ANIRBAN SEN GUPTA, PH.D.

HOME ADDRESS:
1700 E13th Street, #8P
Cleveland, Ohio 4414
Phone: 330-715-0609

U.S.A. Resident Status: Permanent Resident (Green Card)

Lab Website: www.senguptalab.com

EDUCATION

The University of Akron (Akron OH)
Ph.D., Engineering with specialization in Chemical Engineering and polymeric biomaterials 2003
Thesis: *Synthesis and characterization of L-tyrosine based novel biodegradable polyphosphates and polyurethanes for biomaterial applications*
Other emphasis: Drug Delivery, Tissue Engineering, Surface Modification.

The University of Akron (Akron OH)
M.S., Chemical Engineering 2001
Thesis: *Synthesis and characterization of L-tyrosine based novel biodegradable polycarbonates for biomaterial applications*
Other emphasis: Drug Delivery, Tissue Engineering, Surface Modification.

The University of Calcutta (Kolkata, West Bengal, India)
B.Tech., Chemical Engineering 1998
Other emphasis: Process Design, Process Control, Reaction Engineering, Heavy metal extraction

The University of Calcutta (Kolkata, West Bengal, India)
B.Sc. (HONORS), Chemistry 1995
Other emphasis: Organic Chemistry, Molecular Design

PROFESSIONAL EXPERIENCE

Case Western Reserve University, Cleveland, OH:
Associate Professor with Tenure May 2014-present
Assistant Professor, Department of Biomedical Engineering August 2006- April 2104
Senior Research Associate, Department of Biomedical Engineering Jan 2005 – August 2006
Research Associate, Department of Biomedical Engineering August 2003 – December 2005

The Proctor & Gamble Co., Corporate Analytical Research, Miami Valley, Cincinnati, Ohio:
Doctoral Intern, Colloids and Interfaces Laboratory May 2002 – August 2002

Guilford Pharmaceutical Inc, Baltimore, Maryland:
Research Intern, Polymer R & D Division May 2001-August 2001

ACADEMIC APPOINTMENTS

Case Western Reserve University, Cleveland, OH

Associate Professor, Department of Biomedical Engineering 2014-present
Assistant Professor, Department of Biomedical Engineering 2006 - present

The University of Akron, Akron, OH
Graduate Teaching Assistant and Undergraduate Course Instructor
Departments of Chemical Engineering and Biomedical Engineering 1999 – 2003

The University of Akron, Akron, OH
Graduate Research Assistant, Department of Chemical Engineering, Biomaterials Laboratory 1999 - 2003

Honors and Awards

GRADUATE SCHOOL
Graduate Research Scholarship, The University of Akron 1999 – 2003
First Prize in Research Presentation, ISPE Great Lakes Chapter October 2001

PROFESSIONAL

Associate Director, Center for Cardiovascular Biomaterials, CWRU 2006

Case Presidential Research Initiative Awardee (Case PRI) 2007

American Heart Association Beginning-Grant-in-Aid Awardee 2007

Nominated for Wittke Award and Jackson Award for undergraduate teaching and mentoring at Case Western Reserve University 2009, 2010, 2011, 2012, 2013

Nominated for Diekhoff Award in Graduate Teaching and Mentoring 2011, 2012, 2013

Recipient for Outstanding Teacher in Biomedical Engineering in CWRU 2011

Nominated for Outstanding Teacher in Biomedical Engineering in CWRU 2013

Elected as Program Chair for Biomaterials Education SIG, Society for Biomaterials 2013-2014

NIH R01 Awardee 2014

NHLBI Platelet Research Subcommittee Member 2014

GRANTS AWARDED: FUNDED- PI OR CO-I

Completed Support

1. Ohio Board of Regents Sen Gupta (PI) 07/01/2007-06/30/2009
Case Presidential Research Initiative 2007 Total direct: $75,000
Hemostatically active liposomes as synthetic platelet substitutes

2. NOAIRC Pilot Project under NIH-NCI (Duerk, Jeffery L, Director) Sen Gupta (PI) 9/2006 – 8/2009
Case Comprehensive Cancer Center pilot project Total Direct: $30,000
SPECT Imaging for Liposome Biodistribution in a Mouse Model

3. NIH SBIR Phase I (Shuwu Wang, Nanomimetics, PI) Sen Gupta (consultant) 09/2005-08/2008
Consulting fee of $2000 per year
Platelet Liposomal Drug Delivery ---- Thrombosis/Restenosis

4. NIH SBIR Phase I (David Vachon, Aegis Biosciences, PI; Sen Gupta (Co-I) 12/1/07-08/30/2009
Total sub-contract to Sen Gupta: $38,524
Peptide-Modified Sulfonated Styrene Block Copolymers for Vascular Applications

5. AHA Beginning Grant-in-Aid Sen Gupta (PI) 07/01/2007 –06/30/2010
Total direct: $121,000
Functionally Integrated Liposomes as Synthetic Platelet Substitutes

