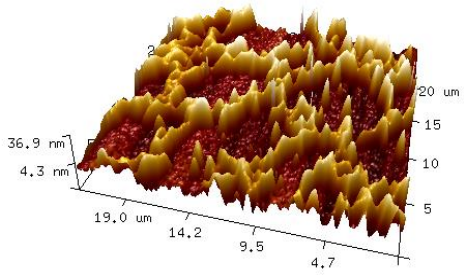
Ipsita Banerjee, Ph.D.

Professor of Chemistry

Fordham University

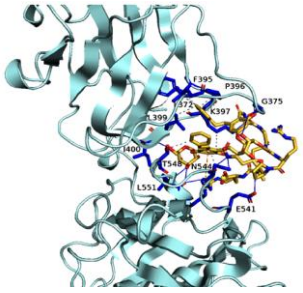
Research Area I: Development of New Biomaterials for Tissue Engineering (TE)

The extent of the body's capacity to regenerate and repair tissues largely varies, and significantly reduces with age, illness and extent of injury. The central feature of TE involves the development of new biomaterials that can efficiently mimic the extracellular matrix components of cells, promote growth of new tissue, replace damaged tissue and stimulate the regenerative process. Ideally, the biomaterial should also be biodegradable and degrade at a comparable rate to the growth of new tissue.



We have thus far developed biomimetic scaffolds for potential applications in cartilage, bone, skin and neural TE. Over the past couple of years, we have been working on the utilization of three-dimensional (3D) printing technologies for preparing our scaffolds. This technology further allows us to produce scaffolds with a high degree of complexity and precision, most importantly it allows us to fine tune detailed dimensions at the micron level. Shown to the left are scaffolds developed in our lab for cartilage tissue engineering.

Research Area II: Biocomputational and Experimental Approaches for Targeting Tumor Cells



We develop novel peptide based-conjugates for targeting specific receptors of tumor cells. The optimal conjugates are synthesized and their nanoscale properties and ability to target tumor cells are validated through laboratory synthesis and cellular interaction studies. The results obtained serve as a basis for creating new avenues toward the development of antitumor drug delivery nanoscale materials. The mechanism of targeting is also investigated. On the left, is shown a newly developed peptide conjugate docked to neuropilin receptor 1 (*Mol. Divers.***2022**. https://doi.org/10.1007/s11030-021-10354-9).

PUBLICATIONS

(*Student Co-Authors Underlined*) (*indicates corresponding author)

- L. R. Hart, C. G. Lebedenko, S. M. Mitchell, R. E. Daso, I. A. Banerjee* In Silico Studies of Tumor Targeted Peptide- Conjugated Natural Products for Targeting Over-Expressed Receptors in Breast Cancer Cells using Molecular Docking, Molecular Dynamics and MMGBSA Calculations. *Appl. Sci*. *12* (1), 515; 2022. https://doi.org/10.3390/app12010515
- D. J. Lambo, C. G. Lebedenko, P. A. McCallum, I. A. Banerjee* Molecular Dynamics, MMGBSA and Docking Studies of Natural Products Conjugated to Tumor Targeted-Peptide for Targeting BRAF V600E and MERTK Receptors. *Mol. Divers.***2022**, https://doi.org/10.1007/s11030-022-10430-8
- M. I. Rico, C. G. Lebedenko, S. M. Mitchell, I. A. Banerjee*, Molecular Dynamics Simulations, Docking and MMGBSA studies of Newly Designed Peptide Conjugated Glucosyloxy Stilbene Derivatives with Tumor Cell Receptors *Mol. Divers.*2022. https://doi.org/10.1007/s11030-021-10354-9

