CURRICULUM VITAE

BIOGRAPHICAL

Name: Rocky S. Tuan, Ph.D.

Birth Place: ' Hong Kong, China

Business Address: Director, Center for Cellular and Molecular Engineering
Distinguished Professor & Executive Vice Chairman
Department of Orthopaedic Surgery
University of Pittsburgh School of Medicine
450 Technology Drive, Room 221
Pittsburgh, PA 15219

E-Mail Address: ' rst13@pitt.edu

EDUCATION and TRAINING '

UNDERGRADUATE: '

1969 – 1970	Berea College, Berea, KY	Chemistry
1970 – 1971	Swarthmore College, Swarthmore, PA	Chemistry
1971 – 1972	Berea College, Berea, KY	BA, Chemistry

GRADUATE:

1972 – 1977 ! Rockefeller University, New York, NY
Ph.D., Life Sciences (Biochemistry and Cell Biology)
Thesis: *Calcium Binding Protein of Chick Chorioallantoic Membrane*
Advisor: Dr. Zanvil A. Cohn

POSTGRADUATE:

1972-1973 ! Parasitology Laboratory, Rockefeller University
Genomic analysis of hemoflagellates and endosymbiotes
Advisors: Drs. William Trager and K.P. Chang

1973-1974 ! Biochemistry Laboratory, Rockefeller University
Solid phase synthesis of ferredoxin; Advisor: Dr. Robert B. Merrifield

1973 Physiology Research Program, Marine Biological Laboratory
Spasmoneme motility in peritrich ciliates; Advisor: Dr. Thomas Pollard

1974-1977 ! Laboratory of Cellular Physiology and Immunology, Rockefeller University
Ca^{2+}-binding protein of chorioallantoic membrane (Ph.D. Thesis)
Advisor: Dr. Zanvil A. Cohn

1977-1978 ! Research Fellow, Dept. of Orthopaedic Surgery, Harvard Medical School
Children's Hospital, Boston
Embryonic vitamin K metabolism and calcium transport
Advisor: Dr. Melvin J. Glimcher

1978-1980 Research Fellow, Department of Medicine, Harvard Medical School
Developmental Biology Laboratory, Massachusetts General Hospital
Regulation of embryonic skeletogenesis

	Advisor: Dr. Jerome Gross
1980	Assistant in Biochemistry, Department of Medicine, Massachusetts General Hospital

APPOINTMENTS and POSITIONS

1980	Instructor in Medicine, Harvard Medical School
1980-1990	Assistant/Associate Professor/Adjunct Professor, Department of Biology, University of Pennsylvania, Philadelphia
1988-2003	Professor, Department of Orthopaedic Surgery, and Dept of Biochemistry and Molecular Biology, Thomas Jefferson University, Philadelphia
1988-2001	Director, Orthopaedic Research Laboratory, Thomas Jefferson University
1992-1995	Academic Director, M.D.-Ph.D. Program, Thomas Jefferson University
1996-2001	Vice Chairman, Dept of Orthopaedic Surgery, Thom. Jefferson University
1998-2001	Director, Cell and Tissue Engineering Ph.D. Program, Thom. Jefferson U.
1997-2003	Adjunct Professor, Biomedical Engineering, Drexel Univ., Philadelphia
2001-2009	Chief, Cartilage Biology and Orthopaedics Branch National Institute of Arthritis, and Musculoskeletal and Skin Diseases, National Institutes of Health, Bethesda
2002-2010	Adjunct Professor, Department of Orthopaedic Surgery George Washington University School of Medicine, Washington D.C.
2002-2010	Adjunct Professor, Department of Orthopaedic Surgery Georgetown University School of Medicine, Washington D.C.
2009-present	Director, Center for Cellular and Molecular Engineering, University of Pittsburgh School of Medicine
2009-present !	Professor and Executive Vice Chairman for Orthopaedic Research Department of Orthopaedic Surgery, Arthur J. Rooney, Sr. Chair in Sports Medicine, University of Pittsburgh School of Medicine
2009-present !	Professor, Department of Bioengineering and Department of Mechanical Engineering and Materials Science, University of Pittsburgh Swanson School of Engineering
2010-present	Co-Director, Armed Forces Institute of Regenerative Medicine
2012-present	Visiting Professor, Shanghai Jiaotong University School of Medicine, China
2012-present	Founding Director, Center for Military Medicine Research, University of Pittsburgh School of Medicine
2012-present	Associate Director, McGowan Institute for Regenerative Medicine, University of Pittsburgh/UPMC
2014-present	Distinguished Professor, University of Pittsburgh
2016-present	Member, Board of Trustees, Berea College
2016-present	Distinguished Visiting Professor and Director, Institute for Tissue Engineering and Regenerative Medicine, The Chinese University of Hong Kong

MEMBERSHIPS in PROFESSIONAL and SCIENTIFIC SOCIETIES

1972-1977 !	New York Choral Society
1977-1979 !	Tanglewood Festival Chorus of the Boston Symphony Orchestra
1984-1988 !	Mendelssohn Club of Philadelphia
1980-present !	Society for Developmental Biology
1986-present !	American Society for Cell Biology
1988-present !	Orthopaedic Research Society
1991-present !	American Society of Bone and Mineral Research
1995-present !	Biomedical Engineering Society
2001-present !	Teratology Society
2002-present !	Tissue Engineering Regenerative Medicine International Society
2004-present !	Osteoarthritis Research Society International
2005-present !	Society for Physical Regulation in Biology and Medicine
2007-present !	International Society for Stem Cell Research
2009-present !	American Society for Matrix Biology
2010-present !	International Cartilage Repair Society
2011-present !	American Association of Anatomists
2011-present !	International Society of Arthroscopy, Knee Surgery, and Orthopaedic Sports Medicine
2012-present !	World Orthopaedic Alliance

HONORS

1971	Phi Kappa Phi Honor Society, Berea College
1972	Austin Scholar Award, Berea College
1975	Sigma Xi Honor Society, Rockefeller University
1977	Jane Coffin Childs Memorial Fund Postdoctoral Fellowship
1979	Arthritis Foundation Postdoctoral Research Fellowship
1981	Basil O'Connor Starter Grant Award, March of Dimes Birth Defects Foundation
1987	M.A. (Hon.), University of Pennsylvania
1996	Coventry Award, American Academy of Orthopaedic Surgeons
1997	Hap Paul Award, International Society of Technologies in Arthroplasty
2000	College of Fellows, American Institute of Medical and Biological Engineering
2004	Marshall Urist Award for Excellence in Tissue Regeneration Research, Orthopaedic Research Society
2003	Merit Award, NIAMS, National Institutes of Health
2004	Outstanding Mentor Award, National Institutes of Health
2004	Chief Scientist Pro-Tempore, Hospital for Special Surgery
2006, 2007	Special Recognition Award, NIH Undergraduate Scholars Program
2009	Mar W. Allam Lecturer, American College of Veterinary Surgeons
2010	Arthur J. Rooney, Sr. Chair in Sports Medicine, University of Pittsburgh
2014	Distinguished Professor of Orthopaedic Surgery, University of Pittsburgh
2014	Raine Visiting Professor, University of Western Australia

2015 ! Chancellor's Distinguished Research Senior Scholar Award, University of Pittsburgh
2016 ! Carnegie Science Award in Life Sciences
2016 ! Clemson Award, Society for Biomaterials
2016 ! Fellow of the International Combined Orthopaedic Research Societies

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PUBLICATIONS

(Total citations: 37282; h-index: 98. June 2017)

Refereed Articles (selected from a total of over 450):

1. ! **Tuan RS**, Chang KP. Isolation of intracellular symbiotes by immune lysis of flagellate protozoa and characterization of their DNA. J Cell Biol. 1975 May;65(2):309-23.
2. ! **Tuan RS**, Scott WA. Calcium-binding protein of chorioallantoic membrane: Identification and developmental expression. Proc Natl Acad Sci USA. 1977 May;74(5):1946-9.
3. ! **Tuan RS**, Scott WA, Cohn ZA. Purification and characterization of a calcium-binding protein from chick chorioallantoic membrane. J Biol Chem. 1978 Feb 25;253(5):1011-6.
4. ! **Tuan RS**, Scott WA, Cohn ZA. Calcium-binding protein of the chick chorioallantoic membrane. I. Immunohistochemical localization. J Cell Biol. 1978 Jun;77(3):743-51.
5. ! **Tuan RS**, Scott WA, Cohn ZA. Calcium-binding protein of the chick chorioallantoic membrane. II. Vitamin K-dependent expression. J Cell Biol. 1978 Jun;77(3):752-61.
6. ! **Tuan RS**, Zrike J. Functional involvement of carbonic anhydrase in calcium transport of the chick chorioallantoic membrane. Biochem J. 1978;176:67-74.
7. ! **Tuan RS**. Vitamin K-dependent gamma-glutamyl carboxylase activity in the chick embryonic chorioallantoic membrane. J Biol Chem. 1979 Feb 25;254(4):1356-64.
8. ! **Tuan RS**. Calcium transport and related functions in the chorioallantoic membrane of cultured shell-less chick embryos. Dev Biol. 1980 Jan;74(1);196-204.
9. ! **Tuan RS**. Biosynthesis of calcium-binding protein of chick chorioallantoic embryonic membrane: *In vitro* organ culture and cell-free translation. Cell Calcium. 1980 Dec;1(6):411-29.
10. ! **Tuan RS**. Identification and characterization of a calcium-binding protein from human placenta. Placenta. 1982;3(2):145-57.
11. ! **Tuan RS**. Supplemented eggshell restores calcium transport in chorioallantoic membrane of cultured shell-less chick embryos. J Embryol Exp Morph. 1983 Apr 1;74:119-31.
12. ! **Tuan RS**, Lynch M. Effect of experimentally induced calcium deficiency on the developmental expression of collagen types in chick embryonic skeleton. Dev Biol. 1983 Dec;100(2):374-86.
13. ! **Tuan RS**, Knowles K. Calcium-activated ATPase of the chick embryonic chorioallantoic membrane. Identification, developmental expression and topographic relationship with the calcium-binding protein. J Biol Chem. 1984 Mar 10;259(5):2754-63.
14. ! **Tuan RS**. Ca^{2+}-binding protein of the human placenta: Characterization, immunohistochemical localization, and functional involvement in Ca^{2+} transport. Biochem J. 1985;227:317-26.
15. ! **Tuan RS**, Cavanaugh S. Identification and characterization of a calcium-binding protein in the mouse chorioallantoic placenta. Biochem J. 1985;233:41-9.