6. NIH SBIR Phase I (Shuwu Wang, Nanomimetics, PI) Sen Gupta (Co-I) 04/01/2010-06/30/2011
Total subcontract to Sen Gupta: $32,970
Fluorosurfactant polymers for vascular interface applications

7. CCTIP Coulter Pilot Funding Sen Gupta (PI) 01/2010 – 06/2010
Total direct: $30,000
In Vitro Analysis of Synthetic Platelet Substitute in a Dynamic Shear Flow Environment

8. NIH SBIR Phase I (Vachon PI, IASIS Molecular) Sen Gupta (Co-I) 06/ 2010 – 08/2013
Total sub-contract to Sen Gupta: $37,123
A Novel Electrospun Vascular Graft

Current Support

1. VA Merit Award Application Sen Gupta (Co-I) 04/2011 – 03/2015
Total sub-contract to Sen Gupta: $45,574 per year
In vivo performance of a high efficiency microfabricated artificial lung

2. Case Comprehensive Cancer Center ACS IRG Pilot Grant Sen Gupta (PI) 0 7/2013 - 06/2014
Total direct: $30,000
A Platelet-inspired Nanomedicine Platform for Metastasis-targeted Drug Delivery

3. NIH R01 Sen Gupta (PI) 01/2014 – 12/2019
Total direct: $1,250,000
Heteromultivalent Peptide-Lipid Nanoconstructs as Artificial Platelet Analogs

PROFESSIONAL SERVICE

PROFESSIONAL/INTERNATIONAL SOCIETIES

Society for Biomaterials: member, session organizer, program chair (Education SIG)
Biomedical Engineering Society: member, session chair
Controlled Release Society; member
American Heart Association; member

PEER REVIEWER

Biomaterials 2006-present
Journal of Biomedical Materials Research 2005-present
Journal of Biomaterials Science, Polymer Edition 2005-present
International Journal of Pharmaceutics 2007-present

International Journal of Nanomedicine 2007-present
Journal of Biomaterials Application 2008-present
Annals of Biomedical Engineering 2008-present
Nanomedicine: Nanotechnology, Biology and Medicine 2010-present
Nanomedicine: Future Medicine (London) 2010-present
Journal of Pharmaceutical Sciences 2010-present
Molecular Pharmaceutics 2010-present
Experimental Biology and Medicine 2012-present

GRANT REVIEW PANEL
NIH, NSF, AHA and DoD 2014

INVITED PRESENTATIONS/LECTURES

Sen Gupta, Anirban
Surface Modified Nanoparticles for Targeted Therapy in Vascular Pathology
The University of Akron, Department of Chemical and Biomolecular Engineering Seminar
Akron, Ohio 2007

Sen Gupta, Anirban
Surface Modified Nanoparticles for Targeted Therapy in Vascular Pathology
Abbott Vascular Inc
Santa Clara, California 2007

Sen Gupta, Anirban
Drug Encapsulation Strategies
Abbott Vascular Inc
Santa Clara, California 2007

Sen Gupta, Anirban
Nanoparticles in Medicine
Equinox Program, CWRU
Cleveland, Ohio 2008

Sen Gupta, Anirban
EGFR-targeted Nanoparticles in PDT of Cancer
University of Akron
Cleveland, Ohio 2010

Sen Gupta, Anirban
Targeted Pc 4-PDT in Cancer
First World Congress on Nanomedicine
Kerala, India 2010

Sen Gupta, Anirban
Blood-Biomaterial Interactions
SFB Upper Midwest Conference
University of Michigan, Ann Arbor 2011

Sen Gupta, Anirban
Platelet-mimetic Paradigm in Drug Delivery

SFB Biomaterials Day
University of Kentucky, Lexington 2012

Sen Gupta, Anirban
Platelet-inspired Approaches in Drug Delivery
Canada Blood Society, International Symposium: Focus on Platelets
University of Toronto, Toronto, Canada 2013

Sen Gupta, Anirban
Platelet-inspired Biomedical Technologies: From Synthetic Hemostats to Targeted Drug Delivery Systems
University of Kentucky 2014

Teaching Experience

Graduate
Polymers in Medicine (EBME 406) 2009, 2010
Co-instructor for Topics on Drug Delivery

Nanotherapeutics (EBME 426) 2010
Lecturer in Lipidic and Polymeric Nanoparticles for Drug Delivery

Undergraduate
Biomedical Engineering Laboratory (EBME 313/314 AND EBME 318/319)
Course Co-ordinator, Instructor and Laboratory Organizer 2006-present

Introduction to Biomaterials Science (EBME 306)
Course Organizer and Principal Instructor (70% course load) 2006-present

Quantitative Biomolecular Engineering (EBME 350)
Course Co-instructor (50% course load) 2008-2012

Biomedical R&D Training (EBME 328) 2010-present
Course Co-instructor

Drug Delivery (EBME 316/416) 2014
Course co-lecturer

Thesis/Research Directed

- Heather Herd, BS (currently PhD student at University of Utah)
  Platelet-targeted Liposomes for Vascular Drug Delivery
  Department of Biomedical Engineering, Case Western Reserve University. Graduated Summer 2008.

