

DR. AKHILESH K. GAHARWAR

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Short Bio:

Dr. Akhilesh K. Gaharwar is an Associate Professor in the Department of Biomedical Engineering at Texas A&M University. He received his Ph.D. from Purdue University and completed his postdoctoral training from MIT and Harvard University. The goal of his lab is to design nanoengineered biomaterials with wide-ranging applications in the field of regenerative medicine, by combining principles from materials science, stem cell biology, additive biomanufacturing and high throughput genomics. He has published more than 100 peer-reviewed articles in high-impact journals. Dr. Gaharwar's interdisciplinary research has also been recognized with over 20 major international awards including the prestigious - the NIH Director's New Innovator Award (DP2).

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PROFESSIONAL EXPERIENCE:

Texas A&M University, College Station, TX

Assistant Professor, Department of Biomedical Engineering

2013-2019

Affiliated Faculty, Department of Materials Science & Engineering

Member, Center for Remote Health Technologies and Systems

ACADEMIC TRAINING:

Massachusetts Institute of Technology (MIT), Cambridge, MA

2011-13

Postdoctoral Associate, David H. Koch Institute for Integrative Cancer Research

Advisor: Prof. Robert S. Langer

Harvard University, Boston, MA

2011-13

Postdoctoral Research Fellow, Wyss Institute of Biologically Inspired Materials

Advisor: Prof. Ali Khademhosseini

Purdue University, West Lafayette, IN

2007-11

Ph.D, Biomedical Engineering

Advisor: Prof. Gudrun Schmidt

Indian Institute of Technology (IIT-Bombay), Mumbai, India

2004-07

M.Tech, Materials Science (DAAD Fellowship-Germany & MHRD Scholarship-India)

Rheinisch-Westfälischen Technischen Hochschule (RWTH), Aachen, Germany

2005-06

Visiting Research Fellow - Deutscher Akademischer Austausch Dienst (German Academic Exchange Service)

National Institute of Technology (NIT), Nagpur, India

1999-2003

B.E., Metallurgical Engineering

AWARDS AND RECOGNITIONS:

- 2019 Young Investigators in ACS Applied Materials & Interfaces (Dec 2019)
- 2019 ChemComm Emerging Investigators, Royal Society of Chemistry (June 2019)
- 2019 Research Impact Award, Texas A&M Engineering Experiment Station (TEES) (May 2019)
- 2019 TEES Young Faculty Award, Texas A&M University (May 2019)
- 2018 Engineering Genesis (EG) Award for Multidisciplinary Research, Texas A&M Engineering Experiment Station (TEES) (Oct 2018)
- 2018 Dean of Engineering Excellence Award, Texas A&M University (May 2018)
- 2018 Rising Star Award by Cellular & Molecular Bioengineering Special Interest Group of Biomedical Engineering Society (Jan, 2018)
- 2018 Langmuir Early Career Authors in Fundamental Colloid and Interface Science (Jan 2018)
- 2017 NIH Director's New Innovator Award (DP2) by National Institute of Health (Oct, 2017)

- Most Cited Article Award by Annals of Biomedical Engineering (Oct, 2017)
- 2015 Cellular and Molecular Bioengineering Young Innovator Award by Biomedical Engineering Society (Oct, 2015)
- 2015 Outstanding Young Scientists - Talent Article from Macromolecular Chemistry and Physics Talent Article (Jan 2015)
- 2015 Outstanding Faculty Mentor Award by Texas A&M BMES Student Organization (April 2015)
- Merit Award by Orthopedic Special Interest Group (SIG) at 2013 Society For Biomaterials Annual Meeting, Boston (April 2013)
- 2013 CMBE - BMES Rising Fellows Award by Cellular & Molecular Bioengineering Special Interest Group of Biomedical Engineering Society. (Jan 2013).
- 2012 ACTA Graduate Student Award based on the quality of the paper published in ACTA journal (Gaharwar *et al.* Acta Biomaterialia 7 (2) (2011) 568-577) and leadership potential (Oct 2012).
- 2011 MRS Graduate Research Silver Award by the Materials Research Society (MRS). Awarded semi-annually to only 26 graduate students (Nov 2011).
- 2011 BMES Graduate Research Award by the Biomedical Engineering Society (BMES). Awarded annually to only 8 graduate students (Oct 2011).
- 2010 Dimitris Chorafas Foundation Award for outstanding Ph.D dissertation. Awarded only to 31 students in 2010 around the world among top universities such as MIT, UCLA, Purdue, and EPFL etc. to "*reward exceptional performance*" and "*encourage significant future contributions to science and technology*". (Dec 2010)
- 2010 Society For Biomaterials STAR (Student Travel Achievement Recognition) Honorable Mention in the 2010 Annual Meeting, Seattle (April 2010).
- 2011 Best Student Poster Award at 2011 Midwest Biomedical Engineering Career Conference (MBECC) at Northwestern University in Evanston, IL (March 2011).
- 2010 Purdue Graduate Student Government (PGSG) Travel Award from the Purdue University (Mar 2010).
- 2005 Deutscher Akademischer Austausch Dienst (DAAD) Fellowship for research work in RWTH-Aachen, Germany. Awarded only to 61 students from India (Sep 05 - May 06).
- 2005 Ministry of Human Resource Development Scholarship by Govt. of India (Jul 04 - Aug 05).
- All India Rank 36 (96.1 percentile), Graduate Aptitude Test for Engineering (GATE-2004).

INVITED TALKS (SEMINAR, CONFERENCE, WORKSHOP):

1. Gaharwar A. K., First Bernhard Gottlieb Conference Periodontal Homeostasis in Disease and Regeneration, TAMU College of Dentistry Dallas, TX (Aug 2019)
2. Gaharwar A. K., International Association for Dental Research (IADR), Vancouver (June 2019)
3. Gaharwar A. K., Wound Healing Society Annual Meeting, San Antonio, TX (May 2019)
4. Gaharwar A. K., Society for Biomaterials, Seattle (April 2019)
5. Gaharwar A. K., Tissue Engineering Workshop, Nagpur India (Dec 2018)
6. Gaharwar A. K., Materials Research Society, Boston (Nov 2018)
7. Gaharwar A. K., Houston Methodist, Houston (Oct 2018)
8. Gaharwar A. K., TERMIS World Congress, Kyoto Japan (Sept 2018)
9. Gaharwar A. K., ETH Zurich - Additive Manufacturing and Biofabrication, Switzerland (Aug 2018)
10. Gaharwar A. K., University of British Columbia, Vancouver, BC, Canada (June 2018)
11. Gaharwar A. K., Department of Chemistry, Keio University, Japan (Mar 2018)
12. Gaharwar A. K., Cellular and Molecular Bioengineering Conference, Award talk (Jan 2018)
13. Gaharwar A. K., University of Oklahoma, (Nov 2017)
14. Gaharwar A. K., Indian Institute of Technology - Kanpur, (Oct 2017)
15. Gaharwar A. K., University of Missouri, (Nov 2016)

16. Gaharwar A. K., Nanotech 2016 Conference - TechConnect World, Washington DC (May 2016)
17. Gaharwar A. K., Department of Biomedical Engineering, UT San Antonio (March 2016)
18. Gaharwar A. K., 2015 AIChE Annual Meeting, Salt Lake City (UT)
19. Gaharwar A. K., 3rd International Association for Dental Research Academy: 21st century tools for dental research, Boston, MA (March, 2015).
20. Gaharwar A. K., Materials Science and Engg., University of Michigan, Ann Arbor, MI (Oct, 2014)
21. Gaharwar A. K., Materials Science & Engineering, IIT-Bombay, Mumbai, India (July, 2014)
22. Gaharwar A. K., Metallurgy and Materials Science, VNIT-Nagpur, India (June, 2014)
23. Gaharwar A. K., Biomaterials Day, Texas A&M University, TX (June, 2014)
24. Gaharwar A. K., Materials Science and Engineering, Texas A&M University, TX (April, 2014)
25. Gaharwar A. K., Biomedical Engineering, Texas A&M University, TX (Oct, 2013)
26. Gaharwar A. K., Materials Science & Engineering, NIT-Nagpur, India (July, 2013)
27. Gaharwar A. K., Department of Biomedical Engineering, SUNY Stony Brook, NY (July, 2013)
28. Gaharwar A. K., Mechanical Engineering, University of Massachusetts Amherst, MA (Feb, 2013)
29. Gaharwar A. K., Harvard-MIT Health Sciences and Technology, Harvard University (Feb, 2013)
30. Gaharwar A. K., Biomedical Engineering, Texas A&M University, College Station, TX (Jan 2013)
31. Gaharwar A. K., 2013 CMBE-BME Annual Meeting, Waimea, Hawaii– Award Talk (Jan, 2013)
32. Gaharwar A. K., Brigham and Women's Hospital, Harvard Medical School, Boston (Nov, 2012)
33. Gaharwar A. K., Biomedical Engineering, Louisiana Tech University, Ruston, LA, (June 26, 2012)
34. Gaharwar A. K., Chemical Engineering, University of Kansas, Lawrence, KS (Jan 20, 2012)
35. Gaharwar A. K., Massachusetts College of Pharmacy and Health Sciences, Boston, MA (Dec 8, 2011)
36. Gaharwar A. K., Weldon School of Biomedical Engineering, West Lafayette, IN (Feb 2011)

EDITORIAL BOARD MEMBER:

1. **Regenerative Biomaterials**, published by Oxford Press (2018)
2. **Bioprinting**, published by Elsevier (since May 2016)
3. **Scientific Reports**, published by Nature-Springer (since Jan 2013).
4. **IET Nanobiotechnology**, published by IEEE (since March 2014)

EDITORIAL POSITION (GUEST EDITOR):

- Special Issue title: “Emerging Trends in Biomaterials Research” **Annals of Biomedical Engineering**, Guest Editors: **Gaharwar, A. K.**, Detamore M., Khademhosseini A., Pub: June. 2016
- Special Issue title: Nanomaterials: From Bench to Bedside, **IEEE Pulse**, Guest editors: Khademhosseini A. and **Gaharwar A.K.**, Pub: March, 2014

CURRENT SUPPORT

Current:

NIH DP2 EB026265 (PI: Gaharwar)	10/01/2017 - 09/31/2022	3.0 calendar
National Institutes of Health (NIBIB)		\$2,227,500
<i>“Mineralomics: Designing mineral based therapeutics to control and direct cell function”</i>		
The goal of this project is to discern pivotal cellular pathways stimulated by minerals and designing mineral-based nanoparticles to direct the differentiation of human mesenchymal stem cells (hMSCs)		
NSF CBET 1705852 (PI: Gaharwar)	07/15/2017 - 07/14/2020	1.0 calendar
National Science Foundation		\$300,000
<i>“3D Bioprinting of Complex Tissue Structures Using Nanoengineered Ionic-Covalent Entanglement (NICE) Bioinks”</i>		

To develop a family of shear-thinning bioinks to print complex tissue structures and direct cell functions.

X-grant (PI: Gaharwar, Co-PI: Jain, Sun) 08/01/2019 to 07/30/2021 0.5 calendar
TAMU President's Excellence Fund **\$325,000**

"3D printing bioartificial pancreas for diabetes research"

To develop vascularized 3D printed platform to stimulate angiogenesis *in vivo*.

Triads for Transformation (T-3) (PI: Jain, Co-PI: Gaharwar, Sun) 01/01/2019 to 12/31/2020
TAMU President's Excellence Fund **\$35,994**

"Vascular-islet-on-chip: A biosystem for enabling basic & translational diabetes research"

To develop disease specific organ-on-a-chip platform to model type 1 diabetics.

AggiE-Challenge (PI: Gaharwar) 09/01/18-05/31/19 0.0 calendar
College of Engineering, TAMU **\$20,000**

"3D Printing anatomical size tissues and organs "

Training undergraduate students on 3D bioprinting.

Completed:

NIH R03 EB023454 (PI: Gaharwar) 12/01/2016 - 01/30/2019 0.5 calendar
National Institutes of Health **\$142,471**

"Two-dimensional Nanomaterials for Cartilage Regeneration"

Understanding the effect of 2D nanosilicates and its dissolution ionic products at whole genome scale using RNA-Seq. Develop nanosilicates for sustained delivery of TGF- β to stimulate chondrogenic differentiation of stem cells.

GIAN (Co-I: Gaharwar) 09/01/17-05/31/19 0.0 calendar
MHRD, Government of India **\$10,000**

International workshop "Tissue Engineering and Regenerative Medicine"

AggiE-Challenge (PI: Gaharwar) 09/01/17-05/31/18 0.0 calendar
College of Engineering, TAMU **\$28,000**

"Bioprinted Organs on Chips"

Training undergraduate students on 3D bioprinting.

AggiE-Challenge (PI: Gaharwar) 09/01/16-05/31/17 0.0 calendar
College of Engineering, TAMU **\$24,000**

"Tools for Discovery & Engineering Better Medicines: Bioprinted Cancer Models."

Training undergraduate students on 3D bioprinting.

403993 (PI: Gaharwar) 01/07/15-11/30/16 0.0 calendar
Star Animal Health Inc. **\$13,911**

"Chondrocytes Proliferation, and Production of Extracellular Matrix"

Investigate the effect of different dietary supplements on production of cartilage ECM by chondrocytes.

AggiE-Challenge (PI: Gaharwar) 09/01/15-05/31/16 0.0 calendar
College of Engineering, TAMU **\$28,000**

"Tools for Discovery: 3D Bioprinted Cancer Mimicking Model (3D-BioCMM) for Cancer Research"

Training undergraduate students on 3D bioprinting.

TEES Strategic Initiative Program (PI: Kaunas) 10/22/14-10/21/16

0.0 calendar

Texas A&M Engineering Experiment Station

\$82,500

“Establishing a cytotherapeutic discovery pipeline at Texas A&M University”

Collaborative research combining novel cell preparations and materials for tissue engineering.

IMPACT ON RESEARCH

I have demonstrated an ability to perform impactful, leading-edge research at the interface of materials science, biomedical engineering, and cell biology. I have secured \$2.7M of funding from National Institutes of Health (NIH) National Science Foundation (NSF), and Industry, all single PI grants. I have published more than 100 journal articles in high impact journal such as *Advanced Materials* (IF 22.1), *ACS Nano* (IF 12.8), *PNAS* (IF 9), *Biomaterials* (IF 8.5), *ACS Applied Materials and Interfaces* (IF 7.5) *Acta Biomaterialia* (IF 6), and *Advanced Healthcare Materials* (IF 5.8). Most of these studies were highlighted in various news media. We have also obtained provisional/patents on some of our technology to facilitate commercialization. My research impact has been acknowledged by the NIH Director's New Innovator Award (DP2), the Dean of Engineering Excellence Award by Texas A&M University, CMBE Rising Star Award by CMBE-BMES and Cellular and Molecular Bioengineering Young Innovator by Biomedical Engineering Society, 2015.