- S. M. Mitchell, H. T. Pajovich, S. M. Broas, M. M. Hugo, I. A. Banerjee* Molecular Dynamics Simulations and *in vitro* Studies of Hybrid Decellularized Leaf-Peptide-Polypyrrole Composites for Potential Tissue Engineering Applications. *J. Biomol. Struc. Dynamics.* 1-16, 2022 doi: 10.1080/07391102.2021.2023643.
- R. E. Daso, S. M. Mitchell, C. G. Lebedenko, R. M. Heise, I. A. Banerjee* "Exploring the Interactions of Ionic Liquids with Bioorganic Amphiphiles using computational approaches" *ACS Omega*, 6, 48, 32460–32474, 2021. https://doi.org/10.1021/acsomega.1c03864
- C. G. Lebedenko, I. A. Banerjee* "Investigation of Self-Assembly of Symmetric and Asymmetric Peptide Bolaamphiphiles by COSMO-RS and Atomistic Simulations and their Interactions with POPC Bilayers". *Macromol. Theory Simul*. 2100066, 2021 https://doi.org/10.1002/mats.202100066
- M. M. Bashant, S. M. Mitchell, L. R. Hart, C. G. Lebedenko, I. A. Banerjee* "In Silico Studies of Interactions of Peptide Conjugated Cholesterol Metabolites and Betulinic acid with EGFR, LDR and N-terminal Fragment of CCKA Receptors". *J. Mol. Modeling* 28 (1): 16, 2021 https://doi.org/10.1007/s00894-021-05007-5
- E. J. Boder, I. A. Banerjee* Alzheimer's Disease: Current Perspectives and Advances in Physiological Modeling, *Bioengineering*. 8 (12), 211, 2021. doi: 10.3390/bioengineering8120211.
- C. G. Lebedenko, I. A. Banerjee* "Enhancing kidney vasculature in tissue engineering- current trends and approaches: A review". *Biomimetics*, 6, 40, 2021. doi: 10.3390/biomimetics6020040
- L. R. Hart, S. M. Mitchell, P. A. McCallum, R. E. Daso, I. A. Banerjee*, "Self-assembled peptide conjugated rosemary extract derivatives as drug delivery vehicles for targeting tumor cells". *Soft Materials.* 2021. https://doi.org/10.1080/1539445X.2021.1926282.
- S. M. Mitchell, R. M. Heise, D. J. Lambo, R. E. Daso, I. A. Banerjee* "Design, molecular docking and computational analysis of natural polyphenol-peptide conjugates for targeting EphB4 receptors". *J. Biomol. Struc. Dynamics.* (*Under Revision*) 2021.
- M. S. Whalen, R. E. Daso, M. F. Thomas, I. A. Banerjee* "Interactions of betainium and imidazolium based ionic liquids with peptide amphiphiles and their implications in the formation of nanohybrid composite gels". *J. Sol Gel Sci. Technol*. 97, 488–504, 2021. doi. 10.1007/s10971-020-05434-5
- S. M. Broas, I. A. Banerjee*, Design of Peptide-PEG-Thiazole bound Polypyrrole for Enhanced Neuronal Cell Interactions. *Soft Materials.* 19: 4, 428-443 2021. https://doi.org/10.1080/1539445X.2020.1853162
- N. P. Wijedasa, R. E. Daso, S. M. Broas, I. A. Banerjee*, Varying Fish Scale Derived Hydroxyapatite bound Hybrid Peptide Nanofiber Scaffolds for Potential Applications in Periodontal Tissue Regeneration. *Mater. Sci. Eng. C*. 109, 110540, 2020.
  R. E. Daso, I. A. Banerjee* Self-Assembled Peptide-Based Biocomposites for Near-Infrared Light Triggered Drug Release to Tumor Cells". *Biotechnol. J*. 15, e2000128, doi.org/10.1002/biot.202000128. 2020
- R. E. Daso, L. J. Osborn, M. F. Thomas, I. A. Banerjee* Development of nanoscale hybrids from ionic liquid-peptide amphiphile assemblies as new functional materials. *ACS Omega*, 5, 14543-14554, 2020.
- I. A. Banerjee*, K. R. Fath, S. H. Frayne, M. M. Hugo, B. Cohen "Development of Self-Assembled Phytosterol Based Nanoassemblies as Vehicles for Enhanced Uptake of Doxorubicin to HeLa Cells" *Mater. Sci. Eng. C.*, 97, 451-460, 2019.
- M. M. Hugo, I. A. Banerjee* "Development of New Amphiphilic Bio-organic Assemblies for Potential Applications in Iron Binding and Targeting Tumor Cells" *Soft Materials* 17, 57-76, 2019.
- S. K. Hurley, N. M. Cutrone, K. R. Fath, H. T. Pajovich, A. M. Smith, J. Garcia, J. R. Dorilio, I. A. Banerjee*, "Self-Assembled Phenylisoxazole-Peptide Hybrid Assemblies and their Interactions with Breast and Ovarian Tumor Cells". *Int. J. Polym. Mater. Polym. Biomater*. 68, 978-992, 2019.
- G. A. Knoll, H. T. Pajovich, S. M. Romanelli, I. A. Banerjee* "Development of Self-Assembled Polygalacturonic Acid-Peptide Composites and their Interactions with Mesenchymal Stem Cells for Potential Applications in Tendon Tissue Engineering" *Int. J. Nano Biomaterials*. 8, 64-80, 2019.