16. ! Ono T, **Tuan RS**. Effect of experimentally induced calcium deficiency on development, metabolism and liver morphogenesis of the developing chick embryo. J Embryol Exp Morph. 1986 Mar 1;92(1):207-22.
17. ! Jacenko O, **Tuan RS**. Calcium deficiency induces expression of cartilage-like phenotype in chick embryonic calvaria. Dev Biol. 1986 May;115(1):215-32.
18. ! **Tuan RS**, Carson M, Jozefiak J, Knowles K, Shotwell B. Calcium-transport function of the chick embryonic chorioallantoic membrane. I. *In vivo* and *in vitro* characterization. J Cell Sci. 1986 Jun 1;82(1):73-84.
19. ! **Tuan RS**, Carson M, Jozefiak J, Knowles K, Shotwell B. Calcium-transport function of the chick embryonic chorioallantoic membrane. II. Functional involvement of calcium-binding protein, Ca2+-ATPase and carbonic anhydrase. J Cell Sci. 1986 Jun 1;82(1):85-97.
20. ! San Antonio JD, **Tuan RS**. Chondrogenesis of limb bud mesenchyme *in vitro*: Stimulation by cations. Dev Biol. 1986 Jun;115(2):313-24.
21. ! **Tuan RS**, Ono T. Regulation of extraembryonic calcium mobilization by the developing chick embryo. J Embryol Exptl Morphol. 1986 Sep 1;97(1):63-74.
22. ! **Tuan RS**, Nguyen H. Cardiovascular changes in calcium-deficient chick embryos. J Exp Med. 1987 May;165(5):1418-23.
23. ! San Antonio JD, Winston BM, **Tuan RS**. Regulation of chondrogenesis by heparan sulfate and structurally related glycosaminoglycans. Dev Biol. 1987 Sep;123(1):17-24.
24. ! **Tuan RS**, Kirwin J. Mouse placental 57-kDa calcium-binding protein: I. Cloning of cDNA and characterization of developmental expression. Differentiation. 1988 Apr; 37(2):98-103.
25. ! **Tuan RS**, Lamb B, Jesinkey C. Mouse placental 57-kDa calcium-binding protein: II. Localization of mRNA by *in situ* cDNA hybridization. Differentiation. 1988 May;37:198-204.
26. ! McDonald SA, **Tuan RS**. Expression of collagen type transcripts in chick embryonic bone detected by *in situ* cDNA-mRNA hybridization. Dev Biol. 1989 May;133(1):221-34.
27. ! Oshima O, Leboy PS, McDonald SA, **Tuan RS**, Shapiro IM. Developmental expression of genes in chick growth cartilage detected by *in situ* hybridization. Calcified Tissue Int. 1989 May;45(3):182-92.
28. ! Liebhaber S, Urbanek M, Ray J, **Tuan RS**, Cooke N. Characterization and histologic localization of human growth hormone-variant gene expression in the placenta. J Clin Invest. 1989 Jun 1;83(6):1985-91.
29. ! Arasu P, Nutman TB, Steele C, Mulligan M, Abraham D, **Tuan RS**, Perler F. Human T-cell stimulation , molecular characterization and *in situ* mRNA localization of a *Brugia malayi* recombinant antigen. Mol Biochem Parasit. 1989 Oct;36(3):223-32.
30. ! Koide M, **Tuan RS**. Adrenergic regulation of calcium-deficient hypertension in chick embryos. Am J Physiol-Heart C. 1989 Dec 1;257(6):H1900-9.
31. ! Ono T, **Tuan RS**. Double staining of immunoblot using enzyme histochemistry and India ink. Anal Biochem. 1990 Jun;187(2): 324-7.
32. ! **Tuan RS**, Bigioni N. Ca^{2+}-activated ATPase of the mouse chorioallantoic placenta: Developmental expression, characterization and cytohistochemical localization. Development. 1990 Oct 1;110(2):505-13.
33. ! Gawande SR, **Tuan RS**. Characterization of bone-derived chondrogenesis-stimulating activity on embryonic limb mesenchymal cells in vitro. Cell Prolif. 23: 375-90.

34. ! Ono T, **Tuan RS**. Vitamin D and chick embryonic yolk calcium mobilization: Identification and regulation of expression of vitamin D-dependent Ca^{2+}-binding protein, calbindin-D_{28K}, in the yolk sac. Dev Biol. 1991 Mar;144(1):167-76.
35. ! **Tuan RS**, Moore CJ, Brittingham JW, Kirwin JJ, Akins RE, Wong M. *In vitro* study of placental trophoblast calcium uptake using JEG-3 human choriocarcinoma cells. J Cell Sci. 1991 Mar 1;98(3):333-42.
36. ! **Tuan R S**, Turchi D, Kreitzer D. Polylysine stimulation of ectopic cartilage formation. Cell Mater. 1991;1:157-70.
37. ! Joshua G, Chuang RY, Cheng SC, Lin SF, **Tuan RS**, Wang CC. The spliced leader gene of *Angiostrongylus cantonensis*. Mol Biochem Parasit. 1991 Jun;46(2):209-17.
38. ! Groessner-Schreiber B, **Tuan RS**. Bone cell response to hydroxyapatite-coated titanium surfaces *in vitro*. Sem Arthrop. 1991;2:260-7.
39. ! **Tuan RS**, Shepley K, Mulligan M, Abraham D, Perler F. Histochemical localization of gene expression in *Onchocerca volvulus*: *In situ* DNA hybridization and immunocytochemistry. Mol Biochem Parasit. 1991 Dec;49(2):191-204.
40. ! Groessner-Schreiber B, **Tuan RS**. Enhanced extracellular matrix production and mineralization by osteoblasts cultured on titanium surfaces *in vitro*. J Cell Sci. 1992 Jan 1;101(1):209-17.
41. ! Akins RE, Levin P, **Tuan RS**. Cetyltrimethylammonium bromide discontinuous gel electrophoresis: M_r-based separation of proteins with retention of enzymatic activity. Anal Biochem. 1992 Apr;202(1):172-8.
42. ! Sato M, **Tuan RS**. Effect of systemic calcium deficiency on the expression of transforming growth factor-β in chick embryonic calvaria. Am J Anat. 1992 Apr;193(4):300-13.
43. ! Lata JA, **Tuan RS**, Mulligan MM, Shepley KJ, Jackson LG, Smith JB. Localization of major histocompatability complex class I and II mRNA in human first trimester chorionic villi by *in situ* hybridization. J Exp Med. 1992 Apr;175(4):1027-32.
44. ! Murdoch AD, Dodge GR, Cohen I, **Tuan RS**, Iozzo RV. Primary structure of the human heparan sulfate proteoglycan from basement membrane (HSPG2/perlecan). A chimeric molecule with multiple domains homologous to the low density lipoprotein receptor, laminin, neural cell adhesion molecules, and epidermal growth factor. J Biol Chem. 1992 Apr 25;267(12):8544-57.
45. ! Shapiro I, DeBolt K, Funanage VL, Smith SM, **Tuan RS**. Developmental regulation of creatine kinase activity in cells of the epiphyseal growth plate. J Bone Miner Res. 1992 May;7(5):493-500.
46. ! Funanage V, Carango P, Shapiro I, Tokuoka T, **Tuan RS**. Creatine kinase activity is required for mineral deposition and matrix synthesis in endochondral growth cartilage. Bone Miner. 1992 May;17(2):228-36.
47. ! San Antonio JD, Jacenko O, Yagami M, **Tuan RS**. Polyionic regulation of cartilage development: Promotion of chondrogenesis *in vitro* by polylysine associated with altered glycosaminoglycan biosynthesis and distribution. Dev Biol. 1992 Aug;152(2):323-35.
48. ! Koide M, Smith CA, Miyahara T, **Tuan RS**. Alterations in cellular calcium handling as a result of systemic calcium deficiency in the developing chick embryo: I. Erythrocytes. J Cell Physiol. 1992 Dec;153(3):626-35.
49. ! Miyahara T, Akins RE, **Tuan RS**. Alterations in cellular calcium handling as a result of systemic calcium deficiency in the developing chick embryo: II. Ventricular myocytes. J Cell Physiol. 1992 Dec;153(3):636-44.

50. ! Jakowlew SB, Ciment G, **Tuan RS**, Sporn MB, Roberts AB. Pattern of expression of transforming growth factor-β4 mRNA and protein in the developing chicken embryo. Am J Anat. 1992 Dec;195(4):276-89
51. ! Sato T, Ono T, **Tuan RS**. 1,25-Dihydroxy vitamin D3 stimulation of TGF-β expression in chick embryonic calvarial bone. Differentiation. 1993 Jan; 52(2):139-50.
52. ! **Tuan RS**. Analysis of gene expression in skeletal tissue by *in situ* hybridization. Bone. 1993 May-Jun;14(3):309-14.
53. ! Akins RE, **Tuan RS**. Transepithelial calcium transport in the chick chorioallantoic membrane. I. Isolation and characterization of chorionic ectoderm cells. J Cell Sci. 1993 Jun 1;105(2): 369-79.
54. ! Akins RE, **Tuan RS**. Transepithelial calcium transport in the chick chorioallantoic membrane. II. Compartmentalization of calcium during uptake. J Cell Sci. 1993 Jun 1;105:381-8.
55. ! Love J, **Tuan RS**. Pair-rule gene expression in the somitic stage chick embryo: Association with somite segmentation and border formation. Differentiation. 1993 Sep;54(2):73-83.
56. ! Sinha RK, **Tuan RS**. *In vitro* analysis of the bone-implant interface. Sem Arthrop. 1993;4:194-204.
57. ! Haynes MK, Jackson LG, **Tuan RS**, Shepley KS, Smith JB. Cytokine production in first trimester chorionic villi: Detection of mRNAs and protein products *in situ*. Cell Immunol. 1993 Oct 15;151(2): 300-8.
58. ! Reginato A, **Tuan RS**, Ono T, Jimenez SA, Jacenko O. Effect of calcium deficiency on chondrocyte hypertrophy and type X collagen expression in chick embryonic sternum. Dev Dynam. 1993 Dec;198(4): 284-95.
59. ! Wong M, **Tuan RS**. NuSerum, a synthetic serum replacement, supports chondrogenesis of embryonic chick limb bud mesenchymal cells in micromass cultures. In Vitro Cell Dev Biol-An. 1993 Dec;29A(12):917-22.
60. ! Bradley JE, **Tuan RS**, Shepley KJ, Tree TIM, Maizels RM, Helm R, Gregory WF, Unnasch TR. *Onchocerca volvulus:* Characterization of an immunodominant hypodermal antigen present in adult and larval parasites. Exp Parasitol. 1993 Dec;77(4):414-24.
61. ! Chesmel K, Beight J, Rothman RH, **Tuan RS**. TGF-beta enchances osseointegration in vivo. Bioceramics. 1993. 6: 21-26.
62. ! Oberlender SA, **Tuan RS**. Expression and functional involvement of N-cadherin in embryonic limb chondrogenesis. Development. 1994 Jan 1;120(1):177-87.
63. ! Jakowlew SB, Ciment G, **Tuan RS**, Sporn MB, Roberts AB. Expression of transforming growth factor-β2 and β3 mRNAs and proteins in the developing chicken embryo. Differentiation. 1994 Jan;55(2):105-18.
64. ! Murdoch AD, Liu B, Schwarting R, **Tuan RS**, Iozzo RV. Widespread expression of perlecan proteoglycan in basement membranes and extracellular matrices of human tissues as detected by a novel monoclonal antibody against domain III and by *in situ* hybridization. J Histochem Cytochem. 1994 Feb;42(2):239-49.
65. ! Smith CA, **Tuan RS**. Human PAX gene expression and development of the vertebral column. Clin Orthop Relat Res. 1994 May;302:241-50.
66. ! Sinha RK, Morris F, Shah SA, **Tuan RS**. Surface composition of orthopaedic implant metals regulates cell attachment, spreading and cytoskeletal organization of primary human osteoblasts *in vitro*. Clin Orthop Relat Res. 1994 Aug;305:258-72.