Over the years I have developed new nanomaterials that have and will continue to shape the field of biomedical engineering and biomaterials. Specifically, I have introduced a new class of two-dimensional (2D) nanomaterials, also known as nanosilicates, for biomedical applications. I have showed that these nanosilicates are non-toxic and degrade into non-toxic minerals that can be easily adsorbed by human body. Here, I will outline three of the most promising applications of 2D nanomaterials that I have introduced to biomedical field:

Impact 1: Mineral based Approach for Biomedical Applications. Current clinical strategies for bone regeneration involve the administration of supraphysiological doses of growth factors such as recombinant human bone morphogenetic protein 2 (rhBMP2), but there are complications associated with serious side effects of off-target tissue responses. For these reasons, there remains a critical unmet need to design and develop a material-based cell carrier that can retain and induce differentiation of stem cells in absence of growth factors. Our lab has developed new mineral-based technology to direct the differentiation of human stem cells into bone and cartilage tissues. These studies are published in high impact journal articles such as **Proceedings of the National Academy of Sciences (2018)** and **ACS Nano (2015)**. Over the year, our article has resulted in enormous research impact in the field of tissue engineering and biomaterials which is evident from **high citation ~120 times (Xavier et al., ACS Nano 2015)** and is labeled as one of **Highly Cited Papers** (Top 1% articles based on impact). In addition, our approach to understand how minerals nanoparticles can induce stem cells differentiation was recently awarded **\$2.2M NIH Director's New Innovator Award (DP2)**. This is the first time that an award from that program has been received by a researcher in the Texas A&M College of Engineering.

Impact 2: Advanced Bioinks for Additive Manufacturing: Three-dimensional (3D) bioprinting is emerging as a promising method for rapid fabrication of biomimetic cell-laden constructs for tissue engineering using cell-containing hydrogels, called bioinks, that can be crosslinked to form a hydrated matrix for encapsulated cells. However, extrusion based 3D bioprinting has hit a bottleneck in progress due to the lack of available bioinks with high printability, mechanical strength, and biocompatibility (**Advanced Materials 2016, cited 103 times**). Our lab has introduced multiple approaches to design highly printable bioink for fabricating large scale, cell-laden, bioactive scaffolds. Specifically, we have introduced a novel bioink strengthening strategy that combines nanocomposite reinforcement with ionic-covalent entanglement (ICE) to create a bioactive **Nanoengineered Ionic Covalent Entanglement (NICE) bioink** with excellent printability, mechanical properties, and shape-fidelity. We have filed a patent application on this technology and are currently discussing the possibility to license it to a company for commercialization. In addition, this work also received

\$300k funding from **National Science Foundation (NSF)** for bioink development. The results from these studies have published in multiple journal including **ACS Applied Materials and Interfaces, Langmuir, Biomaterials**. We are in process of submitting a SBIR/STTR grant to further develop this technology.

Impact 3: Hemostats and Wound Healing for Battlefield Injury: A penetrating injury from shrapnel is a serious obstacle in overcoming battlefield wounds and mortality. Given the high mortality rates due to hemorrhage, there is an unmet need to quickly self-administer materials that prevent fatality due to excessive blood loss. While progress has been made in the development of hemostats over the last decade, the performance of existing materials in healing internal wounds is not satisfactory. We have developed an injectable hydrogel that are promising materials for achieving hemostasis for internal injuries and bleeding, as these biomaterials can be introduced into a wound site using minimally invasive approaches (**ACS Nano, 2014**). Moreover, we have also introduced 2D nanosilicates as a platform technology to sequester and deliver multitude of pro-inflammatory and pro-angiogenic growth factors to stimulate angiogenesis and wound healing (**Acta Biomaterialia 2018**). The high surface area and charged characteristics of nanosilicates prolong the release of the molecules. This work resulted in an **issued patent** and **\$140k NIH R03 award**.

JOURNAL PUBLICATIONS:

Total published journal articles ~100 (**5000+ citations, H-index~38**), and Conference Talk/Poster ~100+. Publications as corresponding authors ~50+

Submitted (under review)

1. Gold K, Pandian NKR, Jain A, **Gaharwar AK**. Multiscale Modeling of Vascular Pathophysiology Using 3D Bioprinting. Under review
2. Carrow JK, Singh KA, Ramirez A, Jaiswal MK, Lokhande G, Singh I, **Gaharwar AK**. Photomodulation of Human Stem Cells Gene Expression Using Light-responsive 2D Nanomaterials. Under review
3. Bhunia S, Jaiswal MK, Deo K, Rajput S, Brokesh AM, Singh KA, **Gaharwar AK**. 2D covalent organic framework (COF)-based nanomaterials for sustained delivery of hydrophobic therapeutics. Under review
4. Clover TM, O'Neill CL, Posey AE, White MA, Lokhande G, Gaharwar AK, Pappu RV, Rudra JS. Suprahelical Self-Assembly of Heterochiral Amphipathic Peptides. Under review
5. Dhavalikar P, Lan Z, Kar R, Salhadar K, **Gaharwar AK**, Cosgriff-Hernandez E. Biomedical Applications of Additive Manufacturing. Under review
6. Brokesh AM, **Gaharwar AK**. Role of Minerals and Mineral-based Nanomaterials in Regenerative Medicine. Under review
7. Sears C, Mondragon E, Richards Z, Sears N, Chimene D, McNeill E, Gregory CA, **Gaharwar AK**, Kaunas R, Nanoengineered Ionic-Covalent Entanglement (NICE) Scaffolds that Mimic the Osteogenic Niche for Craniomaxillofacial Implants. Under review
8. Jhan YY, Prasca-Chamorro D, Zuniga G, Moore DM, Kumar SA, **Gaharwar AK**, Bishop C, Engineered Extracellular Vesicles with Synthetic Lipids via Membrane Fusion to Establish Efficient Gene Delivery. Molecular Pharmaceutics (accepted)

2019

9. Chimene D., Kaunas R., **Gaharwar AK**. Hydrogel Bioink Reinforcement Techniques for Additive Manufacturing: A Focused Review of Emerging Strategies. Advanced Materials

10. Mathur T, Singh KA, Pandian NKR, Tsai SH, Hein TW, **Gaharwar AK**, Flanagan JM, Jain A., Organ-on-chips consisting Blood Endothelial Progenitor Cells Model Disease-Specific Vascular Thromboinflammation. Lab on a Chip 2019 DOI 10.1039/C9LC00469F
11. Jaiswal M, Singh KA, Lokhande G, **Gaharwar AK**. Superhydrophobic states of 2D nanomaterials controlled by atomic defects. Chemical Communications 2019 DOI 10.1039/C9CC00547A *Media coverage: [Altmetric Index of 57](#), [Journal Back Cover](#), [ScienceDaily](#), [Phy.Org](#), [Nanowerk](#), [Eureka Alert](#), [Newswise](#), [TAMU Today](#), [ScienceBlog](#), [Futurity](#), [Medgadget](#), [MedicalDesignBriefs](#), [NanoappMedical](#),*
12. **Gaharwar AK**, Cross LM, Peak CW, Gold K, Carrow JK, Brokesh A, Singh KA. Two-Dimensional Nanoclay for Biomedical Applications: Regenerative Medicine, Therapeutic Delivery, and Additive Manufacturing. Advanced Materials 2019 31 (23), 1900332.
13. Peak CW, Chen J, Adlouni M, Singh KA, **Gaharwar AK**. Printing Therapeutics in 3D using Nanoengineered Bioinks. Advanced Healthcare Materials 2019 8 (11), 1801553. *Media coverage: [Altmetric Index of 110](#), [Journal Front Cover](#), [Science Daily](#), [Phy.Org](#), [Technology Network](#), [Genetic Engineering and Biotechnology News](#), [Long room](#), [TAMU Today](#), [3D Printing Media Network](#), [Onties](#), [Eureka Alert](#), [Science Codex](#), [Shilfa](#), [ECNMag News](#), [Futurity](#), [Med Gadget](#), [3D printing today](#), [NewsRegal](#), [TrueViralNews](#), [3D Printing Industry](#), [Biospace](#),*
14. Mehrali M, Thakur A, Kadumudi FB, Pierchala MK, Vacacela Cordova JA, Shahbazi MA, Mehrali M, Pennisi CP, Orive G, **Gaharwar AK**, Dolatshahi-Pirouz A*, Pectin Methacrylate (PEMA) and Gelatin-Based Hydrogels for Cell-Delivery: Converting Waste-Materials into Biomaterials. ACS Applied Materials and Interface. 11 (13), 12283–12297
15. Xin S., Chimene D., Garza JE, **Gaharwar AK**, Alge D. Clickable PEG hydrogel microspheres as building blocks for 3D bioprinting. Biomaterials Science 2019,7, 1179-1187. DOI: 10.1039/C8BM01286E
16. Cross LM, Carrow JK, Ding X, Singh KA, **Gaharwar AK**, Sustained and Prolong Delivery of Protein Therapeutics to Direct Differentiation of Human Mesenchymal Stem Cells. ACS Applied Materials and Interface 2019, 11 (7), pp 6741–6750. DOI: 10.1021/acsami.8b17733 *Media coverage: [Altmetric Index of 120](#), [Journal Cover](#), [NIBIB](#), [NSF discovery files \(episode 23\)](#), [Scientific European](#), [BHS Connect](#), [MyBiology](#), [Nanowerk](#), [MedGadget](#), [Eureka Alert](#), [Science Daily](#), [Medical X press](#), [NEWS Medical Lifescience](#), [Business-standard](#), [ANI News](#), [Technology Network](#), [Siasat Daily](#), [Futurity](#), [NewKerala News](#), [Deccan Chronical](#), [SciSeek](#), [Med India](#), [Nutrition review](#), [Industry news network](#), [Affaritaliani](#), [Health Desk](#), [Nanowerk](#), [HealthPremiere](#)*
17. Ashammakhi N, Kaarela O, Hasan A, Byambaa B, Sheikhi A, **Gaharwar AK**, Khademhosseini A., Advancing Frontiers in Bone Bioprinting. Advanced Healthcare Materials 2019, 8(7), 1801048. DOI: 10.1002/adhm.201801048. [Journal Cover](#), [Advanced Science News](#)
18. Carrow JK, Di Luca A, Dolatshahi-Pirouz A, Moroni L, **Gaharwar AK**. 3D-printed bioactive scaffolds from nanosilicates and PEOT/PBT for bone tissue engineering. Regenerative Biomaterials 2019, 6 (1), 29–37
19. Gold K, **Gaharwar AK**, Jain A., Emerging trends in multiscale modeling of vascular pathophysiology: Organ-on-a-chip and 3D printing. Biomaterials 2019, 196, 2-17.
20. Deo K, Lokhande G, **Gaharwar AK**. Nanostructured Hydrogels for Tissue Engineering and Regenerative Medicine. Encyclopedia of Tissue Engineering and Regenerative Medicine 2019

2018

21. Carrow JK, Cross L., Reese R. W., Jaiswal M., Gregory C., Kaunas R., Singh I., **Gaharwar A.K.** Widespread Changes in Transcriptome Profile of Human Mesenchymal Stem Cells Induced by Two-

- Dimensional (2D) Nanosilicates. Proceedings of the National Academy of Sciences 2018 115 (17), E3905-E3913 *Media coverage: Received wide media coverage with an **Altmetric Index of 114**, and rated among top 5% research articles to gained audience attention.* [BMES](#), [beckersspine](#), [MedIndia](#), [RNA-seq Blog](#), [Futurity](#), [21st Stcentech](#), [TEES/TAMU](#), [RnDMagazine](#), [Phys.org](#), [Physical World](#), [Nanowerk](#)
22. Weems A, Carrow JK, **Gaharwar AK**, Maitland D., Improving the oxidative stability of shape memory polyurethanes containing tertiary amines through the presence of isocyanurate triols. Macromolecules 2018 51 (22), 9078–9087
23. Hasany M, Thakur A, Tabenia N, Kadumudi FB, Shahbazi MA, Pierchala MK, Mohanty S, Orive G, Andresen TL, Foldager CB, Yaghmaei S, Arpanaei A, **Gaharwar AK**, Mehrali M, Dolatshahi-Pirouz A*, Combinatorial and multiplex screening of nanoengineered hydrogels: A Glimpse of the “Holy Grail” in Orthopedic Stem Cell Therapy? ACS Applied Materials and Interface 2018 10 (41), 34924–34941 *Media coverage: [R&D Magazine](#), [Phy.Org](#), [Nanowerk](#)*
24. Howell DW, Peak CW, Bayless KJ, **Gaharwar AK**. 2D Nanosilicates Loaded with Proangiogenic Factors Stimulate Endothelial Sprouting. Advanced Biosystem 2018 1800092. DOI: 10.1002/adbi.201800092. *Media coverage: Received wide media coverage with an **Altmetric Index of 90**, and rated among top 5% research articles to gained audience attention.* [Journal Front Cover](#), [PhysicsWorld](#), [TAMU Today](#), [The health site](#), [World wide news](#), [z-news](#), [Business-standard](#), [Daily Pioneer](#), [Lab roots](#), [Ultimavoce](#), [PresseText](#), [Wall street online](#), [Indian Wire](#), [Sentinelassam](#), [Social News](#), [Sci Casts](#), [Times Now news](#), [Interesting Engineering](#), [Laboratoryequipment](#), [Brinkwire](#), [Indian Times daily](#), [Science Daily](#), [World Health](#), [Tech Inspired](#), [TAMU Engineering](#), [Research@TAMU](#).
25. Cross L., Shah K., Palani S., Peak C.W., **Gaharwar AK**. Gradient nanocomposite hydrogels for interface tissue engineering. Nanomedicine: Nanotechnology, Biology and Medicine. 2018 14 (7), 2465-2474 May 26. pii: S1549-9634(17)30087-4. doi:10.1016/j.nano.2017.02.022. PMID: 28554596
26. Sheikhi A, Afewerki S, Oklu R, **Gaharwar AK**, Khademhosseini A. Effect of ionic strength on shear-thinning nanoclay-polymer composite hydrogels. Biomaterials Science 2018 DOI 10.1039/C8BM00469B [Inside Cover](#)
27. Desai P., Venkataramanan A., Schneider R., Jaiswal M.K., Carrow J.K., Purwada P., Singh A., **Gaharwar AK**. Self-assembled, Ellipsoidal Polymeric Nanoparticles for Intracellular Delivery of Therapeutics. Journal of Biomedical Materials Research Part A 2018 DOI 10.1002/jbm.a.36400
28. Gold K, Slay B, Knackstedt M, **Gaharwar AK**. Antimicrobial Activity of Metal and Metal-Oxide Based Nanoparticles. Advanced Therapeutics 2018, 1700033 DOI: 10.1002/adtp.201700033.
29. Chimene D., Peak C.W., Gentry J., Carrow J.K., Cross L.M., Mondragon E., Cardoso G., Kaunas R., **Gaharwar AK**. Nanoengineered Ionic-Covalent Entanglement (NICE) Bioinks for 3D Bioprinting. ACS Applied Materials and Interface 2018 10 (12), 9957–9968. DOI: 10.1021/acsami.7b19808. *Media coverage: [Nanowerk](#).*
30. Lokhande G., Carrow J.K., Thakur T., Xavier J.R., Parani M., Bayless K.J, **Gaharwar A.K**. Nanoengineered injectable hydrogels for wound healing application. Acta Biomaterialia 2018 70, 35-47. DOI: 10.1016/j.actbio.2017.2366 *Media coverage: Received wide media coverage with an **Altmetric Index of 275 (30 news, 6 blogs)**, and rated among top 5% research articles to gained audience attention.* [NEWS Medical](#), [News Wise](#), [Science Daily](#), [Long room](#), [RnD Magazine](#), [Design News](#), [Geneng News](#), [Hindustan Times](#), [Business Standard](#), [The Engineer](#), [Science Alert](#), [Eureka Alert](#), [Medical Xpress](#), [RnD Magazine](#), [TEES@TAMU](#).
31. Clough BH, Zeitouni S, Krause U, Chaput CD, Cross L, **Gaharwar AK**, Gregory CA. Rapid osteogenic enhancement of stem cells in human bone marrow using a glycogen-synthase-kinase-3-beta inhibitor

improves osteogenic efficacy in vitro and in vivo. STEM CELLS Translational Medicine, 2018 7 (4), 342-353. DOI:10.1002/sctm.17-0229 *Media coverage:* [Journal front cover](#)