- Kenneth D Rys, MS (currently employed in Medtronic)
  P-selectin Targeted Liposomes for Thrombolytic Therapy
  Department of Biomedical Engineering, Case Western Reserve University. Graduated December 2008.

- Linda Zhang, MS (currently employed at University of Cincinnati)
  Liposome-based Synthetic Platelets
  Department of Biomedical Engineering, Case Western Reserve University. Graduated December 2008.

- Madhumitha Ravikumar, BS (currently employed in Cleveland VA Hospital and graduate student at CWRU)
  Blood-Biomaterial Interaction and Synthetic Platelets Substitutes
  Department of Biomedical Engineering, Case Western Reserve University, Graduated 2009.
- Brian D Holt, BS (currently graduate student at Carnegie Mellon)
  Loading and Release Kinetics of Clot-dissolving Enzymes in Liposomes
  Department of Biomedical Engineering, Case Western Reserve University, Graduated 2009.

- Yizhi 'Stacey' Qi, BS (currently graduate student at Duke University)
  Block-copolymer Micelles in targeted Delivery of Chemotherapeutic Agents
  Department of Biomedical Engineering, Case Western Reserve University, Graduated 2010.

- Timothy Wong, BS MS (currently in industry)
  Biomimicry of vWF and Collagen-adhesion of Platelets
  Department of Biomedical Engineering, Case Western Reserve University. Graduated 2011

- Alyssa M Master MS PhD, Case Western, (Graduated August 2013)
  Recipient of Medtronic Fellowship and NIH F-31 Graduate Fellowship under mentorship of Sen Gupta
  Targeted Photodynamic Therapy of H&N Cancers
  Department of Biomedical Engineering, Case Western Reserve University.

- Christa L Modery-Pawlowski (PhD Candidate, expected graduation 2015)
  Recipient of Medtronic fellowship and NSF GRFP Graduate Fellowship under mentorship of Sen Gupta
  Coupling Biological and Geometric Parameters for a Vascular Nanomedicine Platform
  Department of Biomedical Engineering, Case Western Reserve University.

- Megan Livingston (Research Assistant, 2010-present)
  Platelet role in metastasis
  Department of Biomedical Engineering, Case Western Reserve University.

- Lewis Tian (Research Assistant, 2011-present)
  Role of shape and size in bio-transport of vascular delivery systems
  Department of Biomedical Engineering, Case Western Reserve University.

- Victor Pan (Research Assistant, 2011-present)
  Platelet role in metastasis
  Department of Biomedical Engineering, Case Western Reserve University.

- Preethi Siva (Research Assistant, 2013-present)
  Ex-vivo chip for CTC capture and detection
  Department of Biomedical Engineering, Case Western Reserve University.

- Clarissa Kos (Research Assistant, 2013-present)
  Thrombus-targeted Enzyme-triggered Drug Delivery
  Department of Biomedical Engineering, Case Western Reserve University.

THESIS COMMITTEE PARTICIPATION

Chris Hofmann (Ph.D, graduated 2012)
Advisor: Roger E Marchant

Nick Wang (Ph.D., graduated 2012)
Advisor: Horst von Recum

Alyssa Master (PhD, graduated August 2013)
Advisor: Anirban Sen Gupta

Madhumitha Ravikumar (PhD, graduated 2014)
Advisor: Jeffrey Capadona

Christa Modery (PhD Candidate, expected May 2015)
Advisor: Anirban Sen Gupta

Isaac Adijei (PhD Candidate, graduated 2014)
Advisor: Vinod Labhasetwar

Partha Deb (PhD student)
Advisor: Anand Ramamurthi

Alexander Rivera (PhD, graduated 2014)
Advisor: Hari Baskaran

Lin Lin (PhD, graduated 2014)
Advisor: Roger E Marchant, Co-advisor: Anirban Sen Gupta

Derek Jones (PhD Candidate, expected January 2015)
Advisor: Roger E Marchant, Co-advisor: Anirban Sen Gupta

Jennifer Bastijanic (PhD Candidate, expected May 2015)
Advisor: Roger E Marchant, Co-advisor: Anirban Sen Gupta

PEER-REVIEWED MANUSCRIPTS/PUBLICATIONS

1. **A. Sen Gupta**, S.T. Lopina, L-tyrosine-based backbone-modified poly(amino acids). *J. Biomat. Sci. Polym. Ed.,* 2002,13, p1093. PMID: 12484486

2. **A. Sen Gupta**, S.T. Lopina, Development of novel "Pseudo"polypeptidic biodegradable polymers based on natural amino acid L-tyrosine for biomaterial application. *Materials Science Forum,* 2003, 426-432, p3261.

3. M.V. Chaubal, **A. Sen Gupta**, S.T. Lopina, D. F. Bruly, Polyphosphates and other phosphorus containing polymers for drug delivery applications, *Critical Reviews in Therapeutic Drug Carrier Systems*. 2003, 20, p295. PMID: 14635982

4. **A. Sen Gupta**, S.T. Lopina, Investigation of "solid phase" synthesis of Tyrosine-derived diphenol monomers with resin-bound carbodiimide coupling reagents. *J. Polym., Sci., Part A., Polym. Chem.,* 2004, 42, p4906.