67. ! Akins RE, **Tuan RS**. Separation of proteins using cetyltrimethylammonium bromide discontinuous gel electrophoresis. Mol Biotechnol. 1994 Jun;1(3):211-28.
68. ! Guo JP, Milhoan K A, **Tuan RS**, Lefer AM. Beneficial effect of SPM-5185, a cysteine-containing nitric oxide donor, in rat carotid artery intimal injury. Circ Res. 1994 Jul 1;75(1):77-84.
69. ! Krisak L, Strich R, Winters S, Hall JP, Mallory MJ, Kreitzer D, **Tuan RS**, Winter E. SMK1, a developmentally regulated MAP kinase, is required for spore wall assembly in *Saccharomyces cerevisiae*. Gene Dev. 1994 Sep 15;8(18):2151-61.
70. ! **Tuan RS**. Cellular and molecular events during bone-implant interaction. Scripta Metall Mater. 1994 Oct 15;31(8):971-6.
71. ! Ekanayake S, **Tuan RS**. Chondrogenesis of neural crest cells: Effect of poly-L-lysine and bone extract. Differentiation. 1994 Nov;58(1):19-27.
72. ! Wilson WR, **Tuan RS**, Shepley KJ, Freedman DO, Greene BM, Awadzi K, Unnasch TR. The *Onchocerca voluvulus* homologue of the multifunctional polypeptide protein disulfide isomerase. Mol Biochem Parasit. 1994 Nov;68(1):103-17.
73. ! Oberlender SA, **Tuan RS**. Spatiotemporal profile of N-cadherin expression in the developing limb mesenchyme. Cell Adhes Commun. 1994 Dec;2(6):521-37.
74. ! Jacenko O, **Tuan RS**. Chondrogenic potential of chick embryonic calvaria: I. Low calcium permits cartilage differentiation. Dev Dynam. 1995 Jan;202(1):13-26.
75. ! Jacenko O, San Antonio JD, **Tuan RS**. Chondrogenic potential of chick embryonic calvaria: II. Matrix calcium may repress cartilage differentiation. Dev Dynam. 1995 Jan;202(1):27-41.
76. ! Wong M, **Tuan RS**. Interactive cellular modulation of chondrogenic differentiation *in vitro* by subpopulations of chick embryonic calvarial cells. Dev Biol. 1995 Jan;167(1):130-47.
77. ! Levine MJ, Mariani BD, **Tuan RS**, Booth RE. Molecular genetic diagnosis of infected total joint arthroplasty. J Arthroplasty. 1995 Jan;10(1):93-4.
78. ! Triteeraprapab S, Richie TL, **Tuan RS**, Shepley KJ, Dinman JD, Neubert TA, Scott AL. Molecular cloning of a gene expressed during early embryonic development in *Onchocerca volvulus.* Mol Biochem Parasit. 1995 Feb;69(2):161-71.
79. ! Tree TIM, Gillespie AJ, Shepley KJ, Blaxter ML, **Tuan RS**, Bradley JE. Characterization of an immunodominant glycoprotein of *Onchocerca volvulus* with homologues in other filarial nematodes and *Caenorhabditis elegans.* Mol Biochem. Parasit. 1995 Feb;69(2):185-195.
80. ! Yates RA, **Tuan RS**, Shepley KJ, Unnasch TR. Characterization of genes encoding members of the nuclear hormone receptor superfamily from *Onchocerca volvulus.* Mol Biochem Parasit. 1995 Mar;70(1-2):19-31.
81. ! Denker AE, Nicoll SB, **Tuan RS**. Formation of cartilage-like spheroids by micromass cultures of murine C3H10T1/2 cells upon treatment with transforming growth factor-β1. Differentiation. 1995 Jul;59(1): 25-34.
82. ! Akins RE, **Tuan RS**. Ultrafast protein determinations using microwave enhancement. Mol Biotechnol. 1995 Aug;4(1):17-24.
83. ! Nicoll SB, Denker AE, **Tuan RS**. *In vitro* characterization of transforming growth factor-β1-loaded composites of biodegradable polymer and mesenchymal cells. Cell Mater. 1995;5:231-44.

84. ! Ruhl KK, Pomidor MM, Rhim JS, **Tuan RS**, Hickok N. Post-transcriptional suppression of human ornithine decarboxylase gene expression by phorbol esters in human keratinocytes. J Invest Dermatol. 1995 Nov;103(5):687-92.
85. ! Pomidor MM, Ruhl KK, Zheng P, Song Y, Jänne OA, **Tuan RS**, Hickok NJ. Relationship between ornithine decarboxylase and cytoskeletal organization in cultured human keratinocytes: Cellular responses to phorbol esters, cytochalasins, and α-difluoromethylornithine. Exp Cell Res. 1995 Dec;221(2):426-37.
86. ! Mariani BD, Levine MJ, Booth Jr RE, **Tuan RS**. Development of a novel, rapid processing protocol for polymerase chain reaction-based detection of bacterial infections in synovial fluids. Mol Biotechnol. 1995 Dec;4(3): 227-37.
87. ! Smith CA, **Tuan RS**. Functional involvement of *Pax-1* in somite development: Somite dysmorphogenesis in chick embryos treated with *Pax-1* paired-box antisense oligodeoxynucleotide. Teratology. 1995 Dec;52(6):333-45.
88. ! Sinha RK, **Tuan RS**. *In vitro* analysis of the bone-implant interface. Semin Arthropl (Classics). 1996;7:47-57.
89. ! Abdel-Wahab N, Kuo YM, Wu Y, **Tuan RS**, Bianco AE. OvB20: An *Onchocerca volvulus*-cloned antigen selected by differential immunoscreening with vaccination serum in a cattle model of onchocerciasis. Mol Biochem Parasit. 1996 Feb-Mar;76(1-2):187-199.
90. ! **Tuan RS**, Suyama E. Developmental expression and vitamin D regulation of calbindin-D_{28K} in chick embryonic yolk sac endoderm. J Nutr. 1996 Apr;126(4 Suppl):1308S-16S.
91. ! Sinha RK, **Tuan RS**. Regulation of human osteoblast integrin expression by orthopaedic implant materials. Bone. 1996 May;18(5):451-7.
92. ! Barnes Jr GL, Mariani BD, **Tuan RS**. Valproic acid-induced somite teratogenesis in the chick embryo: Relationship with *pax-1* gene expression. Teratology. 1996 Jun;54(2):93-102.
93. ! Gehris AL, Oberlender SA, Shepley KJ, **Tuan RS**, Bennett VD. Fibronectin mRNA alternative splicing is temporally and spatially regulated during chondrogenesis *in vivo* and *in vitro*. Dev. Dynam. 1996 Jun;206(2): 219-30.
94. ! Koide M, Akins RE, Harayama H, Yasui K, Yokota M, **Tuan RS**. Atrial natriuretic peptide accelerates proliferation of chick embryonic cardiomyocytes *in vitro*. Differentiation. 1996 Oct;61(1):1-11.
95. ! Barnes GL, Hsu CW, Mariani BD, **Tuan RS**. Chicken Pax-1 gene: Structure and expression during embryonic somite development. Differentiation. 1996 Oct;61(1):13-23.
96. ! Mariani BD, Martin DS, Levine MJ, Booth RE, **Tuan RS**. Polymerase chain reaction detection of bacterial infection in total knee arthroplasty. Clin Orthop Relat R. 1996 Oct;331:11-22.
97. ! Stringa E, **Tuan RS**. Chondrogenic cell subpopulation of chick embryonic calvarium: Isolation by peanut agglutinin affinity chromatography and *in vitro* characterization. Anat Embryol (Berl). 1996 Nov;194(5):427-37.
98. ! Stolz LE, **Tuan RS**. Hybridization of biotinylated oligo(dT) for eukaryotic mRNA quantitation. Mol Biotechnol. 1996 Dec;6(3):225-30.
99. ! Frye CA, Yocum DE, **Tuan RS**, Suyama E, Seftor EA, Seftor REB, Khalkhali-Ellis Z, Moore TL, Hendrix MJC. An *in vitro* model for studying mechanisms underlying synoviocyte-mediated cartilage invasion in rheumatoid arthritis. Pathol Oncol Res. 1996;2(3):157-66.

100. Lin FJ, Fitzpatrick JW, Iannotti C, Martin DS, Mariani BD, **Tuan RS**. Effects of cadmium on trophoblast calcium transport. Placenta. 1997 May;18(4): 341-56.
101. Stringa E, Love JM, McBride S, Suyama E, **Tuan RS**. *In vitro* characterization of chondrogenic cells isolated from chick embryonic muscle using peanut agglutinin affinity chromatography. Exp Cell Res. 1997 May 1;232(2):287-94.
102. Nicoll SB, Radin S, Santos EM, **Tuan RS**, Ducheyne P. *In vitro* release kinetics of biologically active transforming growth factor-β1 from a novel porous glass carrier. Biomaterials. 1997;18(12): 853-9.
103. Barnes GL, Alexander PG, Hsu CW, Mariani BD, **Tuan RS**. Cloning and characterization of chicken *Paraxis*: A regulator of paraxial mesoderm development and somite formation. Dev Biol. 1997 Sep 1;189(1):95-111.
104. Gehris AL, Stringa E, Spina J, Desmond ME, **Tuan RS**, Bennett VD. The region encoded by the alternatively spliced exon IIIA in mesenchymal fibronectin appears essential for chondrogenesis at the level of cellular condensation. Dev Biol. 1997 Oct 15;190(2)191-205.
105. Henkle-Dührsen K, **Tuan RS**, Wildenburg G, Eschbach ML, Tawe W, Zipfel P, Walter RD. Localization and functional analysis of the cytosolic and extracellular CuZn superoxide dismutases in the human parasitic nematode *Onchocerca volvulus*. Mol Biochem Parasit. 1997 Sep;88(1-2):187-202.
106. Kauh YC, Rouda S, Mondragon G, Tokarek R, di Leonardo M, **Tuan RS**, Tan EML. Major suppression of pro-α1(I) type I collagen gene expression in the dermis after keloid excision and immediate intrawound injection of triamcinolone acetonide. J Am Acad Dermatol. 1997 Oct;37(4):586-9.
107. Nicoll SB, Denker AE, **Tuan RS**. Mesenchymal cell-based repair of connective tissue defects: Application of transforming growth factor-β superfamily members and biodegradable polymer scaffolds. Cell Mater. 1998;8:99-122.
108. Mariani BD, **Tuan RS**. Molecular diagnosis of bacterial infections using polymerase chain reaction. Trends Mol Med. 1998;4:207-13.
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383. Yang G, Lin H, Rothrauff BB, Yu S, **Tuan RS**. Multilayered polycaprolactone/gelatin fiber-hydrogel composite for tendon tissue engineering. Acta Biomat. 2016. Apr 15;35:68-76.
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400. Rothrauff BB, Lauro BB, Yang G, Debski RE, Musahl V, **Tuan RS**. Braided and stacked electrospun nanofibrous scaffolds for tendon and ligament tissue engineering. Tissue Engin Part A. 2017. *In press.*

Books:

1. ! Balderston RA, **Tuan RS**, co-editors. Basic Science in Joint Reconstruction. In: Fitzgerald RH, editor. Seminars in Arthroplasty, Vol. 4. Philadelphia: W. B. Saunders Co; 1993.
2. ! **Tuan RS**, editor. Recombinant Gene Expression Protocols: Methods in Molecular Biology, Volume 62. Totowa, New Jersey: Humana Press; 1997. !
3. ! **Tuan RS**, editor. Recombinant Protein Protocols: Detection and Isolation: Methods in ! Molecular Biology, Volume 63. New Jersey: Humana Press; 1997. !
4. ! **Tuan RS**, Lo CW, editors. Developmental Biology Protocols, Volume I. New Jersey: ! Humana Press; 2000. !
5. ! **Tuan RS**, Lo CW, editors. Developmental Biology Protocols, Volume II. New Jersey: ! Humana Press; 2000. !
6. ! **Tuan RS**, Lo CW, editors. Developmental Biology Protocols, Volume III. New Jersey: ! Humana Press; 2000. !

