
BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Sarindr Bhumiratana

eRA COMMONS USER NAME (credential, e.g., agency login): bhumiratana

POSITION TITLE: Chief Scientific Officer

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Northwestern University	B.S.	06/2005	Biomedical Engineering
University of Michigan	M.S	12/2006	Biomedical Engineering
Columbia University	M.Phil.	05/2008	Biomedical Engineering
Columbia University	Ph.D.	10/2012	Biomedical Engineering

A. Personal Statement

As the Chief Scientific Officer of EpiBone, I possess extensive experience in both non-clinical and clinical research and product development in the field of orthopedic regeneration therapy utilizing mesenchymal stem cells (MSCs) for bone, cartilage, osteochondral, and connective tissues. My research and engineering development have resulted in intellectual properties that are integral to EpiBone's core technology. I am a lead inventor of over 11 patent families that encompass EpiBone's technology. I have developed innovative MSCs processing techniques and tissue maturation bioreactor systems to control MSCs differentiation towards specific tissue phenotypes and facilitate the formation of functional tissue. I am responsible for overseeing the development of Advanced Therapy Medicinal Products (ATMPs) and have successfully obtained US FDA-regulated IND clearances for two stem cell-based tissue-engineered medical products: an anatomical autologous tissue-engineered bone graft and an allogeneic tissue-engineered osteochondral graft. Additionally, I lead the R&D, engineering, quality, manufacturing, and clinical teams throughout the pre-clinical and clinical development phases. Selected relevant scientific publications are:

1. LE Keller, TN Kelly, JM Chevalier, HJ Jung, GB Pearson, L Begum, OS Beane, **S Bhumiratana**, and LA Fortier. Tissue-engineered osteochondral allograft versus equine osteochondral allograft: Comparable cartilage and subchondral bone repair in a 14-month equine osteochondral defect model. *The American Journal of Sports Medicine*, 2026. In pressed.
2. **Bhumiratana, S**, Bernhard, JC, Alfi, DM, Yeager K, Eton RE, Bova J, Shah F, Gimble JM, Lopez MJ, Eisig SB, Vunjak-Novakovic G. Tissue-engineered autologous grafts for facial bone reconstruction. *Science Translational Medicine*, 2016. 8(343)
3. **S Bhumiratana**, RE Eton, S Oungoulian, LQ Wan, GA Ateshian, and G Vunjak-Novakovic, Large, Stratified, and mechanically functional human cartilage grown in vitro by mesenchymal condensation, *Proc Natl Acad Sci*, 2014; 111(19):6940-5
4. **Bhumiratana, S**, Yeager K, and Vunjak-Novakovic G. Perfusion Bioreactor with Tissue Flow Control and Live Imaging Capability. U.S. patent publication number 14/782,630 (Publication Date: February 11, 2016)
5. WL Grayson, M Frohlich, K Yeager, **S Bhumiratana**, ME Chan, C Cannizzaro, LQ Wan, XS Liu, XE Guo, and G Vunjak-Novakovic, Engineering anatomically shaped human bone grafts, *Proc Natl Acad Sci*, 2010;108(8):3299-304

B. Positions and Honors

Positions and Employment

2014-present	Chief Scientific Officer, EpiBone Inc., New York, NY
2012-2014	Postdoctoral Fellow, Department of Biomedical Engineering, Columbia University, New York, NY
2007-2012	Graduate Student Research Assistant, Department of Biomedical Engineering, Columbia University New York, NY
2005-2006	Research Assistant, Department of Biomedical Engineering, University of Michigan, Ann Arbor, MI
2004-2005	Research Assistant, Department of Biomedical Engineering, Northwestern University, Evanston IL
2003	Shrimp Genome Project Laboratory Assistant (Summer Internship), Biochemistry Department, Chulalongkorn University, Bangkok, Thailand
2002	Protein Engineering Laboratory Assistant (Summer Internship), National Center for Genetic Engineering and Biotechnology, Bangkok, Thailand
2001	Bioassay Laboratory Assistant (Summer Internship), National Center for Genetic Engineering and Biotechnology, Bangkok, Thailand