5. **A. Sen Gupta**, S.T. Lopina, Synthesis and characterization of L-tyrosine based novel polyphosphates. *Polymer,* 2004, 45, 14, p4653.

6. **A. Sen Gupta**, S.T. Lopina, Properties of L-tyrosine based polyphosphates pertinent to potential biomaterial applications. *Polymer*, 2005, 46, 17, p2133.

7. **A. Sen Gupta**, G. Huang, BJ. Lestini, S. Sagnella, K. Kottke-Marchant and RE. Marchant, RGD-modified liposomes targeted to activated platelets as a potential vascular drug delivery system. *Thrombosis and Haemostasis*, 2005, 93, p106. (*This paper was awarded the journal cover*). PMID: 15630499

8. **A. Sen Gupta**, S. Wang, E. Link, E. H. Anderson, C. Hofmann, J. Lewandowski, K. Kottke-Marchant, R.E. Marchant, Glycocalyx-mimetic dextran-modified poly(vinyl amine) surfactant coating reduces platelet adhesion on medical-grade polycarbonate surface. *Biomaterials*, 2006, 27, p3084. PMID: 16460796

9. G. Huang, Z. Zhou, R. Srinivasan, M.S. Penn, K. Kottke-Marchant, R.E. Marchant, **A. Sen Gupta**. Affinity manipulation of surface-conjugated RGD peptide to modulate binding of liposomes to activated platelets. *Biomaterials*, 2008, 29, p1676. PMID: 18192005.

10. D. Sarkar D, J-C. Yang, **A. Sen Gupta**, S.T. Lopina. Synthesis and characterization of L-tyrosine based polyurethanes for biomaterial applications. *J Biomed Mater Res Part A*. 2009, 90, p263. PMID: 18496869.

11. S. Wang, **A. Sen Gupta**, S. Sagnella, P McVicker, K Kottke-Marchant, R E Marchant. Biomimetic fluorocarbon surfactant polymers reduce platelet adhesion on PTFE/ePTFE surface. *J Biomat Sci, Polym Ed*, 2009, 20, p619. PMID: 19323880

12. R. Srinivasan, R. E Marchant, **A. Sen Gupta**. In Vitro and In Vivo Platelet Targeting By Cyclic RGD-modified Liposomes. *J Biomed Mater Res: Part A.* 2010, 93, p 1004. PMID: 19743511

13. A.M. Master, M.E. Rodriguez, M.E. Kenney, N.L. Oleinick, **A. Sen Gupta.** Formulation of photosensitizer Pc 4 in in PEG-PCL micelles and in vitro PDT studies. *J Pharm Sci.* 2010, 99, p2386. PMID: 19967780

14. B. Holt, **A. Sen Gupta**. Streptokinase loading in liposomes for vascular targeted nanomedicine applications: encapsulation efficiency and effects of processing. *J Biomat Appli* (ePub ahead of print, 2010). PMID: 20659961

15. **A. Sen Gupta.** Nanomedicine Approaches in Vascular Disease: A Review. *Nanomedicine: Nanotechnology, Biology and Medicine* (ePub ahead of print, 2011). PMID: 21601009

16. A.M. Master, Y. Qi, N.L. Oleinick, **A. Sen Gupta**. EGFR-mediated Intracellular Delivery of Pc 4 Nanoformulation for Targeted Photodynamic Therapy of Cancer: In Vitro Studies. *Nanomedicine: Nanotechnology, Biology and Medicine* (ePub ahead of print, 2011). PMID: 22024195

17. C. Modery, M. Ravikumar, T. Wong, M. Dzuricky, N. Durongkaveroj, **A. Sen Gupta**. Heteromultivalent Liposomal Nanoconstructs for Enhanced Targeting and Shear-stable Binding to Active Platelets for Site-selective Vascular Drug Delivery. *Biomaterials* (ePub ahead of print, 2011). PMID: 21906806

18. M. Ravikumar, T. Wong, C. Modery, **A. Sen Gupta**. Peptide-decorated Liposomes Promote Arrest and Aggregation of Activated Platelets under Flow on Vascular Injury Relevant Protein Surfaces In Vitro. *Biomacromolecules* 2012, 13, 1495−1502

19. M. Ravikumar, C. Modery, T. Wong, **A. Sen Gupta**. Mimicking Adhesive Functionalities of Blood Platelets using Ligand-decorated Liposomes. (Accepted for publication, *Bioconjugate Chemistry*, April 2012). dx.doi.org/10.1021/bc300086d

20. A. M. Master, M. Livingston, N.L. Oleinik, **A. Sen Gupta**. Optimization of a Nanomedicine-Based Silicon Phthalocyanine 4 Photodynamic Therapy (Pc 4‑PDT) Strategy for Targeted Treatment of EGFR-Overexpressing Cancers. *Mol. Pharmaceutics* 2012, 9, 2331−2338.