- K. E. Oberhelman, K. R. Fath, I. Kandinov, I. A. Banerjee* "Development of pH Tunable Self-Assembled Bipyridyl-Serinyl Nanoassemblies and their Interactions with Mammalian Cells" *Adv. Sci. Eng. Med.* 10, 1183-1190, 2018.
- A. M. Smith, H. T. Pajovich, I. A. Banerjee*, "Development of Self-Assembled Nanoribbon bound Peptide-Polyaniline Composite Scaffolds and their Interactions with Neural Cortical Cells" *Bioengineering*, 5, 6, 2018.
- H.T. Pajovich, I. A. Banerjee*, "Biomineralization of Fucoidan-Peptide Blends and their Potential Applications in Bone Tissue Regeneration" (Invited Article) *J. Funct. Biomaterials, (published as Feature Article)* 8, 41; doi:10.3390/jfb8030041 2017.
- H. T. Pajovich, A. M. Brown, A. M. Smith, S. K. Hurley, J. R. Dorilio, N. M. Cutrone, I. A. Banerjee*, "Development of Phytonutrient-Conjugated Multilayered Peptide based Scaffolds for Soft Tissue Engineering – An *in vitro* study". *J. Biomimetics Biomater. Biomedical Eng.* 34, 37-56, 2017.
- S. A. Lundell, A. M. Brown, A. M. Santora, S. M. Romanelli, I. A. Banerjee* "Development of Self-Assembled of Gold Nanoparticle Bound Coumarin-Hydroxymercaptopurine Nanoconjugates as Sensors for DNA Binding" *Nanohybrids Composites*, 18, 20-33, 2017.
- N. M. Cutrone, J. M. Dorilio, S. K. Hurley, H. T. Pajovich, A. M. Smith, I. A. Banerjee* "Probing the Formation of Supramolecular Assemblies of Amphiphilic N-Methyl Glycine and N, N Dimethyl β-Alanine Derivatives". *New J. Chem.*, 41, 7506-7516, 2017.
- A. M. Brown, Y. S. Miranda-Alarćon, A. M. Santora, G. A. Knoll, I. A. Banerjee* "Fetoprotein derived peptide coated Nanostructured Amphiphilic Surfaces for Targeting Mouse Breast Cancer Cells " *Int. J. Nanosci*, 1650023 2016.
- A. M. Brown, Y. S. Miranda-Alarćon, G. A. Knoll, S. M. Romanelli, A. M. Santora, I. A. Banerjee*, "Development of Self-Assembled Biomimetic Boc-protected peptide-polymer based nanovehicles for targeted delivery of tumor cells". *J. Biomimetics, Biomater. Biomedical Eng.*, 29, 33-53, 2016.
- Y. S. Miranda-Alarćon, A. M. Brown, A. M. Santora, I. A. Banerjee*, "Self-Assembled Bio-organic Nanocomposites and their Potential Applications in Engineering Three Dimensional Skin matrices -An *in vitro* Study". *Nano Life*, 6, No. 01: 1650002, 2016.
- G. A. Knoll, S. M. Romanelli, A. M. Brown, R. M. Sortino, I. A. Banerjee* "Multilayered Short Peptide-Alginate Blends as New Materials for Potential Applications in Cartilage Tissue Regeneration" *J. Nanosci. Nanotechnol*. 16, 2464-2473, 2016.
- S. M. Romanelli, G. A. Knoll, A. M. Santora, A. M. Brown, I. A. Banerjee*, "Comparison of Engineered Peptide-Glycosaminoglycan Microfibrous Hybrid Scaffolds for Potential Applications in Cartilage Tissue Regeneration". (*Invited Article*) *Fibers*, 3, 265-295, 2015.
- S. M. Romanelli, K. R. Fath, R. Davidov, A. Phekoo, I. A. Banerjee* "Supramolecular Boc-Spermidine-Fmoc-Valine based Nanogels for Drug Delivery of Mitoxantrone into HeLa Cells". *J. Drug Del. Sci. Technol*. 29, 107-116, 2015.
- S. M. Romanelli, J. W. Hartnett, I. A. Banerjee* "Effects of Amide Side Chains on Nanoassembly Formation of Fmoc-Valine Conjugates" *Powder Technol.* 271, 76-87, 2015.
- R. M. Sortino, S. M. Romanelli, G. A. Knoll, I. A. Banerjee* "Development of Peptide Conjugated Chlorogenic Acid Nanossemblies for Targeting Tumorigenic Cells" *Soft Materials*, 13, 150-159, 2015.
- S. M. Romanelli, K. R. Fath, A. Phekoo, I. A. Banerjee* "Layer-by-Layer Assembly of Peptide based Biorganic-Inorganic Hybrid Scaffolds and their Interactions with MC3T3-E1 cells" *Mater. Sci. Eng. C*. 51, 316-328, 2015.
- J. W. Hartnett, J. R. Hannah, K. R. Fath, V. Flaris, I. A. Banerjee* "Development of Peptide-Pyrazole Nanocomposites as Scaffolds for Bone Tissue Regeneration" *J. Chem. Biol. Interfaces*. 2, 24-32, 2014.
- J. W. Hartnett, S. M. Romanelli, I. A. Banerjee* "Fabrication of Pyrazole Based Biomimetic Scaffolds for Potential Cartilage Tissue Regeneration Applications" *J. Biomater. Tissue Eng*. 4, 834-842, 2014.

