

ANIMESH AGRAWAL

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Career Summary:

- Experienced Biomedical R&D Scientist with 10+ years of experience in Medical Device Development and Commercialization.
 - Responsible for Product life cycle management including Prototype development, Design and Development Planning, Verification and Validation, Pre-Clinical and Clinical Evaluation of medical devices and Design Transfer.
 - Expert in Biomaterial based product development, hydrogel synthesis, materials characterization, cell culture, immunohistochemistry and hands on experience in various fabrication techniques such as 3D bioprinting, electrospinning, and lyophilization.
 - Good Track record in USFDA-510(k) clearance, CE marking and Indian MDR clearance of medical devices.
 - Strong ability to collaborate and partner with health care providers, internal and external stakeholders.
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Work Experience:

Principal Engineer- Product lifecycle management (Sept 2017- Present) Axio BioSolutions Pvt Ltd, Ahmedabad

Principal Engineer- Product lifecycle management (Jan 2023- Present

Principal Scientist (May 2021 – Dec 2022)

Senior Scientist (Sept 2017-May 2021)

Achievements:

- Successfully helped in expanding Axio's flagship hemostatic product in European and US market by getting multiple USFDA-510(k) clearance and CE marking.
- Developed a chitosan based wound dressing to treat all types of exudating wounds and helped in getting CE marking. USFDA application under review.
- Successfully developed a wound care formulations in the form of wound gels, wound irrigation solution, and wound powders to treat various types of wounds.
- Responsible for product translation up to design transfer. Documentation preparation includes DHF, validation and verification reports, preclinical animal studies and marketing collaterals.
- Responsible for filing and managing IP (3 patent filed), managing vendors and third-party manufacturer.

Scientist (May 2015-Aug 2017) Sri Research for Tissue Engineering Pvt Ltd, Bangalore

Primarily responsible for R&D activities in biomaterials department such as

- Successfully developed and characterized placental tissue based wound therapies for the treatment of chronic ulcers and wounds (filed Indian Patent).
 - Developed Biodegradable scaffolds for cell delivery for various indications such as urinary stricture, buccal mucosa fibrosis, and chronic non-healing wounds.
 - Developed a biodegradable injectable hydrogel for cell delivery.
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- Developed a low-cost injectable autologous cell therapy for the treatment of SUI (BIRAC funded project- Co-PI).

Research Associate (Sept 2011-April 2015) Nanyang Technological University, Singapore
Prof. Subbu's Lab, Department of Material Science and Engineering

Projects:

- Successfully fabricated small caliber synthetic cardiovascular conduit via dip coating and 3D rapid prototyping techniques. Mechanical properties such as compliance test, burst test, and suture strength were performed also tested for cell adhesion in the lumen (HUVEC cells) and the outer layer (SMC cells) of the vascular tube (US patent granted)
- Developed an enzyme crosslinked hydrogel bio-ink for the 3D bioprinting. Living cells were encapsulated inside the bio-ink and patterned into 3D tissue like structure. Printed structures were mechanically stable, and cells were viable and proliferated inside the hydrogels
- Aligned polycaprolactone melt-spun fibrous scaffold for the orientation and phenotypic control of smooth muscle cells, fibroblast, and mesenchymal stem cells

Professional certification

MDR, ISO 13485, ISO 9001, ISO 10993-1, FDA 21CFR Part 820

Education:

- **Executive MBA** Dec 2022
SP Jain School of Global Management – Dubai, Mumbai, Singapore & Sydney
- **Master of Science** in Biomedical Engineering and Biotechnology July 2010
University of Massachusetts Dartmouth, MA, USA
- **Master of Science** in Textile Chemistry July 2006
University of Massachusetts Dartmouth, MA, USA
- **Bachelor of Technology** in Textile Technology June 2003
Rajiv Gandhi Technical Institute, Indore, India

Research Experience

- **Research Assistant** (2006-2011) University of Massachusetts Dartmouth
Department of Biomedical Engineering and Biotechnology:

Projects:

- Developed new class of fiber reinforced hydrogels for load bearing applications such as synthetic connecting tissues and artificial skin
 - Ink-Jet printing of biomaterials such as collagen and silk and living cells such as stem cells, yeast, and bacteriophage for tissue engineering application
 - A surface plasmon resonance (SPR) study to find the binding interaction between modified M13 bacteriophage and Botulinum neurotoxin type A
 - Waste proteins recycle: Amyloid nanofiber formation from fisheye homogenate
- **Research Assistant** (2003-2006) University of Massachusetts Dartmouth-
Department of Materials and Textiles:

Worked on National Textile Center funded project “**Quantum Tunneling Nanocomposite Textile Soft Structure Sensors and Actuators.**” Work involved Ink-Jet printing of conductive polymers (PEDOT/PSS) onto textile fabrics to form flexible piezoresistive strain sensors, and Ink-Jet printing of electroless metals (silver) to form highly conducting leads which can serve as connectors