21. C.L. Modery-Pawlowski, L.L. Tian, V. Pan, KR McCrae, S Mitragotri, **A. Sen Gupta**. Approaches to synthetic platelet analogs. *Biomaterials*. 2013, 34(2):526-541.

22. A.M. Master, **A. Sen Gupta**. EGF receptor-targeted nanocarriers for enhanced cancer treatment. *Nanomedicine: Future Medicine* (Lond). 2012 Dec;7(12):1895-906

23. C.L. Modery-Pawlowski, L.L. Tian, M. Ravikumar, T.L. Wong, **A. Sen Gupta**. In vitro and in vivo hemostatic capabilities of a functionally integrated platelet-mimetic liposomal nanoconstruct. *Biomaterials*. 2013, 34(12):3031-41.

24. C.L. Modery-Pawlowski, A.M. Master, V. Pan, G.P. Howard, **A. Sen Gupta**. A platelet-mimetic paradigm for metastasis-targeted nanomedicine platforms. *Biomacromolecules*. 2013;14(3):910-919

25. C.L. Modery-Pawlowski, L.L. Tian, V. Pan, **A. Sen Gupta**. Synthetic Approaches to RBC Mimicry and Oxygen Carrier Systems. *Biomacromolecules*. 2013; 14(4): 939-948.

26. A.M. Master, M. Livingston, **A. Sen Gupta**. Photodynamic nanomedicine in the treatment of solid tumors: Perspectives and challenges. *J Control Release*. 2013; 168(1): 88-102.

27. A. M. Master, A. Malamas, R. Solanki, D, Liggett, J.L. Eiseman, **A. Sen Gupta**. A Cell-targeted Photodynamic Nanomedicine Strategy for Head-&-Neck Cancers. *Molecular Pharmaceutics*. 2013; 10(5): 1988-1997.

28. C.L. Modery-Pawlowski, K. Hsiaohsuan, W. Baldwin, **A. Sen Gupta**. A Platelet-inspired Paradigm for Nanomedicine Targeted to Multiple Diseases. *Nanomedicine: Future Medicine* (Lond). 2013; 8(10): 1709-1727.

29. C.L. Modery-Pawlowski, **A Sen Gupta**. Heteromultivalent Ligand-decoration for Actively Targeted nanomedicine. *Biomaterials* 2014; 35(9):2568-2579.

30. K.M. Kovach, J.R. Capadona, **A. Sen Gupta**, J.A. Potkay. The effects of PEG-based surface modification of PDMS microchannels on long-term hemocompatibility. J Biomed Mater Res. Part A. (accepted 2014).

31. H Haji-Valizadeh, C L Modery-Pawlowski, **A Sen Gupta**. An FVIII-derived Peptide Enables VWF-binding of a Synthetic Platelet Surrogate without Interfering with Natural Platelet Adhesion to VWF. *Nanoscale* (accepted, 2014).

32. **A Sen Gupta**. Nanotechnology Applications in Diagnosis and Treatment of Metastasis. *Nanomedicine: Future Medicine* (Lond). (accepted 2014)

33. A. C. Anselmo, C.L. Modery-Pawlowski, S Menegatti, S Kumar, D.R. Vogus, L.L. Tian, M Chen, T.M. Squires, **A Sen Gupta**, S Mitragotri. Platelet-like nanoparticles: mimicking shape, flexibility and surface biology of platelets to target vascular injuries. *ACS Nano* 2014; 8(11): 11243-11253.

PEER-REVIEWED ABSTRACTS, PRESENTATIONS AND/OR EXHIBITS

1. **A Sen Gupta***, Stephanie T. Lopina "*Investigation of Side-Reactions in the Synthesis of DTH- Based Poly-Iminocarbonate for Biomaterial Applications* ", at session 199, Biomaterials II, AIChE Annual Meeting, Los Angeles, CA, (2000).

2. StephanieT. Lopina*, Siddharth Mahapatra, Mike Rottmayer, Darrell Weaver, **A Sen Gupta** "*Synthesis of polyethylene oxide star polymers*", 28'th International Symposium on Controlled Release of Bioactive Materials and 4th Consumer & Diversified Products Conference, San Diego, CA, (2001).

3. **A Sen Gupta***, Stephanie T. Lopina "*Pseudopeptide chemistry to synthesize materials for potential biomaterial applications* ", International Society of Pharmaceutical Engineering (ISPE), Great Lakes Chapter Regional Conference, Research Poster Competition, Cinicinnati, OH (2001) and ISPE annual meeting, Las Vegas, NV (2001).

4. **A Sen Gupta** *, Guofeng Huang, Rekha Srinivasan, Kandice Kottke-Marchant, Roger E. Marchant," *Novel Approaches To Intra-vascular Drug Delivery: RGD-modified Liposomes Targeted To Platelets* " invited podium presentation at BMES Annual Conference, Philadelphia, PA, (2004).