- J. W. Hartnett, J. R. Hannah, K. R. Fath, V. Flaris, I. A. Banerjee*, "Fabrication of CdS bound Pyrazole Carboxamide Conjuagated Nanoassemblies and their Applications" *Mater. Express* 4, 441-452, 2014.
- J. W. Hartnett, K. R. Fath, I. Kandinov, I. A. Banerjee* "Formation of Peptide-Pyrazole Nanoassemblies and their Biological Applications" *J. Chem. Biol. Interfaces*. 1, 127-137, 2013.
- A. Banerjee, K. T. Johnson, I. A. Banerjee, D. K. Banerjee* "Nanoformulation Enhances Anti-Angiogenic Efficacy of Tunicamycin" *Trans. Cancer Res*. 2, 240-255, 2013.
- P. U. Chukwuneke, I. A. Banerjee*, "Probing the Formation of Ferulic Acid Derived Nanoconjugates as Building Blocks for Antioxidant Applications" *TFURJ*, 3, 31-38, 2013.
- S. N. Barnaby, N. H. Sarker, I. A. Banerjee* "Ellagic acid directed growth of Au-Pt Bimetallic Nanoparticles and their Catalytic Applications" *Int. J. Nanoscience*, 12, 1250037/1-1250037/10 2013.
- N. Nakatsuka, S. N. Barnaby, A. Tsiola, K. R. Fath, B. A. Williams, I. A. Banerjee* "Self-Assembling Peptide Assemblies bound to ZnS Nanoparticles and their Interactions with Mammalian Cells" *Coll. Surf B: Biointerfaces* 103, 405-415, 2013.
- N. H. Sarker, S. N. Barnaby, A. P. Dowdell, N. Nakatsuka, I. A. Banerjee* "Biomimetic Formation of Pd and Au-Pd Nanocomposites and Their Catalytic Applications" *Soft Materials.* 11, 403-413, 2013.
- S. N. Barnaby, N. Nakatsuka, K. R. Fath, S. H. Frayne, I. A. Banerjee* "Formation of Hyaluronic Acid-Ellagic Acid Microfiber Hybrid Hydrogels and their Applications" *Coll. Polym. Sci.* 291, 515-525, 2013.
- S. H. Frayne, S. N. Barnaby, N. Nakatsuka, I. A. Banerjee* "Growth and Properties of CdSe Nanoparticles on Ellagic Acid Biotemplates for Photodegradation Applications" *Mater. Express* 2, 335-343, 2012.
- S. N. Barnaby, N. H. Sarker, A. Tsiola, I. A. Banerjee* "Biomimetic formation of chicoric acid directed luminescent silver nanodendrites" Invited contribution to the special issue of *Green Nanotechnology*, in the journal *Nanotechnology*, 23, 294011, 2012.
- S. N. Barnaby, K. R. Fath, A. Tsiola, I. A. Banerjee* "Fabrication of Ellagic Acid Incorporated Self-Assembled Peptide Microtubes and their Applications" *Coll. Surf B: Biointerfaces*, 95, 154-161, 2012.
- S. N. Barnaby, K. R. Fath, N. Nakatsuka, N. H. Sarker, I. A. Banerjee* "Formation of Hydroxyapatite-Ellagic acid composites by LBL assembly for Cellular Attachment to Osteoblasts" *J. Biomim. Biomater. Tiss. Eng.* 13, 1-17, 2012.
- N. H. Sarker, S. N. Barnaby, K. R. Fath, S. H. Frayne, N. Nakatsuka, I. A. Banerjee* "Biomimetic Growth of ZnO-Gallic Acid Nanohybrid Assemblies and their Applications" *J. Nanoparticle Res*. 14, 4, 1-12, 2012.
- N. H. Sarker, S. N. Barnaby, I. A. Banerjee* "Fabrication of CdS Nanoparticle Coated Jasmonate Conjugates and their interactions with Mammalian Cells" *TFURJ*, 2, 50-51, 2012.
- N. H. Sarker, I. A. Banerjee*, "Design of Self-Assembled Peptide Assemblies and their interactions with Lipid Membranes" *Biophys. J*. 102 (3) 78a, 2012.
- E. M. Smoak, M. P. Dabakis, M. M. Henricus, R. Tamayev, I. A. Banerjee* "Interactions of Amyloid Beta Peptide Aβ(1-42) with Self-Assembled Peptide Nanospheres". *J. Peptide Sci*. 17, 14-23, 2011.
- S. N. Barnaby, S. M. Yu, A. Tsiola, K. R. Fath, I. A. Banerjee* "Spontaneous Formation of Ellagic Acid Assemblies for Hela Cancer Cell Detection" *J. Nanosci. Nanotech.* 11, 7579-7586, 2011.
- E. M. Smoak, K. R. Fath, S. N. Barnaby, V. C. Grant, I. A. Banerjee* "Self-Assembly of Chicoric Acid for Templating Gold Nanoparticles and their Biocompatibility Studies" *Supramolecular Chem*. 23, 678-688, 2011.
- S. N. Barnaby, S. M. Yu, K. R. Fath, A. Tsiola, O. Khalpari, I. A. Banerjee* "Ellagic Acid Promoted Formation of Shape Controlled Silver Nanochains" *Nanotechnology*, 225605, 2011.
- S. N. Barnaby, S. H. Frayne, K. R. Fath, I. A. Banerjee* "Growth of Se nanoparticles on Kinetin Assemblies and their Biocompatibility studies" *Soft Materials* 9, 313-334, 2011.
- S. N. Barnaby, S. H. Frayne, E. M. Smoak, I. A. Banerjee* "Biomimetic Fabrication of Gold Nanoparticles on Indole-3-acetic acid based Nanofibers" *Mater. Sci. Eng. C*. 31, (3), 620-628, 2011.