Reviews, Invited Published Papers, Proceedings of Conference and Symposia, and Book Chapters (selected from last 14 years)***:***

1. ! Hickok NJ, Purtill JJ, Marcolongo M, **Tuan RS**. Biological fixation in hip replacement. In: Sinha RK, editor. *Hip Replacement: Current Trends and Controversies*. New York: Informa Healthcare; 2002. p. 137-76.
2. ! Caterson EJ, **Tuan RS**, Bruder SP. Cell-based approaches to orthopaedic tissue engineering. In: Goldberg VM, Caplan AI, editors. *Orthopedic Tissue Engineering: Basic Science and Practice*. New York: Informa Health Care; 2004. p. 21-50.
3. ! **Tuan RS**, Chen FH. Cartilage. In: Battler A, Leor J, editors. *Stem Cells and Gene Therapy: Frontiers in Regenerative Medicine*. London: Springer-Verlag; 2005. p. 179-94.
4. ! Moucha CS, Renard RL, Gandhi A, Lin SS, **Tuan RS**. (2006) Bone Allograft Safety and Performance. In: Farach-Carson M, Bonner F, Mikos A, editors. *Engineering of Functional Skeletal Tissues*. Totowa, New Jersey: Humana Press; 2006. p. 46-54.
5. ! Li WJ, Shanti RM, **Tuan RS**. Electrospinning technology for nanofibrous scaffolds in tissue engineering. In: Kumar C, editor. *Nanotechnologies for Life Sciences*, Vol. 9 - Tissue, Cell and Organ Engineering. Germany: Wiley-VCH Verlag GmbH; 2006. p. 135-99.
6. ! Chen FH, Song L, Mauck RL, Li WJ, **Tuan RS**. Mesenchymal stem cells. In: Lanza RP, Nerem R, Vacanti JP, editors. *Principles of Tissue Engineering*, 3rd Edition. Burlington, MA: Elsevier Academic Press; 2007. p. 823-44
7. ! Steinert AF, Ghivizzani SC, Rethwilm A, **Tuan RS**, Evans CH, Nöth U. Major biological obstacles for persistent cell-based regeneration of articular cartilage. Arthritis Res Ther. 2007 Jun;9:213-27.
8. ! Shanti RM, Li WJ, Nesti LJ, Wang X, **Tuan RS**. Adult mesenchymal stem cells: Biological properties, characteristics, and applications in maxillofacial surgery. J Oral Maxillofac Surg. 2007 Aug;65(8):1640-7.
9. ! Lima EG, Bian L, Mauck RL, Byers BA, **Tuan RS**, Ateshian GA, Hung CT. The effect of applied compressive loading on tissue-engineered cartilage constructs cultured with TGF-β3. Conf Proc IEEE Eng Med Biol Soc. 2006 Aug:779-82
10. Alexander PG, Boyce AT, **Tuan RS**. Skeletal Development. In: Moody SA, editor. *Principles of Developmental Genetics*. Burlington, MA: Elsevier; 2007. p 886-906.

11. Rousche KT, Basksh D, **Tuan RS**. Wnt signaling for targeted therapies in rheumatology. In: Smolen JS, Lipsky PE, editors. *Contemporary Targeted Therapies in Rheumatology*. London: Taylor & Francis; 2007. p. 317-28.
12. Li WJ, Gollapudi K, Patterson DP, Huang GTJ, **Tuan RS**. Cell-based therapies for musculoskeletal repair. In: Atala A, Lanza R, Thomson JA, Nerem RM, editors. *Principles of Regenerative Medicine*. London: Elsevier-Academic Press; 2008. p. 888-911.
13. Taboas J, Kuo CK, Huang GTJ, **Tuan RS**. Growth factors in adult stem cell based skeletal tissue engineering. In: Mao J, Vunjak-Novakovic G, Mikos A, Atala A. *Translational Approaches in Tissue Engineering and Regenerative Medicine*. Boston: Artech House; 2008. p. 83-124.
14. Alexander PG, **Tuan RS**. Environmental factors and axial skeletal dysmorphogenesis. In: Kusumi, K and Dunwoodie, SL, Eds. *The Genetics and Development of Scoliosis*. New York: Springer. 2009. p. 47-72.
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17. Lozito T, Kolf C, **Tuan RS**. Microenvironmental regulation of adult mesenchymal stem cells. In: Rajasekhar VK, Vemuri M. *Regulatory Networks in Stem Cells*. New York: Humana Press; 2009. p. 185-210.
18. Djouad F, **Tuan RS**. Mesenchymal stem cells: New insights into tissue engineering and regenerative medicine. In: Meyer U, Meyer T, Handschel J, Wiesmann HP, editors. *Fundamentals of Tissue Engineering and Regenerative Medicine*. Berlin: Springer-Verlag; 2009. p.177-196.
19. Mauck RL, Li WJ, **Tuan RS**. Microenvironmental determinants of stem cell fate. In: Meyer U, Meyer T, Handschel J, Wiesmann HP, editors. *Fundamentals of Tissue Engineering and Regenerative Medicine*. Berlin: Springer-Verlag; 2009. p. 647-664.
20. Alexander PG, **Tuan RS**. Role of environmental factors in axial skeletal dysmorphogenesis. Birth Defects Res C Embryo Today. 2010 Jun;90(2):118-32
21. Kuo CK, Marturano JE, **Tuan RS.** Novel strategies in tendon and ligament tissue engineering: Advanced biomaterials and regeneration motifs. Sports Med Arthros Rehab Ther Tech. 2010. 2(1):20.
22. Nöth U, Rackwitz L, Steinert AF, **Tuan RS.** Cell delivery therapeutics for musculoskeletal regeneration. Adv Drug Deliv Rev. 2010. 62(7-8):765-83.
23. Nöth U, Rackwitz L, Steinert AF, **Tuan RS**. Principles of tissue engineering and cell- and gene-based therapy. In: Hochberg MC, Silman AJ, Smolen JS, Weinblatt ME, Weisman MH, editors. *Rheumatology*, 5th Edition. 2010. Philadelphia: Elsevier. Chapter 18.
24. Petrie Aronin CE, **Tuan RS**. Therapeutic potential of the immunomodulatory activities of adult mesenchymal stem cells. Birth Defects Res C Embryo Today. 2010 Mar;90(1):67-74.
25. Fortier LA, **Tuan RS.** Stem cells in regenerative surgical strategy. In: Tobias & Johnson, editors. *Small Animal Surgical Practice*. Maryland Heights: Elsevier; 2011. Vol. 1, Chapt. 4.
26. Petrie Aronin CE, Kuhn NZ, **Tuan RS**. Tissue engineering and selection of cells. In: P. Ducheyne, K. Healy, D. Hutmacher, J. Kirkpatrick, Eds. *Comprehensive Biomaterials*. Vol. 5. 2011. Oxford: Elsevier. pp. 81-93.
27. Mueller MB, **Tuan RS.** Anabolic/catabolic balance in pathogenesis of osteoarthritis. 2011.

Phys. Med. Rehab. 3(6 Suppl):S3-S11.
28. Bergin PF, **Tuan RS.** New Technologies for Diagnosing Orthopaedic Infections. 2011. AAOS NOW. May, 2011.
29. **Tuan RS.** Current trends and new technologies in developmental toxicology. Birth Defects Res C Embryo Today. 2011 Dec;93(4):289-90.
30. Mueller J, Mollenhauer J, **Tuan RS**, Benz K. Quality control for mesenchymal stromal cells: Chondrogenesis as a standard condition? Rheum. Curr Res. 2012. S3:003
31. Diederichs S, Shine KM, **Tuan RS**. Cell-based therapies for skeletal tissue. BioEssays. 2013. 35(3):220-230.
32. Locke P, **Tuan RS,** O'Brien T. Stem Cell Research and Therapy in 2012. Stem Cell Res Ther. 2012;3(2):16.
33. **Tuan RS**. REGENERATIVE MEDICINE IN 2012. The coming of age of musculoskeletal tissue engineering. Nature Clin Pract Rheum. 2013. Feb. 9(2):74-76.
34. **Tuan RS,** Mauck RL. Articular cartilage repair and regeneration. In: Einhorn T, O'Keefe R, Chu C, Jacobs J, editors. *Orthopaedic Basic Science*, 4th Edition. 2013. pp 309-327.
35. Bean AC, **Tuan RS**. Stem cells and nanotechnology in tissue engineering and regenerative medicine**.** In *Micro and Nanotechnologies in Engineering Stem Cells and Tissues* (Ramalingam M, Jabbari E, Ramakrishna S, Khademhosseini A, Eds.) 2013. p.1-26.
36. Baker N, **Tuan RS**. The less-often-travelled surface of stem cells: Caveolin-1 and caveolae in stem cells, tissue repair and regeneration. Stem Cell Res Ther. 2013. 4:90.
37. Locke P, O'Brien T, **Tuan RS**. Three years of Stem Cell Research & Therapy. Stem Cell Res Ther. 2013 May 1;4(3):46
38. **Tuan RS**, Chen AF, Klatt BA. Cartilage regeneration. J Am Acad Orthop Surg. 2013 May;21(5):303-11.
39. Lozito T, **Tuan RS**. Crosstalk between MSCs and their environments. In*: Mesenchymal Stromal Cells: Biology and Clinical Applications.* (Hematti R, Keating A, Eds) New York: Springer. 2013, pp 169-192
40. Yang G, Rothrauff BB, **Tuan RS**. Tendon and ligament regeneration and repair: Clinical relevance and developmental paradigm. Birth Defects Research C: Embryo Today. 2013. 99(3):203-22
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42. Boyette LB, **Tuan RS**. Adult Stem Cells and Diseases of Aging. J Clin Med. 2014. 3(1):88-134.
43. Rothrauff BB, **Tuan RS.** Cellular therapy in bone-tendon interface regeneration. Organogenesis. 2014. 10:1.
44. Xie X, Zhang C, **Tuan RS.** Biology of platelet-rich plasma and its clinical application in cartilage repair. Arthr Res Ther. 2014. 16:204
45. Lv, FJ, **Tuan RS**, Cheung KMC, Leung VYL. The identity of mesenchymal stem cells. Stem Cells. 2014. Jun;32(6):1408-19.
46. Langhans MT, Alexander PG, **Tuan RS**. Skeletal Development. In: Moody SA, editor. *Principles of Developmental Genetics*. 2nd Edition. Elsevier, 2014. Chapter 28. pp. 505-530.
47. Alexander PG, Gottardi R, Lin H, Lozito TP, **Tuan RS**. Three-dimensional osteogenic and chondrogenic systems to model osteochondral physiology and degenerative joint diseases. Expt Biol Med. 2014. Sep;239(9):1080-95.