5. **A Sen Gupta***, Emily Link, Shuwu Wang, Eric H Anderson, Christopher Hoffman, Kandice Kottke-Marchant and Roger E Marchant " *Oligosachharide Modified Biomimetic Surfactant Polymer For Non-thrombogenic Interface Applications: Platelet Adhesion Studies* ", at session 90, Biomimetic Interfaces, AIChE Annual Meeting, Austin, TX, (2004).

6. Guofeng Huang*, **A Sen Gupta**, Kandice Kottke-Marchant, Marc Penn, Roger E. Marchant. RGD-modified liposomes to activated platelets as a potential vascular drug delivery system. American Institute of Chemical Engineering Annual Conference. Austin, Texas, (2004).

7. Guofeng Huang*, **A Sen Gupta**, Kandice Kottke-Marchant, Marc Penn, Roger E. Marchant. RGD-Modified liposomes for targeted drug delivery to activated platelets. Controlled Release Society Annual Conference, Miami, Florida, (2005).

8. Kenneth D Rys*, **A Sen Gupta**. P-selectin targeted liposomes for thrombolytic therapy. BMES Annual Fall Meeting, Hollywood, CA (2007).

9. Alyssa M. Master *, **A Sen Gupta**. Amphiphilic block copolymer nanoparticles for targeted cardiovascular drug delivery. BMES Annual Fall Meeting, Hollywood, CA (2007).

10. Alyssa M. Master*, **A Sen Gupta**. Block-copolymer Micelles for Delivery of Photosensitizer Pc 4 for Photodynamic Therapy of Cancer. BMES Annual Fall Meeting, St. Louis, MO (2008).

11. Madhumitha Ravikumar*, **A Sen Gupta**. Comparison of Hemocompatibility of Biomedical Polymers by Analyzing Platelet Adhesion under Shear in a Rotating Disk System. BMES Annual Fall Meeting, St. Louis, MO (2008).

12. Madhumitha Ravikumar*, **A Sen Gupta**. Comparison of Hemocompatibility of Biomedical Polymers by Analyzing Platelet Adhesion under Shear in a Rotating Disk System. Research Symposium for Undergraduates, Argonne National Labs, IL (2008).

13. Sarah Jacobs*, Madhumitha Ravikumar, **A Sen Gupta**. Hemocompatibility of Biomedical Polymers. Source Intersections Undergraduate Symposium: Cleveland, Ohio. Poster Presentation 4/17/09

14. Madhumitha Ravikumar*, **A Sen Gupta**. Development of a Hemostatically Active Liposome-Based Synthetic Platelet Substitute. Source Intersections Undergraduate Symposium: Cleveland, Ohio. Podium Presentation 4/17/09

15. Madhumitha Ravikumar*, Timothy Wong, **A Sen Gupta**. Hemostatically Active Synthetic Platelet Substitutes. 11'th International Congress of the IUPESM, 2009, Munich Germany. Poster Presentation. 9/4/09

16. Madhumitha Ravikumar*, Timothy Wong, **Anirban Sen Gupta**. Hemostatically Active Liposomes as Synthetic Platelet Substitutes. Case Cardiovascular Center (CCC) Research Retreat 2009, Cleveland OH. Poster Presentation 9/17/09

17. Madhumitha Ravikumar*, Sarah Jacobs, **A Sen Gupta**. Hemocompatibility of Biomedical Polymers. Society for Biomaterials (SFB), Regional Conference 2009, Lexington KY. Poster Presentation 9/25/09

18. Madhumitha Ravikumar*, Timothy Wong, **A Sen Gupta**. Hemostatically Active Liposomes as Synthetic Platelet Substitutes. Society for Biomaterials (SFB), Regional Conference 2009, Lexington KY. Poster Presentation 9/25/09.
19. A.M. Master*, M.E. Rodriguez, N.L. Oleinick, **A. Sen Gupta**. Delivery of the photosensitizer Pc 4 in PEG-PCL micelles for in vitro PDT studies. Society for Biomaterials: Biomaterials Day, Lexington, KY. September 2009.

20. **A. Sen Gupta***, A.M. Master, M.E. Rodriguez, M.E. Kenney, N.L. Oleinick. Micelle-Mediated Delivery of Pc 4 for PDT: *In Vitro* Studies on Cancer Cells. Biomedical Engineering Society Annual Conference, Pittsburgh, PA. October 2009.

21. A.M. Master*, M.E. Rodriguez, N.L. Oleinick, **A. Sen Gupta**. Formulation of Photosensitizer Pc 4 in PEG-PCL micelles and in vitro PDT Studies. American Institute of Chemical Engineers, Nashville, TN. November 2009

22. Y Qi*, A.M. Master, M.E. Rodriguez, N.L. Oleinick, **A. Sen Gupta**. Comparison of Two Block-Copolymer Micelle Systems for Delivery of Photosensitizer Pc 4 for PDT of Cancer. BMES Annual Conference, Pittsburgh, PA. October 2009.