32. Peak CW, Stein J, Gold K, **Gaharwar AK**, Nanoengineered Colloidal Inks for 3D Bioprinting. Langmuir 2018, 34 (3), 917–925. doi: 10.1021/acs.langmuir.7b02540. PMID: 28981287 *Media coverage:* This article is part of the Early Career Authors in Fundamental Colloid and Interface Science special issue. *Media coverage:* [Nanowerk](#)

2017

33. Wilson S., Cross L., Peak C. W., **Gaharwar A.K.**, Thermo-reversible and Shear-thinning Nanoengineered inks for 3D Bioprinting. ACS Applied Materials and Interface, 2017 Dec 20;9(50):43449-43458. doi: 10.1021/acsami.7b13602. PMID: 29214803 *Media coverage:* [Nanowerk](#),
34. Jaiswal M.K, Carrow J.K., Gentry J., Gupta J., Altangerel N., Scully M., **Gaharwar AK**. Vacancy-driven Gelation Using Defect-rich Nanoassemblies of 2D Transition Metal Dichalcogenides and Polymeric Binder for Biomedical Applications. Advanced Materials 2017;29(36) 1702037. doi: 10.1002/adma.201702037. PubMed PMID:28940819.) *Media coverage:* [TAMU](#), [Nature Index](#), [Bio Portfolio](#)
35. Lee G. Jaiswal M.K, **Gaharwar A.K.**, Chen Z., Versatile click-protein hydrogels for biomedical applications. ChemistrySelect, 2017 2 (31), 10310-10315 (DOI: 10.1002/slct.201701960)
36. Meng Z., Thakur T., Chitrakar C., Jaiswal M., **Gaharwar AK**, Yakovlev V.V. In situ Assessment of Local Heterogeneity in Mechanical Properties of a Bulk Hydrogel Network. ACS Nano, 2017, 11 (8), pp 7690–7696. DOI: 10.1021/acsnano.6b08526
37. Sant A, Coutinho DF, Gaharwar AK, Neves NM, Reis RL, Gomes ME, Khademhosseini A., Self-Assembled Hydrogel Fiber Bundles from Oppositely Charged Polyelectrolytes Mimic Micro-/Nanoscale Hierarchy of Collagen. Advanced Functional Materials 27 (36), 1606273
38. Jalili N.A, Jaiswal M.K, Peak C.W, Cross L.M., **Gaharwar AK**, Injectable Nanoengineered Stimuli-responsive Hydrogels for On-Demand and Localized Therapeutic Delivery. Nanoscale, 2017, 9, 15379-15389. DOI: 10.1039/C7NR02327H.
39. Kerativitayanan P., Tatullo M., Khariton M., Joshi P., Perniconi B., **Gaharwar AK**. Osteoinductive and Elastomeric Nanocomposite Scaffolds for Bone Tissue Engineering. ACS Biomaterials Science and Engineering 3 (4), 590–600.
40. Luan X, Zhou X, Trombetta e’Silva T J, Francis M, **Gaharwar AK**, Atsawasuan P, Diekwisch TGH. MicroRNAs and Periodontal Homeostasis. Journal of Dental Research 2017 96 (5), 491-500.

2016

41. Jalili NA, Muscarello M, **Gaharwar AK**. Nanoengineered Thermoresponsive Magnetic Hydrogels for Biomedical Applications. Bioengineering & Translational Medicine. 2016;1:3:297-305. Epub 2016/09/21. doi: 10.1002/btm2.10034.
42. Jivan F, Yegappan R, Pearce H, Carrow JK, McShane M, **Gaharwar AK**, Alge DL. Sequential Thiol-Ene and Tetrazine Click Reactions for the Polymerization and Functionalization of Hydrogel Microparticles. Biomacromolecules. 2016;17:11:3516–3523. Epub 2016/10/21. doi: 10.1021/acs.biomac.6b00990. PubMed PMID: 27656910.
Media coverage: [Journal Cover](#), [TAMU](#)

43. Nash LD, Docherty NC, Monroe MB, Ezell KP, Carrow JK, Hasan SM, **Gaharwar AK**, Maitland DJ. Cold Plasma Reticulation of Shape Memory Embolic Tissue Scaffolds. Macromolecular rapid communications. 2016. Epub 2016/08/30. doi: 10.1002/marc.201600268. PubMed PMID: 27568830.
44. Guermani E, Shaki H, Mohanty S, Mehrali M, Arpanaei A, **Gaharwar AK**, Dolatshahi-Pirouz A. Engineering complex tissue-like microgel arrays for evaluating stem cell differentiation. Scientific reports. 2016;6:30445. Epub 2016/07/29. doi: 10.1038/srep30445. PubMed PMID: 27465860; PubMed Central PMCID: PMC4964594.
45. Cross LM, Thakur A, Jalili NA, Detamore M, **Gaharwar AK**. Nanoengineered biomaterials for repair and regeneration of orthopedic tissue interfaces. Acta biomaterialia. 2016;42:2-17. Epub 2016/06/22. doi: 10.1016/j.actbio.2016.06.023. PubMed PMID: 27326917.
46. Thakur A, Jaiswal MK, Peak CW, Carrow JK, Gentry J, Dolatshahi-Pirouz A, **Gaharwar AK**. Injectable shear-thinning nanoengineered hydrogels for stem cell delivery. Nanoscale. 2016;8(24):12362-72. Epub 2016/06/09. doi: 10.1039/c6nr02299e. PubMed PMID: 27270567.
47. Chimene D, Lennox KK, Kaunas RR, **Gaharwar AK**. Advanced Biinks for 3D Printing: A Materials Science Perspective. Annals of biomedical engineering. 2016;44(6):2090-102. Epub 2016/05/18. doi: 10.1007/s10439-016-1638-y. PubMed PMID: 27184494.
- **Most Cited Article Award by Annals of Biomedical Engineering (Oct, 2017)**
48. **Gaharwar AK**, Detamore MS, Khademhosseini A. Emerging Trends in Biomaterials Research. Annals of biomedical engineering. 2016;44(6):1861-2. Epub 2016/05/18. doi: 10.1007/s10439-016-1644-0. PubMed PMID: 27184493.
49. Alemdar N, Leijten J, Camci-Unal G, Hjortnaes J, Ribas J, Paul A, Mostafalu P, **Gaharwar AK**, Qiu Y, Sonkusale S, Liao R, Khademhosseini A. Oxygen-generating photocrosslinkable hydrogels support cardiac progenitor cell survival by reducing hypoxia-induced necrosis. ACS Biomaterials Science & Engineering. DOI: 10.1021/acsbiomaterials.6b00109.
50. Parani M, Lokhande G, Singh A, **Gaharwar AK**. Engineered Nanomaterials for Infection Control and Healing Acute and Chronic Wounds. ACS applied materials & interfaces. 2016;8(16):10049-69. Epub 2016/04/05. doi: 10.1021/acsami.6b00291. PubMed PMID: 27043006.
51. Barry M, Pearce H, Cross L, Tatullo M, **Gaharwar AK**. Advances in Nanotechnology for the Treatment of Osteoporosis. Current osteoporosis reports. 2016;14(3):87-94. Epub 2016/04/07. doi: 10.1007/s11914-016-0306-3. PubMed PMID: 27048473.
52. Paul A, Manoharan V, Krafft D, Assmann A, Uquillas JA, Shin SR, Hasan A, Hussain MA, Memic A, **Gaharwar AK**, Khademhosseini A. Nanoengineered biomimetic hydrogels for guiding human stem cell osteogenesis in three dimensional microenvironments. Journal of materials chemistry B, Materials for biology and medicine. 2016;4(20):3544-54. Epub 2016/08/16. doi: 10.1039/c5tb02745d. PubMed PMID: 27525102; PubMed Central PMCID: PMC4980085.
53. Thakur T, Xavier JR, Cross L, Jaiswal MK, Mondragon E, Kaunas R, **Gaharwar AK**. Photocrosslinkable and elastomeric hydrogels for bone regeneration. Journal of biomedical materials research Part A. 2016;104(4):879-88. Epub 2015/12/10. doi: 10.1002/jbm.a.35621. PubMed PMID: 26650507.
54. Jaiswal MK, Xavier JR, Carrow JK, Desai P, Alge D, **Gaharwar AK**. Mechanically Stiff Nanocomposite Hydrogels at Ultralow Nanoparticle Content. ACS nano. 2016;10(1):246-56. Epub 2015/12/17. doi: 10.1021/acsnano.5b03918. PubMed PMID: 26670176.
Media coverage: [Phy.org](#), [Spinal Cure](#), [Today@TAMU](#)
55. **Gaharwar AK**, Arpanaei A, Andresen TL, Dolatshahi-Pirouz A. 3D Biomaterial Microarrays for Regenerative Medicine: Current State-of-the-Art, Emerging Directions and Future Trends. Advanced

materials (Deerfield Beach, Fla). 2016;28(4):771-81. Epub 2015/11/27. doi: 10.1002/adma.201503918. PubMed PMID: 26607415. **(Impact factor: 21.9)**

56. Peak CW, Cross L, Singh A, **Gaharwar AK**. Microscale Technologies for Engineering Complex Tissue Structures. Microscale Technologies for Cell Engineering. 2016 1 3-25.
57. Paduano F, Marrelli M, **Gaharwar AK**, Tatullo M. *DSC-Differentiated Hepatocytes for Treatment of Liver Diseases*. Dental Stem Cells: Regenerative Potential. 2016 1, 265-279.

2015

58. Chimene D, Alge DL, **Gaharwar AK**. Two-Dimensional Nanomaterials for Biomedical Applications: Emerging Trends and Future Prospects. Advanced materials (Deerfield Beach, Fla). 2015;27(45):7261-84. Epub 2015/10/16. doi: 10.1002/adma.201502422. PubMed PMID: 26459239.
59. Kerativitayanan P, **Gaharwar AK**. Elastomeric and mechanically stiff nanocomposites from poly(glycerol sebacate) and bioactive nanosilicates. Acta biomaterialia. 2015;26:34-44. Epub 2015/08/25. doi: 10.1016/j.actbio.2015.08.025. PubMed PMID: 26297886.
60. Xavier JR, Thakur T, Desai P, Jaiswal MK, Sears N, Cosgriff-Hernandez E, Kaunas R, **Gaharwar AK**. Bioactive nanoengineered hydrogels for bone tissue engineering: a growth-factor-free approach. ACS nano. 2015;9(3):3109-18. Epub 2015/02/13. doi: 10.1021/nm507488s. PubMed PMID: 25674809.
Media coverage: This article has been among top 5% with an Altmetric score is 46. [Phy.org](#), [Med Device News](#), [Equipment Management](#), [Hiptertextual](#), [Bioportfolio](#)
61. Purwada A, Jaiswal MK, Ahn H, Nojima T, Kitamura D, **Gaharwar AK**, Cerchietti L, Singh A. Ex vivo engineered immune organoids for controlled germinal center reactions. Biomaterials. 2015;63:24-34. Epub 2015/06/16. doi: 10.1016/j.biomaterials.2015.06.002. PubMed PMID: 26072995; PubMed Central PMCID: PMC4490011.
Media coverage: Rated among top hundred discoveries of the year 2015 by Discover magazine. The altmetric score of this work is 115. [NanoWerk](#), [Sci Casts](#), [NEWS@Cornell](#), [Med Gadget](#), [Futurity](#), [Loony Labs](#), [The Scientist](#)
62. Kerativitayanan P, Carrow JK, **Gaharwar AK**. Nanomaterials for Engineering Stem Cell Responses. Advanced healthcare materials. 2015;4(11):1600-27. Epub 2015/05/27. doi: 10.1002/adhm.201500272. PubMed PMID: 26010739.
63. Carrow J, Kerativitayanan P, Jaiswal M, Lokhande G, **Gaharwar AK**. Polymers for Bioprinting. 3D Biofabrication for Biomedical and Translational Research, 2015; 1, 229-248
64. Peak CW, Carrow JK, Thakur A, Singh A, **Gaharwar AK**. Elastomeric cell-laden nanocomposite microfibers for engineering complex tissues. Cellular and Molecular Bioengineering. 2015; 8 (3):404-415. doi:10.1007/s12195-015-0406-7.
Media coverage: [Cornell University science blog](#)
65. Meng Z, Chitrakar C, **Gaharwar AK**, Yakovlev VV, “Reinforcement of osteogenesis with nanofabricated hydroxyapatite and GelMA nanocomposite. SPIE BiOS. 2015; 930340-930340-7. doi: 10.1117/12.2080301.
66. Xavier JR, Desai P, Varanasi V, Al-Hashimi I, **Gaharwar AK**. Advanced Nanomaterials: Promises for Improved Dental Tissue Regeneration. Nanomaterials in Endodontics, 2015, 1, 5-55. DOI: 10.1007/978-3-319-13575-5_2 (2015)
67. Carrow JK, **Gaharwar AK** Bioinspired Polymeric Nanocomposites for Regenerative Medicine. Macromolecular Chemistry and Physics. 2015; 216(3): 248–264. DOI: 10.1002/macp.201400427.

68. Patel RG, Purwada A, Cerchietti L, Inghirami G, Melnick A, **Gaharwar AK**, Singh A. Microscale Bioadhesive Hydrogel Arrays for Cell Engineering Applications. Cellular and molecular bioengineering. 2014;7(3):394-408. Epub 2014/10/21. doi: 10.1007/s12195-014-0353-8. PubMed PMID: 25328548; PubMed Central PMCID: PMC4196273.