- N. Nakastuka, S. N. Barnaby, K. R. Fath, I. A. Banerjee* "Fabrication of Collagen-Elastin Bound Peptide Nanotubes as Scaffolds for Mammalian Cell Attachment" *J. Biomater. Sci. Polym Edn*. 23 (14), 1843-1862, 2012.
- S. N. Barnaby, N. H. Sarker, A. P. Dowdell, I. A. Banerjee* "The Spontaneous Formation of Selenium Nanoparticles on Gallic Acid Assemblies and their Antioxidant Properties" *TFURJ*, 1, 41-46, 2011.
- E. M. Smoak, M. M. Henricus, I. A. Banerjee* "In situ Photopolymerization of PEGDA-Protein Hydrogels on Nanotube surfaces" *J. Appl. Polym. Sci.* 118, 2562-2571, 2010.
- C. C. Fowles, E. M. Smoak, I. A. Banerjee* "Self-Assembled Zeatin Nanoribbon Mediated Preparation of Gold Nanoparticles" *Coll. Surf. B: Biointerfaces*, 78, 250-258, 2010.
- K. T. Johnson, T. E. Gribb, E. M. Smoak, I. A. Banerjee* "Self-assembled nanofibers from Leucine Derived Amphiphiles as Nanoreactors for Growth of ZnO Nanoparticles*" Chem. Commun*., 46, 1757 –1759, 2010.
- E. M. Smoak, A. D. Carlo, C. C. Fowles, I. A. Banerjee* "Self-Assembly of Gibberellic Amide Assemblies and their Applications in the Growth and Fabrication of Ordered Gold Nanoparticles" *Nanotechnology* 21 025603, 2010.
- C. T. Schwall, I. A. Banerjee* "Micro and Nanoscale Hydrogel Systems for Drug Delivery and Tissue Engineering". *Materials* 2 (2), 577-612, 2009 *(Invited Review)*.
- M. M. Henricus, I. A. Banerjee* "Facile Synthesis of Vesicle Templated Hollow Germania Nanospheres" *Int. J. Nanotechnol*. 6 (120), 1096-1192, 2009.
- K. T. Johnson, K. R. Fath, M. M. Henricus, I. A. Banerjee* "Self-Assembly and Growth of Smart Cell-Adhesive Mucin Bound Microtubes" *Soft Materials* 7, 21-36, 2009.
- M. M. Henricus, K. R. Fath, M. Z. Menzenski, I. A. Banerjee* "Morphology Controlled Growth of Chitosan-Coated Microtubes and a study of their Biocompatibility and Antibacterial Activity" *Macromol. Biosci.* 9, 317-325, 2009.
- C. P. Avanzato, J. M. Follieri, K. R. Fath, I. A. Banerjee* "Biomimetic Synthesis and Antibacterial Characteristics of Magnesium Oxide-Germanium Dioxide Nanocomposite Powders" *J. Composite Mater.*43, 897-910, 2009.
- M. M. Henricus, K. T. Johnson, I. A. Banerjee* "Investigation of Insulin Loaded Self-Assembled Microtubules for Drug Release" *Bioconjug. Chem.* 19, 2394-2400, 2008.
- R. I. MacCuspie, I. A. Banerjee, S. Gummalla, H. S. Mostowski, P. R. Krause, H. Matsui*, "Virus Assay Using Antibody-Functionalized Peptide Nanotubes", *Soft Matter*, 4, 833-839, 2008.
- K. I. Fabijanic, M. R. Regan, I. A. Banerjee* "Amino Acid Catalyzed Biomimetic Preparation of Tin oxide-Germania Nanocomposites and their Characterization". *J. Nanosci. Nanotech.* 7, 2674-2682, 2007.
- R. L. Spear, R. Tamayev, K. R. Fath, I. A. Banerjee* "Templated growth of calcium phosphate on tyrosine derived microtubules and their Biocompatibility" *Coll. Surf. B: Biointerfaces*, 60, 158-166, 2007.
- M. R. Regan, I. A. Banerjee* "Immobilization of invertase in Germania matrix and a study of its enzymatic activity*". J. Sol-Gel Sci. Tech.* 43, 27-33, 2007.
- M. Z. Menzenski, I. A. Banerjee* "Self-assembly of supramolecular nanostructures from phenylalanine derived Bolaamphiphiles". *New J. Chem*. 31, 1674-1680, 2007.
- I. A. Banerjee, G. Muniz, S. Y. Lee, H. Matsui* "Mineralization of Semiconductor Nanocrystals on peptide-coated Bionanotubes and their pH-dependent morphology changes". *J. Nanosci. Nanotech.* 7, 2287-2292, 2007.
- O. Taratula, A. Chen, J. Zhang, J. Chaudhry, L. Nagahara, I. Banerjee*, H. He*, "Highly Aligned Ribbon-Shaped Pd Nanoparticle Assemblies by Spontaneous Organization" *J. Phys. Chem. C.* 111, 7666-7670, 2007.
- M. R. Regan, I. A. Banerjee*. "In situ Growth of Co-Pt Nanoparticles in Porous Germania Nanospheres". *Mater. Lett*. 61(1), 71-75, 2007.

