

Anand K. Agarwal, MD

Position Title: University Research Professor and Orthopaedic Spine Surgeon, Engineering Centre for Orthopaedic Research Excellence (E-CORE), Department of Bioengineering and Orthopaedic Surgery, The University of Toledo

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a. Professional Preparation.

Institution	Major	Degree	Year
Maharani Laxmi Bai Medical College/India	Medicine	BS	1984
University of Bundelkhand/India	Medicine/Surgery	MB, BS	1991
Bezirksarztekammer Nordbaden/Germany	Medicine/Surgery	MD	1992
Bezirksarztekammer Nordbaden/Germany	Medicine/Surgery	Postgraduate	1998

b. Appointments.

08.2011-Present Research Professor and Orthopedic Spine Surgeon University of Toledo, Toledo, OH
05.2010 – 08.2011 Adjunct Prestigious Professor University of Toledo, Toledo, OH
05.2010 – Present Consultant Spine Surgeon Co-Founder Global Spine Care Private Practice, London
04.2010 – Present Chief Medical Advisor Spinal Ventures LLC, Brighton, MI
2006- 2010 Orthopedics and Trauma & Spinal Surgery Associate Specialist in Spine Surgery (Associate Professor) Medway Maritime Hospital Gillingham Kent
1999- 2006 Orthopedics and Trauma & Spinal Surgery Specialist Registrar Medway Maritime Hospital Gillingham Kent
1998- 1999 Orthopedics and Trauma 01.12.1998 to 16.05.1999 LAS Specialist Registrar St. Thomas Hospital London
05.1999 to 08.1999 Orthopedics and Trauma Locum Specialist Registrar, Maidstone Medway Maritime Hospital, Gillingham King George's Hospital, Ilford, Caerphilly District Miners Hospital, Caerphilly
05.1998 to 09.1998 Orthopedics and Trauma Locum Staff Grade, Queen Elizabeth II Hospital Welwyn Garden City
12.1988 – 03.1998 Orthopedics and Trauma
10.1997 – 12.1997 Locum Specialist Registrar, Medway Maritime Hospital, Windmill Road Gillingham, Kent
12.1997 – 02.1997 Orthopedics and Trauma
07.1997 – 08.1997 Locum Senior House Officer, The John Radcliffe Hospital, Headington OXFORD
04.1996 – 05.1997 Orthopaedics and Spinal Surgery Registrar, Klinikum Karlsbad Langensteinbach, Germany
03.1995 - 03.1996 Orthopaedics and Paediatric Orthopaedic Registrar, Clinic Dr. Tilman Gaertner, Schwarzwaldstraße 1 a, 75173 Pforzheim, Germany
09.1994 – 03.1995 Primary and Secondary Air Ambulance Save & Rescue Systems (A&E) Heliservice Mitte GmbH D - 63329 Egelsbach, Frankfurt Airport Germany
02.1993 - 08.1994 General Surgery & Traumatology Senior House Officer Department of Surgery and Traumatology, Sana Krankenhaus 75323 Bad Wildbad Germany
02.1992 – 01.1993 Pediatric Surgery, Pediatric Orthopaedics & Traumatology Senior House Officer Department of Pediatric Surgery, State General Hospital (Teaching), Karlsruhe Germany
06.1992 – 06.1997 Part Time Accident & emergency medicine Deutsches Rotes Kreuz - Ambulance Services Calw Germany
07.1990 – 07.1991 House Officer Rotation through General Surgery, Orthopaedics, Paediatrics, Obstetrics & Gynaecology, Social & preventive Medicines, Maharani Laxmi Bai Medical Hospital, Jhansi

c. Publications.

Publications Most Closely Related to the Proposed Work

- 1). Agarwal A, Palepu V, Agarwal AK, Goel VK, Yildirim ED. Biomechanical evaluation of an endplate-conformed polycaprolactone-hydroxyapatite intervertebral fusion graft and its comparison with a

- typical nonconformed cortical graft. *J Biomech Eng.* 2013 Jun;135(6):61005-9. doi: 10.1115/1.4023988. PubMed PMID: 23699717.
- 2). Zhou H, Luchini TJ, Agarwal AK, Goel VK, Bhaduri SB. Development of monetite-nanosilica bone cement: a preliminary study. *J Biomed Mater Res B Appl Biomater.* 2014 Nov;102(8):1620-6. doi: 10.1002/jbm.b.33149. Epub 2014 Mar 21. PubMed PMID: 24652701.
 - 3). Lin B, Zhou H, Leaman DW, Goel VK, Agarwal AK, Bhaduri SB. Sustained release of small molecules from carbon nanotube-reinforced monetite calcium phosphate cement. *Mater Sci Eng C Mater Biol Appl.* 2014 Oct 1;43:92-6. doi: 10.1016/j.msec.2014.06.027. Epub 2014 Jul 6. PubMed PMID: 25175192.
 - 4). Zhou H, Agarwal AK, Agarwal AK, Goel VK, Bhaduri SB. Microwave assisted preparation of magnesium phosphate cement (MPC) for orthopedic applications: a novel solution to the exothermicity problem. *Mater Sci Eng C Mater Biol Appl.* 2013 Oct;33(7):4288-94. doi: 10.1016/j.msec.2013.06.034. Epub 2013 Jun 28. PubMed PMID: 23910345.
 - 5). Pflugmacher R, Agarwal A, Kandziora F, K-Klostermann C. Balloon kyphoplasty combined with posterior instrumentation for the treatment of burst fractures of the spine--1-year results. *J Orthop Trauma.* 2009 Feb;23(2):126-31. doi: 10.1097/BOT.0b013e318193dad5. PubMed PMID: 19169105.

Other Significant Publications (Patents):

- 1). Bioactive Facet Fusion Device, Provisional Application, Serial No. 61/599,988, filed: Feb 17, 2012.
Inventors: Goel, Agarwal and Dick
- 2). An Injectable Load Bearing Alkaline Earth Phosphate Bone Cement and Method for Making the same, Provisional Application, Ref # D2012-39 (1-54319), U. S. patent office, filed: Sep 5, 2012.
Inventors: Bhaduri, Zhou, Agarwal, Goel
- 3). Injectable Biodegradable Bone matrix for Multiple Myeloma lesion Augmentation and osteoporosis USPTO Application No. 61/783,100, filed: Mar 14, 2013.
Inventors: Agarwal, Goel, Kim, Bhaduri, Lin
- 4). A Biosensor Device to Detect Infection in Real Time and Methods of Making Same, Provisional application, Ref # 61/775939 filed March 11, 2013, File No.: 1-54735.
Inventors: Anand K. Agarwal, Vijay K. Goel, Dong-Shik Kim, Do-Young Yoon, Boren Lin, Hamid Feyzizarnagh

d. Synergistic activities.

I am an orthopaedic surgeon, life science business strategist and entrepreneur in development of surgical instruments and implants for the past 10 years. Currently I am a Research Professor at the Engineering Center for Orthopaedic Research Excellence at the University of Toledo as Director of Product Development and Bio-Skills Laboratories. I have been serving as a coordinator to bridge scientific discoveries and product engineering.

e. Collaborators & other affiliations.

i). Collaborators

Sarit Bhaduri, Vijay Goel, Douglas Leaman, Dong-shik Kim, William Von Sigler
The University of Toledo

ii). Postdoctoral and Graduate Students Supervision

Boren Lin, PhD, Aakash Agarwal, PhD, Amirhesam Amerinatanzi, Joel Gerber, Mohammad-Saeid Asadollahi, Anoli Shah, Sushil Sudershan, Marcel Ingels
The University of Toledo

iii). Thesis advising. N/A