2014-2012 (Postdoctoral work)

69. **Gaharwar AK**, Patel A, Dolatshahi-Pirouz A, Zhang H, Rangarajan K, Iviglia G, Shin SR, Hussain MA, Khademhosseini A. Elastomeric nanocomposite scaffolds made from poly(glycerol sebacate) chemically crosslinked with carbon nanotubes. Biomaterials science. 2015;3(1):46-58. Epub 2015/07/28. doi: 10.1039/c4bm00222a. PubMed PMID: 26214188.
70. **Gaharwar AK**, Nikkhah M, Sant S, Khademhosseini A. Anisotropic poly (glycerol sebacate)-poly (-caprolactone) electrospun fibers promote endothelial cell guidance. Biofabrication. 2014;7(1):015001. Epub 2014/12/18. doi: 10.1088/1758-5090/7/1/015001. PubMed PMID: 25516556; PubMed Central PMCID: PMC4479144.
71. **Gaharwar AK**, Peppas NA, Khademhosseini A. Nanocomposite hydrogels for biomedical applications. Biotechnology and bioengineering. 2014;111(3):441-53. Epub 2013/11/23. doi: 10.1002/bit.25160. PubMed PMID: 24264728; PubMed Central PMCID: PMC43924876.
72. **Gaharwar AK**, Avery RK, Assmann A, Paul A, McKinley GH, Khademhosseini A, Olsen BD. Shear-thinning nanocomposite hydrogels for the treatment of hemorrhage. ACS nano. 2014;8(10):9833-42. Epub 2014/09/16. doi: 10.1021/nn503719n. PubMed PMID: 25221894; PubMed Central PMCID: PMC4212795.
Media coverage: Received Altmetric score of 61 and has been among top 5% articles. [PoP Science](#), [Phy.Org](#), [Nanowerk](#)
73. **Gaharwar AK**, Mihaila SM, Kulkarni AA, Patel A, Di Luca A, Reis RL, Gomes ME, van Blitterswijk C, Moroni L, Khademhosseini A. Amphiphilic beads as depots for sustained drug release integrated into fibrillar scaffolds. Journal of controlled release : official journal of the Controlled Release Society. 2014;187:66-73. Epub 2014/05/06. doi: 10.1016/j.jconrel.2014.04.035. PubMed PMID: 24794894; PubMed Central PMCID: PMC4079754.
74. Paul A, Hasan A, Kindi HA, **Gaharwar AK**, Rao VT, Nikkhah M, Shin SR, Krafft D, Dokmeci MR, Shum-Tim D, Khademhosseini A. Injectable graphene oxide/hydrogel-based angiogenic gene delivery system for vasculogenesis and cardiac repair. ACS nano. 2014;8(8):8050-62. Epub 2014/07/06. doi: 10.1021/nn5020787. PubMed PMID: 24988275; PubMed Central PMCID: PMC4148162.
75. Mihaila SM, **Gaharwar AK**, Reis RL, Khademhosseini A, Marques AP, Gomes ME. The osteogenic differentiation of SSEA-4 sub-population of human adipose derived stem cells using silicate nanoplatelets. Biomaterials. 2014;35(33):9087-99. Epub 2014/08/16. doi: 10.1016/j.biomaterials.2014.07.052. PubMed PMID: 25123923.
76. **Gaharwar AK**, Mukundan S, Karaca E, Dolatshahi-Pirouz A, Patel A, Rangarajan K, Mihaila SM, Iviglia G, Zhang H, Khademhosseini A. Nanoclay-enriched poly(varepsilon-caprolactone) electrospun scaffolds for osteogenic differentiation of human mesenchymal stem cells. Tissue engineering Part A. 2014;20(15-16):2088-101. Epub 2014/05/21. doi: 10.1089/ten.tea.2013.0281. PubMed PMID: 24842693; PubMed Central PMCID: PMC4137355.
77. Dolatshahi-Pirouz A, Nikkhah M, **Gaharwar AK**, Hashmi B, Guermani E, Aliabadi H, Camci-Unal G, Ferrante T, Foss M, Ingber DE, Khademhosseini A. A combinatorial cell-laden gel microarray for inducing osteogenic differentiation of human mesenchymal stem cells. Scientific reports. 2014;4:3896.

Epub 2014/01/30. doi: 10.1038/srep03896. PubMed PMID: 24473466; PubMed Central PMCID: PMC3905276.

78. **Gaharwar AK**, Mihaila SM, Swami A, Patel A, Sant S, Reis RL, Marques AP, Gomes ME, Khademhosseini A. Bioactive silicate nanoplatelets for osteogenic differentiation of human mesenchymal stem cells. Advanced materials (Deerfield Beach, Fla). 2013;25(24):3329-36. Epub 2013/05/15. doi: 10.1002/adma.201300584. PubMed PMID: 23670944.

Media coverage: This paper has got enormous amount of attention in tissue engineering research. Its altmetric score is 50 and has been cited over 200 times since its publication in 2013. The paper illustrates use of clay-based minerals for bone-tissue regeneration and has been acknowledged in several science magazines. [Materials Views](#), [Medical News Today](#), [Nanowerk](#), [Eureka Alert](#)

79. Zhang H, Patel A, **Gaharwar AK**, Mihaila SM, Iviglia G, Mukundan S, Bae H, Yang H, Khademhosseini A. Hyperbranched polyester hydrogels with controlled drug release and cell adhesion properties. Biomacromolecules. 2013;14(5):1299-310. Epub 2013/02/12. doi: 10.1021/bm301825q. PubMed PMID: 23394067; PubMed Central PMCID: PMC3653976.
80. Mihaila SM, **Gaharwar AK**, Reis RL, Marques AP, Gomes ME, Khademhosseini A. Photocrosslinkable kappa-carrageenan hydrogels for tissue engineering applications. Advanced healthcare materials. 2013;2(6):895-907. Epub 2013/01/03. doi: 10.1002/adhm.201200317. PubMed PMID: 23281344.
81. Patel A, **Gaharwar AK**, Iviglia G, Zhang H, Mukundan S, Mihaila SM, Demarchi D, Khademhosseini A. Highly elastomeric poly(glycerol sebacate)-co-poly(ethylene glycol) amphiphilic block copolymers. Biomaterials. 2013;34(16):3970-83. Epub 2013/03/05. doi: 10.1016/j.biomaterials.2013.01.045. PubMed PMID: 23453201; PubMed Central PMCID: PMC3650775.
82. Kharaziha M, Nikkhah M, Shin SR, Annabi N, Masoumi N, **Gaharwar AK**, Camci-Unal G, Khademhosseini A. PGS:Gelatin nanofibrous scaffolds with tunable mechanical and structural properties for engineering cardiac tissues. Biomaterials. 2013;34(27):6355-66. Epub 2013/06/12. doi: 10.1016/j.biomaterials.2013.04.045. PubMed PMID: 23747008; PubMed Central PMCID: PMC3685203.
83. Oh J, Kim K, Won SW, Cha C, **Gaharwar AK**, Selimovic S, Bae H, Lee KH, Lee DH, Lee SH, Khademhosseini A. Microfluidic fabrication of cell adhesive chitosan microtubes. Biomedical microdevices. 2013;15(3):465-72. Epub 2013/01/29. doi: 10.1007/s10544-013-9746-z. PubMed PMID: 23355068; PubMed Central PMCID: PMC3651799.
84. Sant S, Iyer D, **Gaharwar AK**, Patel A, Khademhosseini A. Effect of biodegradation and de novo matrix synthesis on the mechanical properties of valvular interstitial cell-seeded polyglycerol sebacate-polycaprolactone scaffolds. Acta biomaterialia. 2013;9(4):5963-73. Epub 2012/11/22. doi: 10.1016/j.actbio.2012.11.014. PubMed PMID: 23168222; PubMed Central PMCID: PMC3662231.

2012-2007 (Doctoral Thesis)

85. **Gaharwar AK**, Rivera C, Wu CJ, Chan BK, Schmidt G. Photocrosslinked nanocomposite hydrogels from PEG and silica nanospheres: structural, mechanical and cell adhesion characteristics. Materials science & engineering C, Materials for biological applications. 2013;33(3):1800-7. Epub 2013/07/06. doi: 10.1016/j.msec.2012.12.099. PubMed PMID: 23827639.
86. **Gaharwar AK**, Kishore V, Rivera C, Bullock W, Wu CJ, Akkus O, Schmidt G. Physically crosslinked nanocomposites from silicate-crosslinked PEO: mechanical properties and osteogenic differentiation of human mesenchymal stem cells. Macromolecular bioscience. 2012;12(6):779-93. Epub 2012/04/21. doi: 10.1002/mabi.201100508. PubMed PMID: 22517665.

87. **Gaharwar AK**, Rivera CP, Wu CJ, Schmidt G. Transparent, elastomeric and tough hydrogels from poly(ethylene glycol) and silicate nanoparticles. Acta biomaterialia. 2011;7(12):4139-48. Epub 2011/08/16. doi: 10.1016/j.actbio.2011.07.023. PubMed PMID: 21839864.
88. Wu C-J, **Gaharwar AK**, Burke C, Schmidt G. Mechanically Tough Pluronic F127/Laponite Nanocomposite Hydrogels from Covalently and Physically Cross-linked Networks. Macromolecules. 2011; 44: 8215–8224. DOI: 10.1021/ma200562k
89. **Gaharwar AK**, Dammu SA, Canter JM, Wu CJ, Schmidt G. Highly extensible, tough, and elastomeric nanocomposite hydrogels from poly(ethylene glycol) and hydroxyapatite nanoparticles. Biomacromolecules. 2011;12(5):1641-50. Epub 2011/03/19. doi: 10.1021/bm200027z. PubMed PMID: 21413708.
90. **Gaharwar AK**, Schexnailder PJ, Dundigalla A, White JD, Matos-Perez CR, Cloud JL, Seifert S, Wilker JJ, Schmidt G. Highly extensible bio-nanocomposite fibers. Macromolecular rapid communications. 2011;32(1):50-7. Epub 2011/03/25. doi: 10.1002/marc.201000556. PubMed PMID: 21432969.
91. **Gaharwar AK**, Schexnailder PJ, Kline BP, Schmidt G. Assessment of using laponite cross-linked poly(ethylene oxide) for controlled cell adhesion and mineralization. Acta biomaterialia. 2011;7(2):568-77. Epub 2010/09/22. doi: 10.1016/j.actbio.2010.09.015. PubMed PMID: 20854941.
92. **Gaharwar AK**, Schexnailder P, Schmidt, G. *Nanocomposite polymer biomaterials for tissue repair of bone and cartilage: A materials science perspective*. Nanobiomaterials Handbook 2011, 24-1. ISBN:9781420094664.
93. Schexnailder PJ, **Gaharwar AK**, Bartlett RL, 2nd, Seal BL, Schmidt G. Tuning cell adhesion by incorporation of charged silicate nanoparticles as cross-linkers to polyethylene oxide. Macromolecular bioscience. 2010;10(12):1416-23. Epub 2010/07/06. doi: 10.1002/mabi.201000053. PubMed PMID: 20602416.
94. **Gaharwar AK**, Schexnailder P, Jin Q, Wu C-J, Schmidt G. Addition of chitosan to silicate cross-linked PEO for tuning osteoblast cell adhesion and mineralization. ACS Applied Materials & Interfaces. 2011; 2 (11): 3119–3127. DOI: 10.1021/am100609t.
95. Wu C-J, **Gaharwar AK**, Schexnailder PJ, Schmidt G. Development of Biomedical Polymer-Silicate Nanocomposites: A Materials Science Perspective. Materials. 2010; 3: 2986-3005. doi:10.3390/ma3052986.
96. **Gaharwar AK**, Schexnailder P, Kline B, Kaul V, Akkus O, Zakharov D, Seifert S, Schmidt G. Highly Extensible Bio-Nanocomposite Films with Direction-Dependent Properties. Advanced Functional Materials. 2010; 20: 429-436. DOI: 10.1002/adfm.200901606.
97. Jin Q, Schexnailder P, **Gaharwar AK**, Schmidt G. Silicate cross-linked bio-nanocomposite hydrogels from PEO and chitosan. Macromolecular bioscience. 2009;9(10):1028-35. Epub 2009/07/14. doi: 10.1002/mabi.200900080. PubMed PMID: 19593783.

2007-2008 (M.S Thesis)

98. **Gaharwar AK**, Wong JE, Muller-Schulte D, Bahadur D, Richtering W. Magnetic nanoparticles encapsulated within a thermoresponsive polymer. Journal of nanoscience and nanotechnology. 2009;9(9):5355-61. Epub 2009/11/26. PubMed PMID: 19928227.
99. Wong JE, **Gaharwar AK**, Muller-Schulte D, Bahadur D, Richtering W. Magnetic nanoparticle-polyelectrolyte interaction: a layered approach for biomedical applications. Journal of nanoscience and nanotechnology. 2008;8(8):4033-40. Epub 2008/12/04. PubMed PMID: 19049173.

100. Wong JE, **Gaharwar AK**, Muller-Schulte D, Bahadur D, Richtering W. Dual-stimuli responsive PNiPAM microgel achieved via layer-by-layer assembly: magnetic and thermoresponsive. Journal of colloid and interface science. 2008;324(1-2):47-54. Epub 2008/06/03. doi: 10.1016/j.jcis.2008.05.024. PubMed PMID: 18514212.
101. Wong JE, **Gaharwar AK**, Muller-Schulte D, Bahadur D, Richtering W. Layer-by-Layer Assembly of Magnetic Nanoparticles Shell on a Thermoresponsive Microgel Core. Journal of Magnetism and Magnetic Materials. 2007;311(1):219–23.

BOOKS:

1. "Nanomaterials in Tissue Engineering: Characterization, Fabrication and Applications", Editors: **Gaharwar, A.K.**, Sant S., Hancock, M., Hacking A. Woodhead Publishers (UK) (ISBN 9780857095961) (Sept, 2013)
2. "Microscale Technologies for Cellular Engineering", Editors: Singh A., **Gaharwar A.K.**, Springer (ISBN 978-3-319-20725-4) (Sept, 2016)

PATENTS (ISSUED AND PENDING):

1. **Gaharwar A. K.**, Avery R.K., McKinley G.H., Khademhosseini A., Olsen B., Nanocomposite Hydrogels as a Hemorrhagic Agent (US Patent No. 20,160,144,068)
2. **Gaharwar A.K.**, Carrow J.K., Mineral-Based Nanoparticles for Arthritis Treatment (Provisional filed – Dec 2015, 13260-P084V1)
3. Chimene D., **Gaharwar A.K.**, Nanoengineered Ionic Covalent Entanglement (NICE) (US Provisional application 62/420,727)

IMPACT ON TEACHING/MENTORING

Pedagogical Approach: My primary objective as a teacher is to integrate theoretical knowledge with practical experience. I attempt to go beyond traditional pedagogical efforts to enhance my student's learning curve by integrating theoretical concepts with innovative research ideas. I believe it is important that the instructor adapt to the student's individual needs while encouraging them to actively participate in group discussions and hands-on research. I found that positive feedback and constructive criticism motivates students much more than negative comments or harsh corrections. The quality of the knowledge they accumulate and the genuine interest to further increase that knowledge becomes a measure of teaching effectiveness.

Impact on Undergraduate Teaching and Research: I view teaching as a part of the process of expanding my own knowledge, and improving my ability to effectively communicate it to my students. I had taught a required undergraduate course in biomaterials (BMEN 343: Introduction to Biomaterials) and an advanced technical elective in nanotechnology (BMEN 486/686: Biomedical Nanotechnology) to undergraduate and graduate students. I always undertake this class as a challenge to escalate my student's interest in the subject so that they develop the curiosity to pursue research in related fields. This teaching experience has taught me that my quality of teaching greatly depends on three major principles: careful planning, innovative strategies and personal focus. Wherever possible I incorporate multimedia resources to explain the core concepts in an accessible way. Immediately following the theories, I discuss case studies and provide practical examples to illustrate core concepts and highlight corollaries between topics. Practical applications are important to students because they learn about industries that have translated biomaterials research into useful products, as these industries might be the destinations for job prospects. I have consistently earned student evaluations greater than 4 on a 5 point scale for past four years. Students indicated that I was knowledgeable, well organized, intellectually stimulating and interested in helping students. My teaching excellence has been acknowledged with 2015 Outstanding Faculty Mentor Award by BMES undergraduate student organization. In addition, my teaching has been successful in drawing a lot of undergraduate students to my colleague's and my research labs. In past five years, I have provided opportunities to more than forty undergraduate students to actively participate in various research projects in my lab. Most of these students have successfully co-authored research publications, presented their work at national-level conferences and completed a research thesis (2 students) as well as received prestigious scholarships. As a positive outcome of my efforts, twelve students decided to pursue graduate school at renowned institutions including Stanford, UFL.

Impact on Curriculum Development: Engineering graduates will face challenges that are increasingly complex and multidisciplinary. Traditional engineering science would not suffice to develop such skills. To address this need, I have created a section (**ENGR 491-518**) of AggieE-Challenge program (COE) to educate and train engineering undergraduate students (10-15 students/semester) for applying engineering fundamentals to biomedical problems. During this course, students developed knowledge and skills for engineering design, multidisciplinary teamwork, effective communication, and application of engineering fundamentals. More than 50% of the undergraduate students participated in research related internships and 20% of the students went to graduate schools.