- M. R. Regan, I. A. Banerjee*. "Preparation of Au–Pd bimetallic Nanoparticles in Porous Germania Nanospheres: A study of their morphology and catalytic activity". *Scrip. Mater.* 54(5), 909-914, 2006.
- I. A. Banerjee, M. R. Regan* "Preparation of Gold Nanoparticle Templated Germania Nanoshells". *Mater. Lett.* 60 (7), 915-918, 2006.
- I. A. Banerjee, L. Yu and H. Matsui* "Room-Temperature Wurtzite ZnS Nanocrystal Growth on Zn Finger-like Peptide Nanotubes by Controlling Their Unfolding Peptide Structures". *J. Am. Chem. Soc.*, 127, 16002-16003, 2005.
- L. Yu, I. A. Banerjee, X. Gao, N. Nuraje and H. Matsui*. "Fabrication and Application of Enzyme Incorporated Peptide Nanotubes". *Bioconjug. Chem.* 16, 1484-1487, 2005.
- Z. Zhao, I. A. Banerjee, H. Matsui* "Simultaneous Targeted Immobilization of Anti-Human IgG Coated Nanotubes and Anti-Mouse IgG-coated Nanotubes on the Complementary Antigen-Patterned Surfaces Via Biological Molecular Recognition". *J. Am. Chem. Soc.* 127, 8930-8931, 2005.
- I. A. Banerjee, L. Yu, M. Shima, T. Yoshino, H. Takeyama, T. Matsunaga and H. Matsui* "Magnetic Nanotube Fabrication by Using Bacterial Magnetic Nanocrystals" *Adv. Mater*. 17, 1128-1131, 2005.
- I. A. Banerjee, L.Yu, R. MacCuspie, H. Matsui* "Assembly of Peptide Nanotubes on Patterned Arrays using Nanolithography". *Nano Lett.* 4 (12), 2437-2440, 2004.
- Y. F. Chen, I. A. Banerjee, L. Yu, R. Djalali and H. Matsui* "Fabrication of Ferrocene Nanotubes and their Electric Field-Controlled Molecular Recognitions" *Langmuir,* 20(20), 8409-8413, 2004.
- N. Nuraje, I. A. Banerjee, R. MacCuspie, L.Yu, H. Matsui* "Biological Bottom-Up Assembly of Antibody Nanotubes on Patterned Antigen Arrays". *J. Am. Chem. Soc*. 126 (26), 8088-8089, 2004.
- L. Yu, I. A. Banerjee, M. Shima, K. Rajan, H. Matsui* "Size-Controlled Ni Nanocrystal Growth on Peptide Nanotubes and Their Magnetic Properties", *Adv. Mater*. 16, 709-712, 2004.
- L. Yu, I. A. Banerjee, H. Matsui* "Incorporation of Sequenced Peptides on Nanotubes for Pt Coating: Smart Control of Nucleation and Morphology via Activation of Metal Binding Sites on Amino Acids", *J. Mater. Chem.*, 14, 739-743, 2004.
- I. A. Banerjee, L.Yu, and H. Matsui* "Cu Nanocrystal Growth on Peptide Nanotubes via Biomineralization: Size Control of Cu Nanocrystals by Tuning Peptide Conformation". *Proc. Natl. Acad. Sci., USA*. 100 (25), 14678-14682, 2003.
- L. Yu, I. A. Banerjee, H. Matsui* "Direct Growth of Shape-Controlled Nanocrystals on Nanotubes via Biological Recognition". *J. Am. Chem. Soc*. 125, 14837-14840, 2003.
- I. A. Banerjee, L. Yu, and H. Matsui* "Application of Host-Guest Chemistry in Nanotube based Device Fabrication-Photochemically Controlled Azobenzene coated Nanotubes-Attachment and Detachment via Molecular Recognition". *J. Am. Chem. Soc*. 125(32), 9542-9543, 2003.
- I. A. Banerjee, L. Yu, and H. Matsui* "Location-Specific Biological Functionalization on Nanotubes: Attachment of Proteins at the Ends of Nanotubes Using Au Nanocrystal Masks" *Nano Lett.* 3(3), 283-287, 2003.
- I. A. Banerjee*, G. A. Epling, N. K. Modukuru. "Protein-Enhanced Photoreactivity – "Dye Promoted Polymerization of Acrylates". *Eur. Polym. J.* 38(12), 2383-2391, 2002.
- J. D. Pitts, A. R. Howell, R. Taboada, I. Banerjee, J. Wang, S. L. Goodman and P. J. Campagnola* "New Photoactivators for Multi-Photon Excited 3 Dimensional Sub-Micron Cross-linking of Proteins". *Photochem. Photobiol. B,* 76(2), 135-144, 2002.