48. Thompson WR, Gottardi R, Stearns KM, Rubin J, Ambrosio F, **Tuan RS**. Biologics in Cartilage, Bone Repair, and Regeneration. In: Hughes C, editor. *ISC 23.2, Applications of Regenerative Medicine to Orthopaedic Physical Therapy*. La Crosse, WI: Orthopaedic Section APTA; 2013. *In press.*
49. Klatt BA, Chen AF, **Tuan RS**. Arthritis and other cartilage disorders. In: Cannada LK, editor. *Orthopaedic Knowledge Update 11*. American Academy of Orthopaedic Surgeons, Rosemont. 2014. Chapter 18, pp. 207-222.
50. Jiang Y, **Tuan RS**. Origin and function of cartilage stem/progenitor cells in osteoarthritis. Nat Rev Rheumatol. 2015 Apr;11(4):206-212.
51. Baker N, Boyette LB, **Tuan RS**. Characterization of bone marrow-derived mesenchymal stem cells in aging. Bone. 2015. 70C:37-47.
52. Choe H, Deirmengian CA, Hickok NJ, Morrison TN, **Tuan RS**. Musculoskeletal Infection: Where are we in 2014? Molecular diagnostics. J Am Acad Orthop Surg. 2015 Apr;23 Suppl:S26-31.
53. Liou JJ, Langhans MT, Gottardi R, **Tuan RS.** Injury and repair of tendon, ligament, and meniscus. In: Laurence J, Baptista P, Atala A, van Beusekom M, Editors; *Translating Regenerative Medicine to the Clinic*, Elsevier. 2015. Chapter 6. pp.75-88.
54. Sohn J, Brick RM, **Tuan RS.** From embryonic development to human diseases: The functional role of caveolae/caveolin. Birth Defects Res. Part C: Rev Embryo Today. 2016 Mar;108(1):45-64
55. Rothrauff BB, Yang G, **Tuan RS.** Tendon resident cells – functions and features. In: Reis RL, Gomes ME, Rodrigues MT, Editors. *Tendon Regeneration: understanding tissue physiology and development to engineer functional substitutes*. Elsevier. 2015. *Chapter 2.*
56. Langhans MT, Yu ST, **Tuan RS.** Stem cells in skeletal tissue engineering: Technologies and models. Curr Stem Cell Res Ther. 2016. 11: 453-474.
57. Sun AX, Numpaisal P., Gottardi R, Shen H, Yang G, **Tuan RS**. Cell and biomimetic scaffold based approaches for cartilage regeneration. In: Musahl V and Tuan RS, eds. *Operative Techniques in Orthopaedics.* Stellar Med Pub, Plymouth. 2016. *In press.* DOI: http://dx.doi.org/10.1053/j.oto.2016.06.003
58. **Tuan RS.** Prenatal substance use and developmental disorders: Overview and highlights. Birth Defects Res C Embryo Today. 2016 Jun; 108(2): 106-107.
59. Lozito TP, **Tuan RS**. Lizard tail regeneration as an instructive model of enhanced healing capabilities in an adult amniote. Connect Tiss Res. 2016. 26:1-10.
60. Hutson MS, Alexander PG, Allwardt V, Aronoff DM, Bruner-Tran KL, Cliffel DE, Davidson JM, Gough A, Markov DA, McCawley LJ, McKenzie JR, McLean JA, Osteen KG, Pensabene V, Samson PC, Senutovitch NK, Sherrod SD, Shotwell MS, Taylor DL, Tetz LM, **Tuan RS**, Vernetti LA, Wikswo JP. Organs-on-chips as bridges for predictive toxicology. Appl In Vitro Toxicol. 2: 97-102.
61. **Tuan RS**, Korkusuz F. Joint Cartilage. *In: Musculoskeletal Research and Basic Science.* Springer. 2016. pp. 367-386.
62. Hofer HR, **Tuan RS**. Secreted trophic factors of mesenchymal stem cells support neurovascular and musculoskeletal therapies. Stem Cell Res Ther. 2016. Sep 9;7(1):131
63. Alexander PG, Clark KL, **Tuan RS**. Prenatal exposure to environmental factors and congenital limb defects. Birth Defects Res C Embryo Today. 2016 Sep;108(3):243-273.

64. Baker N, Jiang Y, **Tuan RS**. Mesenchymal Stem Cells and Regenerative Medicine. In: Ratcliffe MJH (Editor in Chief), *Encyclopedia of Immunobiology,* 2016. Vol. 5, pp. 275–280. Oxford: Academic Press.
65. Ulici U, Chen AF, Chen AWM, **Tuan RS**. Anatomy: Cartilage. In: McCarthy JV, Villar R, Noble P, Editors. *Hip Joint Restoration: Worldwide Advances in Arthroscopy, Arthroplasty, Osteotomy and Joint Preservation Surgery.* Springer. 2017. *In press.*
66. Lozito TP, Jiang Y, **Tuan RS**. Cartilage healing, repair, and regeneration: Natural history to current therapies. In: Kusumi K, Editor. *Innovations in Stem Cell and Tissue Engineering.* Springer 2017. *In press.*
67. Rothrauff BB, Pauyo T, Debski RE, **Tuan RS,** Musahl V. The rotator cuff organ: Integrating developmental biology, tissue engineering, and surgical considerations to treat chronic massive rotator cuff tears. 2017. Tissue Eng. Part A. *In press.*
68. Jiang Y, Lin H, **Tuan RS.** Cartilage repair: Current state and future prospectives. In: Graessel S, Aszodi A, Editors. *Cartilage Repair*. Springer 2017. *In press.*
69. **Tuan RS.** Birth defects: Etiology, screening and detection. Birth Defects Res. 2017 Jun 1; 109 (10):723-724.

TEACHING:

University of Pennsylvania !

1980-88	Biology 102, Biology 3, “Introductory Biology” !
1980-88	Biology 526, “Experimental Molecular Biology” !
1980-88	Guest lecturer in various Developmental Biology and Biochemistry courses !

Thomas Jefferson University !

1988-1998	Biochemistry 515, 525, 535 - “Experimental Principles in Molecular Biology” !
1988-2001	Medical Biochemistry and Small Group Discussion !
1988-2001	Biochemistry 424, "Biochemistry of Extracellular Matrix" !
1988-2001	Developmental Biology 615/625/635 - “Developmental Biology and Teratology" I: Embryology; II: Mechanisms of Development; III: Mechanisms of Teratogenesis
1988-2001	Postgraduate Orthopaedic Residency Education, “Orthopaedic Basic Science”
1999-2001	Tissue Engineering 511, 521, 531 - "Principles and Topics in Cell and Tissue Engineering"

George Washington University !

2001-2009	Postgraduate Orthopaedic Residency Education, “Orthopaedic Basic Science” !

Georgetown University !

2001-2009	Postgraduate Orthopaedic Residency Education, “Orthopaedic Basic Science” !

University of Pittsburgh !

2014-now	MSCMP 3740 “Stem Cells” !
2015-now	MSCMP 3735 “Extracellular Matrix in Tissue Biology and Bioengineering” !
2010-now	Postgraduate Orthopaedic Residency Education !

2016	Coursera Lecture (MOOC: Massive Online Open Courses": "Skeletal Regenerative Rehabilitation: *Stem cells, tissue repair and functional restoration"*
2017	Seminar course, Doctor of Physical Therapy Programs

SELECTED SEMINARS AND INVITED LECTURESHIPS RELATED TO RESEARCH (2011-present only)

January, 2011 - Annual Meeting Orthopaedic Research Society, Long Beach, CA
"How to Tailor Your CV for Academic Versus Industry Versus Government Positions" -

February, 2011 – Instructional Course Lecture 405 !
American Academy of Orthopaedic Surgeons Annual Meeting, San Diego, CA !
"Gene Therapy and Tissue Engineering in Orthopaedic Surgery" !

March, 2011 – Vice Chair, Gordon Research Conference on Cartilage Biology and Pathology, Ventura Beach, CA
Discussion leader "Repair, Regeneration, Tissue Engineering"

April, 2011 – Podium Presentation 2011 Translational Regenerative Medicine Forum, !
Washington, D.C. !
"Biomaterials/Bioprinting: A Technologic Innovation in Regenerative Medicine" !

April, 2011 – Symposium on Advanced Wound Care, Wound Healing Society, Dallas, TX
"Hot Topics in Regenerative Medicine: Lessons from Eyes, Bones and Heart" !

May, 2011 – 3rd Joint Meeting of the European Calcified Tissue Society & the International !
Bone and Mineral Society, Athens, Greece !
"Developmental *versus* Regenerative Chondrogenesis: Adult Stem Cells and !
Nanostructured Materials in Cartilage Tissue Engineering and Regeneration" !

May, 2011 – Presidential Guest Lecture, International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine, Rio de Janeiro, Brazil !
"Application of Adult Stem Cells and Nanomaterial Scaffods for Skeletal Tissue !
Engineering and Regeneration" and !
"Stem Cell Therapy in Orthopaedics 2011" !

June, 2011 – Seminar, Guangzhou Institute of Biomedicine and Health, Guangzhou, China !
"Developmental *versus* Regenerative Skeletogenesis" !

July, 2011 – Invited Speaker, "Stem Cell and Regenerative Medicine Symposium", National Science Council, Taiwan !
"Developmental *versus* Regenerative Skeletogenesis – Role of Stem Cells and !
Biomaterials" !

August, 2011 – Keynote Speaker, Panther Summit on Anterior Cruciate Ligament, Pittsburgh, PA

"Future of Matrices in Musculoskeletal Tissue Engineering and Regeneration"

September, 2011 – Keynote Speaker, Joint Symposium of the 6th People's Hospital of Shanghai, Fudan University and University of Pittsburgh, Shanghai, China
"Stem Cells and Nanostructured Biomaterials in Skeletal Tissue Engineering and Regeneration"

October, 2011 – Keynote Speaker, University of Akron Symposium on Biomaterials, OH
"Adult Stem Cells and Nanomaterials in Skeletal Tissue Engineering and Regeneration"

November, 2011 – Keynote Speaker, International Federation for Adipose Therapeutics and Science Annual Meeting, Miami, FL
"Adult Stem Cells and Musculoskeletal Regeneration"

December, 2011 – Keynote Speaker, Dental Implant Conference, American Association of Oral and Maxillofacial Surgeons, Chicago, IL
"Adult Stem Cells and Nanomaterials in Skeletal Tissue Engineering and Regeneration: Developmental *versus* Regenerative Skeletogenesis"

December 2011 – Workshop Chair and Speaker, Tissue Engineering and Regenerative Medicine International Society, Houston, TX
"Armed Forces Institute of Regenerative Medicine"

December 2011 – Seminar Speaker, University of Hawaii School of Medicine, Honolulu, HI
"Adult Stem Cells and Nanomaterials in Skeletal Tissue Engineering and Regeneration: Developmental *versus* Regenerative Skeletogenesis"

January 2012 – Grand Rounds Visiting Professor, Department of Orthopaedic Surgery, Yale University School of Medicine, New Haven, CT
"Adult Stem Cells and Nanomaterials in Skeletal Tissue Engineering and Regeneration"

February 2012 – Workshop Director, Orthopaedic Research Society Annual Meeting, San Francisco, CA
"Building a Successful Research Program: Decisions, Victories and Pitfalls"

March 2012 – Lecturer, Academy of Osseointegration Annual Meeting, Phoenix, AZ
"Use of Stem Cells to Generate Hard and Soft Tissue"

March 2012 – Speaker, AOSSM Biologics Think Tank Meeting, Vail, CO
"Augmenting Hypovascular Tissue Repair: Cartilage Regeneration"

April 2012 – Organizer, Keystone Symposium: Regenerative Tissue Engineering and Transplantation, Breckenridge, CO
"Adult Stem Cells for Skeletal Tissue Engineering and Regeneration"

