikkim, India. 2006
B. Ed. (Physical Sc. And Maths)	University of Calcutta, Kolkata, India. 2001
B. Sc. (Chemistry Hons.)	University of Calcutta, Kolkata, India. 1999

Academic Outputs: -

Thesis:

[1] Swar, S., Modification of Synthetic Polymeric Materials' Surface for Suppression of Biofilm Formation, *Ph.D. Thesis*, Technical University of Liberec, Liberec, Czech Republic. (2018)
[2] Swar, S., Health Hazard due to Non-ionizing Radiation of High Tension Line and Safety Measures, *Master's Thesis*, Sikkim-Manipal University of Health, Medical and Technological Sciences, Sikkim, India. (2006)

Publications in Peer Reviewed Journals:

[1] **Swar, S.**; Máková, V.; Horáková, J.; Kejzlar, P.; Stibor, I. A Comparative Study Between Chemically Modified and Copper Nanoparticle Immobilized Nylon 6 Films to Explore Their Efficiency in Fighting Against Two Types of Pathogenic Bacteria; ***European Polymer Journal*** (Accepted 27 November 2019). DOI: 10.1016/j.eurpolymj.2019.109392.

[2] **Swar, S.**; Máková, V.; Stibor, I. Effectiveness of Diverse Mesoporous Silica Nanoparticles as Potent Vehicles for the Drug L-DOPA; ***Materials*** (2019), 12, 1-15, DOI: 10.3390/ma12193202.

[3] **Swar, S.**; Zajícová, V.; Müllerová, J.; Šubrtová, P.; Horáková, J.; Dolenský, B.; Řezanka, M.; Stibor, I. Effective Poly(Ethylene Glycol) Methyl Ether Grafting Technique Onto Nylon 6 Surface To Achieve Resistance Against Pathogenic Bacteria Staphylococcus aureus and Pseudomonas aeruginosa; ***Journal of Materials Science*** (2018), 53, 14104-14120. DOI: 10.1007/s10853-018-2636-2.

[4] Martinek, M.; **Swar, S.**; Zajícová, V.; Voleský, L.; Blažková, L.; Müllerová, J.; Stuchlík, M.; Řezanka, M.; Stibor, I. Pre-treatment of Polyethylene Terephthalate by Grignard Reagents for High Quality Polypyrrole Coatings and for Altering of Hydrophobicity**; *Chemical Papers*** (2017), 71, 2403-2415. DOI: 10.1007/s11696-017-0235-3.

[5] **Swar, S.**; Zajícová, V.; Rysová, M.; Lovětinská-Šlamborová, I.; Voleský, L.; Stibor, I. Biocompatible Surface Modification of Poly (ethylene Terephthalate) Focused Against Pathogenic Bacteria: Promising Prospects In Biomedical Applications; ***Journal of Applied Polymer Science.*** (2017), 1-11. DOI: 10.1002/APP.44990.

Papers published in Important Conference Proceedings:

[1] **Swar**, **S.;** Máková, V.; Holubová, B.; Šubrtová, P.; Horáková J. Novel Strategies Towards Surface Modification of Polymeric Biomedical Devices Based on Nylon 6 and Polycaprolactone; *NanoMedicine International Conference 2019*, LISBON, Portugal, October 23-25, 2019.

[2] Zajícová, V.; **Swar, S.**; Müllerová, J.; Šubrtová, P.; Horáková, J.; Stibor, I. Chemical Modification of Nylon 6 Leading to The Decrease of Pathogenic Bacteria On Its Surface; *7th EuCheMS Chemistry Congress 2018*, LIVERPOOL, UK, August 26-30, 2018.

[3] **Swar, S.**; Zajícová, V.; Müllerová, J.; Šubrtová, P.; Stibor, I. New Approach Towards m-PEG Grafting onto Commercially Available Nylon 6 To Resist Bacterial Adhesion On Surface, *18th AUTEX World Textile Conference 2018*, ISTANBUL, Turkey, June 20-22, 2018, **DOI:** 10.1088/1757-899X/460/1/012043.

[4] Zajícová, V.; Šinkorová, H.; **Swar, S.**; Voleský, L.; Müllerová, J.; Stibor, I. Cytocompatible Modification of Poly(Ethylene Terephthalate) Focused on Biofilm Elimination, *11th Aachen-Dresden-Denkendorf International Textile Conference 2017*, STUTTGART, Germany, November 30-December 1, 2017, **ISSN:** 1867-6405.

[5] **Swar, S.**; Zajícová, V.; Müllerová, J.; Šubrtová, P.; Stibor, I. Unique Antibacterial Surface Modification of Nylon 6. *11th Aachen-Dresden-Denkendorf International Textile Conference 2017*, STUTTGART, Germany, November 30-December 1, 2017, **ISSN:** 1867-6405.