23. C Modery*, M Ravikumar**, A Sen Gupta**. Platelet-targeted Liposomal Nanoconstructs for Site-specific Drug Delivery in Vascular Disease. BMES Annual Conference, Poster Presentation, 10/09/2010

24. A.M. Master*, N.L. Oleinick, **A. Sen Gupta**. EGFR-mediated delivery of Pc 4 nanoformulation for targeted PDT of cancer. Society for Biomaterials, Annual Conference, Orlando, Florida, April 2011.

25. C. Modery*, M. Ravikumar, **A. Sen Gupta**. **Platelet-targeted Nanoconstructs for Site-specific Drug Delivery in Vascular Disease.** Society for Biomaterials, Annual Conference, Orlando, Florida, April 2011.

26. **A. Sen Gupta***, M Ravikumar, T Wong, C Modery. Rational Design of a Platelet-mimetic Hemostatically Active Nanoconstruct. Society for Biomaterials, Annual Conference, Orlando, Florida, April 2011.

27. A Master*, N Oleinick, **A Sen Gupta**. Optimization of a Nanomedicine Strategy for Cell-Targeted Photodynamic Therapy of Head-&-Neck Cancers. BMES Annual Conference, Atlanta, 2012.

28. C Modery*, M Ravikumar, T Wong, M Dzuricky, M Livingston, **A Sen Gupta**. Heteromultivalent Ligand Modification to Enhance Specific Bioactivity of Nanomedicine Platforms. BMES Annual Conference, Atlanta, 2012.

29. V Pan, G Howard, C Modery, A Master, **A Sen Gupta**. Mimicking Platelet-Cancer Cell Interactions for Targeted Drug Delivery in Metastatic Breast Cancer. BMES Annual Conference, Atlanta, 2012.

30. V Pan, G Howard, C Modery-Pawlowski, A Master, **A Sen Gupta**. Platelet-inspired Nanovehicles for Targeted Delivery of Doxorubicin to Metastatic Breast Cancer. BMES Annual Conference, Seattle, 2013.

31. V Pan, G Howard, C Modery-Pawlowski, A Master, **A Sen Gupta**. Platelet-inspired Nanovehicles for Targeted Delivery of Doxorubicin to Metastatic Breast Cancer. SFB Annual Conference, Denver, 2014.

32. P Siva, C Modery-Pawlowski, **A Sen Gupta**. Heteromultivalent ligand-mediated surface capture of circulating tumor cells. SFB Biomaterials Day, University of Kentucky, 2014.

33. C Kos, C Modery-Pawlowski, G Kaur, K Ravichandran, **A Sen Gupta**. A nanomedicine approach for targeted thrombolysis. SFB Biomaterials Day, University of Kentucky, 2014.

34. **A. Sen Gupta**. Platelet-inspired Biomedical Technologies: From Synthetic Hemostats to Targeted Drug Delivery Systems. SFB Biomaterials Day, University of Kentucky, 2014.

BOOK CHAPTERS

1. P N Shah, J A Smolen, **A Sen Gupta**, Y H Yun. Electrospun Pseudo Poly(Amino Acids) for Tissue Engineering Applications. In: *Nanotechnology in Tissue Engineering and Regenerative Medicine*, Ed: Ketul Popat, CRC Press, Taylor and Francis, 2011.

2. **A Sen Gupta**, H von Recum. Bioconjugation Strategies: Lipids, Liposomes, Polymerosomes and Microbubbles. In: *Chemistry of Bioconjugates: Synthesis, Characterization, and Biomedical Applications*, Ed: Ravin Narain, Wiley-Blackwell, (2014).

3. **A Sen Gupta**. Cardiovascular Nanomedicine: Materials and Technologies. In: Nanomaterials in Pharmacology, Eds: Zheng-Rong Lu and Shinji Sakuma, Springer (2015).

4. **A Sen Gupta**. Biomaterials based Strategies in Blood Substitutes. In: Biomaterials and Regenerative Medicine. Ed: Laura Santambrogio, Springer (2015).

PATENTS AND INVENTION DISCLOSURES

Materials and Methods of Introducing Genetic Material Into Living Cells. International Publication No. WO2008/063562. Inventors: Yang H Yun, Stephanie T Lopina, Anirban Sen Gupta, Andrew Ditto, Debanjan Sarkar, Parth Shah. Applicant: The University of Akron.

Synthetic Platelets. Inventor: Anirban Sen Gupta, Madhumitha Ravikumar. Invention Disclosure submitted to CWRU. Provisional patent No. 61/475,039, filed April 2012.

Multi-targeted nanomedicine platform for vascular drug delivery. Inventor: Anirban Sen Gupta. Disclosure to CWRU: April 2011. Provisional patent filed April 2013.

Platelet-inspired Nano Medicine Targeted to Metastasis. Inventor: Anirban Sen Gupta. Disclosure to CWRU: January 2013

Platelet-inspired and Complement-targeted Nanomedicine for Immunomodulatory and Immunoregulatory Applications. Inventors: Anirban Sen Gupta and William Baldwin III. Disclosure to CWRU: March 2013.