April 2012 – Lecturer, Tufts Biomedical Engineering Graduate Seminar Series, Boston, MA

"Stem Cells in Tissue Engineering and Regeneration: Biological Regulation and Application of Nanostructured Scaffolds"

May 2012 – Lecturer, University of Pittsburgh Molecular Biophysics and Structural Biology Seminar Series, Pittsburgh, PA
"Adult Stem Cells in Musculoskeletal Tissue Engineering and Regeneration: Microenvironmental Regulation and Application of Nanoscaffolds"

May 2012 – Lecturer, 2012 Rheumatology Research Workshop, Denver, CO
"The Future of Stem Cell Research"

May 2012 – Lecturer, WITE Strategies in Tissue Engineering Conference,Wurzburg, Germany
"Musculoskeletal Tissue Engineering"

June 2012 – Inaugural Lecture, Arthur J. Rooney, Sr. Chair in Sports Medicine, University of Pittsburgh, Pittsburgh, PA
"Skeletal Tissue Engineering and Regeneration: Adult Stem Cells, Nanofibrous Scaffold and Biological Regulation"

June 2012 – Keynote Lecture/Debate Leader, World Biomaterials Congress, Chengdu, China
"Skeletal Tissue Engineering and Regeneration: *Adult Stem Cells, Nanostructured Scaffold, and Microenvironmental Regulation*"
Debate Motion: "We believe that traditional oriental medicines are complementary to biomaterials in therapies for major diseases and trauma." (For)

July 2012 – Guest Lecturer, 6th Hartl-Symposium on Rheumatology and the 6th Symposium of the DFG Research Unit FRO696, Regensburg, Germany
"Regenerative Medicine in Skeletogenesis"

August 2012 – Discussion Leader, 2012 Musculoskeletal Biology and Bioengineering Gordon Research Conference, Andover, NH
"Signaling and Regulation in Musculoskeletal Growth and Regeneration"

August 2012 – Lecturer, 1st Cell Therapy Congress, Santiago, Chile
"Perspectives in Regenerative Therapy" and
"Tissue Engineering for Articular Diseases"

August 2012 – Symposium Speaker, American Cancer Society National Meeting, Polymeric Biomaterials Symposium
"Nanomaterials for Tissue Engineering"

October 2012 – Speaker, NIH Microphysiological Systems Program, Bethesda, MD
"Three-Dimensional Osteochondral Micro-Tissue to Model Pathogenesis of Osteoarthritis"

October 2012 – Keynote Speaker, TERM STEM Conference, Guimaraes, Portugal
"Skeletal Tissue Engineering and Regeneration: Adult Stem Cells, Nanostructured Scaffold, and Microenvironmental Regulation"

November, 2012 – Keynote Speaker, Chinese Orthopaedic Assoc. Annual Meeting, Beijing
"Cartilage Tissue Engineering: Principles of Development and Strategies of Regeneration" and
"How to Elevate the Prominence of Musculoskeletal Research?"

November, 2012 – Keynote Speaker, 2nd Stem Cells and Regenerative Medicine Symposium, Chinese University of Hong Kong, Shenzhen & Hong Kong
"Cell-Based Regenerative Therapies: Potential and Challenges" and
"Experimental Paradigms of Tissue Engineering and Regeneration"

January, 2013 – Keynote Speaker, Combined AAOS/ORS Symposium, Orthopaedic Research Society Annual Meeting, San Antonio, TX
"Cell-Based Regenerative Strategies for Musculoskeletal Tissues -
The Future: Opportunities for New Applications and Further Development"

February, 2013 – Keynote Speaker, University of Michigan School of Dental Medicine Research Day, Ann Arbor, MI
"Adult Stem Cells and Nanostructured Materials in Skeletal Tissue Engineering and Regeneration"

February, 2013 – Invited Speaker, "VIII Extremity War Injuries Symposium", American Academy of Orthopaedic Surgeons, Washington, DC
"Armed Forces Institute of Regenerative Medicine: Successes and Lessons Learned"

March 2013 - Speaker, Symposium on Biomedical Research Across the Continents – Insight and Innovation, Hong Kong
"Adult Mesenchymal Stem Cells: A Model for Tissue Development and Regeneration"

April 2013 - Speaker, Gordon Research Conference on Cartilage Biology and Pathology, Les Diablerets, Switzerland
"Cartilage Tissue Engineering and Regeneration: Technologies and Models"

May 2013 - Speaker, Annual Meeting of the International Society of Arthroscopy, Knee Surgery, and Orthopaedic Sports Medicine, Toronto, Canada
"Development of Innovative Biomaterials for Cartilage Tissue Engineering and Regeneration" – Instruction Course
"Adult Stem Cells for Cartilage Repair in Post-Traumatic Arthritis" - Symposium

May 2013 - Symposium Speaker, Annual Meeting American Society for Gene and Cell Therapy, Salt Lake City, UT
"Regenerative Applications of Adult Stem Cells"

June 2013 - Keynote Lecturer, Brandenburg School of Regenerative Technologies Symposium, Berlin, Germany
"Adult Stem Cells and Novel Biomaterials for Skeletal Tissue Engineering and Regeneration: Technologies and Models"

July 2013 - Keynote Lecturer, Annual Meeting of Asian Cell Therapy Organization, Hsinchu, Taiwan
"Development of Adult Stem Cells and Novel Biomaterials for Skeletal Tissue Regeneration and Disease Modeling"

August 2013 – Invited Speaker, MSC 2013, Cleveland, OH
"Adult Stem Cells and Scaffolds for Cartilage Tissue Engineering: Technologies and Models"

September, 2013 – Plenary Speaker, International Cartilage Repair Society, Izmir, Turkey
"*Future Frontiers:* Stem Cell-Based Regenerative Strategies for Musculoskeletal Tissues"

September, 2013 – Seminar Speaker, Department of Biology, Villanova University, PA
"Adult Stem Cells and Biomimetic Scaffolds for Skeletal Tissue Engineering and Regeneration"

October, 2013 – Invited Speaker, Regenerative Medicine Summit, Xian, China
"Clinical Target: Skeletal System – Functional Regeneration"

October, 2013 – Keynote Speaker, N Carolina Regenerative Medicine Society Annual Meeting
"MSCs and Biomimetic Scaffold Based Skeletal Engineering and Regeneration: Technologies and Tissue Models"

November, 2013 – Keynote Speaker, 3rd Chinese University of Hong Kong Symposium on Stem Cell Biology and Regenerative Medicine, Hong Kong
"New Frontiers of Skeletal Regeneration: Stem Cells, Extracellular Matrix, and Biomaterial Scaffolds"

November, 2013 – Invited Centennial Lecture, Erasmus University, Rotterdam, Netherlands
"Don't Replace! Repair!"

March, 2014 – Keynote Lecturer, International Chinese Musculoskeletal Research Society-Orthopaedic Research Society Annual Meeting, San Francisco
"My Musculoskeletal Research Journey from Embryos to Stem Cells to Tissue-On-A-Chip: Knowledge Gained and Lessons Learned"

March, 2014 – Keynote Lecturer, Institute of Stem Cell and Regenerative Medicine Annual Stem Cell Symposium 2014, University of Washington, Seattle
"Adult Stem Cells and Biomimetic Scaffold for Skeletal Engineering and Regeneration"

April, 2014 – Keynote Speaker, Duke Medical School MD/PhD MSTP Annual Research Symposium
"Regenerative Application of Adult Stem Cells and Biomimetic Scaffolds for Skeletal Tissues: *Science, Technologies and Tissue Models*"

April, 2014 – Seminar Speaker, Stanford University Department of Orthopaedic Surgery
"Regenerative Application of Adult Stem Cells and Biomimetic Scaffolds for Skeletal Tissues: *Science, Technologies and Tissue Models*"

April, 2014 – Keynote Lecture, Third Symposium on Regenerative Rehabilitation, University of California, San Francisco
"Regenerative Application of Adult Stem Cells and Biomimetic Scaffolds for Skeletal Tissues: *Science, Technologies and Tissue Models*"

April, 2014 – Featured Speaker, Arthritis Foundation, "*Moving Closer to a Cure"*, Pittsburgh
"Armed Forces Institute of Regenerative Medicine, Center for Military Medicine Research, and Osteoarthritis"

April, 2014 – Chair and Speaker, Workshop on "Signaling by Natural and Engineered Extracellular Matrix", Experimental Biology 2014, San Diego
"Biomimetic Scaffolds and Natural Matrices for Stem Cell-Based Tissue Engineering and Modeling"

May, 2014 – Speaker, American Academy of Orthopaedic Surgeons/Orthopaedic Research Society Research Symposium on Orthopaedic Infection
"Polymerase Chain Reaction: State of Affairs - *What Is It, and What Can We Do With It?*"

May, 2014 – Keynote Speaker, Taiwan Ministry of Science and Technology SPARK Symposium, Taipei
"Therapeutic Translation of Enabling Technologies: *Lessons Learned from Managing a National Consortium of Regenerative Medicine*"

May, 2014 – Speaker, NATO Workshop on Regenerative Medicine, Berlin, Germany
"AFIRM", "Stem Cells", and "Musculoskeletal Regeneration"

May, 2014 – Keynote Lecturer, Symposium on Regenerative Medicine, University of Nazarbayev, Astana, Kazakhstan
"Biomimetic Scaffolds and Natural Matrices for Stem Cell-Based Tissue Engineering and Modeling"

June, 2014 – Keynote Lecturer, Chinese University of Hong Kong School of Biomedical Sciences, Research Day 2014, Hong Kong
"Adult Stem Cell and Biomimetic Matrix-Based Skeletal Tissue Engineering and Regeneration: *Technologies and Tissue Models*"

June, 2014 – Keynote Speaker, Tissue Engineering Regenerative Medicine International Society – EU, Genoa, Italy
"Microphysiological Systems to Model Tissue/Organ Units: *Technologies and Tissue Platforms*"

September, 2014 – Speaker, National Institute of Aging Workshop on Tissue Repair, Rejuvenation and Aging – NIH, Bethesda
"3D Microtissue Test Platforms for Disease Modifying Agents"

September, 2014 – Keynote Lecturer, Arthritis Foundation Emerging Investigators Conference, Roanoke, WV
"Stem Cell-Based Therapies, Biomimetic Scaffolds, and 3D Printing Technologies to Combat Osteoarthritis"

October, 2014 – Keynote Lecturer, Haciteppe University, Ankara, Turkey
"Application of Stem Cells, Biomimetic Scaffolds, and 3D Printing Technologies for Tissue Engineering and Regeneration *(and more……)"*

October, 2014 – Invited Speaker, Symposium "Engineering Cell-Matrix Interactions for Musculoskeletal Tissue Engineering", American Society for Matrix Biology (presented by Tissue Engineering and Regenerative Medicine International Society), Cleveland
"Biomimetic Scaffolds for Stem Cell-Based Skeletal Tissue Engineering and Modeling"

November, 2014 – Keynote Speaker, Fifth Margaret River Forum: Stem Cell Therapy and Regeneration, University of Western Australia, Perth, Australia
"Stem Cells and Biomimetic Scaffolds for Skeletal Tissue Engineering and Modeling"

November, 2014 – Keynote Speaker, Chinese University of Hong Kong 4th International Symposium on Stem Cells and Regenerative Medicine, Hong Kong
"Regenerative Applications of Adult Stem Cells: *Repair, Renovate, and Re-create"*

