



**Department of
Polymer Science**

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Biography:

- Postdoctoral Fellow: Rutgers University (New Jersey Center for Biomaterials) / University of Pennsylvania (2006-2010)
- Postdoctoral Associate: Georgia Institute of Technology (2000-2005)
- Ph.D. Organic Chemistry, Tulane University (1995-2000)

Awards/Accomplishments:

- FDA Scholar in Residence (2016-2018)
- NSF CAREER award (2014-2019)
- 3M Non-tenured faculty award (2011-2013)
- NIH Postdoctoral fellow (2006- 2008)

Research Interests:

The Joy Lab develops polymeric materials that address several challenges in tissue engineering such as combating bacterial biofilms, designing synthetic skin grafts, addressing non-healing wounds, and challenges of protein delivery. The Joy Lab develops polymers in these research areas i) 'peptide-like' biomaterials to provide the physical and biological cues necessary for wound healing ii) stimuli responsive materials (thermal, photochemical, mechanical, non-covalent interactions) ii) low modulus polyesters that enable fabrication of 3D printed skin graft matrices iv) therapeutic encapsulated fiber mats that inhibit bacterial colonization and improve wound healing outcomes v) protein encapsulation and controlled release

Application Areas:

- *Skin grafts and wound healing materials*
- *Bacterial and biofilm control*
- *Drug / protein encapsulation, delivery, inhibition*
- *Stimuli Responsive Materials*

Representative Publications:

- ❖ C. Peng, A. Vishwakarma, Z. Li, T. Miyoshi, H.A. Barton, A. Joy; Modification of a conventional polyurethane composition provides significant anti-biofilm activity against Escherichia coli; Polymer Chemistry, 2018, 9, 3195
- ❖ Y. Xu, Q. Liu, A. Narayanan, D. Jain, A. Dhinojwala, A. Joy; Mussel-inspired polyesters with aliphatic pendant groups demonstrate the importance of hydrophobicity in underwater adhesion; Adv. Mat. Interfaces, 2017, 4, 1700506
- ❖ J.P. Swanson, M.A. Cruz, L.R. Monteleone, M.R. Martinez, P.J. Costanzo, A. Joy; The effect of pendant group structure on thermoresponsive properties of N-substituted polyesters; Polymer Chemistry, 2017, 8, 7195
- ❖ S. Mankoci, R.L. Kaiser, N. Sahai, H.A. Barton, A. Joy; Bactericidal peptidomimetic polyurethanes with remarkable selectivity against Escherichia coli; ACS Biomater Sci. Eng., 2017, 3, 2588
- ❖ C. Peng, A. Joy; Alternating and random-sequence polyesters with distinct physical properties; Polymer Chemistry, 2017, 8, 2397
- ❖ E.A. Chamsaz, S. Mankoci, H.A. Barton, A. Joy; Non-toxic coumarin polyester coatings prevent pseudomonas aeruginosa biofilm formation; ACS Appl. Mater. Interfaces, 2017, 9, 6704
- ❖ S. Gokhale, Y. Xu, A. Joy; A library of multifunctional polyesters with 'peptide-like' pendant functional groups; Biomacromolecules, 2013, 14, 2489