Technology Disclosure

- Method for preparing a patterned substrate and use thereof in implants for tissue engineering
Inventor: S. Venkatraman, S.A. Irvine, A. Agrawal, A. Jia, and C.C. kai
Granted in **US** and **Singapore**
 - Composite dressings, manufacturing methods and applications thereof
Inventor: Leo Mavely, Kiran Sonaje, Animesh Agrawal
Granted in **India, Australia, Canada** and **EU**. Awaiting **US**
 - Superabsorbent chitosan wound dressings, manufacturing methods and applications thereof
Inventor: Leo Mavely, Kiran Sonaje, Animesh Agrawal, Venkat Devadasu, Anup Kumar, Pavan Kumar
Filed in **India** and **PCT**
 - Wound healing composition, process for preparation and applications thereof
Inventor: Leo Mavely, Animesh Agrawal, Pavan Kumar, Anup Kumar, Venkat Devadasu
Application filed in India
 - Placental tissue derived cross-linked porous dressing and methods thereof
Inventor: Kumar Chokalingam, Animesh Agrawal, K. N. Sridhar
Application filed in India
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List of Selected Publications (800 citations)

- An architecturally rational hemostat for rapid stopping of massive bleeding on anticoagulation therapy, VK Lee et al, Proceedings of the National Academy of Sciences, Vol 121, Issue 5, 2024
- 3D patterned substrates for bioartificial blood vessels–The effect of hydrogels on aligned cells on a biomaterial surface, X Zhao, SA Irvine, **A Agrawal**, Y Cao, PQ Lim, SY Tan, SS Venkatraman, Acta biomaterialia 26, 159-168, 2015
- Smooth Muscle Cell Alignment and Phenotype Control by Melt Spun Polycaprolactone Fibers for Seeding of Tissue Engineered Blood Vessels, **Animesh Agrawal**, Bae Hoon Lee, Scott A Irvine, Jia An, Ramya Bhuthalingam, Vaishali Singh, Kok Yao Low, Chee Kai Chua, Subbu S Venkatraman, International journal of biomaterials 2015
- Printing cell-laden gelatin constructs by free-form fabrication and enzymatic protein crosslinking, Scott A Irvine, **Animesh Agrawal**, Bae Hoon Lee, Hui Yee Chua, Kok Yao Low, Boon Chong Lau, Marcelle Machluf, Subbu Venkatraman, Biomedical microdevices 17 (1), 1-8
- Strong fiber-reinforced hydrogel, **A Agrawal**, N Rahbar, PD Calvert, Acta Biomaterialia 9 (2), 5313-5318, 2013
- Strong Fiber Reinforced Hydrogel Composite, **A Agrawal**, S Youssefian, N Rahbar, P Calvert, AIP Conference Proceedings, 2012

- Tough, Strong Hydrogels with Elastomeric Fiber Reinforcement, P Calvert, **A Agrawal**, N Rahbar, V Chalivendra, MRS Proceedings 1420, mrsf11-1420-oo05-05, 2012
- Strong fiber reinforced hydrogels for biomedical applications, **A Agrawal**, N Wanasekara, V Chalivendra, N Rahbar, P Calvert, Bioengineering Conference (NEBEC), 2011 IEEE 37th Annual Northeast, 1-2, 2011
- Effect of Liquid Environment on Dynamic Constitutive Response of Reinforced Gels, S Padamati, VB Chalivendra, **A Agrawal**, PD Calvert, Dynamic Behavior of Materials, Volume 1, 43-50, 2011
- Inkjet and extrusion printing of conducting poly (3, 4-ethylenedioxythiophene) tracks on and embedded in biopolymer materials, CA Mire, **A Agrawal**, GG Wallace, P Calvert, Journal of Materials Chemistry 21 (8), 2671-2678, 2011
- Conducting polymer and conducting composite strain sensors on textiles, P Calvert, D Duggal, P Patra, **A Agrawal**, A Sawhney, Molecular Crystals and Liquid Crystals 484 (1), 291/[657]-302/[668], 2008
- Piezoresistive sensors for smart textiles, P Calvert, P Patra, TC Lo, CH Chen, A Sawhney, **A Agrawal**, The 14th International Symposium on: Smart Structures and Materials & Nondestructive Evaluation and Health Monitoring, 007
- Printed conducting polymer strain sensors for textiles, P Calvert, P Patra, A Sawhney, **A Agrawal**, D Duggal, NIP & Digital Fabrication Conference 2007 (2), 831-835, 2007
- Piezoresistive sensors on textiles by inkjet printing and electroless plating, A Sawhney, **A Agrawal**, P Patra, P Calvert, MRS Proceedings 920, 0920-S05-04, 2006

Honors & Activities

- Key investigator in BIRAC funded project entitled “Development of an injectable targeted cell therapy for the treatment of Stress Urinary Incontinence”
- Bell Research Fellowship from Marine Biology Lab, Woods Hole MA, USA (summer 2009)
- Mentored more than 10 undergraduate students for their senior projects (2003-2014)

References

Available upon request