November, 2014 – Keynote Speaker, American Society of Restorative Transplantation, Chicago
"Regenerative Applications of Adult Stem Cells and Biomimetic Scaffolds: *Repair, Renovate, and Re-create.*

December, 2014 – Keynote Speaker, 5th Annual Comprehensive Advanced Restorative Effort (C.A.R.E.) Summit, San Diego
"Regenerative Applications of Adult Stem Cells and Biomimetic Scaffolds: *Repair, Renovate, and Re-create"*

February, 2015 – Chair and Keynote Lecturer, First Fusion Conference on Musculoskeletal Development and Regeneration, Cancun, Mexico
"Stem Cell-Based, Engineered Osteochondral Microtissues"

April, 2015 – Seminar Speaker, Department of Biomedical Engineering, Cornell University

"Regenerative Applications of Adult Stem Cells and Biomimetic Scaffolds: *Repair, Renovate, and Re-create"*

May, 2015 – Invited Lecturer, Translational Regenerative Medicine, North Carolina State University
"Regenerative Applications of Adult Stem Cells and Biomimetic Scaffolds: *Repair, Renovate, and Re-create"*

May 2015 – Keynote Lecturer, Wisconsin Rheumatology Association Annual Meeting
"Regenerative Applications of Adult Stem Cells and Biomimetic Scaffolds: *Repair, Renovate, and Re-create"*

June, 2015 – Speaker, Musculoskeletal Research Network, Karolinska Institute, Sweden
"Trophic Activities and Microenvironmental Influences in Stem Cell Based Tissue Regeneration"

June, 2015 – Plenary Lecturer, Asia Pacific Orthopaedic Association Annual Meeting, Hong Kong
"Mesenchymal Progenitor Cells Derived from Blast-Traumatized Muscle: A Unique Cell Source for Tissue Engineering and Regeneration"
"Regenerative Applications of Adult Stem Cells and Biomimetic Scaffolds: *Repair, Renovate, and Re-create"*

June, 2015 – Keynote Lecturer, North American Veterinary Regenerative Medicine Association, Monterey, CA
"Regenerative Applications of Adult Stem Cells and Biomimetic Scaffolds: *Repair, Renovate, and Re-create"*

July, 2015 – Moderator and Speaker, Collagen Gordon Research Conference, NH
Collagen as a Biomaterial for Bioengineering
"Regenerative Applications of Adult Stem Cells and Biomimetic Scaffolds: *Repair, Renovate, and Re-create"*

September, 2015 – Invited Lecturer/Session Chair/Debate Leader, Tissue Engineering and Regenerative Medicine International Society World Congress, Boston
"Development and Application of an Osteochondral Microphysiological System"
"Application of Adult Stem Cells and Biomimetic Scaffolds for Articular Cartilage Repair"
Session: "The Regenerative Niche: Activation of Endogenous Mechanisms for Tissue Repair"
Debate Motion: "This House believes that tough regulation rather than light touch regulation will promote the most successful clinical applications of regenerative medicine." (For)

September, 2015 – Keynote Lecture, Arthritis Foundation Emerging Investigators Conference, Aurora, OH
"Regenerative Applications of Adult Stem Cells and Biomimetic Scaffolds: *Repair,*

Renovate, and Re-create"

Septmeber, 2015 – Invited Lecture, Regenerative Surgery Symposium, LifeNet Health, Virginia Beach, VA
"Functional Microtissue: The Future of Clinical Trials"

October, 2015 – Keynote Lecture, American Society for Investigative Pathology Inaugural PISA Meeting, Baltimore
"Regenerative Applications of Adult Stem Cells and Biomimetic Scaffolds: *Repair, Renovate, and Re-create"*

October, 2015 – Keynote Lecture, 4th International Society for Cellular Therapy South and Central America Regional Meeting and 3rd Chilean Congress of Cell Therapy and Regenerative Medicine, Santiago, Chile
"Regenerative Applications of Adult Stem Cells and Biomimetic Scaffolds: *Repair, Renovate, and Re-create"*

November, 2015 – Keynote Speaker, International Federation for Adipose Therapeutics and Science, New Orleans
"Regenerative Applications of Adult Stem Cells and Biomimetic Scaffolds: *Repair, Renovate, and Re-create"*

November, 2015 – Keynote Speaker, 4th Chinese University of Hong Kong Symposium on Stem Cell Biology and Regenerative Medicine, Hong Kong
"Mesenchymal Progenitor Cells Derived from Blast-Traumatized Muscle: A Unique Cell Source for Tissue Engineering and Regeneration"

November, 2015 – Seminar Speaker, University of Kansas Medical Center, Kansas City
"Regenerative Applications of Adult Stem Cells and Biomimetic Scaffolds: *Repair, Renovate, and Re-create"*

January, 2016 – Invited Speaker, Extremity War Injuries Symposium XI: *Maintaining Force Readiness During an Era of Military Transition*, American Academy of Orthopaedic Surgeons, Washington DC
"Armed Forces Institute of Regenerative Medicine II"

February, 2016 – Keynote Speaker, Second San Antonio Conference on Stem Cell Research and Regenerative Medicine, San Antonio
"Adult Stem Cells and Biomimetic Materials for Skeletal Tissue Regeneration: *Repair, Restore, and Re-create"*

February, 2016 – Chair, Osteoarthritis Clinical Trials Workshop, Arthritis Foundation/FDA, Atlanta

Feburary, 2016 – Invited Speaker, National Football League Physicians Society Annual Meeting, Indianapolis

*"*Platelet-Rich Plasma in Orthopaedics: *Science and Promises"*

March, 2016 – Invited Speaker, Perinatal Stem Cell Society Annual Conference, Aspen
"Skeletal Tissue Engineering and Modeling Using Adult Stem Cells and Biomimetic Materials: *Repair, Restore, and Re-create"*

March, 2016 – Invited Speaker, Advanced Therapeutics Targets Conference, Palma, Spain
"Skeletal Tissue Engineering and Modeling Using Adult Stem Cells and Biomimetic Materials: *Repair, Restore, and Re-create"*

April, 2016 – Keynote Speaker, Wisconsin Stem Cell Symposium – "Stem Cells in the 4th Dimension: Mechanisms of Stem Cell Aging and Maturation", Madison
"Adult Stem Cells and Biomimetic Matrices for Tissue Engineering and Modeling: *Repair, Restore, and Re-create*"

April, 2016 – Invited Speaker, Gates Stem Cell Center Seminar, University of Colorado
"Skeletal Tissue Engineering and Modeling Using Adult Stem Cells and Biomimetic Materials: *Repair, Restore, and Re-create*"

April, 2016 – Keynote Speaker, XIII National Congress of Histology and Embryology, Turkey, Cesme-Izmir, Turkey
"Developmental and Regenerative Skeletogenesis: *Principles, Strategies, Promises, and Challenges*"

May, 2016 – Clemson Award Lecture, World Biomaterials Congress, Montreal
Developmental and Regenerative Skeletogenesis: *Cells and Biomaterials*

June, 2016 – Keynote Lecture, SICOT Symposium, Wurzburg, Germany
"Skeletal Tissue Engineering and Modeling Using Adult Stem Cells and Biomimetic Materials: *Repair, Restore, and Re-create*"

September, 2016 – Keynote Lecture, 6th Comprehensive Advanced Restorative Effort (C.A.R.E.) Summit, Naval Medical Center, San Diego
"Tissue Engineering and Regenerative Medicine in Orthopaedics: *Repair, Renovate, and Re-create*"

September, 2016 – Keynote Speaker, HKU-ZIRI Inaugural Symposium, Hangzhou, China
"Design and Fabrication of Biomimetic Materials for Stem Cell-Based Tissue Engineering and Regeneration"

September, 2016 – Invited Lecturer, International Cartilage Repair Society, Sorrento, Italy
"Origin and Function of Cartilage Stem/Progenitor Cells in Osteoarthritis and Cartilage Repair"

October, 2016 – Invited Lecturer, U.S. Anti-Doping Agency, Bellevue, WA
"Design and Fabrication of Biomimetic Materials for Stem Cell-Based Tissue Engineering and Regeneration"

October, 2016 – Keynote Lecture, I INTERCAMBIO INTERAMERICANO DE CÉLULAS MADRE, Havana, Cuba
"Adult Stem Cells and Biomimetic Matrices for Tissue Engineering and Modeling: *Repair, Restore, and Re-create"*

October, 2016 – Plenary Lecture, Taiwan Orthopaedic Association, Taipei, Taiwan
"Design and Fabrication of Biomimetic Materials for Stem Cell-Based Tissue Engineering and Regeneration"

October, 2016 – Plenary Lecture, Hong Kong University International Symposium for 3D Bio-printing and Biomaterials, Hong Kong
"Design and 3D Fabrication of Biomimetic Materials for Stem Cell-Based Tissue Engineering and Regeneration"

November, 2016 – Invited Speaker, Second Havemeyer Conference on Regenerative Medicine, Bonita Springs, Florida
"Design and 3D Fabrication of Biomimetic Materials for Stem Cell-Based Tissue Engineering and Regeneration"

December, 2016 – Invited Speaker, 9th International Conference on Stem Cells and Regenerative Medicine, Guangzhou, China
"Adult Stem Cells and Biomimetic Matrices for Tissue Engineering and Modeling: *Repair, Restore, and Re-create"*

February, 2017 – Special Speaker, Experimental Surgery Research Day, McGill University, Montreal, Canada
"Application of Adult Stem Cells and Biomimetic Scaffolds for Skeletal Tissue Engineering and Modeling: *Repair, Restore, and Re-create"*

March, 2017 – Co-Organizer and Speaker, Fusion Conference on "Musculoskeletal Development and Regeneration", Cancun, Mexico
"Application of Decellularized Matrices for Tissue-Specific Engineering"

March, 2017 – Keynote Speaker, Academy of Osseointegration, Orlando, Florida
"Design and 3D Fabrication of Biomimetic Materials for Stem Cell-Based Skeletal Tissue Engineering and Regeneration"

April, 2017 – Chappel Lecture, University of Guelph, Ontario, Canada
"Stem Cells, Biomatrix, and Biomimetic Scaffolds: Skeletal Tissue Engineering and Regeneration – Repair, Renovate, and Re-create"

May, 2017 – Lecturer, "Practical Reproductive and Developmental Toxicology" sponsored by American College of Toxicology and Teratology Society, Philadelphia, PA
"Cellular and Molecular Analysis of Development"

Scientific Committees: '