Other Experience and Professional Memberships

2024-present	Member, International Society for Cell & Gene Therapy (ISCT)
2021-present	Member, ICRS
2021-2025	Leadership Advisory Council, Alliance of Regenerative Medicine Institute (ARMI)
2016-2017	Reviewer, NIH SBIR/STTR Special Review Panel
2010-2014	Member, Orthopedic Research Society
2013	Participant, Innovation and Entrepreneurship Program, Columbia University
2001-2005	Academic Technology Consultant, Northwestern University
2004-2005	Member, Biomedical Engineering Society
2006-2007	Member, The Association of Thai Professional in America and Canada (ATPAC)

Honors

2001-2005	Dean's List, Northwestern University, Evanston, IL
2012	Best Presentation Award, American Association of Oral and Maxillofacial Surgeons (AAOMS) Conference
2013	Best Presentation Award, American Association of Oral and Maxillofacial Surgeons (AAOMS) Conference

C. Contributions to Science

1. Engineering anatomical human bone graft from mesenchymal stem cells. This work demonstrated functional platform to engineer clinically relevant size anatomical human bone graft suitable for implantation. The regenerative quality of the tissue engineered bone graft was presented in large animal model. The clinically translatable technique to tissue engineer human bone in the laboratory has progressed the tissue engineering field closer toward clinical reality.
 - a. **Bhumiratana, S**, Bernhard, JC, Alfi, DM, Yeager K, Eton RE, Bova J, Shah F, Gimble JM, Lopez MJ, Eisig SB, Vunjak-Novakovic G. Tissue-engineered autologous grafts for facial bone reconstruction. *Science Translational Medicine*, 2016. 8(343)
 - b. WL Grayson, M Frohlich, K Yeager, **S Bhumiratana**, ME Chan, C Cannizzaro, LQ Wan, XS Liu, XE Guo, and G Vunjak-Novakovic, Engineering anatomically shaped human bone grafts, *Proc Natl Acad Sci*, 2010;108(8):3299-304
 - c. WL Grayson, D Marolt, **S Bhumiratana**, M Frohlich, XE Guo, and G Vunjak-Novakovic, Optimizing the medium perfusion rate in bone tissue engineering bioreactors, *Biotechnol Bioeng*, 2011;108(5):1159-70
 - d. WL Grayson, **S Bhumiratana**, C Cannizzaro, PHG Chao, DP Lennon, AI Caplan, and G Vunjak-Novakovic, Effects of initial seeding density and fluid perfusion rate on formation of tissue-engineered bone, *Tissue Engineering Part A*, 2008 Nov;14(11):1809-20