[6] **Swar, S.**; Zajícová, V.; Müllerová, J.; Voleský, L.; Stibor, I. Importance and Necessity of the Surface Modification of Nylon 6 Films for Future Biomedical Application, *8th International Conference Nanocon 2016*, BRNO, Czech Republic, October 19- 21, 2016, **ISBN:** 978-80-87294 -71-0.

[7] **Swar, S.**; Zajícová, V.; Voleský, L.; *Řezanka, M.;* Stibor, I. Antibacterial Surface Modification of Polymeric Materials Used in Medicine, *6th EuCheMS Chemistry Congress 2016*, SEVILLE, Spain, September 11-15, 2016.

[8] **Swar, S.**; Padil, V.; Černík, M.; Stibor, I. Preparation of Electrospun Nanofibrous Membranes Using Different Blends of Gum Arabic and Polyvinyl Alcohol, *15th AUTEX World Textile Conference 2015*, BUCHAREST, Romania, June 10-12, 2015, **ISBN:** 978-606-685-275-3.

Project Researcher

1. SGS n. 21207, 2017-2019. Chemical modifications of selected polymers used in medicine. Contractor: Technical University of Liberec, Faculty of Education, Nature Sciences and Humanities, Department of Chemistry. Czech Republic.

2. SGS n. 21164, 2016. Thin coatings prepared chemically and photochemically related to biofilm inhibition in the health care facilities. Contractor: Technical University of Liberec, Faculty of Education, Nature Sciences and Humanities, Department of Chemistry. Czech Republic.

Research Skill: -

- **Electrospinning:** Nano-spider
- **WCA & FSE measurements:** Portable computer-based instrument with special purpose software following ISO 27448:2009 test method.
- **Surface and particle characterization:** SEM-EDS, AFM, XPS, ATR-FTIR, Raman spectroscopy, Fluorescence labelling by Multi-Mode Microplate Reader, DLS, UV-VIS spectroscopy, TGA, ICP-MS, BET.
- **Antibacterial & Cytocompatibility Tests:** Fluorescence microscopy, Optical microscopy, SEM.

Short Research Statement –

Nosocomial infections (NI) have been serious problems for hospitalized patients where almost half of all the infections are device related. Various polymeric materials including polyesters and polyamides such as polyethylene terephthalate – PET and Nylon 6 are widely utilized for clinical devices. These polymers are commonly used in biomedical applications.

A novel approach to anti-corrosive wet chemical surface modification of PET by insertion of alkyl and hydroxyl groups was achieved by using different Grignard reagents and confirmed by several different characterization techniques. High antibacterial efficiency against four different types of biofilm active, pathogenic bacterial strains namely: *Staphylococcus aureus*, *Escherichia coli*, methicillin-resistant *Staphylococcus aureus* (MRSA) and *Pseudomonas aeruginosa* was established on the modified biocompatible PET surface.

Another studies were focused on an efficient reduction of amide functional groups to secondary amine on Nylon 6 film surface with borane-tetrahydrofuran (BH_3-THF) complex, followed by N-alkylation with benzyl chloride ($C_6H_5CH_2Cl$) as well as grafting on reduced Nylon 6 surface by using poly(ethylene glycol) methyl ether tosylate (H_3C-PEG-OTs). The different *N*-alkylation reactions allowed us to tune the surface properties of Nylon 6. Thus obtained modified Nylon 6 polyamide can be useful for many applications including antifouling biomaterials as the polyamide after functionalization was found to be biocompatible and resistant to pathogenic bacterial adhesion due to the presence of hydrophilic poly(ethylene glycol) methyl ether (H_3C-PEG) chains after grafting.

The research was concentrated on sol-gel synthesis of mesoporous silica nanoparticles (MSNs) that are widely studied for drug delivery. The resulting mesoporous surfaces are now conveniently prepared making use of recently published collection of carefully verified synthetic procedures. The selected MSNs with various pore diameters and morphologies were examined to evaluate the capability of L-DOPA drug loading and release that is a well-known drug for Parkinson's disease.

The possibility of electrospinning of Gum Arabic (GA), blended with polyvinyl alcohol (PVA), to make environmental friendly membranes was explored. A number of GA/PVA blend solutions, with different ratio of GA and PVA, were electrospun to produce nanofibrous membranes. These membranes may have huge environmental application for pollution control.

Research Interests: -

Organic synthesis, Sol-gel synthesis, Chemical reactions under inert condition, Surface functional group modification of polymers for biomedical application, Development of smart material to prevent

bacterial adhesion, Synthesis of Nanoparticles (metals and non-metals) and application as antibacterial agents, Drug loading and release profile in drug delivery system, nano-fibrous membranes and their applications in water pollution control for safer environment.

Computer Proficiency: -

Operating System:	Windows
Application Software:	Microsoft Office, Adobe Acrobat, OriginPro, ChemDraw, ImageJ, RStudio.

Voluntary Services: -

2009 – 2010	Volunteer, United Christian Nethersole Community Health Service, Hong Kong SAR.
2006 - 2008	Coordinator, Eco Club, Julien Day School, Kalyani (W.B.), India

References: -

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