Impact on Graduate Mentoring: Graduate students respond well to an environment that is not only intellectually stimulating, emotionally supportive, and critical but also respectful. I work with my graduate students (**2/7 (graduated/ongoing) doctoral and 3/3 (graduated/ongoing) master students**) to develop technical and analytical skills. Three of my current Ph.D. students were awarded TAMU Diversity fellowships including TAMU System Louis Stokes Alliance for Minority Participation (TAMUS LSAMP) Fellowship. As the student progresses, I encourage them to be independent in identifying scientific problem and experimental design. Both MS and Ph.D students have received numerous internal and external awards for research and teaching excellence (see CV).

TEACHING/MENTORING EXPERIENCE:

- **Teaching, Texas A&M University, USA**

Course	Semester	No. of Students	Evaluation Score
BMEN 681: Seminar (1 Credit)	SP18	55	4.04
BMEN 686: Biomedical Nanotechnology (3 Credits)	SP18	13	3.72
BMEN 486: Biomedical Nanotechnology (3 Credits)	SP18	27	3.48
BMEN 681: Seminar (1 Credit)	FA17	59	4.1
BMEN 686: Biomedical Nanotechnology (3 Credits)	SP17	9	4.13
BMEN 486: Biomedical Nanotechnology (3 Credits)	SP17	19	4.05
BMEN 681: Seminar (1 Credit)	SP17	44	4.0
BMEN 681: Seminar (1 Credit)	FA16	48	4.17
BMEN 343-500: Intro to Biomaterials (3 Credits)	FA15	62	4.2
BMEN 343-200: HNR-Intro to Biomaterials (3 Credits)	FA15	6	4.2
BMEN 343-500: Intro to Biomaterials (3 Credits)	FA14	79	4.4
BMEN 343-500: Intro to Biomaterials (3 Credits)	FA13	81	3.4

- Total number of students taught: 502 (55+13+27+44+9+19+59+48+68+79+81)

- **Team-based Teaching, Texas A&M University, USA**

Course	Semester	No. of Students	Evaluation Score
ENGR 491-502: AggieE-Challenge (1 Credit)	SP18	13	-
ENGR 491-502: AggieE-Challenge (1 Credit)	FA17	11	-
ENGR 491-501: AggieE-Challenge (1 Credit)	SP17	12	-
ENGR 491-501: AggieE-Challenge (1 Credit)	FA16	11	-
ENGR 491-518: AggieE-Challenge (1 Credit)	SP16	10	-
ENGR 491-518: AggieE-Challenge (1 Credit)	FA15	10	-

- Total number of students taught: 70 (13+14+12+11+10+10)

- **Undergraduate Research Course, Texas A&M University, USA**

Course	Semester	No. of Students	Evaluation Score
BMEN 491-545 Research (0-4 Credit)	SP18	11	-
BMEN 491-245 HNR-Research (0-4 Credit)	SP18	2	-
BMEN 491-545 Research (0-4 Credit)	FA17	10	-
CHEN 491-518 Research (0-4 Credit)	FA17	1	-
BMEN 491-545 Research (0-4 Credit)	SP17	2	-
BMEN 491-245 HNR-Research (0-4 Credit)	SP17	2	-
BMEN 491-545 Research (0-4 Credit)	FA16	1	-
BMEN 491-245 HNR-Research (0-4 Credit)	FA16	1	-
BMEN 491-545 Research (0-4 Credit)	SP16	4	-
BMEN 491-245 HNR-Research (0-4 Credit)	SP16	1	-
BMEN 491-545 Research (0-4 Credit)	FA15	4	-
BMEN 491-545 Research (0-4 Credit)	SP15	1	-
BMEN 491-545 Research (0-4 Credit)	FA14	4	-
BMEN 491-545 Research (0-4 Credit)	FA14	3	-

- Total number of students taught: 47 (11+2+10+1+2+2+1+1+4+1+4+1+4+3)

- **Graduate Research Course, Texas A&M University, USA**

Course	Semester	No. of Students	Evaluation Score
BMEN 691-645 Research (0-23 Credit)	SP18	6	-
BMEN 491-245 HNR-Research (0-4 Credit)	SP18	2	-
BMEN 691-645 Research (0-23 Credit)	FA17	7	
BMEN 691-345 Research (0-23 Credit)	SU17	4	
BMEN 691-645 Research (0-23 Credit)	SP17	5	
BMEN 691-645 Research (0-23 Credit)	FA16	4	
BMEN 691-344 Research (0-23 Credit)	SU16	3	
BMEN 691-645 Research (0-23 Credit)	SP16	4	
BMEN 691-645 Research (0-23 Credit)	FA15	5	
BMEN 685 345 Research (0-23 Credit)	SU15	1	
BMEN 691 301 Research (0-23 Credit)	SU15	2	
BMEN 691-645 Research (0-23 Credit)	SP15	6	
BMEN 691-645 Research (0-23 Credit)	FA14	6	
BMEN 691 300 Research (0-23 Credit)	SU14	1	
BMEN 691-645 Research (0-23 Credit)	FA14	1	
BMEN 691-645 Research (0-23 Credit)	SP14	1	
BMEN 691-645 Research (0-23 Credit)	FA13	1	

- Total number of students taught: 59 (6+2+7+4+5+4+3+4+5+1+2+6+6+1+1+1+1)

POSTDOCTORAL ASSOCIATES

- **Visiting Scientist and Postdoctoral Trainee (4 Trainee):**
 - a) Dr. Sukanya Bhunia (May 2018 – Current)
 - b) Dr. Xicheng Ding (March 2018 – Current)
 - c) Dr. Manish Jaiswal (Aug 2018 – Current)
 - d) Dr. Jiangang Zhou (Sept 2015- Aug 2016), Currently: Assistant Professor, School of Environmental Engineering, Wuhan Textile University, Wuhan 430073, China
 - e) Prof. Parani Madasamy (March-Oct 2015), Current: Professor and Head of Department, SRM University, India
 - f) Dr. Sadhan Bag (Feb-April 2014), Current: Staff Scientist, ICAR-Indian Veterinary Research Institute (ICAR-IVRI), Izatnagar, India

DOCTORAL STUDENTS

- **PhD Students (Completed/In Progress) (4/7)**
 1. **Anna Brokesh, Ph.D Candidate (2017-Current)**, *Thesis: Effect of Minerals and Mineral-based Nanomaterials on Human Stem Cells.*
 - Student Conference Travel Grant, Biomedical Engineering, Texas A&M University 04/2018
 2. **Abhay Kanwar Singh, Ph.D Candidate (2017-Current)**, *Thesis: Engineered Nanomaterials for Regenerative Medicine*
 - Student Conference Travel Grant, Biomedical Engineering, Texas A&M University 04/2018
 3. **Karli Gold, Ph.D Candidate (May 2017-current)**,
 - Student Conference Travel Grant, Biomedical Engineering, Texas A&M University 04/2018
 - STAR Award Honorable Mention 2018 Society for Biomaterials
 - Doctoral Graduate Diversity Fellowship 2016 Faculty nominated fellowship at Texas A&M awarded to students with diverse backgrounds, including diverse research experience. Award value of \$103,800 over 3 years.

4. **David Chimene, Ph.D Candidate (Aug 2014-Current), Thesis: Nanoengineered Ink for 3D Bioprinting Complex Structured.**
 - STAR Award 2018 Society for Biomaterials
 - Doctoral Graduate Diversity Fellowship 2014 Faculty nominated fellowship at Texas A&M awarded to students with diverse backgrounds, including diverse research experience. Award value of \$103,800 over 3 years.
 - Graduate Fellowship from Texas A&M University System Louis Stokes Alliance for Minority Participation (TAMUS LSAMP). Award value of \$39,000/year over 2 years.

5. **Dr. Lauren Cross, Ph.D Candidate (Aug 2014-Aug 2018), Thesis: Nanosilicates-based Biomaterials for Bone Regeneration**
 - STAR Award Honorable Mention 2018 Society for Biomaterials
 - Student Conference Travel Grant, Biomedical Engineering, Texas A&M University 04/2018
 - Graduate Student Research and Presentation Grant Award value of \$500 for 2017 BMES Annual Meeting (Phoenix, AZ) 2017
 - SFB Biomaterials Day Poster Competition 2017 First place, award value of \$150
 - PEO Scholar Award Nominee 2016
 - Texas A&M Material Advantage Pitch your Research Competition Second place, award value of \$100 2016
 - BME Graduate Student Travel Grant 2015 Award value of \$400 for 2015 BMES Annual Meeting (Tampa, FL)
 - Doctoral Graduate Diversity Fellowship 2014 Faculty nominated fellowship at Texas A&M awarded to students with diverse backgrounds, including diverse research experience. Award value of \$103,800 over 3 years.

6. **Dr. James K. Carrow, Ph.D Candidate (Sept 2013-Aug 2018), Thesis: Nanosilicates-based Biomaterials for Cartilage Regeneration**
 - STAR Award Honorable Mention Society for Biomaterials, Spring 2018
 - US Senator Phil Gramm Doctoral Fellowship – Scholar/Mentor Excellence, Spring 2017
 - 2nd Place - Texas A&M Material Advantage Pitch Your Research Competition, Spring 2016
 - Finished 2nd out of 13 participating teams for ability to communicate research
 - Sigma Xi Grants-in-Aid of Research Award (\$1500), Spring 2015
 - Biomedical Engineering Travel Award – Society for Biomaterials Conference, Spring 2015
 - Excellence in Peer Education, Spring 2014, Nominated for positive impacts on peer education during role as Teaching Assistant

7. **Dr. Alysha Kishan, Ph.D. (co-chair with Elizabeth Cosgriff-Hernandez, 2013-2017), Thesis: Development of Tunable Electrospun Scaffolds for Tissue Engineering Applications.**
 - Graduate Researcher of the Year 2017 Department of Biomedical Engineering, Texas A&M University
 - National Science Foundation Graduate Research Fellowship 2014 – 2017
 - Research and Presentation Grant 2014, 2015 Texas A&M Office of Graduate Studies
 - STAR Award Honorable Mention 2014 Society for Biomaterials
 - Doctoral Graduate Diversity Fellowship 2014 Faculty nominated fellowship at Texas A&M awarded to students with diverse backgrounds, including diverse research experience. Award value of \$103,800 over 3 years.

8. **Michael Whitely, Ph.D (co-chair with Elizabeth Cosgriff-Hernandez, 2014-2018)**
9. **Dr. Charles W. Peak, Ph.D Candidate (Aug 2014-May 2018), Thesis: Nanoengineered Biomaterials for Cell and Therapeutic Delivery.**
 - 2018 Buck Weirus Spirit Award
 - Student Conference Travel Grant, Office of Graduate and Professional Students, Texas A&M University 10/2017
 - Student Conference Travel Grant, BMEGSA Texas A&M University 10/2017
 - Student Conference Travel Grant, Biomedical Engineering, Texas A&M University 06/2015&2016
 - Student Travel Grant, Biomedical Engineering Division, American Society for Engineering Education 06/2015
 - Runner Up Best Abstract (Graduate Student), Biomaterials Day, Rice University, Houston, Texas, June 1, 2015 06/2015
 - Co-Founder & Inaugural President, Biomedical Graduate Student Association (BMEGSA), Texas A&M University Department of Biomedical Engineering, 05/2015 – 05/2016

MASTER STUDENTS

- **Masters Student) (Completed/In Progress) (3/3)**
 1. Anna Kersey (2018-Current), Thesis: Effect of minerals on stem cells fate
 2. Satyam Rajput (2018-Current), Thesis: 3D bioprinting of complex tissue structures
 3. Kailavya Deo (2017-Current), Thesis: Immunomodulation Using 2D Nanomaterials
 4. Giriraj Lokhande (2017-Current), Thesis: Shear-thinning Hydrogels for 3D Bioprinting
 5. Scott A. Wilson, M.S (Aug 2015 – May 2017). Thesis: Designing Advanced Bioinks for 3D Printing Complex Tissue Structures
 - **2018 Association of Former Students Distinguished Graduate Student Award** for Excellence in Research
 6. Nima Jalili, M.S (Aug 2014-May 2016), Thesis: Nanoengineered Injectable Hydrogels for On-Demand and Localized Therapeutic Delivery
 - **2017 Association of Former Students Distinguished Graduate Student Award** for Excellence in Research
 7. Punyavee Kerativitayanan, M.S (Sept 2013 – Dec 2015), Thesis: Elastomeric Boly(glycerol sebacate)/Nanosilicates Scaffolds: A Growth-Factor-Free Approach for Bone Tissue Engineering at Load-Bearing Sites.

UNDERGRADUATE STUDENTS

- **Undergraduate Research Thesis (2 students)**
 1. James Gentry, Thesis: 2D Nanomaterials for Biomedical Applications (Apr 2016)
 2. Rachel Dedas, Thesis: Bioink Development for 3D Printed Arterial Scaffold (April 2018)
- **Undergraduate Researchers (41 students)**
 - a) **Texas A&M University (25 Students):** Madyson Muscarello, Beth Vonasek, Alexandra (Alex) Bock, Adelina (Addie) Ramirez, Jeffrey Chen, Mu'ath Adlouni, Ashwathi Nair, Logan Miller, Kate Hajd, Marc Elizondo, Jonathan Griffin, Evon Looper, Kunal Shah, Camille Zuliani, Nathan

Constance, Franklin (Trip) Hise, Laura Maxey, Jacob Ward, Chandani Chitrakar, Brandon Fugate, Joshua D Wooldridge, Khoa Tran, Scott Andrew Wilson.

- b) **USRG and Visiting Researchers (16 students):** Margarita Khariton (University of Florida), Jin Xiang Yu (Binghamton University), Zachary S. Clauss (University of Florida), Elsy Rivero (Universidad Modelo, Mexico), Adrian Olivera (Universidad Modelo, Mexico), Prachi Desai (SASTRA University, India), Janat Xavier (SASTRA University, India)
- c) **International Undergraduate Students (9 students):** Ashwin Raj, Karthikeyan Baskaran, Ashish Thakur, Pooja Joshi, Sowmiya Palani, Ramanathan Yegappan, Tina Thakur, Anjana Venkatraman, Giriraj Lokhande
- d) **High School Student (2 students):** Sujay Shankar (A&M Consolidated High School), Anup Guggari (Vandegrift High School)

GRADUATE DISSERTATION COMMITTEES

1. Navaneeth Krishna Rajeeva Pandian - PHD in BMEN
2. Shreedevi Arun Kumar - PHD in BMEN
3. Michael T Frassica - PHD in BMEN
4. Ping Dong - PHD in BMEN
5. Prachi S. Dhavalikar - PHD in BMEN
6. Taneidra L. Walker - PHD in BMEN
7. Anna K. Means - PHD in MSEN
8. Lindsey Bornhoeft - PHD in BMEN
9. Michael J. Holtzclaw - MS in MEEN
10. Eli Mondragon - PHD in BMEN
11. Alexis Mitchell - PHD in BIMS
12. Faraz Jivan - PHD in BMEN
13. Nicholas Sears - PHD in BMEN
14. Sehoon Jeong - PHD in BMEN

IMPACT ON COMMUNITY SERVICE AND OUTREACH

I believe that growth at all levels is the key to a healthy and thriving society. I strive to contribute towards the overall growth and development of academic community. I have integrated my service goals with my research and teaching goals to provide mutually beneficial outcomes. My service experiences at the professional, university, and departmental levels have significantly contributed to my personal development. Many of my service activities increase the global visibility of my laboratory, the Department of Biomedical Engineering, and Texas A&M University. I have attended regularly and fully participated in each of the service activities described below.