Refereed Conference Publications and Proceedings *(student co-authors underlined)*

- H. T. Pajovich, G. A. Knoll, A. M. Smith, S. K. Hurley, J. R. Dorilio, N. M. Cutrone, I. A. Banerjee, "Fabrication of New Bio-organic Collagen-Proteoglycan Composites for Tendon & Ligament Tissue engineering", *Proceedings of the Society of Biomaterials,* Volume XXXVIII, 771, 2017.

- J. R. Dorilio, N. M. Cutrone, S. K. Hurley, H. T. Pajovich, A. M Smith, I. A. Banerjee, "Nanoscale Drug Release Vehicles for Targeting Kinase Pathways in Tumor Cells", *Proceedings of the Society of Biomaterials*, Vol. XXXVIII, 416, 2017.
- A. M. Smith, H. T. Pajovich, N. M. Cutrone, I. A. Banerjee, "Layer-by-layer Assembly of Nanoscaffolds for Neural Tissue Regeneration", *Proceedings of the Society of Biomaterials*, Vol. XXXVIII, 464, 2017.
- N. M. Cutrone, J. R. Dorilio, S. K. Hurley, H. T. Pajovich, A. M. Smith, I. A. Banerjee "Developing Short Peptide based Nanoassemblies as Drug Carriers", *Proceedings of the Society of Biomaterials*, Vol. XXXVIII, 556, 2017.
- S. K. Hurley, J. R. Dorilio, N. M. Cutrone, H. T. Pajovich, I. A. Banerjee, "Design of new bio-organic mimics for drug delivery vehicles and an exploration of their interactions with tumor cells", *Proceedings of the Society of Biomaterials*, Vol. XXXVIII, 608, 2017.
- S. M. Romanelli, G. A. Knoll, I. A. Banerjee, "Fluorenylmethyloxycarbonyl-based Peptide-Chitosan hybrid Scaffolds for Potential Applications in Cartilage Tissue Regeneration" *Transactions of the 38th Annual Meeting Biomaterials Revolution, Society for Biomaterials Proceeding*, 604, 2015.
- V. Flaris, H. Siccardi, J. W. Hartnett, I. A. Banerjee, "Exploration of Surface Interactions of Polymer Blended Bioconjugates" *Society of Plastics Engineers Annual Technical Conference* (*SPE-ANTEC)*, Proceedings 2015.
- Y. S. Miranda-Alaraćon, A. M. Brown, I. A. Banerjee "Development of Tailored Bionanocomposites for Applications in Skin Tissue Regeneration" *Transactions of the 38th Annual Meeting Biomaterials, Society for Biomaterials, Proceedings* 602, 2015.
- J. R. Hannah, C. G. Cassaza, H. Siccardi, J. W. Hartnett, V. Flaris, I. A. Banerjee, "Antimicrobial Effects of Polymer Blended Triazole Derivatives", *Society of Plastics Engineers Annual Technical Conference* (*SPE-ANTEC)*, *Proceedings* 2137-2139, 2014.
- K. R. Fath, S. H. Frayne, N. Nakatsuka, I. Kandinov, B. J. Cohen, I. A. Banerjee, *Transactions of the 36th Annual Meeting Biomaterials Revolution, Society for Biomaterials*, 604, 2013.
- E. M. Smoak, S. H. Frayne, V. C. Grant, I. A. Banerjee "Self-Assembly and Characterization of Phytohormone Conjugated Gold Nanoparticles" *Polym. Mater. Sci. Eng.* 2010.
- E. M. Smoak, I. A. Banerjee "Photopolymerization on Peptide Microtube Surfaces" *Polym. Prep.* 50, 149-150, 2009.
- I. A. Banerjee, R. L. Spear, R. Tamayev, M. Z. Menzenski, S. Colletti "Formation of Nanotubes and Nanovesicles from Bolaamphiphilic Peptides and their Applications". *Polym. Prep*. 47 (2), 2006.
- I. A. Banerjee, L. Yu, R. Mac Cuspie, N. Nueraji, H. Matsui. "Protein nanotube-based device fabrication-smart immobilization and metallization via biomineralization". *Polym. Prep.* (*ACS Symposium Proceedings*), 2005.
- G. Muniz, I. A. Banerjee, L. Yu, R. Djalali, Y. F. Chen, H. Matsui, Controlled nanocrystal growth on sequence peptide coated nanotubes to fabricate Au, Ag, and Ge nanowires *Polym. Mater. Sci. Eng.* 92, 34-35, 2005.