2. Engineering cartilage and osteochondral graft from mesenchymal stem cells. This study optimized the process to engineer native-like articular cartilage with cell pellet compression technique. Progression of cartilage formation with different level of chondrogenic maturity of the hMSC pellets was investigated. As a result, clinically sized pieces of human cartilage with physiologic stratification and biomechanics can be grown in vitro by recapitulating some aspects of the developmental process of mesenchymal condensation.
 - a. LE Keller, TN Kelly, JM Chevalier, HJ Jung, GB Pearson, L Begum, OS Beane, **S Bhumiratana**, and LA Fortier. Tissue-engineered osteochondral allograft versus equine osteochondral allograft: Comparable cartilage and subchondral bone repair in a 14-month equine osteochondral defect model. *The American Journal of Sports Medicine*, 2026. In pressed.
 - b. **S Bhumiratana**, RE Eton, S Oungouljian, LQ Wan, GA Ateshian, and G Vunjak-Novakovic, Large, Stratified, and mechanically functional human cartilage grown in vitro by mesenchymal condensation, *Proc Natl Acad Sci*, 2014; 111(19):6940-5
 - c. **S Bhumiratana**, WL Grayson, PHG Chao, CT Hung, and G Vunjak-Novakovic, Spatial regulation of human mesenchymal stem cell differentiation in engineered osteochondral constructs: effects of pre-differentiation, soluble factors and medium perfusion, *Osteoarthritis and Cartilage*, 2010;18(5):714-23
 - d. **S Bhumiratana**, and G Vunjak-Novakovic. Engineering mechanically functional human cartilage and method of making same. U.S. Patent Publication number WO2016118604A1 (Publication date: July 28, 2016)
3. Engineering mineral architecture by directing hMSC mineral deposition through scaffold features. A successful bone graft should ideally match the physiological properties of the implant location in addition to providing a platform for healing. Scaffolds used in bone tissue engineering need to resemble the extracellular matrix of bone tissue, and thereby providing infrastructure for the cells to reside, proliferate, differentiate, and assemble mechanically functional bone. This project demonstrated the process to control bone formation *in vitro* based on the understanding of physiologic tissue formation.
 - a. **S Bhumiratana**, WL Grayson, A Castaneda, DN Rockwood, ES Gil, DL Kaplan, and G Vunjak-Novakovic, Nucleation and growth of mineralized bone matrix on silk-hydroxyapatite composite scaffolds, *Biomaterials*, 2011;32(11):2812-20
 - b. DN Rockwood, ES Gil, SH Park, JA Kluge, WL Grayson, **S Bhumiratana**, R Rajkhowa, X Wang, SJ Kim, G Vunjak-Novakovic, and DL Kaplan, Ingrowth of human mesenchymal stem cells into porous silk particle reinforced silk composite scaffolds: An in vitro study, *Acta Biomaterialia*, 2011;7(1):144-51

Complete List of Published Work in MyBibliography:

<https://www.ncbi.nlm.nih.gov/myncbi/collections/bibliography/50523009/>

D. Additional Information: Research Support and/or Scholastic Performance

Completed Research Support

DoD Proposal: H2-0367	Bhumiratana (PI)	08/23/2018-08/22/2020
Injectable Off-the-Shelf Cell-Based Therapy Cartilage Filler		
The goal is to develop injectable cell-based cartilage filler from allogenic adipose-derived mesenchymal stem cells that has been primed toward chondrogenic development.		
Role: Principle Investigator		
DoD Proposal: H171-009-0021	Bhumiratana (PI)	10/15/2017-04/15/2018
Injectable Off-the-Shelf Cell-Based Therapy Cartilage Filler		
The goal is to develop injectable cell-based cartilage filler from allogenic adipose-derived mesenchymal stem cells that has been primed toward chondrogenic development.		
Role: Principle Investigator		

DoD Proposal: A161-049-1076

Bhumiratana (PI)

05/15/2017-11/14/2017

Production and maintenance of tissue-engineered human osteochondral grafts from human and rabbit cells

The goal is to develop tissue-engineered living osteochondral graft for articular cartilage repair from adipose-derived mesenchymal stem cells from various human donors and compare with rabbit adipose-derived stem cells for future pre-clinical testing.

Role: Principle Investigator

NIH Proposal: R44 DE024924

Bhumiratana (PI)

08/01/15-07/31/17

Engineered living bone grafts for complex craniomaxillofacial reconstructions

The goal is to conduct *in vivo* safety (host response) and efficacy (functional integration and bone remodeling) of tissue engineered anatomical bone graft using adipose-derived mesenchymal stem cells.

Role: Principle Investigator

NIH Proposal: R43 DE024671

Bhumiratana (PI)

09/15/14-06/30/16

Cellularized bone grafts for point-of-care complex craniofacial reconstructions

The goal is to develop a unique class of anatomically precise living bone grafts, a cellularized bone graft that can be prepared within ≤ 7 days to address the needs in trauma patients requiring complex CMF repair.

Role: Principle Investigator