Impact on Professional Service: I have not only focused on my research program but also have tried to play a key role in the overall growth of the field. In my efforts towards this, I have edited two books on “**Nanomaterials for Tissue Engineering**” and “**Microscale Technologies for Cellular Engineering**”, and have served as an editorial board member of “*Scientific Reports*” (a Nature Publishing Group), “*Bioprinting*” (an Elsevier journal) and guest editor of “*Annals of Biomedical Engineering*”. These experiences have expanded my professional network and broadened departmental outlook. I have *served as a reviewer* of more than 60 international journals including *Nature Materials*, *Nature Nanotechnology*, *Nature Communications*, *ACS Nano*, and *Advanced Materials*. Furthermore, I have served on a number of review panels for *National*

Science Foundation (NSF), National Institute of Health (NIH), Swiss National Science Foundation (sNSF), Singapore National Medical Research Council, Israel Science Foundation, and Poland National Science Centre.

My active participation not only helps me to make contributions towards the field but is also highly beneficial for my professional growth. I am actively involved in a number of organizations such as BMES, SFB, MRS, American Chemical Society (ACS), IEEE Engineering in Medicine & Biology Society, and Tissue Engineering and Regenerative Medicine International Society (TERMIS). Specifically, I have organized and chaired multiple scientific sessions at national meetings. I believe that these activities have enhanced my research program by increasing the visibility of my laboratory, providing networking opportunities, and engaging more students in research.

Impact on University Service: I am currently serving as a Chair of the **Junior Faculty Advisory Council (JFAC)**. The purpose of the JEFAC is to generate and develop broad ideas for the improvement and development of the COE and to advise the Dean of Engineering on matters of basic importance to the junior engineering faculty members. In addition, my research efforts emphasize on coordination and collaboration with different departments (MSEN, ME and ISEN) and colleges (HSC and AgriLife) to reinforce the university's aim towards the discovery, development, communication, and application of knowledge in a wide range of academic and professional fields.

Impact on Departmental Service: I have served as a member of **BMEN faculty search committee** (2015-16, and 2017-18) and facilitated recruitment of two faculty members in 2015-16. I am also serving as member of **Graduate committee** (2017-19) and have played key role in attracting high performer applicants to TAMU. In past five years, I have also served as a member on the thesis committee of 15+ doctoral students in last five years.

Impact on Diversity: My service goal is to enhance **recruitment and retention** of women and minorities in engineering to address the national need by increasing participation of underrepresented groups in the scientific and engineering workforce. In an effort towards this direction, I am actively engaged in TAMU's E3 Teacher Summer Research Program and research collaboration with High Schools. In addition, I am active in recruiting students through diversity and LSAMP program. At national level, I have served as a judge for The Siemens Competition in Math, Science & Technology.

PROFESSIONAL SERVICE & AFFILIATION:

- **Departmental, College and University Service:**
 - Departmental
 - BMEN Graduate Committee (2017-18)
 - BMEN Faculty search committee (2015-16, 2017-18)
 - BMEN Research Development Committee (2017-18)
 - Principle Investigator – Tissue Culture facility (ETB 3043) (Fall 2016-Current)
 - Principle Investigator – Regenerative Engineering Foundry (ETB 3039) (Summer 2017-Current)
 - Faculty Advisor - BME Ambassadors (Summer 2017-current)
 - Faculty Advisor - BME Graduate Student Association (BMEGSA) (Fall 2014-Summer2015)
 - University
 - College of Engineering Representative, Council of Principal Investigators (CPI) (2018-2021)
 - College
 - Chair, Junior Engineering Faculty Advisory Council (JFAC) (2017-2019)
- **Professional Society Service:**
 - Session Organizer, 2018 Society for Biomaterials Annual meeting, Atlanta, GA

- Session Organizer, 2017 Society for Biomaterials Annual meeting, Minneapolis, MN
 - Abstract reviewer – Society for Biomaterials Annual Meeting (2013-Current)
 - Abstract reviewer - Biomedical Engineering Society (BMES) Annual Meeting (2013-Current)
 - Session Organizer, IEEE NanoMed 2015 Conference, Hawaii
 - Session Organizer, 2015 Society for Biomaterials Annual meeting, Charlotte, NC
 - Session Chair, 2015 American Chemical Society, Denver, CO
 - Symposium Organizer & Session Chair, 36th Annual meeting IEEE-EMBS, Chicago, IL
 - Session Chair, 2013 Society for Biomaterials Annual meeting, Boston, MA
 - Session Chair. 2012 Biomedical Engineering Society (BMES) Annual meeting, Seattle, WA
- **Proposal Reviewer:**
 - Department of Defense (DOD)
 - National Institute of Health (NIH), National Cancer Institute.
 - National Science Foundation (NSF) – BMAT, CBET, SBIR
 - Swiss National Science Foundation (SNSF), Berne, Switzerland.
 - UK Medical Research Council (London, UK)
 - Natural Sciences and Engineering Research Council of Canada (NSERC)
 - National Science Foundation Graduate Research Fellowship (NSF-GRF),
 - National Medical Research Council, Ministry of Health, Singapore.
 - Israel Science Foundation (ISF), Jerusalem, Israel.
 - University Research Board (URB), American University of Beirut (AUB)
 - National Science Centre, Krakow, Poland
 - LA Board of Regents Pfund, Baton Rouge, LA
- **Journal Reviewer (60+ Journals):**
 1. Acta Biomaterials (Elsevier),
 2. ACS Nano (ACS),
 3. ACS Applied Materials and Interfaces (ACS)
 4. Advanced Drug Delivery Reviews (Elsevier),
 5. Advanced Materials (Wiley),
 6. Advanced Engineering Materials (Wiley),
 7. Advanced Functional Materials (Wiley),
 8. Advanced Healthcare Materials (Wiley),
 9. Advanced Science (Wiley),
 10. Applied Clay Science (Elsevier),
 11. Biomacromolecules (ACS),
 12. Biomatter (Landes Bioscience),
 13. Biomaterials (Elsevier),
 14. Biomedical Materials (IOP),
 15. Biomedical Microdevices (IOP),
 16. Biotechnology Progress (ACS),
 17. Bioprinting (Elsevier),
 18. Current Opinion in Chemical Engineering (Elsevier),
 19. Colloids and Surfaces A: Physicochemical and Engineering Aspects
 20. Colloids and Surfaces B: Biointerfaces (Elsevier),
 21. European Polymer Journal (Elsevier),
 22. IEEE Transactions on NanoBioscience (IEEE)
 23. International Journal of Nanoparticles (Inderscience),
 24. International Journal of Nanomedicine (Dove Press),

25. Journal of Biomedical Materials Research: Part A (Wiley),
26. Journal of Biomedical Materials Research: Part B - Applied Biomaterials (Wiley),
27. Journal of Biotechnology & Biomaterials (OMICS),
28. Journal of Controlled Release (Elsevier),
29. Journal of the Mechanical Behavior of Biomedical Materials (Elsevier),
30. Journal of Materials Chemistry B (Royal Society of Chemistry),
31. Journal of Micromechanics and Microengineering (IOP),
32. Journal of Nanoparticles Research (Springer),
33. Journal of Visualized Experiments,
34. Journal of Inorganic and Organometallic Polymers and Materials (Springer),
35. Journal of Polymer Science: Polymer Physics (Wiley),
36. Macromolecular Bioscience (Wiley),
37. Macromolecular Chemistry and Physics (Wiley),
38. Macromolecules (Wiley),
39. Materials Design (Elsevier),
40. Materials Research Express (IOP),
41. Materials Research Bulletin (Elsevier),
42. Materials Science and Engineering C (Elsevier),
43. Nanotechnology (IOP),
44. Nano Today (Elsevier),
45. Nano Letters (ACS)
46. Nanoscale (RSC)
47. Nature
48. Nature Materials
49. Nature Nanotechnology
50. NGP Asia Materials
51. PLOS One,
52. Polymer (Elsevier),
53. Polymer International (Wiley)
54. Physica Scripta (Elsevier),
55. RSC Advances (RSC),
56. Results in Pharma Sciences (Elsevier),
57. Scientific Reports (Nature)
58. Soft Matter (RSC),
59. Smart Materials and Structures (IOP),
60. Tissue Engineering Part A, B and C (Mary Ann Liebert).
61. Trends in Biotechnology

- **Reviewer for Conferences:**

- BMES Annual Meeting (Tissue Engineering Track, 2013-2015; Stem Cell Engineering Track, 2014-2017; Nano and Micro Technologies Track, 2015;)
- Society For Biomaterials (2013, 2014, 2015, 2017)

- Book Proposal Reviewer – John Wiley & Sons, Elsevier, Springer.

- **Member of Professional Societies:**

- Institute of Electrical and Electronics Engineers (IEEE) Engineering in Medicine and Biology Society (EMBS),
- Biomedical Engineering Society (BMES),

- Society For Biomaterials (SFB),
- Tissue Engineering & Regenerative Medicine Society (TERMIS-USA),
- Materials Research Society (MRS),
- Sigma Xi - The Scientific Research Society,
- American Association for the Advancement of Science (AAAS)
- Life Member: Materials Research Society of India (MRSI), India
- Associate Member: Institute of Nanotechnology (IoN), UK

EDUCATIONAL OUTREACH

- **STEM 4 Innovation (February, 21 2019, Texas A&M University):**
Description of Activity: Interactive experiential event for K-12 STEM educators across the state of Texas; Designed a 2.5 hour workshop for 10 STEM educators. Designed and provided educators with a lecture on tissue engineering concepts, gave a tour of our the lab, and Designed an hour-lab for educators to participate in the gain the experience of research to bring back to their classrooms

- **Enrichment Experiences in Engineering (E3) (July 11 - July 27 2018, Texas A&M University)**
Description of Activity: Hosted a middle school science teacher in the lab for a two-and-a-half week summer engineering research experience for Texas secondary science teachers.
 Hosted and mentored a biology, physics, and chemistry teacher → taught basic engineering principles and research techniques to take back to the classroom and teach students
 Presented a poster at the end of the program to showcase research performed over the duration of the program and a lesson planned designed to bring back to the classroom

- **Society For Biomaterials Education Challenge (Society for Biomaterials Annual Meeting, Atlanta, GA → April 11 - 14, 2018 (First Place) and Minneapolis, MN → 4/04 - 4/08 (First Place))**
Description of Activity: Designed a lecture for middle school biomaterial education outreach and assessed student performance before and after lecture to monitor improvement of topic
 - i. Performed at two different middle schools and modified/adjusted for improvements
 - ii. Organized and designed lesson plans for middle school STEM educators
 - iii. Presented a poster of results at the SFB annual meeting education challenge, representing Texas A&M University

- **Texas Science and Engineering Fair Senior Judge Captain (Texas A&M University, March, 2019)**
Description of Activity: Judge Texas senior level finalist at the state science and engineering fair. Led a group of judges and organized assessment of students to finalize first, second, and third place prizes and individuals to advance and compete in the Intel International Science and Engineering Fair (ISEF)

- **Middle School Outreach (Texas A&M Consolidated Middle School, Third week of every month since 2013)**
Description of Activity: Designed a lecture for middle school biomaterial education outreach and assessed student performance before and after lecture to monitor improvement of topic

- **Retirement Community Outreach (Watercrest at Bryan - Independent Living Apartments, June 15, July 16, and November 16 (2018))**
Description of Activity: Providing a description of Biomedical Engineering to retirement communities in order to explain scientific research and recent advancements to members of the community and foster greater understanding for the field.

- **BioFORCE (Texas A&M University, July 25, 2017)**
Description of Activity: Garnering high-school student interest in STEM fields by providing a lab tour, answering questions about jobs in research, and performing a demo about 3D printing
- **Aggieland Saturday (Texas A&M University, February 9 (2019), February (2018), February (2017))**
Description of Activity: Day of recruiting and garnering interest of highschool students for Biomedical Engineering by performing demonstrations of hydrogel swelling and de-swelling, shape memory polymer functions, and expandable polyurethane scaffoldings in the context of biomedical engineering applications.
- **Louis Stokes Alliance for Minority Participation (Hilton, College Station TX, April 11-12, 2019)**
Description of Activity: Meeting incoming minority students and discussing competitive graduate school applications to support them in their application process for graduate school.
- **Biomedical Graduate Student Association Annual Symposium (Texas A&M University, August 22 (2017), August 21 (2018))**
Description of Activity: Organized, planned, and designed a research symposium for the Biomedical Engineering Department in order to allow students to present their research in an academic setting
- **Big Event (College Station, TX, March 30, 2019)**
Description of Activity: Outreach in which members of the lab performed community service to help members of the community clean up their homes, as well as provided an opportunity for community members to learn more about what graduate students are involved in and work on at Texas A&M University.

CONFERENCE ORAL PRESENTATIONS

1. Gold K., Dedas R., Jain A., **Gaharwar A.K.** “*3D Bioprinting of Tissue Engineered Vascular Graft with Nanoengineered Colloidal Inks*” Society for Biomaterials 2018 Annual Meeting & Exposition, Atlanta, Georgia, 2018.
2. Cross L.M., Carrow J.K., Muscarello M., **Gaharwar A.K.**, “*Two-dimensional Nanosilicates for Therapeutic Protein Delivery*”. (2018 SFB Annual Meeting (Atlanta, GA)).
3. Cross L.M., Carrow J.K., Muscarello M., **Gaharwar A.K.**, “*Nanosilicates for Sustained Therapeutic Delivery to Direct Stem Cell Fate*”. (2017 BMES Annual Meeting (Phoenix, AZ)).
4. Peak C.W., Stein J.S., Gold K.A., **Gaharwar A.K.**, “*Designing Shear-thinning Nanoengineered Ink for 3D Printing*”, Biomedical Engineering Society Annual Conference, Phoenix, AZ, October 12, 2017
5. Peak C.W., Stein J.S., Gold K.A., **Gaharwar A.K.**, “*Designing Shear-thinning Nanoengineered Ink for 3D Printing*”, BMEN Research Symposium, August 22, 2017, College Station, TX
6. Peak C.W, Carrow J., Thakur A., Singh A., **Gaharwar A.K.***, “*Elastomeric Cell-laded Nanocomposite Microfibers for Engineering Complex Tissues*”, 2015 BMES 2015 Annual Meeting, Tampa (2015).
7. Cross L., Palani S., **Gaharwar A.K.***, “*Nanocomposite Gradient Hydrogel for Interface Tissue Engineering*”, 2015 BMES 2015 Annual Meeting, Tampa (2015).
8. Yegappan R., Jivan F., **Gaharwar A.K.**, Alge D., “*Sequential click reactions for the polymerization and functionalization of PEG hydrogel microparticles*”, 2015 BMES 2015 Annual Meeting, Tampa (2015).