1. L. Yu, I. Banerjee, X. Gao, H. Matsui "Fabrications and applications of enzyme-incorporated peptide nanotubes and magnetic nanocrystal-coated peptide nanotubes". *Polym. Preprints.* (*ACS Symposium Proceedings*) 2005.
2. I. A. Banerjee, R. L. Spear "From Peptide Nanspheres to Nanorods". *Polym. Prep*. 46 (2), 746, 2005.
3. R. I. MacCuspie, I. A. Banerjee, P. Krause, H. Matsui "Trace Level Pathogen Identification by Antibody Nanotube Networks". *Polym. Mater. Sci. Eng.* (*ACS Symposium Proceedings*) 2005.
4. R. Djalali, Y. F. Chen, L. Yu, I. A. Banerjee, H. Matsui "Smart Peptide Nanotubes: Targeted Immobilization via Molecular Recognition and Size Packing/Density-Controlled Nanocrystal Coating via Biomineralization ". *Polym. Mater. Sci. Eng*. 89, 273, 2003.
5. I. A. Banerjee, G. A. Epling. "Dye-Amine Conjugates as Novel Photoinitiators". *Polym. Prep*. 44 (1), 4289-4290, 2003.

6. I. A. Banerjee and G. A. Epling. "Dye Sensitized Formation of Graft Copolymers of Poly(Ethylene Glycol) Diacrylate-BSA Hydrogels in the presence of Visible Light". *Polym. Prep.* 43(1) 488-489, 2002.
7. G.A. Epling and I. A. Banerjee "New Photocatalysts for the Polymerization of Acrylates". *Polym. Prep.* 42(1), 492-493, 2001.

Mentored Student Accomplishments:

- Outstanding Poster Presentation award in Biochemistry – Hannah Hunt at the 76th Eastern Colleges Science Conference, 2022.
- Outstanding Platform Presentation award in Biochemistry – Charlotta Lebedenko at the 76th Eastern Colleges Science Conference, 2022.
- Outstanding Poster Presentation award in Chemistry - Niyasha Wijedasa at the 73rd Eastern Colleges Science Conference, 2019.
- Honorable Mention for research presentation at the 2019 Columbia University Undergraduate Research Symposium. - Niysaha Wijedasa.
- Poster selected for presentation at SCI-MIX (Colloids and Surfaces Division), at the 255th ACS National Meeting, New Orleans, LA (2018) – with undergraduate student Mindy Hugo.
- NIH T-32-GM8353-26, Cellular Biotechnology Training Program, awarded in 2017 to past student Steven Romanelli at his graduate program (at U. Mich)
- Best Overall Science Presentation: Fordham University 9th Annual Undergraduate Research Symposium Steven Romanelli (2016)
- Poster entitled "Multilayered Peptide-based Biocomposites for Potential Bone Tissue Regeneration Applications" was awarded "Superior Presentation Medal" at the Sigma χi International Conference. The poster was presented by undergraduate student researcher, Steven Romanelli (2014).
- Poster selected for presentation at SCI-MIX (Analytical Chemistry Division) at the 247th ACS National Meeting, Dallas, TX (2014) – with undergraduate students Guliano Picchini, Grant Knoll & Steven Romanelli
- Undergraduate Research student (S. Romanelli) was awarded of "Certificate of Excellence" for Oral presentation at the 68th Eastern Colleges Science Conference (2014).
- NSF-GRFP awarded to past student Stacey Barnaby during her graduate research at Northwestern University (2013).
- Three undergraduate research students (Nako Nakatsuka, Stephen Frayne and Nazmul Sarker) were awarded "Certificates of Excellence" for their respective research presentations (Oral) at the 66th Annual Eastern Colleges Science Conference (2012).
- Biophysical Society Student Travel Award Grant, (Awarded to Undergraduate Student: Nazmul Sarker (2012)
- Biophysical Society Student Travel Award Grant, (Awarded to Undergraduate Student: Stacey Barnaby (2011)
- Poster presented by undergraduate student Stacey Barnaby at the 241st ACS National Meeting entitled "Formation of metal ion complexes with plant phytohormones and green synthesis of nanoparticles for cellular detection" received "Best Poster award" in the Colloids and Surfaces Division (2011)
- Poster presented at the 64th Eastern Colleges Science Conference was awarded "Excellence in Molecular Biology and Biochemistry Division", Undergraduate Research Student presenter: Stacey Barnaby (2011)
- Paper presented at the 237th ACS National Meeting was awarded the WCC/Eli Lilly Travel Award Grant for undergraduate research student Karen Johnson for presentation at the ACS National Meeting at Salt Lake City, Utah (She was the only undergraduate student out of 6 women that included graduate students and postdoctoral associates) (2009)
- NSF-GRFP awarded to past student Christine Schwall for her graduate work at University of Connecticut (2009).
- Mirage Foundation Fellowship awarded to Marsiyana Henricus for pursuing graduate research at Oxford University, England (2008)

- Undergraduate Research Student Rose Spear awarded Gates Cambridge Scholarship to pursue Graduate Research at Cambridge University, England (2006)