Synergistic Activities

- Associate Director of Center for Cardiovascular Biomaterials, ***www.case.edu/affil/CCB/ccbhome.htm,*** a consortium of state-of-the-art facilities and expertise to carry out fundamental and applicative research in novel biomaterials for transformative biomedical applications especially in the cardiovascular area.
- Active member and researcher at *Case Comprehensive Cancer Center*. ***http://cancer.case.edu*** in areas of developmental therapeutics, imaging and tumor metastasis and microenvironment.
- Member and participant, Case Institute for Advanced Materials, that span multiple schools and disciplines, and have broad thrusts in Fundamental Materials Research, Biomaterials, Materials for Energy and Sustainability.
- Individual endeavor for biomaterials-based education and research via partnerships with local high schools, namely, Solon High School (via LabLink) and with Hathaway Brown (a girls only school).
- Active role in International Education Partnership Committee at Case to develop and implement strategies to enhance educational and collaborative opportunities of Case Western globally
- Significant contribution as an organizer and judge in multiple science fair and project activities for middle school and high school students in City of Akron and City of Cleveland, Ohio.
- Reviewer in multiple journals in the area of biomaterials, drug delivery and biomedical nanotechnology
- Organizational, editorial and advising role in Biomedical Engineering Society (BMES) and Society for Biomaterials (SFB; currently Program Chair for Biomaterials Education SIG for SFB
- Active participation as a member of Vision Committee at CWRU to promote multicultural harmony and diversity among university students and employees,
- Member and significant contributor to Engineering Core Committee and Undergraduate Education Commitee at CWRU to oversee the engineering core curriculum
- Active contribution in the EQUINOX program and the Meet the Faculty activities (educational outreach and admissions programs) at Case Western, to promote scientific education and interest
- Significant participation in advising sessions and orientation activities of incoming freshman

F. Collaborators and Other Affiliations

(a) Collaborators: Keith McCrae MD (Hematology, The Cleveland Clinic), Wei Li (Molecular Medicine, The Cleveland Clinic), Marvin Nieman (Pharmacology, Case School of Medicine), Malcolm Kenney PhD (Chemistry, CWRU), Nancy L Oleinick PhD (Comprehensive Cancer Center, CWRU), William Schiemann (Comprehensive Cancer Center, CWRU), Yang Yun PhD (Biomedical Engg, The University of Akron), Wiley J Youngs (Chemistry, The University of Akron), Carl P Frick PhD (Mechanical Engg, University of Wyoming), David J Vachon PhD (AEGIS Biosciences and IASIS Molecular Sciences, Spokane, Washington), Julie Eiseman and Erik Wiener (Hillman Cancer Institute, University of Pittsburgh), Omolola Eniola-Adefesio (University of Michigan Ann Arbor), Samir Mitragotri (University of California Santa Barbara).

(b) Applicants Own Advisors: Stephanie T Lopina, PhD PE (deceased, Associate Professor of Chemical Engg and Biomedical Engg, The University of Akron);

(c) Graduate Student and Undergraduate Trainees

Current Graduate Advisees.

- Christa Modery: under the mentorship of Anirban Sen Gupta, published six manuscripts on vascular nanomedicine between 2010-2013, received the prestigious Medtronic Fellowship in 2011 and received the prestigious NSF GRFP Doctoral Fellowship in 2012.

Previous Graduate Advisees. Kenneth Rys MS (Medtronic), Linda Zhang MS (University of Cincinnati), Timothy Wong BS MS (Medical School)
• Alyssa M Master: under the mentorship of Anirban Sen Gupta, published seven manuscripts on cancer nanomedicine between 2009-2013, received the prestigious Medtronic Fellowship in 2009, and received the prestigious F-31 Pre-doctoral Fellowship from NIH in 2010. Graduated in August 2013. Currently post-doc at UNC Chapel Hill.

Current Undergraduate Trainees. Megan Livingston, Victor Pan, Lewis Tian, Preethi Siva, Clarissa Kos.

Previous Undergraduate Trainees (2007-2009). Heather Herd (currently PhD Student at University of Utah), Brian Holt (currently PhD Student at Carnegie Mellon University), Madhumitha Ravikumar (currently PhD student at CWRU BME in Neural Engineering area), Yizhi Qi (currently PhD student at Duke University), Jonathan Shaul (currently PhD student at Clemson University), Sarah Jacobs (currently Research Assistant in macromolecular Science and Engineering Department at CWRU), Kristina Vaci (currently in MEM program at case), Michael Dzuricky (currently working for Athersys in Cleveland and looking into graduate schools for Fall 2013), Janice Moore (senior undergrad at Case), Eric Larsen (senior undergrad at Case).

NSF REU Students Mentored. Alyssa Master (2008), Josh Yeoba (2009), Michael Dzuricky (2011), Lewis Tian (2012), Gregory Howard (2013).

CWRU SOURCE Students Mentored. Madhumitha Ravikumar, Michael Dzuricky, Kristina Vaci, Victor Pan.

(d) Affiliations: Case Comprehensive Cancer Center, Case Center for Cardiovascular Biomaterials, Case Center for Imaging Research, Case Institute of Advanced Materials, BMES, SFB, AIChE, ACS, CRS