9. Jaiswal M.K., Xavier J., Desai P., Carrow J.K., Alge D., **Gaharwar A.K.***, “*Mechanically Stiff Hydrogels Using Nanoparticles as Crosslink Epicenter at Ultralow Content*”, 2015 BMES 2015 Annual Meeting, Tampa (2015).
10. Carrow J.K., Thakur A., Lokhande G., Cross L., **Gaharwar A.K.***, “*Bioinspired Silicate Nanocomposites for Osteoarthritis Therapy*”, 2015 BMES 2015 Annual Meeting, Tampa (2015)
11. Thakur T., Xavier J., Cross L., Jaiswal M.K., **Gaharwar A.K.***, “*Nanohydroxyapatite Gelatin Hydrogels for Biomimetic Bone Tissue Engineering*”, 2015 BMES 2015 Annual Meeting, Tampa (2015)
12. Jaiswal M.K., Xavier J., Desai P., Carrow J.K., **Gaharwar A.K.***, “*Ultrastiff nanocomposite hydrogels for biomedical applications*”, ACS 249th National Meeting & Exposition being held in Denver, CO.
13. Xavier J., Carrow J.K., Thakur T., Desai P., Cross L., Jaiswal M.K., **Gaharwar A.K. ***, “*Nanoengineered polymeric biomaterials for musculoskeletal tissue engineering: A growth-factor-free approach*”, ACS 249th National Meeting & Exposition being held in Denver, CO.
14. Kerativitayanan P., **Gaharwar A.K.***, “*Elastomeric and mechanically stiff nanocomposite for bone tissue engineering*”, ACS 249th National Meeting & Exposition being held in Denver, CO.
15. Carrow J.K., Lokhande G. **Gaharwar A.K.***, “*Bioinspired Silicate Nanocomposites for Osteoarthritis Therapy*”, 2015 Society For Biomaterials Annual Conference, Charlotte (2015)
16. Jaiswal M.K., Xavier J., Desai P., Carrow J.K., **Gaharwar A.K.***, “*Ultrastiff nanocomposite hydrogels for biomedical applications*”, 2015 Society For Biomaterials Annual Conference, Charlotte (2015)
17. Xavier J., Thakur T., Desai P., **Gaharwar A.K. ***, “*Nanoengineered Bioactive Hydrogels for Cells-based Tissue Engineering*”, 2015 Society For Biomaterials Annual Conference, Charlotte (2015)
18. **Gaharwar A.K***, Mihaila S., Swami A., Patel A., Sant S., Reis R., Marques A., Gomes M., Khademhosseini A., “*Bioactive Silicate Nanoplatelets for Osteogenic Differentiation of Human Mesenchymal Stem Cells*”, 2014 Society For Biomaterials Annual Conference, Colorado (2014)
19. **Gaharwar A.K.**, Nikkhah M., Sant S., Patel A., Mihaila S., Khademhosseini A, “Effect of PGS-PCL Electrospun Fibers Orientation on Alignment and Proliferation of Human Umbilical Vein Endothelial Cells”, 2013 Society For Biomaterials Annual Conference (April 10-13 2013, Boston)
20. **Gaharwar A.K.**, Hongbin Z., Patel A., Mihaila S., Iviglia G., Mukundan S., Bae H., Yang H., Khademhosseini A, “Hyperbranched Polyester Hydrogels with Controlled Drug Release Properties for Cellular Therapies” 2013 CMBE-BME Meeting (Jan 2-5, 2013, Waimea, Hawaii)
21. **Gaharwar A.K**, Mihaila S., Marques A., Gomes M., Reis R., Khademhosseini A., “Methacrylated kappa-Carrageenan as a Photocrosslinkable Biopolymer for Tissue Engineering Applications”, *BMES 2012 Annual Meeting* (Oct 24-27th) Atlanta, GA
22. **Gaharwar A.K.**, Patel A., Zhang H., Mihaila S., Shin S-R, Rangarajan K., Khademhosseini A., “Elastomeric, Degradable and Electroconducting Nanocomposites for Neural Tissue Engineering”, *International Congress of Interventional Neurology*”, (Sept 6-8th, 2012) Minneapolis, MN
23. **Gaharwar A. K.**, Kishore V., Rivera C., Wu C-J., Pavalko W., Akkus O., Schmidt G.*, “Design and Development of Silicate Nanocomposites for Orthopedic Tissue Repair”, 2011 Materials Research Society Fall Meeting, Nov 28 – Dec 3 in Boston, MA
24. **Gaharwar A. K.**, Kishore V., Pavalko W., Akkus O., Schmidt G.*, “Osteogenic Differentiation of Human Mesenchymal Stem Cells on Silicate Cross-linked Poly(ethylene Oxide)” 2011 Biomedical Engineering Society Annual Meeting, October 12-15, 2011 in Hartford, Connecticut
25. **Gaharwar A. K.**, Rivera C., Wu C-J., Schmidt G.*, “Transparent, Elastomeric and Tough Bio-Nanocomposite Hydrogels from Poly(ethylene glycol) and Silicate Nanoparticles”, 2011 Biomedical Engineering Society Annual Meeting, October 12-15, 2011 in Hartford, Connecticut

26. **Gaharwar A. K.**, Schexnaider P., Wu C.-J., Schmidt G.*, “Silicate cross-linked polyethylene oxide for the development of orthopedic biomaterials”, *Biomaterials Day, Case Western Reserve University, Nov 6, 2010 in Cleveland, OH*
27. Schmidt G.*, Schexnaider P.J., **Gaharwar A. K.**, Wu C.-J., “Relating Molecular Self-Assembly to Mechanical Strength in Nanocomposite Hydrogels”, Society for Engineering Science (SES), 47th Annual Technical Meeting, Oct 2010, Ames, OH
28. **Gaharwar A. K.**, Schexnaider P., Dundigalla A., Seifert S., Wilker J., Schmidt G.*, “Highly Extensible Bio-nanocomposite Fibers”, *Biomaterials Day, Case Western Reserve University, Nov 6, 2010 in Cleveland, OH*
29. Wu C.-J., **Gaharwar A. K.**, Schmidt G.*, “Photopolymerizable Nanocomposite Hydrogels with Robust Mechanical Properties for Orthopedic Applications”, *Biomaterials Day, Case Western Reserve University, Nov 6, 2010 in Cleveland, OH*
30. **Gaharwar A. K.**, Schexnaider P. and Schmidt G.*, “Osteoblast Adhesion and Proliferation on Silicate Containing Nanocomposites”, *Society for Biomaterials 2010 Annual Meeting and Exposition: April 21 - 24, 2010 in Seattle, Washington, USA*
31. **Gaharwar A. K.**, Schexnaider P. and Schmidt G.*, “Control cell adhesion, proliferation and differentiation on silicate cross-linked polyethylene oxide”, *PUSFB Biomaterials Evening Research Symposium: April 15, 2010 in West Lafayette, IN*
32. **Gaharwar A. K.**, Schexnaider P., Jin Q., Wu C.-J., and Schmidt G.*, “Poly(ethylene oxide)-silicate cross-linked bio-nanocomposite with incorporated chitosan for bone repair”, *Advances in Bioactive Materials and Interfaces for Therapeutics and Diagnostics - Biomaterials Day (Society For Biomaterials), Sept 25 2009 at Lexington, KY*
33. **Gaharwar A. K.**, “Nanomaterials for biomedical applications: current trend and future prospect”, *National Institute of Technology-Nagpur, India (Aug 2009) [Invited]*
34. **Gaharwar A. K.**, Schexnaider P., White J., Seifert S., Kaul V., Akkus O., Wilker J., Dundigalla A., and Schmidt G.*, “New bionanocomposite fibers from PEO and silicate cross-linkers”, *236th American Chemical Society (ACS) National Meeting, Aug 16-21st 2008 at Philadelphia, PH*
35. **Gaharwar A. K.**, Schexnaider P., White J., Seifert S., Kaul V., Akkus O., Wilker J., Dundigalla A., and Schmidt G.*, “Development of Silicate Cross-Linked Bio-Nanocomposites for Cartilage and Bone Repair”, *2008 BME Summer Seminar, Purdue University, June 25th 2008 at West Lafayette, IN [Invited]*
36. **Gaharwar A. K.**, Kaul V., Dundigalla A., Akkus O., and Schmidt G.*, “Structure and mechanical properties of PEO-Laponite films made from gels”, *235th American Chemical Society (ACS) National Meeting, April 6-10th 2008 at New Orleans, LA*
37. **Gaharwar A. K.**, Wong J.E., Müller-Schulte D., Bahadur D., Richtering W., “Encapsulated Magnetic Nanoparticles for Biomedical Applications”, *Tata Research Development and Design Centre (TRDDC), Feb 16th 2007 at Pune, India [Invited]*
38. **Gaharwar A. K.**, Wong J.E., Müller-Schulte D., Bahadur D., Richtering W., “Thermoresponsive Magnetic Nanoparticles for Biomedical Applications”, *Dept. Metallurgical Engg and Mats Science, IIT-Bombay, Nov 14th 2006 at Mumbai, India*
39. **Gaharwar A. K.**, Wong J.E., Müller-Schulte D., Bahadur D., Richtering W., “Dual Responsive Nanoparticles for Drug Delivery Applications”, *Institut für Physikalische Chemie - RWTH Aachen University, May 15th 2006 at Aachen, Germany*
40. **Gaharwar A. K.**, Wong J.E., Müller-Schulte D., Bahadur D., Richtering W., “Layer-by-Layer Assembly of Magnetic Nanoparticles on Thermoresponsive PNIPAM microgel”, *Institut für Physikalische Chemie - RWTH Aachen University, Jan 16th 2006 at Aachen, Germany*
41. **Gaharwar A. K.**, Gupta M., “Development of Novel Magnesium Composite Reinforced with Nano Copper”, *Proceeding of 2nd In House Symposium on Material Research (MR05), 21th Feb 2005 at IIT-B, Mumbai, India*

CONFERENCE POSTER PRESENTATIONS

42. Carrow J.K., Cross L.M., Singh I., Reese R.W., Jaiswal M.K., Gregory C.A., Kaunas R., **Gaharwar A.K.** “Whole Transcriptome Analysis of Two-Dimensional Nanosilicates to Discern Pivotal Cellular Pathways” (poster) Cell and Molecular Bioengineering, January 2-6, 2018 Key Largo, FL
43. Gold K*, Jain A, **Gaharwar AK.** “3D Bioprinted In Vitro Model of Atherosclerotic Vascular Tissue” Texas A&M Biomedical Engineering Annual Symposium, College Station, Texas, 2017. [Poster]
44. Muscarello M.*, Cross L.M., **Gaharwar A.K.**, Effect of Minerals on Human Mesenchymal Stem Cells, (2017 BMES Annual Meeting (Phoenix, AZ)).
45. Cross L.M.*, Carrow J.K., Muscarello M., **Gaharwar A.K.**, Nanosilicates for Sustained and Therapeutic Delivery to Direct Stem Cell Fate, (2017 SFB Biomaterials Day (Austin, TX)). [First Place - Poster]
46. Muscarello M.*, Cross L.M., **Gaharwar A.K.**, The Effect of Minerals on Human Mesenchymal Stem Cell Fate, (2017 SFB Biomaterials Day (Austin, TX)).
47. Carrow J.K.*, Cross L.M., Reese R., Kaunas K., Gregory C., **Gaharwar A.K.**, Discerning pivotal cellular pathways stimulated by two-dimensional (2D) nanomaterials using whole transcriptome sequencing, (2017 SFB Biomaterials Day (Austin, TX)).
48. Shah K.*, Cross L.M., **Gaharwar A.K.**, Designing a Hydrogel-Loaded Gradient Microarray, (2016 BMES Annual Meeting (Minneapolis, MN)).
49. Chen J., Makhani W., Adlouni M., Kumar R., Bergh C., Hong J., Krause R., Rosa J., Nguyen Q., Sliva S., Akpabio I., Lilly J., Peak C.W., **Gaharwar A.K.**, “3-D Bioprinted Cancer Models & Spatial Mapping of 3-D Printed Constructs”, Biomedical Engineering Society Annual Conference, Phoenix, AZ, October 17, 2017
50. Peak C.W., Stein J.S., **Gaharwar A.K.**, “Designing Shear-thinning Nanoengineered Ink for 3D Bioprinting”, Biomaterials Day, University of Texas, Austin, Texas, June 2, 2017
51. Koyfman A.Y., Peak C.W., Appavu R., **Gaharwar A.K.**, Rudra J.S., “Self-Assembly of Heterochiral Peptides with Varied Sequence Patterns”, Biomedical Engineering Society Annual Conference, Minneapolis, MN, October 6, 2016
52. Jalili N., Jaiswal M., **Gaharwar A.K.***, “Injectable Thermoresponsive Hydrogel for Protein Release”, 2015 BMES 2015 Annual Meeting, Tampa (2015).
53. Lokhande G., Xavier J.R., **Gaharwar A.K.***, “Nanoengineered Composite Hydrogels as Hemostatic Agents”, 2015 BMES 2015 Annual Meeting, Tampa (2015).
54. Griffin J.M., Peak C.W, Carrow J., Thakur A., Cross L., **Gaharwar A.K.***, “*Hydrogels from Poly(ethylene glycol) Reinforced with Aluminum Oxide Nanoparticles*”, 2015 BMES 2015 Annual Meeting, Tampa (2015).
55. Peak C.W, Carrow J., Thakur A., **Gaharwar A.K.***, “Microfiber Fabrication from Nanoparticle Polymeric Solutions for Cellular Encapsulation”, 2015 BMES 2015 Annual Meeting, Tampa (2015).
56. Joshi P., Keratitayanan P., **Gaharwar A.K.***, “*Synthesis and Fabrication of Porous PGS-Nanosilicate Scaffolds for Bone Tissue Engineering*”, 2015 BMES 2015 Annual Meeting, Tampa (2015).
57. Xavier J.R., Desai, P., Thakur, T., **Gaharwar, A. K.**, “Bioactive Nanocomposites from 2D Silicate Nanoparticles and Gelatin”, Texas A&M University Biomaterials Day, College Station, TX (June, 2014)
58. Desai, P., Venkataramanan, A.; Jaiswal, M., Purwada, A., Carrow, J., Singh, A., **Gaharwar, A. K.***, “Nanoengineered Amphiphilic Particles for Drug Delivery Applications”, Texas A&M University Biomaterials Day, College Station, TX (June, 2014)
59. Keratitayanan P. , **Gaharwar A.K.***, “Engineering Elastomeric and Mechanically Stiff Nanocomposite by Covalently Crosslinking Poly(glycerol sebacate) and Silicate Nanoplatelets”, *247th ACS National Meeting & Exposition, Dallas (2014)*
60. Keratitayanan P. , **Gaharwar A.K.***, “Engineering Elastomeric and Mechanically Stiff Nanocomposite by Covalently Crosslinking Poly(glycerol sebacate) and Silicate Nanoplatelets”, 2014 Society For Biomaterials Annual Conference, Colorado (2014)