1991-1995 !	Member, NIH Oral Biology and Medicine Study Section
1992-1994 !	Chairman, NIH Oral Biology and Medicine Study Section
1992-1996 !	Member, Orthopaedic Research and Education Foundation Research Grants Review Committee
1997 !	Member, Orthopaedic Research Society Annual Meeting Program Committee
1997-2000 !	Member, NIH Center for Scientific Review Advisory and Oversight Committee
2000 !	College of Fellows, American Institute of Medical and Biological Engineering
2000 !	Member, NIH CSR, Study Section Boundary Team (BMCTS IRG)
2001 !	Member, Grant Review Committee, Aircast Foundation
2002-2004	Member, Shriners Hospital for Children Research Advisory Board
2000 !	Co-organizer, Cold Springs Harbor Laboratory Tissue Engineering Workshop
2003-2005 !	Member, Clinician Scientist Development Committee, American Academy of Orthopaedic Surgeons
2004/2006/ 2008/2012	Co-organizer, "Strategies in Tissue Engineering" International Conference, Wurzburg, Germany
2005	Member, NIH Roadmap Subcommittee "Biomaterials and Regenerative Medicine"
2006	Co-organizer, "International Workshop on Skeletal Growth Plate"
2006-2010 !	Member, International Scientific Advisory Board, Wellcome Trust Res Ctr, UK
2006-2013 !	Consultant Member, Research Development Committee, American Academy of Orthopaedic Surgeons
2007 !	Subcommittee Member, NIH Working Group on Women in Biomedical Careers
2007 !	Co-Chair, Basic Research Conference, American College of Rheumatology Annual Meeting
2007 !	Member, Organizing Committee, 2nd Congress of German Society for Stem Cell Research
2007 !	Organizer, Tissue Engineering and Regeneration Symposium, NIH Research Festival
2006/2008 !	Vice Chair/Chair, Gordon Research Conference, "Musculoskeletal Biology and Bioengineering"
2008 !	Member, Steering Committee, NIH Bone Marrow Stromal Cell Transplantation Center
2008-present !	Scientific Review Board, Arthritis Research UK
2010-present !	Member, Scientific Committee, International Society of Arthroscopy, Knee Surgery, and Orthopaedic Sports Medicine
2010-2014 !	Council Member, American Society for Matrix Biology
2010-present !	Council Member, Tissue Engineering and Regenerative Medicine International Society – Americas
2010-present !	Member, Scientific Advisory Council, Regenerative Medicine Foundation
2010-2016 !	Member/Chair, Biology and Medicine Panel, Hong Kong Research Grant Council
2011/2013 !	Co-Vice Chair/Chair, Gordon Research Conference, "Cartilage Biology and Pathology"
2012 !	Co-Organizer, Keystone Symposium on "Regenerative Tissue Engineering and Transplantation"
2012 !	*Ad hoc* Member, NIH Study Section "Skeletal Biology Structure & Regeneration"

2013-2015 Member, Research Advisory Board, Arthritis Foundation
2013 *Ad hoc* Member, NIH Study Section "Biomaterials and Biointerfaces"
2014-present Co-Chair, Task Force on Cell-Based Therapies, American Society for Bone and Mineral Research/Orthopaedic Research Society
2014-present Member, Scientific Review Panel, Arthritis Research UK
2015-present Co-Chair, Fusion Conference on "Musculoskeletal Development and Regeneration"
2015-present Member, Scientific Discovery Advisory Board, Arthritis Foundation
2015-2016 Chair, Planning Committee, Arthritis Foundation "Accelerating OA Clinical Trials Workshop, 2016"

Editorial Appointments:

1992-2012 ! Advisory Editor, *Journal of Arthroplasty*
1993-2010 ! Reviewer Board, *Clinical Orthopaedics and Related Research*
1994-2004 ! Editorial Board, *Molecular Biotechnology*
1996-2006 ! Editorial Board, *Biology of the Cell*
1998-2006 ! Editorial Advisory Board, Member/Chairman, *Journal of Orthopaedic Research*
2003-present ! Founding Editor-In-Chief, *Birth Defects Research; Part C – Embryo Today*
2004-2014 ! Editorial Board, *Osteoarthritis and Cartilage*
2004-present ! Editorial Section Head, *'Musculoskeletal Repair and Regeneration*', Faculty of 1000 (Medicine)
2004-present ! Editor, *Developmental Biology Section, Biology Image Library*, BioMed Central
2006-present ! Associate Editor, *Cell Communication and Adhesion*
2006-2012 ! Editorial Board, *Matrix Biology*
2009-present ! Founding Editor-in-Chief, *Stem Cell Research and Therapy*
2011-present ! Editorial Board, *Biomaterials*
2011-present ! Associate Editor, *Stem Cell: Translational Medicine*
2012-present ! Editorial Board, *Tissue Engineering*
2013-2014 ! Guest Co-Editor, "Stem Cells" Issue in *Bone*
2015-present ! Editorial Board, *Journal of Experimental Orthopaedics*
2016-present ! Editorial Board, *FASEB Journal*

Patents and Inventions:

1. Cetyltrimethylammonium Bromide Gel Electrophoresis - US Patent No. 5,275,708
2. Biodegradable Drug Delivery System for the Prevention and Treatment of Osteomyelitis - US Patent No. 5,281,419
3. Protein Assay Using Microwave Energy - US Patent No. 5,403,747
4. Amplification-based Detection of Bacterial Infection - US Patent No. 5,654,141
5. Trabecular Bone-Derived Human Mesenchymal Stem Cells – Pending (20030050709)
6. In vitro Engineered Cartilage Constructs Produced by Coating Biodegradable Polymer with Human Mesenchymal Stem Cells – Pending (20030103947)
7. Cross-Linked Polymer Matrices, and Methods of Making and Using Same – European

Patent EP1558216, US Patent No. 8,673,333

8. Tissue Engineered Cartilage, Method of Making Same, Therapeutic and Cosmetic Surgical Applications Using Same – US Patent No. 8,202,551
9. Cell-Nanofiber Composite and Cell-Nanofiber-Hydrogel Composite Amalgam Based Engineered Intervertebral disc – US patent pending (20100179659)
10. Bioreactor Chamber Apparatus, and Method and System for Fabricating Tissue in the Bioreactor Device – US Patent No. 8,709,793
11. Bioreactor Device, and Method and System for Fabricating and Mechanically Stimulating Natural and Engineered Tissues – U.S. patent pending (20080274545)
12. Tissue Graft with Non-Aligned Fiber Matrix Retains Mesenchymal Progenitor Cells on the Non-Injury-Facing Side – US Patent No. 8,652,458
13. !A Nanofibrous Conduit Seeded with Muscle-Derived Mesenchymal Progenitor Cells as Trophic Mediators for Peripheral Nerve Regeneration – US and worldwide patents pending
14. !Regenerative Tissue Grafts and Methods of Making Same - US Patent pending (20140227339)
15. Adult Mesenchymal Stem Cells as an Adjunct Therapy for Treating Orthopaedic Infections – Invention disclosed (University of Pittsburgh, Ref. No. 02638)
16. A Visible Light-Activated Injectable Construct for Cartilage Regeneration – Invention disclosed (University of Pittsburgh, Ref. No. 03030)
17. !A Modular, Microfluidic, Mechanically Active Bioreactor for 3D, Multi-Tissue Tissue Culture – US patent pending (University of Pittsburgh, Ref. No. 3088; International patent pending, PCT/US2014/052348)
18. !Stem Cell-Based Technologies for Avian Skeletal Tissue Engineering and Regeneration – US patent pending (University of Pittsburgh, Ref. No. 03360; International Patent Pending, PCT/US2015/059005)
19. Musculoskeletal Tissue Fabrication – US Patent pending (University of Pittsburgh, Reference No. 03390; US Patent pending, 14/934,646)
20. Microfluidic Tissue Development Systems - International Patent pending (University of Pittsburgh, Ref. No. 03707; International Patent pending, PCT/US2016/055763)
21. Regenerative Tissue Grafts and Methods of Making Same - Australian Patent No. 2009320446

RESEARCH INTERESTS:

Musculoskeletal Biology, Stem Cells, Tissue Engineering and Regeneration, and Molecular Orthopaedics

The central theme of my research program concerns the development, growth, function, and health of the musculoskeletal system, the biology of stem cells, the design of smart biomaterials, and the utilization of this knowledge to develop engineering-based technologies for clinical applications that will regenerate and/or restore function to diseased and damaged musculoskeletal tissues. Projects in my laboratory cover multiple aspects of musculoskeletal biology, including embryonic development, growth factor biology, cell-biomaterial interaction, cell-matrix interaction and signaling, novel biomaterials, stem cells, cell reprogramming, tissue matrix remodeling, mechanobiology, microgravity skeletal biology, and tissue engineering and regeneration. The integrated experimental approaches combine contemporary technologies of biochemistry, cell and molecular biology, embryology and development, imaging, biomaterials, nanotechnology, 3D printing, tissue-on-a-chip, and engineering, with the central focus being the translation of these technologies to clinical applications.

SERVICE:

1. University and Medical School

1980-1987	Chair, Graduate Guidance Committee, Biology Graduate Group University of Pennsylvania
1984-1986	Member, Graduate Admissions Committee, Molecular Biology Graduate Group, University of Pennsylvania
1990-1998	Member, Graduate Admissions Committee, Biochemistry and Molecular Biology Graduate Program, Thomas Jefferson University
1992-1995	Chairman, Graduate Admissions Committee, Developmental Biology and Teratology Graduate Program, Thomas Jefferson University
1988-2001	Member, Graduate Programs of Biochemistry and Molecular Biology, Developmental Biology and Teratology, Genetics, and Microbiology and Virology, Thomas Jefferson University
1992-1995	Academic Director, M.D.-Ph.D. Program, Thomas Jefferson University
1995-1998	Chairman, Graduate Advisory Committee, Biochemistry and Molecular Biology Graduate Program, Thomas Jefferson University
1995-2001	Co-Director, NIH-sponsored Postdoctoral Research Training Program in Molecular Rheumatology and Orthopaedics, Thomas Jefferson Univ
1997-2000	Institutional Animal Care and Use Committee, Thomas Jefferson Univ
1997-2001	Director/Founder, Cell and Tissue Engineering Ph.D. Program, Thomas Jefferson University
1998-2001	Co-Director, Thomas Jefferson University and Drexel University Alliance for Biomedical Engineering (Whitaker Foundation Special Opportunity Award)
1999-2001/2004-06	Outside Examiner, Swarthmore College Honors Program
2000-2001	Faculty Promotion and Appointment Committee, Thomas Jefferson

	University
2006-2010	Member, International Scientific Advisory Board, Wellcome Trust Matrix Research Center, University of Manchester, UK
2009-2012	Member, International Advisory Committee, School of Biomedical Sciences, Chinese University of Hong Kong
2010	Member, External Advisory Committee for Life Sciences, Hong Kong University of Science and Technology
2010-present	Co-Director, Armed Forces Institute of Regenerative Medicine, Wake Forest University and University of Pittsburgh Consortium
2010-2015	Member, Advisory Committee, University of Pittsburgh Stem Cell Core
2011-2013	Member, Scientific Review Panel on Biology and Medicine, Hong Kong Research Grant Council
2012-present	Associate Director, McGowan Institute for Regenerative Medicine, University of Pittsburgh/UPMC
2012-present	Founding Director, Center for Military Medicine Research, University of Pittsburgh School of Medicine
2014-2016	Chair, Scientific Review Panel – Biology and Medicine, Hong Kong Research Grant Council

2. National Institutes of Health

1991-1995	Member, NIH Oral Biology and Medicine Study Section
1992-1994	Chairman, NIH Oral Biology and Medicine Study Section
1997-2000	Member, NIH Center for Scientific Review Advisory and Oversight Committee
2001-2006	Animal Care and Use Committee, NIAMS, NIH
2004/2005	Chair, NIAMS Intramural Retreat Committee
2004	Member, NIH Roadmap Working Group
2006-2009	Member, NIH Working Group on Women in Biomedical Careers
2008-2009	Member, Steering Committee, NIH Bone Marrow Stromal Cell Transplantation Center
2012	*Ad hoc* Member, NIH Study Section “Skeletal Biology Structure & Regeneration”
2013	*Ad hoc* Reviewer, NIH Study Section “Biointerfaces and Biomaterials”

3. Veterans Administration

2011	Reviewer, VA Rehabilitation Research & Development Center of Excellence Program