Research Interests:

The central theme of the Joy Lab is in developing advanced polymeric materials for applications in medicine and engineering. The Joy Lab designs and develops polymers in three research areas i) multivalent biomaterials to modulate physical and biological responses ii) photoresponsive materials that degrade, crosslink or change their mechanical or adhesive properties iii) self-assembling polymers that exhibit emergent material properties and will be useful for applications such as therapeutic delivery. The above polymers are polyesters, polycarbonates, polyurethanes or polyacrylates.

Application Areas:

- Drug / protein delivery
- Wound adhesive and wound healing materials
- Bacterial and biofilm control
- Micro-patterned polymer surfaces and devices
- Controlled release of active ingredients
- Modulating cell proliferation and differentiation

Representative Publications:

- C. Peng, A. Joy; Baylis-Hillman reaction as a versatile platform for the synthesis of diverse functionalized polymers by chain and step polymerization; Macromolecules, 2014, 47, 1258.
- S. Gokhale, Y. Xu, A. Joy; A library of multifunctional polyesters with ‘peptide-like’ pendant functional groups; Biomacromolecules, 2013, 14, 2489.