61. Paul A., Kindi H. A., Hasan MD A., **Gaharwar A.K.**, Nikkhah M., Dokmeci M.R., Shum-Tim D., Khademhosseini A., “Nanobioactive hydrogel for myocardial therapy applications” The 15th International Conference on Biomedical Engineering (ICBME 2013), (4 – 7 December 2013, Singapore).
62. **Gaharwar A.K.**, Mukundan S., Patel A., Hongbin Z., Mihaila S., Iviglia G., Khademhosseini A, “Nanoclay Enriched Electrospun Polycaprolactone Scaffolds for Bone Tissue Engineering”, 2013 Society For Biomaterials Annual Conference (April 10-13 2013, Boston)
63. **Gaharwar A.K.**, Hongbin Z., Patel A., Mihaila S., Iviglia G., Mukundan S., Bae H., Yang H., Khademhosseini A, “Hyperbranched Polyester Hydrogels with Controlled Drug Release and Cell Adhesion Properties” 2013 Society For Biomaterials Annual Conference (April 10-13 2013, Boston) [**Merit Award by Orthopedic SIG**]
64. Dolatshahi-Pirouz A., Guermani E., Hashmi B., **Gaharwar A. K.**, Nikkhah M., Aliabadi H., Camci-Unal G., Ingber D., Khademhosseini A., "High-Throughput Printing of Human Mesenchymal Stem Cells Inside 3D Microgels for Identification of Promising Osteogenic Microenvironments" *2012 IEEE-EMBS Micro and Nanotechnology in Medicine Conference*, Hawaii December 3-7, 2012
65. Patel A., **Gaharwar A.K.**, Zorlutuna P., Karaca E., Schukar L. Khademhosseini A., “Wnt5a Conjugated Poly(ethylene glycol) - Gelatin Composite for Vascularized Tissue Engineering” *Tissue Engineering Microenvironment I- in AICHE 2012 Annual Meeting, Pittsburg, PA Oct 2012* [**Abstract selected for Biochemical Engineering Journal Young Investigator Award for Prof. Khademhosseini**]
66. Patel A., **Gaharwar A.K.**, Zhang H., Khademhosseini A.*, “Poly (Glycerol Sebacate)-Carbon Nanotube Nanocomposites” *2012 MIT Polymer Day Symposium, MIT, Cambridge March 7 2012* ****Third Place in the Poster Session****
67. Mihaila S. M., **Gaharwar A K.**, Marques A. P., Gomes M E., Reis R. L., Khademhosseini A.*, “Tailoring kappa carrageenan properties towards tissue engineering applications”, *2012 MIT Polymer Day Symposium, MIT, Cambridge March 7 2012*
68. Seevaratnam D.J., Liu J., Swami A., Patel A., **Gaharwar A.K.**, Khademhosseini A., Farokhzad O.C, “Novel Elastomeric Polymers to Develop Nanoparticles for Delivery of Chemotherapeutic Drugs”, *2012 MIT Polymer Day Symposium, MIT, Cambridge March 7 2012*
69. Giorgio I., Patel A., **Gaharwar A.K.**, Mihaila S., Demarchi D., Khademhosseini A.*, “Novel Poly(glycerol sebacate)-co-Polyethylene Glycol for Soft Tissue Engineering”, *2012 MIT Polymer Day Symposium, MIT, Cambridge March 7 2012*
70. **Gaharwar A. K.**, Patel A., Mihaila S. M., Langer R. S., Khademhosseini A.*, “Design and Development of Bioactive Nanocomposite Hydrogels for Orthopedic Tissue Engineering”, *Wyss Institute 3rd Annual Retreat 2011, Boston MA November 21st, 2011*
71. **Gaharwar A. K.**, Dammu S. A., Canter J. M., Wu C-J., Schmidt G.*, “Highly Extensible, Tough and Elastomeric Nanocomposite Hydrogels from Poly(ethylene glycol) and Hydroxyapatite Nanoparticles”, *Midwest Biomedical Engineering Career Conference (MBECC) at Northwestern University in Evanston,IL April 1st, 2011.*
72. **Gaharwar A. K.**, Schexnailder P., Wu C-J., Kline B., Schmidt G.*, “Assessment of Using Laponite Cross-linked Poly(ethylene oxide) as Biomaterial for Bone Repair”, *2010 Biomedical Engineering Society Annual Meeting, October 6-9, 2010 in Austin, Texas*
73. Schexnailder P., Wu C-J., Dammu S., Rivera C., Canter J., Vaid S., **Gaharwar A.K.**, Schmidt G.*, “Mechanical Properties and in Vitro Cytocompatibility of Nanocomposite Polymer Hydrogels”, *2010 Biomedical Engineering Society Annual Meeting, October 6-9, 2010 in Austin, Texas*
74. Dammu S. , Vaid S., Canter J., **Gaharwar A.K.**, Schmidt G.*, “Assessment of Silicate Cross-linked Poly(ethylene oxide) Hydrogels for Orthopedic Tissue Repair”, *2010 Biomedical Engineering Society Annual Meeting, October 6-9, 2010 in Austin, Texas*
75. **Gaharwar A.K.**, Schexnailder P., Wu C-J., Jin Q., Schmidt G.*, “Chitosan Enhances Cell Adhesion and Spreading on Nanocomposite Films”, *2010 Biomedical Engineering Society Annual Meeting, October 6-9, 2010 in Austin, Texas*

76. Rivera C., Canter J., Vaid S., **Gaharwar A. K.**, Schmidt G.*, “Chemically Cross-linked Nanocomposite Hydrogels for Drug Delivery Systems”, *Weldon Intern Showcase, Purdue University, September 16, 2010 in West Lafayette*
77. Canter J., Rivera C., **Gaharwar A. K.**, Schmidt G.*, “Injectable PEO-HA Nanocomposite Hydrogels for Tissue Engineering Applications”, *Weldon Intern Showcase, Purdue University, September 16, 2010 in West Lafayette*
78. Schmidt G., Schexnailder P., **Gaharwar A.K.**, Wu C-J., “Relating Molecular Self-Assembly to Mechanical Strength in Nanocomposite Hydrogels”, *Society of Engineering Science ▪ 47th Annual Technical Meeting, Page 336, Oct 4-6 2010 in Amens, OH*
79. Canter J., Dammu S., Rivera C., **Gaharwar A. K.**, Schmidt G.* , “Cross-linked Nanocomposite Hydrogels for Viscoelastic Tissue Engineering Applications”, *Biomedical Engineering Graduate Student Association Research Symposium, July 29, 2010 in W Lafayette, IN*
80. **Gaharwar A. K.**, Schexnailder P., Jin Q., Wu C-J., Schmidt G.*, “Chitosan enhances adhesion and proliferation of osteoblast cells on nanocomposite films”, *Society for Biomaterials 2010 Annual Meeting and Exposition: Where Materials Meet Biology, April 21 - 24, 2010 in Seattle, Washington*
81. Schexnailder P., **Gaharwar A. K.**, Schmidt G.* “Addition of Silicate Nanoparticles to Poly(ethylene oxide) Controls Cell Adhesion”, *Society for Biomaterials 2010 Annual Meeting and Exposition: Where Materials Meet Biology, April 21 - 24, 2010 in Seattle, Washington*
82. Dammu S., **Gaharwar A. K.**, Wu C-J., Schmidt G.*, “Polymer-Hydroxyapatite Nanocomposite Hydrogels for Bone Tissue Engineering”, *2010 Undergraduate Research and Poster Symposium, Purdue University (7th April 2010)*
83. Vaid S., **Gaharwar A. K.**, Wu C-J., Schmidt G.*, “Tough and Elastomeric Nanocomposite Hydrogels for Tissue Engineering Applications”, *2010 Undergraduate Research and Poster Symposium, Purdue University (7th April 2010)*
84. **Gaharwar A. K.**, Schexnailder P., Schmidt G.*, “Design and Development of Nanocomposite Biomaterials for Orthopedic Tissue Repair”, *2010 Sigma Xi Poster Session (Purdue chapter), Feb 17, 2010 in West Lafayette, Indiana*
85. Schmidt G.*, Wu C-J., Schexnailder P., **Gaharwar A. K.** and Jin Q., “Development of Bio-nanocomposite Polymer Hydrogels for Drug Delivery and Tissue Engineering Applications”, *Materials Research Society - 2009 Fall Meeting, Dec 2009 at Boston, MA*
86. **Gaharwar A. K.**, Schexnailder P., Jin Q., Wu C-J., and Schmidt G.*, “Poly(ethylene oxide)-silicate cross-linked bio-nanocomposite with incorporated chitosan for bone repair”, *Advances in Bioactive Materials and Interfaces for Therapeutics and Diagnostics - Biomaterials Day (Society For Biomaterials), Sept 25 2009 at Lexington, KY*
87. Kline B., Schexnailder P., **Gaharwar A. K.**, G.Schmidt, “Controlling the Mechanical Properties of Nanocomposite Films with Ionic Concentration”, *Biomedical Engineering Graduate Student Association Research Symposium July 29, 2009 in W Lafayette, IN*
88. Schexnailder P., **Gaharwar A. K.**, C. Gustafson[#], G Schmidt, “Controlled cell adhesion properties of silicate cross-linked PEO nanocomposites”, *Advances in Bioactive Materials and Interfaces for Therapeutics and Diagnostics - Biomaterials Day, Sept 25 2009 at Lexington, KY*
89. **Gaharwar A. K.**, Schexnailder P., J. White, S. Seifert, V. Kaul, O. Akkus, J. Wilker, A. Dundigalla, and Schmidt G.*, “Development of Silicate crosslink bionanocomposite for biomedical applications”, *2008 Biomedical Engineering Society Annual Fall Meeting, Oct 2-4th 2008 at St. Louis, USA*
90. Schexnailder P., Jin Q., **Gaharwar A. K.**, Wu C-J., Schmidt G.*, “Development of Bio-Nanocomposite Hydrogels based on Silicate Cross-linked PEO for Tissue Engineering”, *TERMIS-EU 2008 Meeting – Porto, Portugal*
91. **Gaharwar A. K.**, Wong J. E.*, Müller-Schulte D., Richtering W., and Bahadur D., “Magnetic Nanoparticles – Polyelectrolyte Interaction : A Layered Approach for Biomedical Application”, *Particles*

2006 - *Medical/Biochemical Diagnostic, Pharmaceutical, and Drug Delivery Applications of Particle Technology, 13th-16th May 2006 at Orlando, Florida, USA*

92. **Gaharwar A. K.**, Wong J. E.*, Müller-Schulte D., Bahadur D., Richtering W., “Magnetic nanoparticle encapsulated within thermoresponsive polymer: Core-Shell particle”, *International Conference on Nano Science and Technology, February 27-29th 2008 at Chennai, India*
93. Wong J. E.*, **Gaharwar A. K.**, Müller-Schulte D., Bahadur D., Richtering W., “Dual-stimuli responsive hybrid core-shell system achieved via layer-by-layer assembly of polyelectrolytes and magnetic nanoparticles on a thermoresponsive microgel”, *21st Conference of the “European Colloid and Interface Society”- ECIS 2007, September 17th, 2007 at Geneva, Switzerland.*
94. **Gaharwar A. K.**, Wong J. E.*, Müller-Schulte D., Richtering W., and Bahadur D., “Magnetic Nanoparticles – Polyelectrolyte Interaction : A Layered Approach for Biomedical Application”, *International conference on Advance Nano Materials – ANM2007, Jan 8th-10th 2007 at Mumbai, India.*
95. Wong J. E.*, **Gaharwar A. K.**, Müller-Schulte D., Bahadur D., Richtering W., “Dual-Stimuli Responsive PNIPAM Microgel Achieved via Layer-by-Layer Assembly: Magnetic and Thermoresponsive”, *43rd Meeting of the German Colloid Society, Mainz, October 8-10th, 2007*
96. Wong J. E.*, **Gaharwar A. K.**, Müller-Schulte D., Bahadur D., Richtering W., “Layer-by-Layer Assembly of Polyelectrolytes and Magnetic Nanoparticles on Thermoresponsive Microgel: A Dual-Stimuli Responsive Hybrid Core-Shell System”, (a) *12th International Conference on ORGANIZED MOLECULAR FILMS (LB-12), Kraków, July 1-5, 2007[Oral]* ; (b) *International Congress on Particle Technology - Partech 2007, March 27th -29th, 2007 at Nuremberg, Germany [Oral]*
97. **Gaharwar A. K.**, Wong J. E.*, Müller-Schulte D., Richtering W., and Bahadur D., “Magnetic Nanoparticles – Polyelectrolyte Interaction: A Layered Approach for Biomedical Application”, *The 8th International Conference on Nanostructured Materials - Nano 2006, 20th-25th August, 2006 at IISc, Bangalore, India.*
98. Wong J. E.*, **Gaharwar A. K.**, Müller-Schulte D., Richtering W., and Bahadur D., “Magnetic Core - Thermoresponsive Shell: A Smart Synthesis Route”, *International Congress on Particle Technology - Partech 2007, March 27th -29th, 2007 at Nuremberg, Germany*
99. **Gaharwar A. K.**, Wong J. E.*, Bahadur D., Müller-Schulte D., Richtering W., “Novel Magnetic Nanoparticles Shell on a Thermoresponsive Microgel Core”, *6th International Symposium on Polyelectrolytes, 4th -8th Sept2006 at TU Dresden, Germany*
100. Wong J. E.*, **Gaharwar A. K.**, Müller-Schulte D., Bahadur D., Richtering W., “Magnetic Nanoparticles – Polyelectrolyte Interaction : A Layered Approach for Biomedical Application”, *6th International Symposium on Polyelectrolytes, 4th -8th Sept2006 at TU Dresden, Germany.*
101. **Gaharwar A. K.**, Konate N., Wong J. E.*, Müller-Schulte D., Richtering W., Bahadur D., “Encapsulated Magnetic Nanoparticles in Thermoresponsive Microgel”, *The 8th International Conference on Nanostructured Materials-Nano 2006, 20th-25th Aug 06 at Bangalore, India*
102. Wong J. E.*, **Gaharwar A. K.**, Müller-Schulte D., Bahadur D., Richtering W., “Magnetic Nanoparticles – Polyelectrolyte Interaction: A Layered Approach for Biomedical Application”, *COE-LCC Keio-Aachen joint symposium, RWTH-Aachen, 5th Oct., 2006, Aachen.*
103. Wong J. E.*, **Gaharwar A. K.**, Müller-Schulte D., Bahadur D., Richtering W., “Magnetic Nanoparticles – Polyelectrolyte Interaction: A Layered Approach for Biomedical Application”, *20th Conference of the European Colloid and Interface Society -ECIS2006, 18th-22th Sept., 2006, Budapest.*
104. Wong J. E.*, **Gaharwar A. K.**, Bahadur D., Müller-Schulte D., Richtering W., “Magnetic Nanoparticles Embedded on a Thermosensitive Microgel Core via a Layer-by-Layer Assembled Polyelectrolyte Shell”, *The 8th International Conference on Nanostructured Materials-Nano 2006, 20th-25th Aug 06 at Bangalore, India*
105. Wong J. E.*, **Gaharwar A. K.**, Müller-Schulte D., Richtering W., Bahadur D., “Novel Magnetic Nanoparticles Shell on a Thermoresponsive Microgel Core”, *6th International Conference on “The Scientific and Clinical Applications of Magnetic Carriers”, 17th – 20th May 2006 at Krems, Austria.*

106. **Gaharwar A. K.**, Konate N., Wong J. E.*, Müller-Schulte D., Richtering W., Bahadur D., “Novel route to Incorporate Magnetic Nanoparticles in Thermoresponsive Microgel”, *6th International Conference on “The Scientific and Clinical Applications of Magnetic Carriers”*, 17th – 20th May 2006 at Krems, Austria.
107. Wong J. E.*, **Gaharwar A. K.**, Bahadur D, Richtering W., and Müller-Schulte D., “Composite Thermoresponsive Microgel Core Decorated with Magnetic Nanoparticles”, *Particles 2006 - Medical/Biochemical Diagnostic, Pharmaceutical, and Drug Delivery Applications of Particle Technology*, 13th-16th May 2006 at Orlando, Florida, USA
108. **Gaharwar A. K.**, Wong J. E.*, Bahadur D, Müller-Schulte D., Richtering W., “Polyelectrolyte Multilayer Coating for Magnetic Nanoparticles”, *Zsigmondy Colloquium*, 6th-7th April 06 at TU Berlin, Germany